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Ms. Brenda Edwards
U.S. Department of Energy
Building Technologies Program
Mailstop EE-2J
1000 Independence Avenue, SW
Washington, DC 20585-0121

Re: “Energy Conservation Program: Energy Conservation Standards for General Service Fluorescent Lamps and Incandescent Reflector Lamps; Proposed Rule,” 74 Fed. Reg. 16,920 (April 13, 2009).

Docket No. EE-2006-STD-0131; RIN 1904-AA92

On behalf of Sierra Club, Earthjustice submits the following comments on the Department of Energy’s (DOE’s) Notice of Proposed Rulemaking (NOPR) for General Service Fluorescent Lamps (GSFLs) and Incandescent Reflector Lamps (IRLs).

As noted in the April 14, 2008 joint comments of the American Council for an Energy Efficient Economy, et al., the Department’s initial view of the scope of its authority to adopt standards for previously exempted IRLs was unlawful, for the reasons explained in two memoranda prepared by the National Consumer Law Center and attached to those comments. Because the Department has announced that it intends to revisit its initial view, and because the existing record provides a thorough explanation of the correct scope of DOE’s authority, the comments below exclusively address other flaws in the NOPR. However, as DOE’s failure to issue standards for previously exempted IRLs represents an ongoing violation of the Energy Policy and Conservation Act (EPCA), the Department must act quickly to issue standards for the previously exempted IRLs.

I. DOE Must Analyze the Maximum Technologically Feasible Standard Levels for IRLs, and May Not Exclude Proprietary Technologies Without Justification.

DOE has unlawfully refused to evaluate the maximum technologically feasible standards for IRLs. DOE recognized that the maximum technologically feasible efficacy level for these lamps incorporates a combination of technologies, including a silverized reflector, a proprietary technology. 74 Fed. Reg. at 16,934. However, DOE excluded this maximum technologically feasible level from its analysis, and instead based the strongest standard that the Department

analyzed (TSL5) on a lower efficacy level capable of being achieved by non-proprietary technologies. *Id.* In other words, DOE concluded that “TSL5 is the maximum technologically feasible level for IRL that is not dependent on the use of a proprietary technology.” *Id.* However, this is not the same thing as the maximum technologically feasible standard level – the level that EPCA requires DOE to evaluate.¹

DOE rejected standards that reflect the application of silverized reflector technology without explaining why the Department views the application of such technologies as not technologically feasible. In the NOPR, DOE merely pointed back to the rulemaking framework document: “As discussed during the Framework stage of this rulemaking, DOE only considers proprietary designs in its engineering analysis if there are other technology pathways to meet that efficacy level.” 74 Fed. Reg. at 16,945. However, the Framework Document contains no rationale for the Department’s blanket exclusion of proprietary technologies:

The Department will consider in its engineering and economic analyses all design options that are commercially available or present in a working prototype, including proprietary designs. The Department will consider a proprietary design in the subsequent analyses only if it is not a unique path to a given lamp efficacy level. If the proprietary design is the only approach available to achieve a given efficacy level, then DOE will reject the efficacy level (that can only be achieved by a proprietary design) from further analysis.

DOE, RULEMAKING FRAMEWORK DOCUMENT FOR GSFLS, IRLS, AND GENERAL SERVICE INCANDESCENT LAMPS (2006) at 27-28.

DOE’s unqualified rejection of standard levels incorporating proprietary technologies repeats the errors that the Department made over 25 years ago in refusing to analyze efficiency levels incorporating technologies available only in prototypes. In that rulemaking, as the D.C. Circuit explained, DOE “conclusively assume[d] that manufacturers cannot incorporate *any* prototypes for *any* product type or class into all appliances of that type or class [by the effective date of the standard].” *Natural Resources Defense Council v. Herrington*, 768 F.2d 1355, 1396 (D.C. Cir. 1985). The court held that this approach was unjustified:

DOE cannot prevail merely by asserting that *many* or even *most* prototypes could not workably have been included within 5 years in all products of a particular type

¹ As the District of Columbia Circuit explained in *Natural Resources Defense Council v. Herrington*, 768 F.2d 1355 (D.C. Cir. 1985), EPCA establishes a top-down approach to standards:

The statute . . . establishes a clear decisionmaking procedure. DOE must first identify, for all product types or classes, the maximum improvement in energy efficiency that is technologically feasible. If a standard at that level would be economically justified, DOE must set the standard there. If a standard requiring the maximum technologically feasible level would not be economically justified, DOE must set the standard at the highest level that is both technologically feasible and economically justified. In that event, EPCA requires DOE to explain specifically why a standard achieving the maximum technologically feasible improvement in efficiency was rejected.

