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Comments of Battery Council International on DOE Notice of Proposed Rulemaking,
Energy Conservation Standards for Battery Chargers,
EERE-2020-BT-STD-0013 / RIN 1904-AE50,
88 Fed. Reg. 16112 (March 15, 2023)

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Battery Council International (BCI) appreciates the opportunity to offer comments on the Department of Energy (DOE) Notice of Proposed Rulemaking (NOPR) for energy conservation standards for battery chargers.

BCI is a not-for-profit trade association formed in 1924 to promote the interests of the lead (Pb) battery industry. BCI's members manufacture and recycle large format, high-capacity, and low voltage batteries in various chemistries, as well as the battery chargers that power them.

BCI supports reasonable DOE standards that meet the requirements of the Energy Policy and Conservation Act (EPCA).[1] Regrettably, the standards proposed in the NOPR do not meet those statutory requirements. Despite assertions to the contrary, the practical impact of the proposed standards is that they would regulate batteries through the arbitrary inclusion of the battery efficiency in a charger "system." This is unlawful because batteries are not a "covered product" under EPCA,[2] and represents an arbitrary and capricious decision under the Administrative Procedure Act[3] because the agency has provided no analysis of or justification for those regulatory impacts. In addition, proposed standards—particularly for class 2c and 2b—do not meet the EPCA requirements for being "technologically feasible and economically justified."[4] Further, the amended standards would not result in "significant conservation of energy."[5]

1 42 U.S.C. § 6291 *et seq*.
2 *Id.* § 6291(2).
3 5 U.S.C. § 551 *et seq*.
4 42 U.S.C. § 6295(o)(2)(A).
5 *Id.* § 6295(o)(3(B).

Batteries are not a "covered product" and cannot be regulated by DOE.

DOE rules for consumer products may lawfully apply only to "covered products." A battery charger is a covered product.[6] In contrast, a battery is not a covered product.[7] Despite that, the proposed standards would regulate batteries. They would do so in the following way. DOE admits that the proposed standards are established based on criteria "designed to measure the overall system efficiency," by which DOE means the standard includes the battery as well as the battery charger.[8] Hence, as DOE further admits, "DOE's battery charger standards do account for the battery energy losses. . . ."[9]

In practice, this means that the efficiency level that would be established by the proposed "battery charger" standard is, by DOE's own admission, a combined standard met through a combination of the efficiency of the battery charger itself ***and*** the battery to which it is attached. For example, a theoretically 100% efficient battery charger[10] could still fail the standard if attached to a low-efficiency battery. By contrast, a much lower efficiency charger would pass the standard if attached to a theoretically 100% efficient battery. Thus, DOE's "system" efficiency standard inappropriately and unlawfully regulates the efficiency of the battery to which the regulated product attaches, and flies in the face of EPCA's limitations.

DOE attempts to regulate non-covered products have been strongly rejected. In *Hearth, Patio & Barbecue Ass'n v. DOE*,[11] the D.C. Circuit held unlawful DOE's effort to treat decorative fireplaces as a covered product. The Court did so because decorative fireplaces are not listed as a covered product in EPCA and DOE had not complied with EPCA's statutory scheme for obtaining coverage over them. "In essence, Congress designed this statutory scheme to protect a defined class: manufacturers of products not specifically enumerated in the EPCA. Decorative fireplaces clearly fall within this protected class."[12] As the Court stressed, "Congress employed specific statutory mechanisms to circumscribe DOE's authority to define and regulate new consumer products under the EPCA. . . . If the Department still wishes to regulate decorative fireplaces, it must do so through the EPCA's catch-all provision, [42 U.S.C.] § 6292(a)(20)."[13] So, too, batteries are not specifically enumerated in EPCA as a covered product and therefore are a class

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6 10 C.F.R. § 430.2 (definition of "covered product" includes "battery charger"). "The term 'battery charger' means a device that charges batteries for consumer products, including battery chargers embedded in other consumer products." 42 U.S.C. § 6291(32).

7 *See* 10 C.F.R. § 430.2 (definition of "covered product" does not include "battery charger").

8 NOPR, 88 Fed. Reg. 16112, 16127 (March 15, 2023).

9 *Id.*

10 A product that cannot exist.

11 *Hearth, Patio & Barbecue Ass'n v. U.S. Dep't of Energy*, 706 F.3d 499 (D.C. Cir. 2013).

