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## DEPARTMENT OF ENERGY

## 10 CFR Part 430

[Docket Number EERE-2013-BT-STD-0051]

RIN 1904-AD09

## Energy Conservation Program: Energy Conservation Standards for General Service Lamps

**AGENCY:** Office of Energy Efficiency and Renewable Energy, Department of Energy.

**ACTION:** Final rule.

**SUMMARY:** On March 17, 2016, the U.S. Department of Energy (DOE) published a notice of proposed rulemaking (NOPR) proposing standards for general service lamps (GSLs) pursuant to the Energy Policy and Conservation Act of 1975 (EPCA), as amended. DOE responds to comments received on the NOPDDA in this final rule and adopts a revised definition of GSL and other supplemental definitions.

**DATES:** The effective date of this rule is January 1, 2020.

**ADDRESSES:** The docket, which includes **Federal Register** notices, public meeting attendee lists and transcripts, comments, and other supporting documents/materials, is available for review at [www.regulations.gov](http://www.regulations.gov). All documents in the docket are listed in the [www.regulations.gov](http://www.regulations.gov) index. However, some documents listed in the index may not be publicly available, such as those containing information that is exempt from public disclosure.

A link to the docket Web page can be found at: [https://www1.eere.energy.gov/buildings/appliance\\_standards/standards.aspx?productid=4](https://www1.eere.energy.gov/buildings/appliance_standards/standards.aspx?productid=4). This Web page contains a link to the docket for this document on the [www.regulations.gov](http://www.regulations.gov) site. The [www.regulations.gov](http://www.regulations.gov) Web page contains simple instructions on how to access all documents, including public comments, in the docket.

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## I. Introduction

Title III, Part B of the Energy Policy and Conservation Act of 1975 (EPCA or the Act), Public Law 94-163 (42 U.S.C. 6291-6309, as codified) established the Energy Conservation Program for Consumer Products Other Than

Automobiles, a program covering most major household appliances (collectively referred to as “covered products”).<sup>1</sup> Subsequent amendments expanded Title III of EPCA to include additional consumer products, including general service lamps (GSLs)—the products that are the focus of this final rule.

In particular, amendments to EPCA in the Energy Independence and Security Act of 2007 (EISA 2007) directed DOE to engage in rulemakings regarding GSLs. (42 U.S.C. 6295(i)(6)(A)–(B)) EPCA, as amended by EISA 2007, directs DOE to initiate a rulemaking no later than January 1, 2014, to determine whether standards in effect for GSLs should be amended and determine whether exemptions for certain incandescent lamps should be maintained or discontinued. (42 U.S.C. 6295(i)(6)(A)(i)) The scope of the rulemaking is not limited to incandescent lamp technologies. (42 U.S.C. 6295(i)(6)(A)(ii)) Further, for this first cycle of rulemaking, the EISA 2007 amendments provide that DOE must consider a minimum standard of 45 lumens per watt (lm/W). (42 U.S.C. 6295(i)(6)(A)(ii)) If DOE fails to complete a rulemaking in accordance with 42 U.S.C. 6295(i)(6)(A)(i)–(iv) or a final rule from the first rulemaking cycle does not produce savings greater than or equal to the savings from a minimum efficacy standard of 45 lm/W, the statute provides a “backstop” under which DOE must prohibit sales of GSLs that do not meet a minimum 45 lm/W standard beginning on January 1, 2020. (42 U.S.C. 6295(i)(6)(A)(v))

In March 2016, DOE published a notice of proposed rulemaking (NOPR) that proposed a revised definition of GSL and energy conservation standards for certain GSLs (hereafter the “March 2016 GSL ECS NOPR”). 81 FR 14528 (March 17, 2016). In conjunction with the March 2016 GSL ECS NOPR, DOE also published on its Web site the complete technical support document (TSD) for the proposed rule, which described the analyses DOE conducted and included technical documentation for each analysis. The TSD also included the life cycle cost (LCC) spreadsheet, the national impact analysis spreadsheet, and the manufacturer impact analysis (MIA) spreadsheet.<sup>2</sup>

DOE held a public meeting on April 20, 2016, to hear oral comments on and

<sup>1</sup> Part B was re-designated Part A on codification in the U.S. Code for editorial reasons.

<sup>2</sup> The spreadsheets developed for this rulemaking proceeding are available at: [https://www1.eere.energy.gov/buildings/appliance\\_standards/standards.aspx?productid=4](https://www1.eere.energy.gov/buildings/appliance_standards/standards.aspx?productid=4).

solicit information relevant to the proposed rule. At this meeting, DOE heard concerns from stakeholders regarding the expansion of scope in the proposed GSL definition and DOE's approach to analyzing the 22 GSIL exemptions. In addition, DOE received written comments that reiterated concerns, and also provided additional data for DOE's consideration. Specifically, the National Electrical Manufacturers Association (NEMA) provided new data and information on the 22 exempted lamp types to inform DOE's evaluation of whether the exemptions should be maintained or discontinued as required by 42 U.S.C. 6295(i)(6)(A)(i)(II).

After the publication of the March 2016 GSL ECS NOPR, DOE analyzed the data submitted by NEMA and collected additional data where available. DOE published a notice of proposed definition and data availability (hereafter the "October 2016 NOPDDA") to: (1) Propose a revised definition of GSL; (2) announce the availability of the NEMA data and supplemental data collected by DOE; (3) request public comment on proposed definitions and compiled data; and (4) request any additional data that stakeholders may have in support of this evaluation. 81 FR 71794 (October 18, 2016). DOE also held a public meeting on October 21, 2016 to hear oral comments and solicit information relevant to the October 2016 NOPDDA.

Utility Coalition urged DOE to finalize this rulemaking before the January 1, 2017 deadline set by EISA 2007. Additionally, Utility Coalition recommended that if any of their comments would cause DOE to miss the deadline, then the comments should be deferred to the next GSL rulemaking. (Utility Coalition, No. 95 at pp. 1–2) Philips Lighting (Philips) also urged DOE to complete the rulemaking on time. (Philips, No. 96 at p. 2)

The following sections of this preamble respond to comments received on the October 2016 NOPDDA and during the NOPDDA public meeting, except those specifically related to incandescent reflector lamps, and describe the adopted GSL definition and additional data in more detail. In a separate final rule DOE is responding to comments specifically related to incandescent reflector lamps.

## II. Authority and Rulemaking Process

DOE is required under the EISA 2007 amendments to EPCA to undertake the present rulemaking. Under EPCA, DOE shall initiate a rulemaking to determine whether standards in effect for GSILs should be amended to establish more

stringent standards; and determine whether exemptions for certain incandescent lamps should be maintained or discontinued. (42 U.S.C. 6295(i)(6)(A)(i)) In addition to that mandate, DOE has the authority to qualify lamps as general service lamps upon determining that they are "used to satisfy lighting applications traditionally served by general service incandescent lamps." (42 U.S.C. 6291(30)(BB)(i)(IV))

An additional statute relevant to this rulemaking is section 312 of the Consolidated and Further Continuing Appropriations Act, 2016 (Pub. L. 114–113, 129 Stat. 2419; hereafter referred to as the "Appropriations Rider") that prohibits expenditure of funds appropriated by that law to implement or enforce: (1) 10 CFR 430.32(x), which includes maximum wattage and minimum rated lifetime requirements for GSILs; and (2) standards set forth in section 325(i)(1)(B) of EPCA (42 U.S.C. 6295(i)(1)(B)), which sets minimum lamp efficiency ratings for incandescent reflector lamps (IRLs).<sup>3</sup>

This final rule constitutes a decision on whether to maintain or discontinue various lamp exemptions and, in addition, DOE is determining that certain types of lamps should be included as GSILs because they are used for lighting applications traditionally served by GSILs. This final rule does not determine whether DOE should impose or amend standards for any category of lamps, such as GSILs or GSILs.

As discussed in more detail, DOE is grounding the first of those decisions, namely which exemptions to maintain or discontinue, on an assessment of whether lamps within a given exemption would provide a convenient unregulated alternative to lamps that will be subject to energy conservation standards. In DOE's view, EPCA exempted certain categories of lamps because, on the one hand, some lamps in those categories have specialty applications; and on the other hand, it was not clear, when these lamp provisions were enacted, whether those lamps were part of the broader lamp market to which Congress wished to apply energy conservation standards. The purpose, then, of the decision that Congress entrusted to DOE, to maintain or to discontinue a given exemption, was that DOE should assess the role of

lamps of that type in the broader lighting market, bearing in mind the evident statutory purpose of achieving energy conservation by imposing efficiency standards for general lighting.

While the statute does not expressly state a criterion by which DOE should decide which exemptions to maintain—it simply identifies one important evidentiary input, sales data—DOE understands its instruction to be that DOE should maintain an exemption if doing so would be consistent with that statutory purpose, and discontinue the exemption if it would not. To carry out that instruction, DOE has assessed for each exemption whether lamps within that exemption are readily substitutable for lamps that are already categorized as general service lamps. Sales data, as the statute directs, are an important type of evidence informing that assessment.

The discontinuation of certain exemptions will render the lamps within those exemptions GSILs, to the extent they would otherwise qualify as GSILs, and for some lamps GSILs. As the October 2016 NOPDDA observed, DOE will then either impose standards on these lamps pursuant to its authority to develop GSL standards or apply the backstop standard prohibiting the sale of lamps not meeting a 45 lm/W efficacy standard.

Commenters, chief among them LEDVANCE, objected to both the procedures that DOE undertook and the substance of what it proposed to determine. In general, LEDVANCE contended that DOE cannot make lamps subject to a given standard—whether a DOE-developed standard or the backstop—simply by undertaking a definitional exercise such as it proposed in the October 2016 NOPDDA. (LEDVANCE, No. 90 at p. 3) LEDVANCE offered multiple, connected arguments in support of that general position.

First, LEDVANCE pointed out that, in general, section 6295 requires DOE to conduct certain analyses and carry out certain procedures when it amends standards. Under section 6295(o), "[a]ny new or amended energy conservation standard prescribed by the Secretary under this section . . . shall be designed to achieve the maximum improvement in energy efficiency" that is "technologically feasible and economically justified." 42 U.S.C. 6295(o)(2)(A). DOE cannot generally prescribe a new or amended standard if it has not prescribed a test procedure for the relevant product, or if DOE determines that the standard will not result in "significant conservation of energy." 42 U.S.C. 6295(o)(3). DOE also generally cannot prescribe a new or amended standard if it finds that the

<sup>3</sup> This provision of the Consolidated and Further Continuing Appropriations Act, 2016 has been extended to the current appropriations authorization. See, The Continuing Appropriations and Military Construction, Veteran Affairs, and Related Agencies Appropriations Act, 2017 and Zika Response and Preparedness Act, 2017 (Pub. L. 114–223, 130 Stat. 908).

standard would “result in the unavailability in the United States” of a type of product “of performance characteristics . . . that are substantially the same as those generally available” at the time. 42 U.S.C. 6295(o)(4). Procedurally, in general to impose a new or amended standard, DOE must publish a proposed rule and permit 60 days of comment, and it cannot publish a final rule less than 90 days after the proposed rule. 42 U.S.C. 6295(p). In addition, DOE has typically taken various other procedural steps, such as publication of a framework document before the proposed rule, when it amends a standard.

(LEDVANCE, No. 90 at pp. 4–5) LEDVANCE observed that DOE is evidently not engaging in comparable substantive analyses with respect to its definition of GSL, and that DOE has not undertaken comparable procedures (including 60 days of comment). (LEDVANCE, No. 90 at pp. 4–6) DOE acknowledges those observations to be correct, and it considers its approach appropriate and consistent with the statute. The requirements that LEDVANCE cited apply, by their terms, only when DOE prescribes a new or amended standard. This final rule does neither. Rather, DOE is deciding which lamp exemptions to discontinue and which to maintain and determining that certain lamps should be GSLs because they are used to satisfy lighting applications traditionally served by GSILs.

DOE acknowledges, of course, that a likely consequence of DOE’s including additional lamps in the definition of GSL is that those lamps will be subject to energy conservation standards. DOE has the authority to impose standards for GSLs; and if it does not impose such standards or does not impose standards that meet a certain condition, then EPCA specifies a minimum standard of 45 lm/W. In LEDVANCE’s view, this consequence means that DOE must, before including a given lamp as a GSL, carry out the same type of rulemaking (in both procedure and substance) as it would in prescribing a new or amended standard.

DOE sees a difference between the two modes in which GSLs may be subject to standards. Where DOE develops its own energy conservation standards, it carries out the analyses that section 6295(o) calls for and provides the procedure that section 6295(p) mandates. But it does so in the course of developing the standards, just as sections 6295(o) and 6295(p) provide. The decision to include a lamp within the scope of GSLs would only be a precursor to that standards

development. If DOE does not develop its own energy conservation standards for GSLs, section 6295(i)(6)(A)(v) requires it to impose a standard of 45 lm/W. If that obligation were to come into force, DOE would not perform the section 6295(o) analyses or follow the section 6295(p) procedure to fulfill it. Because in that circumstance the statute itself would require DOE to prohibit sales of lamps below that standard, DOE would not be “prescrib[ing] a new or amended standard,” the situation in which sections 6295(o) and 6295(p) apply. In addition, reading those provisions harmoniously with section 6295(i)(6), DOE does not believe the section 6295(o) and section 6295(p) requirements were meant to apply to a rulemaking imposing the section 6295(i)(6)(A)(v) backstop. The backstop provision specifies by number a particular efficacy standard and says DOE “shall” prohibit sales of lamps below that standard. If the general standards-setting provisions applied in that context, DOE would have discretion, depending on the evidence, to conclude that the 45 lm/W standard is not technologically feasible or not economically justified (on the basis of the multiple factors, including “other factors the Secretary considers relevant,” that inform that assessment under section 6295(o)). For DOE to retain that discretion would be inconsistent with the mandatory language of the backstop.

Of course, for lamps that will be GSLs only as a consequence of this final rule, DOE is exercising some discretion that will result in those lamps being subject to some standard (potentially the backstop or some standard that DOE develops). Nonetheless, DOE does not believe that fact obligates it to engage in section 6295(o) analyses or section 6295(p) procedures for this rule—either as a matter of law or for the sake of sound decision making.

The scheme that section 6295(i)(6) establishes for GSLs differs in important ways from what is in place for consumer products in general under section 6295. For most products, DOE has discretion to develop the initial standards or to amend, in the course of periodic reviews, standards initially set by statute. Using that authority, DOE could in principle set any type of standard, such as a level of performance or a design requirement, with far-reaching consequences for the products at issue. To guide that exercise of discretion, Congress has laid out various restrictions on the standards-setting authority and substantive factors that DOE must consider. By contrast, in section 6295(i)(6), Congress expressed a

strong preference for 45 lm/W as an efficacy standard. If DOE takes no other action, that will be the standard for GSLs. Congress permitted DOE to establish different standards if DOE chooses to do so and can demonstrate that an alternative set of standards would produce at least as much energy savings. But in the rulemaking to consider whether to set different standards, DOE must consider the alternative of effectively setting a 45 lm/W standard for all GSLs, whereby DOE would simply not take the option that Congress provided for setting other standards, and instead adopt Congress’s default standard.

At the same time, Congress exempted certain lamps from the GSL definition, and included within the scope of GSLs a category that left room for some additions. In both of these areas, DOE’s authority is tightly circumscribed. With respect to the exemptions, DOE maintains or discontinues the exemptions as written. With respect to additions to the scope of GSLs, DOE can include additional lamps only if they satisfy lighting applications traditionally served by GSILs. In DOE’s view, Congress simply deferred the last details of the definition of GSL for final assessment by DOE. By postponing the decision in that manner, Congress did not implicitly invoke, with respect to its 45 lm/W, the whole machinery of DOE standards rulemaking under EPCA.

The backstop reflects a congressional determination that a 45 lm/W standard is appropriate. For DOE to conduct an independent assessment of the technological feasibility, economic justification, and other such factors for the 45 lm/W standard as applied to a given set of lamps would risk being inconsistent with that congressional determination. DOE believes that the most important consideration with respect to the scope of GSLs is whether leaving a given set of lamps outside GSLs would undermine the regulation that Congress mandated for GSLs, by making readily available an unregulated substitute for lamps that are subject to the standard. If so, DOE cannot freely conduct its own evaluation of the 45 lm/W standard in the course of defining the scope of GSLs. For DOE to exclude from the definition of GSLs a lamp that consumers can use and do use in the same way they use GSLs, and do so on the ground that the 45 lm/W standard is not sound policy for that type of lamp, would be inconsistent with the policy Congress set in enacting EISA 2007.

DOE acknowledges that paragraph (i)(6)(A) did not, upon enactment, require that the 45 lm/W default or a DOE-developed substitute apply to

lamps within the exemptions. But DOE believes it would be inconsistent with the EISA 2007 policy for DOE to decide whether to maintain or discontinue an exemption by assessing whether the 45 lm/W standard would be economically justified—in the sense of section 6295(o)—for the exempt lamps. Conducting that analysis could mean that even though a lamp is readily substitutable for GSLs, so that the lamp would serve as a loophole to GSL standards, DOE would find GSL standards not economically justified for that lamp. That conclusion would imply that GSL standards are not economically justified in themselves, which would contravene the statutory policy.

Similarly, if DOE were to conclude that a lamp is readily substitutable for GSLs, yet the GSL standard is not technologically feasible for that lamp—in the sense of section 6295(o)—that conclusion would imply that the GSL standard is not technologically feasible overall. While it may not be possible to make incandescent lamps suitable for many current applications that meet a 45 lm/W standard, and consequently the paragraph (i)(6)(A) standards may result in the elimination of incandescent lamps covered by the standards, that outcome is the evident policy set by EISA 2007 regarding energy use in lighting. Therefore it is reasonable not to engage in a section 6295(o) analysis of technological feasibility in reviewing the GSL exemptions.

DOE bases the preceding discussion on the overall structure of section 6295(i)(6). The particular language describing DOE's tasks regarding the definition of GSLs further supports DOE's conclusion. With respect to the exemptions, section 6295(i)(6)(A)(i)(II) says that DOE shall make its decision to maintain or discontinue exemptions “based, in part, on exempted lamp sales collected . . . from manufacturers.” If DOE were supposed to carry out a full section 6295(o) analysis for this decision, lamp sales would be one among very many strands of evidence; under section 6295(o) DOE is to consider factors like the operating costs of a product over its lifetime, the energy savings from a proposed standard, how the standard will affect the utility of the product, the impact on competition, and other factors. 42 U.S.C. 6295(o)(2)(B). It seems odd that, among all the things at issue in a section 6295(o) analysis, section 6295(i)(6)(A)(i)(II) would call out just one specific item, sales data. By contrast, DOE believes its task is to assess whether lamps in a given exemption are a ready substitute for lamps that are not exempt, as that assessment relies upon sales data as an

important input. Thus, the statutory reference to a decision “based, in part, on exempted lamp sales” makes much more sense under DOE's reading of the statute.

With respect to the fourth type of GSLs provided for under the statutory definition, the statute requires a specific finding. DOE can include a lamp within GSLs if it determines that such lamps satisfy lighting applications traditionally served by GSILs. 42 U.S.C. 6291(30)(BB)(i)(IV). The particularity of that finding is not consistent with the notion that DOE should, in making that finding, carry out a section 6295(o) analysis. The factual question is whether a lamp satisfies traditional GSIL applications. Questions about, for example, how a given standard would affect the lamp's operating costs do not seem relevant to that factual question.

LEDVANCE offered several arguments against DOE's interpretation of section 6295(i)(6)(A). First, LEDVANCE pointed out that in some other parts of section 6295, a decision about what products are covered is subject to section 6295(o) analysis and section 6295(p) procedures. As examples, LEDVANCE cited sections 6295(g)(7)(B) and 6295(i)(5). The former says that DOE shall publish a rule to determine “whether to amend the standards in effect for fluorescent lamp ballasts, including whether such standards should be amended such that they would be applicable to additional fluorescent lamp ballasts.” The latter requires DOE to begin a rulemaking “to determine if the standards in effect for fluorescent lamps and incandescent lamps should be amended so that they would be applicable to additional” lamps. (LEDVANCE, No. 90 at pp. 4–6)

By their terms, however, these provisions say that certain decisions about scope involve setting standards, and therefore are textually different from sections 6295(i)(6)(A) and 6291(30)(BB). That textual difference is also consistent with the preceding framework. In a section 6295(g)(7)(B) or 6295(i)(5) rule, DOE would be developing its own “amended” standard and simultaneously might be imposing that amended standard on a new set of products. That is the sort of situation in which, pursuant to the preceding explanation, sections 6295(o) and 6295(p) could come into play. Here, by contrast, DOE is conducting a circumscribed coverage decision, in light of considerations coming from sections 6291(30)(BB) and 6295(i)(6)(A), that may result in products being subject to a standard already set by Congress.

LEDVANCE also observed that in final rules in 2009 and 2015, DOE engaged in section 6295(o)-type analysis when deciding what products to subject to the standards set in those rules. (LEDVANCE, No. 90 at p. 5) However, those past situations were different from today's. Both rules were, in relevant part, responses to section 6295(i)(5). Thus, the statutory requirements were different from those at issue in this rule, for the reasons just given. And, apart from the statutory mandate, the substantive factors that were important for the decisions were different, for the preceding reasons.

LEDVANCE offered an additional statutory argument based on EISA 2007. Section 321 of EISA included a provision under which “[a]ny person may petition the Secretary to establish standards for lamp shapes or bases that are excluded from the definition of general service lamps.” DOE “shall grant a petition,” said section 321, if the evidence shows “that commercial availability or sales of exempted incandescent lamp types of have increased significantly . . . and likely are being widely used in general lighting applications” and “significant energy savings could be achieved by covering exempted products.” If DOE were to grant such a petition, then it would have to conduct a rulemaking “to determine standards for the exempted lamp shape or base,” and it would be required to complete that rulemaking “not later than 18 months after the date on which notice is provided granting the petition.” Public Law 110–140, section 321(a)(3), 121 Stat. 1579.<sup>4</sup> According to LEDVANCE, Congress would not have simultaneously prescribed this procedure and given DOE what LEDVANCE calls “nearly unfettered discretion to unilaterally remove these same exclusions without any substantive economic or technical analysis.” (LEDVANCE, No. 90 at p. 5)

DOE notes that its discretion regarding the exemptions is far from unfettered, and it rejects the notion that it is allowed to remove them, or is removing them, “without any substantive economic or technical analysis.” As laid out in the October 2016 NOPDDA, and as discussed in detail in section III.A.1, DOE's consideration of whether lamps in a

<sup>4</sup> Section 321 added this provision as paragraph 325(i)(1)(E) of EPCA. Section 322(b) of EISA purported to strike paragraph 325(i)(1) in its entirety and replace it with a different text that did not include the material previously quoted. In its consideration of the argument that LEDVANCE put forward, DOE need not resolve how sections 321 and 322 interact and what is the current status of the provisions that section 321 added to EPCA section 325(i)(1).

given exemption are ready substitutes for lamps already considered GSLs reflects a range of factors. For example, DOE has considered sales data as evidence of how lamps are being used. These considerations are not the same as the analysis DOE would conduct in developing an amended standard, but it is incorrect to suggest that DOE has performed no substantive analysis at all.

In any case, the language in EISA section 321 is more consistent with DOE's understanding of its current task. DOE notes that the petition process was to proceed in two stages. First, DOE was to decide whether to grant a petition. The statute laid out certain criteria for that decision, including whether a given lamp type is likely being widely used in general lighting applications. Those criteria are different from the considerations described in 42 U.S.C. 6295(o). Second, if DOE granted a petition, it was to conduct a rulemaking to decide what standards to impose. Presumably, DOE would conduct a section 6295(o) analysis in evaluating standards at that point. But the section 321 language clearly distinguishes the two stages: It instructs DOE to do a standards-setting rulemaking "if" it grants a petition, and to complete the rulemaking within 18 months "after the date on which notice is provided granting the petition." Evidently, the decision on the petition itself is not a rule prescribing standards. Similarly and by analogy, the current rule defines what are GSLs, and is not a rule prescribing standards to which sections 6295(o) and 6295(p) apply.

LEDVANCE further contended that the adoption of the petition process forecloses DOE's authority to maintain or discontinue exemptions as it does in this rule. (LEDVANCE, No. 90 at p. 5) However, section 321 itself provided both mechanisms: The response to petitions and the decision whether to continue or maintain exemptions.<sup>5</sup> Section 321 established certain procedures and criteria for responding to petitions. For the second type of decision, it did not prescribe the same considerations, either explicitly or by reference.

DOE does not read 42 U.S.C. 6295(i)(6)(A)(i)(II) to implicitly invoke the same considerations. The petition process is distinct and independent from the decision to discontinue an exemption. When DOE discontinues an exemption, the previously exempted

lamp is included among GSLs. By contrast, the petition provision from EISA section 321 does not suggest that DOE would end an exemption, thus rendering a type of lamp a GSL. To the contrary, the petition process applies only to lamps that *are* exempted. Through that process, DOE could, if the petition satisfies certain prerequisites, establish standards even though the lamps are exempted from being GSLs. Further, because discontinuing an exemption under section 6295(i)(6)(A)(i) causes the affected lamps to be GSLs, the lamps become susceptible to the backstop GSL standard; and, if DOE establishes GSL standards to substitute for the backstop, it must include the formerly exempt lamps in its analysis of whether the substitute standards are adequate. By contrast, the petition process from EISA section 321 does not purport to be part of the GSL standards-setting process. Indeed, the section 321 language specifically requires DOE to assess whether sales of a given lamp have "increased significantly since the date on which the standards on general service lamps were established." Thus, the section 321 process is only available after the initial GSL standards process. Then, after granting a petition, DOE would establish whatever standard was appropriate in the circumstances, without regard to the 45 lm/W backstop. In short, the petition process would be a separate mechanism, under which DOE had considerably more latitude regarding standards than it does for GSLs. Accordingly, EISA section 321 prescribed specific gating criteria before DOE could grant a petition.

To be sure, the fundamental concerns motivating the petition process and the authority granted to DOE to discontinue exemptions seem to be similar. The purpose of both, DOE believes, was to ensure that unregulated lamps do not present a loophole that would undermine the effect and purpose of energy conservation standards. To fulfill that purpose with respect to the exemptions, DOE is discontinuing an exemption if, considering sales data and technical features, it concludes that lamps within the exemption are already used in general lighting applications or are ready substitutes for GSLs. That analysis is comparable to what the petition provision prescribed. But it is not identical, because the processes are not identical.

The analysis DOE has conducted is more appropriate for the current decision, and indeed, the analysis that EISA section 321 describes would not be appropriate. EISA section 321 states that the Secretary shall grant a petition if "the petition presents evidence that

demonstrates that commercial availability or sales of exempted incandescent lamp types have increased significantly since the standards on general service lamps were established." DOE understands the point of that assessment to be that if lamp sales have increased significantly since the establishment of standards, that increase may show the lamp has become a less regulated alternative to GSLs. Thus, the baseline—the volume of sales when standards were established—is critical for the analysis. At this point, when no standards have yet been established, the sales analysis described in EISA section 321 would not be possible. DOE could assess whether sales of a lamp have increased in recent years, but increases or decreases, without reference to the baseline and the establishment of standards, would not demonstrate in the same way that a lamp has become a loophole to GSL standards.

The other substantive criterion for granting an EISA section 321 petition is whether "significant energy savings could be achieved by covering exempted products." As explained, the various conditions in the EISA section 321 petition provision do not apply to this final rule, because the paragraph (i)(6)(A)(i) decision about exemptions is different. Nonetheless, DOE acknowledges that it would not choose to discontinue an exemption unless doing so could achieve significant energy savings compared to maintaining the exemption. As discussed in the sections that follow, discontinuing the exemptions described in section III.A.1 could indeed lead to significant energy savings. As shown in Table III.1, six of the lamp categories for which DOE discontinued an exemption have annual sales that are several times the sales of the 15 lamp categories for which DOE maintained the exemption. The seventh lamp exemption that DOE is discontinuing, shatter-resistant lamps, presents a significant risk of lamp switching and maintaining its exemption could otherwise undermine potential standards for general service lamps.

Fourth, LEDVANCE urged that the D.C. Circuit's decision in *Hearth, Patio & Barbecue Ass'n v. U.S. Department of Energy*, 706 F.3d 499 (D.C. Circuit 2013), forecloses DOE from altering a product definition in a way that will have standards consequences without performing a section 6295(o) analysis. (LEDVANCE, No. 90 at p. 6) The *Hearth, Patio & Barbecue* opinion did not say so on its face. The case involved a question of whether DOE's inclusion of decorative fireplaces within the definition "direct heating equipment"

<sup>5</sup> The apparent conflict between sections 321 and 322 of EISA does not affect EPCA section 325(i)(6)(A), the provision that is the basis for DOE's decisions on the various exemptions. EISA section 321 added section 325(i)(6), and section 322 did not alter it.

was impermissible; the court held that DOE's interpretation of "direct heating equipment" to permit that coverage was unreasonable. However, LEDVANCE argued that the case was "analogous" to the current situation, in that "altering a definition to change what falls within . . . a category of regulated products . . . 'is the essence of regulation.'" (LEDVANCE, No. 90 at p. 6 [quoting 706 F.3d at 508]). DOE does not consider the analogy sound. To be sure, this final rule is a species of regulation, and will bring certain products newly within the scope of regulation as GSLs. But the question, as ever in such matters, is what sort of regulation the statute authorizes, and what considerations and procedures it prescribes as prerequisites. LEDVANCE's comment suggests that because it has labeled sections 6295(o) and 6295(p) the "Rulemaking Requirements," DOE must comport with those provisions every time it engages in regulation under EPCA. Having considered the specific statutory provisions that authorize this rule, as discussed, DOE concludes that it is not obligated to conduct this rulemaking as though it were "prescrib[ing] a new or amended standard" pursuant to section 6295(o) or 6295(p).

LEDVANCE raised a second category of objection to the process by which it anticipated DOE would reach this final rule. Noting that DOE had proposed in March 2016 to amend standards for GSLs, and that the October 2016 NOPDDA seemed to contemplate finalizing a definition for GSLs without finalizing a standards amendment based on the March 2016 GSL ECS NOPR, LEDVANCE stated that DOE cannot bifurcate those procedures. (LEDVANCE, No. 90 at p. 3) In LEDVANCE's view, the statute does not permit DOE to issue multiple notices proposing different aspects of its GSL decisionmaking—whether to amend standards and whether to discontinue the exemptions. LEDVANCE contends that DOE must conclude those determinations in a single final rule, and that by finalizing amendments to the GSL definition, DOE is impermissibly circumventing EPCA rulemaking requirements and the Appropriations Rider. (LEDVANCE, No. 90 at p. 3) (LEDVANCE also argues, in what DOE takes to be an alternative argument, that lamps that qualify as GSLs only because of this final rule will not in fact be subject to the backstop standard; in this line of argument, LEDVANCE says the backstop standard can only apply to lamps that were already subject to standards.) Further,

LEDVANCE commented that DOE failed to provide appropriate notice of the standards that would apply to lamps considered under the October 2016 NOPDDA and that DOE must provide, in detail, the content and basis of a proposal to allow for meaningful and informed comment. (LEDVANCE, No. 90 at pp. 11–12)

DOE believes that EPCA does permit flexibility with respect to the rulemaking process it undertakes under section 6295(i)(6)(A)(i). Clause (i) says that DOE "shall initiate a rulemaking procedure" to make two distinct decisions: Whether to amend standards, and whether to maintain or discontinue exemptions. Because the statute says "a . . . procedure," LEDVANCE appears to believe it permits only a single NOPR and a single final rule. However, the general presumption in interpreting a federal statute is that the singular encompasses the plural. 1 U.S.C. 1. Thus, a reference to "a . . . procedure" would ordinarily permit a single procedure or multiple procedures.

DOE recognizes that context can lead in some instances to a contrary conclusion that a singular word truly means the singular and not the plural. But DOE has not identified any such contextual clues with respect to section 6295(i)(6)(A). Indeed, it would be unusual and counterproductive for a statute to restrict an agency to a single NOPR and a single final rule to achieve a specified objective. The decisions with which section 6295(i)(6)(A) tasks DOE are complex. DOE, like other agencies, often supplements its proposals with additional proposals and notices of further data and analysis. Yet if "a . . . procedure" permitted only a single proposal, then if DOE failed to prepare and assemble all of its analyses into a single proposal document the entire 6295(i)(6)(A) enterprise would fail for lack of authority. It seems unlikely that, having called for the 6295(i)(6)(A) assessments, Congress intended to make it so uncertain whether they could be achieved.

Further, even if "a rulemaking procedure" only permitted a single procedure, the statute leaves unclear what constitutes a "rulemaking procedure." LEDVANCE appears to take for granted that a "rulemaking procedure" consists of a single notice and a single final rule. But that is not the evident and unambiguous, or even the best, understanding of the phrase. A "rulemaking procedure" may include multiple notices and lead to multiple final rule documents, as and when appropriate under the circumstances. For example, in *Airtouch Paging v. FCC*, 234 F.3d 815 (2d Cir. 2000), the FCC

followed a proposed rule with "two principal reports and orders"; after a petition for reconsideration the agency issued a third order, in which it announced that it would take up certain issues in yet further orders. The court described this series of events as "a rulemaking procedure." Of course it was not significant in that case whether the several reports and orders constituted a single procedure or multiple procedures. But that is consistent with DOE's conclusion here. Whether to conceive of a set of proposals and decisions as a single "rulemaking procedure" or as several "rulemaking procedures" is rarely important. To infer that because section 6295(i)(6)(A) uses the singular form, DOE can only issue a single proposal and a single final rule, would read far too much precision into the concept of a "rulemaking procedure." DOE declines to do so, especially given how—as discussed—that interpretation would undermine the purposes of section 6295(i)(6).

LEDVANCE suggests that the entire scheme of section 6295(i)(6) requires DOE to make its decision in a single integrated rulemaking. According to LEDVANCE, DOE is required to decide what standards to apply to GSLs in the same rule in which it decides what lamps will be GSLs. The backstop standard would come into play only if the standards that DOE has set do not "produce savings that are greater than or equal to the savings from a minimum efficacy standard of 45 lm/W." That savings analysis, LEDVANCE asserts, must be holistic and market-wide rather than product-by-product. In other words, to avoid the backstop standard DOE need not impose a standard of 45 lm/W on each and every GSL. Rather, DOE can impose a more or less stringent standard on various types of lamps so long as the aggregate savings are at least the same as a uniform 45 lm/W standard would have achieved. Because, LEDVANCE says, DOE cannot know what overall savings its standards will achieve unless it knows what lamps will be subject to GSLs, it follows that DOE must define GSLs and set standards in the same final rule.

This argument does not lead to the conclusion LEDVANCE seems to draw. If, indeed, DOE were prohibited from imposing the 45 lm/W backstop standard unless it had conducted an overall market savings analysis, and if that analysis were impossible without defining the scope of GSLs, it would only follow that DOE must define GSLs before imposing the backstop standard. Once DOE had defined GSLs, it could decide what standards to impose, then conduct the savings analysis that

LEDVANCE stated is required. DOE does not see why this analytical process would have to take place in a single final rule. LEDVANCE may be suggesting that it is unavoidably arbitrary and capricious for DOE to include a lamp as a GSL without simultaneously deciding what standards will apply. But DOE regards those questions as analytically distinct. Its task with respect to the exemptions is to determine which among the lamps currently exempted from regulation as GSLs should be brought within the scope of the GSL definition and the applicable EPCA standards-setting authority. In that decision, the relevant issue is whether maintaining or discontinuing an exemption would better serve the purposes of section 6295(i)(6). As discussed, DOE believes an exemption should be discontinued if lamps within that exemption would be convenient substitutes for GSLs, so that exempting the lamps entirely from regulation (or maintaining a less stringent standard for the lamps) would open up a possibility for manufacturers and consumers to undercut EPCA lamp standards. That potential loophole would exist and be damaging regardless what standards DOE might then apply to the formerly exempted lamps or to other GSLs.

Moreover, LEDVANCE's argument seems premised on a notion that EPCA obligates DOE to develop standards for GSLs and then analyze the overall energy savings from those standards, and that absent the development of standards and an analysis that results in insufficient savings, the backstop standard would not be applicable. The statutory language and structure do not support that premise. Section 6295(i)(6) requires DOE to "initiate" a rulemaking procedure to decide whether to amend the GSL standards and to decide whether to maintain or discontinue lamp exemptions. It does not, by its plain terms, require DOE to conclude that rulemaking procedure via a final rule on either topic, except in one case. If DOE "determines that the standards in effect for [GSLs] should be amended," then DOE must publish a final rule doing so. (42 U.S.C. 295(i)(6)(A)(iii)) To be clear, DOE infers, from the language instructing it to initiate a rulemaking procedure, that EPCA authorizes it to complete the rulemaking by issuing final rules taking one or more of the actions on which section 6295(i)(6)(A)(i) calls for rulemaking. Otherwise the mandate to initiate a rulemaking would be pointless. It does not follow, and DOE does not infer, that DOE *must* issue final

rules on each of those items—aside, of course, from the circumstance just mentioned in which DOE determines GSIL standards should be amended.

