Connected Appliances: Charting Progress and Identifying Consumer Value

Melissa Fiffer, U.S. EPA

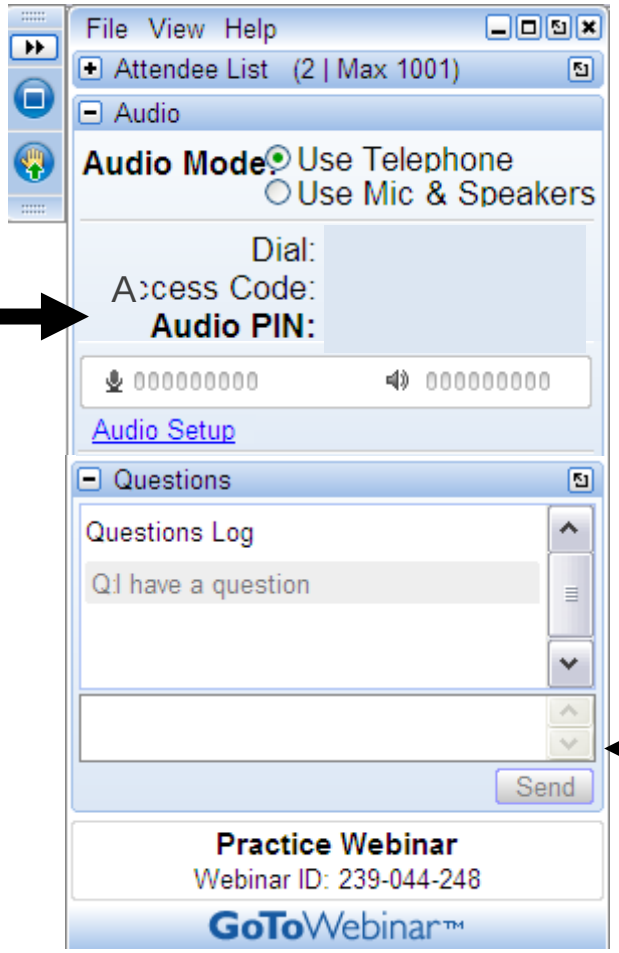
Roadmapping Webinar

February 4, 2016

Using GoToWebinar

Use this button to expand or minimize your toolbar at any time.

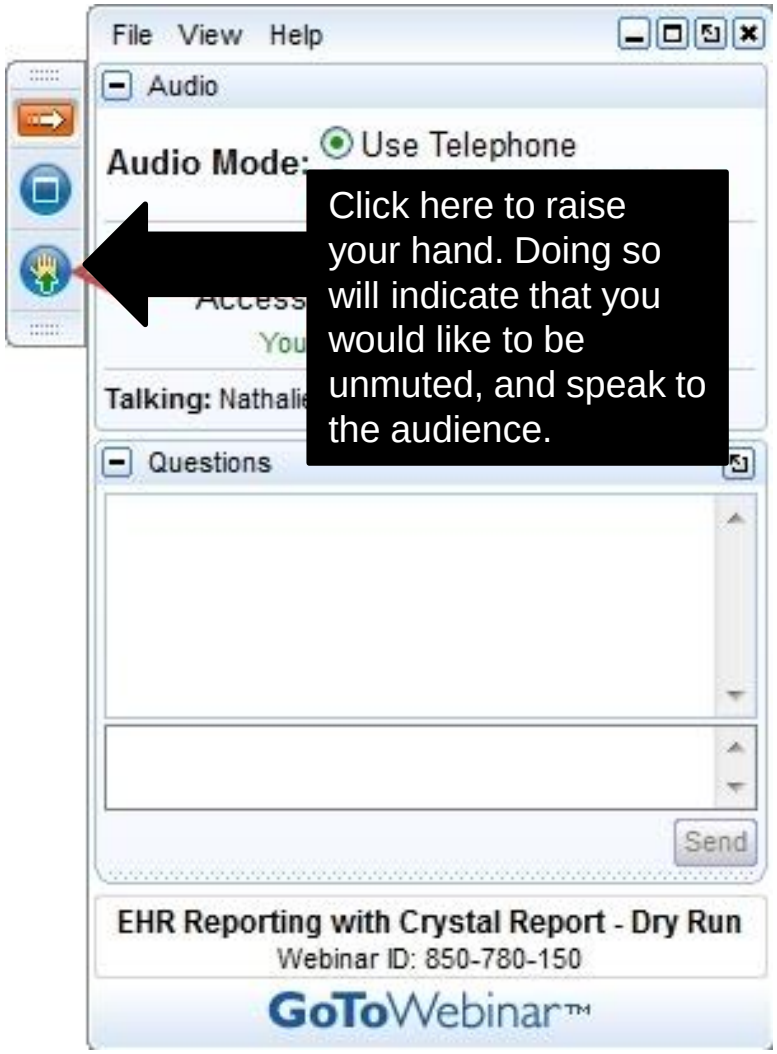
If you are using your telephone:
- Select the "Use Telephone" button.
- Dial in and enter your Access Code.
- Enter your audio PIN and press #.



