ENERGY STAR® Emerging Technology Award

Peter Banwell, EPA

ENERGY STAR Partner Meeting

St. Paul, MN

October 2012

EPA

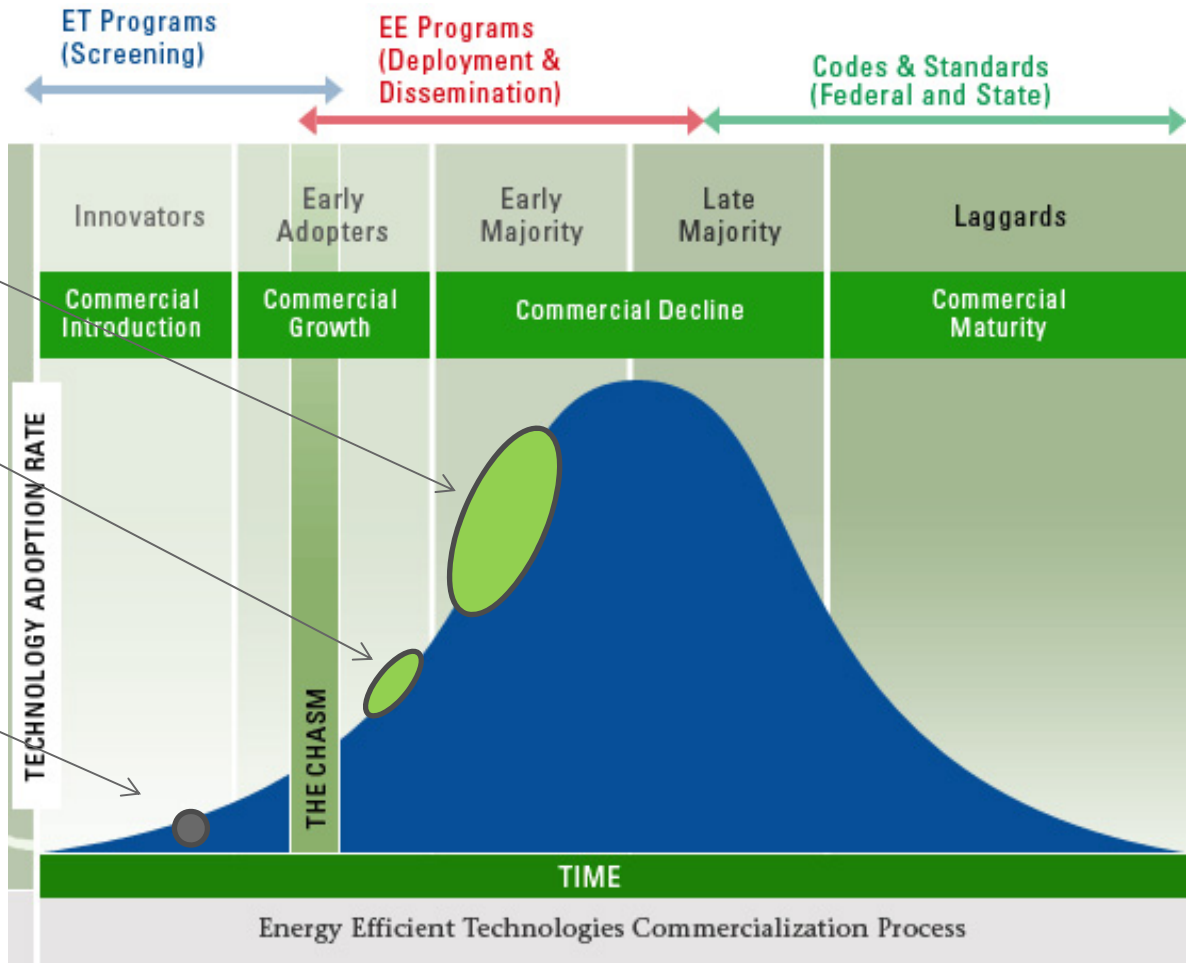
Learn more at **energystar.gov**

Emerging Tech: Positioning

ENERGY STAR

ENERGY STAR:
Most Efficient

Emerging Tech



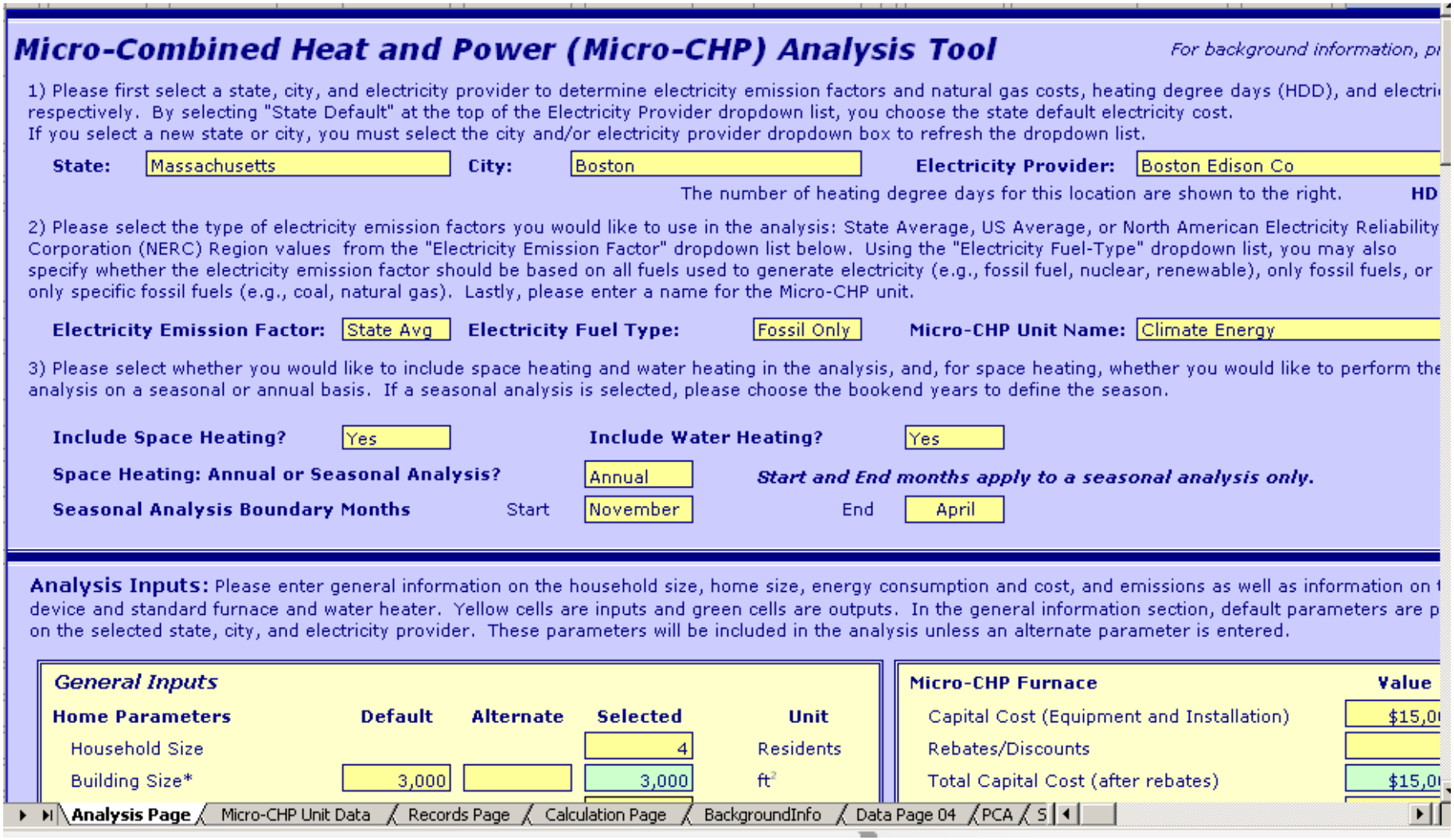
2011/2012 Award: Micro-CHP

- Significant CO_2 and energy savings
  - Particularly in cold climates (NE U.S.)
  - House CO_2 emissions cut of 20–30%

Freewatt – ECR International

Ecopower – Marathon Engine Systems

Overcoming Barriers: Tools



Micro-Combined Heat and Power (Micro-CHP) Analysis Tool

For background information, p

1) Please first select a state, city, and electricity provider to determine electricity emission factors and natural gas costs, heating degree days (HDD), and electri
respectively. By selecting "State Default" at the top of the Electricity Provider dropdown list, you choose the state default electricity cost.
If you select a new state or city, you must select the city and/or electricity provider dropdown box to refresh the dropdown list.

