



ENERGY STAR®

Electric Vehicle Supply Equipment

Version 1.1 Test Method Working Session #1

August 22, 2018

ENERGY STAR Products Labeling Program



Meeting Details

- Slides and related materials will be available on the EVSE Product Development Web page:
 - www.energystar.gov/RevisedSpecs
 - *Follow link to “Version 1.1 is in Development” under “Electric Vehicle Supply Equipment”*
- Audio provided via teleconference:
 - Call in:** +1 (877) 423-6338 (U.S.)
+1 (571) 281-2578 (International)
 - Code:** **773-366 #**
 - Phone lines will remain open during discussion
 - Please mute line unless speaking
 - Press *6 to mute and *6 to un-mute your line



Meeting Agenda

- Introductions and activities to-date
- Testing various product configurations
 - Stakeholder feedback
 - Proposed approach
 - Discussion
- Relevant modes of operation for testing
 - Stakeholder feedback
 - Discussion
- Timeline



Introductions

James Kwon

U.S. Environmental Protection Agency

Peter Banwell

U.S. Environmental Protection Agency

Matt Malinowski

ICF

Stacy Noblet

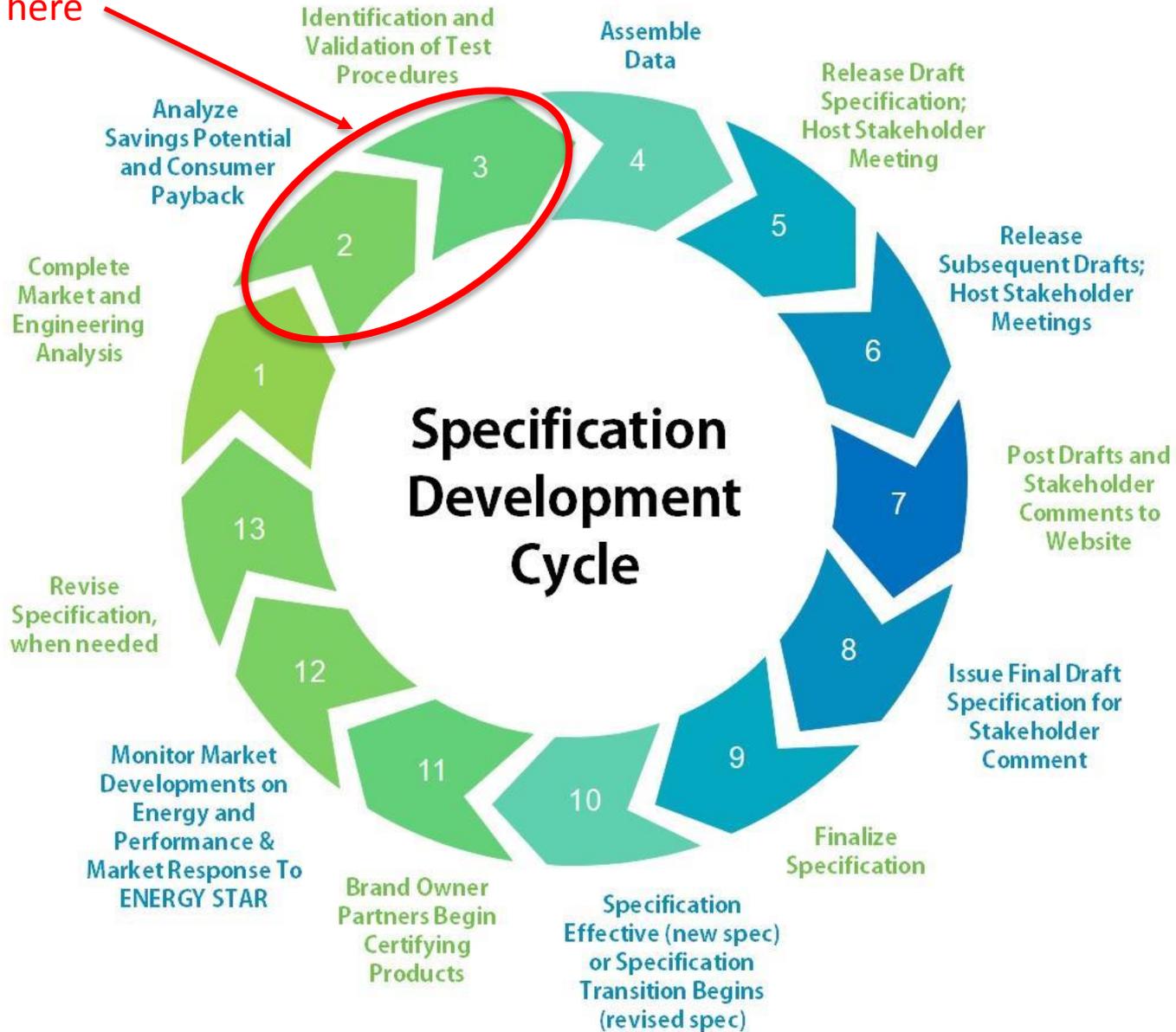
ICF

Emmy Feldman

ICF



We are here





Version 1.1 Discussion Guide

- EPA released the Discussion Guide on May 24 and had a webinar to discuss with stakeholders on June 4
- The Discussion Guide outlines key topics for developing a test method and specification for DC EVSE, including:
 - Test setup – instructions for ambient conditions, input supply requirements, and how the unit should be connected to test equipment
 - Test conduct – description of how the unit should be configured for network connection and a luminance test for products with a display
 - Test procedure – proposal for a test procedure for No Vehicle Mode and Operation Mode
 - Definitions of key terms, scope of the effort, and currently available information on product efficiency



**ENERGY STAR® Electric Vehicle Supply Equipment (EVSE)
Version 1.1 Specification and Test Method Discussion Guide**
May 2018

I. Overview

The U.S. Environmental Protection Agency (EPA) is sharing this ENERGY STAR Version 1.1 EVSE Discussion Guide to invite stakeholder input on key elements in advance of a Version 1.1 Draft Specification and Test Method. The goal of the Version 1.1 EVSE Specification is to include DC Output EVSE into the scope of the specification.

EPA feels the following topics are important to discuss with stakeholders prior to a Version 1.1 Draft release and they are the subject of this document:

- Developing an appropriate test procedure for DC charging, including lab requirements and test setup, relevant modes, and measurements;
- Definitions;
- Scope; and
- EVSE modes subject to ENERGY STAR requirements.

As always, stakeholder engagement is a vital ingredient in the success of the ENERGY STAR program, and EPA looks forward to working with all parties to develop the ENERGY STAR Version 1.1 EVSE specification and test method. **EPA will host a webinar on Monday, June 4, 2018 from 12:00 PM – 2:30 PM Eastern Time** to engage with stakeholders on the content included in this discussion guide. Please register [here](#) to attend. Also, EPA encourages stakeholders to provide written input and relevant data on this topic to evse@energystar.gov by **Monday, June 25, 2018**.

