Northwest Energy Efficiency Alliance
Appliance Standards Awareness Project
Natural Resources Defense Council

January 3, 2022
Via Electronic Mail

Mr. Jeremy Dommu
U.S. Department of Energy
Office of Energy Efficiency and Renewable Energy
Building Technologies Office
EE-5B, 1000 Independence Avenue SW
Washington, DC 20585-0121

Re: Docket Number EERE-2019-BT-TP-0012: Test Procedures for External Power Supplies

Dear Mr. Dommu,

The Northwest Energy Efficiency Alliance (NEEA), Appliance Standards Awareness Project (ASAP), and Natural Resources Defense Council (NRDC) submit the following comments in response to the Department of Energy's (DOE's) supplemental notice of proposed rulemaking (SNOPR) regarding the test procedure for external power supplies (EPS or EPSs): 86 Fed. Reg. 60376 (November 2, 2021).

We appreciate DOE's effort to develop this SNOPR on the EPS test procedure and to seek public input. The following comments are drawn from our collective power supply research and historical involvement in state-level EPS standards. NEEA's power supply program experience and new analysis of current market trends, technology trends, and international test procedures serve to provide timely input as well. Additionally, we researched and analyzed the energy savings opportunities of power factor correction and commercial/industrial power supplies. In all, we offer seven comments on this proposed rulemaking and an attachment that summarizes NEEA's recent industrial power supply research.

Comments

1. We strongly support DOE's removal of the specific reference to direct operation and indirect operation Class A EPSs in Appendix Z. (SNOPR Issue V.E.1)
DOE's 2014 rule divided EPS products into two categories—direct and indirect—and subjected them to different standards levels: VI (higher) and IV (lower), respectively. In its 2020 comment letter, NEEA encouraged DOE to remove the distinction between direct and indirect power

supplies,[1] and we applaud DOE for proposing to remove these definitions in the EPS test procedure. As DOE mentions in this SNOPR, there is no difference in the way these power supplies are tested.[2] Our research indicates no technical justification for these categories to remain either; in summary:

- *The direct/indirect definitions are unnecessary.* Both direct and indirect EPSs convert ac to lower voltage dc and leverage the same technologies to improve efficiency. In fact, DOE's 2020 EPS standards request for information (RFI) notes that 70% of the indirect Class A EPS products already meet the level VI (higher) standards associated with direct Class A.[3] Moreover, neither of the regulations in Canada or the European Union make this distinction.
- *The distinction is confusing.* The definitions of direct and indirect are based on how the end-use product (and not the EPS) is designed and used. Thus, these categories can be confusing to power supply companies that typically certify EPS products on behalf of their customers. DOE confirms in its 2020 EPS RFI that it has received "many questions regarding EPSs that provide direct operation with a different consumer product containing batteries and or a battery charging system."[4] Removing this definition from the test procedure is the first step to adding clarity to the certification process.
- *The definitions support EPS product classes that leave achievable energy savings untapped.* DOE estimates 22% of shipments of all EPS products are indirect[5] and therefore subject to the lower standard level IV, effectively reducing cost-effective savings for U.S. consumers. Assuming the energy savings estimate of these level IV indirect Class A EPSs is similar to savings achieved in the prior rulemaking, collapsing Class A direct and Class A indirect into a single product class will result in 0.08 quads of energy savings over a 30-year period.[6]

These technical reasons strongly support DOE's proposal to remove the definitions of direct and indirect from the Appendix Z test procedure. Removing them is an important first step to

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[1] Northwest Energy Efficiency Alliance (NEEA), Appliance Standards Awareness Project (ASAP), and Natural Resources Defense Council (NRDC). 2020. *Comment Letter to the U.S. DOE Energy Conservation Standards for External Power Supplies Request for Information (RFI).* 6 July. Comment 2, p. 3. Retrieved from: https://www.regulations.gov/comment/EERE-2020-BT-STD-0006-0006.