The structure of section 6295(i)(6)(A) itself is consistent with DOE's interpretation. DOE notes that the statute explicitly and specifically requires DOE to issue a final rule in one particular situation. If the statute were meant to require DOE to issue 6295(i)(6)(A) rules regardless, it would presumably have said so rather than identifying that particular circumstance. (Conversely, reading section 6295(i)(6)(A)(iii) to require DOE to finalize the subparagraph (i) rules in all circumstances would make superfluous the clause in subparagraph (iii) that specifies a particular circumstance.)

The structure of section 6295 overall also supports DOE's interpretation. Repeatedly, the section specifies a point at which DOE must issue a proposed rule, and it follows that instruction with a requirement to publish a final rule. For example, subsection (b)(3) says DOE "shall publish a proposed rule" by a certain date on whether to amend refrigerator standards; it then says DOE "shall publish a final rule" by a second date "which shall contain such amendment, if any." (42 U.S.C. 6295(b)(3)(A)(i)) Subsection (m) says that within six years after amending a given standard, DOE shall publish either a notice of a determination that the standard does not at that time need to be amended, or "a notice of proposed rulemaking including new proposed standards." If DOE publishes the second type of notice, then within two years it "shall publish a final rule amending the standard." (42 U.S.C. 6295(m)) As a third example (among many that could be cited), if DOE receives a petition for an amended standard, it must publish a notice either granting or denying the petition. If it grants the petition, it must within three years publish either "a final rule that contains the new or amended standards" or "a determination that no new or amended standards are necessary." (42 U.S.C. 6295(n))

Thus, throughout section 6295, the statute distinguishes an obligation to propose a rule from an obligation to publish a final rule. When Congress wanted to require DOE to publish a final rule, it specified the conditions in which the requirement holds; the deadline for the final rule; and something about the content (*e.g.*, a final rule that includes amended standards). Section 6295(i)(6)(A) follows that pattern quite closely. It says that if DOE decides GSIL standards should be amended (the conditions leading to the

requirement), then by January 1, 2017 (the deadline), DOE must publish a final rule with an effective date at least three years later (the content). Given that pattern, DOE believes the most sensible interpretation of section 6295(i)(6)(A) is that it means exactly what it says. DOE was required to initiate rulemaking to decide whether to amend GSL standards and to decide which exemptions to maintain or to discontinue. DOE is only obligated to issue a final rule if it decides that GSIL standards should be amended. DOE has fulfilled the obligation to initiate a rulemaking through the publication of a notice announcing the availability of a framework document for general service lamps. 78 FR 73737 (December 9, 2013). It has not thus far concluded that GSIL standards should be amended, and therefore nothing in EPCA currently obligates DOE to issue a final rule amending GSL standards.

LEDVANCE contended that DOE cannot finalize a rule pursuant to section 6295(i)(6)(A)(i)(II)—regarding the exemptions—without finalizing a rule under subclause (I) on amending standards, because it cannot exercise the two authorities independently. (LEDVANCE, No. 90 at p. 8) But LEDVANCE identifies no language in EPCA that would impose such a restriction. As discussed, DOE does not believe paragraph (6)(A) requires it to complete a standards-setting rule at all. The regulatory program that EISA 2007 established was a preference and presumption for a 45 lm/W standard. The statute gives DOE the option to establish an alternative set of standards, on condition that those standards achieve energy savings at least as great as the 45 lm/W standard would. At the same time, Congress set some exemptions from the GSL regulatory scheme, and it authorized DOE to discontinue those exemptions if appropriate. Nothing in this framework would necessitate DOE's exercising the authorities just described in a single final rule. Consistent with that understanding of the policy underlying paragraph (6)(A), the text of the statute does not say DOE must do so.

LEDVANCE did contend that clause (iv) can support an inference that DOE must consider amended standards and discontinued exemptions in a single document. Clause (iv) says that DOE "shall consider phased-in effective dates under this subparagraph after considering" various economic issues such as "the impact of any amendment on manufacturers." In LEDVANCE's view, Congress would not have required DOE to consider those economic factors in isolation. That Congress specified



those factors therefore, LEDVANCE continued, demonstrates that Congress intended DOE to consider the section 6295(o) factors in a unitary rule about GSLs. (LEDVANCE, No. 90 at p. 8)

DOE regards that inference as inconsistent with the text of subparagraph (A) and with its purposes. Clause (iv) refers to “the impact of any amendment.” Evidently clause (iv) comes into play when DOE is considering an amendment to standards. Consistent with that understanding, clause (iii) says that if DOE decides to amend the standards, the final rule shall be published by January 1, 2017, “with an effective date that is not earlier than 3 years after the date” of publication. 42 U.S.C. 6295(i)(6)(A)(iii). Thus, when DOE establishes amended standards pursuant to subparagraph (A), it has discretion to set the effective date of the amendment (subject to the limitation that the effective date cannot be sooner than three years after publication). Clause (iv), then, instructs DOE, in the exercise of that discretion, to consider phased-in effective dates in light of certain factors like “the impact of [the] amendment.” However, if DOE fails to complete a rulemaking in accordance with clauses (i) through (iv) or if the final rule does not produce savings that are greater than or equal to the savings from a minimum efficacy standard of 45 lm/W, clause (v) says that DOE “shall prohibit” sales of lamps below the backstop standard “effective beginning January 1, 2020.” In that case, DOE would not have discretion regarding the effective date of the backstop standard. It would be odd, then, for the statute to require DOE to consider phased-in dates for the backstop. Clause (iv) can readily be interpreted to avoid that inconsistency.

Thus, all that clause (iv) requires is that DOE consider phased-in effective dates if and when it establishes amended standards under subparagraph (A). It seems like a *non sequitur* to conclude, from that requirement, that DOE must establish amended standards. That conclusion would be particularly strained in light of the preceding observation that Congress regularly in section 6295 specified when DOE must initiate and when it must conclude a rulemaking. If the intent was to require DOE to issue a final rule on amended standards, the ordinary way to set that requirement in EPCA would have been to say exactly that. To imply it, via the discussion of phased-in effective dates, would be an unusual and obscure way to require DOE to amend GSL standards. And, as discussed, DOE does not believe the policy of paragraph (6)(A) is that DOE must establish GSL standards.

Rather, Congress established a presumptive standard of 45 lm/W and allowed DOE, if it met the qualifications, to vary from that standard. Reading clause (iv) to apply only if DOE does vary from the 45 lm/W standard is consistent with that policy.

As an alternative argument, LEDVANCE suggested that even if DOE can issue this rule discontinuing certain GSL exemptions, the backstop would not apply to the formerly exempted lamps because there were no “standards in effect” for those lamps at the time of the rulemaking. (LEDVANCE, No. 90 at p. 8) DOE notes that the phrase “standards in effect” does not appear in clause (v), the text that describes the backstop. However, DOE takes LEDVANCE’s argument to be as follows. Clause (i)(I) instructs DOE to initiate a rulemaking to decide whether to amend “standards in effect for general service lamps.” Under clause (iii), if DOE decides that “the standards in effect” should be amended, it must publish a final rule to that effect by January 1, 2017. Clause (v) imposes the backstop “[i]f the Secretary fails to complete a rulemaking in accordance with clauses (i) through (iv).” Because such a rulemaking would be amending “the standards in effect,” and no standards were previously “in effect” for lamps that are currently exempt from being GSLs, LEDVANCE seems to be saying, the rulemaking “in accordance with clauses (i) through (iv)” cannot be about the standards for the previously exempt lamps. Therefore, LEDVANCE seems to infer, the backstop would not apply to those lamps.

However, the backstop provision does not limit itself to lamps for which standards were in effect. The status and content of the “rulemaking in accordance with clauses (i) through (iv)” determine whether the backstop will apply. But if it does, clause (v) says DOE shall prohibit the sale of “any general service lamp” that does not meet the backstop standard. The word “any” sweeps in all general service lamps, including those that were exempt before DOE discontinued an exemption. Clause (v) describes a prospective standard; it does not limit its scope to lamps that were subject to standards *before* the “rulemaking in accordance with clauses (i) through (iv).”

Moreover, LEDVANCE’s argument, as DOE understands it, risks making clause (i)(II) pointless. The argument would logically imply that DOE can only, under clause (i)(I), amend standards that were already “in effect”; thus, on LEDVANCE’s argument, DOE would not

be able to establish standards applicable to lamps for which it discontinued exemptions. If that were so, and if (as LEDVANCE posits) the backstop would not apply to those lamps either, there would be little point in discontinuing the exemption. DOE considers it more sensible and more consistent with the policies of paragraph (6)(A) to read clause (i) to permit it to establish standards for previously exempt lamps.

As a third category of objection, LEDVANCE stated that paragraph (6)(A) requires DOE to conduct a “fleet-wide analysis” of total energy savings from standards established by DOE. Under clause (v), after DOE sets its own standards pursuant to clauses (i) through (iv), the backstop would come into force if DOE’s standards do not “produce savings that are greater than or equal to the savings from” a uniform 45 lm/W standard. 42 U.S.C. 6295(i)(6)(A)(v). According to LEDVANCE, the “fleet-wide energy savings determination is integral to the EISA Rulemaking Proceeding and is a prerequisite to application of the EISA backstop provision.” (LEDVANCE, No. 90 at p. 9)

DOE notes that a “fleet-wide energy savings determination” is not in fact an exclusive prerequisite to the backstop. Under clause (v), DOE will be obligated to effectuate the backstop in either of two circumstances: If the energy savings from standards that DOE develops are insufficient, or “if the Secretary fails to complete a rulemaking in accordance with clauses (i) through (iv).” Thus, clause (v) expressly contemplates the possibility that DOE will not finalize a rule that develops alternative standards for GSLs. In that case, clause (v) by its text does not call for an analysis of energy savings; and of course there would be no energy savings to analyze. This structure is consistent with the understanding of paragraph (6)(A) as laid out before, that it sets 45 lm/W as a default and gives DOE the option—not the obligation—to develop alternative standards for GSLs. Thus, DOE disagrees that it must analyze fleet-wide energy savings from a DOE-imposed standard; and DOE disagrees that a rule defining GSLs is improper without an analysis of hypothetical DOE-imposed standards.<sup>6</sup>

<sup>6</sup> LEDVANCE observed that under section 6295(o)(2)(B)(III), DOE must, in developing a standard, consider the “total projected amount” of energy savings; and LEDVANCE said DOE has typically “conducted a lifetime energy savings analysis for the entire class of covered products at issue.” (LEDVANCE, No. 90 at p. 9.) DOE need not address whether an analysis of energy savings pursuant to clause (v) would be on a similar basis, because DOE has not, at this point, developed

LEDVANCE suggested that it would also be impermissible for DOE to apply the backstop to lamps newly included in the definition of GSLs for a reason arising from the Administrative Procedure Act: That DOE did not provide adequate notice that application of the backstop would be a consequence of defining certain lamps to be GSLs. (LEDVANCE, No. 90 at p. 16) However, the October 2016 NOPDDA said that if DOE does not complete a standards rulemaking pursuant to clauses (i) through (iv), the backstop standard will come into effect for GSLs. 81 FR 71794, 71795 (October 18, 2016). It pointed out that when it discontinues an exemption, the lamps within that exemption will become GSLs (to the extent they otherwise fall within the definition of GSL). *Id.* at 71798. And DOE proposed “to discontinue a given exemption if the continuation of the exemption would undermine the 45 lm/W standard by providing a convenient unregulated alternative to GSLs.” *Id.* at 71799. Thus, an important premise of the decision as set forth in the notice was that DOE would include lamps as GSLs if it was important—in light of the considerations described in the notice—to ensure those lamps would be subject to the clause (v) backstop provision. Thus, DOE believes it provided adequate notice of the possibility that lamps newly included as GSLs would be subject to regulation as GSLs, including the clause (v) backstop provision if that becomes the standard for GSLs. DOE notes that many commenters, including LEDVANCE, discussed the issue in written comments and at the NOPDDA public meeting, indicating they were indeed aware of it.

A fourth category of objection, raised by LEDVANCE and by other commenters, was that DOE is not authorized to discontinue the exemptions set forth in section 6291(30)(D)(ii) and (BB)(ii)—the 22 exemptions for particular types of lamp that the notice discussed. (LEDVANCE, No. 90 at pp. 12–13) DOE notes that clause (i)(II) instructs DOE to initiate a rulemaking to decide whether “the exemptions . . . should be maintained or discontinued.” This language, particularly the reference to “*the*” exemptions, strongly suggests that Congress had a particular set of exemptions in mind about which DOE might make this decision. Consistent with ordinary principles of statutory interpretation and in order to fulfill the purposes of paragraph (6)(A), DOE is inclined to identify exemptions that it

energy standards for which that analysis would be necessary.

can maintain or discontinue pursuant to clause (i)(II).

LEDVANCE argued that the “exemptions” at issue are the exemptions that EISA section 321(a)(3) authorized DOE to grant, upon petition. (LEDVANCE, No. 90 at p. 13) DOE does not believe those are the exemptions to which clause (i)(II) refers. Clause (i)(II) calls for a rulemaking, initiated by January 1, 2014, to decide whether “the exemptions” should be maintained or discontinued; that mandate presumes that “the exemptions” at issue existed as of January 2014. But the discretionary exemptions that EISA section 321(a)(3) permitted would only exist if persons had petitioned for exemptions, and if DOE had then granted those petitions. Were clause (i)(II) referring to those exemptions that might or might not exist at the beginning of 2014, a more natural phrasing would have been something like “any exemptions under this subsection.” Further, DOE could only grant an exemption under the process described in EISA section 321(a)(3) if it found, after a hearing, “that it is not technically feasible to serve a specialized lighting application . . . using a lamp that meets the requirements of this subsection,” and also found that “the exempted product is unlikely to be used in a general service lighting application.” Thus, to grant an exemption under that process DOE would have to engage in an assessment of specific technical issues. It seems unlikely, and contrary to the purpose of that petition process, that Congress would have called for DOE to initiate an overall rulemaking to decide whether to continue any exemptions it might have granted. Such a review would seem particularly odd because, given the timing of the requirements set in EISA section 321, DOE would not have received any petitions earlier than 2011. (In fact, DOE has not received any such petitions.) The clause (i)(II) rulemaking was to begin just a few years later. It seems unlikely that the technical facts underlying DOE’s decision on a petition would have changed in such a brief time.

Given DOE’s understanding of the framework Congress set up for GSLs, as described, DOE believes it is more consistent with the purposes of the statute to read “the exemptions” as referring to the lamp types that the original definition said are not GSILs or are not GSLs. Unlike lamps that DOE might exempt under the EISA section 321(a)(3) petition process, there has been no determination that these lamp types are unlikely to be used for general service lighting. DOE believes Congress

deferred that determination for DOE’s later assessment under clause (i)(II).

LEDVANCE did not identify any other exemptions to which clause (i)(II) might refer. However, DOE has also considered whether clause (i)(II) might address solely an exemption provided by an amendment in EISA section 322.<sup>7</sup> That amendment imposed minimum efficiency standards on certain general service fluorescent lamps and incandescent reflector lamps. In delimiting the coverage of those standards, it said that “the standards specified in subparagraph (B) shall not apply to the following types of incandescent reflector lamps”: ER30, BR30, BR40, or ER40 lamps rated at 50 watts or less; BR30, BR40, or ER40 lamps rated at 65 watts; and R20 lamps rated 45 watts or less. DOE does not believe clause (i)(II) is solely about these exemptions. Clause (i)(II) in subparagraph (6)(A) is paired with clause (i)(I), which calls for a general rulemaking to review standards for GSLs across the board. It seems unlikely that, together with that broad-based rulemaking, Congress would have mandated a rulemaking just to assess the specific, narrow exemptions from the IRL standards set by EISA section 322. It bears mention that the scope of that rulemaking would be particularly narrow. Clause (i)(II) refers to “the exemptions for certain incandescent lamps,” but according to the definition of “incandescent lamp” only reflector lamps above 40 watts are incandescent lamps. 42 U.S.C. 6291(30)(C)(ii). Thus, the “incandescent lamps” exempted from the EISA section 322 standards are only ER30, BR30, BR40, or ER40 lamps between 40 and 50 watts; BR30, BR40, or ER40 lamps of 65 watts; and R20 lamps between 40 and 45 watts. While DOE has determined to address the exemption for IRLs in a separate document (discussed later in this section), limiting consideration of the exemptions only to this narrow set of lamp types would be an odd focus for a rulemaking alongside the broad clause (i)(I) standards review.

One commenter suggested that the clause (i)(II) authority to discontinue exemptions relates only to five types of lamps addressed by section 6295(I)(4). That paragraph requires DOE to collect sales data on five types of lamps (rough service lamps, vibration service lamps, 3-way incandescent lamps, 2,601–3,300

<sup>7</sup> As noted, EISA sections 321 and 322 made conflicting amendments to section 325(i)(1) of EPCA. In assessing whether clause (i)(II) refers solely to the exemptions stated in the EISA section 322 amendment, DOE need not resolve the conflict; DOE assumes for purposes of argument that the EISA section 322 amendments are part of EPCA.

lumen general service incandescent lamps, and shatter-resistant lamps), and construct a model to extrapolate sales after 2006 from historical sales. 42 U.S.C. 6295(I)(4). For each type, if annual sales grow to be more than 100 percent above the extrapolated historical sales would have been, DOE is required to establish either a backstop mandated by the statute or come up with its own energy conservation standard.

DOE does not believe section 6295(i)(6)(A)(i)(II), which requires DOE to initiate a rulemaking on whether to maintain or discontinue “the exemptions for certain incandescent lamps,” refers to this framework of comparisons to forecast sales. The language of section 6295(I)(4), unlike that of section 6291(30)(D)(ii) and (BB)(ii), does not seem to describe exemptions. Paragraph (I)(4) simply says DOE “shall prescribe an energy efficiency standard” for the five types of lamp “in accordance with this paragraph.” It does not purport to exclude the five lamp types from being GSILs or GSLs; it simply sets a framework including a default standard for when sales grow more than expected. By contrast, section 6291(30)(D)(ii) and (BB)(ii) actually say certain lamps are “not included” as GSILs or GSLs; that language sounds much more like an exemption. Furthermore, subsection (I)(4) specifies conditions and timing for when DOE is to undertake a rulemaking for each of the five lamp types. It would be odd if subsection (i)(6)(A) required DOE to assess, separately, whether to cancel subsection (I)(4) for each type.

The remaining exemptions are those in the definitions of GSIL and GSL at 42 U.S.C. 6291(30)(D)(ii) and (BB)(ii). For the reasons discussed, DOE believes that those are the “exemptions” to which clause (i)(II) applies. It bears emphasis that DOE interprets clause (i)(II) to address both the (D)(ii) and the (BB)(ii) exemptions. DOE recognizes that clause (i)(II) refers to “the exemptions for certain incandescent lamps,” and subparagraph (BB)(ii) relates to GSLs rather than GSILs. However, the first type of exemption in subparagraph (BB)(ii) simply refers back to subparagraph (D)(ii): It says GSL does not include “any lighting application or bulb shape described in any of subclauses (I) through (XXII) of subparagraph (D)(ii).” DOE takes “the exemptions” to encompass the subparagraph (D)(ii) exemptions both as exemptions from the definition of GSIL and through their effect on the definition of GSL.

DOE recognizes that clause (i)(II) is ambiguous on this point because, as previously noted, it does not identify “the exemptions” specifically and does not say what “the exemptions” are exemptions from. However, DOE believes the interpretation described here appropriately fulfills the purposes of subsection (i)(6)(A). DOE notes that clause (i)(II) is a counterpart to clause (i)(I), which instructs DOE to consider developing standards for GSLs. Thus, clause (i) as a whole is about GSL standards, and it would be natural for “the exemptions” involved in subclause (II) to include exemptions from the definition of GSL. If subclause (II) only involved the definition of GSIL, it would be hard to see why Congress would require DOE to initiate a rulemaking on that issue at the same time as it initiated a rulemaking on GSL standards; DOE already maintained GSIL standards and would have reviewed them periodically as for other consumer products.

DOE recognizes that because discontinuing an exemption from being GSILs makes the corresponding lamps GSILs (to the extent they otherwise satisfy the criteria in the GSIL definition), those lamps will also become GSLs. That fact actually further motivates DOE’s interpretation. As discussed in the NOPDDA and in section III.A.4.f.i, many of the 22 exemptions in clause (30)(D)(ii) encompass technologies besides incandescent filaments. If “the exemptions” in subclause (II) nonetheless included only exemptions from the GSIL definition, the result of discontinuing an exemption would be that a set of incandescent lamps become subject to GSL standards without the corresponding non-incandescent lamps being subject to the same standards. For example, DOE is discontinuing the exemption for CA shape lamps. If DOE were only permitted to regulate incandescent CA shape incandescent lamps as GSLs, and not other CA shape lamps such as CA shape compact fluorescent lamps, the result would be a skewed regulatory regime that seems inconsistent with the purposes of subsection (i)(6)(A).

Subsection (i)(6)(A) actually instructs DOE to avoid that result: Clause (ii) of subsection (i)(6)(A) specifies that “[t]he rulemaking”—the rulemaking that clause (i) calls for—“shall not be limited to incandescent technologies.” DOE interprets that language to mean that in setting standards and deciding on exemptions under clause (i), it should consider non-incandescent lamps alongside incandescent lamps. With respect to the exemptions, that means

addressing the section 6291(30)(BB)(ii) exemptions from the GSL definition.

LEDVANCE, along with other commenters, contended that the definitional provisions—particularly those listing the 22 types of lamp in (D)(ii) and (BB)(ii)—cannot be the subject of the clause (i)(II) rulemaking because they are “exclusions” rather than “exemptions.” (LEDVANCE, No. 90 at pp. 12–13) DOE notes that the texts of section 6291(30)(D)(ii) and (BB)(ii) do not actually state that they provide “exclusions.” That word appears only in the headings of the provisions. Headings “can be a useful aid in resolving a statutory text’s ambiguity,” *United States v. Quality Stores, Inc.*, 134 S. Ct. 1395, 1401 (2014); but titling subparagraphs (D) and (BB) “Exclusions” does not clearly indicate that the substance of those provisions describe exclusions and not exemptions.

The texts of those provisions say that the respective defined terms (GSIL and GSL) “do[] not include” certain lamps. 42 U.S.C. 6291(30)(D)(ii); 6291(30)(BB)(ii). The language “does not include” is consistent with stating an exemption. “Exemption,” in ordinary English, simply means freeing or excusing one set of persons or things from an obligation to which others are subject (*see American Heritage Dictionary*). GSILs and GSLs are subject to regulatory requirements under EPCA; by stating that certain lamps are “not include[d]” in those categories, subparagraphs (D) and (BB) exempt them from the regulatory requirements.

LEDVANCE stressed that the words “exclusion” and “exemption” are different, and urged that DOE’s interpretation of clause (i)(II) must reflect that difference.<sup>8</sup> (LEDVANCE, No. 90 at pp. 12–13) While DOE recognizes that differences in statutory language are usually significant, “Congress sometimes uses slightly different language to convey the same message,” *DePierre v. United States*, 564 U.S. 70, 83 (2011). *See also McNeil v. United States*, 508 U.S. 106, 112 (1993) (“In its statutory context, we think the normal interpretation of the word ‘institute’ is synonymous with the words ‘begin’ and ‘commence.’”). The words “exemption” and “exclusion” can be synonymous in ordinary English.<sup>9</sup> *See, e.g., Public Investors*

<sup>8</sup> This argument is somewhat misplaced because, as just noted, the text of the GSIL and GSL definitions does not use the word “exclusions.”

<sup>9</sup> LEDVANCE said that the D.C. Circuit’s *Hearth, Patio & Barbecue* decision held that “exclusions” and “exemptions” are different. The opinion actually seems to use the words “exclude” and

*Arbitration Bar Ass'n v. SEC*, 771 F.3d 1, 8 (D.C. Cir. 2014) (Brown, J., concurring) (“We began in 1978 by interpreting Exemption 8’s categorically narrow exclusion broadly.”); *Friends of Animals v. Jewell*, 824 F.3d 1033, 1036 (D.C. Cir. 2016) (citing agency decision titled “Exclusion of U.S. Captive-Bred Scimitar-Horned Oryx, Addax, and Dama Gazelle from Certain Prohibitions (‘Captive-Bred Exemption’)”).

Indeed, Congress used them synonymously in other parts of subsection (i) added by the same provision of EISA 2007 that added both paragraph (6)(A) and the list of 22 lamp types not included as GSILs or GSLs. The provision in EISA section 321(a)(3) allowing the public to petition DOE to regulate additional types of lamps, discussed, reads as follows. “Any person may petition the Secretary to establish standards for lamp shapes or bases that are excluded from the definition of general service lamps.” “The petition shall include evidence that the availability or sales of exempted incandescent lamps have increased significantly.” Surely what Congress had in mind is that when a petitioner asks for standards on a given type of lamp, the petition should demonstrate that the availability or sales of that type of lamp have increased. But in the first sentence refers to the subject of the petition as “lamps excluded from the definition of general service lamps,” and the second calls it “exempted lamps.” Evidently Congress considered the text that “exclude[s]” certain lamps from the definition of GSLs to be an exemption.

A commenter also argued that DOE cannot discontinue exemptions for any set of lamps for which EPCA already imposes standards—or for lamps for which EPCA specifies future standards like the five lamp types addressed by subsection (I)(4). According to this commenter, such lamps are not “exempt” so there are no “exemptions” to discontinue. In considering this argument, DOE observes that to complete a concept of an “exemption” or of “exempting,” it is necessary to say what the exemption is protecting from. In referring to “the exemptions,” section 6295(i)(6)(A)(i)(II) does not provide that information, leaving an unavoidable ambiguity for DOE to reconcile. On the commenter’s view, “the exemptions” means exemptions from regulation

under EPCA; thus if a type of lamp is subject to regulation of any kind under EPCA, it does not enjoy an “exemption” that DOE may discontinue under subsection (i)(6)(A)(i). However, DOE considers it more sensible to read “the exemptions” as meaning exemptions from being regulated as GSLs. That understanding would be consistent with the structure of clause (i), which calls for DOE to consider amending GSL standards and to consider discontinuing exemptions. If these two parts of clause (i) are about the same content, “the exemptions” would be exemptions that protect lamps from GSL standards.

DOE believes its interpretation appropriately fulfills the purposes of subsection (i)(6) and of EPCA as a whole. As discussed, DOE believes subsection (i)(6) was meant to establish a particular level of energy savings, namely the amount that could be achieved by imposing a 45 lm/W standard on GSLs. As the fourth category of GSL indicates, Congress left some flexibility about the concept of GSL, so that it could encompass lamps that fulfill the same sorts of functions as GSILs. Consistent with that understanding, DOE believes the purpose of discontinuing exemptions is to ensure that a given type of lamp does not provide a ready substitute for lamps regulated as GSLs, because the availability of such a substitute will significantly erode the savings achieved by GSL regulation. On that understanding, it is straightforward that Congress would want DOE to assess whether a given type of lamps should be exempt from GSL regulation.

By contrast, to leave lamps out—as the commenter suggested—simply because they are subject to other types of regulation and different standards would largely defeat the purpose of GSL regulation just described. For some lamp types, the criterion that commenters label a “standard” is a definitional limit; for example a G shape lamp is exempt only if it has a diameter of 5 inches or more, and a T shape lamp is exempt only if it uses less than 40 watts or has a length of 10 inches or more. Commenters disagree with DOE’s characterization of these limits as definitional criteria rather than standards. Regardless, they are not GSL standards, and they are not of the same character or stringency as the GSL backstop that is the default GSL standard, and are presumably less stringent than any standard that DOE might develop to achieve energy savings comparable to those from the 45 lm/W backstop standard. It seems unlikely that Congress would have considered such criteria adequate alternatives to

GSL standards. Therefore, DOE considers it more consistent with the scheme of subsection (i)(6) that DOE should assess whether to subject to GSL regulation the lamps within such an exemption. For example, with respect to T shape lamps, DOE must assess whether lamps over 10 inches or lamps under 40 watts are ready substitutes for GSLs.

Commenters also argued that DOE cannot discontinue the exemption for incandescent reflector lamps in particular. DOE will address these comments in a separate rule. This final rule does not include a determination whether to maintain or discontinue the exemption for incandescent reflector lamps and does not include those lamps within the definition of GSLs. This rule does address the exemption for “reflector lamps”; as discussed in section III.A.1.a, the rule addresses only reflector lamps that are not “incandescent reflector lamps” as defined in EPCA.

In the following sections, DOE provides detailed discussions of how the definition of GSL adopted in this final rule is consistent with the authorities discussed in this section.

### III. Adopted Definition of General Service Lamp

#### A. General Service Lamp Definition

The term general service lamp (GSL) includes general service incandescent lamps (GSILs), compact fluorescent lamps (CFLs), general service light-emitting diode (LED) and organic light-emitting diode (OLED) lamps, and any other lamps that DOE determines are used to satisfy lighting applications traditionally served by GSILs; however, GSLs do not include any lighting application or bulb shape that under 42 U.S.C. 6291(30)(D)(ii) is not included in the “general service incandescent lamp” definition, or any general service fluorescent lamp or incandescent reflector lamp. (42 U.S.C. 6291(30)(BB)) The October 2016 NOPDDA revisited the proposed definition of GSL from the March 2016 GSL ECS NOPR, including the exemptions contained in the GSIL and GSL definitions, and proposed a revised definition of “general service lamp” in § 430.2 to capture various criteria and delineate the lamp types considered to be GSLs. 81 FR 71806–71807. More specifically, DOE proposed the a definition for GSL in the October 2016 NOPDDA A general service lamp, as proposed, would be a lamp that has an ANSI base, operates at any voltage, has an initial lumen output of greater than or equal to 310 lumens (or 232 lumens for modified spectrum general

“exempt” interchangeably. At any rate, DOE acknowledges that in many contexts “exclusion” and “exemption” can refer to different concepts. Its observation here is simply that the two words can also be synonymous, and that statutory context and purpose must inform DOE’s interpretation of the word “exemption” here.

service incandescent lamps) and less than or equal to 4,000 lumens, is not a light fixture, is not an LED downlight retrofit kit, and is used in general lighting applications. General service lamps include, but are not limited to, general service incandescent lamps, compact fluorescent lamps, general service light-emitting diode lamps, and general service organic light-emitting diode lamps, but do not include general service fluorescent lamps; linear fluorescent lamps of lengths from one to eight feet; circline fluorescent lamps; fluorescent lamps specifically designed for cold temperature applications; impact-resistant fluorescent lamps; reflectorized or aperture fluorescent lamps; fluorescent lamps designed for use in reprographic equipment; fluorescent lamps primarily designed to produce radiation in the ultra-violet region of the spectrum; fluorescent lamps with a color rendering index of 87 or greater; R20 short lamps; specialty MR lamps; appliance lamps; black light lamps; bug lamps; colored lamps; infrared lamps; left-hand thread lamps, marine lamps, marine signal service lamps; mine service lamps; plant light lamps; sign service lamps; silver bowl lamps, showcase lamps, and traffic signal lamps.

DOE received general comments on its proposed definition.

California Energy Commission (CEC), Southern California Edison (SCE), National Resources Defense Council (NRDC), Rutgers Law School Environmental Law Society (RELS), Northeast Energy Efficiency Partnerships (NEEP), Utility Coalition, and Appliance Standard Awareness Project (ASAP) expressed strong support for DOE's proposed definition of GSL. CEC and RELS commented that the revised proposal encourages high performance requirements for technology-neutral GSLs and will result in significant additional energy savings for the nation as well as increased consumer savings. NRDC and NEEP noted that the revised definition addressed stakeholder input including many of their concerns on previous proposals. In particular, NRDC and CEC agreed with DOE's approach of including lamps regardless of shape or base type in order to prevent gaming of the system. Citing reflector lamps as an example, NRDC stated that manufacturers have taken advantage of definitions in the past by creating new lamp shapes outside of the product definition that then increase in sales. NEEP stated its overall support for proposed scope of GSLs, and asserted there will be a wide variety of highly efficacious and low cost lamps that will

fill the needs for consumers. ASAP added that with a few minor changes to the definitions, the definitions will be consistent with the statute, and DOE will be able to implement the backstop standard as required by Congress and issue a final rule to complete this critical rulemaking. (CEC, No. 81 at p. 1; SCE, No. 83 at pp. 23–24; NRDC, No. 83 at pp. 9–10; ASAP, No. 83 at pp. 20–21; NEEP, No. 83 at p. 13; NRDC, No. 85 at pp. 1–2; RELS, No. 86 at p. 1; CEC, No. 91 at p. 1)

SCE stated that both utilities and industry played a critical role in transforming the market and added that progress will continue after the rulemaking ends. ASAP also emphasized the role of utilities, noting that utilities have spent billions of dollars to move the market to the level of efficiency available today and remain interested in how to make the transition to a GSL standard successful. (SCE, No. 83 at pp. 23–24; ASAP, No. 83 at pp. 17–19)

In contrast, Avalos stated that the expanded definition simply broadens the scope of GSL and does not clarify what lamps are considered GSLs. Avalos added that several lamps are included under the revised definition that are not general service lamps and suggested defining GSL to include lamps that are used on a regular basis. (Avalos, No. 80 at p. 1)

NEMA also commented that the scope of the proposed GSL definition is too broad. NEMA stated that available sales and market data should be used to determine the scope rather than speculating whether lamp types may become loopholes in the future. NEMA added that the sales data collected from the section 6295(l) rulemaking indicates that some of the lamp types that look like 60 W incandescent lamps, such as rough service and vibration service, are being used as substitutes. However, NEMA also noted that there are very small or large lamps, such as 2,000 lumen sign lamps and G40 lamps, which would fall within DOE's proposed definition but that are not effective substitutes for GSILs because they cannot fit in the same fixtures or applications. (NEMA, No. 83 at pp. 50–52) Westinghouse also expressed concern about DOE's proposed definition, stating that because it is so broad some lamp types will be inadvertently included in the scope of the GSL definition. (Westinghouse, No. 83 at p. 135)

DOE acknowledges that it has proposed a broad definition for general service lamp. However, DOE does not intend for the definition to include lamps that are not properly considered

general service lamps. In the following sections, DOE discusses key aspects of the definition and revisions implemented for this final rule.

#### 1. GSILs

As stated previously, GSILs include GSILs. (42 U.S.C. 6291(30)(BB)(i)(I)) The current definition of “general service incandescent lamp” is a standard incandescent or halogen type lamp that is intended for general service applications; has a medium screw base; has a lumen range of not less than 310 lumens and not more than 2,600 lumens or, in the case of a modified spectrum lamp, not less than 232 lumens and not more than 1,950 lumens; and is capable of being operated at a voltage range at least partially within 110 and 130 volts; however this definition does not apply to the following incandescent lamps: An appliance lamp; A black light lamp; A bug lamp; A colored lamp; An infrared lamp; A left-hand thread lamp; A marine lamp; A marine signal service lamp; A mine service lamp; A plant light lamp; A reflector lamp; A rough service lamp; A shatter-resistant lamp (including a shatter-proof lamp and a shatter-protected lamp); A sign service lamp; A silver bowl lamp; A showcase lamp; A 3-way incandescent lamp; A traffic signal lamp; A vibration service lamp; A G shape lamp (as defined in ANSI C78.20 and ANSI C79.1–2002) with a diameter of 5 inches or more; A T shape lamp (as defined in ANSI C78.20 and ANSI C79.1–2002) and that uses not more than 40 watts or has a length of more than 10 inches; and A B, BA, CA, F, G16–1/2, G–25, G30, S, or M–14 lamp (as defined in ANSI C79.1–2002 and ANSI C78.20) of 40 watts or less. 10 CFR 430.2.