II. Applicability of Existing Test Method to DC EVSE

Where possible, EPA is considering applying portions of the current ENERGY STAR test method for AC Output EVSE to DC EVSE. As such, EPA expects to divide the current test method requirements into two parts:

1. Requirements that are generally applicable to both Level 1 and Level 2 AC EVSE as well as DC EVSE; and
2. Requirements that are only applicable to AC EVSE.

To these, EPA expects to add a third part:

3. Requirements that are only applicable to DC EVSE.

The sections below present the structure of this revised test method, along with EPA questions on specific aspects of it. Subsequently, in Section VI, EPA lays out proposals related to a DC charger specification (power and efficiency criteria). EPA welcomes feedback on all aspects of these proposals.

III. Test Setup

EPA is considering an expansion of the test set up instructions in the Version 1.0 EVSE test method to include separate DC EVSE requirements.

- 1) **General Requirements for Both AC and DC EVSE**
 - A) Current Input Power Measurements from ENERGY STAR Final Test Method, Rev. Apr-2017
 - B) Current Power Meter and Illuminance Meter Accuracy Requirements
- 2) **AC EVSE Requirements**
 - A) Current test setup
 - B) Current AC input power table

ENERGY STAR DC EVSE Specification and Test Method Discussion Guide
Page 1 of 9



Applicability of Existing Test Method for DC EVSE

- EPA is proposing to expand the scope of the ENERGY STAR EVSE specification to include DC Output EVSE
- In the Discussion Guide, EPA proposed a plan to revise the existing test method as follows:
 - Apply applicable portions of the current Version 1.0 test method for AC EVSE to DC Output EVSE
 - Maintain some requirements that remain applicable only for AC EVSE
 - Add requirements that will be applicable only for DC EVSE

Version 1.1 Specification

- As EPA works toward finalizing a test method for DC EVSE, work on the Version 1.1 Specification will commence:
 - EPA plans to retain the Version 1.0 criteria for AC L1 and L2 EVSE
 - Goal of V1.1 Specification will be to include appropriate criteria to recognize the most efficient DC charging
 - Intention to include criteria for:
 - No Vehicle Mode
 - Operation Mode
 - Connected Functionality Criteria



Photo by Kendall Septon, NREL 45635



Key Topics for Discussion

Testing Varying Product Configurations

EPA has learned that DC EVSE are typically configured in one of two ways:

1. All-in-One: where the product has all of the components included in one enclosure
2. Cabinet/Dispenser: where the product has components included in two separate enclosures – one including the power conversion equipment (cabinet) and another that connects to the vehicle and has the user interface (dispenser)



AC/DC Converter Cabinet

Dispenser

❖ The test method will need to appropriately account for both configurations and allow for comparison between their efficiency measurements.