768 F.2d at 1391-92 (internal citations omitted).

or class. Even assuming that this is true, a minority of prototypes would remain as technologically feasible and, for all DOE knew, economically justified design options that were *not* considered in the agency's deliberations. EPCA does not permit DOE to ignore design options meeting those two criteria. DOE must therefore show that substantial evidence supports its implicit determination that all or virtually all prototypes would have taken more than 5 years to introduce throughout a product type or class.

Id. at 1397. DOE's approach in the instant NOPR similarly excluded a technology without any analysis of technologically feasibility or economic justification.

To reconcile the Department's TSLs for IRLs with the requirements of the statute, DOE must analyze the economic impacts of a new TSL6 that reflects the true maximum technologically feasible level achievable. In the alternative, DOE must explain why standards incorporating the proprietary silverized reflector technology are not technologically feasible.

II. DOE Has the Authority to Amend EPCA's Color Rendering Index Standards for GSFLs.

In the proposed rule, the Department asserted that it lacks the authority to amend the Color Rendering Index (CRI) values established in EPCA. DOE first pointed to EPCA's definition of the term "energy conservation standard," as either "a performance standard which prescribes a minimum level of energy efficiency or a maximum quantity of energy use," or "a design requirement (only for specifically enumerated products)." 74 Fed. Reg. at 16,933. The Department then asserted that "[a]lthough CRI is a performance requirement, it is not an energy performance requirement within the meaning of the term 'energy conservation standard.'" *Id.* Therefore, DOE concluded that because the Department "has the authority to regulate only energy conservation standards (i.e., energy performance requirements), DOE is not proposing to amend the existing minimum CRI requirements." *Id.*

This reading of the statute ignores the specific context of the duties that Congress imposed in 42 U.S.C. § 6295(i)(3). In 42 U.S.C. § 6295(i)(1)(B), Congress included a table specifying both lamp efficacy and CRI standards for GSFLs. Congress mandated that all GSFLs in covered product classes "meet or exceed the [specified] lamp efficacy *and CRI standards*." 42 U.S.C. § 6295(i)(1)(B) (emphasis added). Having established this initial set of standards, Congress required DOE to "determine if the *standards* in paragraph (1) should be amended." *Id.* § 6295(i)(3) (emphasis added). Congress did not require DOE to assess only the "energy conservation standards" established in 42 U.S.C. § 6295(i)(1), but instead to review all "standards" established in that paragraph, a directive that encompasses both the efficacy and CRI standards.

DOE's explanation in the proposed rule did not clarify whether the Department believes that amendment of the CRI standards is foreclosed by EPCA's plain language, or whether the insulation of CRI standards from DOE review is merely the Department's interpretation of an allegedly ambiguous provision. The former position would be patently incorrect for the reasons

explained above, while the latter position would be arbitrary and capricious. DOE's assertion that Congress has barred the Department from amending the CRI standards established in EPCA is impossible to reconcile with the purposes of the statute and the intent of Congress, which enacted EPCA to "conserve energy supplies through energy conservation programs" and "provide for improved energy efficiency of . . . consumer products." 42 U.S.C. § 6201(4) & (5).

In sum, as several efficiency advocates noted in the April 14, 2008 joint comment, if an efficacy-only standard is not sufficient to capture all technologically feasible and economically justified energy savings, DOE must consider amendments to EPCA's CRI standards.

