



National Electrical Manufacturers Association

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Vice President, Government Relations

September 17, 2018

Online via:

Commissioner Andrew McAllister
Mr. Patrick Saxton
California Energy Commission
Docket Unit, MS-4
Re: Docket No. 17-AAER-07
1516 Ninth Street
Sacramento, CA 95814-5512

NEMA Comments on CEC Staff Report Analysis of General Service Lamps (Expanded Scope) 17-AAER-07

Dear Commissioner McAllister and Mr. Saxton:

As the leading trade association representing the manufacturers of electrical and medical imaging equipment, the National Electrical Manufacturers Association (NEMA) provides the attached comments in response to CEC's Request for Comments on the Draft Staff Report Analysis of General Service Lamps (Expanded Scope). These comments are submitted on behalf of NEMA Member companies.

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

We welcome your careful consideration of this information and we look forward to the Commission regularly seeking constructive interaction with industry. If you have any questions on these comments, please contact Alex Boesenberg of NEMA at 703-841-3268 or alex.boesenberg@nema.org.

Sincerely,

A handwritten signature in black ink that reads "Philip A. Squair". The signature is written in a cursive, flowing style.

Philip Squair
Vice President, Government Relations
National Electrical Manufacturers Association

NEMA COMMENTS (public version¹)

NEMA is taking this opportunity to comment to the California Energy Commission (CEC) on the CEC Draft Staff Report titled Analysis of General Service Lamps (Expanded Scope) in Docket Number 17-AAER-07.

Executive Summary

The Draft Staff Report does not acknowledge that the U.S. Department of Energy's (DOE) general service lamp (GSL) rulemaking is continuing and that the DOE has indicated that it may reassess the assumptions and determinations made in its January 2017 GSL definition rules.² As the proposal in the Draft CEC Staff Report would adopt the DOE January 2017 definitions and others, it seems appropriate for the CEC to wait and see if there is any reassessment of the federal definitions before proceeding in this matter. A change in the federal definition will likely result in a revision to the CEC Staff Report's calculation of benefits currently perceived by the CEC from its proposal. We comment on this issue below.

The Draft Staff Report also presents considerable data about the energy savings projections the Staff believes will be achieved as a result of amending those definitions and applying certain energy conservation standards to general service lamps. NEMA submits the Draft Report significantly overestimates the energy savings of its proposal because the report cites data that significantly overstates the shipments and stock of the various incandescent lamps. The described benefits of the proposal are clearly overstated in our view and we will comment on that issue as well.

The Draft Staff Report incorporates no analysis of the cost-effectiveness or impact of regulating lamps with a vast variety of odd or unique lamp bases, higher lumen lamps (2601-3300 lumens), and voltage ranges beyond the common household lamp voltage range (110-130 volts). The DOE admitted it did not analyze the impact of a regulation on any of these lamps, and NEMA submits that the Warren-Alquist Act requires this analysis and effort to justify a regulation of lighting products. We comment on that issue.

The Draft Staff Report's proposal to apply a "sales ban" on the effective date is unworkable.

NEMA concludes with a few brief comments on other aspects of the Draft Staff Report.

¹ This "public version" submission contains confidential business information found in the Appendix that has been redacted. NEMA is submitting an Application for Confidential Designation pursuant to Title 20, Section 2505 et seq, and if the Application is granted NEMA will submit a non-redacted version to the Commission.

² See 82 F.R. 7276 (Jan. 19, 2017) and 82 F.R. 7372 (Jan. 19, 2017)(amending the DOE's definition of general service incandescent lamp, general service lamp, and other definitions). See also, 82 F.R. 38613, 38616 (Aug. 15, 2017)(indicating possible reassessment of definitions).

I. The Statutory and Legal Landscape

1. Ongoing GSL Regulatory Activity under EPCA at DOE

There is a federal-state regulatory dynamic occurring at this time that the Draft Staff Report does not address, but must address. There is a possibility that the Draft Staff Report's proposal may be premature and should await resolution of the uncertainty over this issue by the DOE.

It is a matter of public record that NEMA filed a petition for review of the two Final Rules mentioned above in the U.S. Court of Appeals for the Fourth Circuit.³ This appeal was lodged because (1) NEMA believed that the DOE had reached legally erroneous conclusions in the Final Rules based on principles of congressional intent and statutory construction, and (2) the DOE had refused to consider and ignored relevant facts that NEMA had placed in the DOE's General Service Lamp (GSL) rulemaking record. NEMA also contended that DOE was required to undertake further rulemaking work under the statute. That appeal was settled and the DOE agreed to resume the rulemaking. NEMA received no assurances that the resumption in the GSL Rulemaking would result in a change of the Final Rules, only that the facts DOE refused to consider and additional facts would be considered, the statutory legal arguments examined, and that DOE would make the standards determinations that Congress required it to make in the underlying legislation.⁴ The first step in this process came with the publication of a Notice of Data Availability and Request for Information on August 15, 2017. 82 F.R. 38613 (Aug. 15, 2017). In the DOE published Notice, the Department advised, "[A]ny data received in response to this NODA could result in a reassessment of the assumptions and determinations made in the January 2017 definition final rules." *Id.* at 38616.

As of the date of this submission, DOE has not published a Notice or other document arising out of the rulemaking proceeding; however, NEMA is aware (as is the CEC staff apparently) that a document in the DOE GSL rulemaking proceeding is under review at the U.S. Office of Management & Budget and might be expected to be released in the relatively near future. This document may inform whether or not the DOE has done "a reassessment of the assumptions and determinations made in the January 2017 definition final rules."

NEMA's legal and factual arguments why the January 2017 definitions rules were legally erroneous are [a matter of public record](#),⁵ and we need not detail them here. NEMA does believe a serious case was presented that would warrant the Department's reconsideration of its definitions of general service lamp and general service incandescent lamp, and that they were legally erroneous by, among other things, including reflector and many other specialty lamps in these definitions. DOE included a large number of specialty lamps in its new definitions in the Final Rules, but most pertinent

³ *National Electrical Manufacturers Association v. United States Department of Energy* (4th Cir. No. 17-1341).

⁴ The Energy Independence and Security Act of 2007, P.L. 110-140 (December 19, 2007) ("EISA").