In the March 2016 GSL ECS NOPR, DOE declined to make a determination about discontinuing the 22 GSIL exemptions from the GSIL definition. DOE initially concluded that, because the Appropriations Rider prohibits DOE from using appropriated funds to implement or enforce standards for GSILs, DOE could not re-evaluate the existing exemptions for GSILs in the GSL rulemaking. 81 FR 14540. Specifically, DOE stated that, by definition, GSL does not apply to any lighting application or bulb shape that, under 42 U.S.C. 6291(30)(D), is not included within the “general service incandescent lamp” definition. (42 U.S.C. 6291(30)(BB)) Therefore, based on the GSL definition, the 22 incandescent lamps that are excluded in EPCA from the definition of GSIL would not be GSILs. Further, DOE stated that the formerly exempted lamp types would have to be considered GSILs in

order for DOE to regulate the lamps under its authority to promulgate standards for GSLs. Since the Appropriations Rider prohibits the expenditure of funds to implement or enforce standards for GSILs, DOE reasoned that it would not be able to establish or amend energy conservation standards for any of these lamps. As a result, making a determination about discontinuing the exemption from the GSIL definition for any of the 22 medium screw base lamps would make no difference in the GSL rulemaking, and DOE declined to address the exemptions at that time. 81 FR 14541.

Upon consideration of the comments received on the March 2016 GSL ECS NOPR and further review of the relevant authorities, DOE revisited its interpretation in the October 2016 NOPDDA with respect to the proposed definition of GSL and application of the Appropriations Rider. DOE noted that the focus of the March 2016 GSL ECS NOPR was to propose new energy conservation standards for GSLs; in that context, DOE did not propose to modify the GSIL exemptions and then impose new standards for GSILs. By contrast, the October 2016 NOPDDA neither implemented nor sought to enforce any standard. Rather, the October 2016 NOPDDA sought to define what constitutes a GSIL and what constitutes a GSL under 42 U.S.C. 6295(i)(6)(A)(i)(II), an exercise distinct from establishing standards. As previously noted, the Appropriations Rider restricts DOE from “implementing or enforcing” the standards imposed on GSILs by 10 CFR 430.32(x). However, it does not preclude DOE from utilizing its authority under EPCA to revisit and alter the scope of GSIL and GSL, even if a consequence of that decision will be that additional incandescent lamps may become subject to the backstop standard.

In the October 2016 NOPDDA, DOE noted it believes this is a reasonable interpretation of the Appropriations Rider because, in evaluating the exemptions, DOE followed a directive related to a GSL rulemaking to define the scope of GSLs. DOE did not conduct any analysis in support of establishing energy conservation standards for GSILs. Although a collateral effect is to broaden the scope of the GSIL definition, DOE simply proposed to define what lamps constitute GSLs so that both manufacturers and DOE can understand how the regulations apply to the market. As discussed, DOE’s defining the scope of GSL in light of the 45 lm/W backstop standard set in 42 U.S.C. 6295(i)(6)(A)(v) is not the same as DOE establishing standards.

Furthermore, as previously noted, in the event standards were established, leaving certain exemptions in place would diminish the energy savings that would otherwise be achieved because the excluded lamps would provide a less efficient option to meet the same general service lighting application. 81 FR 71797–71798.

Commenters inquired why DOE had apparently changed its interpretation of the Appropriations Rider. As noted, the March 2016 GSL ECS NOPR focused on establishing amended standards. The October 2016 NOPDDA and this final rule are addressed solely to the definition of GSL, recognizing that the additional lamps that DOE includes as GSILs will become subject to either a DOE-developed standard or to the 45 lm/W backstop standard that EPCA set as the default. In this context, interpreting the Appropriations Rider to block DOE from assessing the 22 exemptions would risk undermining the 45 lm/W backstop standard that Congress set. That consequence is quite different from what DOE faced with respect to the March 2016 GSL ECS NOPR, with respect to which a broad interpretation of the Appropriations Rider would only have restricted DOE’s ability to develop its own standards. DOE, therefore, interpreted the Appropriations Rider as applying differently in the context of the October 2016 NOPDDA, and similarly does not interpret the Appropriations Rider as precluding its assessment of the exemptions in this final rule.

In the October 2016 NOPDDA, DOE evaluated the 22 lighting applications or bulb shapes exempted under the GSIL definition to determine whether such exemptions should be maintained or discontinued. 81 FR 71798. In the October 2016 NOPDDA, DOE proposed to discontinue eight GSIL exemptions (for reflector lamps, rough service lamps, shatter-resistant lamps, 3-way incandescent lamps, vibration service lamps, and lamps with specific shapes) based on compiled sales data and consideration of additional, applicable factors. DOE proposed to maintain 14 of the GSIL exemptions due to low sales and low potential for use in GSL applications.

In this final rule, DOE is maintaining 15 of the exemptions and discontinuing seven of them. To summarize the analytical approach discussed later with reference to comments, DOE believes the purpose of the decision that subsection (i)(6)(A)(i)(II) calls for is to ensure that a given exemption will not impair the effectiveness of GSL standards by leaving available a convenient substitute that is not

regulated as a GSL. Therefore, DOE has based its decision on each exemption on an assessment of whether the exemption encompasses lamps that can provide general illumination and can functionally be a ready substitute for lamps already covered as GSLs.

The technical characteristics of lamps in a given exemption and the volume of sales of those lamps are among the considerations relevant to that assessment. High annual sales indicates that the product is likely used in general lighting applications,<sup>10</sup> because the sales of lamps for specialty applications tend to be relatively small compared to sales for general-purpose lighting. However, sales data are not the only consideration. It may be appropriate to discontinue an exemption even though current sales are relatively low, if technical characteristics of the exempted lamps make them likely to serve as ready substitutes for GSLs once GSL standards are in place. For example, as discussed in section III.A.1.a, DOE believes shatter-resistant lamps are similar enough to rough service and vibration service lamps that shatter-resistant lamps will be substitutable for GSILs just as rough service and vibration service lamps have become substitutes for GSILs. Further, as discussed later in this section, for a lamp to be a viable substitute for GSILs, DOE does not think the lamp has to fit into the same existing fixtures as some type of GSL. Markets will shift in response to GSL standards, and DOE would expect some substitution of fixtures to occur as part of substituting non-GSL lamps for GSILs.

DOE received several comments regarding its authority to reconsider the 22 GSIL exemptions. NEMA stated that DOE was not authorized to redefine GSIL to include any of the 22 lighting applications or bulb shapes exempted from the definition of GSIL. (NEMA No. 93 at p. 3) NEMA further stated that Congress defined GSIL in very specific terms, limiting the term to “standard incandescent or halogen type lamps” and that the 22 listed lamps are not standard incandescent lamps, and are therefore excluded from the GSIL definition. (NEMA No. 93 at p. 3) NEMA stated that in contrast to the “standard” incandescent lamp, some of the 22 excluded lamps lack a “medium screw base,” some have lower lumen output than the minimum lumens for GSILs, and some of them are separately regulated. (NEMA, No. 93 at p. 3) NEMA

<sup>10</sup> DOE notes that the annual sales of six lamp categories for which exemptions were discontinued in this notice were several times greater than the fifteen lamp categories for which exemptions were maintained.

stated DOE has no authority to change the GSIL definition and urged DOE to retain the existing definition. (NEMA, No. 93 at p. 22)

EPCA does not define “standard” in the context of incandescent lamp.<sup>11</sup> However, DOE considers it unlikely that the exemptions encompass solely lamps that are not “standard.” Were that the case, the exemptions would be superfluous, because the word “standard” in the definition of GSIL would on its own have ensured that none of those lamps are GSILs. For example, one of the 22 exemptions is for 3-way incandescent lamps. With respect to this type of lamp, the GSIL definition reads: “a standard incandescent or halogen type lamp that” meets four qualifications (“intended for general service applications,” medium screw base, 310–2,600 lumens, and functional at 110–130 volts), but not including 3-way incandescent lamps. If no 3-way incandescent lamps are “standard,” then the exemption for those lamps was unnecessary. To be clear, DOE acknowledges that this argument does not imply that all 3-way incandescent lamps are “standard,” or that all 3-way incandescent lamps would meet the other GSIL qualifications (such as lumen range or screw base). Nonetheless, it seems likely that the 22 exemptions cover some lamps that would, absent the exemption, be GSILs.

Regarding DOE’s decision to maintain or discontinue the 22 GSIL exemptions, PG&E supported DOE’s decision to bring previously exempted lamp types into the scope of coverage of the GSL rule. PG&E added that these lamp types pose a significant risk to energy savings as they can easily replace GSLs in many applications. Further PG&E stated that LED versions are dropping in price while increasing in efficiency and are available in range of shapes, sizes, lumen outputs, correlated color temperature (CCT), beam angles, and base types. (PG&E, No. 83 at pp. 14–15) CEC, Utility Coalition, NEEP, and NRDC also supported DOE’s proposed approach and agreed with the eight lamp types DOE proposed to no longer exempt based on the sales of these lamp types and their potential for lamp switching. NEEP and NRDC added that these categories all have high-efficiency alternatives that produce general illumination. (CEC, No. 81 at p. 1; Utility Coalition, No. 95 at p. 3; NEEP, No. 92 at p. 1; NRDC, No. 85 at pp. 1–2) However, NEMA stated that DOE should maintain all 22 GSIL exemptions except for vibration service lamps and

rough service lamps. (NEMA, No. 83 at p. 93)

In support of its analysis of whether to maintain or discontinue the 22 GSIL exemptions, in the October 2016 NOPDDA DOE presented estimated sales data for the 22 exempted lamp types. NEMA stated that sales for most of the 22 exempted lamps are declining and that it was the intent of Congress to require that DOE find sales increasing as a prerequisite to discontinue an exemption. (NEMA, No. 83 at p. 34; NEMA No. 93 at p. 12) NEMA pointed to the petition process established under section 321 of EISA 2007 as indicative of that intent. (NEMA, No. 93 at p. 12–13) NEMA and LEDVANCE noted that Congress required a demonstration of increased sales as a prerequisite for DOE to grant a petition submitted by the public to reconsider an exemption, and that DOE must be guided by the same consideration when determining whether an exemption should be maintained under 42 U.S.C. 6295(i)(6)(A)(i)(II). (NEMA, No. 83 at pp. 33–34; LEDVANCE, No. 90 at pp. 25–27) NEMA and LEDVANCE cited the requirement under 42 U.S.C. 6295(i)(6)(A)(i)(II) for DOE to consider, in part, “exempted lamp sales” collected by DOE as supporting the requirement for increased lamp sales in order to discontinue an exemption. (NEMA, No. 93 at 5; LEDVANCE, No. 90 at p. 26) NEMA and LEDVANCE added that a determination of lamp switching must be driven by data showing increased sales. (NEMA No. 93 at p. 13; LEDVANCE, No. 90 at pp. 25–27) NEMA and LEDVANCE concluded that the October 2016 NOPDDA did not provide data indicating that lamp switching was occurring, and rather data from the Energy Information Administration<sup>12</sup> shows that sales are decreasing. NEMA and LEDVANCE commented that if DOE was petitioned under section 325(i)(3)(E), it would not grant the petition or decide to regulate these specialty lamps and therefore any other action taken under section 325(i)(6)(A) is illogical. (NEMA, No. 93 at p. 13; LEDVANCE, No. 90 at pp. 25–27) John Taxpayer stated that DOE’s inclusion of these specialty lamps was regulatory overreach and Congress had specifically stated these lamps should be regulated if and only if their sales increased over 100 percent. Taxpayer commented that many excluded specialty lamps are not available at

hardware stores and will not fit in normal table lamps or recessed ceiling fixtures. (Taxpayer, No. 84 at p. 1)

While NRDC found the sales data presented by DOE in the October 2016 NOPDDA to be accurate, it commented that historical lamp sales are only one factor for consideration in DOE’s determination of whether an exemption should be maintained. The California Investor Owned Utilities (CA IOUs) and NRDC cautioned that the presented data reflected current standards and sales could increase dramatically for exempted lamp types when the next more efficient standards go into effect in 2020. (CA IOUs, No. 83 at pp. 64–65; NRDC, No. 83 at pp. 29–30, 35) NRDC and CA IOUs both commented that the market has previously seen the sales volume of lamps increase when the lamps were exempted from standards or subject to less stringent standards (*e.g.*, BR lamps and modified spectrum lamps) and that historic sales records do not necessarily capture the potential for lamp switching. (NRDC, No. 85 at p. 1; CA IOUs, No. 83 at pp. 64–65) ASAP noted that market dynamics change as a result of setting standards for an inefficient lamp and that in some cases, an exempted low-volume, high-priced niche variant of an inefficient lamp can become a high-volume, low-priced loophole, thus undercutting the effect of the standard. ASAP added that DOE’s definition of “designed and marketed” has not prevented inefficient low-volume high-priced specialty lamps from becoming loopholes in standards thus far. (ASAP, No. 94 at p. 5)

As discussed, the petition process from EISA section 321(a)(3) is distinct from the decision that subparagraph (6)(A)(i)(II) calls for about maintaining or discontinuing exemptions. The statute does not require DOE to consider the same factors in the clause (i)(II) decision that it would in reviewing a petition. In particular, it does not restrict DOE to discontinuing an exemption only if sales of lamps within that exemption are increasing. While increases or decreases in lamp sales are an important consideration, DOE believes it can in some circumstances be appropriate to discontinue an exemption even at a time when sales of those lamps are decreasing. As described by GE, LEDVANCE, and Westinghouse, incandescent sales can be decreasing because consumers are purchasing LED versions of the same lamp. Thus, the lamp itself is not unpopular but rather is undergoing a shift in technology. For example, GE stated that sales of reflector lamps that are incandescent have been declining significantly over the last five years but

<sup>11</sup> DOE’s understanding of the word “standard” in this context is discussed in section III.A.4.b.

<sup>12</sup> See Energy Information Administration, Sales of specialty incandescent bulbs decline despite exemption from efficiency standards (April 2, 2013) available at: <http://www.eia.gov/todayinenergy/detail.php?id=10631>.

that was in large part caused by the increasing sales of LED reflector lamps. (GE, No. 83 at pp. 38, 84–85; LEDVANCE, No. 90 at p. 35; Westinghouse, No. 83 at pp. 128–129) Consequently, it can in some circumstances be appropriate to consider the overall volume of sales in assessing an exemption, even if the volume is currently decreasing.

DOE also considered the potential of lamp switching that may occur in response to any GSL standard. If an exempted lamp has the same utility to lamp users as a lamp subject to a standard as a GSL, DOE considered the potential increase in the use of the exempted lamp in response to a standard. As noted by the comments from CA IOUs and NRDC, prior to the effective date of any new standard the sales trends of exempted lamps do not necessarily capture the potential for lamp switching. As such, current lamp sale trends are only part of the consideration. DOE is permitted to account for future changes in consumer behavior so as to avoid the creation of loopholes.

DOE received several comments regarding whether a lamp could serve as a replacement for a GSL and therefore present a risk of lamp switching. CA IOUs stated that evaluations of the exemptions should be based on whether the exempted lamp type could serve as a replacement for a general service lamp. (CA IOUs, No. 83 at p. 107) Westinghouse stated that there are low-cost products on the market that consumers do not use as replacements for GSLs because they are not the appropriate shape or design. Avalos noted that a couple of exempted lamp types could be considered GSILs but are not due to their lamp structure. (Westinghouse, No. 83 at p. 30; Avalos, No. 80 at p. 1)

GE and LEDVANCE stated that DOE should consider the traditional omnidirectional incandescent lamp when considering the potential for lamp switching. (GE, No. 83 at pp. 37–38; LEDVANCE No. 83 at p. 59) GE stated that the definition of GSIL describes a lamp with a medium screw base, that produces between 310 and 2,600 lumens, and can operate on a voltage between 110 and 130 V, and that in order for a lamp to be considered as having the potential for “lamp switching” the lamp must maintain these same attributes. (GE, No. 88 at pp. 2–3) NEMA further stated that the definition of GSL authorizes DOE to consider “other lamps” and that “other lamps” must be used to satisfy lighting applications traditionally served by GSILs. (NEMA, No. 93 at p. 6) NEMA

stated that the use of the word “used,” past tense, establishes that there must be evidence for the basis of a finding that other lamps are operating in applications traditionally served by GSILs. (NEMA, No. 93 at p. 6) Westinghouse stated that consideration of lamp switching should be limited to whether a consumer could use an exempted lamp to replace a lamp that the consumer is currently using, and that consideration of how the use of fixtures may change in response to standards (*e.g.*, changes in fixtures used in new home construction) would be inconsistent with EPCA. (Westinghouse, No. 83 at pp. 39–40)

Other commenters stated that consideration of lamp switching should include the ability of an exempted lamp to provide similar function as a traditional GSIL, regardless of the fixture traditionally used with GSILs. ASAP stated that the presence of directional lamps in residences in the U.S. has grown significantly over time due to changes in new construction. (ASAP, No. 83 at pp. 38–39) ASAP stated that lighting in homes that traditionally was provided by A shape lamps in floor and table fixtures is being provided in newer construction through reflector lamps in recessed can lighting. (ASAP, No. 83 at pp. 58–59)

As previously noted, DOE understands the purpose of the decision that EPCA calls for on maintaining or discontinuing exemptions to be to ensure that consumers and manufacturers do not switch to readily available substitutes once standards for GSLs come into force. In making this assessment, the potential for an exempted lamp to be placed in a fixture that traditionally used a GSIL, and the potential change in the fixtures used to provide lighting in an application that was traditionally served by a GSIL are important considerations that DOE appropriately takes into account. Separate from the determinations to be made regarding certain exemptions, DOE is authorized to include in the definition of GSL other lamps that are used to satisfy lighting applications traditionally served by GSILs. (42 U.S.C. 6291(30)(BB)(i)(IV)) While 42 U.S.C. 6295(i)(6)(A)(i)(II) does not expressly direct DOE to consider whether an exempted lamp is used to satisfy the lighting applications traditionally served by GSILs, DOE has determined this consideration to be instructive in the overall assessment regarding the exemptions. As noted by commenters, the function traditionally provided by GSILs can, in some instances, be provided by more than one type of fixture. In order to minimize the

potential for loopholes, DOE has considered the potential for a consumer to change the type of lamp used in an existing fixture, and the potential change in the type of fixture used to provide the same function as traditionally provided by a fixture using a GSIL.

CA IOUs stated that evaluations of the 22 GSIL exemptions should also be based on whether the exempted lamp type can be made as an LED lamp. (That consideration would be relevant because it is almost certain that incandescent lamps will not be able to satisfy the 45 lm/W backstop standard if it comes into force.) (CA IOUs, No. 83 at p. 107) ASAP further stated that of the 15 lamp types that DOE is proposing to continue to exempt there are LED replacements available for all but the infrared lamp. ASAP noted LED replacements that are able to function in high temperature applications could serve as replacements for appliance lamps. (ASAP, No. 83 at pp. 98–99)

DOE is aware that LED replacements may exist for some of the exempt lamp categories. DOE did consider the existence or absence of LED replacements, though not as the only reason to discontinue or maintain a GSIL exemption. DOE’s consideration of lamps for which no equivalent LED replacements exist is discussed in section III.A.4.f.

NEMA provided updated sales information for this final rule. NEMA provided sales data from four members, which represents a significant portion of the market, for each of the exemptions that DOE proposed to discontinue. NEMA stated that although not all members are included, it conferred with other members that did not provide data to confirm the general trend of decreasing sales and shipments of specialty incandescent lamps since standards went into effect for GSILs between 2010 and 2012. (NEMA, No. 93 at pp. 9–10) DOE has updated Table III.1 to reflect this new data. DOE notes that, except with respect to certain lamps discussed in the sections that follow, the data from NEMA are consistent with the estimates and data that the October 2016 NOPDDA presented.

NEMA estimated the annual domestic sales of general service lamps (as defined in 42 U.S.C. 6291(BB)(I)–(III)) to be 600 million units. NEMA noted that this estimate excludes the shipments of the exemption categories proposed to be discontinued noting that each of the exempt lamp categories represents well below 1 percent of the total number of GSLs. NEMA and LEDVANCE stated that the October 2016 NOPDDA appeared to arbitrarily determine that



any number of annual unit sales above 3 million qualifies to be included in the definition of “general service lamp” regardless of whether lamp switching is occurring. NEMA and LEDVANCE cited the example in NEMA’s comments on the March 2016 GSL ECS NOPR that standards for globe lamps, which had an estimated 7 million annual unit sales, would not be justified because these lamps would not consume an average of 100 kWh of electricity per year as required by section 322(b) of EPCA. NEMA and LEDVANCE concluded that the decision to regulate a specialty lamp with declining sales and energy consumption that would not justify regulation as a new consumer product is arbitrary and capricious and contrary to law. (NEMA, No. 93 at pp. 13–14; LEDVANCE, No. 90 at pp. 25–27)

As discussed previously, DOE is not limited to considering only lamp sales when determining whether to maintain or discontinue an exemption. EPCA states lamps sales are only to be a part of the consideration, signifying that DOE is authorized to include other considerations. (42 U.S.C. 6295(i)(6)(A)(i)) As previously discussed, DOE considered the potential for lamp switching in order to minimize the potential for loopholes to any

standard(s) that may be established. Lamp sales are part of that consideration. Again, DOE recognized that historical sales data are not always predictive of future lamp switching. Lamp sales, therefore, were considered in conjunction with the characteristics of a lamp.

Additionally, the specific direction from Congress to consider whether to maintain or discontinue exemptions for certain lamps is separate and distinct from the EPCA requirements for classifying a consumer product as a covered product under 42 U.S.C. 6292(b), which requires minimum energy savings, and from the requirements set out in 42 U.S.C. 6295(o) for establishing new or amended standards. EPCA directs DOE to determine whether to include in the definition of an existing covered product lamps currently excluded. DOE is not designating previously exempt lamps as separate covered products. DOE is determining the scope of an existing covered product pursuant to a specific mandate from section 6295(i)(6)(A), and as such, 42 U.S.C. 6292(b) is inapplicable.

DOE continues to believe it is reasonable to make decisions about the various exemptions without assessing

the average household energy consumption of each, as it would if it conducted a separate section 6292(b) analysis for each exemption. For GSLs as a whole, Congress has determined that regulation is appropriate. (Although DOE of course respects Congress’s decision as sufficient, DOE notes that average household energy consumption of GSLs is well above the section 6292(b) threshold.) The nature of the exemptions is that most of them currently represent relatively small portions of the overall lamp market. Consistent with the preceding framework, DOE believes the exemption decision is meant to ensure that a given type of lamp does not become a loophole for the GSL standards at the time when manufacturers are required to comply with those standards. If a lamp is a ready substitute for GSLs and DOE leaves that type of lamp exempt, energy consumption for that lamp type would presumably increase in the future; but the average rate of current energy consumption for a particular exempt lamp type is not as important a consideration.

Table III.1 summarizes the exemptions maintained or discontinued in this final rule and the sales data for each exemption.

TABLE III.1—DETERMINATIONS REGARDING EXEMPTIONS

GSIL exempted lamp category	Estimated sales data (units annual sales)	DOE’s determination on exemption status
Appliance Lamp	Approximately 2 million	Maintain exemption.
Black Light Lamp	<1 million	Maintain exemption.
Bug Lamp	<1 million	Maintain exemption.
Colored Lamp	<2 million	Maintain exemption.
Infrared Lamp	<1 million	Maintain exemption.
Left-Hand Thread Lamp	<1 million	Maintain exemption.
Marine Lamp	<1 million	Maintain exemption.
Marine Signal Service Lamp	<1 million	Maintain exemption.
Mine Service Lamp	<1 million	Maintain exemption.
Plant Light Lamp	<1 million	Maintain exemption.
Reflector Lamp	Approximately 30 million	Discontinue exemption.
Rough Service Lamp*	10,914,000	Discontinue exemption.
Shatter-Resistant Lamp	689,000	Discontinue exemption.
Sign Service Lamp	Approximately 1 million	Maintain exemption.
Silver Bowl Lamp	Approximately 1 million	Maintain exemption.
Showcase Lamp	<1 million	Maintain exemption.
3-way Incandescent Lamp	32,665,000	Discontinue exemption.
Traffic Signal Lamp	<1 million	Maintain exemption.
Vibration Service Lamp	7,071,000	Discontinue exemption.
G shape Lamp with diameter of 5 inches or more	859,867	Maintain exemption.
T shape lamp of 40 W or less or length of 10 inches or more	9,750,395	Discontinue exemption.
B, BA, CA, F, G16–1/2, G25, G30, S, M–14 lamp of 40 W or less	71,702,637	Discontinue exemption.

\* NEMA submitted revised data for rough service lamps following the publication of the notice of data availability for five lamp types. See 81 FR 20261 (April 7, 2016). The revised data showed sales of 10,914,000 rough service lamps in 2015, which results in a requirement for DOE under 42 U.S.C. 6295(l)(4), to initiate an accelerated rulemaking to establish an energy conservation standard for rough service lamps. See ex parte memorandum published in the docket at: <https://www.regulations.gov/document?D=EERE-2011-BT-NOA-0013-0019>.

As shown in Table III.1, based on the revised sales data and a consideration of additional, applicable factors, DOE has determined to discontinue seven GSIL

exemptions. As discussed in section II, DOE believes the lamp categories for which it discontinued exemptions represent significant energy savings

potential either due to high annual sales or by preventing a loophole from forming. DOE is maintaining 15 of the GSIL exemptions due to low sales and

low potential for use in GSL applications. DOE discusses each of the exemptions and comments received on the proposal in the October 2016 NOPDDA in the sections that follow.

a. Exemptions Proposed To Be Discontinued in October 2016 NOPDDA

In the October 2016 NOPDDA, DOE proposed to discontinue eight exemptions from the definition of GSIL. 81 FR 71799. DOE assessed data available for medium screw base reflector lamps that are incandescent and preliminarily concluded that these lamps have high annual sales. To be clear, the following discussion relates only to reflector lamps that are not IRLs. The market includes many reflector lamps that use incandescent technology but do not fall within the statutory definition of IRL, for example, medium screw base reflector lamps with diameters of 2.25 inches or less (*e.g.*, PAR16 or MR16 lamps) or with rated wattages less than 40 W (*e.g.*, 39 W PAR20 lamps). At present, IRLs are exempt from being GSLs; while DOE proposed to discontinue that exemption, DOE will be addressing that proposal in a separate final rule and does not discuss it here. Accordingly, in the following discussion, except where noted, DOE uses the phrase “reflector lamp” to refer only to lamps that are not IRLs.

DOE estimated the sales of medium base reflector lamps that are incandescent as approximately 30 million units per year. DOE believed medium screw base reflector lamps are capable of providing overall illumination and could be used as a replacement for GSILs. Therefore, DOE found there was also high potential for lamp switching and subsequently creating a loophole. For these reasons, DOE proposed to discontinue the exemption for reflector lamps in the October 2016 NOPDDA. *Id.* at 71800.

DOE received several comments in support of its decision to expand the scope of the GSL definition to include reflector lamps. ASAP commented that they strongly supported covering all reflector lamps in the scope of this rulemaking and noted that hundreds of millions of reflector lamps (including IRLs) are sold each year. ASAP stated that directional lamps of all technology types are a growing presence in homes. ASAP noted that there are more efficient alternatives widely available at affordable prices, and including reflector lamps that are incandescent as GSLs is a step towards technological neutrality which will benefit the environment, industry and consumers. (ASAP, No. 83 at pp. 38–39; ASAP, No.

94 at pp. 1–2) NRDC and Utility Coalition supported DOE’s proposal to discontinue the exemption for reflector lamps and noted that there would be a significant impact on energy savings as a result. (NRDC, No. 83 at p. 11; NRDC, No. 85 at p. 2; Utility Coalition, No. 95 at p. 2) Soraa also supported DOE’s proposal to include reflector lamps as GSILs noting that they are used or can be used to provide overall illumination. (Soraa, No. 87 at p. 2) CEC also commented in support of DOE’s proposal to discontinue the GSIL exemption for reflector lamps due in part to their high lamp sales and potential for lamp switching. (CEC, No. 91 at pp. 4–5)

In contrast, GE recommended that reflector lamps (in GE’s comment, primarily IRLs) continue to be regulated separately and that it is not appropriate to evaluate reflector type lamps as GSLs because these products cannot successfully be used to satisfy lighting applications traditionally served by GSILs. (GE, No. 88 at p. 2) GE added that each reflector lamp has unique optical properties that must be considered when applying a minimum efficacy requirement and noted that these products cannot meet the same efficiency limits designed for general service A shape lamps. (GE, No. 88 at p. 2)

In support of their assertion that reflector lamps should be regulated separately, several commenters disagreed with DOE’s determination that reflector lamps posed a risk of lamp switching. GE stated that reflector lamps would not fit in most fixtures in which GSILs are used. Even if a reflector lamp could fit in such a fixture it could not deliver the omnidirectional light output provided by the GSIL. Therefore, GE asserted reflector lamps would not be suitable replacements for the standard GSILs and needed to be evaluated in their own rulemaking. (GE, No. 83 at pp. 37–38) LEDVANCE agreed and stated that the consumer will not obtain effective light by putting a reflector lamp in a fixture that does not have some type of directional functionality. (LEDVANCE, No. 83 at pp. 59–61)

CA IOUs stated that while it may not be always be optimal, reflector lamps can be used in general service applications. (CA IOUs, No. 83 at p. 66) NRDC stated that reflector lamps can be used in applications other than down lights. NRDC pointed out that reflector lamps come in various shapes and there was nothing to prevent a manufacturer from altering the reflector lamp design so more light goes in different directions. (NRDC, No. 83 at p. 45) CA IOUs further noted that as the cheaper

product, the use of reflector lamps that are incandescent in general service applications may increase due to new market pressures in 2020. (CA IOUs, No. 83 at p. 66) CEC agreed that medium screw base reflector lamps represent a lamp switching risk adding that lamp shape does not determine whether a lamp can provide general service lighting and general service lamps are not limited to omnidirectional lighting. (CEC, No. 91 at pp. 4–5) Utility Coalition also stated that LED lamps are suitable replacements for GSLs in many applications because they have the same base types and therefore represent a significant risk of undercutting the energy savings of the 45 lm/W standard if they are not included. (Utility Coalition, No. 95 at pp. 1–2)

Additionally, Utility Coalition commented that there are LED versions of reflector lamps available in a wide variety of shapes and sizes, lumen outputs, CCT, beam angles, and base types and that decreasing prices and increasing efficiency make these products cost-effective to consumers. NRDC also noted that there are several cost-effective, dimmable LED lamps available that serve as excellent replacements for reflector lamps that are incandescent in a variety of form factors, light outputs, and colors and urged DOE to move forward with its proposal to remove the exemption for these lamps. (NRDC, No. 83 at pp. 45–46; Utility Coalition, No. 95 at pp. 1–2) CEC stated that as of June 15, 2015, 658 models of medium screw base reflector lamps complied with Tier 1 of the adopted California standard thus indicating that cost effective, highly-efficient LED alternatives exist. CEC added that making incremental improvements to existing LED reflector lamps was extremely cost-effective and technically feasible. (CEC, No. 91 at pp. 4–5) Soraa also stated that LED replacements that provide a wide variety of product features, such as color rendering index (CRI), CCT, beam angle, whiteness rendering, and low flicker, are available for the majority of directional incandescent lamps. Soraa noted that customers in quality-sensitive fields such as high-end retail and hospitality have transitioned from halogen to LED technology. Soraa added while there are still some lamp types that are difficult to replicate in LED technology, such as narrow-beam MR16 lamps with the highest wattages, incremental progress in technology will likely make these products available by 2020. Additionally, Soraa stated that the limit of 45 lm/W can be met by

currently-existing products with higher-level features. (Sora, No. 87 at p. 2)

As discussed previously in this document, DOE did not limit its consideration of lamp switching to the ability to replace a lamp in a fixture currently used by a consumer that had been using a traditional incandescent lamp. As indicated by comments from ASAP previously in this document, the presence of reflector lamps in residences in the U.S. has grown significantly over time due to changes in new construction. (ASAP, No. 83 at pp. 38–39) Lighting in homes that traditionally was provided by A shape lamps in floor and table fixtures is being provided in newer construction through reflector lamps in recessed lighting. (ASAP, No. 83 at pp. 58–59)

The basic design characteristic of a reflector lamp, as defined in the industry standard by the Illuminating Engineering Society of North America (IES) RP–16–10, is that it directs the light. But it is possible to direct the omnidirectional light from an incandescent filament into a somewhat more limited set of angles and still have a lamp that provides general illumination. The reflector lamps now being widely used in recessed can lighting are an important example. In such an application (with the lamp mounted in the ceiling), the reflector redirects light that was initially emitted upward. But the resulting light distribution spreads broadly over the area downward from the lamp, so that a consumer can readily use the lamp to provide general illumination for a room. In light of these observations, DOE concludes that “omnidirectional illumination” is not a prerequisite for the traditional functions of incandescent lamps, as GE suggested. Rather, DOE may consider a lamp a ready substitute for GSILs—for purposes of assessing an exemption—if the lamp can provide the same sort of general illumination that GSILs provide.

As presented in Table III.1, DOE estimates that the sales of medium base reflector lamps that are incandescent (and, as noted, do not meet the definition of IRL) are approximately 30 million units per year. 81 FR 71794, 71800. DOE notes that of the 22 exempted lamp types, the category of medium screw base reflector lamps that are incandescent and do not meet the definition of IRL is the third highest annual unit sales, thus indicating that these lamps are likely used in general lighting applications. In addition, because medium screw base reflector lamps are capable of providing overall illumination and could be used as replacements for GSILs, there is also

high potential for lamp switching. For these reasons, DOE is discontinuing the exemption from the GSIL definition for reflector lamps that are incandescent lamps.

While DOE proposed to discontinue the exemption for reflector lamps generally, DOE noted R20 short lamps would continue not to be subject to standards. R20 short lamps are defined as R20 incandescent reflector lamps that have a rated wattage of 100 W; have a maximum overall length of 3 and 5/8, or 3.625, inches; and are designed, labeled, and marketed specifically for pool and spa applications. In a final rule published on November 14, 2013, DOE determined that standards for these lamps would not result in significant energy savings because such lamps are designed for special applications or have special characteristics not available in reasonably substitutable lamp types. 78 FR 68331, 68340. Pursuant to 42 U.S.C. 6291(30)(E), one consequence of DOE’s determination is that these lamps are specifically not incandescent lamps and therefore do not become GSILs when the reflector lamp exemption is discontinued. 81 FR 71800.

ASAP stated that DOE’s analysis on R20 lamps was performed in 2013, before LED substitutes were available for R20 lamps. ASAP asserted that if DOE performed this analysis again that LED substitutes would be available. (ASAP, No. 94 at p. 2)

DOE acknowledges that the analysis on R20 short lamps was conducted in 2013. DOE did consider available LED substitutes at that time. DOE has not reconsidered the lamps in this rulemaking. The final determination regarding R20 lamps was not based solely on the lack of an available substitute. As provided by EPCA, a lamp may be excluded from the definition of “incandescent lamp” by DOE, by rule, as a result of a determination that standards for such lamp would not result in significant energy savings because such lamp is designed for special applications or has special characteristics not available in reasonably substitutable lamp types. (42 U.S.C. 6291(30)(E), emphasis added) DOE determined that in addition to lacking reasonably substitutable lamp types, the application-specific design characteristics of the R20 short lamp and the marketing and non-traditional distribution channels used by these lamp types, are evidence that R20 lamps are designed for pool and spa applications (*i.e.*, a specialty application). 78 FR 68331, 68334. Indeed, R20 lamps must be labeled and marketed specifically for pool and spa

applications. 10 CFR 430.2. Also relevant to DOE’s decision not to include R20 lamps as GSILs under this rulemaking, the lamp did not experience a market migration to other applications even when R20 lamps were perceived not to be regulated (*i.e.*, lamp switching did not occur). 78 FR 68331, 68334. For these reasons, DOE is maintaining the exclusion of R20 lamps from the definition of “incandescent lamp.”

In the October 2016 NOPDDA, DOE also provided data for medium screw base incandescent lamps of the following specific shapes: B, BA, CA, F, G16–1/2, G25, G30, S, M–14 lamps (as defined in ANSI C78.20 and ANSI C79.1–2002) of 40 W or less; G shape lamps (as defined in ANSI C78.20 and ANSI C79.1–2002) with a diameter of 5 inches or more; T shape lamps (as defined in ANSI C78.20 and ANSI C79.1–2002) that use not more than 40 W or have a length of more than 10 inches. For B, BA, CA, F, G16–1/2, G25, G30, S, and M–14 lamps of 40 W or less, DOE estimated the annual sales as approximately 42 million. For G shape lamps with a diameter of 5 inches or more, DOE estimated the annual sales as approximately 8 million units. In addition to the sizeable sales of larger globe shape lamps, DOE noted it is likely that larger globe shape lamps may be used as substitutes for the G16.5, G25, and G30 lamps if the exemption is not also discontinued. Regarding T shape lamps that use not more than 40 W or have a length of more than 10 inches, DOE estimated the annual sales of these lamps as roughly 7 million units. Further, the lamps of the specific shapes discussed in this paragraph are frequently used in general lighting applications and thus DOE believed there is a significant risk for lamp switching. Therefore, due to the high potential for lamp switching—reflected in part by high sales—DOE proposed to discontinue the GSIL exemption for these specific shapes in the October 2016 NOPDDA. 81 FR 71800.