III. DOE Must Extend Coverage to Low-Wattage GSFLs.

In response to comments urging the Department to expand the range of covered GSFLs to include four-foot medium bi-pin lamps and two-foot medium bi-pin U-shaped lamps rated at or below 25 Watts, DOE asserted that "[i]f a lower wattage lamp does not yet exist, DOE cannot confirm that it would be technologically feasible or economically justified for such a lamp to meet a set energy conservation standard." 74 Fed. Reg. at 16,930. However, this bald assertion that DOE cannot project the feasibility or cost-effectiveness of a standard for low-wattage GSFLs does not represent a rational response to comments, as required by the Administrative Procedure Act (APA), 5 U.S.C. § 553(c).

To meet its obligations under the APA, the Department must explain why the alleged uncertainty surrounding low-wattage GSFLs precludes standards. DOE has not stated, for example, that the technologies used to construct 26 to 28 Watt GSFLs would be inapplicable to lamps with lower wattage ratings, making it impossible for manufacturers to introduce lower wattage lamps that avoid compliance with standards without developing entirely new low-wattage lighting technologies. In fact, the development of GSFLs below 28 Watts – the level codified in EPCA – confirms the need for DOE to be proactive in eliminating potential loopholes that manufacturers can exploit.

The Department's response to this comment also fails to reflect the prospective approach that EPCA requires. The Department has proposed a 2012 effective date for the instant rulemaking, and the standards and scope of coverage that it selects must reflect a reasonable projection of the GSFL market at that time. Thus, even if there are currently no four-foot medium bi-pin or two-foot medium bi-pin U-shaped lamps rated at or below 25 Watts, that fact, standing alone, does not absolve DOE of its statutory duty to amend EPCA's standards for GSFLs as needed to achieve the maximum improvement in energy efficiency that is technologically feasible and economically justified in 2012 and beyond.

Further, DOE's mere supposition that "lower wattage lamps may provide different lumen outputs, and thereby different utility," 74 Fed. Reg. at 16,930, even if accurate, does not obviate EPCA's requirement that the Department consider standards for all GSFLs. If reduced wattage lamps do provide a unique customer utility – a proposition on which we take no position at this time – the Department is empowered to select standards that reflect such unique utility. *See* 42 U.S.C. § 6295(q).

IV. DOE Must Examine the Rebuttable Presumption Payback Period for GSFL and IRL Standards.

DOE must adequately explain any refusal to adopt standard levels at least as strong as those that satisfy the rebuttable presumption payback period. EPCA establishes a rebuttable presumption that a standard is economically justified if “the additional cost to the consumer of purchasing a product complying with an energy conservation standard level will be less than three times the value of the energy . . . savings during the first year that the consumer will receive as a result of the standard.” 42 U.S.C. § 6295(o)(2)(B)(iii). In crafting the rebuttable presumption payback provision in 1987, Congress explained that, “[a]lthough this presumption is rebuttable, it provides specific guidance to DOE that standard levels with a simple payback period of three years or less are presumptively economically justified.” H. Rep. No. 100-11, at 36 (1987).

In the NOPR, DOE states that although the Department’s analysis “generate[s] values that calculate” payback periods, it “routinely conducts a full economic analysis that considers the full range of impacts,” and “[t]he results of this analysis serve as the basis for DOE to definitively evaluate the economic justification for a potential standard level (thereby supporting or rebutting the results of any preliminary determination of economic justification).” 74 Fed. Reg. at 16,936. Later in the NOPR, DOE explains that it “has chosen not to present” the results of its analysis of payback periods “because DOE believes that [lifecycle cost] results are a better measure of cost-effectiveness.” *Id.* at 16,982. DOE notes that its analysis of payback periods is available in the Technical Support Document, but as with the Department’s lifecycle cost results, DOE “decided not to aggregate the results of the various event scenarios” to provide a single payback period at each efficacy level. *Id.* The result is that DOE has done no analysis of whether any standard level for GSFLs or IRLs satisfies the rebuttable presumption payback criterion. DOE’s refusal to calculate a rebuttal presumption payback period for each trial standard level plainly ignores the requirements of the statute.

