



# **ENERGY STAR<sup>®</sup>** ***Approaching Smart Grid***

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**ENERGY STAR Partner Meeting**  
**Charlotte, NC**  
**November 9, 2011**



Learn more at [energystar.gov](http://energystar.gov)<sub>1</sub>

# Overview

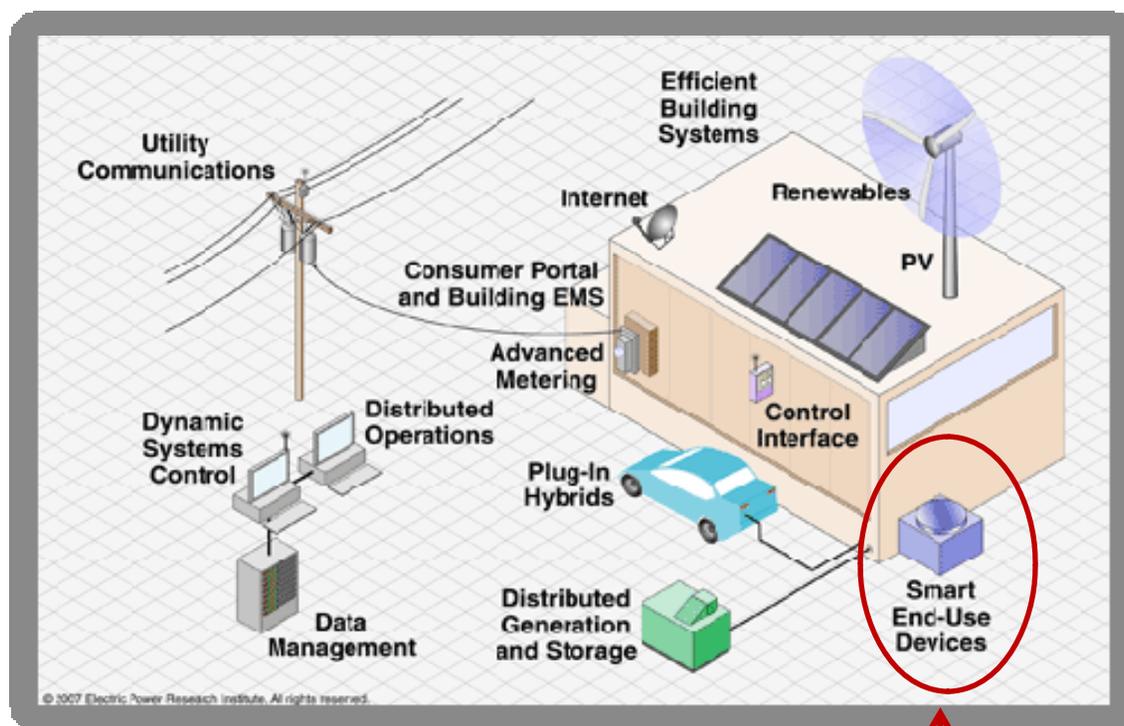
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- What is the “Smart Grid”? – How does it relate to ENERGY STAR?
- ENERGY STAR’s Approach
- Current and Near-Term Work & How to become Involved

# 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

Source: EPRI

# 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

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# 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

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- 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

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- 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

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- 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

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- 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

# Contacts

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