If you are using the speakers on your computer:
- Select the "Use Mic & Speakers" radio button.
- Unmute your desktop.
- Click on Audio Setup if you're having any difficulty.

Everyone will be muted, but you can type in questions at any time and we'll answer them at the end of the presentation.

Using GoToWebinar cont.



Appliance Roadmapping Goals

- Build on more than 20 years of partnership to foster the future success of the ENERGY STAR program for appliances
- Look ahead creatively to the next five years, with the goal of maintaining an ENERGY STAR appliance program that delivers on consumer expectations for performance and efficiency
- Establish pathways to further engagement between EPA ENERGY STAR, appliance manufacturers, retailers and energy efficiency program sponsors on an ongoing basis
- Charting progress and identifying consumer value of connected functionality

Appliance Roadmapping: Where are we now?

Late 2015

- Kick-off session at ENERGY STAR Products Partner Meeting
- Launch of roadmapping web site
- Release of draft outline of upcoming appliance spec revisions

Winter/Spring 2016

- Webinars scheduled for Jan-March on topics inc. Connected
- We are open to exploring other topics of mutual interest to EPA, utilities, manufacturers, and retailers.
- We are open to forming working groups to continue to conversation on any of the webinar topics where there is more in-depth interest.

Summer 2016

- We expect to culminate the appliance roadmapping effort with an in-person meeting in summer 2016.

Fall 2016

- We will report highlights and shared accomplishments at the Oct 2016 ENERGY STAR Products Partner Meeting.

Agenda for Today's Webinar

- Overview of ENERGY STAR optional connected criteria
  - Product categories
  - Demand response test methods
- Status of the market for connected appliances
- Discussion of connected features today
  - Market barriers for each product category
- Next steps for connected appliance roadmapping

ENERGY STAR Connected Criteria

- Our goal: Use ENERGY STAR connected criteria to leverage the national platform that utilities can rely on and consumers look for.
  - 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 and identify the benefits they offer.

Connected Status in ENERGY STAR Specifications

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

Demand Response (DR) Test Methods

- Developed by DOE, on behalf of ENERGY STAR, to help provide a consistent test method with a focus on open standards.
  - Enables a consumer to participate in utility DR programs.
- Residential refrigerators and freezers DR test method is final and can be accessed here.
- Pool Pump DR test method is final and can be accessed here.
- DOE is currently developing a test method for Room AC DR.
- In order to facilitate finalizing DR test methods, units are needed for field testing.
  - Product must be able to receive a simulated utility signal.
- Which product category should be next?

ENERGY STAR Certified Appliances with Connected Functionality

- Have technical questions as you're designing connected appliances?
  - Check out the newly posted ENERGY STAR Connected Criteria Q&A
  - EPA has compiled questions from stakeholders in an effort to make its interpretations broadly available
  - Comments/questions are welcome!
  - We will refresh the Q&A document as questions arise
- Current Status of ENERGY STAR appliances with Connected Functionality
  - 16 refrigerators / freezers
  - 2 clothes washers
  - 1 clothes dryer
- Ability to filter by connected appliances on the ENERGY STAR qualified products list.

