

Topic	Subtopic	Stakeholder Comment	EPA Response
General		<p>One stakeholder supported the ENERGY STAR EVSE specification process, noting that it can facilitate energy efficiency and demand response efforts of utilities.</p> <p>Another stakeholder noted that the EVSE contributes the least to the energy loss in the EV charging system and are essentially extension cords and safety devices, while the onboard charger and electric vehicle sub-systems consume electricity. They noted that the losses in the EVSEs are not as relevant in the whole system and energy reduction achievement would require high component cost upgrades. They requested that EPA justify the efficiency gains with a consumer cost-benefit model.</p> <p>This stakeholder noted that the EVSE market is in its infancy and more data needs to be collected with their endorsement as a one-size-fits-all approach will result only in simple cord sets meeting the criteria. They requested more dialog with industry and a breakdown of efficiency levels with consideration for the intended application.</p>	<p>Based on the ENERGY STAR Market and Industry Scoping Report for EVSE published in September 2013 (<a href="http://energystar.gov/scoping">energystar.gov/scoping</a>), EPA identified that differentiation between models was possible based on power consumption. Based on available data, EPA considers that an opportunity exists to encourage the market toward more efficient products.</p> <p>EPA's fuel efficiency label for electric vehicles already accounts for the energy efficiency of on-board charger inside the vehicle. With this ENERGY STAR Version 1.0 specification, EPA is addressing the off-board EVSE to differentiate the energy efficiency of standalone EVSE in Partial On and Idle Modes.</p> <p>In addition, EPA has tested more models to develop a more robust dataset for setting levels in the Draft 2 specification.</p>
Definition	Primary Function	A stakeholder noted that the primary function of an EVSE is to control the connection of a vehicle to a source of external power. They stated that the vehicle has control over when the EVSE closes the relay and typically do so only when they need power. Once the relay is closed, the EVSE will not know whether current is flowing and the vehicle is in control over how much is drawn and when.	EPA thanks stakeholders for providing this feedback and, as a result, has accounted for relationship between the EV and the EVSE in the Draft 2 specification by altering the auto-power down requirements. Rigorous Partial On levels will ensure non-essential features are powered down.
Definition		<p>A stakeholder requested that EPA clarify the definitions of the vehicle-EVSE interface states:</p> <ul style="list-style-type: none"> <li>• Eliminating the overlap between secondary and tertiary function</li> <li>• Clarifying the definitions of the states A, B, C, and D, including B1 and B2, by replacing implicit references to J1772 with explicit explanations of the EVSE operating states or have a direct cross reference to the current version of J1772</li> <li>• Harmonize operating mode definitions with the SAE International Standard J2894/2 as it is intended to address EVSE operating states</li> </ul>	<p>EPA has eliminated the mention of area lighting in the tertiary functions definition due to confusion with ambient lighting in the secondary function definition. Lacking additional stakeholder input, EPA considers that the current definition of primary function for EVSE accurately reflects that the primary function of the EVSE is to control the connection of a vehicle to a source of external power.</p> <p>Due to stakeholder feedback asking for further clarification of the definitions of the vehicle-EVSE interface states, EPA is crosswalking the proposed ENERGY STAR modal definitions with SAE J1772 definitions of each state (States A, B1, B2, and C) within the modal definitions to demonstrate the intent of each of mode and how each most closely resembles industry-accepted state definitions. The SAE J2894/2 standard contains modal definitions that are out of scope of the ENERGY STAR specification because they cover the entire EVSE/EV system, taking into account EV on-board charging efficiency. The SAE J1772 standard only relates to the interface between the EVSE and EV. In contrast, this specification encompasses only the EVSE. Since neither of the SAE J2894/2 or SAE J1772 standards have definitions specific to the modes of an EVSE, EPA proposes modal definitions for an EVSE to be able to create a uniform way to test and measure an EVSE's standalone power consumption.</p>
Automatic Brightness Control (ABC)		<p>A stakeholder supported the proposed revisions to the ABC ambient lighting conditions but recommended that EPA consider using a higher-output lamp to represent outdoor daylight conditions. They noted that this may lead to test method revisions to achieve higher ambient lighting levels that is more representative of daytime outdoor conditions. This stakeholder requested clarification on how the ABC testing will be used to determine compliance as well, if the outdoor and dark results will be averaged, or how they will fit into the requirements.</p> <p>In addition, this stakeholder recommended requiring a measurement at maximum and minimum luminance settings, similar to the requirement in the Displays specification, for EVSE with screens with ABC capabilities for the most common Idle Mode and Partial On Mode screen display. They requested that EPA reconsider adding a test at 65 percent of maximum luminance for these products as well because products may have easily accessible settings to verify this percentage.