ENERGY STAR Connected Pool Pumps
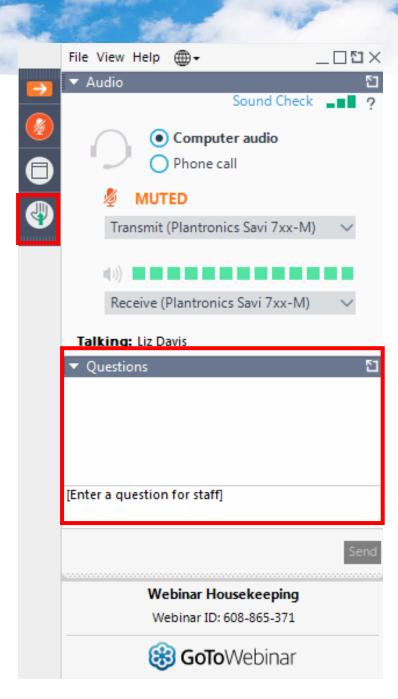
Draft Version 3.1 Stakeholder Webinar

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December 16, 2020

Webinar Participation

- Please mute yourself when you are not speaking (use local mute or dial *6)
- Feel free to ask questions at any time by raising your hand or using the questions box, and please state your name and organization
- Please be advised the audio for this webinar is being recorded

Written comments can be sent to poolpumps@energystar.gov by January 12, 2021

Agenda

1. Welcome, introductions

2. Reminder: DOE regulation and ENERGY STAR Version 3.0

3. Pool pumps Connected Criteria

   • Connected Pool Pump System

   • Connected Criteria Overview

   • Draft Version 3.1 specification updates

4. Test Method Updates
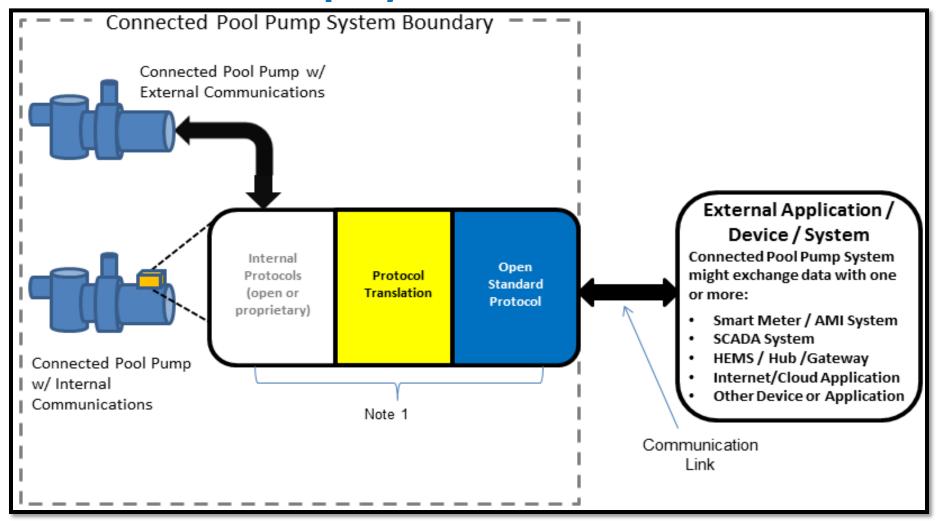
5. Specification and Test Method Timeline

6. Open Q & A

Reminder: DOE regulation and ENERGY STAR Version 3.0

- Updated Federal standard and ENERGY STAR Version 3.0 (to be superseded by 3.1 once completed) both take effect on July 19, 2021.

- ENERGY STAR Version 3.0 is currently available for early certification.

- CBs will be instructed to cease certifying new products to Version 2.0 on March 5, 2021.

- When Version 3.0/3.1 takes effect on July 19, 2021, only products meeting those requirements will appear on the list of certified products.