[2] U.S. DOE. 2021. *Supplemental Notice of Proposed Rulemaking (NOPR) Regarding the Test Procedure for External Power Supplies (EPS or EPSs).* 86 Fed. Reg. 60376. 2 November. p. 60380. Retrieved from: https://www.regulations.gov/document/EERE-2019-BT-TP-0012-0017.

[3] U.S. DOE. 2020. *Energy Conservation Program: Energy Conservation Standards for External Power Supplies, Request for Information.* 85 Fed. Reg. 98. p. 30641. Retrieved from: https://www.regulations.gov/document/EERE-2020-BT-STD-0006-0008.

[4] Ibid.

[5] Ibid.

[6] Given the following: 1) DOE estimated indirect Class A EPSs represent 22% of the market and 70% of those already meet level VI, and 2) Class A EPSs were not subject to a change in standards level in the 2014 final rule. We calculated the savings using a market size ratio of indirect Class A EPS (22%) to EPS market with increased standards in 2014 (78%) and then assume 70% of that indirect Class A EPS market already meets level VI. We then multiply that percentage of the market by the total energy savings associated with the last final EPS rule issued 2 Feb 2014. (Section C, National Benefits. Available at: https://www.regulations.gov/document?D=EERE-2008-BT-STD-0005-0219, accessed 30 November 2021.)

collapsing Class A direct and Class A indirect EPSs into a single product class and capturing additional energy savings for U.S. consumers.

2. We recommend DOE require measurement and reporting of a 10% loading point separately from the active mode power measurement.

A variety of prevalent end-use products (e.g., laptops, printers, tablets, power tool chargers, etc.) are coupled with an EPS. They spend a significant amount of time in low power modes—often around the 10% loading point—which loads the EPS relatively lightly. DOE asked for extensive comment on the possibility of additional loading points in its 2020 EPS RFI,[7] but this SNOPR makes no mention of this issue.

Technical research and industry trends support incorporating a 10% loading point separate from the active mode power measurement. Key reasons include:

- *10% is a unique loading condition.* A high active mode efficiency (measured at 25, 50, 75, and 100% of output current) of an EPS does not typically guarantee that lower loading points (between 0 and 25%) are efficient as well. Similarly, a low no load power level is also not indicative of high efficiency at 10% load.
- *10% loading condition is employed in Europe.* The European Union (EU) Code of Conduct (CoC) and Ecodesign requirements have already addressed EPS efficiency at lower loading conditions by adding an efficiency measurement at 10% load, and in the case of CoC, setting a separate efficiency target for the 10% loading level.[8]
- *Efficiency at the 10% loading condition can be improved.* A conventional EPS typically has an efficiency of 75% at the 10% loading condition.[9] However, when an EPS is specifically designed for higher efficiency at lighter loads, 85% efficiency at this load point can easily be achieved (as documented by the 2020 NEEA comments on the EPS standard RFI).[10] Given end-use products powered by EPSs spend a significant amount of time in low power mode (loading the EPS at or near 10%), this difference in efficiency is likely to yield substantial energy savings.

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[7] U.S. DOE. 2020. *Energy Conservation Program: Energy Conservation Standards for External Power Supplies, Request for Information.* 85 Fed. Reg. 98. pp. 30646 – 30647, RFI Issues 33, 34, 39, 40, and 41. Retrieved from: https://www.regulations.gov/document/EERE-2020-BT-STD-0006-0001.

[8] European Commission. 2013. *Code of Conduct of Energy Efficiency External Power Supplies Version 5.* 29 October. p. 4. Retrieved from: https://e3p.jrc.ec.europa.eu/sites/default/files/documents/publications/code_of_conduct_for_eps_version_5_-_final.pdf.

[9] Knowles, Don. 2013. *Understand Efficiency Ratings Before Choosing an AC-DC Supply.* 26 February. Figure 2. Retrieved from: https://www.electronicdesign.com/power-management/article/21795830/understand-efficiency-ratings-before-choosing-an-acdc-supply, accessed 14 December 2021.