</p>	<p>A measurement of 300 lux represents the highest level of achievable brightness with the particular light source selected. EPA believes that testing at 65% of maximum brightness for products with ABC enabled may cause too much testing burden by requiring measurements of display brightness (luminance) in addition to ambient illuminance as well as a specific test pattern fed into the EVSE display. EPA continues to believe that installers are most likely to keep manufacturers' default settings, and is therefore proposing to keep the EVSE in those settings for test. If stakeholders have any data on EVSEs in more representative outdoor daylight conditions, EPA would welcome this feedback.</p> <p>EPA notes that the specification does contain instructions on how the automatic brightness control is incorporated into the requirements. The brightness at 0 lux and the brightness at 300 lux will be averaged for both Partial On and Idle Mode.</p>

ENERGY STAR EVSE Draft 1 Specification and Draft 2 Test Method Stakeholder Comment Summary and Response

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Auto Power Down (APD)		<p>Several stakeholders requested that APD be further defined and recommended:</p> <ul style="list-style-type: none"> <li>• That EPA add APD requirements that apply when an EVSE is not connected to a vehicle.</li> <li>• Defining how energy is reduced during APD, such as significantly dimming screens or powering them off, opening relay contacts, and/or other conditions.</li> <li>• Requiring a faster transition to APD than thirty minutes to two hours and aligning with the Draft 1 Specification for Connected Thermostats requirements to transition to network standby in 5 minutes.</li> <li>• Clarifying how APD test runs will be compared against the specification and stating which of the three APD test runs will be used to determine APD capability during each mode.</li> <li>• Revisiting the relationship between the EV and EVSE</li> </ul> <p>Two stakeholders noted that the EVSE is not in control of the charging when connected to the EV and as a result, it is not possible for the EVSE to power down once charging is complete. They stated that the vehicle has control over when the EVSE closes the relay and typically do so only when they need power. Once the relay is closed, the EVSE will not know whether current is flowing and the vehicle is in control over how much is drawn and when. As a result of this, the EVSE cannot power down because it is not in control when connected to the vehicle.</p>	<p>EPA received substantial stakeholder feedback that an EVSE can only power down to a lower power state after the EV has released the connection to the EVSE such that current no longer passes through. Therefore, EPA is removing APD as a requirement. Instead, EPA proposes a 2 minute delay before testing the maximum Partial On Mode power to ensure that the unit under test (UUT) has already transitioned to this state. EPA believes that an EVSE is capable of powering down any unnecessary features during this 2 minute delay period, thereby capturing any potential power management capabilities. With this approach, EPA continues to incentivize EVSE power management and also provides manufacturers with flexibility to decide which feature(s) will be turned off or how EVSE can enter lower power state during this delay period.</p>
Data Analysis		<p>Two stakeholders stated that the ENERGY STAR dataset was not robust enough to set criteria and unfairly disadvantaged some manufacturers due to the limited information used to analyze and set efficiency criteria. In addition, they noted that data provided by a third party may not represent power consumption of products across the industry. They noted that it is inappropriate to collect information on power loss from anyone other than the manufacturer of the EVSE equipment. Finally, they questioned if EPA is considering the accuracy of the data that was provided and requested that EPA correct any instances where the accuracy of the data is unsupported.</p> <p>Two stakeholders recommended that EPA collect additional data on the energy use of network activity. One stated that the levels for networked products are not justified by industry data</p>	<p>EPA proposed criteria to recognize efficiency in both Partial On and Idle Modes in the Draft 1 Specification based on data from 20 models (three of which contained network connectivity) from 10 different manufacturers. EPA received limited data from manufacturer stakeholders after the call for data following the release of the Draft 2 Test Method and, thus, the resulting dataset mostly reflected test data submitted by Idaho National Laboratory and input from Argonne National Laboratory.</p> <p>In response to Draft 1, stakeholders relayed that the dataset was not robust enough to set requirements for Partial and Idle Modes. In revising its proposed efficiency criteria in Table 1, EPA acquired and tested an additional set of models to create a larger dataset representing approximately half of current EVSE market which includes products from 13 manufacturers. EPA tested these models according to the ENERGY STAR EVSE Draft 3 Test Method. Per the proposed criteria, EPA revised the base allowance from 2.2W in Draft 1 to 2.6W in this Draft 2 to better reflect the top performing products in its dataset, resulting in a selection of models available from 5 manufacturers.