Regarding T shape lamps, NEMA and LEDVANCE stated that they are often used in applications such as museum or other display cases and in music stands. NEMA and LEDVANCE stated that 40 W T shape lamps (the maximum allowable wattage for these lamps) have low sales volume, and because the majority of T shape lamps are 15 W and 25 W lamps, applying a 45 lm/W standard to this lamp would not yield significant energy savings. They also noted that there is a continuing need for incandescent T shape lamps in exit sign fixtures designed for T-shaped incandescent lamps, pointing out that the UL–1993

safety standard specifically warns that CFLs and LED lamps should not be used in these fixtures. Therefore, NEMA and LEDVANCE commented that eliminating these lamps forces building owners to replace entire exit sign fixtures without an analysis of payback or higher initial costs to consumers. NEMA also provided sales data that show that over the past four years the reported sales of these lamps have fallen by 12.7 percent. (NEMA, No. 93 at p. 17; LEDVANCE, No. 90 at p. 29)

As presented in Table III.1, DOE revised its estimate of the annual sales of T shape lamps of 40 W or less or length of 10 inches or more based on the sales data submitted by NEMA. For the year 2015, the most recent year for which NEMA submitted data, NEMA estimated the annual sales of these T shape lamps as 9,750,395 units. Based on the revised estimate, the T shape lamp category has one of the highest annual sales of the 22 exempted lamp categories, thus suggesting that these lamps are likely used in general lighting applications. In addition to the sizable sales of these T shape lamps, DOE determined that T shape lamps are capable of providing overall illumination and therefore have a high potential for lamp switching. Due to the high potential for lamp switching—reflected in part by high sales—DOE is discontinuing the exemption from the GSIL definition for T shape lamps of 40 W or less or length of 10 inches or more.

Regarding NEMA and LEDVANCE's concern that incandescent T shape lamps are required for use in installed exit signs, DOE was unable to find a UL safety requirement that supported this claim. UL-1993, the standard cited by NEMA and LEDVANCE, states that emergency exit fixtures are outside of the scope of the standard. DOE is aware that certain incandescent lamps, particularly those without equivalent LED replacements, may need to be maintained for safety reasons. DOE has exempted certain specialty lamps as described in section III.A.4.f.

DOE also received feedback on its estimate of sales for the G shape lamp with a diameter of 5 inches or more. NEMA, with LEDVANCE's concurrence, stated that unit sales of G shape lamps with a diameter of 5 inches or more comprise a small portion of the overall unit sales of G shape lamps and noted that DOE's sales estimate of 8 million units attributed to these G shape lamps is inaccurate. NEMA provided data showing that sales of G shape lamps with a diameter of 5 inches have decreased each year since 2012 and were under 1 million units in 2015. (NEMA, No. 83 at pp. 81–82; NEMA,

No. 93 at p. 17; LEDVANCE, No. 90 at p. 27)

Several commenters also disagreed with DOE's assessment that G shape lamps with a diameter of 5 inches or more posed a risk for lamp switching. NEMA commented that this lamp type, due to its large shape, will not fit in most fixtures. Therefore, NEMA noted that instead of consumers switching to this lamp type in applications served by GSILs, they will continue to use it in the specialty applications that it is used in currently. NEMA added that for this reason, and the declining annual sales discussed previously, this lamp type does not pose a risk for lamp switching. (NEMA, No. 83 at p. 85; NEMA, No. 93 at p. 17) LEDVANCE agreed, noting that a consumer is unlikely to replace an A19 shape lamp with a 5-inch diameter lamp. (LEDVANCE, No. 83 at pp. 59–61) NEMA and Westinghouse also argued that the G40 shape incandescent lamp typically is more expensive than GSILs, medium screw base CFLs, and many general service LED lamps on the market. They concluded that the higher price point would also decrease the likelihood of lamp switching. (NEMA, No. 83 at p. 85; NEMA, No. 93 at p. 17; Westinghouse, No. 83 at pp. 87–88) Westinghouse added that LED products that are not UL certified or that are failed market attempts may be priced lower and therefore assessments should be based on average prices rather than the lowest price. (Westinghouse, No. 83 at pp. 87–88) ASAP cautioned that lamp prices are fluid and not necessarily tied to the cost of materials; instead they often fluctuate with demand. ASAP also stated that filament-style G shape LED lamps have become popular in retail food establishments and are reasonably priced. ASAP added that if the volume of G shape lamps were to increase, the price of G shape lamps would likely decrease as well. (ASAP, No. 83 at pp. 82–83, 86–87, 89)

In this final rule, DOE has revised its sales estimate for G shape lamps with a diameter of 5 inches or greater based on the data submitted by NEMA. As shown in Table III.1, the estimated annual sales of this lamp category are 859,867 units. In the October 2016 NOPDDA, DOE had estimated the sales of this lamp category to be approximately 8 million units. As described in the October 2016 NOPDDA, in the absence of actual data DOE estimated annual shipments by extrapolating from DOE's product database based on an inventory of available products. DOE accepts the actual data that NEMA submitted as a more accurate representation of the level of sales of these lamps.

These annual sales, which are substantially lower than what DOE had previously estimated, have motivated DOE to maintain the exemption for G shape lamps with diameter of 5 inches or greater. Low annual sales is not, on its own, a dispositive fact. DOE's previous estimate of annual sales suggested to DOE that consumers were using G shape lamps with large diameters in general lighting applications. However, given the low actual sales, DOE believes that the exempt G shape lamps (*i.e.*, G shape lamps with diameters over 5 inches) are not used in such applications. DOE will continue to monitor the market and may reconsider this decision in the future if G shape lamps with a diameter of 5 inches or greater are used in general lighting applications.

DOE also received comments on medium screw base incandescent lamps of the following specific shapes: B, BA, CA, F, G16–1/2, G25, G30, S, M–14 lamps (as defined in ANSI C78.20 and ANSI C79.1–2002) of 40 W or less. NEMA and LEDVANCE stated that medium screw base decorative lamps (*e.g.*, B, BA, CA, and F shape lamps) have lower lumen output than GSILs and cannot be used interchangeably. They also noted that the sales of the medium screw base versions of these lamps are much smaller than the candelabra base versions. NEMA and LEDVANCE noted that the decorative shape lamps are designed for longer lifetimes, and extend the lifetime of incandescent lamp at the expense of lumen output. NEMA and LEDVANCE added that the statutory wattage cap of 40 W considerably limits the lumen output of decorative shapes compared to typical incandescent or halogen lamps. NEMA and LEDVANCE stated that the smaller size of these lamps prevents manufacturers from making suitable LED alternatives as aesthetically pleasing as incandescent versions or as efficient as larger A shape LED lamps, adding that there is insufficient room to put the required electronics in these lamps to match the efficiency of the A shape LED lamps. NEMA also provided data from its members that show sales of these lamps are declining and that the reported sales are lower in 2015 than they were in 2012. (NEMA, No. 93 at p. 18; LEDVANCE, No. 90 at p. 29)

NEMA and LEDVANCE continued that S-shaped lamps are service lamps typically used as sign lamps. They noted that this is a commercial product that is unlikely to be used in residential applications or in general service lamp fixtures. NEMA and LEDVANCE also commented that M–14 lamps are no longer manufactured as it is an outdated

lamp type. NEMA added that as a result, its annual sales have been zero units over the past four years. (NEMA, No. 93 at pp. 19–20; LEDVANCE, No. 90 at p. 29)

Regarding the other globe shape categories within this list, NEMA and LEDVANCE stated that G16–1/2 shape lamps are the smallest version of a globe shape lamp and that their primary application is in lighting used around dressing room mirrors in theaters. They added that lamp switching is unlikely with this lamp type due to its small size and low lumen output. NEMA and LEDVANCE also noted that the G25 shape is the most popular of the globe shape lamps and that it is used primarily in bathroom vanities and bathroom lamp strips. They argued that lamp switching is also unlikely with this lamp type because of its low lumen output. NEMA and LEDVANCE stated that the G30 shape lamp has declined in popularity in favor of G25 shape lamps, thus its market share has declined significantly. NEMA provided sales data that show sales of these globe shape lamps have been declining over the last four years. (NEMA, No. 93 at p. 19; LEDVANCE, No. 90 at p. 28)

In addition, NEMA disagreed with DOE's decision to include B, BA, CA, F, G16–1/2, G25, G30, S, and M–14 shape lamps all in the same category. NEMA argued that they should be categorized separately because they are used in different lighting applications. NEMA stated that Congress only included these lamps in the same clause of the exclusions list to prevent the list of exclusions from being too lengthy. NEMA added that several of these lamp shape types currently have less than a million units of annual sales with declining sales, which makes lamp switching unlikely. (NEMA, No. 93 at p. 14)

In contrast, NRDC argued that DOE's annual sales estimate of 42 million lamps for the decorative lamps' category is underestimated. NRDC added that the estimate seems low based on DOE's LED adoption report, "Adoption of Light Emitting Diodes in Commercial Lighting Applications," that estimates an installed base of 1.2 billion decorative shape lamps, which would primarily be 25 W and 40 W decorative shaped lamps. (NRDC, No. 85 at p. 5) Thus, NRDC asked DOE to not only focus on the A shape, 5-inch G shape, or 10-inch T shape lamps but also on the B, BA, CA shape lamps as they are very common and could fit in many applications including table or desk lamps. NRDC commented that the pear shape of these decorative lamps (*i.e.*, B, BA, CA, and F shape lamps) does not prevent them

from providing the same amount of light at a low cost. NRDC also added that these lamps, of typically 25 W or 40 W, are used in applications that have high annual hours of use, so they present an opportunity for significant energy savings. NRDC noted that the incandescent CA shape lamps, which are used in sets of 5 or 10 in chandeliers, can be replaced by 7 W LED versions. Further, NRDC stated that by discontinuing these exemptions, though technological limitations may currently exist, there are tremendous benefits that could be gained. (NRDC, No. 83 at pp. 85–86; NRDC, No. 85 at p. 3)

Westinghouse elaborated that the challenge for these decorative lamp shapes is lumen range and efficiency scale. Westinghouse noted that there are not many versions of the decorative lamp shapes in halogen technology because it is not easy to put a double-ended halogen burner in a small size lamp due to heat and space issues. (Westinghouse, No. 83 at pp. 87–88)

While NRDC encouraged a conversation regarding potential hardships in making LED replacements for these lamp shapes in larger form factors, it cautioned DOE not to lose sight of the benefits of discontinuing these exemptions. (NRDC, No. 83 at pp. 85–86) ASAP also acknowledged that not every application of the LED version can be technically and economically feasible. However, citing the popularity of the 500 W double-ended halogen lamp ten years ago, ASAP asserted that the selection of products manufactured and their price points are dictated by market demands. (ASAP, No. 83 at pp. 89–90)

DOE revised its estimate in this final rule for the sales of lamps with specific shapes based on the additional data submitted by NEMA. As shown in Table III.1, the estimated annual sales of this lamp category is 71,702,637 units. While DOE understands that some of these lamps are smaller than A shape lamps, they can still be used to provide overall illumination. DOE further notes that the pear shapes and globe shapes characterized by the majority of lamps in this category would not prevent consumers from using them in general service lighting applications. As indicated by the very high sales data of this category, DOE believes that these lamps are very common and can be used in general lighting applications. Regarding the technical limitations of more efficient versions of these products, DOE reviewed product availability to determine which form factor and light output combinations may not be available in fluorescent or

LED technology. For more information on DOE's consideration of technical feasibility issues, see section III.A.4.a.

Regarding the comment from NEMA suggesting that DOE consider the lamps excluded under 42 U.S.C.

6291(30)(D)(ii)(XXII) separately, DOE notes that Congress listed these lamps together in paragraph (XXII). If the lamps were grouped merely for the purpose of drafting convenience, as suggested by NEMA, it is not clear why Congress would not have also included G shape and T shape lamps in the grouping as well. Instead, G shape and T shape lamps are each listed separately in paragraphs (XX) and (XXI), respectively. (42 U.S.C. 6291(30)(D)(ii)(XX) and (XXI))

DOE has considered whether to maintain the exemption for these lamps as a group due to its concern with lamp switching. DOE recognizes that the lamps listed in clause (XXII) may each not be substituted for one another in existing fixtures. However, as discussed previously, DOE also considers the potential for lamp switching through the future use of different fixtures. There is the potential that inclusion of some but not all of the lamps in the group would shift the market to the lamp or lamps that remain exempt. Thus, due to the very high sales volume and risk of lamp switching of the lamp types, DOE is discontinuing exemptions for B, BA, CA, F, G16–1/2, G25, G30, S, M–14 lamp of 40 W or less.

Regarding other exempt lamp categories, pursuant to 42 U.S.C. 6295(l)(4), DOE is required to collect unit sales data for rough service, shatter-resistant, 3-way incandescent lamps, and vibration service lamps. Section 321(a)(3)(B) of EISA 2007 in part amends subsection 325(l)(4) of EPCA by adding paragraphs (D) through (H), which direct DOE to take regulatory action if the actual annual unit sales of any of these lamp types are more than 200 percent of the predicted shipments (*i.e.*, more than double the benchmark unit sales estimate). (42 U.S.C. 6295(l)(4)(D)–(H)) DOE published a notice of data availability (NODA) in April 2016, which indicated that the shipments of vibration service lamps were over 7 million units in 2015, which equates to 272.5 percent of the benchmark estimate. 81 FR 20261, 20263 (April 7, 2016). Furthermore, NEMA submitted revised data for rough service lamps that showed sales of 10,914,000 rough service lamps in 2015, which exceeds 200 percent of their benchmark estimate. Although the sales of shatter-resistant and 3-way incandescent lamps have not yet exceeded their estimated benchmarks,

DOE expects these sales will likely increase since these lamps could be used as replacements for other regulated lamp types. Based on the high sales volume and probability of consumers switching to these lamp types, DOE proposed to discontinue the exemptions of rough service, shatter-resistant, 3-way incandescent, and vibration service lamps from GSILs in the October 2016 NOPDDA. 81 FR 71800.

NEMA supported the regulation of rough service and vibration service incandescent lamps but opposed treating these lamps as “general service incandescent lamps” because they are specialty lamps that were intended to be regulated using a wattage cap as indicated by the statute (see 42 U.S.C. 6295(i)(4)(D)(ii) and (E)(ii)) rather than a lumens per watt or modified lumens per watt regulation. NEMA encouraged DOE to adopt NEMA’s proposal of maximum wattage caps for regulating these two specialty products, which NEMA asserted is consistent with the congressional intent reflected in EISA 2007. (NEMA, No. 93 at p. 12) Additionally, NEMA, LEDVANCE, and Philips asserted that DOE is authorized to establish standards for rough service lamps, shatter-resistant, 3-way incandescent, and vibration service lamps only under the provisions in 42 U.S.C. 6295(l)(4) and that the sales thresholds required under that section to regulate shatter-resistant and 3-way incandescent lamps have not been met. (NEMA, No. 93 at p. 12; LEDVANCE, No. 90 at pp. 19–20; Philips, No. 96 at p. 4) LEDVANCE stated that the more specific reference to regulate rough service lamps, shatter-resistant lamps, 3-way incandescent lamps and vibration service lamps must be read as governing the regulation of these lamps, as opposed to the more general provision in 42 U.S.C. 6295(i)(6)(A)(i)(II). (LEDVANCE, No. 90 at p. 20)

Under 42 U.S.C. 6295(l)(4), DOE is required to undertake a standards rulemaking for rough service lamps, shatter-resistant lamps, 3-way incandescent lamps and vibration service lamps when the sales of these lamps meet specified thresholds. DOE is also required, in consultation with NEMA, to collect sales data for these lamps and construct a model to predict future sales. (42 U.S.C. 6295(l)(4)(B)) DOE must then track the actual sales data, and when sales exceed sales projected by the model by 100 percent, DOE must initiate a rulemaking. (42 U.S.C. 6295(l)(4)(D), (E), (F), (H)) If DOE does not complete the accelerated rulemaking in the specified time period, it must impose a backstop requirement

for that lamp. (42 U.S.C.

6295(l)(4)(D)(ii), (E)(ii), (F)(ii), (H)(ii)) However, this is not the only way in which DOE can regulate these lamps. The text of section 6295(i) and 6295(l) does not state that the section 6295(l) process operates to the exclusion of regulating these lamps as GSLs. As commenters noted with respect to the section 6295(i)(6)(A)(v) backstop, GSLs may become subject to a default standard of 45 lm/W; but DOE is authorized to impose alternative standards for GSLs in general so long as the overall savings from such a rule are at least as great as a uniform 45 lm/W standard would achieve. Thus, in regulating the five types of section 6295(l) lamp as GSLs, DOE would be able to establish a range of possible standards. However, for these particular lamps, when sales have increased to a certain point, section 6295(l) requires DOE to conduct an accelerated rulemaking, and absent that rulemaking, specifies certain minimum standards. That requirement is not inconsistent with the regulatory framework applicable to GSLs, and Congress’s decision to set a separate backstop for these lamps (conditioned on factual circumstances) does not suggest that Congress meant to exclude them from the broader regulatory program.

Additionally, as DOE explained in the October 2016 NOPDDA, DOE understands the reference to “data collected” by DOE under the GSL rulemaking provision to mean the data collected as required for rough service lamps, vibration service lamps, 3-way incandescent lamps, and shatter-resistant lamps. 81 FR 71794, 71798. As noted, DOE is required to collect sales data for these lamps. (42 U.S.C. 6295(l)(4)(B)) The consideration of sales data collected by DOE in making a determination under 42 U.S.C. 6295(i)(6)(A)(i)(II) further demonstrates that the determination is to include rough service lamps, vibration service lamps, 3-way incandescent lamps, and shatter-resistant lamps.

GE agreed with regulating vibration service lamps and rough service lamps as the sales of these lamps have been increasing and have surpassed the allowed sales threshold. GE added that these lamps resemble and, therefore, are being purchased to replace the standard incandescent A shape lamp. (GE, No. 83 at p. 72; GE, No. 88 at p. 2) However, GE stated that shatter-resistant lamps and 3-way lamps are declining in sales, indicating low risk of lamp switching. GE added that the risk of lamp switching is particularly low for the 3-way lamp. GE explained that these lamps are made in A21 and A23 shapes

because the filament must be placed farther from the glass due to the increased heat. Therefore, these lamps may not fit in existing fixtures where A19 shape lamps are used and also may not meet the UL wattage limit on many fixtures in the home. (GE, No. 83 at pp. 72–73; GE, No. 88 at p. 2) NEMA agreed that lamp switching for 3-way lamps is unlikely because the A21 lamp size is larger than the size of the regular A19 lamp and is not a suitable replacement for a regular incandescent lamp. NEMA also added that the safety standard UL 1598 contains a thermal requirement for most common general service lighting fixtures that limits lamp wattage to 100 W and thus higher 150 W 3-way incandescent lamps cannot be used in these fixtures. Further, NEMA commented that many light switches are incapable of controlling the 3-way functionality of a 3-way lamp and it is unlikely a consumer would purchase a more expensive 3-way lamp if the functionality is not desired or cannot be used. (NEMA, No. 93 at p. 16)

NEMA also disagreed with DOE’s proposal to consider shatter-resistant lamps as GSILs noting that sales have fallen 50 percent since 1997, did not increase when traditional GSILs were phased out from 2010–2012, and have not exceeded the statutory threshold under section 325(l)(4)(H). NEMA noted that DOE cannot justify regulating shatter-resistant lamps using a potential for lamp switching because Congress established a clear threshold for the regulation of these lamps of exceeding the estimated sales by 100 percent. Thus, NEMA concluded that DOE does not have the discretion to determine that shatter-resistant lamps are GSLs and must adhere to the limits of the statute. (NEMA, No. 93 at p. 15) Additionally, NEMA commented that the coating on the shatter-resistant lamp reduces the lumen output significantly, making it not ideal as a replacement for a GSIL or general service LED lamp. NEMA added that the lumen output of a 60 W shatter-resistant lamp is identical to the lumen output of a 40 W standard incandescent lamp. As a result of the lumen output differences, NEMA noted that lamp switching is not likely to occur as consumer will not treat a lower lumen lamp as an effective substitute. (NEMA, No. 93 at pp. 15–16) Westinghouse noted that when standards from EISA 2007 became effective consumers did not switch to 3-way lamps, rough service lamps, or shatter-resistant lamps at the time. (Westinghouse, No. 83 at pp. 74–76)

In contrast, CA IOUs, NRDC, and Utility Coalition supported the proposal to discontinue exemptions for shatter-

resistant lamps, rough service lamps, vibration service lamps, and 3-way lamps because these lamps pose a lamp switching risk. (NRDC, No. 83 at p. 74; CA IOUs, No. 83 at p. 77; Utility Coalition, No. 95 at p. 3) NRDC stated that these lamp types look and operate like a standard incandescent lamp and can be used in general service lighting applications. NRDC and Utility Coalition further noted that there are a wide range of efficient alternatives available for these lamp types and NRDC added if they are not regulated their sales would increase dramatically when the next standards go into effect. NRDC also countered that while the sales of 3-way lamps may not be increasing today, there was nothing to prevent them from doing so in the future. It would cost very little to put a coating over a standard incandescent lamp and make it a shatter-resistant lamp, which would dramatically increase sales and reduce purchase price. NRDC added that these lamps would also use considerably more energy than lamps that must comply with a standard and cost consumers significantly more to operate. (NRDC, No. 83 at pp. 10–11, 73–74; NRDC, No. 85 at pp. 1–2; Utility Coalition, No. 95 at p. 3) Utility Coalition noted that LED lamps are inherently durable and provide the necessary utility to serve in the applications of rough service, shatter-resistant, and vibration service. Thus, Utility Coalition concluded that these lamp types should be held to the same standard as all other LED lamps. Additionally, Utility Coalition noted that the incandescent versions of these lamps are even less efficient than standard GSILs, with rough service lamps commonly performing around 10 lm/W. (Utility Coalition, No. 95 at p. 3)

CA IOUs agreed that LED replacements that provide the same functionality are available for these lamp types, in particular the 3-way lamp type. CA IOUs noted that many of the major manufacturers provide 3-way LED replacements and these lamps are highly efficient and reasonably priced in the \$10–\$14 range. Utility Coalition added that DOE testing confirmed that 3-way LED lamps are highly efficient with an efficiency of 111.4 lm/W at the middle setting. (CA IOUs, No. 83 at p. 77; Utility Coalition, No. 95 at p. 3) Westinghouse disagreed citing a high cost differential for consumers to switch to 3-way LED lamps. Westinghouse stated that a 3-way incandescent lamp costs \$2.19 while a 3-way LED lamp is in the \$20–\$22 range with older versions on clearance at \$15–\$16. (Westinghouse, No. 83 at pp. 74–76)

DOE reviewed the sales data submitted by NEMA for the shatter-resistant and 3-way incandescent lamps. The sales of shatter-resistant lamps declined between 2012 and 2015. The sales of 3-way incandescent lamps increased between 2012 through 2014 and then decreased in 2015. However, sales of these lamps have declined over a limited time period. Further, NEMA submitted data for 2015 that indicated that almost 32 million<sup>13</sup> 3-way incandescent lamps (67.2 percent of the benchmark estimate) and nearly 700,000 shatter-resistant lamps (41.1 percent of the benchmark estimate) were sold in that year. 81 FR at 20263–64 (April 7, 2016).

Regarding the lamp switching potential of 3-way lamps, as stated by NEMA and GE, UL 1598 prescribes wattage requirements for certain luminaires. However, UL 1598 is not a comprehensive standard of all fixtures that could be used in general lighting applications. DOE notes that, as stated previously, lamp switching includes shifting to the use of different fixtures in the future and therefore lamp size does not necessarily prevent switching. Regarding the lamp switching potential of shatter-resistant lamps, DOE notes that shatter-resistant lamps are capable of providing overall illumination despite the lower lumen output resulting from the shatter-resistant coating. As noted by NEMA, a 60 W shatter-resistant lamp is still an appropriate replacement for a 40 W standard incandescent lamp.

DOE also expects the sales of these lamps to increase since they could be used as replacements for other regulated lamp types. Shatter-resistant lamps are similar to rough service and vibration service lamps, two lamp categories for which sales have already increased as a result of standards for GSILs. Whereas rough service and vibration service lamps possess a filament strengthened with additional supports, shatter-resistant lamps possess a reinforced outer bulb to contain glass pieces in the event that the bulb breaks. For all three lamp types the consumer may be under the impression that they are purchasing primarily a more durable product rather than a lamp with subpar performance as claimed by NEMA. Some lamps are even offered with more than one of these criteria (*e.g.*, a shatter-resistant lamp with vibration service filaments). Although these lamps must be designated as rough service, vibration service, or shatter-resistant on the lamp packaging, that designation did not

<sup>13</sup> This value was incorrectly stated as 38 million in the October 2016 GSL NOPDDA.

prevent rough service and vibration service lamps from serving as a loophole to standards for GSILs.<sup>14</sup> Furthermore, for all three of these lamp types, LED versions inherently provide the consumer the desired functionality in the sense that LED lamps do not have metal filaments and typically do not use glass outer bulbs. Because the sales of rough service and vibration service lamps have already showed that consumers view these lamps as convenient, unregulated substitutes for GSILs and choose them even though LED lamps provide the same functionality, DOE expects that sales of shatter-resistant lamps will similarly increase if left unregulated. Therefore, based on the high sales volume and probability of consumers switching to these lamp types, DOE is discontinuing the exemptions of shatter-resistant and 3-way incandescent lamps.

As noted, the sales threshold set by EPCA for vibration service incandescent lamps and rough service incandescent lamps has been exceeded. The increasing sales of these lamp types and industry's feedback on their use indicate that these products are used in general lighting applications as substitutes for GSILs. (Westinghouse, No. 83 at pp. 41–42; NEMA, No. 83 at pp. 52–53; GE, No. 83 at p. 73). Therefore, DOE is also discontinuing the exemptions of rough service and vibration service lamps from GSILs in this final rule.

In summary, DOE is discontinuing the following exemptions from the definition of GSIL in this final rule: Reflector lamps; T shape lamps that use not more than 40 W or has a length of more than 10 inches; B, BA, CA, F, G16–1/2, G25, G30, S, M–14 lamps of 40 W or less; rough service lamps; shatter-resistant lamps; 3-way incandescent lamps; and vibration service lamps.

<sup>14</sup> NEMA points out that the coating used to protect shatter-resistant lamps causes such a lamp to provide less output light, for a given wattage, than a comparable non-protected lamp. DOE recognizes also that, while it considers shatter-resistant lamps to be similar in important respects to rough service and vibration service lamps, sales of the former have not thus far increased alongside sales of the latter two. These observations do not undermine DOE's conclusion here. They may reveal that shatter-resistant lamps are less desirable substitutes for GSILs at a time when GSILs are subject only to their own standards. DOE is discontinuing the exemption for shatter-resistant lamps because it believes they will be convenient substitutes for GSILs at a time when GSIL standards effectively preclude the use of incandescent technology for GSILs. In that context, DOE does not believe the reduction in light output that the shatter-resistant glass coating causes will discourage customers from buying these lamps for GSIL-type applications.

b. Exemptions Proposed To Be Maintained in October 2016 NOPDDA

In the October 2016 NOPDDA, DOE proposed to maintain 14 exemptions from the definition of GSIL. DOE found that medium screw base incandescent lamps that are appliance; black light; bug; colored; infrared; left-hand thread; marine; marine signal service; mine service; plant light; sign service; silver bowl; showcase; and traffic signal lamps had low sales data thus indicating that these are low volume products. DOE estimated that 12 of the 14 exemptions have annual unit sales of 1 million units or less. The remaining two exemptions, appliance lamps and colored lamps, were estimated to have less than 3 million annual unit sales and less than 2 million annual unit sales, respectively. DOE also tentatively concluded that several of these exempted lamp types are unable to serve in general lighting applications and cannot provide overall illumination. Specifically, black light; bug; colored; infrared; and plant light lamps produce radiant power in specific wavelengths of the electromagnetic spectrum that would prevent these lamps from serving in general lighting applications. Further, DOE noted that proposing definitions for these exempted lamp types will help to prevent them from becoming loopholes. (See section III.B for a discussion of the definitions proposed for exemptions.) 81 FR 71801. DOE received comments on the 14 GSIL exemptions proposed to be maintained in the October 2016 NOPDDA.

CEC supported DOE's decision to maintain the 14 exemptions from the GSIL definition that it believes are unable to serve in general lighting applications and cannot provide overall illumination. (CEC, No. 91 at p. 5) NEMA, Philips, and GE also agreed with the 14 exemptions from the GSIL definition that DOE proposed to maintain. (NEMA, No. 93 at p. 22; Philips, No. 96 at p. 3; GE, No. 88 at p. 2) GE commented that sales of the 14 exemption categories are small and decreasing, while offering little opportunity for energy savings. (GE, No. 88 at p. 2) Philips added that these lamps serve many niche applications that currently do not have LED replacements in the same form factor and are unlikely to in the future due to technology limitations. Philips stated that it prefers to leverage improvements in SSL technology to improve performance, reduce cost, and offer innovative versions of mainstream products rather than invest in low volume R&D intensive niche products.

Philips concluded that this will encourage consumer adoption and increase energy savings. (Philips, No. 96 at p. 3)

In contrast, ASAP recommended discontinuing several of the 14 exemptions from the GSIL definition noting that the proposed definitions were not specific enough to prevent potential loopholes.

ASAP recommended discontinuing the exemptions for marine and mine lamps because there is little difference in manufacturing or performance of these lamps compared to GSILs, and there are energy-efficient replacements available. (ASAP, No. 94 at p. 5) Utility Coalition also recommended DOE not exempt marine lamps noting that they agreed with DOE's determination that marine lamps provide overall illumination and argued that DOE should not exempt the incandescent versions of these lamps because a potential loophole may result. In addition, Utility Coalition stated that LED versions of marine lamps are now available with substantially higher efficiencies than the incandescent versions. (Utility Coalition, No. 95 at p. 7)

For marine lamps and mine service lamps, as shown in Table III.1, DOE estimates that the annual sales were less than 1 million units for each lamp type and therefore concludes that marine lamps and mine service lamps are low volume products. Further, DOE has adopted definitions in this final rule requiring that these lamps are designed and labeled for their respective applications in order to discourage their use in general lighting applications. (See sections III.B.10 and III.B.4 for the adopted definitions of mine service lamp and marine lamp, respectively.) For these reasons, DOE has maintained the exemptions from the GSIL definition for marine lamps and mine service lamps.

ASAP also recommended discontinuing the exemption for showcase lamps to prevent a potential loophole noting they are widely available, can fit in many light fixtures, and are similar to the T shape lamps that DOE proposed to include. (ASAP, No. 94 at p. 5) DOE determined that showcase applications generally have space constraints and therefore typically require the use of lamps with specific shapes and characteristics to serve in this specialty application. As shown in Table III.1, DOE estimates the annual sales of showcase lamps to be less than 1 million units and thus concludes that these lamps are low volume products. In addition, DOE has adopted a definition in this final rule that includes only

specific shapes and wattages and requires that showcase lamps be designed and labeled for their specialty application in order to discourage their use in general lighting applications. (See section III.B.5 for the adopted definition of showcase lamp.) Given the specific characteristics of showcase lamps outlined in the definition, DOE concluded that the continued exemption of showcase lamps is unlikely to create a loophole. Thus, DOE has maintained the exemption for showcase lamps from the GSIL definition in this final rule.

ASAP noted that the exemption for bug lamp should be discontinued because it was found recently in a study presented at the American Academy of Arts and Sciences 2016 Annual Meeting that warm light LED lamps attracted fewer bugs than incandescents, CFLs, halogens, cool light LED lamps, and incandescent bug lamps. (ASAP, No. 94 at p. 5) DOE understands that research has been conducted to assess the most effective sources for preventing bug attraction. The abstract of the study<sup>15</sup> cited by ASAP stated that it was the first and only study to directly compare the effectiveness of different lamp technologies designed for outdoor residential use in preventing the attraction of bugs. Further, the study appears to be limited to a specific geographic region and time of year. DOE appreciates ASAP directing its attention to the study but is withholding from making a determination on the effectiveness of various technologies based on the limited research available thus far. DOE estimates the annual sales of bug lamps to be less than 1 million units and thus concludes that these lamps are low volume products. In addition, DOE determined that the features of a bug lamp, including radiant power in a specific portion of the electromagnetic spectrum and visible yellow coating, would discourage its use in general lighting applications and limit its ability to provide overall illumination. Further, DOE has adopted a definition for bug lamp in this final rule reflecting these unique characteristics and requiring that bug lamps be specifically designed and labeled for their specialty application in order to discourage their use in general lighting applications. (See section III.B.1 for the adopted definition of bug lamp.) For these reasons, DOE has maintained

<sup>15</sup> Light Pollution and Insects: Insect Attraction to Various Types of Residential Lights abstract is available at: <http://www.aas.org/abstract/light-pollution-and-insects-insect-attraction-various-types-residential-lights>.



the exemption for bug lamp from the GSIL definition in this final rule.

Regarding plant light lamps, ASAP commented that the LED versions of these lamps are a better alternative to incandescent plant light lamps and less expensive to operate. (ASAP, No. 94 at p.5) DOE acknowledges the potential for LED lamps to be well suited to provide light in specific spectral ranges to encourage plant growth; however, DOE also believes this to be an area of continuing research<sup>16</sup> and is not assessing the effectiveness of different technologies on plant growth. As shown in Table III.1, DOE estimates the annual sales of plant light lamps to be less than 1 million units and thus concludes that these lamps are low volume products. In addition, DOE determined that plant light lamps produce radiant power in specific wavelengths of the electromagnetic spectrum that would prevent these lamps from serving in general lighting applications. DOE has adopted a definition in this final rule specifying radiant power requirements and requiring that these lamps be designed and marketed for their specialty application in order to discourage their use in general lighting applications. (See section III.B.1 for the adopted definition of plant light lamp.) For these reasons, DOE has maintained the exemption for plant light lamp from the GSIL definition in this final rule.

ASAP recommended including traffic signal lamps in the definition of GSL. (ASAP, No. 94 at p. 4) NRDC stated that the exemption for traffic signal lamps is not warranted because these lamps are suitable for general lighting applications and are comparable to rough service or vibration service lamps through the use of a sturdier filament. NRDC noted that these lamps available in medium screw bases, have input voltages of 120 V and 130 V, and have significant light output comparable to 40 W or 60 W lamps. NRDC added that LED lamps can serve as suitable replacements for traffic signal lamps, as they are physically durable, have long lifetimes, and already exist at the desired voltages and light output levels. (NRDC, No. 83 at pp. 12, 95; NRDC, No. 85 at p. 8) Utility Coalition also recommended DOE not exempt traffic signal lamps from the GSL definition. Utility Coalition noted that they agreed with DOE's determination that traffic signal lamps provide overall illumination and argued that DOE should not exempt the

incandescent versions of these lamps because a potential loophole may result. In addition, Utility Coalition noted that LED versions of traffic signal lamps are now available with substantially higher efficiencies than the incandescent versions. (Utility Coalition, No. 95 at p. 7)

DOE understands that traffic signal lamps may share characteristics with rough service or vibration service lamps; however, DOE also identified a characteristic of traffic signal lamps—a very long lifetime, which indicated they were designed for a specialty application. As shown in Table III.1, DOE estimates the annual sales of traffic signal lamps to be less than 1 million units and thus concludes that these lamps are low volume products. In addition, DOE believes removing the exemption for traffic signal lamps could result in safety concerns or stranded equipment. DOE has adopted a definition in this final rule specifying a minimum lifetime requirement and requiring that these lamps be designed and marketed for their specialty application in order to discourage their use in general lighting applications. (See section III.B.6 for the adopted definition of traffic signal lamp.) For the reasons discussed in this paragraph, DOE has maintained the exemption for traffic signal lamp from the GSIL definition in this final rule. DOE will continue to monitor the market and may reconsider this decision in the future if traffic signal lamps are used in general lighting applications.