12 *Id.* at 505.

13 *Id.* 507-509.

protected by EPCA from DOE regulation. And, since DOE has not gone through the multistep process set forth in EPCA for obtaining coverage over batteries, DOE cannot regulate them. Its effort to do so in the NOPR is unlawful.

DOE's unlawful effort to regulate batteries would have severe effects, which are discussed in these comments.

These effects might potentially be ameliorated with respect to class 2c and 2b by disregarding battery energy in the calculations for battery charger standards. A battery is necessary to perform the testing, but its discharge energy can be ignored by simply measuring the output power of the charger as a ratio to its input power draw. For instance, assume we charge a fully discharged battery of any technology and capacity. If the charger draws 100 Wh for a total output power of 90 Wh, then its efficiency can be expressed as 90 / 100, or 90%.

DOE's proposal does not consider severe market and competition impacts.

DOE admitted at the April 27, 2023, webinar that its proposal does not consider effects on batteries, battery manufacturers, and those who use batteries, or fully consider the implications for battery chargers when used with different battery chemistries. The effects would be severe, and failure to address them would be unlawful. As stated by the D.C. Circuit in holding unlawful DOE's standards rule for commercial packaged boilers: "An agency has not engaged in reasoned decision making if it 'entirely failed to consider an important aspect of the problem,' or if it did not 'engag[e] the arguments raised before it.'"[14]

The proposed unlawful standards would effectively ban lead batteries from the market.

The illegal basing of the proposed standards on "overall system efficiency," which includes not only the charger but also the battery, would have the effect of banning lead batteries from the market—an effect not addressed and remedied by DOE.

In that regard, to meet such a standard using lead batteries, manufacturers of battery chargers would have to reduce the total charge being returned to those batteries—which would result in shorter life of lead batteries and poor battery performance. or else, manufacturers of chargers would comply with the standard by testing only with lithium-ion batteries; consumers would have no feasible and lawful way to have their lead batteries charged.
To put a finer point on it, a best-in-class battery charger currently available on the market today achieves a standalone peak efficiency of 93%, with the average efficiency of approximately 90% when measured under the DOE's proposed methodology. The charger cables unavoidably add

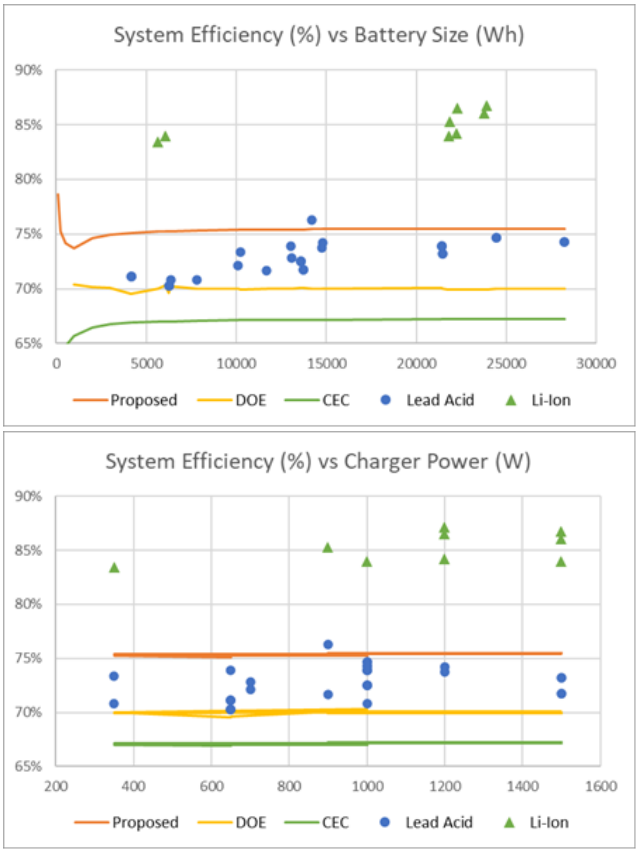
[14] *American Pub. Gas Ass'n v. U.S. Dep't of Energy*, 22 F.4th 1018, 1025 (D.C. Cir. 2022) (internal citations omitted).

another 1-2% efficiency loss. Resulting in a total charger-side efficiency of approximately 88.5%. When measured charger-side only, this is a very respectable and efficient system.