⁵ <https://www.regulations.gov/document?D=EERE-2017-BT-NOA-0052-0004>

for these Comments to the CEC Staff is the inclusion of certain light bulbs that are already federally-covered products whose energy consumption is presently regulated by federal law and the DOE: 1) candelabra base incandescent lamps, 2) intermediate base incandescent lamps, 3) incandescent reflector lamps, 4) rough service incandescent lamps, and 5) vibration service incandescent lamps.⁶ If the Department's reassessment of the determinations made in the January 2017 definitions rules results in the exclusion of one or more of these lamps from the definition of general service lamp and general service incandescent lamp, there are both legal and economic/analytical implications for the Draft Staff Report: 1) *legal* – a number of these lamps remain federally covered products independent of the definition of general service lamp and the CEC must continue to treat them as federally regulated products under Title 20 just as it does now; 2) *analytical* –these federally-covered lamps appear to account for a significant portion of the energy and economic impact data in the Draft Staff Report and would have to be excluded from that analysis. By NEMA's estimate, this issue could potentially impact up to approximately two-thirds of the "stock" referenced in Tables 3-1 and A-2 of the Draft Report. This would mean that the Draft Staff Report's claims of energy savings and economic benefits from its proposal will have to be revised.⁷

Since the CEC Title 20 definition proposal is derivative of the January 2017 Final Rules, and since a reassessment of those definitions is currently pending, NEMA submits that the Draft Staff Report's proposal is premature until the federal definition is settled.

2. *Warren-Alquist Act Considerations*

NEMA also submits that the inclusion of "reflector" and "EISA-exempt lamps" in the definition of general service lamp is barred by the Warren-Alquist Act, §25402.5.4 absent the presence of certain conditions precedent which have not occurred. While the Staff Report's proposal would extend State regulation of the so-called EISA-exempt lamps as "general service lamps," the CEC regulatory authority for applying State standards to those lamps is specifically found in §25402.5.4 where the legislature referred to them as "general purpose lamps." The Warren-Alquist Act specifically says that reflector lamps, rough service lamps, shatter-resistant lamps, three-way lamps, and vibration service lamps are "not included" within the definition of general purpose lamps.

(B) General purpose lights do not include any of the following types of specialty lighting:
appliance, black light, bug, colored, infrared, left-hand thread, marine, marine signal service,

⁶ NEMA cavils over the inclusion of rough service and vibration service incandescent lamps in the term "EISA exempt lamps." As a result of DOE action pursuant to EISA, these two types of lamps are no longer exempt from regulation under EPCA. See 10 C.F.R. §430.32(bb).

⁷ The Draft Report's calculation of electricity savings is derivative of the estimate of stock of "non-compliant" lamps in 2020 and thereafter. See CEC Staff Draft Report at 33 ("Annual statewide electricity savings for the first year and after full stock turnover are calculated by multiplying the single compliant lamp electricity savings by staff's estimates of 2020 lamp shipments and 2020 existing stock, respectively.") If the 2020 stock is smaller than the CEC's estimate, the energy savings are smaller.

mine service, plant light, **reflector, rough service, shatter resistant**, sign service, silver bowl, showcase, **three-way**, traffic signal, **and vibration service or vibration resistant**.

California Public Resources Code, §25402.5.4(f)(1)(B)(emphasis supplied).

The Warren-Alquist Act provided a regulatory pathway for the CEC to undertake the potential regulation of these lamps in the next paragraph (f)(2) of the statute; however that conditions precedent for that action have not been satisfied and there is nothing in the Draft Staff Report to establish that the conditions precedent are met or that the CEC staff even investigated them:

(2) The commission may, after one or more public workshops, with public notice and an opportunity for all interested parties to comment, provide for inclusion of a particular type of specialty light in its energy efficiency standards applicable to general purpose lighting, **if it finds that there has been a significant increase in sales of that particular type of particular specialty light due to the use of that specialty light in general purpose lighting applications.**

California Public Resources Code, §25402.5.4(f)(2)(emphasis supplied).

There has not been a significant increase in the sales of these lamps, and the statutory burden is on the Commission to show a “significant increase.” As we detailed for the U.S. DOE in our comments in the federal regulatory proceeding for these same lamps, sales have fallen since 2011. See Appendix A (confidential submission).

II. Data and Analytical Issues

1. General Service LED market penetration is greater than represented in the old NEMA indices

The CEC Staff Draft Report references and displays a NEMA Lamp Index.⁸ We read the Draft Staff Report to correctly recognize that this Index relates only to certain A-line general service lamps, and it does not include the reflector lamps, decorative lamps, globe lamps, or the five so-called EISA-exempt lamps that the CEC Staff would propose to include in an expanded definition of general service lamp in Title 20. We also read the Draft Report to reference the Index to make the point, “It is probable that the percentage of shipments for LED lamps that are not A-shaped is lower than that of A-shape lamps because incandescents, including halogen, remain readily available in California.” *Draft Staff Report* at 11. NEMA does not disagree with the Staff’s general assessment of probability in this statement, although we would make the point that LED versions of many of the non-A-shaped lamps subject to the Draft Report are also readily available in California and their percentage is growing. While the Lamp Index is not directly applicable to the lamps covered by the CEC Staff’s expanded scope proposal, it is directly relevant to NEMA’s data-driven perception that the CEC has profoundly underestimated the extent of the LED market penetration that has already occurred in the absence of

⁸ Draft Staff Report – Analysis of General Service Lamps (Expanded Scope) at 11, Figure 3-6 (Docket Number 17-AAER-7)(“Draft Staff Report”).

regulatory mandates. Accordingly, we are providing a quick briefing about the Lamp Index in light of recently available data. We submit this is relevant to the lamps covered by the expanded scope proposal.

What is not transparent from the Draft Report is the extent to which the CEC Staff recognizes the degree of LED market penetration for these non-A-shape lamps that is already occurring.⁹ Second, we wish to report to the CEC that NEMA has been examining the part of the Lamp Index cited in the Draft Report for a year now in light of newly-available data that demonstrates the Lamp Index understates the penetration of general service LED (A-line) lamps and overstates the share of general service incandescent lamps. This new data reveals that the market-driven transformation to LED lighting without governmental mandates is occurring faster than the Lamp Index would indicate. While the Lamp Index applies only to A-shape lamps, NEMA believes based on manufacturer Member experience and data showing declining sales of non-A-shape incandescent lamps in recent years that that the market-driven transformation to LED is already occurring for the non-A-shaped lamps and the Draft Staff Report does not recognize this.

In 2012, NEMA developed a Lamp Index with the primary purpose of tracking changes in shipments of lamps impacted by EISA. The lamps in the Index include A-line incandescent lamps including general service incandescent lamps (GSIL), medium screw base compact fluorescent lamps (MBCFL), and a product that was not in the market in 2012 --- a general service light-emitting diode (LED) product then under development by the industry.

The index subdivided the general service incandescent lamp product into two categories: (1) the traditional general service incandescent lamp that would no longer meet the energy conservation standards enacted in EISA and effective in 2012-2014, and (2) the halogen incandescent lamp that would meet the EISA energy conservation standards. The Index would track the shift in shipments from traditional incandescent to halogen incandescent and MBCFL, and potentially general service LED lamps. What the Index did not do was measure changes in the size of the market over time.