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.

Source: Internet of Things in Logistics, Cisco, 2015.

Is this the connected home of the future?

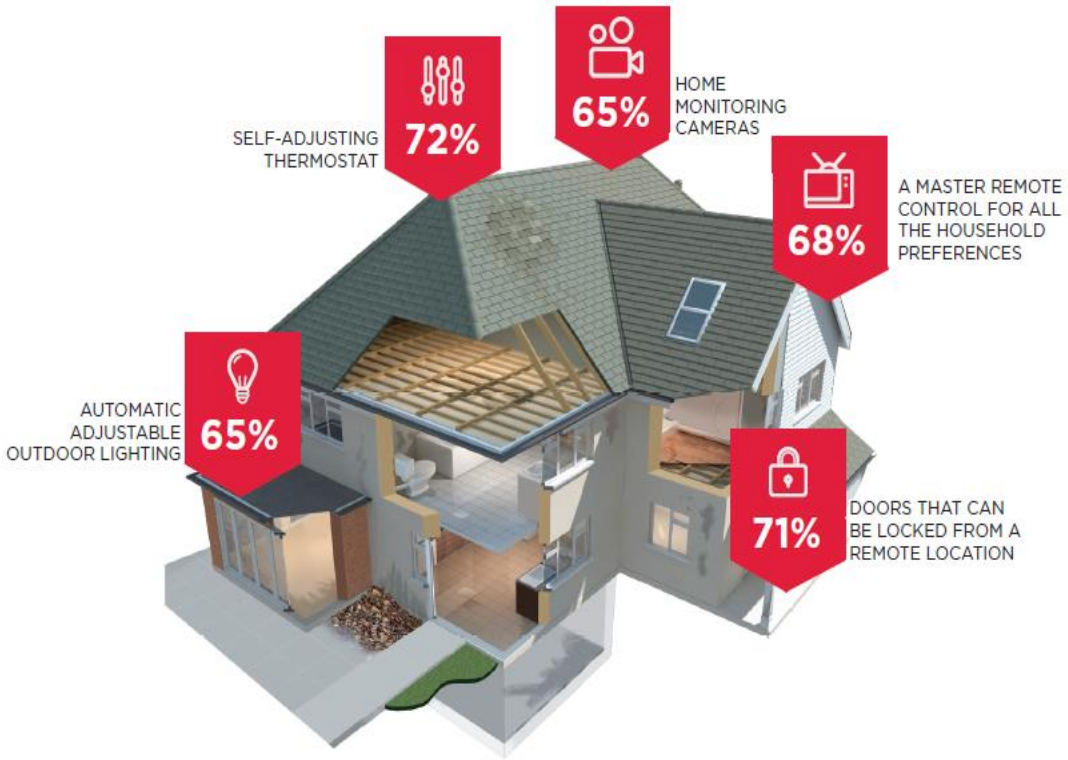
Automation: Devices That Can Read Your Mind and Operate Themselves

- Nearly 60% of consumers say they want their devices to use data, analytics, and sensors to work on their own.
- **Indoor lighting** was 1st, followed by coffee as 2nd, as the most popular devices listed by consumers to read their minds.
- The **washer/dryer** was the 3rd most popular device listed as one they wish could read their mind and operate itself.
- In the Northeast, 46% say that their quality of life would improve if their **fridge** encouraged them to eat healthy.
- 25% of consumers say they would likely purchase a **connected appliance** in the next 12 months. That increases to 50% for ages 25-34.

Source: State of the Smart Home Report, Icontrol Networks, 2015..

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: One of the key drivers is security with 90% consumer agreement, yet others are emerging:
  - 70% are excited about cost savings from **energy efficiency**
  - Nearly 50% list helping the **environment** as a key feature of a smart home
  - Nearly 50% are motivated by the potential in convenience of programming home settings and maintenance



Source: State of the Smart Home Report, Icontrol Networks, 2015.