However, because DOE's proposed "system" approach includes the battery (not a covered product), for a typical class 2c battery the proposed standard would require a total system efficiency of 75.6% and would require a minimum ***battery*** efficiency of 85.9%.

However, no flooded lead battery on the market today (by far the market and historically dominant technology) can achieve that level of charge efficiency (typically around 79.5% under this methodology), and most absorbent glass mat (AGM) lead batteries also cannot achieve such a battery charge efficiency. These charge efficiency limits are fundamental to the battery chemistry and are entirely independent from the efficiency of the charger to which they are connected.

The statistical data below shows that even the most efficient charger on the market today will not achieve the proposed standard when connected with most lead batteries (flooded and AGM), effectively banning lead batteries.



The practical effect of the proposed rule is that charger manufacturers will be required to remove lead batteries from their advertised and labeled serviced battery types – even for chargers that pass the system efficiency test for lithium-ion batteries. This will mean that owners and potential purchasers of lead-based batteries will be unable to purchase a charger, rendering lead batteries unserviceable and unmarketable. Thus, the actual impact will be to eliminate a billion-dollar battery market through a backdoor ban.

Further, it would not be technologically feasible for a charger company to invent a new charger with a sufficiently high charger-side efficiency to meet the system approach with a flooded lead battery. Assuming a flooded battery with a 79.5% battery charge efficiency, to achieve a system efficiency of 75.6% would require an average charger-side (charger + cable) efficiency of 95.1%. A level unobtainable in today's market.

The typical charger and cable efficiency is currently about 88.5%. According to experts in charger design, to get to 95.1% - a 6.6% increase - the losses would need to be reduced by at least 60% or more to have any margin of error to pass the system test. For the cables and other wiring, a 60% decrease in losses would require 2.5x as much copper.

The proposed unlawful standards would harm the lead battery industry.

Driving lead batteries out of the market would, of course, be enormously damaging to the lead battery industry—an important and largely U.S. industry. As stated in a recent economic study done for BCI:[15]

> In 2021, the lead battery industry supported **37,490 direct jobs** in the manufacturing, recycling, mining, transportation and distribution, and services sectors plus an additional 742 R&D jobs. Direct jobs in the lead battery industry had a total payroll of $3 billion.
>
> Production by the lead battery industry also generated indirect impacts through transactions with their suppliers, and induced impacts through workers at both Battery Council International member companies and suppliers spending their earnings on goods and services. When direct, supplier, and worker spending impacts are combined, the industry contributed the following total impacts to the national economy in 2021:

[15] EBP, Economic Contribution of the U.S. Lead Battery Industry in 2021, Battery Council International, March 2023, https://batterycouncil.org/resource/economic-contribution-of-the-u-s-lead-battery-industry/ at 1-2. (emphasis in original).

- **120,610 total jobs plus an additional 742 R&D jobs. Total jobs include:**
  - **o 37,490 direct jobs,**
  - **o 37,400 supplier jobs, and**
  - **o 45,720 jobs supported by worker spending;**
- **$8.5 billion in total labor income;**
- **$13.7 billion in total GDP; and**
- **$32.9 billion in total output.**

These impacts are spread across a variety of industries, with services, trade, manufacturing, and transportation benefiting the most. Finally, by paying local, state, and federal taxes, the lead battery industry contributes $1.81 billion annually in federal tax revenue and $1.16 billion annually in state and local tax revenue.

With respect to category 2c battery chargers, a major market segment in that category is small electric vehicles (e.g., utility cars and golf cars). According to BCI internal industry data, BCI members sold more than 7,000,000 6V and 12V lead-based golf car batteries in 2022, up from ~6,500,000 in 2019. The vast majority of those batteries were manufactured by U.S.-based companies, by workers in the United States. With an expected service life of 3 to 4 years when used regularly,[16] BCI estimates there are between 21 and 28 million lead batteries in service today in golf cars and similar vehicles across the United States. Under this proposed standard, no new chargers would be authorized to be sold to service most of those batteries – except for limited high-performance designs. [17]

By contrast, today only a limited portion of the golf car mobility market is currently served by lithium-ion batteries. A significant reason for that is, as noted below, the cost differential. Furthermore, due to the limited lithium-ion battery manufacturing capacity in the United States, almost universally those lithium-ion batteries are constructed with cells and materials sourced from China and other foreign nations.