Pool Pumps Connected Criteria

- **Meeting connected criteria is OPTIONAL**
  - Identify models that meet as "Connected" on the Qualified Products List (for web visitors + API access)

- **Connected criteria = user functionality + grid services (as appropriate for product type)**
  - All pool pump categories: Full DR requirements

- **This revision will not affect ENERGY STAR certification**

Connected Pool Pump System (CPPS)

Connected Criteria Overview

- **Communications**: Open standard(s) and API or interface docs
- **Functionality:**
  - <u>User Amenity</u>: Similar to other specs, services for homeowners and for home energy management integration
  - <u>Demand Response</u>: Specific choices of communication protocols, responses to specific messages and requests
    - Let manufacturer protect user experience; avoid prescriptive requirements
    - Let manufacturers compete on optimal logic/control strategies to provide grid services
- **Testing:** ENERGY STAR Test Method to Validate Demand Response
- **Appendix:** details on how a given open standard implementation would look (e.g., OpenADR 2.0 / CTA 2045).

Connected Criteria Overview – Demand Response Details

- Communication Protocols

- Consumer Override

- Loss of Connectivity

- Information and Messaging Requirements
  - Required
  - Optional

- Requests and Responses
  - Required
  - Optional

Version 3.1 Spec Updates: Definitions

- Definitions pertaining only to connected moved to the connected section

- Some definitions used widely in ENERGY STAR connected added to the specification

E) **On-Premises**: Refers to a function that relies only on the equipment present at the physical installed location of the ENERGY STAR certified device/ equipment.

F) **Demand Response (DR)**: Changes in electric usage by end-use customers from their normal consumption patterns in response to changes in the price of electricity over time, or to incentive payments designed to induce lower electricity use at times of high wholesale market prices or when system reliability is jeopardized.

G) **Demand Response Management System (DRMS)**: The system operated by a consumer authorized program administrator, such as the utility or third party, which dispatches signals with DR instructions and/or price signals to the CPPS and receives messages from the CPPS.

H) **Interface Specification**: A document or collection of documents that contains detailed technical information to facilitate access to relevant data and product capabilities over a communications interface.

I) **Load Management Entity**: Consumer authorized DRMS, home energy management system, or the like.

Version 3.1 Spec Updates: User Amenity Reorganized

Requirements were reorganized but not substantively changed

- **Remote Management**
  - Product responds to remote consumer requests
- **User Alerts**
  - Communicated either:
    - On the product (e.g controller), and/or
    - Via a communication link (e.g., app)
- **Real-time Power Reporting**
  - Measured or estimated instantaneous power
  - May be met via DR required functionality

Version 3.1 Spec Updates: Demand Response Communication Protocols

- EPA proposes requiring either CTA 2045 or OpenADR 2.0 compliance for CPPS or both

- <u>CTA 2045-A/B</u> offers:
  - On premises application layer translation
  - Direct product endpoint, with physical layer
  - Provides connectivity options, e.g. FM antenna → CTA port

- <u>OpenADR 2.0</u> offers:
  - Implementation on existing cloud endpoints
  - No requirement on backhaul, can be proprietary (if needed)
  - Easily reconfigurable

Version 3.1 Spec Updates: Demand Response

- **Consumer Override – minor updates:**
  - Consumer can override product's DR activity → normal operation
  - Override should be easily accessible
  - Implement override messaging as per chosen protocol(s), upstream and 2-way responses as required.
  - Grid Emergency events do not require override capability
- **Loss of Connectivity – new requirement:**
  - No response to 5 consecutive polling events
  - If processing a DR event with a set duration or end-time, complete event and then resume normal operation.
  - If processing a DR event without a set duration, resume normal operation as set by consumer within 30 minutes

Version 3.1 Spec Updates: Demand Response

Updated the naming convention for DR responses for consistency with ENERGY STAR Connected Criteria:

- Type 1 response → General Curtailment
- Type 2 response → Grid Emergency
- Type 3 response → Load Up

Version 3.1 Spec Updates: Demand Response

DR Information, Messaging & Op States (new requirement) - CPPS shall support the following upstream DR messaging:

