



# **ENERGY STAR® in a Connected World**

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**National Summit on Smart Grid and Climate Change  
Washington, DC                      October 14, 2015**

For more than 20 years, EPA's ENERGY STAR program has identified the most energy efficient **products, buildings, plants, and new homes** – all based on the latest government-backed standards and now a rigorous third-party certification process.



ENERGY STAR. The simple choice for energy efficiency.



Every single day,  
consumers choose  
**ENERGY STAR**  
products more than

**800,000** times



## The Internet of Things (IoT)

- IoT is the network of "things" embedded with electronics, software, sensors, and connectivity to enable objects to exchange data with other connected devices.
- Today, the IoT has **15 billion** connected devices.
- By 2020, it is forecasted the IoT will have **50 billion** connected devices.



## The Internet of Everything (IoE)

- The industry is quickly revolutionizing into the Internet of Everything (IoE).
- IoE is a platform that includes the networked connection of “things”, but also includes the links between people, process, and data, ie. home energy management system.

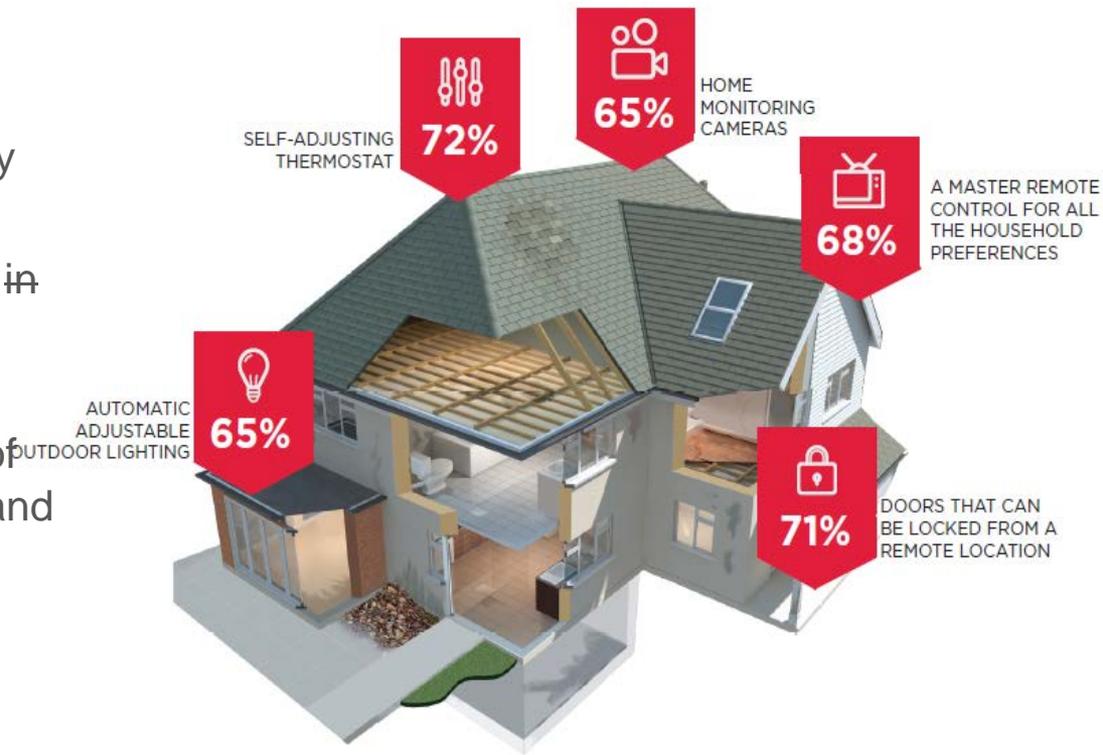


## Energy Efficiency is Emerging as a Key Driver in Connected Homes

- Some of the most desired smart devices are: thermostats, door locks, lighting, monitoring cameras, and a master remote for all household control.