Market Potential: Connected Home Energy Management System

- Connected Home Energy Management System (HEMS) in 2013[1]:
  - Was valued at $1.5 billion.
  - Utility market for HEMS solutions was valued at $106 million and is estimated to grow to $992 million by 2017.
  - Non-utility market was valued at $1.1 billion, includes product sales and service subscriptions.
  - Top two leading home automation companies combined had over 2 million customers paying monthly subscription fees of between $20 and $60.
- The connected kitchen, with its ability to make us healthier, safer and less wasteful, will present a $10.1 billion market opportunity by 2020. [2]
- More than 65 million Americans already have access to some form of utility demand response program.[3]

Sources: 1. Home Energy Management Systems: Vendors, Technologies, and Opportunities 2013-2017, GTM Research, 2013.
2. Quote from Michael Wolf – Smart Appliances' Heyday On Its Way, Just Not Quite, Twice, September 2015.
3. The Economics of Demand Flexibility, Rocky Mountain Institute, August 2015.

Discussion – Connected Features Today and Future

1. What are the connected features with potential energy savings?

2. What are the connected features that consumers are gravitating to and using?

3. What are the barriers to overcome – consumer understanding, program design, partnerships?

4. What can the EPA ENERGY STAR team work on to support on the connected front?

Discussion – Connected Features Today

- **Diagnosis and Service Repair**
- Alerts for repair
- Notification of software updates

Discussion – Cycle-based Connected Features Today

Laundry and Dishwasher

- *Delay start*
- Choose cycles
- Adjust drying times
- Monitor status, e.g. alerts for cycle completion

- Features appearing in *italics* have demand response applicability, and are included in the demand response section of ENERGY STAR connected criteria.
- Cycle-based appliances are well-suited to load reduction and load shifting, with little to no impact on consumer comfort.

Discussion – Connected Features Today

Refrigerator / Freezer

- Look in the fridge without opening the door
- Remote temperature adjustment
- *Delay defrost*
- *Delay ice maker cycles*
- *Reduce average power draw*

Discussion – Connected Features Today

Oven / Range

- Turn-on, pre-heat
- Cook meat to specific temperature
- Monitor status

Cooking products are not currently eligible for ENERGY STAR certification.

Discussion – Connected Features Today

Room Air Conditioner

- Remotely turn on/off
- *Adjust set temperature*

* ENERGY STAR Delay Appliance Load and Temporary Appliance Load Reduction criteria protect consumers from extreme temperatures by inc. an 85 degree F maximum adjusted set temperature limit, and inc. consumer override provisions.

Discussion – Connected Features
Closing Comments

Next Steps in the Connected Roadmapping Process

- Further engagement between EPA ENERGY STAR, appliance manufactures, retailers and energy efficiency program sponsors:
  - Working group on connected criteria?
  - Additional webinars?
  - In person meetings?
- How can ENERGY STAR help promote connected in appliances?

Other Upcoming Roadmapping Webinars

- *Clothes Washers: Defining Key Aspects of ENERGY STAR Customer Satisfaction*
  February 24, 2016 from 1:00-3:00pm Eastern

- *Collaborating on Consumer Messaging: Educating on Efficient Product Use and Replacement/Recycling*
  March 9, 2016 from 1:00-3:00pm Eastern

- *Dishwashers: Defining Key Aspects of ENERGY STAR Customer Satisfaction*
  March 23, 2016 from 1:00-3:00pm Eastern

Contacts

Connected Appliances:

Product Development

- Melissa Fiffer, US EPA
  fiffer.melissa@epa.gov
- Doug Frazee, ICF International
  douglas.frazee@icfi.com
- Justin Capots, ICF International
  justin.capots@icfi.com

Sales & Marketing

- Rosemarie Stephens-Booker, US EPA
  stephens-booker.rosemarie@epa.gov
- Laura Wilson, Navitas Partners
  lwilson@navitas-partners.com

Test Procedure Development:

- Ashley Armstrong, US DOE
  ashley.armstrong@ee.doe.gov
- Bryan Berringer, US DOE
  bryan.berringer@ee.doe.gov

Thank you for participating!

Check for updates on the Appliance Roadmapping web site