Testing Varying Product Configurations

- In the Discussion Guide, EPA suggested testing the Cabinet and Dispenser components separately to potentially reduce testing burden. **Three stakeholders preferred to test Cabinet/Dispenser products as one system.**
- Based on this feedback, EPA is considering testing Cabinet/Dispensers together in a manner representative of how they would be used and more comparable to All-in-One products.

1. Should EPA test the two enclosures as one unit? Is there any disadvantage to connecting Cabinet/Dispensers in a representative configuration for testing?
2. Are there instances where the manufacturer offers a number of combinations of cabinet and dispenser products?



Open Discussion



Testing Varying Product Configurations

Three stakeholders commented that Cabinet/Dispenser products should be connected by a cable with a representative gauge and length when testing

Proposal #1: Choose a standard cable length (e.g., 40 feet) and choose a cable gauge per the National Electric Code (NEC) or manufacturer instructions, to be used for testing all Cabinet/Dispenser products.

Proposal #2: Do manufacturers ship cables with the product or are they obtained by the site owner? If manufacturers commonly ship cables with the product, test the cable that is shipped with the product and then extrapolate the losses at a common length (40 feet) from the NEC, to report losses for each product based on the same length.

How should EPA account for losses from the cable connecting the two enclosures?



Open Discussion

Testing in Relevant Modes of Operation

- In the Discussion Guide, EPA proposed a test procedure for **No Vehicle Mode** and **Operation Mode** and believed that these were the relevant modes for DC EVSE since EV drivers are encouraged to disconnect vehicles at the end of a charging session.
 - However, stakeholders noted that there are applications where DC EVSE may be connected to a vehicle, but not actively charging for significant periods of time – including fleet-based applications, future residential applications, and when a battery storage system is present.
 - As a result, **Partial On Mode** and **Idle Mode** may be relevant





Testing in Relevant Modes of Operation

Operational Modes	Most closely related Interface State as Defined in SAE J1772	Further Description
No Vehicle Mode	State A	No Vehicle Mode is associated with State A, or where the EVSE is not connected to the EV. The EVSE is connected to external power.
Partial On Mode	State B1 or State B2	Partial On Mode is associated with State B1 or State B2 where the vehicle is connected but is not ready to accept energy. Sub-state B1 is where the EVSE is not ready to supply energy and sub-state B2 is where the EVSE is ready to supply energy.
On Mode		
Idle Mode	State C	Idle Mode is associated with State C, where the vehicle is connected and ready to accept energy and the EVSE is capable of promptly providing current to the EV but is not doing so.
Operation Mode	State C	Operation Mode is associated with State C, where the EVSE is providing the primary function, or providing current to a connected load (i.e., the relay is closed and the vehicle is drawing current).