With respect to the traditional A-line incandescent lamp data, NEMA data for this lamp technology historically included certain low-lumen/low wattage (15 and 25 watts) A17 lamps in this category, and NEMA did not change the range of traditional incandescent lamps for which data was collected when the Index was developed. NEMA data was not collected based on specific wattages. So there was a slight mismatch between the wattage and lumen range of product for the NEMA data here for traditional incandescent A17 and A19 lamps with the congressional definition of GSIL. The halogen lamps for which data was collected by NEMA, however, matched the GSIL definition. With the full implementation of EISA-2007 by the end of 2014, the lamps in the NEMA Lamp Index denominated traditional incandescent lamps were only the low lumen, 15-25 watt A17 lamps that are not general

⁹ The Draft Staff Report only refers to 2015 data for market share by light source technology. *Id.* at Table 3-2. The data in this Table is terribly outdated, and it is not be a reasonable or reliable input to assess stock or estimated shipments in 2020.

service incandescent lamps and they should not be considered in the broader “general service lamp” category or class of lamps.

The Index was based on data that NEMA collected from certain of its members, and that fact warrants a second observation. The Index does not capture shipments from non-NEMA members as well as a few NEMA members who decline to participate in NEMA surveys. At the time the Index was created, this gap was not viewed as significant or problematic because (1) NEMA members reporting data were known to account for a very high percentage of the GSIL sold domestically, and 2) NEMA members primarily use the NEMA data to benchmark the direction of the market, and they use their own insights and other sources of data to measure the size of the market. Indeed, the principal purpose of the Index has been to measure direction, and the Index is viewed as a reliable measure of direction, not size of the market. The gap, however, did impact one aspect of the Index and that is relative share of each lamp type, and the CEC staff’s Draft Report at page 11 (figure 3-6) includes that second part of the Index that is impacted by the gap. That gap grew over time, particularly as LEDs entered the market in a significant way beginning in 2015 and thereafter. That Index understates shipments of MBCFL and general service LED and overstates the share of general service incandescent lamps.

One other source of data is US import data for these lamps and, in the case of MBCFL, federal data of imports provides a decent measure of the gap between NEMA data and the ultimate size of the market. This gap is not covered by or adjusted for by the NEMA Lamp Index. The Index relied solely on data reported to NEMA.

At the time the Index was developed, general service LED lamps were not sold in the market in a material way, and following their initial introduction to the market their presence was so small that the size of the gap between NEMA member shipments and the market was not seen as material. That changed around 2015, 2016, and thereafter, and the gap began to grow. NEMA members anticipated this circumstance before 2015, and NEMA began to encourage the federal government to begin collecting import data for general service LED lamps. That effort took several years, but the federal government finally agreed and data collection for imports of the LED general service lamp began in 2017. Earlier this year (2018), we had annual data for the imports of general service LED lamps for the first time. The import data confirmed the growing gap between NEMA member-reported shipments of general service LED lamps and the imports for domestic consumption. Consistent with our members’ own experience, that gap was larger than the MBCFL gap experience. Like the MBCFL gap, the general service LED gap is not covered by or adjusted for by the NEMA Lamp Index.

NEMA presented the gap issue to the U.S. Department of Energy (DOE) in its comments to DOE in the General Service Lamp Rulemaking in October 2017 in response to a Notice of Data Availability, and based on available monthly import data for 2017 for general service LED for the first six months of 2017 NEMA opined that general service LED shipments was approaching parity with the general service incandescent lamp in 2017. This was consistent with NEMA members’ market experience at the time. The annual import data now available for 2017 and year-to-date 2018 for general service LED confirm the NEMA opinion to DOE. In fact, NEMA’s opinion about “approaching parity” was conservative and based on more recent data our conclusion is that domestic shipments of general service LEDs actually

exceeded domestic shipments of general service halogen lamps in 2017 by a significant margin. That trend and the margin between the two technologies is growing. Based on six months' of import data for 2018, we believe that domestic shipments of general service LED lamps will exceed the domestic shipments of general service incandescent lamps by approximately 2:1 in 2018. That phenomenon is not picked up by the NEMA Lamp Index, nor is it reflected in the draft CEC Staff Report.

The other phenomenon we detailed in our comments to the DOE in October 2017 was what had been happening with respect to the overall size of the market for general service lamp types over time. NEMA noted that in the year 2000, its data for general service incandescent lamps showed that 1.8 billion units were shipped domestically. There was also a relatively small number of MBCFL at that time (about 20 million units in 2000). Today, the number of units of general service incandescent lamps is about 15% of the 1.8 billion unit figure for the year 2000, and the total number of all general service lamp type shipments is less than half the total in 2000. The principal reasons for that change are two-fold. As we explained to the DOE in our Comments, replacement sales of these general service lamps represent about 90-95% of shipments, with the remaining 5-10% attributable to new sockets created by new construction or major renovation. The second influence is lamp life: the general service incandescent lamp has a lamp life of approximately 1-2 years (1000 hours or 2000 hours), with most of these lamps in the 1000 hour category. Due to their shorter life and more rapid turnover in sockets, replacement sales of GSIL can be dramatic compared to longer-life MBCFL (and now even longer-life general service LED). Nevertheless, the data for MBCFL demonstrates that domestic shipments of MBCFL grew to over 300 million units in 2007 and, with exception of the recession year in 2009, remained in a range over 300 million units through 2014. This fact confirms that longer life MBCFL were rapidly taking medium-screw base sockets from general service incandescent lamps in a significant way and because of their longer life there were fewer and fewer sockets for the replacement general service incandescent lamp to contest and occupy in a given year. This is consistent with the long-term trend showing the remarkable decline in general service incandescent lamp and overall general service lamp shipments that we described earlier in this paragraph. What it also unambiguously informs is that general service incandescent lamp shipments overstate the share of medium screw base GSL sockets occupied by those lamps, and the MBCFL and general service LED lamp shipments understate the share of medium screw base GSL sockets occupied by those lamps. This is due to the longer life of MBCFL and general service LED lamps.

Another observation is that the growth of the general service LED lamp shipments is greater than the decline in MBCFL (which have declined significantly) shipments in recent years, and this confirms members' market observations that general service LED lamps are not only replacing MBCFL lamps at end-of-life, but also halogen incandescent lamps in a material way.

Based on data available to date through the first six months of 2018 (including federal import data), NEMA's best estimate of the 2018 relative share of domestic shipments of the three types of general service lamp technologies (GSIL (halogen), MBCFL, and general service LED) is: 67% general service LED, 5% MBCFL, and 28% general service incandescent (halogen) lamp. The share of domestic shipments for general service LED is likely to continue to grow in 2019 and into 2020. This market-driven transformation of the general service lamp market to LED technology that has already occurred is not

adequately or accurately reflected in the CEC draft report, and we submit the trend applies to the non-A-shaped lamps as well although with varying magnitudes among the different types of these non-A-shape lamps. We provide publicly available information about MBCFL and general service LED lamps immediately below.