CA IOUs acknowledged that silver bowl lamps are unique in that they have an aluminum cover at the top that reflects light back into the fixture. However, CA IOUs stated that these lamp types are becoming more popular and being used for general illumination, often in restaurants, because they can still project light into an area and provide overall illumination. CA IOUs and ASAP added that silver bowl LED lamps are also becoming more common and offered in different form factors. Therefore, CA IOUs recommended that the exemption for silver bowl lamps from GSILs be discontinued. (CA IOUs, No. 83 at pp. 107–108; ASAP, No. 94 at p.5) Utility Coalition also recommended that DOE not exempt silver bowl lamps from the GSL definition. Utility Coalition noted that they agreed with DOE's determination that silver bowl lamps provide overall illumination and argued that DOE should not exempt the incandescent versions of these lamps because a potential loophole may result. (Utility Coalition, No. 95 at p. 7)

As shown in Table III.1, DOE estimates the annual sales of silver bowl

lamps to be approximately 1 million units and thus concludes that these lamps are low volume products. In addition, DOE has determined that silver bowl lamps use an opaque reflective coating to provide diffuse light concentrated in an upward direction which other lamps, such as omnidirectional or reflector lamps, are unable to provide without the use of additional components. DOE has adopted a definition in this final rule specifying the inclusion of an opaque reflective coating and requiring that these lamps be designed and marketed for their specialty application in order to discourage their use in general lighting applications. (See section III.B.7 for the adopted definition of silver bowl lamp.) For these reasons, DOE has maintained the exemption for silver bowl lamp from the GSIL definition in this final rule.

Utility Coalition also recommended that DOE not exempt left-hand thread lamps from the GSL definition. Utility Coalition noted that they agreed with DOE's determination that left-hand thread lamps provide overall illumination and argued that DOE should not exempt the incandescent versions of these lamps because a potential loophole may result. In addition, Utility Coalition noted that LED versions of left-hand thread lamps are now available with substantially higher efficacies than the incandescent versions. (Utility Coalition, No. 95 at p. 7)

As shown in Table III.1, DOE estimates the annual sales of left-hand thread lamps to be less than 1 million units and thus concludes that these lamps are low volume products. In addition, DOE has adopted a definition in this final rule requiring that these lamps be designed and marketed for their specialty application in order to discourage their use in general lighting applications. (See section III.B.10 for the adopted definition of left-hand thread lamp.) Given the very low sales and the adopted definition, DOE concluded that the continued exemption of left-hand thread lamps is unlikely to create a loophole. Thus, DOE has maintained the exemption for left-hand thread lamps from the GSIL definition in this final rule. DOE will continue to monitor the market and may reconsider this decision in the future if left-hand thread lamps are used in general lighting applications.

Westinghouse stated that the lumen output of heat lamps (or infrared lamps) is low but was not sure if it is below 310 lumens which would exclude them from the GSL definition. (Westinghouse, No. 83 at p. 43) DOE notes that

<sup>16</sup> Massa, G., Kim, H.-H., & Wheeler, R. *Plant Productivity in Response to LED Lighting*. HortScience. December 2008. (Last accessed November 20, 2016.) <<http://hortsci.ashspublications.org/content/43/7/1951.full>>

information available for infrared lamps is very limited and lumen output was generally not available since the primary purpose of these lamps is to provide heat. DOE determined that infrared lamps predominately provide radiant power in the infrared region of the electromagnetic spectrum and also typically have a wattage of 125 W or greater. As shown in Table III.1, DOE estimates the annual sales of infrared lamps to be less than 1 million units and thus concludes that these lamps are low volume products. In addition, DOE has adopted a definition in this final rule specifying the design parameters and requiring that infrared lamps be designed and marketed for their specialty application in order to discourage their use in general lighting applications. (See section III.B.2 for the adopted definition of infrared lamp.) For these reasons, DOE has maintained the exemption for infrared lamp from the GSIL definition in this final rule.

DOE also estimated the sales data of medium screw base incandescent lamps that are appliance lamps; black light lamps; colored lamps; marine signal service lamps; and sign service lamps. As indicated in Table III.1, the annual sales of black light, marine signal service, and sign service lamps were 1 million units or less. Appliance lamps and colored lamps were estimated to have annual sales of 2 million units or less. Having received no comments to the contrary, DOE has maintained the exemptions for these lamps due to low sales and the inability or unlikelihood of these lamps to serve in general lighting applications. Further, DOE adopted definitions for these exempted lamp types to prevent them from becoming loopholes. (See section III.B for a discussion of the adopted definitions.)

As discussed in section III.A.1.a, in this final rule, DOE is also maintaining the exemption of G shape lamps with a diameter of 5 inches or greater. As stated previously, DOE will continue to monitor the market and may reconsider this decision in the future if G shape lamps with a diameter of 5 inches or greater are used in general lighting applications.

#### c. Amended Definition for GSIL

Based on the preliminary determinations in the October 2016 NOPDDA, DOE proposed a new definition for GSIL. GSILs are included in the definition of GSL. (42 U.S.C. 6291(30)(BB)(i)(I)) Thus, any lamp that meets the definition of a GSIL would be a GSL. ASAP supported DOE's proposed revisions to the GSIL definition stating that it is clearer and reduces the chances

of loophole products emerging that can undercut the energy savings from the 45 lm/W backstop standard. (ASAP, No. 94 at p. 3)

In this final rule, DOE is adopting a revised definition of GSIL. A general service incandescent lamp is a standard incandescent or halogen type lamp that is intended for general service applications; has a medium screw base; has a lumen range of not less than 310 lumens and not more than 2,600 lumens or, in the case of a modified spectrum lamp, not less than 232 lumens and not more than 1,950 lumens; and is capable of being operated at a voltage range at least partially within 110 and 130 volts; however this definition does not apply to the following incandescent lamps: An appliance lamp; a black light lamp; a bug lamp; a colored lamp; a G shape lamp with a diameter of 5 inches or more as defined in ANSI C79.1–2002; a n infrared lamp; a left-hand thread lamp; a marine lamp; a marine signal service lamp; a mine service lamp; a plant light lamp; an R20 short lamp; a sign service lamp; a silver bowl lamp; a showcase lamp; and a traffic signal lamp. See the amendments to § 430.2 for the revised definition in its entirety.

#### 2. CFLs

CFLs are also included in the definition of GSL; however, the term “compact fluorescent lamp” was not previously defined. DOE adopted a definition for CFL in the August 2016 CFL test procedure final rule. 81 FR 59386, 59403 (August 29, 2016). DOE incorporated language from the industry standards published by IES RP–16–10 and IES LM–66–14 to define CFL without inappropriately excluding or including lamps. A CFL is an integrated or non-integrated single-base, low pressure mercury, electric-discharge source in which a fluorescing coating transforms some of the ultraviolet energy generated by the mercury discharge into light; the term does not include circline or U-shaped lamps. 10 CFR 430.2.

DOE did not receive any comments regarding this definition and therefore considers CFLs to be lamps as described in the definition adopted in the August 2016 CFL test procedure final rule.

#### 3. General Service LED Lamps and OLED Lamps

General service LED and OLED lamps are included in the definition of GSL under 42 U.S.C. 6291(30)(BB). DOE proposed definitions for both terms in the October 2016 NOPDDA. 81 FR 71803. NEMA recommended and LEDVANCE supported their recommendation that the definition of

general service LED lamp be modified to include lamps marketed for vibration service, rough service, and vibration resistance and exclude specialty lamps and specialty base lamps as defined by NEMA. (NEMA, No. 93 at p. 26; LEDVANCE, No. 90 at pp. 32–33)

As described in section III.A.1.a, DOE discontinued exemptions for vibration service and rough service lamps from the definition of GSIL and therefore these lamps are also included in the definition of GSL. 81 FR 71801. DOE has addressed other specialty lamps as they relate to the definition of GSL in section III.A.4. Therefore, DOE has not revised the definition of “general service LED lamp” in this final rule.

DOE is definitions for “general service LED lamp” and “general service OLED lamp” as detailed in the amendments to § 430.2.

#### 4. Other Lamps

As stated previously, the definition of GSL includes (subject to the exemptions to the extent DOE maintains them) any other lamps that DOE determines are used to satisfy lighting applications traditionally served by GSILs. (42 U.S.C. 6291(30)(BB)(i)(IV)) In addition to GSILs, CFLs, and general service LED and OLED lamps, DOE proposed in the October 2016 NOPDDA a determination that any other lamps that are intended to serve in general lighting applications and have specific features would meet the statutory criterion of lamps used to satisfy lighting applications traditionally served by GSILs. To implement this determination in the October 2016 NOPDDA, DOE proposed to define general service lamp as a lamp capable of serving in general lighting applications and that has the following basic characteristics: (1) An ANSI base (with the exclusion of light fixtures and LED downlight retrofit kits); (2) a lumen output of greater than or equal to 310 lumens and less than or equal to 4,000 lumens; (3) an ability to operate at any voltage; and (4) no designation or label for use in non-general applications. 81 FR 71807. “General lighting application” is currently defined at 10 CFR 430.2 as lighting that provides an interior or exterior area with overall illumination. The key aspects of the proposed definition of GSL and specific comments received regarding these features are discussed in the following sections.

##### a. Product Availability

Regarding DOE's authority to include other lamps as GSILs, DOE received several comments regarding the availability of equivalent LED substitutes. Westinghouse commented

that there should be two considerations: (1) Whether a lamp type can be made in an LED form and (2) whether it makes economic sense to make the LED version of a lamp type. Westinghouse added that while it is sometimes possible to make the LED version of a specialty lamp, it may not make sense if the sales are declining and potential energy savings are very small. (Westinghouse, No. 83 at pp. 62–64) Westinghouse stated that there are products with small form factors and high lumen output that simply cannot be made as LED replacements. Westinghouse added that they are not aware of any current technology pathways to make certain lamps despite funding opportunities offered by DOE and the utilities. (Westinghouse, No. 83 at pp. 22–23) GE agreed with Westinghouse that there are many halogen lamps used for commercial applications for which it would be physically impossible to make LED replacements. (GE, No. 83 at pp. 129–130) Westinghouse stated that halogen lamps are declining in sales due to a shift towards integrated LED fixtures, but that as long as these sockets remain, consideration should be given to lamps that cannot be made using LED technology. (Westinghouse, No. 83 at pp. 126–129)

After reviewing product availability, technical information, and comments from stakeholders, DOE believes there are three main categories of lamps: (1) Lamps with more efficient, equivalent replacements (*i.e.*, the same form factor and light output); (2) lamps currently without equivalent replacements but for which replacements can likely be made in the future; and (3) lamps for which industry is unlikely to ever be able to create equivalent replacements using more efficient technology.

Regarding the third category of lamps, DOE believes that there are certain lamps that cannot be made with fluorescent or LED technology while reasonably maintaining the same form factor and light output, and thus more efficient, equivalent replacements are technically infeasible for these lamps. For example, certain bipin and double-ended halogen lamps have such small form factors that current information shows it is unlikely that these lamps can be made using a more efficient technology while maintaining a similar form factor and light output. DOE is aware of ongoing research regarding the design challenges when adapting LED technology to the compact form factors of the incandescent and halogen lamps

they are intending to replace.<sup>17</sup> One of the most significant challenges for LED lamps is thermal management, as LED lamps must dissipate a substantial amount of the heat generated to avoid degrading performance (*e.g.*, efficiency, lifetime, color). LED lamps use conduction and convection to transfer heat away from the LEDs and circuitry to a heat sink and eventually to the ambient environment. Comparatively, incandescent lamps dissipate heat generated by the filament to the ambient environment directly through infrared radiation (*i.e.*, absent a heat sink component).<sup>18</sup> The additional components required for LED lamps create design constraints when attempting to maintain the compact form factors of the lamps they are intended to replace. Thus, DOE believes that the dimensions of certain lamps prevent the development of equivalent LED replacement lamps in the desired form factors and lumen outputs.

DOE believes this conclusion is significant because the unavailability of non-incandescent substitutes for a given lamp suggests that lamp is not being used for traditional GSIL applications. The applications traditionally served by GSILs involve general illumination, and DOE believes non-incandescent lamps such as CFLs and LED lamps can adequately serve that application. Indeed, that premise is fundamental to the policy set by EISA 2007 regarding energy use in lighting; the 45 lm/W default standard would likely preclude the use of incandescent technology for any lamp to which it applied. DOE recognizes that various lighting applications do not involve general illumination, and that many of those applications involve technical requirements that necessitate design features in lamps such as specific sizes, shapes, and lumen outputs. If the design characteristics of lamps for a given application are such that non-incandescent lamps cannot be made with the same characteristics, DOE believes it cannot, at present, conclude that those lamps are being used for general illumination. Consequently, DOE is not including such lamps as “other lamps” in its definition of GSL. In the discussion that follows, DOE refers to lamps that it, for this reason, is excluding from GSLs as “specialty products.” But DOE emphasizes that it uses that language only for convenience in explaining its decisions. It is not in

fact determining that such lamps are “specialty products.” Rather, and consistent with the “other lamps” clause, DOE is simply declining to determine that such lamps are used for traditional GSIL applications.

DOE has reviewed product availability to determine which form factor and light output combinations may not be available in fluorescent or LED technology. For the second category of lamps, products that do not currently have more efficient replacements with the same form factor and light output but for which replacements can likely be made in the future, DOE believes that it is possible to manufacture equivalent replacements but that companies have chosen not to do so because the market demand has not yet been great enough. These products have been included in the definition of general service lamp, to the extent they satisfy other aspects of the definition. As discussed in the following sections, DOE has developed multiple criteria that together justify a determination that a lamp is used for traditional GSIL applications. For lamps that cannot be made with non-incandescent technology, those criteria may be insufficient and DOE has excluded such lamps from being GSLs. But for lamps that can be made with non-incandescent technology, DOE believes the criteria it has developed will be adequate for the “other lamps” determination, just as for lamps that are already available with non-incandescent technology.

#### b. General Lighting Applications

As stated previously, EISA 2007 added the definition of GSL to EPCA and defined the term, in part, to include GSILs, CFLs, general service LED and OLED lamps, and any other lamp that DOE determines is used to satisfy lighting applications traditionally served by GSILs (“other lamps” authority). (42 U.S.C. 6291(30)(BB)(i)(IV)).

To implement this provision, DOE must determine what types of lighting applications have been traditionally served by GSILs; and then it must establish criteria for determining whether a given lamp is used in such applications. With respect to the first issue, the October 2016 NOPDDA noted that GSILs have traditionally provided overall illumination. DOE bases that conclusion on the definition of GSIL and its review of lamps in the market that fulfill that definition. A GSIL, as defined in section 6291(30)(D), is (subject to exemptions) “a standard incandescent or halogen type lamp” that “is intended for general service

<sup>17</sup> Chen, H., S.Y. Hui, S. Li, S. Tan, and E. Waffenschmidt. Power Flow Analysis and Critical Design Issues of Retrofit Light-Emitting Diode (LED) Light Bulb. IEEE Transactions on Power Electronics. 2015. 30(7): pp. 3830–3840.

<sup>18</sup> *Id.*

applications”; that “has a medium screw base”; that has a lumen range as specified in the definition; and that is capable of being operated between 110 and 130 volts. DOE believes that traditionally, lamps that are standard incandescent or halogen and that satisfy the other criteria have served general lighting applications. By “general lighting applications,” DOE means lighting that provides an interior or exterior area with overall illumination. As described in the October 2016 NOPDDA, DOE considers the term “overall illumination” to be similar in meaning to the term “general lighting” as defined in the industry standard ANSI/IES RP-16-10 (hereafter “RP-16”). RP-16 states that “general lighting” means lighting designed to provide a substantially uniform level of illuminance throughout an area, exclusive of any provision for special local requirements.

GE stated that the phrase “used in general lighting applications” that DOE included in the proposed definition of GSL was too vague and DOE should instead include the phrase “used to satisfy lighting applications traditionally served by general service incandescent lamps.” GE explained that for a product to satisfy light applications traditionally served by GSILs it should have a medium screw base, produce between 310 and 2,600 lumens, and operate on a voltage between 110 and 130 V per the current definition of GSILs. (GE, No. 83 at p. 130; GE, No. 88 at pp. 2–4)

NEMA commented that the authority to include other lamps that are used to satisfy lighting applications traditionally served by GSILs is limited to consideration of new technologies given that the EISA 2007 amendment establishing the GSL definition was just beginning to be introduced and development of LED technology was underway. (NEMA, No. 93 at pp. 3–4)

DOE acknowledges that the phrase identified by GE is the same one used in the statutory definition of GSL. While including the phrase would ensure consistency with the statutory definition, it is clear from the comments on this rulemaking that the phrase is ambiguous and needs further clarification.

With respect to NEMA’s comment, nothing in the language of the statute limits the consideration of “other lamps” to “new technologies.” EPCA directs DOE to consider how GSILs have traditionally been used (*i.e.*, in what applications GSILs served). Also, it would frustrate the purposes of the statute for DOE to assess what counts as

a “new technology.” DOE would have to conduct a historical assessment to see what the status of a given lighting technology was in 2007, and DOE would need to know what degree of development would have been sufficient for Congress to have considered in 2007 whether to include that technology explicitly in the statute. Moreover, DOE would be presuming that if a technology had reached a certain degree of development, then Congress certainly would have decided whether to include or exclude the technology. Yet there are no signs in the statute or the legislative history that Congress engaged in that searching analysis of technological developments. If DOE were mistaken in its presumption that Congress would have considered a technology during the 2007 deliberations, then it might end up overlooking a set of lamps that could be widely used to provide general illumination. This “new technology” assessment, for which the statute provides no guidance, seems inconsistent with the framework established by EISA 2007. Rather, DOE believes that Congress deferred to DOE the assessment whether, over the course of time, a given set of lamps is being used for GSIL-type applications—regardless whether that set of lamps existed in 2007 as a technological matter.

In developing a definition for GSL that includes “other lamps,” DOE has also considered how to determine whether a lamp is used for traditional GSIL applications. EPCA does not specify to what extent a lamp must be used to satisfy those applications in order to be considered a GSL, and DOE does not interpret the definition to require that the use of other lamps be extensive. As in its consideration of whether to maintain an exemption under the GSL definition, DOE also considered the potential of lamp switching that may occur in response to any GSL standard when evaluating “other lamps.” Even if a lamp is currently used in only very limited instances to satisfy lighting applications traditionally served by GSILs, that use has the potential to increase in response to a standard for GSLs.

DOE does not have data on every application in which a lamp is used, so absent complete data on actual use, DOE considers the characteristics of a lamp relevant for assessing whether it is used to satisfy lighting applications traditionally served by GSILs. In looking at the application of a GSIL, DOE considered the lighting characteristics of a GSIL, *i.e.*, DOE considered what lighting characteristics allow a GSIL to

meet the needs of a general service application and what lighting characteristics would satisfy a lighting application traditionally served by a GSIL. DOE believes that if a lamp is capable of being used in general lighting applications and has the additional features that DOE is including in the definition of GSL, that lamp is actually being used to some extent in applications traditionally served by GSILs. As GSILs have traditionally provided overall illumination, a lamp that would satisfy the same application as traditionally served by GSILs is one that would provide overall illumination. 81 FR 71803–71804.

Utility Coalition and CA IOUs asserted that the scope of GSL is not limited to residential products. The definition of “general lighting application” means “lighting that provides an interior or exterior area with overall illumination,” with no mention of sector. Utility Coalition stated that the inclusion of all voltages and bases in the proposed GSL definition reinforces that this rulemaking is not specific to only residential products. Further Utility Coalition asserted that the existence of exemptions for clearly non-residential lamps, such as marine lamps and traffic signal lamps, indicated that the scope of GSLs is not only residential products. (Utility Coalition, No. 95 at p. 4; CA IOUs, No. 83 at p. 136)

With respect to whether “other lamps” must be for residential use, DOE notes that GSLs are regulated under Title III, Part B of EPCA, The Energy Conservation Program for Consumer Products Other Than Automobiles; *i.e.*, GSLs are regulated as consumer products. (42 U.S.C. 6291–6309) “Consumer product” is not necessarily restricted to a product used in a residential setting. EPCA defines “consumer product,” in part, as any article of a type which to any significant extent is distributed in commerce for personal use or consumption by individuals, without regard to whether such article of such type is in fact distributed in commerce for personal use or consumption by an individual. (42 U.S.C. 6291(1)(B)) Because a consumer product need only be distributed “to a significant extent” for consumer use, evidently many sales of the product type could be for non-consumer uses; and the definition explicitly says that a particular product with no consumer sales can still be a consumer product if it is of a type that is “to a significant extent” sold for consumer use. Meanwhile, the phrase “applications traditionally served by general service incandescent lamps” is

not limited to residential applications. Thus, GSILs can be sold extensively for non-consumer applications and the “other lamps” provision does not suggest DOE should regard “applications traditionally served” by GSILs as comprising only consumer use. Accordingly, DOE did not limit its analysis to certain market sectors when considering which lamps served in these applications.

Nothing in the language of the statute limits the consideration of “other lamps” to “new technologies.” EPCA directs DOE to consider how GSILs have traditionally been used (*i.e.*, in what applications GSILs served). Also, it would frustrate the purposes of the statute for DOE to assess what counts as a “new technology.” DOE would have to conduct a historical assessment to see what the status of a given lighting technology was in 2007, and DOE would need to know what degree of development would have been sufficient for Congress to have considered in 2007 whether to include that technology explicitly in the statute. Moreover, DOE would be presuming that if a technology had reached a certain degree of development, then Congress certainly would have decided whether to include or exclude the technology. Yet there are no signs in the statute or the legislative history that Congress engaged in that searching analysis of technological developments. If DOE were mistaken in its presumption that Congress would have considered a technology during the 2007 deliberations, then it might end up overlooking a set of lamps that could be widely used to provide general illumination. This “new technology” assessment, for which the statute provides no guidance, seems inconsistent with the framework established by EISA 2007. Rather, DOE believes that Congress deferred to DOE the assessment whether, over the course of time, a given set of lamps is being used for GSIL-type applications—regardless of the state of the technology of the set of lamps in 2007.

As described in the October 2016 NOPDDA, GSILs have traditionally provided overall illumination. Therefore, a lamp that would satisfy the same application as traditionally served by GSILs is one that would provide overall illumination. DOE included the phrase “is used in general lighting applications” in the definition of GSL because “general lighting application” means lighting that provides an interior or exterior area with overall illumination. As described in the October 2016 NOPDDA, DOE considers the term “overall illumination” to be

similar in meaning to the term “general lighting” as defined in the industry standard ANSI/IES RP-16-10 (hereafter “RP-16”). RP-16 states that “general lighting” means lighting designed to provide a substantially uniform level of illuminance throughout an area, exclusive of any provision for special local requirements.

DOE acknowledges the point that some commenters made, that the “other lamps” subclause in the GSL definition refers to lamps that “are used” for traditional GSIL applications, not lamps that could be so used or are likely to be so used. DOE’s approach is consistent with that language. A lamp that is capable of being used for general illumination could, in many cases, be used for traditional GSIL applications. But, as previously described, that capability is not sufficient, on its own, to qualify a lamp as an “other lamp” under DOE’s definition. Rather, a lamp must have specific additional characteristics, described in later sections. DOE believes that this set of market characteristics, in light of market realities, is sufficient to identify lamps that are used for traditional GSIL applications.

As noted, DOE does not interpret “are used” to impose a particular threshold of how prevalent a GSIL-type use must be before a lamp can qualify as an “other lamp.” In addition, the statute does not specify that the GSIL-type uses be the only uses of a lamp for it to qualify as an “other lamp.”

Finally, DOE does not believe that by referring to lamps that “are used” for GSIL-type applications, EPCA requires DOE to have direct evidence of such uses. As usual with factual determinations, this one can be made on the basis of expert judgment and circumstantial evidence. The criteria discussed in later sections are relevant in that respect; these are characteristics that make a lamp particularly suitable for consumers’ use as a substitute for GSILs. DOE notes that lamps—like other products—tend to be designed and optimized for the applications in which buyers actually use them. Consistent with that observation, specialty lamps tend to have a range of design characteristics which make them especially suitable for their particular applications, and at the same time make it more difficult to use them in the same applications as GSILs. Thus, if a lamp that is capable of providing general illumination has design features that make it highly suitable for performing that task in the sort of application that GSILs have traditionally served, DOE infers that manufacturers of that lamp are, to some extent, serving buyers that

use the lamps in that way. The marketing or labeling of a lamp also helps reveal the uses to which a lamp is actually put. If a lamp is marketed solely for specialty purposes, that fact makes it less likely that the lamp is used for traditional GSIL applications. DOE has reflected this consideration by excluding from the definition of GSL certain specialty lamps.

#### c. ANSI Bases

In the October 2016 NOPDDA, DOE proposed that a GSL must have an ANSI base, with the exclusion of light fixtures and LED downlight retrofit kits. DOE noted that it considers an ANSI base to be a lamp base standardized by the American National Standards Institute. To better clarify the term ANSI base, DOE proposed a definition in the October 2016 NOPDDA. 81 FR 71804. More specifically, an

*ANSI base, as proposed, would be a base type specified in ANSI C81.61-2016 or IEC 60061-1:2005. Id.*

Utility Coalition supported DOE’s proposal to include all bases specified in ANSI C81.61-2016 or IEC 60061-1:2005 in the GSL definition and noted the wide availability of base types in LED lamps. (Utility Coalition, No. 95 at p. 4) ASAP also commented that the ANSI base type specification is appropriate. ASAP noted that bases commonly found in residential applications are driven by the applications or fixture types that are popular at that point in time and can be driven by changes in the market or manufacturing decisions to take advantage of existing standards. (ASAP, No. 83 at pp. 117-118)

However, GE commented that base type needs to be limited because lamps are included in the GSL scope that have never been nor cannot ever be used in a home, and instead are intended for use in specialty commercial or industrial applications. GE explained that most fixtures in homes have predominantly medium screw base sockets with some candelabra base sockets and very few intermediate base sockets. (GE, No. 83 at p. 130) NEMA stated that DOE should include only common base types as only they would be used to satisfy lighting applications traditionally served by GSILs. Maxlite agreed that the ANSI base specification is too broad and suggested limiting general service lamps to those with bases that are common in consumer and residential products. (NEMA, No. 93 at pp. 27-28; Maxlite, No. 83 at p. 123)

As noted in section III.A.4.b, EPCA directs DOE to include as GSILs lamps that are used to satisfy lighting

applications traditionally served by GSILs. DOE has determined that lamps that would satisfy the same applications as traditionally served by GSILs are ones that would provide overall illumination. DOE is not directed to limit its analysis to lamps that provide overall illumination in only the residential sector or, more specifically, only in homes. Therefore, DOE has not used this criterion in deciding whether certain lamps are general service lamps.

For this final rule, DOE reviewed available product offerings by ANSI base type. While DOE is maintaining the specification that GSLs must have an ANSI base, DOE has concluded that certain incandescent/halogen lamps without more efficient, equivalent replacements should not—for the reasons previously given—be included in the definition of GSL. As described in more detail in section III.A.4.f, DOE is excluding lamps with the following ANSI bases from the definition of GSL: Wedge bases; prefocus bases; reflector lamps with a diameter less than 2 inches that do not have E26/24, E26d, E26/50x39, E26/53x39, E29/28, E29/53x39, E39, E39d, EP39, or EX39 bases; and J, JC, JCD, JCS, JCV, JCX, JD, JS, and JT shape lamps that do not have Edison screw bases. DOE did not receive comments specific to its proposed definition of ANSI base. However, upon further deliberation, DOE has concluded that the term “ANSI base” is clear enough that it does not need a specific regulatory definition.

#### d. Lumen Range

In the October 2016 NOPDDA, DOE proposed to prescribe a maximum lumen output when defining GSL. DOE noted that it believes that lamps with lumen outputs greater than 2,600 can be used in overall illumination and therefore would meet the definition of GSL. However, DOE reviewed available product information and proposed a maximum lumen output in the definition of GSL. At the time of the October 2016 NOPDDA, DOE noted that overall product offerings of general service lamps significantly decreased around 4,000 lumens. Using product offerings as a proxy for overall sales, DOE concluded that sales of lamps with lumen outputs greater than 4,000 lumens were also much lower than lamps with lumen outputs between 310 and 4,000 lumens. While sales are not necessarily an indication of use in general lighting applications, DOE tentatively concluded that the limited and unique product offerings above 4,000 lumens indicated that these lamps may be used mainly in specialty applications rather than for applications

traditionally served by GSILs. Therefore, DOE proposed that general service lamps must have lumen outputs greater than or equal to 310 lumens and less than or equal to 4,000 lumens. 81 FR 71804.

NEMA and LEDVANCE argued that DOE cannot regulate high lumen lamps (2,601–3,300 lumen lamps) unless the sales threshold specified in 42 U.S.C. 6295(l)(4)(G) is met (*i.e.*, at least 100 percent higher than modeled unit sales). (NEMA, No. 93 at p. 20; LEDVANCE, No. 90 at p. 21) NEMA stated that sales for high lumen lamps have declined each year from 2012. (NEMA, No. 93 p. 20) Additionally, LEDVANCE stated that high lumen lamps are not in any “exclusion” or “exemption” from the definition of GSIL and that DOE does not have authority to amend the definition of GSIL to alter the lumen range. (LEDVANCE No. 90, at p. 21)

NEMA commented that DOE does not acknowledge that sales of high lumen incandescent lamps have been decreasing over the last several years and that DOE states that most product offerings between 2,601 and 3,300 lumens are CFLs and LED lamps without providing sales data to support this claim. NEMA stated that although this observation may be correct, DOE is proposing to eliminate high lumen incandescent lamps from the market by applying the 45 lm/W backstop standard without considering the statutory requirement for regulating this lamp type. NEMA stated that DOE cannot include all three lamp technologies in one category noting that DOE has not provided evidence that such a standard would be economically justified for high lumen CFL and LED lamps or would achieve significant energy savings. NEMA added that DOE did not identify high lumen incandescent lamps as posing a lamp switching risk and noted that, following DOE’s proposed reasoning, these lamps provide no lamp switching risk. In addition, NEMA stated that DOE must adhere to the requirements outlined by Congress for regulating these lamps and cannot use its discretion alone. Further, NEMA concluded that these lamps are not used to satisfy lighting applications traditionally served by GSILs, noting that high lumen incandescent lamps are mostly used in commercial and outdoor applications where very bright light is required. (NEMA, No. 93 at p. 21)

As DOE explained for shatter-resistant incandescent and 3-way incandescent lamps in III.A.1.a, 42 U.S.C. 6295(l)(4)(G) requires DOE to complete a rulemaking for high lumen lamps when the sales threshold is met. However, as previously explained, the

mandatory rulemaking under 42 U.S.C. 6295(l)(4) is not the only avenue for DOE to regulate high lumen lamps. Additionally, DOE is not making a determination as to the lumen limit in the definition of GSIL. As commenters noted, the definition of GSIL applies to lamps that have a lumen range of not less than 310 lumens and not more than 2,600 lumens (or, in the case of a modified spectrum lamp, not less than 232 lumens and not more than 1,950 lumens). The definition of GSIL remains limited to lamps that have a lumen range of not less than 310 lumens and not more than 2,600 lumens (or, in the case of a modified spectrum lamp, not less than 232 lumens and not more than 1,950 lumens). DOE is adding a lumen range of greater than or equal to 310 lumens (or 232 lumens for modified spectrum general service incandescent lamps) and less than or equal to 3,300 lumens to the definition of GSL for “other lamps.” As discussed previously in this document, consideration of including lamps in the definition of GSL under the “other lamps” authority is a separate consideration from whether to maintain or discontinue an exemption from the GSL (and GSIL) definition. DOE is establishing this lumen range as part of the definition of GSL as authorized under the “other lamps” provision in the statutory definition of GSL. (42 U.S.C. 6291(30)(BB)(i)(IV)).

The consideration of “other lamps” is not limited by a lumen range. Where Congress intended to limit the definition of GSL based on certain lamp characteristics, it did so (*e.g.*, Congress initially excluded from the definition of GSL the lighting applications and bulb shapes excluded from the definition of GSIL). (42 U.S.C. 6291(30)(BB)(ii)(I)) While the statutory definition of GSIL includes a lumen limit, Congress did not provide a comparable lumen range for lamps that may be determined to be “other lamps.” DOE is to consider whether a lamp is used to satisfy a lighting application traditionally served by a GSIL. The lumen range of a GSIL may be informative for this consideration, but Congress did not impose it as a limit. Instead Congress directed DOE to consider a lamp’s application. As previously discussed, DOE considers the characteristics of a lamp to determine whether it is used to satisfy lighting applications traditionally served by GSILs. In the October 2016 NOPDDA, DOE proposed that lamps within the lumen range of greater than or equal to 310 lumens (or 232 lumens for modified spectrum general service incandescent lamps) and less than or equal to 4,000 lumens and

that meet the other characteristics of GSL as defined in this final rule have the capacity to satisfy lighting applications traditionally served by general service incandescent lamps.

DOE also received comments recommending both raising and lowering the upper lumen limit. NRDC commented that they support the upper lumen limit of 4,000 lumens but noted that they identified several lamps around 3,910 lumens, and therefore suggested increasing the lumen range to around 4,500 lumens to prevent a potential loophole. (NRDC, No. 83 at pp. 10; 138) While supporting an upper lumen bound, NEMA and GE stated that DOE should not set the maximum lumens for GSLs beyond 3,300 lumens per Congress' definition of high lumen incandescent lamps (42 U.S.C. 6295(l)(4)(G)). (NEMA, No. 93 at p. 23; GE, No. 88 at p. 3) NEMA stated that high lumen lamps above 3,300 lumens are too bright to be used in households, where GSILs are predominantly used. NEMA further stated that 200 W incandescent lamps and 40–45 W CFLs in the 2,650–3,600 lumen range are not found in homes because, in addition to being too bright, they are extremely expensive (*i.e.*, about \$15–16 for CFLs and \$10–\$12 for incandescent lamps). (NEMA, No. 93 at p. 23–24) GE stated that fixtures typically have wattage limits prescribed by UL and very few fixtures found in homes can accommodate 200 W (*i.e.*, 4,000 lumen) lamps. (GE, No. 83 at pp. 139–140) Philips recommended DOE align with the definition of GSILs and set the upper lumen limit of GSLs at 2,600 lumens. Philips stated that while the proposed 4,000 lumen maximum would exclude higher wattage high intensity discharge (HID) lamps, it does not exclude all such lamp types. (Philips, No. 96 at p. 4)

For this final rule, DOE reviewed available product offerings to determine whether to raise, lower, or maintain the 4,000 lumen upper limit proposed in the October 2016 NOPDDA. As described in section III.A.4.b, DOE did not limit its analysis to lamps used in only the residential sector. DOE is aware that implementing any lumen limits, regardless of the value, may encourage industry to develop products just outside of the prescribed range. However, DOE believes that lumen output is an important characteristic for determining whether a lamp is used in traditional GSIL applications, particularly since the definition of GSIL itself includes only lamps up to 2,600 lumens in output. While, as noted, that limit in the definition of GSIL does not circumscribe DOE's authority to include

lamps as "other lamps," it does illustrate what applications GSILs have traditionally served. Applications that require high-output lamps have not traditionally been served by lamps up to 2,600 lumens. DOE's current approach recognizes that fact, but also recognizes that lamps with higher outputs are actually used for some of the same applications as GSILs.

Upon reviewing current product offerings, DOE has concluded that it is appropriate to lower the upper lumen bound from 4,000 to 3,300 lumens. DOE determined that there are lamps within the range of 3,301 to 4,000 lumens not intended for use in general lighting applications. For example, lamps marketed for use in stage and studio applications fall within the range of 3,301 to 4,000 lumens. Further, as noted in the October 2016 NOPDDA, although the reported sales of these incandescent lamps are declining, the majority of product offerings between 2,601 and 3,300 lumens are CFLs or LED lamps and are thus not captured in the sales data. Based on product offerings, DOE found that establishing the upper lumen limit at 3,300 was appropriate for including lamps used in applications traditionally served by GSILs.