[10] Northwest Energy Efficiency Alliance (NEEA), Appliance Standards Awareness Project (ASAP), and Natural Resources Defense Council (NRDC). 2020. *Comment Letter to the U.S. DOE Energy Conservation Standards for External Power Supplies Request for Information (RFI).* 6 July. Attachment to letter: *NEEA EPS Chipset Efficiency Data*. Retrieved from: https://www.regulations.gov/comment/EERE-2020-BT-STD-0006-0006.

- *10% loading condition is supported by the power supply industry.* In its comments to DOE on the 2020 EPS RFI, the Power Sources Manufacturers Association (PSMA) supported adding a 10% loading point to the test procedure.[11]

Therefore, we recommend that DOE:

- *Harmonize with the EU approach for measuring low load efficiency at 10% load.* This will increase clarity and consistency in the worldwide power electronics marketplace with negligible incremental test burden to manufacturers as they are already testing this 10% load point at higher input voltage to meet EU reporting requirements.
- *Create a separate minimum efficiency requirement for the 10% loading point.* If a separate efficiency requirement is not feasible in the near term, then we encourage DOE to enable testing and optional reporting to DOE's Compliance Certification Management System (CCMS) so that the EPA ENERGY STAR® program can use the data to create incentives for the most efficient EPSs in the market. Reporting the 10% load point separately may more effectively support DOE's EPS energy use calculations at low power mode conditions as well.
- *Retain the 25, 50, 75, 100% active mode measurement separate from the 10% load point*, as the active mode measurement average is standardized across the world. Including the 10% load point would bring the U.S. out of alignment with the worldwide testing approach for EPSs.

3. We encourage DOE to specify an output cord for testing when no output cord is recommended by the manufacturer. (SNOPR Issue V.E.4)

Consumers use EPSs with an output cord, and thus testing with one is more representative than testing without. However, not all manufacturers recommend an output cord for use with each EPS. Given this, we recommend that DOE specifies testing EPSs with a manufacturer-recommended cord, and if the recommendation is too general or if no cord is specified, then the EPS shall be tested with a standard cord. Table III-1 in this SNOPR is a good example of the typical gauge and length for an output cord specification. The EPS industry states that the gauge and length of the cord can change the efficiency of an EPS by 1 to 2%,[12] which suggests a standardized approach will support better repeatability and reproducibility of the test procedure.

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[11] Power Sources Manufacturers Association (PSMA). 2020. *Comment Letter to the U.S. DOE Energy Conservation Standards for External Power Supplies Request for Information.* 30 June. Retrieved from: https://www.regulations.gov/comment/EERE-2020-BT-STD-0006-0003.

[12] NEEA personal communications, EPS industry representatives, November 2021.

4. We recommend that DOE measure and report power factor at all active mode loading conditions.

NEEA suggested DOE measure power factor in response to its 2020 EPS RFI.[13,14] However, this issue was not discussed in this test procedure SNOPR. We encourage DOE to measure and report power factor at all active mode loading conditions (25, 50, 75, and 100% rated output current) for five key reasons:

- *Power factor correction offers cost-effective energy savings opportunities.* In its 2020 EPS RFI, DOE sought additional design options to improve the efficiency of EPSs.[15] Research reveals power factor correction silicon can yield cost-effective savings associated with reduced losses in building wiring, especially for higher power EPSs. 2014 research suggests power factor correction requirements for power supplies are cost-effective for input power greater than 50 watts.[16] NEEA's conversations with silicon manufacturers indicate prices for power factor correction silicon are the same as 2014.[17] Over that same time, residential electricity prices have increased,[18] making power factor correction even more cost-effective today.
- *The magnitude of energy savings may be significant.* Using a 2014 report that estimated energy savings for California only,[19] we calculated the possible energy savings associated with improved power factor of external power supplies for the U.S. to be 0.6 quads of

[13] Northwest Energy Efficiency Alliance (NEEA), Appliance Standards Awareness Project (ASAP), and Natural Resources Defense Council (NRDC). 2020. *Comment Response to the U.S. DOE Energy Conservation Standards for External Power Supplies Request for Information.* 6 July. Comment 10, p. 15. Retrieved from: https://www.regulations.gov/comment/EERE-2020-BT-STD-0006-0006.

