



ENERGY STAR®

Approaching Smart Grid

**Amanda Stevens, U.S. EPA
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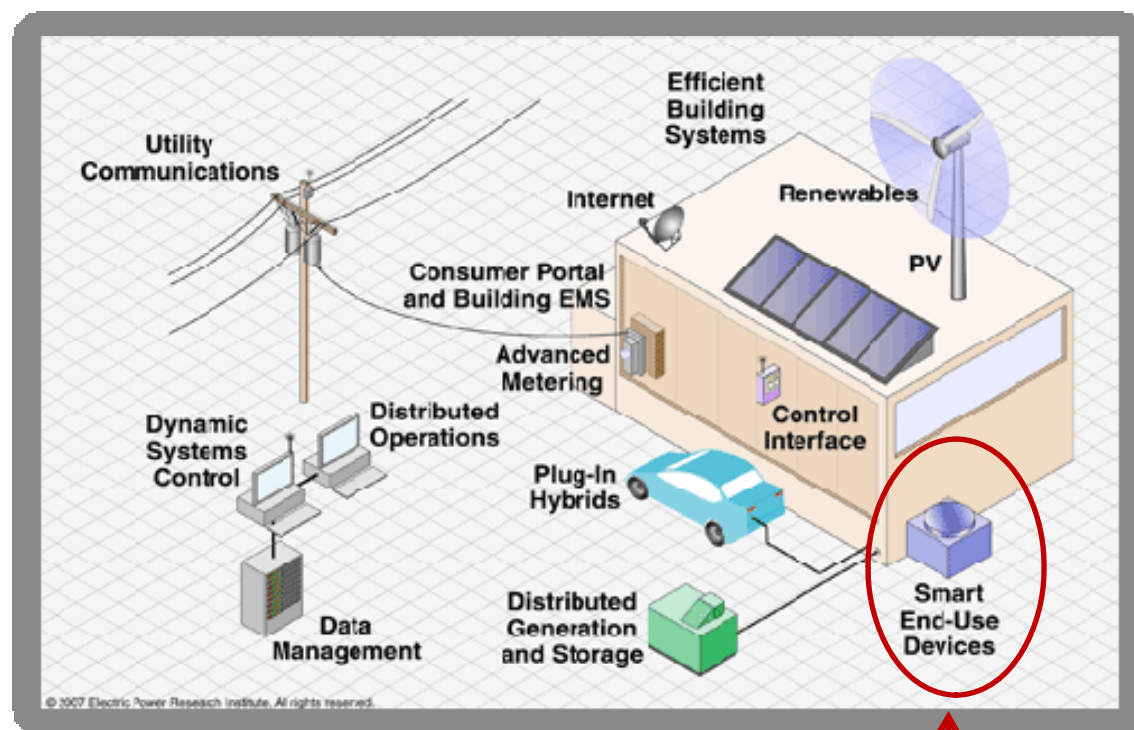
Overview



- What is the “Smart Grid”? – How does it relate to ENERGY STAR?
- ENERGY STAR’s Approach
- Current and Near-Term Work & How to become Involved

What is the “Smart Grid”?

- Many definitions/meanings. Generally, it involves use of information and communications technology (ICT) in the electricity grid system.



Per 2007 EISA, a smart grid is characterized by:

- Increased use of digital information & controls to improve reliability, security, efficiency of the grid
- Increased use of distributed generation & renewable energy, demand response, energy efficiency
- Use of smart technologies & appliances (like meters, distribution automation), storage
- Information to consumers
- Development of interoperability standards for device to grid communication

What can smart-grid enabled products deliver to electric grid?



- Reduced costs
 - Avoid high-cost peak power
 - Reduce investments in power plants (potential)
- Reliable electricity service
 - Change load to avoid potential outages
 - Support high penetration of intermittent renewable generation (currently being explored)
- Customer engagement
 - Provide technology option for smart grid programs
 - Support customer participation in time-based rates

↑
utility

What can smart-grid enabled products deliver to consumers?



- Demand Response (future application)
 - Ability to automatically adjust energy use in response to grid conditions (e.g., price or event based signal)
 - May or may not also deliver energy efficiency (depends on product)
- Intelligent scheduling of energy use
 - Automatic shift to off peak; no connectivity required
- Energy-savings and consumer convenience features
 - Information/insights into household energy-use down to appliance level; personalized tips, etc.
 - Fault notifications, service reminders
 - Remote management (e.g., power down to “away” mode)

product ↑



Market Opportunities & Trends

- The connected home is well on the way into the American culture
- New markets, opportunities and business models emerging for energy management
 - New energy management products/services are being brought to market through utilities, as well as major retailers, cable companies, home security and automation providers, and start-ups
- “Connected” appliances can enable both additional energy-savings opportunities and demand response, as well provide new, non-energy functionality.