Moreover, DOE’s overall approach to the rebuttable presumption provision does not reflect the extent to which the rebuttable presumption analysis constrains the Department’s authority to reject strong standards based on economic impacts. In 42 U.S.C. § 6295(o)(2)(B)(iii), Congress erected a significant barrier to DOE’s rejection, on the basis of economic justifiability, of standard levels to which the rebuttable presumption applies. DOE may ultimately conclude that other economic impacts are sufficient to rebut the presumption, provided the Department adequately justifies this conclusion. However, DOE may not ignore the rebuttable presumption out of a simple preference for the seven factor test contained in 42 U.S.C. § 6295(o)(2)(B)(i). DOE’s analysis must reflect the clearly expressed intent of Congress that the highest standard level resulting in cost recovery within three years constitutes the presumptive weakest standard level that DOE is permitted to adopt.

V. DOE Must Expand the Scope of the National Impact Analysis to Include the Economic Benefits of Increased Employment and Reduced Emissions.

The Department currently analyzes the costs and benefits of standard levels from the perspective of individual consumers of the regulated product and then aggregates these consumer impacts into a national net present value (NPV). However, this analysis is not a truly *national* analysis. It ignores that saving significant amounts of energy impacts all citizens, not just users of the regulated product. EPCA provides that in determining whether a standard level is economically justified, DOE must consider “to the greatest extent practicable . . . the need for national energy . . . conservation.” 42 U.S.C. § 6295(o)(2)(B)(i). The only rational way to evaluate the benefits and burdens of efficiency standards as the statute requires is to incorporate into the national NPV the monetary value of those economic benefits that reflect the need for national energy conservation, including increased employment and reduced emissions.

For example, the Department estimates that adopting TSL5 for both GSFLs and IRLs will lead to the creation of up to 40,600 new jobs. *See* 74 Fed. Reg. at 17,008-09 Tables VI.35 & VI.36. However, the Department refuses to place any economic value on this figure in weighing the economic benefits and burdens to determine whether TSL5 is economically justified. DOE first notes that its modeling results do not provide data on the wage level of the jobs created, 74 Fed. Reg. at 17,008, but this justification ignores that the Department could apply the federal minimum wage as a reasonable minimum value to measure the economic benefit of the jobs created through the standards at issue. DOE further asserts that the projected increase in employment “might be offset by other, unanticipated effects on employment.” *Id.* However, DOE’s mere assertion that the Department cannot be certain of its own modeling results, without an explanation of the basis for that uncertainty, cannot excuse the Department’s dismissal of those modeling results. DOE’s reluctance to give effect to its own projections is particularly surprising, as even under the most pessimistic set of assumptions presented in the NOPR the number of jobs created through indirect employment impacts at TSL5 is more than ten times the total number of workers currently employed in GSFL and IRL production in the U.S.²

VI. DOE Must Revise Its Estimate of the Monetary Value of Carbon Dioxide Emissions Reductions Resulting from the Standards for GSFLs and IRLs.

By the time DOE’s standards for GSFLs and IRLs take effect, it is almost certain that Congress will have enacted a nationally applicable, mandatory regime to limit CO₂ emissions. Because of the high probability of such legislation, and the fact that the predictions of future energy prices that DOE uses in its analysis do not assume a fee for CO₂ emissions from power plants, if DOE fails to incorporate a value for CO₂, its electricity price assumptions will be

² Compare 74 Fed. Reg. at 17,008-09 Tables VI.35 & VI.36 (23,000 new jobs in the emerging technologies, no product substitution, roll up scenario), *with id.* at 17,004 Tables VI.29 & VI.30 (2018 U.S. workers employed in GSFL and IRL production).

arbitrarily low.³ This reduces estimates of the operating cost savings of more efficient products, which skews the economic justification analysis against stronger standards.

However, even if DOE assumes that such legislation will stall in Congress, because many states are participating in regional cap and trade schemes to reduce CO₂ emissions, there will be functioning markets for CO₂ emissions in the U.S. that DOE must consider in evaluating the impact of the CO₂ reductions at issue in this rulemaking. For example, the Regional Greenhouse Gas Initiative (RGGI), which includes the states of Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Rhode Island, and Vermont, has now held multiple auctions for CO₂ emissions allowances.⁴ Similarly, the Western Climate Initiative (WCI), which includes the states of California, Washington, Oregon, Montana, Arizona, New Mexico, and Utah, has released its design guidelines for the WCI's own cap and trade program.⁵ These markets will affect regional electricity prices, while the electricity generation avoided through standards will create an economic benefit in the form of reduced CO₂ allowance prices under the RGGI and WCI programs.