[14] U.S. DOE. 2020. *Energy Conservation Program: Energy Conservation Standards for External Power Supplies, Request for Information.* 85 Fed. Reg. 98. p. 30636. 20 May. Retrieved from: https://www.regulations.gov/document/EERE-2020-BT-STD-0006-0008.

[15] Ibid. p. 30646, RFI Issue 30.

[16] Fortenbery, B. 2014. *Power Factor Requirements for Electronic Loads in California.* American Council for an Energy Efficient Economy (ACEEE) Summer Study. Asilomar, CA. Retrieved from: https://www.aceee.org/files/proceedings/2014/data/papers/9-959.pdf.

[17] NEEA personal communications, EPS industry representatives, November 2021.

[18] Energy Information Administration (EIA). *Electricity Data Browser, Average annual retail price of electricity (residential sector).* Retrieved from: https://www.eia.gov/electricity/data/browser/#/topic/7, accessed 11 December 2021.

[19] Fortenbery, B. 2014. *Power Factor Requirements for Electronic Loads in California.* American Council for an Energy Efficient Economy (ACEEE) Summer Study. Asilomar, CA. Retrieved from: https://www.aceee.org/files/proceedings/2014/data/papers/9-959.pdf.

primary energy over 30 years.[20] These savings are equal to nearly two-thirds of the 0.94 quads of primary energy savings achieved from the prior EPS standard final rule.[21]

- *Technologies to correct power factor are readily available.* Power factor correction silicon is non-proprietary and available from a variety of providers. NXP's TEA19162,[22] On Semi's NCP1612A,[23] and Power Integrations' HiperPFS-4[24] are three examples of many power factor correction solutions available today.
- *Adding power factor measurement has little to no incremental test burden*. EPS test equipment already measures input power factor, so the incremental cost for this measurement is associated with the time to simply record the value.
- *The power supply industry supports the measurement of power factor*. Power Sources Manufacturers Association (PSMA) confirmed support for power factor measurement at all loading conditions in its 2020 response to DOE's EPS RFI.[25]

Given the opportunity for substantial cost-effective energy savings, industry support, and the negligible incremental test burden associated with collecting this additional information, we urge DOE to measure and report power factor at all active mode loading conditions.

5. We support testing USB-PD EPSs with both the highest and lowest nameplate output voltages to capture the range of possible operating conditions. (SNOPR Issue V.E.5)
EPSs are generally less efficient at lower output voltages because the magnitude of the voltage change is larger,[26] so testing this voltage condition is important to accurately represent an EPS's efficiency range.

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[20] The 2014 report estimates energy savings of 28 average MW in California after full stock turnover. Assuming an annual growth rate of 0.7% (equal to population growth), the cumulative 30-year savings in California is 920 MW-years. Savings from products sold in the 30-year period are included, and the midpoint of the timeframe is used to approximate the integral over 30 years (the growth rate is applied only for 15 years). Given these are consumer products, this savings is scaled to the U.S. using population data. California's 30-year energy savings is divided by 11.9% (the California share of U.S. population) yielding 0.23 quads site energy savings over 30 years. Multiplying the site energy savings by 2.55 converts the site energy savings to source, resulting in 0.6 quadrillion BTU (quads). The site to source/primary energy savings conversion factor is from the year 2035 found in Figure 10.3.1 of U.S. DOE's 2015 *Technical Support Document: Energy Efficiency Program for Consumer Products and Commercial and Industrial Equipment: Battery Chargers*. Retrieved from: https://www.regulations.gov/document/EERE-2008-BT-STD-0005-0230.

[21] U.S. DOE. 2014. *Energy Conservation Program: Energy Conservation Standards for External Power Supplies; Final Rule.* 79 Fed. Reg. p. 7850, 10 February. Retrieved from: https://www.regulations.gov/document/EERE-2008-BT-STD-0005-0219.

