



TIP 272a: EPRI P170 Supplemental: CEA 2045 Standard Modular Communications Interface for Demand Response

Context

The Consumer Electronics Association (CEA) has released a new standard for a modular communication interface for demand response. The ANSI/CEA-2045 Modular Communication Interface Standard defines a port/plug that enables off-the-shelf consumer products to be compatible with multiple utility demand response systems through utility provided customer-installable plug-in communication modules.

Prior EPRI projects, in collaboration with several appliance manufacturers, retail electric utilities, and other constituents, have contributed to the development and evaluation of this standard by conducting laboratory interoperability demonstrations. Those projects found the standard to be sufficiently complete and capable of achieving the intended goals.

Description

This supplemental project has been designed to provide utilities a means of working together in a coordinated fashion to test the concepts behind the standard in field deployments and under actual demand response program requirements.

The project intends to determine if the CEA-2045 standard can deliver on its intended purposes:

- To enable a standard product design to be compatible with any communication technology and to work in DR programs everywhere
- To enable a communication module to work on any end use device

To the extent that issues are found, the project will identify the gaps and offer solutions to correct them. To meet this objective, end-devices and communication modules selected by each project participant, will be produced with a CEA-2045 interface communication port. The end-use device types to be evaluated in this project include domestic water heaters (resistive), electric vehicle supply equipment (EVSE or electric vehicle charging units), HVAC thermostats and pool pump/timers. Heat pump water heaters (HPWH), photovoltaic (PV) panel inverters and packaged terminal air conditioners (PTAC) were added upon the request of project participants.

All project participants are working together to develop requirements that define how the demonstration products should respond to each specific information or request.

The requirements will also include the type of information that should be communicated from the end-device back to a remote application (feedback). The process of developing consensus requirements enables participating utilities to understand one another's needs and provides insight to the challenge of producing one product with universal applicability.

Additionally, the project addresses the following components:

- Industry coordination (including NIST, Energy Star and DOE)
- Assessment of retail strategies, providing incentives to manufacturers, retailers, installers and consumers.

EPRI will provide technical support to those companies developing both end-use devices and communication modules for this project. As part of this support, EPRI is developing software tools, including a desktop application that developers could use to test their prototypes. To ensure that the equipment is designed and built as specified, EPRI will test the equipment throughout the production process and provide feedback to the manufacturers. After the equipment is produced, all equipment will be lab tested prior to deploying in the field. Different combinations of communication modules and end-device types will be tested with one another to assess interoperability.

After the units are deployed in the field, which will include 10 HPWH units in BPA territory, EPRI will monitor communications across the CEA-2045 communication port using an instrumentation packaged developed specifically for this purpose. The data collected throughout the field demonstration will be used to evaluate the CEA-2045 standard. Another aspect of the CEA-2045 interface that will be evaluated its self install capability, or "ease of installation."

Why It Matters

The goal of this supplemental project is 1) to prove the performance of universal CEA 2045 communications port ("comm port"), and 2) persuade manufacturers that the installation of a simple comm port is very low cost, and makes their equipment easy to incorporate into any utility DR program nationwide so that it could eventually become standard practice on all water heaters. If that can be achieved, then the question of whether or not a customer participates in a utility DR program or

not becomes a simpler customer choice. Their equipment will already have the port, and all they have to do is plug in the communication device (“comm device”) from any provider. Since this does not require a contractor on site, this is a huge reduction in cost to utility implementation of a DR program, particularly large scale programs. It also means less intrusion into residential homes, and no need to be home to allow a contractor to perform work.

With the success and wide adoption of the CEA-2045 standard, BPA benefits by ultimately having all water heaters DR capable with an off-the-shelf technology compatible with a broad range of demand response systems. This would enable equipped appliances (first water heaters, and later other equipment) to more likely be able to participate in a large scale DR program offers when needed. The alternative, as implemented today, requires more cumbersome recruiting, and custom control equipment and communication protocols (different for each controls manufacturer) installed on site by contractors.

Active participation in this project is important for multiple reasons:

- The standard allows for a wide range of communications parameters and applications. This broad and non-focused functionality is the by-product of getting consensus from a wide range of collaborators. It makes it less practical to manufacture as the manufacturer will not include functionality unless driven by market demand. The scope of this project is to define minimum parameters to support utility enabled DR program functionality. Through collaboration, manufacturers will see a larger opportunity and one whose requirements are more representative of the utility industry as a whole.
- First hand assessment and understanding of whether and to what extent the standard meets BPA’s needs
- Ability to influence how the standard is implemented into manufactured appliances, ensuring that our use cases are well-supported going forward
- Gain insight into the differences between various utility plans and needs

TIP 272a: EPRI P170 Supplemental: CEA 2045 Standard Modular Communications Interface for Demand Response

Project Start Date: September 9, 2013

Project End Date: December 31, 2015

Funding

BPA FY2016 Membership: \$0

Reports & References

Links

Participating Organizations

Electric Power Research Institute
Portland General Electric,
Tennessee Valley Authority
AEP
Southern Company
Duke Energy
Electricite de France
Hawaiian Electric
Hydro One
National Grid
Southern Cal Edison
SMUD
Ameren

For More Information Contact:

BPA Project Manager:

Tony Koch, jakoch@bpa.gov