Table 1: Imports for Domestic Consumption of Medium Base Compact Fluorescent Lamps 2011 – 2018 (millions)

	2011	2012	2013	2014	2015	2016	2017	2018 (6 mos)	2018 est. annualized
HTS Import Data 8539310060	302	315	309	328	262	124	67	22	44
Index 2011=100	100	104.3	102.3	108.6	86.7	41	22		14

Table 2: Imports for Domestic Consumption of A-line General Service LED Lamps 2017-2018 (millions)

	2011	2012	2013	2014	2015	2016	2017	2018 (6 mos)	2018 est. annualized
HTS Import Data 8539500010	N/A	N/A	N/A	N/A	N/A	N/A	382	291	580

2. The CEC Estimates of “Stock” are Vastly Overstated

It is not immediately transparent in the Draft Staff Report how the estimates of California’s existing stock for the non-A-shape lamps in Table 3-1¹⁰ were derived; however, the Table’s reference to the General Service Lamp (Expanded Scope) CASE Initiative document leads us to Table 7 in that report.¹¹ The CASE Initiative document explains that their estimates for shipments of IRL and decorative lamps are calculated by dividing their estimate for “stock” of these lamps by lamp life. Table 7 displays the following figures for IRLs and Decorative Lamps:

¹⁰ Draft Staff Report at 12 and Appendix A, Table A-2.

¹¹ California Investor Owned Utilities Comments Response to Invitation to Submit Proposals - General Service Lamps (Expanded Scope) at 23 (Docket Number 17-AAER-07, TN#: 221219)(September 18, 2017).

CASE Initiative Estimates for Stock of Incandescent Reflector and Decorative Lamps

Product Class	2017 Shipments	2017 Stock
IRLs	32,400,000	88,800,000
Decorative Lamps	30,900,000	170,000,000

By the methodology described, it can be calculated that product life of the IRL used in the calculation is 2.7 years and the product life of the decorative lamp used in the calculation is 5.5 years.¹² NEMA agrees that there is a relationship between stock, shipments, and lamp life although the algorithm is probably a little more nuanced than the methodology described above. Having said that, the described methodology provides a ballpark for discussion purposes. The CASE Initiative document explains that the estimate of California stock is derived “by multiplying the 2015 national stock by the ratio of the 2015 California to national population per the U.S. Census Bureau (12.18%).”¹³ The 2015 national stock figure is reported to be derived from two Department of Energy reports,¹⁴ although we struggled to find national stock figures in these reports for these lamps that would match these calculations.

Given the relationship between shipments and stock described in the methodology and the computed estimate for 2017 shipments, *there is a serious problem with the Draft Staff Report’s 2017 stock estimate because there is a serious problem with the CEC 2017 shipment estimate.* The CEC shipment estimates for these lamps are significantly divorced from reality. **If manufacturers are not and have not been selling and shipping these lamps anywhere near the rate and in the quantities the CEC Staff estimates, the “stock” of these lamps cannot be anywhere near the level the CEC estimates.**

Incandescent reflector lamps (IRL)

In the DOE August 2017 Notice of Data Availability (NODA) and Request for Information, DOE published its estimate of 2015 shipments of IRL as 316 million units.¹⁵ In its Comments to the NODA, NEMA provided to DOE historical shipment data provided by NEMA Members showing that actual shipments of IRL in 2015 (including the estimate of non-NEMA member shipments) were about 38% of the DOE estimate. That is a serious discrepancy, and it seriously undermines the Draft Report’s “stock”

¹² See *id* at 27 and Table 11 describing design life of residential IRL at 2.5 years and decorative lamps at 5.4 years.

¹³ *Id.* at 22.

¹⁴ *Id.* citing Lawrence Berkeley National Laboratory, *Impact of the EISA 2007 Energy Efficiency Standard on General Service Lamps* (2017) and U.S.DOE, *2015 U.S. Lighting Market Characterization* (2017).

¹⁵ 82 F.R. 38613, 38615 (Aug. 16, 2017).

estimates. Using the methodology deployed in the CASE Initiative document and applying NEMA shipment data (including estimates of non-NEMA member data), the national stock of IRL in 2017 is closer to 306 million units, **and multiplying that figure by 12.18% would compute the California stock of IRL at approximately 37,000,000 units not 88,000,000 units as shown in the CASE Initiative document.** Again, using the CASE Initiative methodology, **that would compute California shipments of IRL at something close to 14.5 million units, not 32.4 million units as shown in the CASE Initiative document and relied upon in the Draft Staff Report.**

Furthermore, as NEMA reported to DOE in its comments, IRL shipments have been steadily shrinking since 2011. Not only were actual shipments of IRL a fraction of what the DOE NODA reported since 2011, but 2016 shipments of IRL were thirty percent less in 2016 than they were in 2011. 2017 shipments of IRL were 47% less than they were in 2011, and six-month data for 2018 shows IRL shipments falling further. This last point undermines another assumption in the CASE Initiative document --- that the total stock of IRLs and incandescent decorative lamps would remain constant in future years.¹⁶ Shipments of these lamps have fallen steadily this decade and continue to fall. The rate of decline in shipments of IRL is nowhere reflected in the CEC Staff Report, the CASE Initiative document, nor is it reflected in the DOE documents (e.g., LBNL (2017) and DOE (2017)) relied upon therein. That is a material omission in the analysis contained in the CASE Initiative document and the CEC Staff Draft Report.

Decorative incandescent lamps

The story for decorative incandescent lamps is similar. The California stock of decorative lamps for 2017 is shown in Table A-2 to be 137.6 million units. We are assuming that this represents both medium base and candelabra base decorative lamps. The CASE Initiative document placed the 2017 California stock at 170,000,000 units. It is not clear why there is a discrepancy between the two reports, but even the lower Staff Report figures vastly overstate the actual stock. The Draft Staff Report lists 2017 shipments of Decorative Lamps at 25 million, which is proportional to stock based on a lamp life of 5.5 years.¹⁷ It is not transparent why the Draft Staff Report figures for decorative lamp shipments diverge from the CASE Initiative document shipment estimates.

In its NODA, the DOE estimated 2015 domestic shipments of decorative candelabra base lamps at 209 million units¹⁸ and estimated 2015 shipments of decorative medium base lamps at 71 million

¹⁶ California Investor Owned Utilities Comments Response to Invitation to Submit Proposals - General Service Lamps (Expanded Scope) at 23 (Docket Number 17-AAER-07, TN#: 221219)(September 18, 2017).

¹⁷ The CASE Initiative document shows decorative lamp shipments in 2017 at 30,900,000 which is proportional to stock based on lamp life of 5.5 years.