[22] https://www.nxp.com/products/power-management/ac-dc-solutions/ac-dc-controllers-with-integrated-pfc/pfc-controller:TEA19162T, accessed 30 November 2021.

[23] https://www.onsemi.com/products/power-management/ac-dc-power-conversion/power-factor-controllers/ncp1612, accessed 30 November 2021.

[24] https://www.power.com/products/hiper/hiperpfs-4, accessed 30 November 2021.

[25] Power Sources Manufacturers Association (PSMA). 2020. *Comment Letter to the U.S. DOE Energy Conservation Standards for External Power Supplies Request for Information (RFI).* 30 June. Retrieved from: https://www.regulations.gov/comment/EERE-2020-BT-STD-0006-0003.

[26] For a detailed discussion of why this is true for switch-mode power supplies, see industry article: *Switch-mode Power Supplies for Beginners, An Efficiency Primer Part 1* by D. Wagner and M. Kenyon. Available at: https://www.powerelectronics.com/learning-resources/engineering-essentials/article/21862924/switchmode-power-supplies-for-beginners-an-efficiency-primer-part-1, accessed 24 November 2021.

6. We encourage DOE to consider including simple multifunction EPSs within the scope of Appendix Z. (Issue V.E.2)

We support DOE's approach to exclude from Appendix Z complex multifunction products—such as televisions and desktop computers—that have a USB port (and therefore an EPS) but whose primary purpose is not to provide power to an external device. However, there are simple multi-function EPSs available in the market today that are designed to provide power to an external device but may also have another simple function (such as illumination) or occasional motor-driven movement (e.g., motorized standing desk). Figure 1 shows examples of products that use simple multifunction EPSs. We encourage DOE to consider including them in the scope of Appendix Z.

Figure 1. Examples of Simple Multifunction EPSs Available in the Current Market

Left: EPS coupled with illumination[27] *Middle:* EPS with small plug strip integrated into side table.[28] *Right:* EPS integrated into standing motorized desk.[29]

7. We encourage DOE to consider commercial and industrial power supplies as a future rulemaking opportunity. (SNOPR Section III.A.1)

Multiple commercial and industrial applications use power supplies, including:

- *Computer data servers* (commercial/light industrial) found in dedicated data centers and businesses.
- *Industrial automation and controls* used in myriad ways: robots, lighting, signage, and other end uses found in material handling distribution centers, water and sewer treatment plants, factories, and other industries.
- *Transportation controls* such as automotive traffic control signals and signs, rail signals, and other rail systems, many of which are redundant for safety reasons.

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[27] https://www.wayfair.com/lighting/pdp/everly-quinn-chaves-1475-table-lamp-set-with-usb-w005485087.html?piid=2123741587&categoryid=416503&placement=1&slot=5&sponsoredid=468a82dae97bcebf95c2e5e61ddd6ca76e44a4b7c8d631de67a5dfe38ca37d9e&_txid=I%2BF9OmG0%2B2YHTs2JBFE0Ag%3D%3D&isB2b=0&auctionId=39a9ea47-906b-4153-9cda-0fd0e0dbddd6, accessed 11 December 2021.

[28] https://www.overstock.com/Home-Garden/Mission-Charger-Walnut-Wood-Side-Table/12434754/product.html?opre=1&option=20115340, accessed 11 December 2021.

[29] https://www.amazon.com/dp/B076BH7V9H?tag=athletedesk-20&linkCode=ogi&th=1, accessed 11 December 2021.

- *Process controls in a variety of industries* such as control cabinets and actuators,[30] which enable mechanical movement in medical, manufacturing, energy production (e.g., solar installations), and other sectors.

