

Scope

- 1) Which products or product capabilities should be included in the basic package?

Response: The basic SHEMS package should be only the system designated to optimize the other devices. Certify only the system that that allows for a) the best interoperability, b) connection to external energy markets (to enable TVR adjustments, etc), and c) energy efficiency of the entire home. Demand Management in lieu of energy savings could be considered at certain times. Demand management (kW management and response), during periods of grid stress provides greater benefit to the grid and customers than kWh reductions.

- 2) What devices and/or capabilities should be included to address miscellaneous energy loads (MELs)?

Response: Miscellaneous energy loads can be addressed if the SHEMS system can a) recognize the devices attached (or be able to learn about the device), b) control or influence the control of devices, and c) communicate with the cloud about those devices.

- 3) Which products or capabilities should be expressly included in scope or encouraged beyond the basic package?

Response: The ability to connect to a wide number of devices is paramount to the success of any SHEMS. It would be a poor customer experience if customers were locked into a particular ecosystem because their SHEMS only supported a single manufacturer's devices.

- 4) Are there any specific products or product capabilities that should be expressly excluded from scope?

No Response.

Questions about Qualification Criteria

- 1) Are there hallmarks of optimization strategies for short term, long term, and partially occupied spaces that have been used or piloted that could provide a general framework for this specification?

Response: The commercial space offers an example. Most of the operation is controlled through laboriously programmed sequence of operations, designed to account for different scenarios or adjust according to certain triggers. Directly translating this to a residential home would not be feasible. However, programs like Optimal Start/Stop which "learns" over time how best to turn on the building HVAC after a vacancy is a good starting point for the sophistication that exists, albeit a very rudimentary one for the current capability of learning algorithms.

In addition, the optimization strategy should not only focus on occupied vs. unoccupied spaces. The SHEMS needs to dynamically be able to balance the desires of the occupant(s) with the demands the facility is placing on the grid with the cost of energy/power with the current GHG output of the energy mix coming into the facility with other factors to achieve a desired outcome for the occupant(s) as energy efficiently as possible. Occupancy vs. vacancy is only a part of the whole.

- 2) What strategies are effective to address MELs?

No Response.

- 3) What is the range of power use of smart switches when they are supplying power independent of what is plugged in?

No Response.

- 4) What is the range of power use of smart plugs when they are not supplying power?

No Response.

5) Are other measures needed to address this concern?

Response: It is necessary for the management system to have an understanding of what is plugged into the outlets so that it can effectively manage or influence each device.

6) What other data and statistical measures would be helpful to analyze savings potentials realized by the population?

Response: An adjusted baseline of facility consumption would be best. Outside that, a record of each device, intended setting, realized setting, and outcome could provide a proxy for estimating savings. For example, knowing that some MELs were shut off and then the cooling load was reduced as evidenced by information from the thermostat could lead to the conclusion that those MELs were causing a heat load that the HVAC no longer had to cool, thus showing energy savings.

Questions about Evaluation Methodology

1) Is it practical to report data from the entire population? Alternately, EPA could define a procedure to produce a random sample and require analysis of that.

Response: It is practical and reasonable to report data from an entire population, especially if anonymized.

2) Is there a way to characterize energy savings from optimized unoccupied hours in terms of how deep the energy savings are (e.g., short term away optimization versus long term vacation modes, periods with pets at home, etc.)?

Response: Yes.

3) There are a wide range of ways to determine occupancy, some which require user interaction (e.g., geo-fencing, arming an alarm panel) and some which do not. Do data show a difference in frequency of use, depth of energy savings, or total time optimized based on the type of occupancy detection?

No Response.

4) How would EPA determine, based on a description of product capability, whether a particular system can respond to occupancy?

Response: EPA should develop a computer benchmarking system (app, website, or some other system), similar to test code developed to test software or benchmarking code used to test computer graphic cards, to evaluate the SHERMSs. Using a wide range of APIs from devices (to ensure interoperability), standardized protocols that connect to grid-facing technologies (like OpenADR and OpenFMB), and randomizing scenarios, the system could test the algorithms for adherence to various requirements and benchmarks.

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