Moreover, a DOE assumption that some areas of the country will remain outside of CO₂ reduction regimes does not obviate the need to consider the economic impact of reductions in CO₂ emissions in those states. For this purpose, there is a well-established literature on the value of CO₂ emissions that DOE must consult in selecting a rational value for CO₂ for use in its analysis. For example, numerous published sources give values for the avoided damage costs realized through CO₂ emissions reductions.

In the NOPR, the Department derives a range of values for CO₂ by consulting such studies, but DOE's retention of zero as the lower bound, based on the U.S. share of global damage costs, distorts the results of that analysis. Leaving aside the validity of DOE's estimate of the upper bound for CO₂ value, a significant portion of the full global social cost of carbon will be felt in the U.S. Rising sea levels, weather pattern changes and droughts, and increasing global conflict caused by climate change will all result in water and food shortages and mass migrations to which the U.S. will not be immune.⁶

In sum, to rationally evaluate the economic value of resulting reductions in CO₂ emissions, the Department must consider the effect of coming climate change legislation and a national cap on carbon emissions. DOE must (1) quantify the effect of a CO₂ emissions cap on energy prices in the lifecycle cost analysis, and (2) account in the NPV for the effect of the

³ See 74 Fed. Reg. at 16,970-71 (using the Energy Information Administration's (EIA's) *Annual Energy Outlook* (AEO) to project future electricity prices); EIA, *AEO* 2008 at 16 ("The potential impacts of pending or proposed legislation, regulations, and standards . . . are not reflected in the projections.").

⁴ See RGGI website: <http://www.rggi.org/home>.

⁵ See WCI website: <http://www.westernclimateinitiative.org>.

⁶ DOE notes that, in coordination with other agencies, it is reviewing methodologies for assessing the monetary value of CO₂ reductions, and will be considering comments received on this topic in the instant rulemaking as well as other rulemakings. 74 Fed. Reg. at 17,012. Stakeholders have previously submitted extensive comments on this issue in prior appliance standards rulemakings, and in light of the Department's statement that it will consider comments from other dockets, incorporate those prior comments by reference. See, e.g., Lane Burt, et al., ISSUE PAPER: ON THE VALUE OF CARBON DIOXIDE EMISSIONS IN THE DEPARTMENT OF ENERGY'S APPLIANCE EFFICIENCY STANDARD SETTING PROCESS (Oct. 24, 2008).

standard in reducing allowance prices. Even if DOE refuses to consider the impact of a future nationwide cap, existing regional carbon caps will produce similar effects in states where they are applicable, and DOE must account for these impacts, as well as the avoided damage costs associated with reductions in CO₂ emissions in states where no cap applies.

VII. DOE Must Consider the Impact of the GSFL and IRL Standards on Particulate Matter Emissions.

DOE must also calculate and monetize the value of the reductions in emissions of particulate matter (PM) that will result from standards for GSFLs and IRLs. In the past, DOE has refused to calculate PM emissions reductions in efficiency standards rulemakings because PM pollution consists of both primary and secondary emissions. *See* 71 Fed. Reg. at 44,384. However, DOE's mere assertion that PM formation is "complex" does not excuse the Department from considering the impact of PM reductions in standards rulemakings. The Department has not explained why this alleged complexity prohibits calculating the impact of efficiency standards on PM emissions. Moreover, even if it were physically impossible for DOE to ascertain the impact of efficiency standards on secondary PM emissions, that would not justify the Department completely ignoring primary PM emissions in its analysis. Similarly, DOE's consideration of the impacts of standards on PM precursors (NO_x and SO₂) does not obviate the need to assess the impact of standards on direct emissions of PM.