DOE also received several comments regarding the lower lumen bound in the proposed definition of GSL. NRDC, NEEP, and ASAP stated that DOE should reduce its proposed minimum lumen output for GSLs from 310 to 120 to include 25 W and 40 W equivalent decorative lamps. NRDC added that this would prevent manufacturers from tweaking the lumen output of their current incandescent products, such as globe shape lamps at 320 lumens, to exclude them from the GSL definition. (NRDC, No. 85 at pp. 5–6; NEEP, No. 92 at p. 3) NRDC further stated that lamps between 120 and 310 lumens should be included in the GSL definition because hundreds of millions of sockets contain these lamps; they have high hours of use in commercial settings; and they are available in LED replacements that are mostly dimmable and offered in a variety of shapes, base types, and optics. (NRDC, No. 85 at p. 6; NEEP, No. 92 at p. 3; ASAP, No. 94 at p. 3) RELS agreed with NRDC's proposal, stating that a more inclusive GSL definition would lead to more energy savings, lowering the environmental impact of these products. (RELS, No. 86 at p. 1)

NEEP noted that when many bulbs are used together (*e.g.*, in a chandelier), 25 W and 40 W equivalent lamps can provide acceptable general illumination. NEEP further stated that there are over 80 ENERGY STAR® LED lamps with less than 310 lumens. NEEP

recommended lowering the lower lumen limit from 310 to 120 lumens for all GSILs or, if that change would cause unintended consequences, to lower it to 120 lumens for B, BA, CA, F, G16–1/2, G–25, G30, S or M–14 lamps that are less than or equal to 40 W. (NEEP, No. 92 at p. 3)

CEC recommended a few changes to the lower lumen limit in the definition of GSL to maintain consistency with its own regulations. CEC stated that its general service LED lamp regulation applies to E12 base lamps with 150 lumens or greater and all other lamps of 200 lumens or greater. CEC stated that because 25 W equivalent lamps with lumens less than 310 are used for general illumination (*e.g.*, chandeliers) and have more efficient replacements, they should be included in the GSL definition. (CEC, No. 91 at p. 7) Utility Coalition also recommended DOE align the GSL minimum lumen limit with CEC's general service LED lamps rulemaking but added that DOE should apply the 150 lumen minimum to E17 bases as well. Utility Coalition provided examples of products less than 310 lumens that, it asserted, are marketed and sold for general service applications. (Utility Coalition, No. 95 at p. 4)

Similar to establishing an upper lumen bound, establishing a lower lumen bound can provide an incentive for manufacturers to create products just below the lumen limit. Stakeholders are concerned about this result and have provided several suggestions regarding where this lower lumen bound should be to prevent this problem. Stakeholders have suggested lowering the lower lumen bound from 310 lumens to 120, 150, or 200 lumens to include 25 W equivalent lamps. DOE acknowledges that some lamps with lumen outputs less than 310 lumens can be marketed as 25 W equivalents. However, there is inconsistency in how these lamps are marketed. There are no Federal guidelines that govern the "equivalency" claims of lamps. As such, there is great variety in equivalency claims. Even when equivalency guidelines exist, there is variety in what a 25 W equivalent may be. For example, the ENERGY STAR Lamps V2.0 Specification defines the typical light output of a 25 W omnidirectional lamp to be at least 250 lumens and the typical lumen output of an 25 W omnidirectional decorative lamp (which is also omnidirectional) to be at least 150 lumens. DOE has reviewed available product offerings and instead of trying to include every lamp that is marketed as a 25 W equivalent, DOE has determined the minimum lumen output

of lamps that provide overall illumination. At this time, DOE has determined that lumen output to be 310 lumens, and DOE has therefore established the lower lumen bound at 310 lumens.

GE stated that high lumen lamps, which it considered to be the 150 W and 200 W incandescent lamps, also tend to have larger bulb sizes. GE stated that these lamps are made in A21 and A23 shapes because the filament must be placed farther from the glass due to the increased heat. Therefore, these lamps may not fit in existing fixtures where A19 size lamps are used and also may not meet the UL wattage limit on many fixtures in the home (NEMA estimates that about 95 percent of GSL fixtures will not accommodate 200 W incandescent lamps because it is prohibited by UL 1598). (GE, No. 83 at pp. 72–73) In contrast, NRDC disagreed that the slightly larger size of the 150 W and 200 W incandescent lamps would be too large to be used as a replacement for a standard incandescent lamp in household fixtures. (NRDC, No. 83 at pp. 73–74)

DOE reviewed the lamp dimensions of the A19, A21, and A23 bulb shapes. Per the typical naming convention, the number after the “A” indicates the diameter of the bulb in eighths of an inch. DOE agrees that the bulb shapes of higher lumen lamps are generally larger than those with lumen outputs between 310 and 2,600 lumens. DOE notes that this difference is a quarter to a half of an inch increase in lamp diameter. While there are potentially fixtures that cannot accommodate this increase in size, there is no requirement that all lamps that meet the definition of general service lamp have the same size as GSILs (as currently defined). General service lamps included through the “other lamps” category are those that are used in lighting applications traditionally served by GSILs. Larger diameters would not preclude use of a higher-output lamp in a different fixture. DOE does not believe that, in light of the complete set of characteristics it is using to define “other lamps,” a larger diameter would mean that a lamp is not used in those applications.

#### e. Operating Voltage

In the October 2016 NOPDDA, DOE did not propose a specific voltage range when defining GSL. 81 FR 71804. ASAP and Utility Coalition agreed with the operating voltage criterion. ASAP commented that they support not specifying a voltage range because adding a range creates the opportunity for manufacturers to specify that

products operate outside of the range even though the products can also operate at common voltages, thus creating a loophole. (ASAP, No. 83 at p. 118; Utility Coalition, No. 95 at p. 4) However, several stakeholders commented that including lamps that operate at all voltages would have unintended consequences.

Westinghouse and Maxlite noted that the voltage range is too broad and could have unintended consequences if products are inadvertently included. (Westinghouse, No. 83 at pp. 119–120; Maxlite, No. 83 at p. 123) GE asserted that by not limiting the operating voltage, DOE was including lamps intended for use in specialty commercial or industrial applications such as airplanes, trains, and automobiles. (GE, No. 83 at p. 130)

Maxlite suggested limiting the operating voltage range to voltages that are common in consumer and residential products. (Maxlite, No. 83 at p. 123) GE stated that 98 percent of GSILs are used in homes according to the 2010 LMC, and nearly all lighting systems in homes operate at 120 V, with a few at 12 V. (GE, No. 88 at p. 4) NEMA stated and Philips agreed that the GSL definition should specify a voltage range from 110 to 130 V or 11 to 13 V. (NEMA, No. 93 at pp. 27–28; Philips, No. 96 at p. 5) NEMA provided a list of specialty applications in which lamps of uncommon voltages are used. (NEMA, No. 93 at pp. 27–28) In order to narrow the scope while preventing loopholes, Westinghouse suggested writing the regulatory language to prevent manufacturers from rating a lamp for an exempted voltage if the lamp is intended to operate at 12 V or 120 V by stating that if the lamp “can operate at 120 V” or “can operate at 12 V,” it would meet the definition of GSL. (Westinghouse, No. 83 at pp. 119–120)

NRDC commented that an operating voltage cap at 120 V does not make sense because 130 V products are increasingly being sold and therefore should be covered too. (NRDC, No. 83 at p. 132) Maxlite added that they agreed with including 130 V products but requested that 277 V products and other voltages not be included. (Maxlite, No. 83 at pp. 132–133) CEC stated that while it agrees with DOE not proposing a specific voltage range in the definition for GSILs, voltage limitations may be useful when defining what is not covered within the GSL definition. (CEC, No. 91 at p. 4)

Northwest Energy Efficiency Alliance (NEEA) and Philips requested clarification on whether certain lamps, such as non-integrated CFLs and HID lamps, are included in the definition of

GSL because these lamps operate on a ballast rather than “at any voltage” as specified in the proposed GSL definition. Philips noted these lamps will not operate if placed directly on a DC or AC sinusoidal waveform and therefore requested that DOE clarify the language in the proposed GSL definition. NEEA noted that these are popular products and that they should be included in the scope. (NEEA, No. 83 at pp. 134–135; Philips, No. 83 at p. 124)

As noted in section III.A.4.b, EPCA directs DOE to include as GSILs lamps which are used to satisfy lighting applications traditionally served by GSILs. DOE has determined that lamps that would satisfy the same applications as traditionally served by GSILs are ones that would provide overall illumination. DOE is not directed to limit its analysis to lamps that provide overall illumination in only the residential sector or, more specifically, only in homes. Therefore, DOE has not used this criterion in deciding whether certain lamps are general service lamps.

DOE reviewed available product offerings to determine whether lamps of all operating voltages are used in general lighting applications. DOE found that certain operating voltages could be an indicator that the lamp is used in specialty applications. For example, lamps with an input voltage of 6.6 V are typically used in airport or aviation applications. DOE has therefore revised the operating voltage criteria for this final rule. Instead of including lamps that operate at all input voltages, DOE is including integrated lamps that are capable of operating at or between input voltages of 12 V, 24 V, 100 to 130 V, 220 to 240 V, or 277 V. DOE determined that lamps capable of operating at these voltages generally provide overall illumination. For example, lamps operating at 12 V and 24 V are commonly MR16 lamps, and lamps operating at 277 V are commonly spiral CFLs. All non-integrated lamps of any voltage are included, assuming they meet the other specified criteria. DOE found that the operating voltage of non-integrated lamps did not correlate to use in specialty applications.

#### f. Exempted Lamps From GSL

##### i. GSIL Exemptions

By definition, GSL does not apply to any lighting application or bulb shape that under 42 U.S.C. 6291(30)(D) is not included in the “general service incandescent lamp” definition. (42 U.S.C. 6291(30)(BB)(ii)(I)) DOE tentatively determined in the October 2016 NOPDDA that the language of the



“exclusions provision” under 42 U.S.C. 6291(30)(BB)(ii)(I) is not limited to lamps that are medium screw base or lamps that use incandescent technology. The GSL definition excludes lamps that serve the lighting application or are of the same lamp shape described in the GSIL “exclusions” provision, and makes no express reference to lighting technology or base type. Nonetheless, although the language of 42 U.S.C. 6291(30)(BB)(ii)(I) is not specific to incandescent technology, some of the lamp applications and bulb shapes described under the exemptions to the GSIL definition may be specific to incandescent lamps. 81 FR 71805.

In the October 2016 NOPDDA, DOE assessed each of the 22 lamp categories within the GSIL exemptions to determine whether the Secretary should discontinue or maintain these exemptions for purposes of the GSL definition. DOE tentatively concluded that 14 of the 22 GSIL exemptions for medium screw base incandescent lamps should be maintained, while eight of the GSIL exemptions should be discontinued and considered as GSLs. Consistent with that tentative determination, DOE then assessed the remaining 14 lamp categories in the GSIL exemptions to determine whether the application or lamp shape described is specific to an incandescent technology in order to determine the applicability of each exemption to GSLs other than GSILs. DOE tentatively determined that appliance lamps; black light lamps; bug lamps; colored lamps; infrared lamps; left-hand thread lamps; marine lamps; marine signal service lamps; mine service lamps; plant light lamps; sign service lamps; silver bowl lamps; showcase lamps; and traffic signal lamps are not specific to incandescent technology. Therefore, DOE proposed to extend the exemptions for all 14 lamp categories to all GSLs. 81 FR 71805.

Philips agreed with DOE’s determination of exemption types that are not specific to incandescent technology and that the exemption should be technology neutral. However, Philips cautioned DOE that certain wattages and shapes may be specific only to incandescent technology due to size and heat management issues. (Philips, No. 96 at p. 3) NEEP also agreed that many exempt lamp categories are not specific to incandescent technology. In support of their point, NEEP cited the following as having high efficiency replacements: Appliance lamps; black light lamps; bug lamps; colored lamps; left-hand thread lamps; marine lamps; plant light lamps; sign service lamps; silver bowl lamps;

showcase lamps; and traffic signal lamps. (NEEP, No. 92 at p. 3)

NEMA and LEDVANCE stated that the exemptions for incandescent, CFL, and LED versions of these 14 lamp categories should be maintained, noting that some do not have a CFL or LED replacement. (LEDVANCE, No. 90 at pp. 29–30; NEMA, No. 93 at p. 22) For any specialty lamp types with a CFL or LED replacement, NEMA explained that there is no evidence that lamp shifting is occurring to these lamps, and therefore saw no reason to discontinue exemptions for the CFL or LED versions. NEMA stated that an exemption from energy conservation standards should extend to all technologies for a particular lamp type if no energy conservation standards have been set for that lamp. However, NEMA did remind DOE of its comments in response to the March 2016 GSL ECS NOPR to consider energy conservation standards for certain specialty LED lamps excluded from the definition of general service lamp. (NEMA, No. 93 at p. 22) NEMA also referenced a table from its comments in response to the March 2016 GSL ECS NOPR explaining what sort of technologies are available for the lamp types that may be impacted by the general service lamp rulemaking. (NEMA, No. 66 at pp. 38–40)

As described section III.A.1, in this final rule, DOE concluded that 15 of the 22 GSIL exemptions for medium screw base incandescent lamps should be maintained. Consistent with that determination, DOE then assessed the 15 lamp categories to determine whether the application or lamp shape described is specific to an incandescent technology in order to determine the applicability of each exemption to GSLs other than GSILs. DOE determined that appliance lamps; black light lamps; bug lamps; colored lamps; G shape lamps with a diameter of 5 inches or more; infrared lamps; left-hand thread lamps; marine lamps; marine signal service lamps; mine service lamps; plant light lamps; sign service lamps; silver bowl lamps; showcase lamps; and traffic signal lamps are not specific to incandescent technology. Therefore, DOE is extending the exemptions for all 15 lamp categories to all GSLs.

#### ii. Specialty MR Lamps

In addition to the aforementioned exempted lamp types, DOE surveyed the market in the October 2016 NOPDDA for MR-shaped lamps with smaller diameters than the common MR16 lamps that are used in non-general lighting applications. DOE found and confirmed that these lamps are typically marketed for use in non-general lighting

applications such as projectors, scientific illumination equipment, theater lighting, studio lighting, stage lighting, film lighting, medical equipment lighting, and emergency lighting. In addition, DOE found that these lamps are significantly more expensive and have shorter lifetimes than MR-shaped lamps designed for general lighting applications. Further, DOE noted it is unsure whether higher efficiency replacements are technologically feasible for these lamps due to their specific optical working distances and smaller form factors. Due to their use in specialty applications and lack of more efficacious equivalent replacements, DOE proposed in the October 2016 NOPDDA that MR-shaped lamps with diameters less than 2 inches that are designed and marketed for use in projectors, scientific illumination equipment, theater lighting, studio lighting, stage lighting, film lighting, medical equipment lighting, and emergency lighting not be included in the GSL definition. 81 FR 71806.

DOE received several comments regarding whether specialty MR lamps should be exempt from the definition of GSL. NRDC agreed with exempting specialty MR16 lamps but stated that regular MR16 lamps should not be exempted because there are LED versions available. (NRDC, No. 83 at pp. 150–151) NRDC and ASAP suggested defining specialty MR16 lamps by specifying a maximum lifetime or voltage requirement. (NRDC, No. 83 at pp. 150–151; NRDC, No. 85 at pp. 2–3; ASAP, No. 94 at p. 2) NEEP also agreed that specialty MR lamps should be exempted. However, NEEP expressed support for covering all MR lamps and requiring petitions to consider individual lamps as specialty MR lamps. NEEP reasoned that this requirement would avoid any potential loopholes for MR-shaped lamps that have a diameter just less than 2 inches and also for higher efficiency replacements. NEEP stressed that there are LED MR14 and MR11 lamps currently being used in general service applications and that unless technical restrictions prevent them from being used as replacements for small form factors, they should be included in the GSL definition. (NEEP, No. 92 at pp. 3–4)

GE commented that MR lamps originated from specialty equipment and have since become commonly used for accent lighting. GE noted that the MR lamps used in general service lighting applications typically operate at 12 V and have a lifetime from 2,000 to 5,000 hours. However, GE stated that MR lamps designed for specialty

equipment typically have very high light output, operate at odd voltages, and have short lifetimes because light output is more important than lifetime. Specifically, GE stated that specialty MR lamps may operate at strange voltages, such as 42, 52, or 82 V, because the lamps are designed for the voltage of the equipment. In addition, specialty MR lamps have lifetimes as low as 200 to 600 hours because they are designed for short operating periods. Additionally, GE noted that the light output is more focused. The ellipsoidal reflector shape has two focal points and the second focal point of specialty MR lamps is designed for the specific distances of the equipment in which it operates. GE further noted that specialty MR lamps are expensive and are not typically sold into the residential market since they are designed for specific applications such as projectors, and medical, scientific, optical equipment, air rail, and roadway. GE concluded that due to their odd voltages, shorter lifetimes and high prices, specialty MR lamps would not be an acceptable replacement for general service lighting. (GE, No. 83 at pp. 143–146; 148–150; GE, No. 88 at p. 2) NEMA noted that for the California regulations, a short lifetime was required for specialty MR16s, thus discouraging use in homes along with their higher price point. (NEMA, No. 83 at pp. 147–148)

NEMA commented that while MR16 lamps are used in both specialty and general lighting applications, if MR16 lamps are eliminated, millions of dollars in equipment designed to use these lamps, such as medical and ophthalmology equipment, will be stranded. NEMA added that because of the small form factor, an LED alternative cannot be made that fits older equipment. (NEMA, No. 83 at pp. 147–148)

NEMA again drew attention to its proposal submitted in response to the March 2016 GSL ECS NOPR to establish wattage caps of 15 W for LED versions and 50 W for incandescent versions of MR lamps. NEMA explained that the 45 lm/W limit would be problematic for LED MR-shaped lamps and the wattage caps would be technologically feasible, economically justified, and reduce testing and certification burden. (NEMA, No. 93 at pp. 25–26) LEDVANCE added that there are no lamps that can replace the functionality of MR lamps and therefore DOE cannot impose an efficacy standard and make them unavailable. (LEDVANCE, No. 90 at pp. 21–22)

After reviewing available product offerings, DOE agrees that certain MR lamps are specialty lamps. These lamps

are labeled for use in applications such as projector lighting, film lighting, and audio/visual lighting. In addition, certain MR lamps are used in specialized equipment (such as scientific illumination and medical equipment) or emergency lighting installations which would be either inoperable or lose their UL safety rating if these lamps were to be removed from the market.

DOE received several comments regarding how to revise the definition of specialty MR lamp. CEC recommended that DOE align its specialty MR lamp definition with CEC's definition for small diameter directional lamps (SDDLs) which it had worked with NEMA to develop. CEC stated the definition of specialty MR lamps should be based on physical and electrical characteristics instead of applications. CEC recommended the definition require the MR bulb shape to be as defined in ANSI C79.1 with a diameter of 2.25 inches or less and meet one of the following criteria: Not be capable of operating at 12 V, 24 V, or 120 V, not have an ANSI compliant pin base or E26 base, have a lumen output of more than 850 lumens, have a wattage of more than 75 W, or have a lifetime of 300 hours or less. (CEC, No. 91 at pp. 7–8)

Utility Coalition also recommended that DOE refer to CEC's definition of SDDL to inform its definition of specialty MR lamps. Utility Coalition stated their research found specialty MR lamps to have extremely high wattages, high lumens, and short lifetimes (50–100 hours) and LED SDDLs are currently not available as adequate substitutes. Utility Coalition further noted that a 300-hour lifetime maximum would prevent them from being used in general service applications. (Utility Coalition, No. 95 at pp. 11–12)

GE, LEDVANCE, and NEMA disagreed with DOE's proposed requirement that specialty MR lamps have a diameter less than 2 inches noting that many MR16 lamps, with a diameter of exactly 2 inches, are specialty lamps. (GE, No. 88 at p. 2; LEDVANCE, No. 90 at pp. 21–22; NEMA, No. 93 at pp. 24–25) GE suggested defining specialty MR lamps to have a maximum diameter of 2.25 inches, to operate at voltages other than 12 or 120 volts, to have a lifetime less than 1,000 hours, or to have a wattage of more than 75 W. (GE, No. 88 at p. 3) NEMA and LEDVANCE recommended the same diameter requirements. NEMA also recommended the same lifetime and wattage criteria as GE but specified the lamps not operate at 11–13 V or 120–130 V. Further, NEMA specified that if any of these characteristics are

not applicable, it could also be considered a specialty MR lamp if it is listed in Table 8 of ANSI Special Report 24f. LEDVANCE stated that Table 8 shows various lamp voltages, wattages, bases, lengths, working distances (which are application critical), and beam characteristics. LEDVANCE asserted that none of the lamps in Table 8 have characteristics that are identical to a 20 W, 30 W, or 50 W GU5.3 bipin base, less than 4 inch length MR16 lamp. Philips expressed support for NEMA's proposed definition. (NEMA, No. 93 at pp. 24–25; LEDVANCE, No. 90 at pp. 31–32; Philips, No. 96 at pp. 4–5)

Additionally, LEDVANCE and NEMA stated that the applications outlined in the proposed specialty MR lamp definition were limiting as they did not capture all of the specialty uses of these lamps, in particular aviation applications, and therefore should be removed. (NEMA, No. 93 at pp. 24–25; LEDVANCE, No. 90 at pp. 31–32) Philips explained that some halogen MR lamps are used in exit sign applications and any LED replacements for the lamps would need to meet several different lighting and electrical safety requirements from NFPA, UL, and local safety codes. (Philips, No. 96 at pp. 4–5)

After reviewing available MR lamps, DOE agrees that revisions to the definition of specialty MR lamp are appropriate. In addition to product offerings in catalogs, DOE reviewed the Lighting Facts database and ANSI Special Report 24f to determine which MR lamps were specialty products and should therefore be included in the definition of specialty MR lamp. DOE considered factors such as whether the lamp had a specific feature that prevented or made it unlikely for use in general lighting applications; whether the lamp was labeled for a specialty application; and whether the lamp must exist for reasons of safety. Regarding whether equivalent LED replacements exist (*i.e.*, lamps with reasonably the same form factor and light output but that use LED technology), see section III.A.4.f.iv.

DOE has decided to revise specifications for lamp diameter and a specialty application label in the definition of specialty MR lamp. To include specialty MR16 lamps, DOE has revised the diameter requirement to include MR lamps with diameters of 2.25 inches or less. DOE continues to include smaller MR-shaped lamps (such as MR11s and MR14s) in the definition of specialty MR lamp because DOE found numerous smaller MR-shaped lamps marketed for use in specialty

applications. DOE agrees that by listing all applications of specialty MR lamps in the definition, it may inadvertently fail to include one. As such, DOE has removed the long list of applications from the specialty MR lamp definition. However, DOE has maintained the requirement that the lamp be designed and marketed for a specialty application. DOE believes this requirement will further convey to consumers that the lamp is not intended for general service applications.

DOE has also decided to add a specification for lifetime in the definition of specialty MR lamp. DOE has reviewed available product information and agrees that this qualifier should be added to ensure only specialty MR lamps are included in the definition. DOE agrees with stakeholders that specialty MR lamps tend to have short lifetimes because lumen output is valued over their longevity. CEC suggested a lifetime requirement of 300 hours or less whereas industry suggested a lifetime requirement of 1,000 hours or less. DOE notes that 1,000 hours is the same lifetime as many lamps used in general service applications, such as GSILs. Furthermore, DOE reviewed available specialty lamps and found that the majority had a lifetime of 300 hours or less. DOE is therefore including a requirement that specialty MR lamps have a lifetime of 300 hours or less in the definition adopted in this final rule.

Although DOE also received comments regarding voltage and wattage (or lumen output), DOE is not including requirements for these quantities in the definition of specialty MR lamp. As described in section III.A.4.e, DOE has modified the input voltage requirements for all general service lamps. DOE has included in the definition of GSL non-integrated lamps that operate at any voltage and integrated lamps that are capable of operating at 12 V, 24 V, 100 to 130 V, 220 to 240 V, and 277 V. Lamps that cannot operate at these voltages are not included in the definition of general service lamp. DOE has found that it is not necessary to limit input voltage requirements for specialty MR lamps beyond the requirements already established for general service lamps. Regarding light output, DOE believes that there are certain lamps that cannot be made with fluorescent or LED technology while reasonably maintaining the same form factor and light output. These lamps are discussed in section III.A.4.a.

### iii. R20 Short Lamps

As recounted in the October 2016 NOPDDA, DOE determined in a final

rule published on November 14, 2013 that standards for R20 short lamps would not result in significant energy savings because such lamps are designed for special applications or have special characteristics not available in reasonably substitutable lamp types. 78 FR 68331, 68340. Therefore, DOE proposed in the October 2016 NOPDDA to maintain the exemption for these lamps from GSIL and exempt R20 short lamps from the definition of GSL. 81 FR 71806. As described in section III.A.1.a, DOE is maintaining this exemption in this final rule.

### iv. Other Specialty Lamps

As described in section III.A.4.a, DOE believes there are three main categories of lamps: (1) Lamps with more efficient, equivalent replacements (*i.e.*, the same form factor and light output); (2) lamps currently without equivalent replacements but for which replacements can likely be made in the future; and (3) lamps for which industry is unlikely to ever be able to create equivalent replacements using more efficient technology. Regarding the third category of lamps, DOE has concluded that some form factor and light output combinations are unlikely to ever be available using more efficient technology due to technical limitations. As discussed in section III.A.4.a, DOE is declining to determine that lamps with those particular characteristics are used for traditional GSIL applications, and DOE is accordingly not including those lamps as GSLs.

Utility Coalition agreed with DOE's process to begin with a broad scope and exempt products that do not have general service applications or do not have an LED replacement. Utility Coalition stressed that DOE should only exempt products if commenters can specifically explain why a product cannot be manufactured with LED technology. (Utility Coalition, No. 95 at p. 4)

Several stakeholders provided specific examples of lamps that do not have more efficient, equivalent replacements. Westinghouse noted that for certain incandescent/halogen specialty lamps there is no design path to develop LED products with equivalent lumen output and similar form factor. Hence Westinghouse noted that because they are specialty and not available in more efficient technology, they should not be included in the GSL definition. Specifically, Westinghouse noted the following lamps: JC and JCD shaped lamps with G4, G8, G9, GU4, GU7.9, GU8, GY6.35, GY7.9, GY8, and GY8.6 base types; T shape lamps with

diameters of 1 inch or less (T8 or smaller) that do not have medium screw bases; lamps with wedge bases; T shape lamps with diameters of 0.75 inch or less (T6 or smaller) with double-ended double contact, metal fin bases; and miniature reflector lamps with diameter less than 2 inches. (Westinghouse, No. 83 at pp. 126–129; Westinghouse, No. 89 at pp. 1–2) Maxlite agreed, commenting that lamps operating at 12 V with small bases such as G4, G9, wedge, and festoon, are typically halogen lamps with high lumens and when made in LED form, are significantly larger and no longer fit in the traditional luminaires for which they were designed. GE and NEMA added that halogen bipin lamps cannot be made using LED technology and should not be included as general service lamps. (Maxlite, No. 83 at pp. 133–134; NEMA, No. 83 at pp. 52–53; GE, No. 88 at p. 4)

GE stated that if specialty MR lamps are exempt from the GSL definition, specialty PAR lamps should be exempted as well. GE explained that only PAR20, 30, and 38 lamps with medium screw bases that operate at 120 V are used in general service applications. All other PAR lamps should be considered specialty PAR lamps. (GE, No. 88 at p. 3)

NEMA and GE expressed concern that including lamps of all voltages and base types in the GSL definition would include specialty lamps. (NEMA, No. 93 at pp. 27–28; GE, No. 88 at p. 5) NEMA stated that LED replacements do not exist for the following applications: Airport; airplane; airway; locomotive; automobiles; photographic; stage; studio; medical; and dental. GE added the following to NEMA's list of applications for which equivalent LED replacements do not exist: Projection; television service; headlight; street railway or other transportation service; microscope; map; and microfilm or other specialized equipment service. Hence the inclusion of these lamp types in the GSL definition may create an absence of products resulting in safety and security concerns. Philips also stated that it was important to maintain the incandescent/halogen versions because recent Caliper reports indicate issues with compatibility of LED reflector lamps with dimming/control systems. (Philips, No. 96 at p. 6) NEMA submitted ANSI Special Report 24f that provides details on some but not all specialty lamps. (NEMA, No. 93 at pp. 27–28; GE, No. 88 at p. 4)

In contrast, Utility Coalition stated that LED replacements are widely available in an array of screw bases like medium screw bases (E26/E27);

candelabra bases (E12); mogul bases (E39); intermediate bases (E17); E5 and E10 bases; pin bases such as G4 and G13; various sizes of GX, GU, GY, and GZ bases; wedge bases; and bayonet bases (BA). Additionally LED replacements of double-ended halogen lamps with recessed single contact bases are available. Utility Coalition also noted the availability of LED replacements in a wide array of lamp shapes including A, R, PAR, BR, ER, MR, C, CA, F, G, E, and T shapes. Utility Coalition asserted that high efficiency lamps are affordable, noting that CFLs are below \$2–3, and LED lamp prices are declining dramatically, with some available below \$3–5. (Utility Coalition, No. 95 at pp. 1–2) Utility Coalition also provided price data and trends on LED lamps based on data it has been collecting since 2013, which show that lamps with the highest efficiencies have dropped in price by at least 30 percent since 2013. (Utility Coalition, No. 95 at p. 13) Several other commenters, including NRDC, Soraa, ASAP, and NEEP, noted the wide spread availability of various LED lamp replacements. (NRDC No. 85 at p. 6; NRDC, No. 83 at p. 11; Soraa, No. 87 at p. 2; NEEP, No. 83 at pp. 13–14; ASAP, No. 83 at pp. 98–99, 170–171)

ASAP suggested using a similar approach as DOE's motors rulemaking and defining the specific base types and voltages that are problematic and excluding them from the definition of GSL. (ASAP, No. 83 at pp. 120–121)

In section III.A.4.a, DOE discusses the three categories of lamp identified: (1) Lamps with more efficient, equivalent replacements (*i.e.*, the same form factor and light output); (2) lamps currently without equivalent replacements but for which replacements can likely be made in the future; and (3) lamps for which industry is unlikely to ever be able to create an equivalent replacement using more efficient technology. DOE has reviewed available product offerings to identify lamps that do not have equivalent replacements (*i.e.*, the same form factor and light output) using more efficient technology. For some of those lamps DOE concluded that, based on information available at this time, it was unlikely that industry would ever be able to create an equivalent replacement using more efficient technology. DOE has therefore excluded them from the definition of GSL in this final rule, for the reasons given in section III.A.4.a. DOE has concluded that the remaining lamps without more efficient equivalent replacements can likely be made, but manufacturers have chosen not to do so because market demand is not yet sufficient. DOE has included those

lamps as general service lamps. See section V for information regarding DOE's enforcement policy.

After identifying lamps without more efficient equivalent replacements, DOE considered the size of the ANSI base, the dimensions of the bulb shape, and the lumen output gap between existing incandescent products and existing LED replacements to evaluate whether equivalent replacements could be produced. DOE determined that the larger the ANSI base, the greater the bulb volume, and the smaller the lumen gap between existing incandescent and LED products, the more likely that an equivalent LED replacement could be produced. Larger ANSI bases and bulb shapes allow for more space to accommodate a heat sink and/or additional electronics needed to support LED technology. For example, a medium screw base LED filament lamp can accommodate the electronics of an LED driver in the ANSI base. However, lamps with very small bases, such as wedge bases, or lamps with very small shapes, such as T shape lamps with diameters of 1 inch or less, cannot accommodate the LED driver and/or the LEDs themselves in the same form factor and light output combinations as is possible with incandescent technology. Furthermore, certain lamp types have already shown progress in developing equivalent LED replacements. For example, incandescent/halogen candelabra base lamps with B10 shapes are available with lumen outputs up to 760 lumens. Equivalent LED replacements are currently available with lumen outputs only up to 500 lumens. A small lumen output gap between existing incandescent and LED products indicates that only modest improvements in technology, electronics, or design are necessary to increase product performance.

After reviewing these factors, DOE concludes that lamps were included in the definition of GSL proposed in the October 2016 NOPDDA that should not have been included because they do not and likely cannot have equivalent replacements using more efficient technology. DOE is excluding these lamps from the definition of general service lamp for the reasons given in section III.A.4.a. DOE has determined that it must use a combination of shape, base, length, and diameter to capture all of these specialty lamps. The excluded products include:<sup>19</sup>

<sup>19</sup>DOE notes that for several of these exclusions, the October 2016 NOPDDA included references to appropriate industry standards to define terms like "wedge base" or "EX39 base." DOE is omitting those references from this final rule because on further deliberation, it believes those terms are

- T shape lamps that have a first number symbol less than or equal to 8 (diameter less than or equal to 1 inch) as defined in ANSI C79.1–2002, nominal overall length less than 12 inches, and that are not compact fluorescent lamps;

- S shape or G shape lamps that have a first number symbol less than or equal to 12.5 (diameter less than or equal to 1.5625 inches) as defined in ANSI C79.1–2002;

- Reflector lamps that have a first number symbol less than 16 (diameter less than 2 inches) as defined in ANSI C79.1–2002 and that do not have E26/24, E26d, E26/50x39, E26/53x39, E29/28, E29/53x39, E39, E39d, EP39, or EX39 bases;

- MR shape lamps that have a first number symbol equal to 16 (diameter equal to 2 inches) as defined in ANSI C79.1–2002, operate at 12 volts, and have a lumen output greater than or equal to 800;

- J, JC, JCD, JCS, JCV, JCX, JD, JS, and JT shape lamps that do not have Edison screw bases; and

- Lamps that have a wedge base or prefocus base.

#### g. Lamps Subject to Other Rulemakings

In the March 2016 GSL ECS NOPR, DOE proposed that a GSL cannot be a lamp that is the subject of other ongoing rulemakings. 81 FR 14528, 14543. In the October 2016 NOPDDA, DOE proposed to discontinue this criteria regarding other rulemakings. DOE continued to exempt GSFLs from the definition of GSL. 81 FR 71806. Because the definition of GSFL and the supporting definition of fluorescent lamp are structured in a certain way, DOE added some exemptions to the proposed rule to exclude lamps from the definition of GSL that are specifically and currently excluded from the GSFL and fluorescent lamp definitions. For example, DOE exempted circline lamps, which were considered to be GSFLs in the January 2015 rulemaking but for which DOE did not evaluate standards, and DOE exempted fluorescent lamps with a CRI of 87 or greater because they are statutorily exempt from standards. However, DOE did not propose to exempt other lamps that were the subject of other ongoing rulemakings. For example, DOE did not specifically propose to exempt HID lamps that otherwise meet the GSL criteria. 81 FR 71806.

NEMA agreed with exempting GSFLs from the definition of general service lamp, noting that Congress intended to

terms of art whose meaning will be clear to participants in the lighting market.

keep GSFLs out of this rulemaking because there were already energy conservation standards for these products. (NEMA, No. 83 at pp. 48–49) However, ASAP voiced concern that the proposed definition in the October 2016 NOPDDA was unintentionally applying exemptions for linear fluorescent lamps, such as those for cold temperature, impact-resistant, and reflectorized lamp types, to CFLs. (ASAP, No. 83 at pp. 20–21, 109–110)

After reviewing the proposed exemptions for fluorescent lamps, DOE agrees that some revisions are necessary to ensure terms related to fluorescent lamps are used consistently. In this final rule, DOE is adopting a definition of “other fluorescent lamps, which grouped these exemptions and made clear that the lamps included are circline lamps and certain double-ended lamps that use fluorescent technology. An “other fluorescent lamps” is a low pressure mercury electric-discharge sources in which a fluorescing coating transforms some of the ultraviolet energy generated by the mercury discharge into light and include circline lamps and include double-ended lamps with the following characteristics: Lengths from one to eight feet; designed for cold temperature applications; designed for use in reprographic equipment; designed to produce radiation in the ultra-violet region of the spectrum; impact-resistant; reflectorized or aperture; or a CRI of 87 or greater.

GE, NEMA and LEDVANCE pointed to what they saw as a contradiction in DOE attempting to include HID lamps in the GSL definition to be regulated when in a recent rulemaking DOE had determined that regulations on HID lamps were either not technologically feasible, economically justified, or would not result in significant energy savings. (GE, No. 88 at p. 4, NEMA, No. 93 at pp. 23–24, LEDVANCE, No. 90 at p. 22, Philips, No. 96 at p. 4) NEMA noted that in the HID determination DOE had stated that significant energy savings would not result from standards for directional HID lamps. (NEMA, No. 93 at pp. 23–24)

GE stated that HID fixtures are never found in the home and are rarely found outside it. (GE, No. 88 at p. 4) Philips stated that because HID lamps require a ballast, are extremely expensive, and have a warm-up time, they are not typically used by consumers and thus do not pose a risk for lamp switching. (Philips, No. 96 at p. 5) NEMA added that 2015 sales for HID lamps with 4,000 lumens or lower were 33 percent below 2012 sales and expected to fall. (NEMA, No. 93 at pp. 23–24) LEDVANCE pointed out that currently there are no

viable replacements for HID lamps.