State: Massachusetts **City:** Boston **Electricity Provider:** Boston Edison Co

The number of heating degree days for this location are shown to the right. **HD**

2) Please select the type of electricity emission factors you would like to use in the analysis: State Average, US Average, or North American Electricity Reliability Corporation (NERC) Region values from the "Electricity Emission Factor" dropdown list below. Using the "Electricity Fuel-Type" dropdown list, you may also specify whether the electricity emission factor should be based on all fuels used to generate electricity (e.g., fossil fuel, nuclear, renewable), only fossil fuels, or only specific fossil fuels (e.g., coal, natural gas). Lastly, please enter a name for the Micro-CHP unit.

Electricity Emission Factor: State Avg **Electricity Fuel Type:** Fossil Only **Micro-CHP Unit Name:** Climate Energy

3) Please select whether you would like to include space heating and water heating in the analysis, and, for space heating, whether you would like to perform the analysis on a seasonal or annual basis. If a seasonal analysis is selected, please choose the bookend years to define the season.

Include Space Heating? Yes **Include Water Heating?** Yes

Space Heating: Annual or Seasonal Analysis? Annual ***Start and End months apply to a seasonal analysis only.***

Seasonal Analysis Boundary Months Start November End April

Analysis Inputs: Please enter general information on the household size, home size, energy consumption and cost, and emissions as well as information on t
device and standard furnace and water heater. Yellow cells are inputs and green cells are outputs. In the general information section, default parameters are p
on the selected state, city, and electricity provider. These parameters will be included in the analysis unless an alternate parameter is entered.

General Inputs

Home Parameters	Default	Alternate	Selected	Unit
Household Size			4	Residents
Building Size*	3,000		3,000	ft^2

Micro-CHP Furnace	Value
Capital Cost (Equipment and Installation)	$15,0
Rebates/Discounts	
Total Capital Cost (after rebates)	$15,0

Analysis Page | Micro-CHP Unit Data | Records Page | Calculation Page | BackgroundInfo | Data Page 04 | PCA | S

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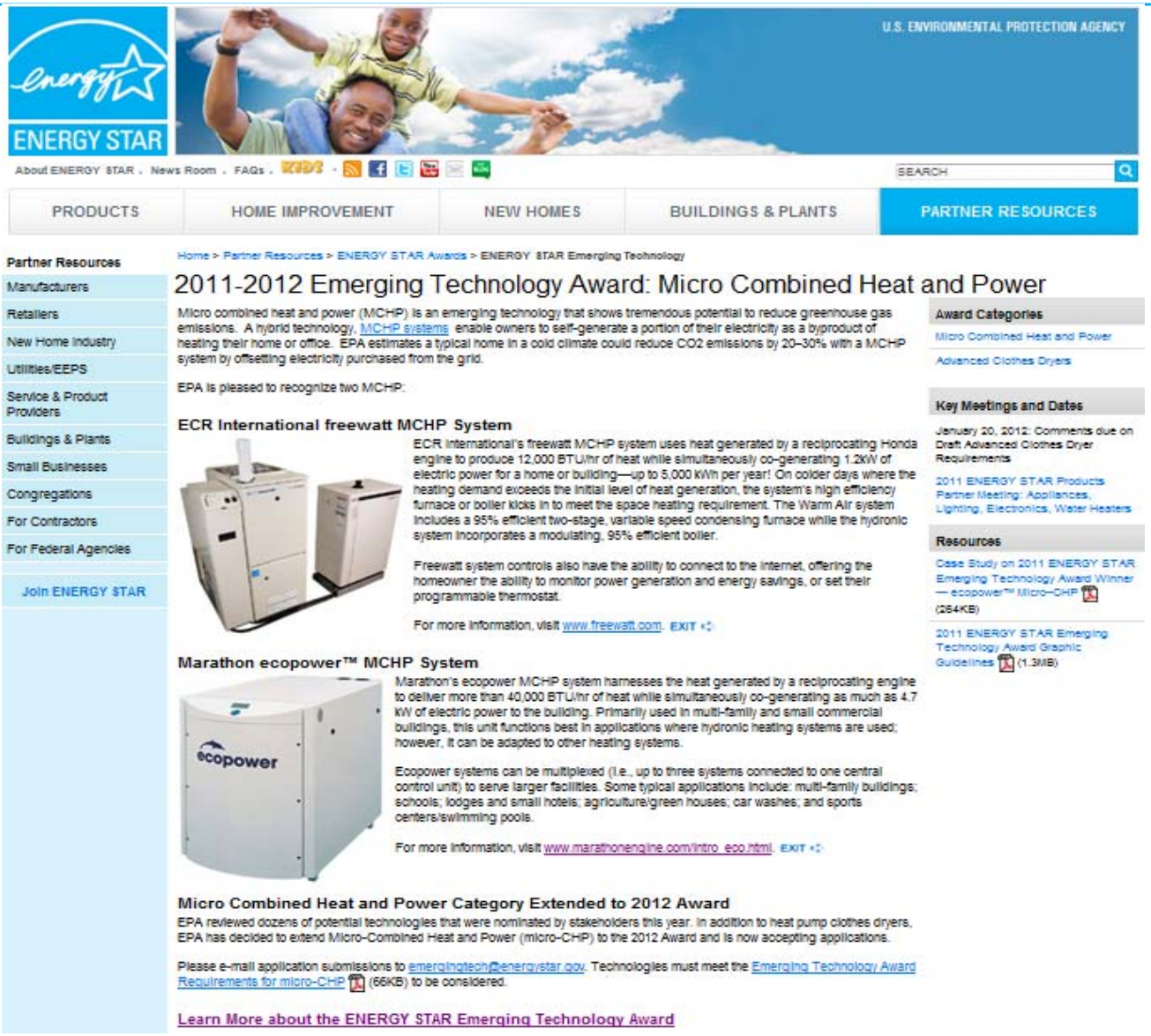
Promotion: Trade - Micro-CHP Award