¹⁸ 82 FR at 38616 (Aug 16, 2017)(Table II.3).

units.¹⁹ Thus the NODA represents that there were a total of 241 million units of decorative lamps (all bases) shipped in 2015. As it had done with IRL shipment data, NEMA provided shipment data to DOE for decorative lamps that described a much smaller universe of decorative lamp shipments than the DOE NODA described. The number of candelabra base decorative lamps reported by NEMA was about 41% of what the DOE NODA reported. The total of all decorative lamps (all lamp bases) reported to DOE by NEMA was 46% of the DOE NODA estimates. Like IRL, this too is a serious discrepancy, and it seriously undermines the “stock” estimates.

Using the methodology deployed in CASE Initiative document and applying the NEMA shipment data (including estimates of non-NEMA member shipments), the 2017 national stock of decorative lamps (candelabra base and medium base) is closer to 770 million units, **and multiplying that figure by 12.18% would compute the California stock of decorative lamps at approximately 94 million units, not 170 million units as shown in the CASE Initiative document or 137.6 million units shown in the CEC Staff Draft Report.** Again, using the CASE Initiative methodology, that would **compute California 2017 shipments of decorative lamps at something close to 13.5 million units, not 30.9 million units as shown in the CASE Initiative document and relied upon in the Draft Staff Report.** Furthermore, as NEMA reported to DOE in its comments, decorative incandescent lamp shipments have been steadily shrinking since 2011. Not only were actual shipments of decorative lamps a fraction of what the DOE NODA reported since 2011, but shipments of decorative incandescent lamps were 24% less in 2015 than they were in 2012. Like IRL, this last point undermines another assumption in the CASE Initiative document --- that the total stock of incandescent decorative lamps would remain constant in future years. Shipments of these lamps have fallen steadily this decade and continue to fall.

As the CASE Initiative document and Draft Staff Report’s estimates of shipments and stock for these lamps is derivative in large part from DOE and LBNL data that has been shown to be seriously flawed, the Draft Staff Report data is consequently flawed. As the other economic estimates in the Draft Staff Report are driven heavily by the estimates of stock and shipments, the justification for the Draft Staff Report proposal needs to be reworked.

Summary

NEMA has undertaken the same types of calculations for globe and EISA-exempt lamps as undertaken above using NEMA shipment data and applying the historical rate of decline in shipments of these lamps to forecast shipments through 2019 to compute the estimated California stock for 2017 – 2020.²⁰ The CEC Staff Report presents its calculation of California stock for these years in Table A-2, and

¹⁹ *Id* at 38615 (Table II.2). This figure includes G-25 and G-30 globe lamps. G-25 and G-30 medium base lamps are about 55% of medium base specialty lamps in this category. One can scale back the DOE NODA estimate by 45% in Table II.2 to about 32 million to represent medium base decorative lamps not including the medium base globe lamps.

²⁰ NEMA is available to meet and confer with the CEC Staff if there are any questions about the methodology used in arriving at the NEMA estimates for California stock.

we present a comparison of the stock estimates using more realistic shipment data for these lamps based on company reported sales. There is a remarkable difference between the two.

COMPARISON OF CEC AND NEMA ESTIMATES OF CALIFORNIA LAMP STOCK FOR CERTAIN INCANDESCENT LAMPS FROM 2017 – 2010 (millions of units)

Lamp Type/Year		2017	2018	2019	2020	2020 Variance (%)
Large-Diameter Reflector Lamps	CEC est.*	88.8	82.3	75.2	67.4	
	NEMA est.**	37.3	32	27.43	24.12	35.78% of CEC est.
Decorative Lamps	CEC est.*	137.6	133.9	129.7	125.2	
	NEMA est.**	94	87	80.9	75.6	60.3*% of CEC est.
Globe Lamps	CEC est.*	32.4	31.8	31.2	30.4	
	NEMA est.**	13.88	12.04	10.88	9.8	32.23% of CEC est.
EISA-Exempt Lamps	CEC est.*	35.0	35.0	35.0	35.0	
	NEMA est.**	11.1	9.79	8.45	7.63	21.8% of CEC est.
Low-Lumen Lamps	CEC est.***	3.5	3.0	2.5	2.0	
Total Stock of above lamps	CEC est.	296	286	273.6	260	
	NEMA est.	160.03	145.26	131.79	119.15	45.8%

* Source: CEC Draft Staff Report, Analysis of General Service Lamps (Expanded Scope) at A-2 (Table A-2).

** Source: NEMA Shipment Data applying life assumptions in CEC Draft Staff Report.²¹

*** NEMA does not have complete shipment data available at this time for “low lumen lamps” to establish a comparative estimate of domestic or California “stock” of these lamps.

3. *Estimates of LED Market Penetration by 2020*

At Table 3.2 of the CEC Staff’s Draft Report, there is a confusing entry for estimates of market penetration by lamp technology:

Table 3-2: Estimate of 2015 National Market Share by Light Source Technology

Lamp Type	Estimated Stock Share by Technology in 2020		
	Incandescent	CFL	LED

²¹ Estimates for 2017 – 2020 based on average rate of decline in shipments for each lamp 2011 – 2016 except large diameter reflector lamps (IRL), which reflects reported 2017 shipments and 6 months of 2018 shipments. 2018 estimate for IRL represents an annualized estimate base on the first 6 months shipments for 2018; 2019-2020 estimates are based on average rate of decline in shipments for IRL from 2011-2018.

Large Diameter Reflector Lamps	82%	17%	1%
Decorative Lamps	96%	4%	0
Globe Lamps	100%	0	0
EISA-exempt lamps	100%	0	0

Source: *Impact of the EISA 2007 Energy Efficiency Standard on General Service Lamps*

We note that the cited source refers to “Estimated Stock Share by Technology in 2015”, LBNL Report at 4 (Table 1)(2017)), and we understand the reference to the year “2020” in the table is a typographical error. As both the NEMA Lamp Index and the enhanced data based on recently available import data demonstrates for general service lamps, LED market penetration for A-line general service lamps has surged dramatically in 2015, surpassing the general service incandescent lamp only two years later in 2017. General service LED lamp shipments are expected to account for about two-thirds of domestic shipments in 2018. This trend is expected to continue in the coming years. The consumer’s rapid acceptance of LED technology is playing out with respect to reflector lamps and decorative lamps and the other lamps as well, although not at the exact same pace as the A-line lamp.

At Table A-1 of the CEC Staff’s Draft Report, there is an estimate of shipments share by light source technology in 2017.

Table A-1: Estimate of Shipments Share by Light Source Technology in 2017

Lamp Type	Incandescent	LED
Large Diameter Reflector Lamps	80%	20%
Decorative Lamps	85%	15%
Globe Lamps	90%	10%
EISA-exempt lamps	100%	0%
Low-Lumen Lamps	85%	15%

Source: Energy Commission Staff

It is not transparent how Tables 3-2 or A-1 factors into the CEC analysis in the Draft Staff Report, but the LBNL report utilized greatly inflated numbers for shipments of incandescent reflector lamps, decorative and globe lamps and that fact must necessarily have an impact on these 2015 estimates. The LBNL data also does not capture the rapid rate of decline in shipments of these incandescent lamps. The CEC estimate of California shipments at Table A-3, which assumes flat shipment rates for these replacement lamps from 2017-2019 is not a safe assumption. NEMA submits that a significant portion of the substantial discrepancy between the California and LBNL shipment data for these specialty lamps is accounted for by LED market penetration for these lamps in the relevant categories that has and is

continuing to occur more rapidly than the CEC acknowledges. Table A-1's statement that there are 0% LED shipments for EISA-exempt lamps is not plausible, because these lamps are on store shelves and are being purchased.