(LEDVANCE, No. 90 at p. 22)

NEMA asserted that, had Congress intended for HID lamps to be included as GSLs, it would have done so expressly, but instead authorized DOE to regulate HID lamps as commercial equipment. (NEMA, No. 93 at pp. 23–24) Finally, NEMA and Philips stated there is no DOE test procedure for HID lamps. (Philips, No. 96 at p. 4; NEMA, No. 93 at pp. 23–24)

LEDVANCE stated that should DOE regulate HID lamps as GSLs, it needs to exclude the lamps exempted from analysis in DOE’s final determination for HID lamps. 80 FR 76355, December 9, 2015. Specifically, these were for lamps less than 50 W, directional lamps, specialty lamps, and lamps that run exclusively on electronic ballasts, which LEDVANCE asserted would eliminate most HID lamps from the scope of this final rule. LEDVANCE added that while direct LED lamp replacements are available for high wattage HID lamps, there are no such lamp replacements for low wattage lamps. LEDVANCE explained that to replace low wattage HID lamps, consumers would have to replace the entire fixture and DOE has not done the necessary payback analysis for this scenario. (LEDVANCE, No. 90 at pp. 30–31)

DOE acknowledges the various comments that HID lamps are primarily used for specialty applications. Given the particular characteristics of HID lamps regarding startup, DOE believes that the criteria it has developed for the “other lamps” category may not be adequate to support an inference that an HID lamp, in particular, is actually used in traditional GSIL applications. Accordingly, DOE will not include HID lamps as GSLs in this rulemaking and will continue to study the issue. DOE notes that if it notices an influx of HID lamps for the general service lamp market, then DOE may revisit this decision.

DOE further notes that although DOE determined in the recent HID lamps rulemaking that standards for HID lamps are either not technologically feasible or not economically justified, that analysis was based on a different set of lamps than would be analyzed as part of a rulemaking for GSLs. For example, the HID lamp determination considered only mercury vapor, high pressure sodium, and metal halide technology. In addition, the determination did not analyze self-ballasted or directional HID lamps, among other types. Thus, the previous determination is not relevant and an analysis conducted in the context of a rulemaking for GSLs could well come to

a different conclusion. However, per the preceding discussion, DOE has determined to exclude HID lamps from the definition of GSL.

##### 5. Summary and Adopted Regulatory Text Definition

DOE proposed a revised definition of GSL in the October 2016 NOPDDA. Westinghouse recommended DOE revise the definition of GSL to capture only those products intended by Congress to be regulated and exclude lamps which are specialty products or covered by existing regulations. (Westinghouse, No. 89 at p. 2)

NEMA recommended the following changes to the proposed GSL definition: Include lamps that operate only at voltages between 110 to 130 V or 11 to 13 V and have maximum lumens of 3,300; and exclude incandescent reflector lamps, specialty lamps, and specialty base lamps. NEMA also provided definitions for specialty lamp and specialty base lamps. NEMA defined specialty lamp as a lamp designed for and used in special applications and listed the current 22 exempted lamp types specified in the GSIL definition. NEMA defined a specialty base lamp as a lamp with an intermediate base (E17), candelabra base (E12), mini-candelabra base (E11), bayonet base, double ended base, screw terminal base, medium side prong base, mogul prong base, recessed single contact, mogul screw, mogul bi-post, G53, double contact prefocus, 2-pin GY6.35, 2-pin G8, and 2-pin G9 when used with any lamp; or 2-pin G4 when used with non-reflector lamp. (NEMA, No. 93 at p. 27) LEDVANCE supported NEMA’s recommended changes for the GSL definition. (LEDVANCE, No. 90 at pp. 32–33) Philips agreed with NEMA’s proposed voltage range for the GSL definition. (Philips, No. 96 at p. 6)

GE recommended DOE modify the GSL definition to include only lamps with medium screw bases and candelabra bases; that operate between 110 and 130 V or at 12 V, have maximum lumens at 3,300, and “satisfy lighting applications traditionally served by general service incandescent lamps;” and exclude HID lamps. Additionally, GE suggested the definition exclude lamps with the following applications: Airway, airport, aircraft, photo, projection, stage, studio or television service, headlight, locomotive, street railway, or other transportation service; medical or dental service, microscope, map, microfilm, or other specialized equipment service. (GE, No. 88 at pp. 3–4)

In the preceding sections, DOE has reviewed all aspects of the GSL

definition. DOE has identified the criteria pertinent to lamps that serve in general lighting applications and also identified specialty products that should be exempt from the definition of GSL. In this final rule, DOE is defining general service lamp as a lamp intended to serve in general lighting applications and that has the following basic characteristics: (1) An ANSI base (with the exclusion of light fixtures, LED downlight retrofit kits, and exemptions for specific base types); (2) a lumen output of greater than or equal to 310 lumens and less than or equal to 3,300 lumens; (3) an ability to operate at or between 12 V, 24 V, 100 to 130 V, 220 to 240 V, or 277 V; and (4) no designation or label for use in non-general applications. Regarding the fourth criteria, DOE notes that this requirement is not explicitly stated in the regulatory definition of GSL adopted in this rule. Rather, DOE has listed each of the non-general applications identified or lamps used in such applications in order to clearly define the scope of the definition. The definition excludes certain types of lamp, as discussed elsewhere in this notice.

DOE notes that the definition adopted in this final rule excludes incandescent reflector lamps. That exclusion simply mirrors the exemption for IRLs from the statutory definition of GSL. DOE had proposed to discontinue the IRL exemption. But it is not reaching a decision on that issue in this final rule; DOE will address the status of IRLs in a separate final rule. Accordingly, as of this final rule the exemption for IRLs stands and DOE is replicating that exemption in its definition of GSL.

Thus, DOE is adopting a definition of “general service lamp” in § 430.2 to capture the criteria and the exemptions discussed in previous sections. A general service lamp is a lamp that has an ANSI base; is able to operate at a voltage of 12 volts or 24 volts, at or between 100 to 130 volts, at or between 220 to 240 volts, or of 277 volts for integrated lamps (as defined in this section), or is able to operate at any voltage for non-integrated lamps (as defined in this section); has an initial lumen output of greater than or equal to 310 lumens (or 232 lumens for modified spectrum general service incandescent lamps) and less than or equal to 3,300 lumens; is not a light fixture; is not an LED downlight retrofit kit; and is used in general lighting applications. General service lamps include, but are not limited to, general service incandescent lamps, compact fluorescent lamps, general service light-emitting diode lamps, and general service organic light-

emitting diode lamps. General service lamps do not include:<sup>20</sup> Appliance lamps, black light lamps, bug lamps, colored lamps, G shape lamps with a diameter of 5 inches or more as defined in ANSI C79.1–2002, general service fluorescent lamps, high intensity discharge lamps, infrared lamps, J, JC, JCD, JCS, JCV, JCX, JD, JS, and JT shape lamps that do not have Edison screw bases, lamps that have a wedge base or prefocus base, left-hand thread lamps, marine lamps, marine signal service lamps, mine service lamps, MR shape lamps that have a first number symbol equal to 16 (diameter equal to 2 inches) as defined in ANSI C79.1–2002, operate at 12 volts, and have a lumen output greater than or equal to 800, other fluorescent lamps, plant light lamps, R20 short lamps, reflector lamps that have a first number symbol less than 16 (diameter less than 2 inches) as defined in ANSI C79.1–2002, and that do not have E26/E24, E26d, E26/50x39, E26/53x39, E29/28, E29/53x39, E39, E39d, EP39, or EX39 bases, S shape or G shape lamps that have a first number symbol less than or equal to 12.5 (diameter less than or equal to 1.5625 inches) as defined in ANSI C79.1–2002, sign service lamps, silver bowl lamps, showcase lamps, specialty MR lamps, T shape lamps that have a first number symbol less than or equal to 8 (diameter less than or equal to 1 inch) as defined in ANSI C79.1–2002, nominal overall length less than 12 inches, and that are not compact fluorescent lamps, traffic signal lamps, incandescent reflector lamps. See the amendments to § 430.2 for the definition of general service lamp in its entirety.

#### B. Supporting Definitions

In the October 2016 NOPDDA, DOE proposed several definitions to support its proposed definition of “general service lamp.” Specifically, DOE proposed definitions for “integrated lamp,” “non-integrated lamp,” “light fixture,” “pin base lamp,” “GU24 base,” “LED downlight retrofit kit,” and several terms to better define the lamp types described in section III.A.4 that are exempt from the definition of general service lamp.

LEDVANCE and Philips agreed with the proposed supporting definitions and emphasized that further specifications were not necessary since manufacturers

have produced no products that would take advantage of any potential loopholes. (LEDVANCE, No. 90 at p. 34; Philips, No. 96 at p. 5) CEC stated DOE should base definitions of exempted lamp types on physical and electrical characteristics rather than application, whenever possible. (CEC, No. 91 at p. 5) DOE discusses specific comments regarding the proposed definitions in the following sections.

#### 1. Black Light Lamp, Colored Lamp, Plant Light Lamp, and Bug Lamp

DOE proposed definitions for “black light lamp,” “colored lamp,” “plant light lamp,” and “bug lamp” in the October 2016 NOPDDA. 81 FR 71807. DOE received several comments regarding these definitions.

ASAP commented that while they supported DOE’s approach of using the electromagnetic spectrum to define bug lamps, colored lamps, infrared lamps, and black light lamps, they would suggest defining exempted lamps by specifying a percentage of radiated power within a band of the spectrum rather than just a peak as stated in the proposed definitions. ASAP noted that fluorescent lamps, which can have multiple peaks in the spectrum, could become a loophole and therefore the definitions should be more specific. (ASAP, No. 83 at pp. 44, 99, 105)

The proposed definition of black light lamp would require radiant power peaks in UV–A portion of the electromagnetic spectrum. Typical incandescent lamps and fluorescent lamps do not have their highest radiant power peak in the UV–A portion of the electromagnetic spectrum. Hence, DOE finds that specifying this limited region of the lower end of the electromagnetic spectrum is sufficiently distinctive for identifying black light lamps. Therefore, in this final rule, DOE is adopting the definition of “black light lamp” as proposed in the October 2016 NOPDDA. A black light lamp is a lamp that is designed and marketed as a black light lamp and is an ultraviolet lamp with the highest radiant power peaks in the UV–A band (315 to 400 nm) of the electromagnetic spectrum.

The proposed definition for colored lamp would apply to lamps that satisfy one of two conditions—either a CRI less than 40 or a CCT lower than or greater than a designated value. NRDC, NEEP, and ASAP requested that DOE modify the definition of colored lamp to require that lamps meet both the CRI and the CCT requirement in order to be considered colored lamps. In addition, several stakeholders suggested modifying the lower CCT value. NRDC suggested changing the lower bound

<sup>20</sup> DOE notes that for several of these exclusions, the October 2016 NOPDDA included references to appropriate industry standards to define terms like “JT shape” or “EX39 base.” DOE is omitting those references from this final rule because on further deliberation, it believes those terms are terms of art whose meaning will be clear to participants in the lighting market.

CCT value to 2,100 K instead of 2,500 K because incandescent lamps have a CCT around 2,700 K, which is very close to 2,500 K. NEEP, ASAP, and Utility Coalition suggested changing the lower bound CCT value to 2,000 K. NEEP noted that with advancements in color tunable lamps, there is little risk of eliminating lamps with lower CCT values from the market. In addition, NRDC and NEEP stated that the ENERGY STAR Lamps Specification V2.0 includes CCT values of 2,200 K and 2,500 K for filament lamps. Further, NRDC and Utility Coalition pointed out that filament LED lamps have CCT values below 2,500 K. NEEP added that while the lamps with a CCT of 2,000 K are quite visually orange, they are gaining popularity, and coupled with a high CRI, could serve as general illumination bulbs. (NRDC, No. 83 at pp. 12–13, 96; NRDC, No. 85 at p. 10; ASAP, No. 83 at p. 20; ASAP, No. 94 at p. 6; NEEP, No. 83 at p. 97; NEEP, No. 92 at pp. 1–3; Utility Coalition, No. 95 at pp. 10–11)

Maxlite noted that it had supported the inclusion of 2,200 K and 2,500 K for filament lamps in ENERGY STAR Lamps Specification V2.0 as these are becoming popular colors for ultra-warm products. However, Maxlite cautioned DOE not to make categorizations of these CCTs part of the colored lamp definition. Maxlite explained that filament LED lamps with a CCT of 2,200 K or 2,400 K that are designed to mimic incandescent lamps were very popular when introduced. However, Maxlite stated that recent market feedback has shown a preference for a slightly higher CCT of 2,700 K. Westinghouse agreed that consumers may prefer a different color temperature because they have experienced consumers returning lamps with CCTs of 2,200 K and 2,400 K. (Maxlite, No. 83 at pp. 105–106; Westinghouse, No. 83 at pp. 101–102)

NEMA, LEDVANCE, and GE stated the proposed definition of colored lamp was one that has been used by industry for many years and has proven to be both clear and effective. NEMA, LEDVANCE, and GE noted that changing the definition could have the unintended consequence of preventing colored lamps from being produced. In particular, NEMA and LEDVANCE explained that if the definition included CCT and CRI requirements instead of one or the other, then a number of colored lamps would no longer be included in the definition. NEMA and LEDVANCE stated that meeting just one criteria was sufficient to be considered a colored lamp. (GE, No. 83 at p. 104; NEMA, No. 93 at pp. 28–29; LEDVANCE, No. 90 at p. 34)

CCT and CRI are both metrics that characterize the color of light emitted by a light source. CCT is measured by examining how close the light source's chromaticity is to the reference blackbody locus. CRI is calculated from the differences in the chromaticities of eight standard color samples when illuminated by a light source compared to a reference illuminant of the same CCT. Hence, each measurement provides an independent method of determining if the light emitted by a light source is colored. Regarding the proposed requirement of CCT less than 2,500 K, DOE notes that ENERGY STAR Lamps Specification V2.0 includes CCTs of 2,200 K for only filament lamps. As noted by stakeholders, lamps with a CCT of 2,200 K are relatively new products and it is still uncertain how they will be used. Therefore, DOE is maintaining the lower bound threshold of 2,500 K for colored lamps. DOE will continue monitor the market to understand the impact of new products at low CCTs and may revise the definition of colored lamp in the future.

ASAP also noted that in the “colored lamp” definition, as well as specifying that the lamp be designed and marketed as a colored lamp, DOE stated the lamp not be designed and marketed for general service applications. ASAP commented DOE had not added the latter prohibitive phrase in any other definition of an exempted lamp type and suggested DOE either remove it or specify it in all definitions. (ASAP, No. 94 at p. 7)

DOE agrees that the term “designed and marketed” should be consistently used in definitions of exempted lamp types. Therefore, in this final rule, DOE removes the phrase “not designed and marketed for general lighting applications” because the definition of colored lamp already includes the phrase “designed and marketed as a colored lamp.” DOE is adopting a slightly modified definition of colored lamp in the final rule. A colored lamp is a colored fluorescent lamp, a colored incandescent lamp, or a lamp designed and marketed as a colored lamp with either of the following characteristics (if multiple modes of operation are possible [such as variable CCT], either of the below characteristics must be maintained throughout all modes of operation): a CRI less than 40, as determined according to the method set forth in CIE Publication 13.3; or a CCT less than 2,500 K or greater than 7,000 K.<sup>21</sup>

The proposed definition of plant light lamp would require radiant power

peaks in the red and blue region of the electromagnetic spectrum. NRDC commented that plant light lamps could have radiant power peaks in the green portion of the spectrum in addition to the blue or red portions thus making them suitable for general lighting applications. NRDC recommended adding a maximum allowable CRI to ensure general service lamps are not characterized as plant light lamps. (NRDC, No. 83 at pp. 96–97; NRDC, No. 85 at p. 10) ASAP agreed that the radiant power peak requirements specified for plant light lamps could easily be met by fluorescent lamps and possibly by incandescent lamps. ASAP also noted the availability and growing market of efficient LED lamps that emit light beneficial for plants and recommended that plant light lamps be included in the definition of GSILs. (ASAP, No. 94 at pp. 3–7)

A high CRI is not required for the lamp to effectively function and emit the highest radiant power peaks in blue and red wavelengths. Hence, a CRI requirement is not appropriate for defining a plant light lamp. While DOE finds that requirements for radiant power peak may not be exclusively applicable to plant light lamps, the additional requirement that the lamp be designed and marketed for plant growing applications is sufficient to discourage consumers from using plant light lamps in general light applications. For discussion regarding the inclusion of this lamp type in the GSIL definition, see section III.A.1.b. In this final rule DOE is adopting the definition of “plant light lamp” as proposed in the October 2016 NOPDDA. A plant light lamp is a lamp that is designed to promote plant growth by emitting its highest radiant power peaks in the regions of the electromagnetic spectrum that promote photosynthesis: Blue (440 nm to 490 nm) and/or red (620 to 740 nm), and is designed and marketed for plant growing applications.

NRDC commented that the definition of bug lamp, which requires the lamp to have a visible yellow coating, should also specify the amount of coating to prevent possible loopholes. However, GE commented that the requirement that bug lamps produce the majority of radiant power above 550 nm paired with the requirement of a visible yellow coating would prevent general service lamps from meeting the definition of bug lamp. They stated that the definition as proposed is sufficient and well understood by industry. (NRDC, No. 83 at p. 153; GE, No. 83 at p. 154) ASAP stated that fluorescent lamps exhibit peak radiant power above 550 nm and therefore could easily meet the

<sup>21</sup> DOE notes that the October 2016 NOPDDA included references to appropriate industry standards to define “CCT.” DOE is omitting those references from this final rule because on further deliberation, it believes CCT is a term of art well understood in the lighting industry.

definition of a bug lamp. ASAP added that some fluorescent lamps naturally appear yellowish due their phosphor mix. Noting a study that found that warm light LED lamps attracted fewer insects than conventional and bug incandescent lamps, CFLs, halogens, and cool light LED lamps, ASAP stated DOE should discontinue the exemption of bug lamps from the definition of GSILs. (ASAP, No. 94 at pp. 3–7)

DOE concludes that requiring the yellow coating to be visible on the lamp is sufficient and quantifying it is unnecessary. DOE understands that the requirements for radiant power peak may not be exclusively applicable to bug lamps. However, DOE finds that the combination of requirements for radiant power peak and visible yellow coating should discourage this lamp type from being used in general service applications. For discussion regarding the inclusion of this lamp type in the GSIL definition, see section III.A.1.b. In this final rule, DOE is adopting the definition of “bug lamp” proposed in the October 2016 NOPDDA. A bug lamp is a lamp that is designed and marketed as a bug lamp, has radiant power peaks above 550 nm on the electromagnetic spectrum, and has a visible yellow coating.

## 2. Infrared Lamp

In the October 2016 NOPDDA, DOE proposed a definition for “infrared lamp” to support the definition of “general service lamp.” 81 FR 71809. NRDC, Utility Coalition, ASAP, and NEEP stated that the proposed definition of infrared lamp, which states that the highest radiant power peaks are in the infrared region of the electromagnetic spectrum, describes any incandescent lamp. They noted that the definition’s requirement that the primary purpose is to provide heat is the only difference from a standard incandescent lamp. NRDC, Utility Coalition, ASAP, and NEEP suggested several possible modifications to the definition. First, they recommended specifying a limit on the percentage of radiant power in the visible spectrum. Specifically, NEEP suggested stating that the lamp must generate more than 95 percent of energy towards heat rather than lighting and ASAP suggested that the share of radiant power in visible range be limited to a maximum of 1 percent. NEEP and ASAP suggested applying a wattage minimum to ensure that only infrared lamps were included, while NRDC recommended a wattage minimum of 125 W coupled with a minimum lamp diameter of 5 inches. Utility Coalition recommended an approach of using maximum lumen

output whereas NEEP suggested using a lumens per watt limit. (NRDC, No. 83 at pp. 12–13, 94–95; NRDC, No. 85 at pp. 6–7; NRDC, No. 85 at p. 7; NEEP, No. 92 at pp. 1–3; Utility Coalition, No. 95 at p. 10; ASAP, No. 94 at p. 6)

Westinghouse commented that the proposed definition of infrared lamp is sufficient and that these lamps are not at risk for use in general service applications because of their low lumen output. Westinghouse added that a lumen range could be added if necessary. (Westinghouse, No. 83 at pp. 41–42) LEDVANCE and NEMA supported the definition. They explained that using “and” in the definition, to require an infrared lamp to have radiant power peaks in the infrared region and have a primary purpose of providing heat, means that these lamps would be distinct from any GSIL and prevent any lamp switching. (NEMA, No. 93 at p. 29; LEDVANCE, No. 90 at pp. 34–35)

DOE understands that the requirement of a radiant power peak is not exclusively applicable to infrared lamps. In this final rule, DOE reviewed the definition of “infrared lamp” and determined that most infrared lamps are at least 125 W. This high wattage aligns with the use of this lamp type to provide heat. Hence, DOE is including a wattage minimum in the definition of “infrared lamp.” In this final rule, DOE is adopting a slightly modified definition for “infrared lamp.” An infrared lamp is a lamp that is designed and marketed as an infrared lamp; has its highest radiant power peaks in the infrared region of the electromagnetic spectrum (770 nm to 1 mm); has a rated wattage of 125 watts or greater; and which has a primary purpose of providing heat.

## 3. Appliance Lamp

DOE received comments on its use of the statutory definition of “appliance lamp,” which is defined at 42 U.S.C. 6291(30)(T).

NRDC and NEEP stated that appliance lamps resemble a conventional incandescent light bulb to a consumer, except they have smaller bulb dimensions, and therefore can serve as a replacement for 40 W incandescent lamps. NEEP explained that these lamps would particularly be attractive as a replacement due to their low price. NRDC recommended that appliance lamps should be able to operate in high temperature environments throughout the product’s rated lifetime. This requirement would make the lamp more robust and expensive and therefore, an unsuitable replacement for general light applications. NEEP suggested adding

the criteria of high temperature operation or a lumen maximum. (NRDC, No. 85 at p. 8; NEEP, No. 92 at pp. 1–3)

Most appliance lamps are intended for use in a variety of appliances and therefore are designed to operate in low and high temperature environments. Therefore, a criterion for high temperature operation would not be appropriate for defining these lamp types. DOE finds that the specifications in the definition for designating and marketing the lamp for use in appliances is sufficiently clear, thus discouraging consumers from using appliance lamps in general lighting applications. DOE will continue to monitor the market and may revise this definition if needed in the future.

## 4. Marine Lamp

In the October 2016 NOPDDA, DOE proposed a definition of “marine lamp.” 81 FR 71808. NRDC and NEEP commented that additional detail was needed for the definition of marine lamps to avoid potential loopholes. NRDC noted that these lamps likely operate on 12 or 24 V and recommended that marine lamps be defined as not able to operate at more than 25 V. NEEP suggested adding at least one qualifier to this definition relating to either operating voltage, outdoor temperature operation, or waterproof capability. (NRDC, No. 83 at pp. 95–96; NRDC, No. 85 at p. 9; NEEP, No. 92 at pp. 1–3)

DOE reviewed the performance characteristics of marine lamps and determined that most operate at voltages 12 V to 13.5 V. DOE finds that these operating voltages likely align with the use of these lamps in marine applications. Hence in this final rule DOE is adopting the definition of “marine lamps” with a voltage specification. A marine lamp means a lamp that is designed and marketed for use on boats and can operate at or between 12 volts and 13.5 volts.

## 5. Showcase Lamp

ASAP commented that the proposed definition for showcase lamp is insufficient to prevent loopholes and that widely available incandescent showcase lamps could fit into many light fixtures. Additionally, ASAP noted that DOE is proposing to include many T shape lamps in the definition of GSILs and recommended that showcase lamps also be included. (ASAP, No. 94 at pp. 3–7)

DOE finds that the shape and wattage specifications as well as the requirement that these lamps be designed and marketed as a showcase lamp is sufficient to discourage consumers from



using these lamps in general lighting applications. For discussion regarding the exemption of this lamp type in the definition of GSIL, see section III.A.1.b. In this final rule DOE is adopting the definition of “showcase lamp” as proposed in the October 2016 NOPDDA. A showcase lamp is a lamp that has a T shape as specified in ANSI C78.20–2003 and ANSI C79.1–2002, is designed and marketed as a showcase lamp, and has a maximum rated wattage of 75 watts. See the amendments to § 430.2 for the definition in its entirety.

#### 6. Traffic Signal Lamp

NRDC stated that given their medium screw base and residential voltage as well as likeness to incandescent lamps, traffic signal lamps would appeal to consumers. Further, the unique characteristics of a strengthened filament and longer life liken these lamps to vibration and rough service lamps. NRDC recommended that DOE remove the exemption for traffic signal lamps to avoid potential lamp switching scenarios. NRDC also commented that LED lamps already meet the needs of traffic signal lamps. (NRDC, No. 85 at p. 8)

NEMA and LEDVANCE agreed with the proposed definition of traffic signal lamp. LEDVANCE explained that these replacement traffic signal lamps have a low lumen output, longer life, A21 shapes; and are more robustly constructed and expensive compared to a GSIL. LEDVANCE stated that due to these factors consumers would not use these lamps as replacements. LEDVANCE added that these lamps cannot be found in typical distribution channels such as retail stores. NEMA and LEDVANCE also stated that this type of lamp has seen dramatic decreases in sales because of the EPCA mandate to use LED technology in new traffic signal modules. (NEMA, No. 93 at p. 30; LEDVANCE, No. 90 at p. 35)

In its review of the definition for traffic signal lamps, DOE found that most traffic signal lamps have a lifetime of 8,000 hours, which is longer than typical incandescent lamps. This distinctive characteristic aligns with the use of these lamp types in traffic signals, in which long lifetimes are likely a desirable feature. Hence, DOE is amending its proposed definition of “traffic signal lamps” to include a lifetime specification. A traffic signal lamp means a lamp that is designed and marketed for traffic signal applications and has a lifetime of 8,000 hours or greater.

#### 7. Silver Bowl Lamp

NEMA and LEDVANCE agreed with DOE’s proposed definition of silver bowl lamp. Both stated that this is a specialty lamp used for pendant and hanging light fixtures and that the lamp has an opaque silver coating causing the light to reflect towards the ceiling to create a specific lighting atmosphere. NEMA and LEDVANCE asserted that these lamps are not suitable for general service lighting applications. (NEMA, No. 93 at pp. 29–30; LEDVANCE, No. 90 at p. 35)

ASAP disagreed and recommended that the definition for “silver bowl lamp” be revised to include a minimum requirement for the percentage of total bulb surface that has a reflective coating. ASAP also suggested that the coating be required to be opaque. Finally, ASAP noted that more efficient alternatives to the incandescent silver bowl lamps are available and that silver bowl lamps should also be included in the definition of GSILs. (ASAP, No. 94 at p. 4)

Manufacturer catalogs and product specifications do not provide the amount of coating used in silver bowl lamps and therefore, it is difficult to determine a consistent value applicable across all products. DOE agrees that an opaque coating is necessary for the primary purpose of the lamp to reflect light towards the lamp base. DOE has therefore included the term “opaque” in the definition. For discussion regarding the exclusion of this lamp type in the GSIL definition, see section III.A.1.b. In this final rule, DOE amends the proposed definition to specify an opaque coating and is adopting a definition of “silver bowl lamp.” A silver bowl lamp is a lamp that has an opaque reflective coating applied directly to part of the bulb surface that reflects light toward the lamp base and that is designed and marketed as a silver bowl lamp.

#### 8. Specialty MR Lamp

In the October 2016 NOPDDA, DOE proposed to exempt certain MR-shaped lamps that have smaller diameters than MR16 lamps and are marketed for use in specialty applications. In doing so, DOE found it necessary to establish a definition for “specialty MR lamp” to describe the lamps used in these specialty applications. As described in section III.A.4.f, DOE has revised the definition of specialty MR lamp for this final rule. A specialty MR lamp is a lamp that has an MR shape as defined in ANSI C79.1–2002, a diameter of less than or equal to 2.25 inches, a lifetime of less than or equal to 300 hours, and

that is designed and marketed for a specialty application.

NEMA recommended and LEDVANCE supported a definition for “MR lamp,” describing it as “a curved focusing reflectorized bulb which may have a multifaceted inner surface that is generally dichroic coated and referred to as a multifaceted reflector lamp with a GU10, GU11, GU5.3, GUX5.3, GU8, GU4, or E26 base” and providing information regarding common light sources and diameters used in the lamp type. (NEMA, No. 93 at p. 27; LEDVANCE, No. 90 at pp. 32–33) DOE does not find that a general definition for MR-shaped lamps is necessary to clarify the scope of this rulemaking. Additionally, the details regarding the bulb shape provided in NEMA’s proposed definition are very similar to those in the ANSI standard that DOE references in its definition of “specialty MR lamp.”

#### 9. Designed and Marketed

In the October 2016 NOPDDA, DOE proposed a definition for “designed and marketed” to provide additional detail regarding the use of the term in several of the supporting definitions. 81 FR 71809. NEEP, Utility Coalition, and ASAP recommended the addition of the words “prominently displayed” in the definition to provide clarity in product labels regarding the application of the product. NEEP commented that this requirement would not overly impact the manufacturer’s packaging process. Further, Utility Coalition and ASAP explained that this requirement would reduce confusion among consumers about how the lamp should be used. (NEEP, No. 92 at pp. 1–3; Utility Coalition, No. 95 at p. 11; ASAP, No. 94 at p. 7)

DOE agrees that the specification of “prominently displayed” would help ensure that the application for which the product is intended is clearly communicated to consumers. Hence in this final rule, DOE amends the proposed definition of “designed and marketed” to specify that the application designation be prominently displayed. Designed and marketed is exclusively designed to fulfill the indicated application and, when distributed in commerce, designated and marketed solely for that application, with the designation prominently displayed on the packaging and all publicly available documents (*e.g.*, product literature, catalogs, and packaging labels). This definition is applicable to terms related to the following covered lighting products: Fluorescent lamp ballasts; fluorescent lamps; general service fluorescent

lamps; general service incandescent lamps; general service lamps; incandescent lamps; incandescent reflector lamps; medium base compact fluorescent lamps; and specialty application mercury vapor lamp ballasts.

#### 10. Other Definitions

In the October 2016 NOPDDA, DOE also proposed definitions for “GU24 base,” “integrated lamp,” “LED downlight retrofit kit,” “left-hand thread lamp,” “light fixture,” “marine signal service lamp,” “mine service lamp,” “non-integrated lamp,” “non-reflector lamp,” “pin base lamp,” “reflector lamp,” and “sign service lamp.” 81 FR 71807, 71809. DOE believes the definitions for “GU24 base” and “non-reflector lamp” are no longer necessary. DOE did not receive any comments on the other definitions and is adopting a definition for integrated lamp, LED downlight retrofit kit, left hand thread lamp, light fixture, marine signal service lamp, mine service lamp, non-integrated lamp, pin-base lamp, sign-service lamp in § 430.2 in this final rule.<sup>22</sup>

Although DOE received no comments on the definition of reflector lamp, DOE believes the phrase “is used to provide directional light” describes the function of a reflector lamp better than “is used to direct light.” DOE has therefore revised the definition of reflector lamp in the final rule. A reflector lamp is a lamp that has an R, PAR, BPAR, BR, ER, MR, or similar bulb shape (as defined in ANSI C78.20–2003 and ANSI C79.1–2002) and is used to provide directional light.

### IV. Energy Conservation Standards

#### A. Energy Conservation Standards Proposed in the March 2016 GSL ECS NOPR

In the March 2016 GSL ECS NOPR, DOE proposed standards for GSLs. Although the October 2016 NOPDDA did not specifically address the proposed standards, DOE received a number of general comments regarding the proposed standards. CEC and RELS urged DOE to consider a minimum efficiency standard that achieves feasible and prospective energy savings for products in the GSL scope once the definition of GSL is finalized. (CEC, No. 81 at p. 1; CEC, No. 83 at pp. 32–33;

RELS, No. 86 at p. 1) CEC stated that significant energy savings would result in shifting from an incandescent lamp to an LED lamp or shifting from an LED lamp to a more efficient LED lamp for SDDLs and medium screw base LED reflector lamps. CEC also provided an estimate of current availability of LED replacements at 80 lm/W or higher for SDDLs and medium screw base directional lamps. (CEC, No. 91 at pp. 7–8)

NEEP commented that given the range of LED products available on the market that are high quality and high efficiency, NEEP believes that the federal minimum standard for 2020 and corresponding scope are very achievable. (NEEP, No. 83 at pp. 13–14)

This final rule adopts a definition for GSL, as well as related definitions. DOE is not addressing proposed standards in this final rule. DOE acknowledges the comments regarding the proposed standards for GSLs, and will address them at such time as standards may be finalized.

#### B. Backstop

If DOE fails to complete a rulemaking in accordance with 42 U.S.C. 6295(i)(6)(A)(i)–(iv) or a final rule from the first rulemaking cycle does not produce savings greater than or equal to the savings from a minimum efficacy standard of 45 lm/W, the statute provides a “backstop” under which DOE must prohibit sales of GSLs that do not meet a minimum 45 lm/W standard beginning on January 1, 2020. (42 U.S.C. 6295(i)(6)(A)(v)) DOE received a number of comments regarding the backstop standard.

CEC commented on the potential for DOE to exercise enforcement discretion if the backstop standard was applicable. (CEC, No. 91 at p. 10) CEC stated that if DOE were to exercise enforcement discretion, that the backstop standard would still be applicable in the context of California building codes (which incorporate Federal appliance standards), and in the context of California’s appliance efficiency standards (which require product certification for federally covered products). (CEC, No. 91 at p. 10)

As of the issuance date of this document the backstop standard would not be applicable. The backstop standard is not applicable unless DOE fails to complete the rulemaking as prescribed by EPCA by January 1, 2017, or the final rule does not produce savings that are greater than or equal to the savings from a minimum efficacy standard of 45 lm/W. (42 U.S.C. 6295(i)(6)(A)(iv))

#### C. Preemption

Federal energy conservation requirements generally supersede state laws or regulations concerning energy conservation testing, labeling, and standards. (42 U.S.C. 6297(a)–(c)) Generally, preemption applies both before an energy conservation standard becomes effective, and after an energy conservation standard becomes effective. (42 U.S.C. 6297(b) and (c)) For energy conservation standards applicable to GSLs, EISA 2007 established additional preemption provisions specific to California and Nevada. Namely, beginning January 1, 2018, no provision of law can preclude these states from adopting: (1) Standards established in a final DOE rule adopted in accordance with 42 U.S.C. 6295(i)(6)(A)(i)–(iv); (2) the minimum efficacy standard of the backstop standard (45 lm/W) if no final rule was adopted in accordance with 42 U.S.C. 6295(i)(6)(A)(i)–(iv); or (3) for the State of California, any California regulations related to the covered products adopted pursuant to state statute in effect as of the date of enactment of EISA 2007 (*i.e.*, December 19, 2007). (42 U.S.C. 6295(i)(6)(A)(vi)) Other than these narrow exceptions, EPCA’s statutory preemption provision prohibits any state from adopting energy conservation standards for any type of GSL regardless of whether DOE sets standards for that type of GSL.

CEC stated that California has already established a 45 lm/W standard with an effective date of January 1, 2018. (CEC, No. 91 at p. 10) CEC stated that the technology neutral approach to the scope of GSLs would minimize lamp switching that would otherwise limit the energy savings and consumer benefits achieved by the 45 lm/W requirement effective January 1, 2018 in California and in January 1, 2020 in the rest of the nation. (CEC, No. 91 at p. 1) Philips asked if CFL and LED reflector lamps would be GSLs under the definitions proposed in the October 2016 NOPDDA, whether they would be subject to the backstop standard, and if so, whether the backstop standard would preempt the California Title 20 regulation. (Philips, No. 96 at p. 6)

Except for the narrow exception to the preemption provision provided in 42 U.S.C. 6295(i)(6)(A)(vi), the general EPCA preemption provisions apply to GSLs. Federal test procedures for GSLs supersede state test procedures that require testing in any manner other than the Federal test procedure. (42 U.S.C. 6297(a)(1)(A)) Prior to the effective date of standards for GSLs, no state regulation regarding energy efficiency or

<sup>22</sup> DOE notes that for several of these definitions, the October 2016 NOPDDA included references to appropriate industry standards to define terms like “retrofit kit” or “single pin base system.” DOE is omitting those references from this final rule because on further deliberation, it believes those terms are terms of art whose meaning will be clear to participants in the lighting market.

energy use shall be effective with respect to such covered products.<sup>23</sup> (42 U.S.C. 6297(b)) Preemption continues to apply after a Federal energy conservation standard for GSLs becomes effective. (42 U.S.C. 6297(c))

#### V. Manufacturer Impacts

NEMA noted that in response to the March 2016 ECS NOPR, it had commented that in 2020 manufacturers would have to supply the entire nation with general service LED lamps as incandescent lamps would not be available. NEMA had explained in its comment that this would mean a 300 percent increase in the steady state demand and require tripling capacity for only that year. NEMA stated that the proposed definitions in the October 2016 NOPDDA increased the scope of GSLs to a wider range of specialty products than what was proposed in the March 2016 GSL ECS NOPR. Hence the projected spike in demand in 2020 would now be even higher. Therefore, NEMA encouraged DOE to either not impose regulations or postpone them for a few years on niche products. (NEMA, No. 83 at pp. 157–158)

NRDC noted that stakeholders have known that standards set by DOE and/or the 45 lm/W backstop standard would be implemented in 2020. NRDC stated that sales from a recent quarter showing LED market share was at 25 percent indicated that industry has done an amazing job preparing for this standard. Further NRDC noted that supply chains worldwide would be impacted as Europe and China are also phasing out incandescent lamps. Hence, NRDC asserted that industry would be adequately prepared for to meet demand in 2020. (NRDC, No. 83 at pp. 164–165)

GE, NEMA and LEDVANCE urged DOE to reconsider its interpretation of the Appropriations Rider and EISA 2007 and pointed out that expanding the scope of GSLs will further increase the amount of stranded inventory and consequently the time it will take to sell the lamps, adding that a minimum of 2–3 years will be required to sell stranded inventory and exit the businesses. GE, NEMA and LEDVANCE stated that typically DOE allows existing inventory of noncompliant products to be sold after a standard goes into effect while the backstop standard prohibits sale of noncompliant products at a certain date.