- Idle Normal, Running Normal
  - Current activity, no Grid DR Command in effect
- Running Curtailed Grid, Running Heightened, Idle Curtailed
  - Current activity, Grid DR Command in effect
- CPPD Error (fault)
  - Fault Conditions
- Variable Following/ Not Following
  - Variable-setting type DR event in effect and CPPD status
- Idle Opted Out, Running Opted Out
  - Current activity, Opt Out in effect

Appendix A

- Appendix changes from informational to normative
- Specifies use of each protocol to support requests and responses listed in the specification
- Work towards same message → similar product response for every model

Table 5: Demand Response Request Mapping

	Demand Response Message	Response Result	OpenADR (2.0b)	ANSI/CTA (2045-B)
Basic Signals	General Curtailment (Shed)	Reduce load per Table 3.	oadrDistributeEvent: SIMPLE level 1.[4]	Shed[5]
	Grid Emergency (Full Shed)	Turn off (if possible)	oadrDistributeEvent: SIMPLE level 3.[4]	Critical Peak Event[5]
	Load Up	Use more energy (if possible)	oadrDistributeEvent: NEAR / FAR flag. CHARGE STATE, LOAD_DISPATCH.[4]	Load Up[5]
Advanced Signals	Utility Peak Load Price Signal	Use/do not use energy when appropriate (follow programming)	oadrDistributeEvent: ELECTRICITY_PRICE[4]	Present Relative Price[5]
Device Properties	Consumer Override	Skip response to event within opt out	oadrCreateOpt: device sends upstream opt message[6]	Customer Override Message, in response to Operational State Query or load reduction request[5]
	Device Information	Indicates all mandatory product information	Ei:eiTargetType (endDeviceAsset)	Info Request[7] [Section 11.1.1]
	State Reporting Requirements	Provide state information to requestor	EiReport. oadrPayloadResourceStatus	Operational State Query[5]
	Hardware Requirements	Design of product & comms.		DC or AC Form Factor[8]
Device Energy	Power (instantaneous)	Demand of product (W)	oadrPayloadResourceStatus: energyReal	GetCommodity Read, code 0
	Energy (cumulative)	Energy used by product (kWh)	oadrPayloadResourceStatus: energyReal	GetCommodity Read, code 0
	Current Energy Storage Capacity	Available energy storage (Wh)	oadrPayloadResourceStatus: oadrCapacity: oadrCurrent	GetCommodity Read, Code 7
	Total Energy Storage Capacity	Energy storage under ideal conditions (Wh)	oadrPayloadResourceStatus: oadrCapacity: oadrNormal	GetCommodity Read, Code 6

Version 3.1 Spec Updates: Demand Response

- Our understanding is that the required protocols will not be a challenge for currently certified products

- V3.1 is more specific about how commands are to be implemented within these protocols – we are seeking input on whether those will require additional work for products currently on the market or scheduled for release in the near future

Discuss here – please reach out if you would prefer a 1:1 discussion

ENERGY STAR Test Method to Validate Demand Response

- No substantive changes
- Terminology will be updated to align with specification edits
- Updated version will be released with the Final Version 3.1 specification

Draft Specification Comment Deadline

- Send written feedback to PoolPumps@energystar.gov

- All comments will be posted to the ENERGY STAR Product Development website unless the submitter requests otherwise

Comment Deadline
Tuesday, January 12, 2021

Next Steps and Anticipated Timeline

- December 9, 2020: Draft Version 3.1 Published

- December 16, 2020: Stakeholder Webinar

- January 12, 2021: Draft Version 3.1 Comment Deadline

- Q1 2021: Pool Pumps Version 3.1 specification finalized

  - Effective July 19, 2021

- Certifications to Version 3.0 prior to V3.1 being finalized will not be affected

- Previous recognition as connected may be affected (feedback requested)

- Once it is finalized, new certifications should use Version 3.1

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