Another example is decorative lamps. A significant number of decorative lamps are actually used in commercial applications such as hotels and other hospitality, entertainment environments and commercial consumers of decorative lamps moved rapidly toward adoption and installation of CFL versions of these lamps in the past. And today, they are shifting to the LED versions of these lamps. NEMA submits that even in 2015 the 4% estimate for CFL decorative lamps is low.

III. Problems with the Expanded Definition of GSL

In addition to the statutory construction and data issues that we have highlighted above, the CEC Staff's Draft Report and proposal does not recognize or address the problems that the proposal to expand the definition of general service lamp portends for consumers for many other lamps that the proposal sweeps into the definition of general service lamp. In particular, we refer to the inclusion of lamps with "an ANSI base" in the proposed definition, the inclusion of lamps with a lumen output above 2600 lumens and up to 3300 lumens in the proposed definition, and the inclusion of lamps with a rated voltage outside the range of consumer lamps used in 110 – 130 volt residential applications. Notably, the CEC Staff Draft Report has undertaken no analysis of the cost-effectiveness or impact of regulating these lamps as required by the Warren-Alquist Act.

1. **An ANSI base.** Including the reference to "an ANSI base" in the definition of general service lamp brings in over 100 lamp base variations to the scope of lamps that would potentially be regulated as a general service lamp. The Draft Staff Report makes no effort to study, evaluate or comprehend just how many lamps this captures, and no effort has been made to analyze the cost-effectiveness of regulating lamps with these special lamp bases. Nor did the DOE attempt to measure the impact of including "an ANSI base" in a rule.²² As best as we can tell, the CEC Staff's Draft Report examines only certain medium screw base lamps and candelabra base lamps. See e.g., Draft Report at 12, Tables 3-1 and 3-2 which tables list lamps that use these two lamp bases.

In the DOE general service lamp rulemaking proceeding, DOE cited the ANSI C81.61-2016 standard, *American National Standard for Electric Lamp Bases—Specifications for Bases (Caps) for Electric Lamps* as the reference document for "an ANSI base." We submit for the Staff's review a copy of this document to demonstrate that there are over 100 different lamp bases referenced in this standard. See ANSI C81.61-2016 at pages 3-6, Table 1. The document summarizes the myriad of special lamp bases used in certain lighting applications. Not only did the DOE *not* conduct an analysis to determine whether the lamps that used these unique lamp bases are used to satisfy lighting applications

²² NEMA submits that there is a statutory obligation to address the cost-effectiveness of regulating lamps with non-medium screw bases before applying State regulations to them. California Public Resources Code, §25402(a), (b)(2) and (3) ("The standards adopted or revised pursuant to subdivisions (a) and (b) shall be cost-effective . . .").

traditionally served by general service incandescent lamps, but neither has the CEC. The CEC Staff should not blindly go where DOE never analytically went in the first place.

The CEC Staff Draft Staff Report makes this questionable observation at page 26 (emphasis supplied):

The primary distinguishing feature of other GSLs is base type (for example, E11 candelabra base, various bi-pin bases). Additional distinguishing features could be items such as form factor. *The DOE, in crafting its expanded definitions for GSLs, explicitly excluded lamps where it could not identify efficient, equivalent replacements or where the lamps clearly did not provide general illumination.*⁵⁵ For the lamps that were included in the definition of GSLs, then, *staff infer s that the DOE implicitly found* that high efficiency replacements for these lamps were technically feasible, either because they exist in the market today or because there is a clear technological pathway to manufacture such replacement lamps.

It is true that the DOE explicitly excluded a limited handful of lamp bases where it could not find a more efficient substitute for an incandescent or halogen version of these lamps,²³ but DOE's cursory review was incomplete and inadequate. It would be unwise to "infer" that "DOE implicitly found" anything: this sentence in the CEC Staff Draft Report explicitly recognizes the weakness in the DOE review if the staff has to "infer" from something "implicit."

Many of these special pin-base lamps are used only with lamps that have a small form factor and are used in space-confined applications. Setting aside the legitimate question whether any of these space-confined applications are applications "traditionally served by general service incandescent lamps" as the definition of general service lamp requires, there is the fact that a halogen or halogen-quartz version of these small lamps with special lamp bases are available at higher lumen output levels and LED versions of these lamps are not available and cannot now be made at the same higher lumen output level and may never be made at that higher lumen output level. There are serious technology limitations in making small LED lamps at higher lumen outputs. An LED lamp with a very small form factor comes with very low lumen output. During the public workshop in this proceeding a member of the public displayed a small, non-dimmable, 12 volt LED lamp with a G4 pin base that is used in landscape accent lighting applications (not exactly a lighting application that is "traditionally served by general service incandescent lamps"). The light output of this lamp is extremely dim: only 195 lumens. This lamp is a substitute for a halogen single-ended quartz lamp with a similarly dim lumen level. A statement was made to the effect that if manufacturers can make this LED lamp they can make any lamp with LED technology. This is a demonstrably false statement, and its falsity should caution the CEC (just as it should caution the DOE) that each additional lamp proposed for regulation needs to have its technical feasibility and economic impact evaluated *separately*. The burden is on the CEC to do just

²³ 82 FR 7276, 7304 (January 19, 2017)(excluding 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.).

that, and the Staff Report does not do that here. One cannot propose to regulate a lamp with “an ANSI base” given the sheer breadth of the number of lamp types impacted by that proposal.

A sampling of single-ended quartz (SEQ) halogen lamps currently offered is shown in the table below. The low lumen lamps on the first three lines are capable of being manufactured for LED technology. The higher lumen lamps in the remaining rows are not because the small form factor of the bulb cannot accept the heat levels associated with the higher lumen LED versions of these lamps.