We agree with DOE's assessment that the EPS test procedure is too simple to characterize the efficiency of these multi-output commercial and industrial power supplies. However, NEEA's research (summarized in the attachment to this letter) also suggests there is an opportunity to achieve significant cost-effective energy savings with a separate test procedure and standard for these products. In brief:

- *A test procedure already exists to measure the efficiency of these products.* A procedure originally developed in 2004 by the California Energy Commission (CEC) was most recently updated in 2018.[31] This test procedure is currently used by the power supply industry to certify commercial/industrial power supply efficiency to an independent industry-recognized label[32] and to certify power supplies for use in ENERGY STAR certified desktop computers and data servers.[33,34] The 2007 version of this test procedure is cited by DOE itself as additional instruction for testing multiple voltage external power supplies in Appendix Z (section 3.i.b.i.B). This test procedure is also cited in CEC standards for computers and small-scale data servers.[35] Because this test procedure has been used by industry for nearly 20 years[36] and is leveraged by ENERGY STAR and the CEC, it offers a suitable option for DOE's consideration.
- *Commercial/industrial power supplies are manufactured as a component.* Like EPSs, most commercial/industrial power supplies are manufactured by a separate entity and then sold to an OEM or (in custom industrial applications) directly to the end-use integrator. The variety of physical formats—embedded, encapsulated, open frame, rack

[30] For more information about applications of actuators in industrial uses, please see *Complete Guide to Actuators (Types, Attributes, Applications and Supplier*s), available at https://www.thomasnet.com/articles/pumps-valves-accessories/types-of-actuators/#applications_industries, accessed 24 November 2021.

[31] Mansoor, A., B. Fortenbery, B. Vairomohan, T. Geist, P. Ostendorp, C. Calwell, R. Rasmussen, D. McIlvoy, J. Boehlke. 2018. *Generalized Test Protocol for Calculating the Energy Efficiency of Internal Ac-Dc and Dc-Dc power Supplies, Revision 6.7.1*. 5 October 2018. Retrieved from: https://www.clearesult.com/sites/default/files/program_resources/Generalized_Internal_Power_Supply_Efficiency_Test_Protocol_R6.7.1.pdf.

[32] For more information on the 80 Plus program, see https://www.clearesult.com/80plus, accessed 24 November 2021.

[33] U.S. EPA. 2019. *ENERGY STAR Program Requirements for Computers, Partner Commitments.* p. 8. Retrieved from: https://www.energystar.gov/sites/default/files/ENERGY%20STAR%20Computers%20Final%20Version%208.0%20Specification%20-%20Rev.%20April%202020.pdf.

[34] U.S. EPA. 2019. *ENERGY STAR® Program Requirements Product Specification for Computer Servers, Eligibility Criteria Version 3.0*. p. 9. Retrieved from: https://www.energystar.gov/sites/default/files/ENERGY%20STAR%20Version%203.0%20Computer%20Servers%20Program%20Requirements.pdf, accessed 30 November 2021.

[35] Title 20, California Code of Regulations (CCR) § 1604. 2019. *Test Methods for Specific Appliances.* Retrieved from: https://govt.westlaw.com/calregs/Document/I90BAEA80D44E11DEA95CA4428EC25FA0?viewType=FullText&originationContext=documenttoc&transitionType=CategoryPageItem&contextData=(sc.Default).

[36] *80 PLUS Program Timelines and Milestones.* Available at: https://www.clearesult.com/80plus/program-details-information#program-timelines-and-milestones, accessed 24 November 2021.

mount, and DIN-mount—can all be measured with the same test method independent of the end-use application.

- *Significant energy savings are possible.* Approximately 0.6 quads of primary energy savings from commercial industrial power supplies are possible over a 30-year period.[37] This energy savings estimate focuses on commercial/industrial power supplies not found in data servers, so including those applications will increase savings further. Additionally, analysts expect automation to continue increasing over the next 10 years,[38] which will also spur the need for more commercial/industrial power supplies. Given these variables, we consider 0.6 quads a conservative estimate of potential energy savings.