ENERGY STAR's Role



- EPA, through the ENERGY STAR program, has long encouraged development of “intelligence” in products, while enabling emissions reductions that persist over the long-term.
 - Deep sleep in set-top boxes
 - Power management for monitors
- EPA sees opportunity to apply the ENERGY STAR program’s longstanding commitment to the consumer as various aspects of “smart grid” are extended to end-use products
 - Consumer value is longstanding brand promise
 - Complements more recent emphasis within smart grid community on *consumer-focused* smart grid

Promote “Connected” for Immediate & Long Term Value



- End-use products use bi-directional communications can interface with the Home Area Network (HAN), enabling new energy-saving opportunities, for example:
 - Enhanced energy awareness; disaggregate household energy use down to product level – personalized and actionable information!
 - Diagnostics and alerts to minimize periods of reduced efficiency (important convenience factor here too)
- Enable consumers to take advantage of future programs and rate designs that help them to tailor their energy use to when its cheaper or cleaner
- Consumers **must** retain ultimate control over product

ENERGY STAR Spec Efforts



- EPA is currently considering “Connected” enhanced functionality in a number of product specifications under development or revision:
 - Climate Controls (new spec)
Room Air Conditioners
 - Refrigerators-Freezers
- DOE is developing and validating test procedures for DR functionality

Building upon Recommendations in “Smart Appliance” Petition



- Coalition of appliance manufacturers and efficiency advocates submitted “Smart Appliance” petition to ENERGY STAR in early 2011
- Requests EPA and DOE consider “smart” functionality for:
 - Refrigerators/Freezers
 - Clothes Washers
 - Clothes Dryers
 - Room Air Conditioners
 - Dishwashers
- Groups have requested “smart” appliances be eligible for an allowance against minimum performance levels

“Connected” in play right now...



| Product | Anticipated Timeline | | EPA Contact |
|--|--|---------------------------------------|----------------|
| | Next Milestone | Spec Completion/ Effective Date | |
| Climate Controls | Draft 3 in Dec 2011 | Spring 2012/ Effective Immediately | Abigail Daken |
| Room Air Conditioners | Draft 3 in Nov/Dec 2011 | Jan. 2011/ Effective Oct 2012 | Amanda Stevens |
| Refrigerators-Freezers | Draft 1 in Nov 2011 <i>Webinar next week</i> | March 2012/ Effective Jan 2013 | Amanda Stevens |
| Dishwashers, Clothes Washers | <i>“Smart grid” will be considered during next spec revisions (2012/2013)</i> | | Amanda Stevens |
| Others - TBD (e.g., pool pumps, dryers) | <i>EPA plans to initiate spec development efforts for pool pumps and dryers, in 2012</i> | | TBD |



Highlights: Climate Controls

- Opportunity of HVAC scheduling well understood
- Excellent target for peak shaving
- Striving to deliver actual savings for consumers
 - Performance based test for ease of use, with a group of actual people performing common tasks
 - Connectivity supports innovation in energy savings, AND for demand response

Highlights: Refrigerators-Freezers



- Draft 1 shared with stakeholders in early November
- For “Connected” products EPA has proposed:
 1. A set of near term value attributes for consumers, based on discussions with manufacturers and other stakeholders:
 - Feedback on product’s energy consumption
 - Alerts
 - Remote management
 - Interoperability
 2. Automatically shift defrost outside peak period
 3. DR functionality based upon recommendations made in Smart Appliance petition
 - Future-oriented since programs/pricing/infrastructure not yet in place



New Directions & Challenges

- Smart Grid development is maturing from grid perspective, potential to expand consumer benefits
 - The ENERGY STAR program is well poised to help drive development toward delivering both near-term consumer value and societal/grid/environmental benefits.
- Standards efforts, such as those being coordinated by NIST Smart Grid Interoperability Panel are driving standardization of HAN communications to enable demand response, but don't cover appliance-specific opportunities (e.g., for enhanced convenience and energy saving).
 - In near term, ENERGY STAR specs can provide some structure
 - In long term, standard information and commands could be established through additional industry standards activity

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