Watts	Lumens	ANSI Base	Length (Inches)	Volts
5	60	G4	1.25”	12
10	140	G4	1.25	12
20	350	G4	1.25	12
35	550	GY6.35	1.75	12
50	950	GY6.35	1.75	12
75	1400	GY6.35	1.75	12
100	2350	GY6.35	1.75	12
25	240	G8	1.59	120
35	350	G8	1.77	120
50	700	G8	1.77	120
75	900	G8	1.77	120
100	1300	G8	1.77	120

2. **Higher lumen output lamps.** The Draft CEC Staff Report contains no analysis of the cost-effectiveness or impact for regulating lamps with a lumen output above 2600 lumens and up to 3300 lumens. As the DOE data published in its Notice of Data Availability (NODA) and Request for Information established, sales of these lamps are falling, not increasing. Sales of these higher lumen incandescent lamps in 2011 were 9.8 million units and by 2015 had fallen by 60% to 4 million.²⁴ Using the methodology in the Draft Staff Report and the CASE initiative document, that would indicate that California sales of these higher lumen lamps were 487,200 units in 2015. In NEMA’s Comments to the DOE (footnote 38), NEMA noted,

²⁴ 82 F.R. 38613, 38616 (August 15, 2017)(Table II.3).

Higher lumen output LEDs are substantially more expensive and also physically larger than higher lumen incandescent lamps, and they will not fit in standard fixtures for high lumen output lamps. The LED high lumen output lamps are primarily a substitute for high wattage CFL (55W+) and low wattage HID lamps, although replacing an HID lamp can require fixture rewiring to remove the ballast in order to operate. They are not good substitutes for high lumen incandescent lamps.

These are material facts that the Commission must consider and address before regulating high lumen output lamps, and as we stated above, there is no analysis of these facts in the Draft Staff Report, which we submit is required by the Warren-Alquist Act.²⁵

3. **Lamps outside the traditional residential voltage range of 110-130 volts.** The CEC Staff's Draft Report likewise contains no analysis of the cost-effectiveness or impact of regulating integrated lamps that operate in a voltage range of 12 volts or 24 volts, . . . or between 220 to 240 volts, or of 277 volts, or non-integrated lamps "at any voltage" as proposed in the Draft Staff Report. These lamps do not serve applications traditionally served by general service incandescent lamps because general service incandescent lamps, by definition, only serve applications at 100-130 volts.

IV. The CEC Staff Proposal to Apply a "Sales" Ban Date for General Service Lamps Is Unworkable

The Commission, like the DOE Appliance Efficiency program, historically applies compliance dates that prohibit the "manufacture" of a product on or after a given date. We note that in the case of "low lumen lamps," the Draft Staff Report proposes applying the effective date of the standard to low lumen lamps "manufactured" on or after January 1, 2020. In contrast, the CEC Staff's Draft Report proposes to apply the standards to general service lamps "sold on or after Jan 1, 2020." Draft Staff Report at 43. The rationale for historically applying manufacturing compliance dates is because it is comparatively easier to manage compliance and enforce than a sales compliance date. There are thousands of wholesale and retail outlets where the lamps included in the expanded definition of general service lamp are sold, and the Commission does not have the resources to ensure and enforce compliance. The burden falls heaviest on California retailers. Retailers and distributors may be stranded with millions of dollars of unsellable inventory and the Commission must try to enforce a sales ban at a store level. NEMA directs the CEC's attention to the recently-filed comments of the American Lighting Association, who represent retailers of light bulbs, about the significant problems they will face from a sales ban.²⁶ Nor should manufacturers be liable for product lawfully sold by them at the time of sale that can no longer be sold after an effective date. That raises constitutional questions of retroactive impairment of contracts. Manufacturers have no control over products already shipped into the

²⁵ California Public Resources Code, §25402(a), (b)(2) and (3).

²⁶ American Lighting Association Comments on Draft Staff Report Analysis of General Service Lamps (Expanded Scope)(17-AAER-07, TN #224698)(September 13, 2018)("impact of a sales ban at the individual store level would represent a huge burden on the channel, resulting in major financial losses on showrooms collectively.")

California market. The proposed sales ban envisioned by the Draft Staff Report presents significant supply chain issues for lamps that are distributed through a complex supply chain in the first place.

Without prejudice to any of NEMA's comments and arguments made above, the Commission should adhere to its historical regulatory scheme that ties an effective date to a date of manufacture.

V. Other Comments

We note the Draft Staff Report "does not propose to require certification of general service lamps or low-lumen lamps as a separate category of appliances." Draft Staff Report at 22. Without prejudice to our comments and arguments above, NEMA supports that proposal.

We further note the Draft Staff Report proposes not to add additional regulatory performance requirements for the additional lamps added by the Staff proposal. Draft Staff Report at 22. Again, without prejudice to our comments and arguments above, NEMA supports that proposal.

While outside the question of expanded definition of general service lamp, NEMA notes that the standard for State-regulated LED lamps includes at 1605(k)(2)(A)(i) a reference to an outdated ANSI Standard for color targets and consistency. The current version of the ANSI Standard is ANSI C78.377-2017 and NEMA recommends, without prejudice to our Comments and arguments above, the CEC add acceptable color target areas to include either Table 2 in that Standard, or Table E2 in Annex E to the existing color requirements.

Finally, NEMA states that the decision whether to and when to apply a 45 lumen per watt energy conservation standard to general service lamps is a matter to be determined by the U.S. Secretary of Energy. 42 U.S.C. §6295(i)(6)(A)(ii)(II) and (A)(v). The Secretary has not made that decision yet, and NEMA objects to the CEC's application of a 45 lumen per watt standard to general service lamps in the absence of that determination.

CONCLUSION

NEMA respectfully requests strongly that the the CEC hold this proceeding in abeyance until the U.S. DOE has announced whether and how it has reassessed the definition of general service lamp and general service incandescent lamp. NEMA also requests that the CEC review its estimates of lamp stock in light of the actual shipment-based data provided by NEMA in these comments.

Thank you.

APPENDIX A

(includes CONFIDENTIAL BUSINESS INFORMATION)

This is an excerpt from NEMA's Confidential Submission to the U.S. Department of Energy in response to the DOE Request for Information dated August 15, 2017. It relates to certain specialty incandescent lamps. We have updated the data to provide 2017 data for incandescent reflector lamps, and we have updated shipment data for "EISA-exempt" lamps to include 2016 and 2017 shipments, based on reports made by NEMA to the U.S. DOE pursuant to EISA. Because the data for decorative lamps requires NEMA to undertake a special survey of members, we are not able to update the decorative lamp data in a short period of time.

Pursuant to Title 20, Sec. 2505 *et seq*, NEMA designates portions of this Appendix A Confidential Business Information and that it be treated confidentially not subject to disclosure, because it contains exclusive proprietary data collected from manufacturers who, in the aggregate, account for a substantial share of lamp shipments in the United States. In our confidential, non-public submission we have highlighted confidential data in yellow and redacted it from the public version. This type of data is collected by no other entity, and it is collected on a requirement that the data not be shared with others. The aggregated data is not provided to firms or persons who have not provided the input data for the aggregated data reports. There are other organizations that make estimates of similar data without access to manufacturer data, and NEMA has found that those other sources are not often reliable. Disclosure of NEMA data would harm NEMA competitively. We provide the confidential information with the CEC solely on the condition that it is treated confidentially and will not be disclosed, and to assist the government in assessing the reasonableness of estimates provided by NEMA in these Comments.