Similarly, the class 2b charger standards would impact medical mobility and mobility-assistance products such as wheelchairs and mobility scooters. According to the U.S. Bureau of Transportation Statistics, more than 2.1 million Americans rely on motorized scooters or wheelchairs due to mobility impairments (4.4% and 3.8% of the 25.5 million mobility impaired

[16] See DOE Life-Cycle Cost Analysis (Dkt. No. EERE-2020-BT-STD-0013-0022) and BCI Recycling Rate Study data (https://batterycouncil.org/recycling-sustainability/recycling/).

[17] In addition, a limitation on the availability of chargers for "consumer" uses will have an indirect but meaningful impact on the availability of chargers for "industrial" products that use the same chargers by reducing the market incentives for charger manufacturers to serve lead battery products.

persons in the USA in 2017).[18] Effectively all of those medical devices are battery powered, with lead batteries providing the majority of those batteries.

Forcing a change from lead batteries to lithium-ion batteries would mean a shift of manufacturing away from the United States to Asia, where lithium-ion batteries are made.

As mentioned earlier in these comments, banning lead batteries also runs counter to research efforts performed by or funded by DOE supportive of lead batteries, including research to improve their performance and extend their lifetimes.

The unlawful standards would harm equipment manufacturers.

Forcing a change from lead to lithium-ion batteries would harm manufacturers of equipment that use batteries. Because battery-powered vehicles and mobility devices have service lifetimes that can exceed 15 years, most in operation today were designed prior to the mass-market availability of lithium-ion batteries and were designed to exclusively operate using lead batteries.

Because lithium-ion batteries have different charge and discharge profiles and characteristics than lead batteries, they cannot simply be "swapped" for the vehicles/devices powered by lead batteries. Most such vehicles will require being retrofitted with additional electronic interfaces and circuitry to allow lithium-ion batteries to properly power the vehicle. Some designs may also require the installation of counterweights to maintain the center of balance when switching to much lighter lithium-ion batteries to prevent tip-over incidents during operation. And some vehicles may simply be unable to be retrofitted safely.

Because, as detailed above, DOE's energy efficiency standard for *battery chargers* would effectively eliminate the market for lead batteries, it also will have the impact of requiring manufacturers to redesign or retrofit existing products to newly accommodate lithium-ion batteries. This would be onerous.

The proposed unlawful standards would harm consumers.

The unlawful standards would also result in severely decreased competition since they would eliminate the important option for consumers to choose lead batteries.

Consumers would be further harmed since lithium-ion batteries are much more costly than lead batteries. For example, in May 2023, a survey of MSRP quoted by national suppliers in the

[18] U.S. Department of Transportation, Travel Patterns of American Adults with Disabilities (Jan. 3, 2022), (https://www.bts.gov/travel-patterns-with-disabilities).

United States for lead-based deep cycle batteries used in 48-volt low-speed off-road or street-legal electric vehicles compiled the following national average purchase cost to consumers: GC8 Lead Battery, 48 Volt Battery Pack, 165 to 170 Ah: $1,234.69.[19] In May 2023, a survey of average MSRP quoted by national suppliers in the United States for lithium batteries used in comparable EV applications found the following national average purchase cost to consumers: Lithium LiFePO4 Battery, 48-Volt, 105 Ah: $2968.67. In these examples, the average for a 48-volt lithium battery system is 240% higher than a functionally equivalent lead battery pack.

DOE's cost study thus vastly underestimates the costs to consumer from the proposed standards. It indicates that there would be an incremental per-unit cost of about $6 to comply with the standards. This ignores that, as discussed herein, consumers could not charge their lead batteries, and would therefore have to replace them with lithium-ion batteries. This would entail hundreds or thousands of dollars of expense.

According to the consumer analytics firm JD Power,[20] 21% of new vehicle purchasers were "very unlikely" to consider purchasing an electric vehicle due to the cost of the vehicle. Central to this data is the cost differential between lead and lithium-ion batteries. Excluding lead batteries from the market would exacerbate this. Thus, forcing a change from lead to lithium-ion could result in slowdown of conversion from internal combustion engine vehicles to electric vehicles. Golf cars and other products could use internal combustion engines rather than batteries. There would be a significant decrease in the uptake of new chargers as battery systems currently in use would need to be changed. There would be a significant cost increase for equipment, and end users would not be able to afford new or as many new units. Internal combustion engine vehicle sales would soar because they would cost less than electric vehicles. Slowing the progress of electric vehicles and increasing the use of internal combustion engines would be the opposite of the intent to reduce greenhouse gases.

