ENERGY STAR® Energy Efficiency Ideas for the Illinois EE Stakeholder Advisory Group

May 12, 2020

New Measure/Program: Next Generation Refrigerators

The Opportunity

- To introduce refrigerators to the Illinois (and U.S.!) market that are at least 30% more efficient than the federal standard more quickly that would otherwise occur
- New European Union (EU) Standard will become effective March 2021 and will require significantly improved efficiency across product energy consumption bins
  - In response, some refrigerator manufacturers have designed significant improvements into new offerings for the EU market
- Multiple manufacturers are willing to introduce products to the U.S. market with sufficient support among utility program sponsors

- Target Fuel: Electric
- Target sector: Residential
- New technology: Low free-ridership concerns
- Potential market segments
  - Mass market (e.g., retail)
  - Multifamily
  - Income-qualified direct install

The Technology

- These next generation refrigerators are:
  - At least 30% more efficient than the current U.S. Department of Energy (DOE) standard
  - Standard sized residential units (e.g., units with volumes between 10 and 25 cubic feet)
  - Affordable and have basic functionality of refrigerators that are already part of appliance programs
  - Products that use an isobutane refrigerant (an acceptable EPA Significant New Alternatives Policy (SNAP) Program refrigerant substitute)
- Proven technology:
  - Next generation refrigerators contain a variable speed compressor system
  - The system and additional sensors throughout the refrigerator create an on-the-fly system that adapts and reacts
  - Already implemented in the EU

Next Generation Technology Refrigerator Models and Savings Estimates

Configuration	Total Volume (ft^3)	Savings beyond Federal Minimum (kWh/year)
Top Freezer	10	100
	15	114
	20	130
	25	143
Bottom Freezer	10	128
	15	143
	20	160
	25	175
Side-by-Side Freezer	15	135
	20	152
	25	167

Innovative Idea: Illinois Efficiency Initiative to Achieve ENERGY STAR Tenant Space Recognition

The Idea: Illinois Electric Utility Leverage of ENERGY STAR Tenant Space Recognition

- The opportunity:
  - Electric energy savings opportunities in commercial tenant spaces
  - Hard-to-reach market (landlord-tenant barriers in collaborating in the implementation of energy efficiency projects)
- The idea:
  - Leverage ENERGY STAR Tenant Space Recognition to advance electric utility program measures
- Eligibility:
  - Tenants who lease office space in the U.S. will be able to apply
  - Applications must include all the space the tenant leases within the building
  - No size requirement

- Target Fuel: Electric*
- Target Sector:
  - Commercial tenant, separately metered
  - Hard-to-reach (landlord-tenant split incentive)
- Could be a stand-alone effort or a way to increase adoption of an existing measure (e.g., lighting)

*HVAC use in a range is estimated, so gas-fueled measurements may be involved.

ENERGY STAR Tenant Space Recognition

Criteria

- To earn ENERGY STAR Tenant Space recognition, applicants will need to demonstrate that they:
  - Estimate energy use
    - An EPA-provided tool estimates site and source energy use of HVAC (in a range), plug load, and lighting
  - Meter energy use
    - Metering for lighting is the only measure required
  - Light efficiently
  - Use efficient equipment
  - Share meter data with the landlord (if requested)

The Application Process

- Applicants need to have:
  - Meters installed in the space for which tenants are directly responsible and control
  - Documentation of lighting fixtures and controls
  - A green procurement policy for equipment is in place
  - Office equipment counts
  - Set up the tenant space in ENERGY STAR Portfolio Manager
    - Applicants will apply using the upcoming tenant tool within ENERGY STAR Portfolio Manager
  - A licensed professional review and stamp the application

SAVE TODAY. SAVE TOMORROW.
SAVE FOR GOOD.

Enhanced Uptake of Plug Load Measures

ENERGY STAR Certified Products

- **Appliances**
  - Commercial/residential Dishwashers and Refrigerators
- **Commercial Food Service Equipment**
  - Commercial coffee makers
- **Data Center Equipment**
  - Servers
  - Small Network Equipment
  - Uninterrupted Power Supplies
- **Electronics**
  - Audio/Video
  - Digital Media Players
  - Set-top Boxes
  - Signage Displays
  - Tablets
- **Office Equipment**
  - Laptop and desktop computers
  - Imaging Equipment
    - Desktop printers
    - Full sized copy machines/printers
  - Monitors
  - Voice over Internet Protocol (VoIP) Phones
- **Lighting**
  - ENERGY STAR certified and Design Lights Consortium qualified commercial lighting
- **Other**
  - Vending Machines
  - Water Coolers

Other Office Products

- Residential coffee makers
- Multi-media projectors

Demand Response Opportunities

SAVE TODAY. SAVE TOMORROW.
SAVE FOR GOOD.

ENERGY STAR Certified Heat Pump Water Heaters with Optional Connected Functionality

- A 50-gallon heat pump water heater with a first hour rating (FHR) of 62 will save on average 1,145 kWh/year, compared to a Department of Energy (DOE) minimum electric resistance water heater
- Adding connectivity enables load shift to heat water during low demand periods or to accept energy when excess renewables are available
- DOE Consumer Water Heaters Final Rule, 75 FR 20112

- Target Fuel: Electric (also gas connected options)
- Target Sector: Residential and small commercial
- Potentially geotargeted to high need feeders

ENERGY STAR Certified Heat Pump Water Heaters with Optional Connected Functionality

- Proposed optional connected criteria defines
  - Demand Response (DR) capabilities
  - DR messaging requirements
  - Required responses based on operational mode request
  - Requires compliance with CTA-2045 (physical port on device accepts module) or OpenADR (can be cloud implementation) with specific responses for specific protocol messages
  - Product is tested to show it complies and can shift a minimum amount of load over 4 hours under laboratory conditions
- Status: DOE test method in development, likely finalization of criteria and some product availability by 2021

Q. Will connectivity/use for DR affect energy efficiency opportunity or customer experience?

A: Depend on the need and duration of the need

Need	Strategy
Avoid usage for 2 hours in day or absorb moderate excess energy for a couple hours	Generally, will not interfere with customer experience.
Avoid use for many hours a day (6 continuous hours) or move all energy use to times when excess renewables available.	May need to oversize unit (e.g., increase volume from 50 gallon to 65 gallon); small increase in standby energy.

Questions to think through

- How can we allow DR enablement benefit to be captured in cost benefit analysis for EE programs?
  - *Assume consumer separately compensated for use of their WH for load shifting in DR program, but reduced customer acquisition costs and need to install control device could be captured*
- What type and duration of DR is needed?
- How much DR enablement is needed for the system? Should it be geotargeted to specific feeders? Is there a locational value that can be captured?
- If oversizing is required what is the counterfactual? The original 50-gallon resistant unit or the DOE standard for the larger unit?

Questions?

U.S. Environmental Protection Agency's ENERGY STAR Program

Maureen McNamara
National Manager, Utility Partnerships
mcnamara.maureen@epa.gov

Tracy Narel
National Manager, C&I Solution Provider Partnerships
narel.tracy@epa.gov

Ga-Young Park
Appliance Product Manager
park.ga-young@epa.gov

THANK YOU