</p> <p>In determining the allowances for network connected products, EPA reviewed the electronic catalogue DigiKey for Ethernet, cellular, and Wi-Fi modules akin to those in use in currently available EVSE to analyze their power draw. The WiFi and Ethernet modules reviewed consumed less than 1 W of power and the cellular modules consumed slightly more energy at closer to 2W. As such, EPA continues to propose the allowances for Wi-Fi, Ethernet and LAN network connectivity at 1W and revised in-use cellular at 2W. As noted in previous stakeholder discussions, other network connected ENERGY STAR qualified products have also been able to demonstrate a similar power draw at under 1W to deliver network connectivity in the equivalent Partial On and Idle Modes.</p> <p>EPA understands that many currently available network connected EVSE are not optimized to reflect the greatest potential energy efficiencies. EPA seeks to encourage a market shift to improve the energy savings of network connected EVSE by setting stringent, yet viable, allowances, as demonstrated in other electronic product categories. Finally, EPA removed the adder for occupancy sensor as most models that EPA analyzed in the market do not contain this feature.</p>

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Safety Requirements		<p>A stakeholder suggested that EPA not have a requirement for relay power because there are safety requirements they need to meet. The relay needs to be sized correctly for safety concerns. Two stakeholders requested that EPA require NRTL certification for any EVSE to be eligible for ENERGY STAR. Stakeholders expressed concern that EVSE without NRTL certification could sacrifice product safety considerations for efficiency gains and could mislead consumers into believing they are of higher quality.</p>	<p>EPA received feedback from stakeholders that products that do not adhere to safety standards may demonstrate lower power consumption, given differences in how the products are constructed. It is EPA's understanding that, at this time, the EVSE market has not universally adhered to safety standards, and that they remain a differentiating feature among EVSE products. To offset any incentive product manufacturers may have to forgo safety standards in the interest of saving energy, EPA proposes that EVSE manufacturers report which safety standards are met so this information can be shared with potential purchasers as part of the ENERGY STAR product finder.</p> <p>Based on an analysis of its expanded dataset, EPA proposes new requirements for Idle Mode in this Draft 2, proposing the same requirements for the base allowance and adds for network connected products as proposed for Partial On Mode. EPA proposes to retain the <math>0.25 * \text{Max Current}</math>, based on the demonstrated relay power consumption of the models in the dataset. Thus, products with a need for greater relay power will continue to receive an allowance proportional to their maximum current capability.</p>
Connected Functionality		<p>A stakeholder recommended that EPA identify development of Connected/DR criteria in the Section 6 "Consideration for Future Revisions", in lieu of including such criteria in the Version 1.0 specification. This stakeholder noted that EPA intends to develop an open communications standard for EVSE with DR capability. While stating that the narrative capabilities description approach would be appropriate for EVSE, this stakeholder noted that a cloud-based option may not be a good fit for EVSE; as unlike connected thermostats, EVSE are sold as stand-alone units without a service package or dedicated service provider. Removing the Connected/DR criteria will allow time for further development and market evolution. Additionally, the DR standards would need to address both the EVSE and the vehicle to ensure customer satisfaction and vehicle battery management.</p>	<p>EPA appreciates this feedback and EPA has clarified that only products qualifying to ENERGY STAR that wish to be designated as having connected functionality in the ENERGY STAR product finder must meet the connected criteria. Products that either currently deliver or are capable of delivering DR capability may be listed. EPA seeks to develop general parameters for products with connected functionality in order to help ensure interoperability and consumer benefits as DR programs continue to develop.</p> <p>While the general approach from Draft 1 is retained (open standards, open access, consumer override and a narrative capabilities description), the Draft 2 proposal will enable EVSE that use the Open Charge Point Protocol (OCCP) to be recognized as connected, and does not mandate consumers be empowered to override "any DR signal." This latter change was driven by verbal feedback during the EVSE Draft 1 webinar that compliance with the Draft 1 ENERGY STAR consumer override criteria could prevent participation in utility DR programs that included non-override-able DR events, e.g. Grid Emergency events. EPA notes that while EVSE that enable open-standards interconnection only in the cloud continue to be permitted, EPA has retained the informative note that recommends that EVSE support direct, on-premises, open-standards based interconnection for purposes of grid communications. Finally, while EPA recognizes that both the EVSE and the EV will participate in DR; the scope of this ENERGY STAR program, including optional Connected/DR is limited to the EVSE.</p>