

NREL Response to ENERGY STAR Smart Home Energy Management Systems Discussion Guide

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Overall:

- We see the potential value in encouraging more occupancy-based controls
- Most of our concerns are around integration and interoperability. Our impression is that there are no systems available today that meet all the requirements in such a way that a consumer could buy a package of devices, install them and have them be automatically be controlled based on occupancy. That probably means there will be quite a bit of manual configuration needed and it's unclear who will be responsible for the configuration process.
- Will there be a way to distinguish between better packages? Especially at this early stage, it seems likely that there will be some options that are significantly better than others. Is this simply a minimum criteria (pass/fail)-based recognition?
- Product-specific occupancy control seems like a better option (TV sensing occupancy is better than an outlet with same control) but more expensive since it would require new equipment, not just new controls. Would a single occupancy-sensing device 'count' for the MELs control requirement? Again, some options might be much more effective than others.
- Is there any preference for room occupancy vs. whole house occupancy? Using occupancy at the whole house level makes sense for bigger equipment, like HVAC and water heating, while room-level occupancy may be more relevant for lights and plug loads.
- Do packages need to be true packages (same brand, intended to work together) or can they just be a group of equipment that meets the requirements? There are a handful of manufacturers that make lighting controls and plug load controllers, but none of those manufacturers make smart thermostats or water heater controls. Different manufacturers could collaborate to create packages but it seems more likely that a service provider would just choose a set of products from different manufacturers.

Specific comments on the document:

Scope: Basic package definition:

- What about including controls for window air conditioners or mini-split heat pumps? We understand that including the smart thermostats ensures energy savings overall, but there are lots of homes that do not have central HVAC system. Also, many homes have combination of central system and window AC or mini-split.
- There is a minimum number of light bulbs or fixtures but no minimum number of MELs controllers. How would an advanced power strip count – one controller or would you count each controlled outlet?
- Can occupancy-based control be local to the device (an occupancy sensor on a light switch, for example) or should occupancy information be shared among devices?
- How are the algorithms going to be configured? Will the service provider configure the devices in each home or will that be left to the consumers?

- Is a connected hot water required? What does “such a device” mean - a controllable water heater or an electric water heater?

Scope: Feedback Request:

3 – It may be worth explicitly saying that controllable light switches are an option for the lighting control requirement. They can be a much cheaper alternative to smart bulbs when there are lots of bulbs in a single fixture or connected to a single switch. Controlling the light switch also works with all types of bulbs, while there are only limited shapes and styles of bulbs available as smart bulbs.

4 – The biggest limitation may be that there are a few commercially mature devices that have automated controls that can respond to occupancy information. This makes it seem likely that controllers will be configured on a case-by-case basis using apps with poor user interfaces or will require a lot of work on the part of the consumer to set them up.

4 – Would you consider devices that can be configured with a schedule as an occupancy-based controller? On the one hand this is not automated occupancy-based control; on the other hand, setting up a schedule that matches their typical occupancy patterns would go a long way towards controlling based on occupancy, even if the schedule sometimes differs from actual occupancy. This seems like it could be a problem since the ability to set up a schedule is a far cry from actually implementing a schedule. It also leaves the question of what to control and how to control it to the homeowner (or whoever is configuring the devices), which seems to go against the point of automating control so that people don’t have to know what control strategies are most effective.

Qualification Criteria: Approach:

- Despite being defined in the appendix, the “service provider” label is hard to understand. Maybe the definition is intentionally vague, but the service providers are such a key piece to this effort. It doesn’t seem like that many different entities could actually do what’s being asked of the service providers in this document.
- How would a system distinguish short-term from long-term occupancy?

Qualification Criteria: Metrics list:

- Include number of controlled sockets? Or some breakdown of single outlet controllers vs. advanced power strips?
- Will power consumption be measured here? How will you understand energy savings without measuring power or energy?

Qualification Criteria: Feedback:

- #6 – How will you estimate energy savings? Power data from the devices will help, but how to know what happened before the smart plug or smart bulb was installed?

Potential Evaluation Methodology: Feedback:

- What will the verification process look like? Will there be any sort of check to make ensure that devices can detect occupancy, how well they detect occupancy, how well the controls are configured to save energy when no one is home?

Appendix:

- Package: There are examples of different packages that might be offered by different service providers, but none of them meet the requirements of the SHEMS package. Maybe change the examples so that each example meets the SHEMS requirements?