Furthermore, while DOE's LCC properly identified mobility scooters and golf cars as impacted product categories, incongruously DOE failed to identify mobility impaired individuals or older Americans who rely on golf cars for transportation as impacted population subgroups, and therefore also failed to conduct the necessary consumer subgroup analysis.[21] As noted above, U.S. DOT data shows that more than 2.1 million Americans rely on medically necessary mobility devices. Given the significant costs required to retrofit or replace lead battery powered mobility devices and golf cars, DOE's failure to properly analyze the impacts on these subgroups is fatal to its proposed rule.

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[19] A market survey of retail prices will be provided separately as Confidential Business Information.

[20] https://www.jdpower.com/business/resources/ev-divide-grows-us-more-new-vehicle-shoppers-dig-their-heels-internal-combustion.

[21] *See* Technical Support Document, Chapter 11.

Eliminating lead batteries from the market would harm recycling.

A shift from lead batteries would dampen recycling success in the U.S., since lead batteries have a highly developed recycling program, in contrast to lithium-ion batteries.

The U.S. lead battery industry operates within the world's most stringent regulatory environment, which helps ensure that manufacturing and recycling plants are clean, safe, and efficient. No other battery chemistry comes close to the sustainability profile of lead batteries. Further, 99% of used lead batteries in the U.S. are recycled.[22] This compares with the less than 15% recycling rate of lithium-ion batteries. This means that the raw material used to manufacture lead batteries in the U.S. and North America are recycled and produced domestically, including the lead, plastic, and electrolyte. According to the U.S. Geological Survey, domestic U.S. recycling of used lead batteries and other lead-bearing scrap provided approximately 72% of the domestic demand for lead in 2019, of which battery production accounted for 93% of demand.[23] In addition, more than half of the imported lead came from Canada and Mexico, where the largest facilities are owned by or have long-term relationships with U.S. companies.[24] That unparalleled domestic supply chain ensures that the primary input material for lead batteries is readily available and insulated against major international supply chain interruptions.

DOE's technology assessment of options is overstated.

DOE's technology assessment, as set forth in its meeting presentation for the April 27, 2023, webinar,[25] identifies purported "potential technology options that could be used to improve battery charger efficiency." These include transformer cores with lower-loss materials; emerging gallium nitride and silicon carbide technologies for fast chargers; modern Switched-Mode Power Supplies (SMPS); and elimination/limitation of standby mode current. But this assessment was shattered during the webinar as a basis for proposed standards.

As stressed during the webinar, industry is already employing most of these items to make their products highly efficient. Hence, these items would not give the boost above existing efficiency levels that DOE is hoping for to justify its proposal. And, to the extent such technologies have not been implemented, this cannot be done without great difficulty, expense, and loss of

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22 Battery Council International, *Industry Associations Reaffirm Commitment to Help Tackle Informal Lead Battery Recycling* (Oct. 4, 2022), https://batterycouncil.org/industry-associations-reaffirm-commitment-to-help-tackle-informal-lead-battery-recycling/?highlight=Battery%20Recycling.]

23 U.S. Geological Survey, 2020, Mineral commodity summaries 2020: U.S. Geological Survey, 200 p., https://doi.org/10.3133/mcs2020.

24 Approximately 55% of the imported lead supply was produced in Canada and Mexico in 2019.

25 https://www.regulations.gov/document/EERE-2020-BT-STD-0013-0014 at 11.

functionality; and, in any event, there would only be a marginal increase in efficiency. Hence, the proposed standards would violate EPCA's requirements that standards be technologically feasible and economically justified and result in a significant conservation of energy.

Conclusion

BCI is proud of the accomplishments of the domestic battery industry spanning more than 100 years. And BCI strongly supports the goals of EPCA. Unfortunately, the standards proposed in the NOPR would violate the requirement of EPCA, at least with respect to 2c and 2b, and should not be adopted. BCI would be pleased to cooperate with DOE towards the adoption of lawful and reasonable standards for battery chargers.

Respectfully submitted,

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