The significant contribution of power plants to PM pollution supports consideration of the impact of standards on PM emissions as a reflection of "the need for national energy . . . conservation." 42 U.S.C. § 6295(o)(2)(B)(i)(VI). According to 2007 emissions estimates from EPA, power plants emit 17.2% of all anthropogenic PM₁₀ and 20.4% of all anthropogenic PM_{2.5}, levels that are comparable to power plants' share of NO_x emissions.^{7, 8} Thus, power plant emissions are a significant source of PM pollution, and it would be arbitrary and capricious for DOE to ignore the impact of efficiency standards on PM emissions on this basis.

VIII. DOE Must Accurately Estimate the Emissions Avoided Through Stronger Efficiency Standards.

In the NOPR, DOE estimated a range of NO_x and mercury reductions from the GSFL and IRL standards. For the most part, DOE derived its estimates of the cumulative NO_x and mercury emissions reductions by multiplying the total number of terawatt hours (TWh) of avoided electricity generation by two sets of emissions factors. For NO_x, DOE based its low estimate on the emission rate of "the cleanest new natural gas combined-cycle power plant available," while the high estimate relied on the "nationwide NO_x emission rate for all electrical generation." 74 Fed. Reg. at 17,010. For mercury, DOE's low estimate again assumed standards displaced only

⁷ EPA, CLEARINGHOUSE FOR INVENTORIES & EMISSIONS FACTORS (1970 - 2007 Average annual emissions, all criteria pollutants in MS Excel - August 2008), *available at* <http://www.epa.gov/ttn/chief/trends/trends06/nationaltier1upto2007basedon2005v1.xls>.

⁸ In comparison, the same EPA data source indicates that power plants emitted 19.9% of anthropogenic NO_x pollution.

electrical generation from the cleanest natural gas-fired power plants, “thereby resulting in an effective emission rate of zero.” *Id.* at 17,011. However, DOE’s high estimate for mercury applied an average coal-fired power plant emission rate to the modeled share of avoided generation that would have otherwise come from coal.

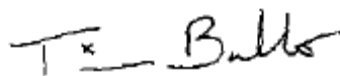
DOE’s approach to estimating NO_x and mercury emissions is internally inconsistent. DOE’s utility impact analysis models not only the cumulative avoided electricity generation from all sources, but also provides a breakout disclosing the cumulative generation reduction from several source categories of generation (coal, petroleum, natural gas, nuclear, and renewables).⁹ DOE used this estimate of the share of total displaced generation from coal plants to calculate one of the two mercury emissions estimates, but neither of the NO_x estimates.

Moreover, without a rational explanation for its actions, DOE’s refusal to apply the results of its own utility impact analysis modeling is arbitrary and capricious. Given that DOE’s own analysis shows the makeup of emissions reductions by generation source, the application of standard emissions factors to the TWh of avoided generation in the aggregate is irrational. Absent some evidence calling into question the accuracy of the source-specific generation tables, DOE must add the product of the number of TWh of avoided coal generation and a mean emissions factor for coal plants, the product of the number of TWh of avoided natural gas generation and a mean emissions factor for natural gas plants, etc., to arrive at an estimate of NO_x and mercury emissions avoided through lamp standards.

DOE’s arbitrary refusal to employ its own estimates of the relative share of avoided generation from specific sources skews the estimates of NO_x and mercury emissions reductions. DOE’s low bound estimates for NO_x and mercury are especially egregious, because the only evidence in the record flatly contradicts DOE’s supposition that any displaced generation would come exclusively from the cleanest natural gas plants. Moreover, DOE’s high bound estimate for mercury emissions is the only estimate that finds support in the record.

Thank you for the opportunity to participate.

Sincerely,



Timothy D. Ballo
Earthjustice
1625 Massachusetts Ave., NW
Suite 702
Washington, DC 20036
(202) 667-4500
tballo@earthjustice.org

On behalf of Sierra Club

⁹ See DOE, NOPR TECHNICAL SUPPORT DOCUMENT (TSD): ENERGY CONSERVATION STANDARDS FOR GSFLS AND IRLS (Jan. 12, 2009) at 14-7 to 14-20.