Additionally, our review of DOE's authority under the Energy Policy and Conservation Act (EPCA) suggests that DOE may be able to regulate the efficiency of these commercial/industrial power supplies, particularly for lighting and motor applications. These commercial/industrial power supplies are used with "electric lights and lighting power supply circuits" described in DOE's authority for coverage.[39] This includes lighting for transportation signage—such as automobile and pedestrian traffic lights, rail systems, and airport runway lighting—as well as other industrial signage. Furthermore, these power supplies also operate electric motors and actuators, which could be considered "other motors" included in the EPCA definition of industrial equipment.[40] We encourage DOE to thoroughly consider its authority to address these commercial and industrial power supplies under EPCA.

Given the strong technical foundation for testing the efficiency of commercial/industrial power supplies, the significant energy savings opportunity, and DOE's probable authority for coverage we strongly encourage DOE to consider adopting a test procedure and mandatory standard for these devices.

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[37] A 2019 industrial market assessment report produced by CLEAResult for NEEA estimates energy savings of 8.14 average MW in the Northwest region after a full stock turnover (report attached). Assuming an annual growth rate of 2%, the cumulative 30-year savings in the Northwest is 329 MW-years. Savings from products sold in the 30-year period are included, and the midpoint of the timeframe is used to approximate the integral over 30 years (the growth rate is applied only for 15 years). This savings estimate is scaled to the U.S. using population. Northwest 30-year energy savings is divided by 3.9% (NEEA's share of the U.S. population) yielding 0.25 quads site energy savings over 30 years. Multiplying the site energy savings by 2.55 converts the site energy savings to source/primary energy, resulting in 0.6 quadrillion BTU (quads). The site to source energy savings conversion factor is from the year 2035 found in Figure 10.3.1 of U.S. DOE's 2015 *Technical Support Document: Energy Efficiency Program for Consumer Products and Commercial and Industrial Equipment: Battery Chargers*. Retrieved from: https://www.regulations.gov/document/EERE-2008-BT-STD-0005-0230.

[38] Forbes. 2020. *U.S. Lost Over 60 Million Jobs – Now Robots, Tech and Artificial Intelligence will Take Millions More.* 27 October. Retrieved from: https://www.forbes.com/sites/jackkelly/2020/10/27/us-lost-over-60-million-jobs-now-robots-tech-and-artificial-intelligence-will-take-millions-more/?sh=1156fe881a52.

[39] Energy Policy and Conservation Act. 2005. 42 U.S.C. § 6311 Definitions, Item 2, Subparagraph B (v). p. 6118. Available at: https://www.govinfo.gov/content/pkg/USCODE-2019-title42/pdf/USCODE-2019-title42-chap77-subchapIII-partA-1-sec6311.pdf.

[40] Ibid. Subparagraph B (xiii). p. 6118.

Summary

NEEA, ASAP, and NRDC appreciate DOE's work to update the test procedure for EPSs as well as the opportunity to provide comments. In summary, we offer the following recommendations and thoughts concerning this EPS test procedure SNOPR:

1. **We strongly support DOE's removal of the specific reference to direct operation and indirect operation Class A EPSs in Appendix Z.** (SNOPR Issue V.E.1)
2. **We recommend DOE require measurement and reporting of a 10% loading point separately from the active mode power measurement.**
3. **We encourage DOE to specify an output cord for testing when no output cord is recommended by the manufacturer.** (SNOPR Issue V.E.4)
4. **We recommend that DOE measure and report power factor at all active mode loading conditions.**
5. **We support testing USB-PD EPSs with both the highest and the lowest nameplate output voltages to capture the range of possible operating conditions.** (SNOPR Issue V.E.5)
6. **We encourage DOE to consider including simple multifunction EPSs within the scope of Appendix Z.** (Issue V.E.2)
7. **We encourage DOE to consider commercial and industrial power supplies as a future rulemaking opportunity.**

Thank you for considering our comments.

Sincerely,

Nicole Dunbar
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Northwest Energy Efficiency Alliance
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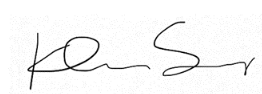

Kanchan Swaroop
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/s/ Joe Vukovich

Joe Vukovich
Natural Resources Defense Council

Attachment: NEEA Industrial Power Supply Research

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