Testing in Relevant Modes of Operation

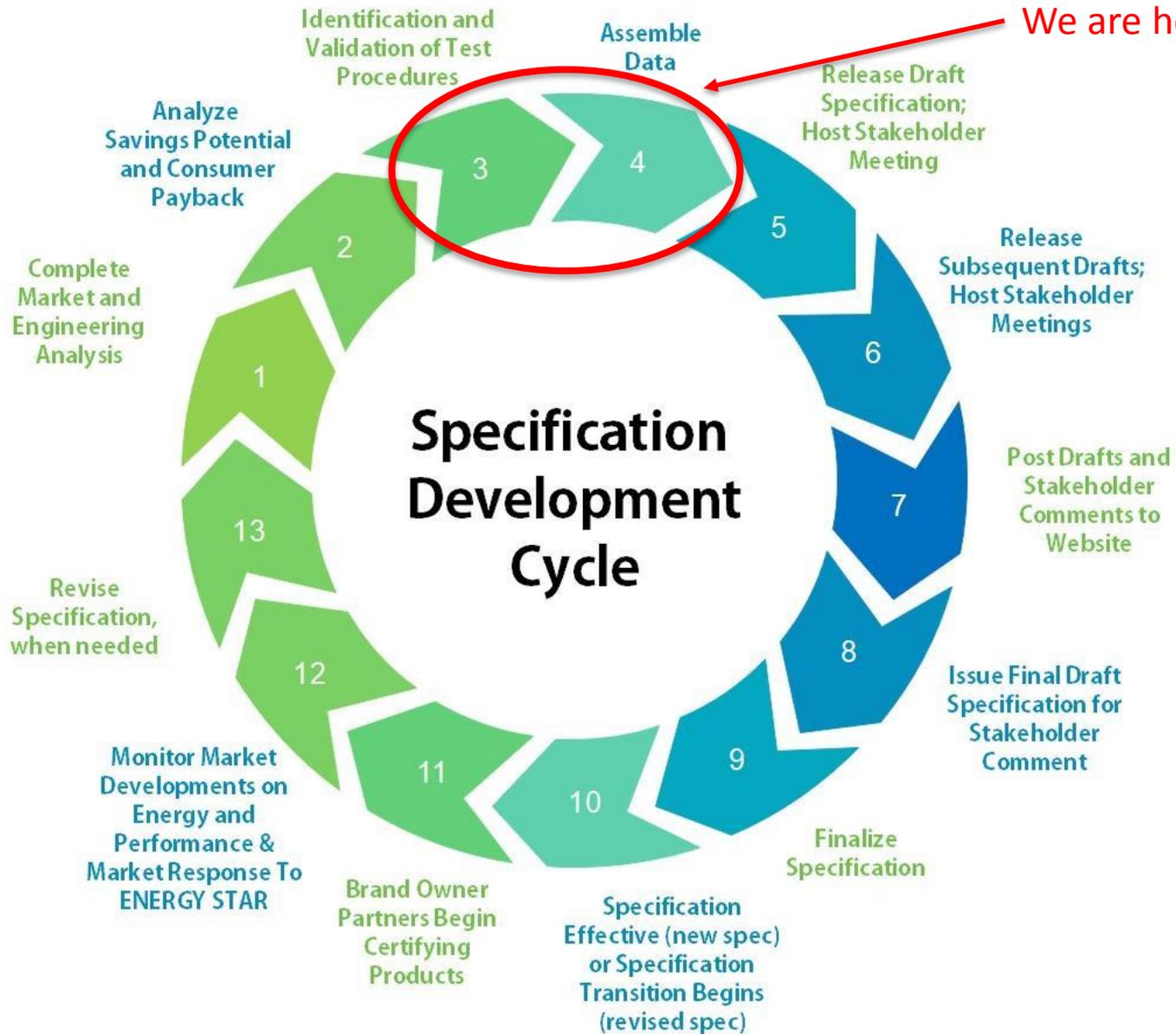
- Three stakeholders noted that additional testing for Partial On and Idle Modes will be applicable for DC EVSE with a rated current of 80 A or less, because drivers may leave their vehicles plugged in for longer periods of time after a charging event.
- They also recommended testing DC EVSE with a rated current greater than 80 A in Partial On due to a demand response event.

1. Is there a difference between Partial On and Idle Modes for DC EVSE?
2. Should EPA include a test procedure for these other modes of operation?

If DC EVSE are in Partial On or Idle Modes for a significant amount of time, EPA believes they should be accounted for in this test procedure. However, including these additional modes will increase test burden.



Open Discussion



We are headed here



Next Steps

Event	Date
<i>Version 1.1 Discussion Guide Published</i>	<i>May 24, 2018</i>
<i>Version 1.1 Discussion Guide Webinar</i>	<i>June 4, 2018</i>
<i>Comments Due</i>	<i>June 25, 2018</i>
Test Method Working Session #1	August 22, 2018
Test Method Working Session #2	Mid-September 2018
Version 1.1 Draft 1 Test Method Expected	October 2018
Release Subsequent Drafts of Test Method	Fall 2018 and Winter 2019
Release Version 1.1 Draft 1 Specification	Spring 2019
Release Subsequent Drafts of Specification	Summer 2019
Version 1.1 Effective Date	Fall 2019



Next Steps – Working Session #2

- In the second working session, EPA would like to discuss:
 - Any proposal outcomes from the first working session,
 - Appropriate loading conditions for testing during a charging event, and
 - Accounting for features/functions such as cooling systems (e.g., those used for the entire system and cooling specific to the cables) and battery banks.
- Registration: A separate memo will be sent for Working Session #2 that will provide the date and registration link, along with a further description of the topics to be addressed
- All information associated with the development of the Version 1.1 can be found on the specification development webpage:
https://www.energystar.gov/products/spec/electric_vehicle_supply_equipment_version_1_1_pd



Thank you!

To be added to EPA's stakeholder listserve to receive specification updates, please email:

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