<sup>23</sup> 42 U.S.C. 6297(b)(1)(B) provided California and Nevada a limited exception to the preemption of the standards for general service incandescent lamps, intermediate base incandescent lamps, or candelabra base lamps established in EISA prior to their effective date. The Federal standards have since gone into effect and that preemption provision is no longer relevant.

(GE, No. 88 at pp. 5–6; NEMA, No. 93 at p. 31; LEDVANCE, No. 90 at p. 36) Philips and LEDVANCE added that enforcement of a prohibition of sale date would also impact the electrical distribution market. Philips recommended DOE consider a prohibition on manufacturing and not sales. LEDVANCE stated DOE should allow manufacturers and retailers to sell inventory they have on-hand before the date of prohibition. (Philips, No. 96 at p. 6; LEDVANCE, No. 90 at pp. 16–17) To avoid imposing severe financial burdens on industry, NEMA stated that DOE should withdraw its proposed expansion of GSL scope and evaluate discontinuing exemptions in the second GSL rulemaking Congress authorized to begin in 2020. (NEMA, No. 93 at p. 31)

CEC agreed that a prohibition on sale would pose difficulties for the industry. CEC noted that use of date-of-manufacture for the compliance date would be more easily enforced and would ensure that retailers are not unfairly penalized for incorrectly determining the exact amount of stock that can be sold prior to the compliance date, but CEC also commented that it understood the backstop standard to establish a date-of-sale compliance date. (CEC, No. 91 at pp. 9–10)

NEMA also encouraged DOE to consider establishing an energy conservation standard that caps energy use (wattage) as it is significantly less burdensome compared to a lumens per watt requirement. NEMA explained a wattage limit is particularly applicable to rough service, vibration service, and shatter-resistant lamps, appliance lamps, intermediate base lamps, candelabra base lamps, T shape lamps and other lamps that have 40 W restrictions as well as high lumen lamps. NEMA stated because there is no hard evidence that lamp switching from general service LED lamps to specialty versions is even possible and will result in loss of significant energy savings, there is no reason for DOE to impose testing burden on manufacturers by regulating specialty LED lamps. (NEMA, No. 93 at p. 11) In addition to test burden, Philips and NEMA noted the significantly increased burden on manufacturers if DOE required certification reports to be submitted for all products to certify to the 45 lm/W standard. (Philips, No. 83 at p. 163; Philips, No. 96 at p. 6; NEMA, No. 93 at p. 11)

NEMA noted that they, as well as domestic lighting manufacturers, are advocates for domestic manufacturing and employment. Thus, in addition to energy savings and energy efficiency, NEMA argued that DOE must consider

the fact that the proposed rule will destroy domestic jobs. (NEMA, No. 83 at p. 16)

However, NRDC and ASAP commented that many LED lamps are designed and produced by domestic companies, and therefore recommended comparing the number of jobs in the U.S. associated with making LED lamps compared to less efficient products. (NRDC, No. 83 at p. 46; ASAP, No. 94 at p. 7) NRDC and Utility Coalition added that, to their knowledge, incandescent/halogen lamps by leading manufacturers such as GE and Philips Lighting are not made in the U.S. They cited domestic producers of SSLs and their employee numbers and asserted that domestic jobs related to designing, testing, and marketing LED lamps and their components would outnumber domestic jobs related to production of incandescent lamps. (Utility Coalition, No. 95 at pp. 5–6; NRDC, No. 85 at pp. 10–11)

DOE acknowledges that manufacturers may face a difficult transition if required to comply with a 45 lm/W standard. Manufacturers have voiced concern regarding the loss of domestic manufacturing jobs, the stranding of inventory, the ability to meet the demand for all general service lamps with lamps using LED technology, and the burden associated with testing and certifying compliance for all general service lamps in DOE's Compliance Certification Management System (CCMS). Manufacturers have requested an end to or delay in imposing any new standards for general service lamps and a two to three year delay in enforcing the backstop standard.

DOE is committed to working with manufacturers to ensure a successful transition if the backstop standard goes into effect.<sup>24</sup> DOE will continue to have an active dialogue with industry, including meetings and other stakeholder outreach, throughout the period between publication of this rule and the compliance date of any backstop standard for general service

<sup>24</sup> In that vein, DOE also notes NEMA's comment that because the backstop requires DOE to "prohibit sales," it could present a substantial practical difficulty regarding compliance. For most products, NEMA states, after a standard comes into effect distributors can continue to sell inventory still on hand that complied with the previous standard. If, by contrast, distributors cannot sell old lamp inventory after January 1, 2020, that inventory will be stranded. Although it is premature for DOE to explain in detail how the backstop would work if it comes into force, DOE notes that under subsection (i)(2), "it shall not be unlawful for a manufacturer to sell a lamp which is in compliance with the law at the time such lamp was manufactured." DOE expects it would interpret and apply the backstop with subsection (i)(2) in mind.

lamps. During this period, DOE will keep stakeholders and the public apprised of its plans for any broad exercise of enforcement discretion with respect to the standard.

#### VI. Clarifications to Regulatory Text

In the October 2016 NOPDDA, DOE proposed editorial modifications to regulatory text to align with the recently adopted test procedure for integrated LED lamps. Specifically, DOE proposed changes to 10 CFR 429.56 regarding the certification and reporting requirements of integrated LED lamps. In the July 2016 LED test procedure (TP) final rule, DOE adopted the requirement that testing of integrated LED lamps be conducted by test laboratories accredited by an Accreditation Body that is a signatory member to the International Laboratory Accreditation Cooperation (ILAC) Mutual Recognition Arrangement (MRA). 81 FR 43404, 43419 (July 1, 2016). To align with this requirement, DOE proposed in the October 2016 NOPDDA to modify the certification report language in 429.56(b)(2) to specify that the testing laboratory's ILAC accreditation body's identification number or other approved identification assigned by the ILAC accreditation body must be included in the certification report. In addition, DOE proposed that manufacturers must also report CRI in the certification report for integrated LED lamps. 81 FR 71809.

LEDVANCE requested clarification on DOE's citation of an ILAC accreditor identification number while NEMA pointed out that there are no identification numbers for ILAC accreditors. NEMA, LEDVANCE, and Philips also asked DOE to reconsider including CRI in the certification reporting requirements to minimize the regulatory and testing burden especially because CRI is not a part of the energy conservation standard for general service incandescent lamps or general service LED lamps. (LEDVANCE, No. 90 at p. 35; NEMA, No. 93 at p. 30; Philips, No. 96 at p. 5)

This final rule document finalizes the definition for GSL and related definitions. DOE is not making changes to the certification and reporting requirements in this final rule. DOE recognizes the comments received regarding the reporting of a testing laboratory's ILAC accreditation number and the reporting of the CRI for integrated lamps, and will address these comments to the extent the proposed revisions are considered at a later date.

#### VII. Effective Date

For the changes described in the various definitions in this final rule,

DOE is adopting a January 1, 2020 effective date.

#### VIII. Procedural Issues and Regulatory Review

##### A. Review Under Executive Orders 12866 and 13563

This final rule neither implements nor seeks to enforce any standard. Rather, this final rule merely defines what constitutes a GSIL and what constitutes a GSL. Lamps that are GSLs will become subject to either a standard developed by DOE or to a 45 lm/W backstop standard, but this rule does not determine what standard will be applicable to lamps that are being newly included as GSLs. Accordingly, this action does not constitute a significant regulatory action under Executive Orders 12866 and 13563.

NEMA commented that DOE failed to meet the requirements of Executive Order 12866 in that DOE did not consider regulatory alternatives to the regulation adopted in this document including the alternative of not regulating and that DOE must choose the regulatory approach that maximizes net benefits unless a statute requires another regulatory approach. (NEMA, No. 93 at p. 10)

As explained throughout the preamble, DOE has undertaken revisions to the GSIL and GSL definitions as authorized by EPCA. (42 U.S.C. 6295(i)(6)(A)(i)(II)) In amending the definitions, DOE considered the potential that lamps exempted from the definition of GSL would create loopholes should a GSL standard or standards be adopted. However, this rule does not establish standards.

##### B. Review Under the Regulatory Flexibility Act

The Regulatory Flexibility Act (5 U.S.C. 601 *et seq.*) requires that when an agency promulgates a final rule under 5 U.S.C. 553, after being required by that section or any other law to publish a general NOPR, the agency shall prepare a final regulatory flexibility analysis (FRFA), unless the agency certifies that the rule will not have a significant economic impact on a substantial number of small entities. As required by Executive Order 13272, "Proper Consideration of Small Entities in Agency Rulemaking," 67 FR 53461 (August 16, 2002), DOE published procedures and policies on February 19, 2003, to ensure that the potential impacts of its rules on small entities are properly considered during the rulemaking process. 68 FR 7990. DOE has made its procedures and policies available on the Office of the General

Counsel's Web site (<http://energy.gov/gc/office-general-counsel>).

DOE reviewed the definitions for GSL and related terms adopted in this final rule under the provisions of the Regulatory Flexibility Act and the procedures and policies published on February 19, 2003. DOE certifies that this final rule does not have a significant economic impact on a substantial number of small entities. The factual basis for this certification is set forth in the following paragraphs.

For manufacturers of GSLs, the SBA has set a size threshold, which defines those entities classified as "small businesses" for the purposes of the statute. DOE used the SBA's small business size standards to determine whether any small entities would be subject to the requirements of the rule. (See 13 CFR part 121.) The size standards are listed by NAICS code and industry description and are available at [http://www.sba.gov/sites/default/files/files/Size\\_Standards\\_Table.pdf](http://www.sba.gov/sites/default/files/files/Size_Standards_Table.pdf). Manufacturing of GSLs is classified under NAICS 335110, "Electric Lamp Bulb and Part Manufacturing." The SBA sets a threshold of 1,250 employees or less for an entity to be considered as a small business for this category.

To estimate the number of companies that could be small businesses that manufacture GSLs covered by this rulemaking, DOE conducted a market survey using publicly available information. DOE's research involved information provided by trade associations (e.g., NEMA<sup>25</sup>) and information from DOE's CCMS Database,<sup>26</sup> EPA's ENERGY STAR Certified Light Bulbs Database,<sup>27</sup> DOE's LED Lighting Facts Database,<sup>28</sup> previous rulemakings, individual company Web sites, SBA's database, and market research tools (e.g., Hoover's reports<sup>29</sup>). DOE used information from these sources to create a list of companies that potentially manufacture or sell GSLs and would be impacted by this

<sup>25</sup> National Electric Manufacturers Association | Member Products | Lighting Systems | Related Manufacturers, <http://www.nema.org/Products/Pages/Lighting-Systems.aspx> (last accessed November 21, 2016).

<sup>26</sup> DOE's Compliance Certification Database | Lamps—Bare or Covered (No Reflector) Medium Base Compact Fluorescent, <http://www.regulations.doe.gov/certification-data> (last accessed November 21, 2016).

<sup>27</sup> ENERGY STAR Qualified Lamps Product List, [http://downloads.energystar.gov/bi/qplist/Lamps\\_Qualified\\_Product\\_List.xls?dee3-e997](http://downloads.energystar.gov/bi/qplist/Lamps_Qualified_Product_List.xls?dee3-e997) (last accessed November 21, 2016).

<sup>28</sup> LED Lighting Facts Database, <http://www.lightingfacts.com/products> (last accessed November 21, 2016).

<sup>29</sup> Hoovers | Company Information | Industry Information | Lists, <http://www.hoovers.com> (last accessed November 21, 2016).

rulemaking. DOE screened out companies that do not offer products covered by this rulemaking, do not meet the definition of a “small business,” or are completely foreign owned and operated. DOE determined that nine companies are small businesses that maintain domestic production facilities for general service lamps.

DOE notes that this final rule merely defines what constitutes a GSIL and what constitutes a GSL. Manufacturers of general service lamps are required to use DOE’s test procedures to make representations and certify compliance with standards, if required. The test procedure rulemakings for CFLs, integrated LED lamps, and other general service lamps<sup>30</sup> addressed impacts on small businesses due to test procedure requirements. 81 FR 59386 (August 29, 2016); 81 FR 43404 (July 1, 2016). The effective date allows reasonable time for manufacturers to transition, while reducing the number of redesigns needed, should manufacturers need to comply with a 45 lm/W statutory standard beginning on January 1, 2020. For these reasons, DOE concludes and certifies that the new adopted definitions do not have a significant economic impact on a substantial number of small entities, and the preparation of an FRFA is not warranted.

#### C. Review Under the Paperwork Reduction Act

Manufacturers of GSLs must certify to DOE that their products comply with any applicable energy conservation standards. In certifying compliance, manufacturers must test their products according to DOE test procedures for GSLs, including any amendments adopted for those test procedures. DOE has established regulations for the certification and recordkeeping requirements for all covered consumer products and commercial equipment. 76 FR 12422 (March 7, 2011). The collection-of-information requirement for the certification and recordkeeping is subject to review and approval by OMB under the Paperwork Reduction Act (PRA). This requirement has been approved by OMB under OMB control number 1910–1400. DOE requested OMB approval of an extension of this information collection for three years, specifically including the collection of information adopted in the present rulemaking, and estimated that the

annual number of burden hours under this extension is 30 hours per company. In response to DOE’s request, OMB approved DOE’s information collection requirements covered under OMB control number 1910–1400 through November 30, 2017. 80 FR 5099 (January 30, 2015).

Notwithstanding any other provision of the law, no person is required to respond to, nor shall any person be subject to a penalty for failure to comply with, a collection of information subject to the requirements of the PRA, unless that collection of information displays a currently valid OMB control number.

#### D. Review Under the National Environmental Policy Act of 1969

Pursuant to the National Environmental Policy Act (NEPA) of 1969, DOE has determined that the rule fits within the category of actions included in Categorical Exclusion (CX) B5.1 and otherwise meets the requirements for application of a CX. (See 10 CFR part 1021, App. B, B5.1(b); 1021.410(b) and App. B, B(1)–(5).) The rule fits within this category of actions because it is a rulemaking that changes the definition of a covered class of products for which there are existing energy conservation standards, and for which none of the exceptions identified in CX B5.1(b) apply. Therefore, DOE has made a CX determination for this rulemaking, and DOE does not need to prepare an Environmental Assessment or Environmental Impact Statement for this rule. DOE’s CX determination for this rule is available at <http://energy.gov/nepa/categorical-exclusion-cx-determinations-cx>.

#### E. Review Under Executive Order 13132

Executive Order 13132, “Federalism,” 64 FR 43255 (August 10, 1999), imposes certain requirements on federal agencies formulating and implementing policies or regulations that preempt state law or that have Federalism implications. The Executive Order requires agencies to examine the constitutional and statutory authority supporting any action that would limit the policymaking discretion of the states and to carefully assess the necessity for such actions. The Executive Order also requires agencies to have an accountable process to ensure meaningful and timely input by state and local officials in the development of regulatory policies that have Federalism implications. On March 14, 2000, DOE published a statement of policy describing the intergovernmental consultation process it will follow in the development of such regulations. 65 FR 13735. DOE has examined this rule and has determined

that it would not have a substantial direct effect on the states, on the relationship between the national government and the states, or on the distribution of power and responsibilities among the various levels of government. EPCA governs and prescribes federal preemption of state regulations as to energy conservation for the products that are the subject of this final rule. States can petition DOE for exemption from such preemption to the extent, and based on criteria, set forth in EPCA. (42 U.S.C. 6297) Therefore, no further action is required by Executive Order 13132.

#### F. Review Under Executive Order 12988

With respect to the review of existing regulations and the promulgation of new regulations, section 3(a) of Executive Order 12988, “Civil Justice Reform,” imposes on federal agencies the general duty to adhere to the following requirements: (1) Eliminate drafting errors and ambiguity; (2) write regulations to minimize litigation; (3) provide a clear legal standard for affected conduct rather than a general standard; and (4) promote simplification and burden reduction. 61 FR 4729 (Feb. 7, 1996). Regarding the review required by section 3(a), section 3(b) of Executive Order 12988 specifically requires that Executive agencies make every reasonable effort to ensure that the regulation: (1) Clearly specifies the preemptive effect, if any; (2) clearly specifies any effect on existing federal law or regulation; (3) provides a clear legal standard for affected conduct while promoting simplification and burden reduction; (4) specifies the retroactive effect, if any; (5) adequately defines key terms; and (6) addresses other important issues affecting clarity and general draftsmanship under any guidelines issued by the Attorney General. Section 3(c) of Executive Order 12988 requires Executive agencies to review regulations in light of applicable standards in section 3(a) and section 3(b) to determine whether they are met or it is unreasonable to meet one or more of them. DOE has completed the required review and determined that, to the extent permitted by law, this final rule meets the relevant standards of Executive Order 12988.

#### G. Review Under the Unfunded Mandates Reform Act of 1995

Title II of the Unfunded Mandates Reform Act of 1995 (UMRA) requires each federal agency to assess the effects of federal regulatory actions on state, local, and tribal governments and the private sector. Public Law 104–4, sec. 201 (codified at 2 U.S.C. 1531). For a

<sup>30</sup> The pre-publication of the general service lamps test procedure final rule was issued on September 30, 2016 and is available at: <http://energy.gov/sites/prod/files/2016/09/f33/General%20Service%20Lamps%20TP%20Final%20Rule.pdf>.

regulatory action likely to result in a rule that includes a Federal mandate that may result in the expenditure by State, local, and Tribal governments, in the aggregate, or by the private sector of \$100 million or more in any one year (adjusted annually for inflation), section 202 of UMRA requires a federal agency to publish a written statement that estimates the resulting costs, benefits, and other effects on the national economy. (2 U.S.C. 1532(a), (b)) The UMRA also requires a federal agency to develop an effective process to permit timely input by elected officers of state, local, and tribal governments on a proposed “significant intergovernmental mandate,” and requires an agency plan for giving notice and opportunity for timely input to potentially affected small governments before establishing any requirements that might significantly or uniquely affect them. On March 18, 1997, DOE published a statement of policy on its process for intergovernmental consultation under UMRA. 62 FR 12820. DOE’s policy statement is also available at [http://energy.gov/sites/prod/files/gcprod/documents/umra\\_97.pdf](http://energy.gov/sites/prod/files/gcprod/documents/umra_97.pdf).

DOE examined this final rule according to UMRA and its statement of policy and determined that the rule contains neither an intergovernmental mandate, nor a mandate that may result in the expenditure of \$100 million or more in any year, so these requirements do not apply.

#### *H. Review Under the Treasury and General Government Appropriations Act, 1999*

Section 654 of the Treasury and General Government Appropriations Act, 1999 (Pub. L. 105–277) requires federal agencies to issue a Family Policymaking Assessment for any rule that may affect family well-being. This rule would not have any impact on the autonomy or integrity of the family as an institution. Accordingly, DOE has concluded that it is not necessary to prepare a Family Policymaking Assessment.

#### *I. Review Under Executive Order 12630*

Pursuant to Executive Order 12630, “Governmental Actions and Interference with Constitutionally Protected Property Rights,” 53 FR 8859 (March 15, 1988), DOE has determined that this rule would not result in any takings that might require compensation under the Fifth Amendment to the U.S. Constitution.

#### *J. Review Under the Treasury and General Government Appropriations Act, 2001*

Section 515 of the Treasury and General Government Appropriations Act, 2001 (44 U.S.C. 3516 note) provides for federal agencies to review most disseminations of information to the public under information quality guidelines established by each agency pursuant to general guidelines issued by OMB. OMB’s guidelines were published at 67 FR 8452 (Feb. 22, 2002), and DOE’s guidelines were published at 67 FR 62446 (Oct. 7, 2002). DOE has reviewed this final rule under the OMB and DOE guidelines and has concluded that it is consistent with applicable policies in those guidelines.

#### *K. Review Under Executive Order 13211*

Executive Order 13211, “Actions Concerning Regulations That Significantly Affect Energy Supply, Distribution, or Use,” 66 FR 28355 (May 22, 2001), requires federal agencies to prepare and submit to OIRA at OMB, a Statement of Energy Effects for any significant energy action. A “significant energy action” is defined as any action by an agency that promulgates or is expected to lead to promulgation of a final rule, and that: (1) Is a significant regulatory action under Executive Order 12866, or any successor order; and (2) is likely to have a significant adverse effect on the supply, distribution, or use of energy, or (3) is designated by the Administrator of OIRA as a significant energy action. For any significant energy action, the agency must give a detailed statement of any adverse effects on energy supply, distribution, or use should the proposal be implemented, and of reasonable alternatives to the action and their expected benefits on energy supply, distribution, and use.

This regulatory action to adopt definitions for GSL and related terms is not a significant regulatory action under Executive Order 12866. Moreover, it would not have a significant adverse effect on the supply, distribution, or use of energy, nor has it been designated as a significant energy action by the Administrator of OIRA. Therefore, it is not a significant energy action, and, accordingly, DOE has not prepared a Statement of Energy Effects.

#### *L. Review Under Section 32 of the Federal Energy Administration Act of 1974*

Under section 301 of the Department of Energy Organization Act (Pub. L. 95–91; 42 U.S.C. 7101), DOE must comply with section 32 of the Federal Energy Administration Act of 1974, as amended

by the Federal Energy Administration Authorization Act of 1977. (15 U.S.C. 788; FEAA) Section 32 essentially provides in relevant part that, where a rule authorizes or requires use of commercial standards, the NOPR must inform the public of the use and background of such standards. In addition, section 32(c) requires DOE to consult with the Attorney General and the Chairman of the Federal Trade Commission (FTC) concerning the impact of the commercial or industry standards on competition.

The modifications to the definition of general service lamp and the associated supporting definitions adopted in this final rule references the following commercial standards that are already incorporated by reference in 10 CFR part 430:

- (1) ANSI C78.20–2003, Revision of ANSI C78.20–1995 (“ANSI C78.20”), American National Standard for electric lamps—A, G, PS, and Similar Shapes with E26 Medium Screw Bases, approved October 30, 2003.
- (2) ANSI C79.1–2002, American National Standard for Electric Lamps—Nomenclature for Glass Bulbs Intended for Use with Electric Lamps, approved September 16, 2002.
- (3) CIE 13.3–1995 (“CIE 13.3”), Technical Report: Method of Measuring and Specifying Colour Rendering Properties of Light Sources, 1995, ISBN 3 900 734 57 7.

DOE previously consulted with both the Attorney General and the Chairman of the FTC about the impact on competition of referencing these standards and at that time received no comments objecting to their use.

#### *M. Congressional Notification*

As required by 5 U.S.C. 801, DOE will report to Congress on the promulgation of this rule prior to its effective date. The report will state that it has been determined that the rule is not a “major rule” as defined by 5 U.S.C. 804(2).

#### **IX. Approval of the Office of the Secretary**

The Secretary of Energy has approved publication of this final rule.

#### **List of Subjects in 10 CFR Part 430**

Administrative practice and procedure, Confidential business information, Energy conservation, Household appliances, Imports, Incorporation by reference, Intergovernmental relations, Small businesses.

Issued in Washington, DC, on December 29, 2016.

**David Nemtzw,**

*Acting Deputy Assistant Secretary for Energy Efficiency, Energy Efficiency and Renewable Energy.*

For the reasons set forth in the preamble, DOE amends part 430 of chapter II, subchapter D, of title 10 of the Code of Federal Regulations, as set forth below:

## **PART 430—ENERGY CONSERVATION PROGRAM FOR CONSUMER PRODUCTS**

■ 1. The authority citation for part 430 continues to read as follows:

**Authority:** 42 U.S.C. 6291–6309; 28 U.S.C. 2461 note.

■ 2. Section 430.2 is amended by:

- a. Adding in alphabetical order the definitions of “Black light lamp,” “Bug lamp,” “Colored lamp,” “General service light-emitting diode (LED) lamp,” “General service organic lighting-emitting diode (OLED) lamp,” “Infrared lamp,” “Integrated lamp,” “LED Downlight Retrofit Kit,” “Left-hand thread lamp,” “Light fixture,” “Marine lamp,” “Marine signal service lamp,” “Mine service lamp,” “Non-integrated lamp,” “Other fluorescent lamp,” “Pin base lamp,” “Plant light lamp,” “Reflector lamp,” “Showcase Lamp,” “Sign service lamp,” “Silver bowl lamp,” “Specialty MR lamp,” and “Traffic signal lamp;” and
- b. Revising the definitions of “designed and marketed,” “general service incandescent lamp,” and “general service lamp.”

The additions and revisions read as follows:

### **§ 430.2 Definitions.**

\* \* \* \* \*

*Black light lamp* means a lamp that is designed and marketed as a black light lamp and is an ultraviolet lamp with the highest radiant power peaks in the UV–A band (315 to 400 nm) of the electromagnetic spectrum.

\* \* \* \* \*

*Bug lamp* means a lamp that is designed and marketed as a bug lamp, has radiant power peaks above 550 nm on the electromagnetic spectrum, and has a visible yellow coating.

\* \* \* \* \*

*Colored lamp* means a colored fluorescent lamp, a colored incandescent lamp, or a lamp designed and marketed as a colored lamp with either of the following characteristics (if multiple modes of operation are possible [such as variable CCT], either of the below characteristics must be

maintained throughout all modes of operation):

(1) A CRI less than 40, as determined according to the method set forth in CIE Publication 13.3 (incorporated by reference; see § 430.3); or

(2) A CCT less than 2,500 K or greater than 7,000 K.

\* \* \* \* \*

*Designed and marketed* means exclusively designed to fulfill the indicated application and, when distributed in commerce, designated and marketed solely for that application, with the designation prominently displayed on the packaging and all publicly available documents (e.g., product literature, catalogs, and packaging labels). This definition is applicable to terms related to the following covered lighting products: Fluorescent lamp ballasts; fluorescent lamps; general service fluorescent lamps; general service incandescent lamps; general service lamps; incandescent lamps; incandescent reflector lamps; medium base compact fluorescent lamps; and specialty application mercury vapor lamp ballasts.

\* \* \* \* \*

*General service incandescent lamp* means a standard incandescent or halogen type lamp that is intended for general service applications; has a medium screw base; has a lumen range of not less than 310 lumens and not more than 2,600 lumens or, in the case of a modified spectrum lamp, not less than 232 lumens and not more than 1,950 lumens; and is capable of being operated at a voltage range at least partially within 110 and 130 volts; however this definition does not apply to the following incandescent lamps—

- (1) An appliance lamp;
- (2) A black light lamp;
- (3) A bug lamp;
- (4) A colored lamp;
- (5) A G shape lamp with a diameter of 5 inches or more as defined in ANSI C79.1–2002 (incorporated by reference; see § 430.3);
- (6) An infrared lamp;
- (7) A left-hand thread lamp;
- (8) A marine lamp;
- (9) A marine signal service lamp;
- (10) A mine service lamp;
- (11) A plant light lamp;
- (12) An R20 short lamp;
- (13) A sign service lamp;
- (14) A silver bowl lamp;
- (15) A showcase lamp; and
- (16) A traffic signal lamp.

*General service lamp* means a lamp that has an ANSI base; is able to operate at a voltage of 12 volts or 24 volts, at or between 100 to 130 volts, at or between

220 to 240 volts, or of 277 volts for integrated lamps (as defined in this section), or is able to operate at any voltage for non-integrated lamps (as defined in this section); has an initial lumen output of greater than or equal to 310 lumens (or 232 lumens for modified spectrum general service incandescent lamps) and less than or equal to 3,300 lumens; is not a light fixture; is not an LED downlight retrofit kit; and is used in general lighting applications. General service lamps include, but are not limited to, general service incandescent lamps, compact fluorescent lamps, general service light-emitting diode lamps, and general service organic light-emitting diode lamps. General service lamps do not include:

- (1) Appliance lamps;
- (2) Black light lamps;
- (3) Bug lamps;
- (4) Colored lamps;
- (5) G shape lamps with a diameter of 5 inches or more as defined in ANSI C79.1–2002 (incorporated by reference; see § 430.3);
- (6) General service fluorescent lamps;
- (7) High intensity discharge lamps;
- (8) Infrared lamps;
- (9) J, JC, JCD, JCS, JCV, JCX, JD, JS, and JT shape lamps that do not have Edison screw bases;
- (10) Lamps that have a wedge base or prefocus base;
- (11) Left-hand thread lamps;
- (12) Marine lamps;
- (13) Marine signal service lamps;
- (14) Mine service lamps;
- (15) MR shape lamps that have a first number symbol equal to 16 (diameter equal to 2 inches) as defined in ANSI C79.1–2002 (incorporated by reference; see § 430.3), operate at 12 volts, and have a lumen output greater than or equal to 800;
- (16) Other fluorescent lamps;
- (17) Plant light lamps;
- (18) R20 short lamps;
- (19) Reflector lamps (as defined in this section) that have a first number symbol less than 16 (diameter less than 2 inches) as defined in ANSI C79.1–2002 (incorporated by reference; see § 430.3) and that do not have E26/E24, E26d, E26/50x39, E26/53x39, E29/28, E29/53x39, E39, E39d, EP39, or EX39 bases;
- (20) S shape or G shape lamps that have a first number symbol less than or equal to 12.5 (diameter less than or equal to 1.5625 inches) as defined in ANSI C79.1–2002 (incorporated by reference; see § 430.3);
- (21) Sign service lamps;
- (22) Silver bowl lamps;
- (23) Showcase lamps;
- (24) Specialty MR lamps;
- (25) T shape lamps that have a first number symbol less than or equal to 8

(diameter less than or equal to 1 inch) as defined in ANSI C79.1–2002 (incorporated by reference; see § 430.3), nominal overall length less than 12 inches, and that are not compact fluorescent lamps (as defined in this section);

(26) Traffic signal lamps;

(27) Incandescent reflector lamps.

*General service light-emitting diode (LED) lamp* means an integrated or non-integrated LED lamp designed for use in general lighting applications (as defined in this section) and that uses light-emitting diodes as the primary source of light.

*General service organic light-emitting diode (OLED) lamp* means an integrated or non-integrated OLED lamp designed for use in general lighting applications (as defined in this section) and that uses organic light-emitting diodes as the primary source of light.

\* \* \* \* \*

*Infrared lamp* means a lamp that is designed and marketed as an infrared lamp; has its highest radiant power peaks in the infrared region of the electromagnetic spectrum (770 nm to 1 mm); has a rated wattage of 125 watts or greater; and which has a primary purpose of providing heat.

\* \* \* \* \*

*Integrated lamp* means a lamp that contains all components necessary for the starting and stable operation of the lamp, does not include any replaceable or interchangeable parts, and is connected directly to a branch circuit through an ANSI base and corresponding ANSI standard lamp-holder (socket).

\* \* \* \* \*

*LED Downlight Retrofit Kit* means a product designed and marketed to install into an existing downlight, replacing the existing light source and related electrical components, typically employing an ANSI standard lamp base, either integrated or connected to the downlight retrofit by wire leads, and is a retrofit kit. LED downlight retrofit kit does not include integrated lamps or non-integrated lamps.

*Left-hand thread lamp* means a lamp with direction of threads on the lamp base oriented in the left-hand direction.

\* \* \* \* \*

*Light fixture* means a complete lighting unit consisting of light source(s) and ballast(s) or driver(s) (when applicable) together with the parts designed to distribute the light, to position and protect the light source, and to connect the light source(s) to the power supply.

\* \* \* \* \*

*Marine lamp* means a lamp that is designed and marketed for use on boats and can operate at or between 12 volts and 13.5 volts.

*Marine signal service lamp* means a lamp that is designed and marketed for marine signal service applications.

\* \* \* \* \*

*Mine service lamp* means a lamp that is designed and marketed for mine service applications.

\* \* \* \* \*

*Non-integrated lamp* means a lamp that is not an integrated lamp.

\* \* \* \* \*

*Other fluorescent lamp* means low pressure mercury electric-discharge sources in which a fluorescing coating transforms some of the ultraviolet energy generated by the mercury discharge into light and include circline lamps and include double-ended lamps with the following characteristics: Lengths from one to eight feet; designed for cold temperature applications; designed for use in reprographic equipment; designed to produce radiation in the ultra-violet region of the spectrum; impact-resistant; reflectorized or aperture; or a CRI of 87 or greater.

\* \* \* \* \*

*Pin base lamp* means a lamp that uses a base type designated as a single pin base or multiple pin base system.

\* \* \* \* \*

*Plant light lamp* means a lamp that is designed to promote plant growth by emitting its highest radiant power peaks in the regions of the electromagnetic spectrum that promote photosynthesis: Blue (440 nm to 490 nm) and/or red (620 to 740 nm), and is designed and marketed for plant growing applications.

\* \* \* \* \*

*Reflector lamp* means a lamp that has an R, PAR, BPAR, BR, ER, MR, or similar bulb shape as defined in ANSI C78.20–2003 (incorporated by reference; see § 430.3) and ANSI C79.1–2002 (incorporated by reference; see § 430.3) and is used to provide directional light.

\* \* \* \* \*

*Showcase lamp* means a lamp that has a T shape as specified in ANSI C78.20–2003 (incorporated by reference; see § 430.3) and ANSI C79.1–2002 (incorporated by reference; see § 430.3), is designed and marketed as a showcase lamp, and has a maximum rated wattage of 75 watts.

\* \* \* \* \*

*Sign service lamp* means a vacuum type or gas-filled lamp that has sufficiently low bulb temperature to permit exposed outdoor use on high-speed flashing circuits, is designed and

marketed as a sign service lamp, and has a maximum rated wattage of 15 watts.

*Silver bowl lamp* means a lamp that has an opaque reflective coating applied directly to part of the bulb surface that reflects light toward the lamp base and that is designed and marketed as a silver bowl lamp.

\* \* \* \* \*

*Specialty MR lamp* means a lamp that has an MR shape as defined in ANSI C79.1–2002 (incorporated by reference; see § 430.3), a diameter of less than or equal to 2.25 inches, a lifetime of less than or equal to 300 hours, and that is designed and marketed for a specialty application.

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*Traffic signal lamp* means a lamp that is designed and marketed for traffic signal applications and has a lifetime of 8,000 hours or greater.

\* \* \* \* \*

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DEPARTMENT OF ENERGY

10 CFR Part 430

[Docket Number EERE–2013–BT–STD–0051]

RIN 1904–AD09

Energy Conservation Program: Energy Conservation Standards for General Service Lamps

AGENCY: Office of Energy Efficiency and Renewable Energy, Department of Energy.

ACTION: Final rule.

SUMMARY: On March 17, 2016, the U.S. Department of Energy (DOE) published a notice of proposed rulemaking (NOPR) proposing standards for general service lamps (GSLs) pursuant to the Energy Policy and Conservation Act of 1975 (EPCA), as amended. In this final rule DOE responds to comments received on the October 2016 NOPDDA regarding IRLs and amends the definition of GSL.

DATES: The effective date of this rule is January 1, 2020.

ADDRESSES: The docket, which includes Federal Register notices, public meeting attendee lists and transcripts, comments, and other supporting documents/materials, is available for review at www.regulations.gov. All documents in the docket are listed in the www.regulations.gov index. However, some documents listed in the index may not be publicly available, such as those containing information that is exempt from public disclosure.