- Motivations:

- 70% are excited about cost savings from energy efficiency
- Nearly 50% list helping the environment as a key feature in of a smart home
- Nearly 50% are motivated by the potential in convenience of programming home settings and maintenance





## Connected in ENERGY STAR Specifications

- **Many products have optional criteria. For these, connected functionality is a feature, like through-the-door ice or a wool wash cycle.**
  - **Appliances** – Refrigerators/Freezers, Clothes Washers, Clothes Dryers, Room Air Conditioners and Dishwashers; criteria include demand response.
  - **Pool Pumps** – Criteria include demand response.
  - **Lighting** – Criteria do not include demand response.
- **One upcoming product has required connected functionality:**
  - **Connected Thermostats (in development)** – Connected functionality provides a unique opportunity to measure savings as actually achieved in the field. Grid responsiveness requirements included to take advantage of the opportunity available from heating and cooling equipment.



## ENERGY STAR and Thermostats

- By 2009, it was clear that in most cases, presence of a control that *could* enable savings (i.e. programmable thermostat) was not sufficient to *achieve* savings.
- 2012 and on: thermostat market was becoming something new, and the vanguard of this trend was WiFi thermostats
- Connected thermostats have many additional avenues for savings
  - More sophisticated algorithms, updated over time
  - Learning, automated control, presence detection
  - Remote control
  - Expanded capacity for user interactions
- Few commonalities in how savings are achieved or in business models (e.g. service vs. hardware, retail vs. installer or utility program)
- Commonalities are claims to savings and connectivity
- Connectivity also provides information about actual use, rather than just how devices could be used

## ENERGY STAR CTs – A new approach

- EPA specifications have always relied on laboratory measurements of energy use
- In the emerging Internet of Things, EPA recognized that CT savings could be modeled using only:
  - publically available weather data, and
  - data reported by the CT itself
- In effect, CT products are able to self-report energy savings





## Metric for periodic reporting

- Provides assurance of sufficient consumer savings
- Is fair to all connected thermostat providers
- Uses only connected thermostat data plus outdoor weather history
- Preserves consumer privacy
- Protects proprietary information
- Practical to calculate



## Program Outline

- Recognition for CTs that save energy in the field
- To earn the ENERGY STAR:
  - “CT device” must meet criteria that enables savings
  - Partner must periodically report aggregate consumer savings for each CT product
  - “CT product” includes the CT device and a service component
- Service Provider is the ENERGY STAR partner



## How to measure savings in the field?

- Compare actual run time to modeled run time with an artificial baseline of constant comfort temperature
- Use a large representative sample of the service provider's customers, reflecting the diversity of climate and demographics in their customer base
- Protect consumer privacy by reporting only aggregated metric data to EPA
- Report aggregated data periodically to ensure that as software updates occur, savings remain
- Estimate savings nationally (or in a region) by comparing achieved metric score to metric score for a typical thermostat schedule

## Advantages of ENERGY STAR Connected Criteria



- ENERGY STAR criteria provide consistent definitions and approaches, a consistent set of starter functionality, and an emphasis on open standards.
- ENERGY STAR is a trusted resource that can help consumers find these connected products.
- ENERGY STAR products with connected functionality provide consumer benefits including insight into energy use, convenience in diagnosing service needs, and control via remote management.



## Contact Information

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## Connected in ENERGY STAR Specifications

Specification	Connected Criteria	Demand Response Test Method
Refrigerator/Freezer	Optional - Final	Final
Clothes Dryers	Optional - Final	In Development
Clothes Washers	Optional - Final	In Development
Room AC	Optional - Final	In Development
Dishwashers	Optional - Final	In Development
Pool Pumps	Optional - Final	Final
Lighting (Lamps and Luminaires)	Optional - In Development	N/A
Connected Thermostats	Required - In Development	In Development
Electric Vehicle Supply Equipment	Required - In Development	TBD