The data collected by NEMA is not provided by every manufacturer or seller of lamps in the United States. The percentage extent to which the NEMA data covers the entirety of lamp shipments will vary between incandescent, compact fluorescent, and LED lamps. This is because certain lamps are imported to the United States by non-manufacturer importers more than others. The estimate of that variance is confidential, because it could expose NEMA collected data. Notwithstanding that the NEMA shipment data does not provide 100% coverage, the NEMA data is still very valuable because, the NEMA manufacturers represent such a significant part of the market for lamps, it confirms trends in the market that correspond to what the market is actually experiencing. Other sources of information are available to NEMA members to fill gaps not accounted for by the aggregated NEMA reports, including U.S. government data on imports of these products.

Specialty Lamps

NEMA provides its confidential and proprietary estimate for candelabra base decorative lamps below. NEMA data for decorative lamps includes both medium base and candelabra base decorative lamps. In previous comments in this rulemaking, NEMA provided data for medium base lamps from most of the manufacturers who make and sell that product. We have backed out those medium base

decorative lamp shipments for 2012-2015 that NEMA previously provided to DOE in this rulemaking to arrive at the estimated candelabra base decorative lamp shipments. NEMA manufacturers inform NEMA that their shipments of candelabra base incandescent lamps are slightly less in 2016 than 2015.

NEMA members recognize that the NEMA figures do not account for all imports of these lamps and there is not comparable U.S. import data available to estimate an adjusted number for candelabra base decorative lamps. What NEMA members do know is that imports of candelabra base incandescent lamps are not more than [REDACTED]. The NEMA estimate below, and NEMA uses a [REDACTED] estimate as a reasonable estimate of the difference with NEMA shipment data. NEMA has accounted for this range in our calculation of the stock and shipments in the text of our Comments to the CEC. It can be said with certainty that domestic shipments are nowhere near the DOE estimate for candelabra base incandescent lamps in the NODA by a wide margin. The NODA estimate for candelabra base lamps would make candelabra base incandescent lamp shipments approximately [REDACTED]% of GSIL shipments, and that is simply not credible.

CANDELABRA BASE DECORATIVE SPECIALTY INCANDESCENT LAMP
Shipment Data (millions (000s') of units)

	Lamp Shape	2011 Domestic Shipments	2012 Domestic Shipments	2013 Domestic Shipments	2014 Domestic Shipments	2015 Domestic Shipments	2016 Domestic Shipments
DOE NODA	B,BA,C, CA,F, G16- 1/2	201	203	205	208	209	N/A
Index 2012=100			100	101	102.5	103	N/A
NEMA	B,BA,C, CA,F, G16- 1/2	N/A	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	N/A
Index 2012=100			100	86.4	90.4	85	N/A

The NEMA numbers for medium base decorative lamps were provided by NEMA previously in this rulemaking are referenced in the NODA. These numbers were obtained from a special survey of NEMA members who make and sell most of these lamps. Since data from one Member Company was

not available for the year 2011, the data for medium screw base lamps begins with the year 2012. These figures do not account for all imports of these lamps, and again, there is not comparable U.S. import data available to estimate an adjusted number for medium base decorative lamps. NEMA members estimate that imports of medium base decorative lamps are not more than ██████% more than the NEMA estimate below.

**MEDIUM BASE DECORATIVE SPECIALTY INCANDESCENT LAMP
Shipment Data**

Lamp shape	2012 Domestic Shipments	2013 Domestic Shipments	2014 Domestic Shipments	2015 Domestic Shipments	2016 Domestic Shipments
B,BA,C,CA,F	45,101,327	41,807,901	29,661,407	26,470,193	N/A
Index 2012=100	100	92.7	65.7	58.7	
G25	46,402,599	43,979,690	36,905,627	33,401,786	N/A
Index 2012=100	100	94.8	79.5	72	
G30	157,629	169,429	154,008	114,951	N/A
Index 2012=100	100	107	97.7	72.9	
Total Medium base	91,661,555	85,957,231	66,721,042	59,986,930	N/A
Index 2012=100	100	93.7	72.8	65.4	

NEMA provides its confidential and proprietary data for medium base incandescent reflector lamps, which matches the definition of incandescent reflector lamps. These figures do not account for all imports of these lamps, and again, there is not comparable U.S. import data available to estimate an adjusted number for medium base decorative lamps. NEMA members reasonably estimate that imports of medium base decorative lamps are not likely more than ██████% more than the NEMA figure disclosed below. Accordingly, NEMA has adjusted its shipment data by that percentage in order to account for non-NEMA imports. The NODA estimates for IRL are not credible because it equates the quantity of domestic IRL shipments as essentially the same as the quantity of GSIL shipments in recent years, and that makes no sense. IRL shipments are a fraction of GSIL shipments.

MEDIUM BASE INCANDESCENT REFLECTOR LAMPS*
Shipment Data (millions of units)

	2011 Domestic Shipments	2012 Domestic Shipments	2013 Domestic Shipments	2014 Domestic Shipments	2015 Domestic Shipments	2016 Domestic Shipments	2017 Domestic Shipments
DOE NODA	308	312	315	319	316	N/A	N/A
Index 2011=100	100	101	102	103.5	102.5		
NEMA	█	█	█	█	█	█	█
Index 2011=100	100	92.5	93.2	88	73.6	70.1	53.7
NEMA adjusted	█	█	█	█	█	█	█
Index	100	92.5	93.2	88	73.6	70.1	53.7

*Includes incandescent reflector lamps as defined by Energy Policy and Conservation Act, including PAR, R, ER, BR, and BPAR.

NEMA data available for the first six months of 2018 shows NEMA adjusted IRL shipments of █ million units. Annualized, this would be █ million units for all of 2018 or 49% of 2011 shipments.

Finally we report shipment data for what the CEC Staff has labeled “EISA-Exempt” lamps, regulated under EISA at 42 U.S.C. §6295(l)(4):

“EISA-EXEMPT” INCANDESCENT LAMPS
Shipment Data (in millions of units)

Lamp Type	2011	2012	2013	2014	2015	2016	2017
Rough service ²⁷	6.829	6.045	6.237	7.267	10.914	9.764	5.860
Vibration Service ²⁸	.914	1.077	1.407	5.220	7.071	6.869	6.018

²⁷ Rough service incandescent lamps are no longer exempt from regulation under EISA.

²⁸ Vibration service incandescent lamps are no longer exempt from regulation under EISA.

3-way Incandescent	31.619	28.854	34.773	35.340	32.665	31.768	28.468
Shatter Resistant	1.21	1.455	1.093	1.042	.689	.548	.474
High lumen	9.8	12.273	9.296	5.232	4.049	3.679	2.794
Total	50.372	49.704	52.806	54.101	55.388	52.628	43.614

Source: NEMA reported data to the U.S. Department of Energy.