- Criteria released in November 2010
- Awarded two Micro-CHP technologies in Jan. 2011:
  - Freewatt 1kW system by ECR International
  - Ecopower 5kW system by Marathon Engine Systems
- Presented Awards at Northeast Sustainable Energy Association (NESEA) conference on March 9, 2011

Promotion: Public



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2011-2012 Emerging Technology Award: Micro Combined Heat and Power

Micro combined heat and power (MCHP) is an emerging technology that shows tremendous potential to reduce greenhouse gas emissions. A hybrid technology, MCHP systems enable owners to self-generate a portion of their electricity as a byproduct of heating their home or office. EPA estimates a typical home in a cold climate could reduce CO2 emissions by 20–30% with a MCHP system by offsetting electricity purchased from the grid.

EPA is pleased to recognize two MCHP:

ECR International freewatt MCHP System

ECR International's freewatt MCHP system uses heat generated by a reciprocating Honda engine to produce 12,000 BTU/hr of heat while simultaneously co-generating 1.2kW of electric power for a home or building—up to 5,000 kWh per year! On colder days where the heating demand exceeds the initial level of heat generation, the system's high efficiency furnace or boiler kicks in to meet the space heating requirement. The Warm Air system includes a 95% efficient two-stage, variable speed condensing furnace while the hydronic system incorporates a modulating, 95% efficient boiler.

Freewatt system controls also have the ability to connect to the internet, offering the homeowner the ability to monitor power generation and energy savings, or set their programmable thermostat.

For more information, visit www.freewatt.com. EXIT

Marathon ecopower™ MCHP System

Marathon's ecopower MCHP system harnesses the heat generated by a reciprocating engine to deliver more than 40,000 BTU/hr of heat while simultaneously co-generating as much as 4.7 kW of electric power to the building. Primarily used in multi-family and small commercial buildings, this unit functions best in applications where hydronic heating systems are used; however, it can be adapted to other heating systems.

Ecopower systems can be multiplexed (i.e., up to three systems connected to one central control unit) to serve larger facilities. Some typical applications include: multi-family buildings; schools; lodges and small hotels; agriculture/green houses; car washes; and sports centers/swimming pools.

For more information, visit www.marathonengine.com/intro_eco.html. EXIT

Micro Combined Heat and Power Category Extended to 2012 Award

EPA reviewed dozens of potential technologies that were nominated by stakeholders this year. In addition to heat pump clothes dryers, EPA has decided to extend Micro-Combined Heat and Power (micro-CHP) to the 2012 Award and is now accepting applications.

Please e-mail application submissions to emergingtech@energystar.gov. Technologies must meet the Emerging Technology Award Requirements for micro-CHP (66KB) to be considered.

Learn More about the ENERGY STAR Emerging Technology Award

Award Categories
- Micro Combined Heat and Power
- Advanced Clothes Dryers

Key Meetings and Dates

January 20, 2012: Comments due on Draft Advanced Clothes Dryer Requirements

2011 ENERGY STAR Products Partner Meeting: Appliances, Lighting, Electronics, Water Heaters

Resources

Case Study on 2011 ENERGY STAR Emerging Technology Award Winner — ecopower™ Micro-CHP (264KB)

2011 ENERGY STAR Emerging Technology Award Graphic Guidelines (1.3MB)

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Promotion: Trade - Micro-CHP Case Study

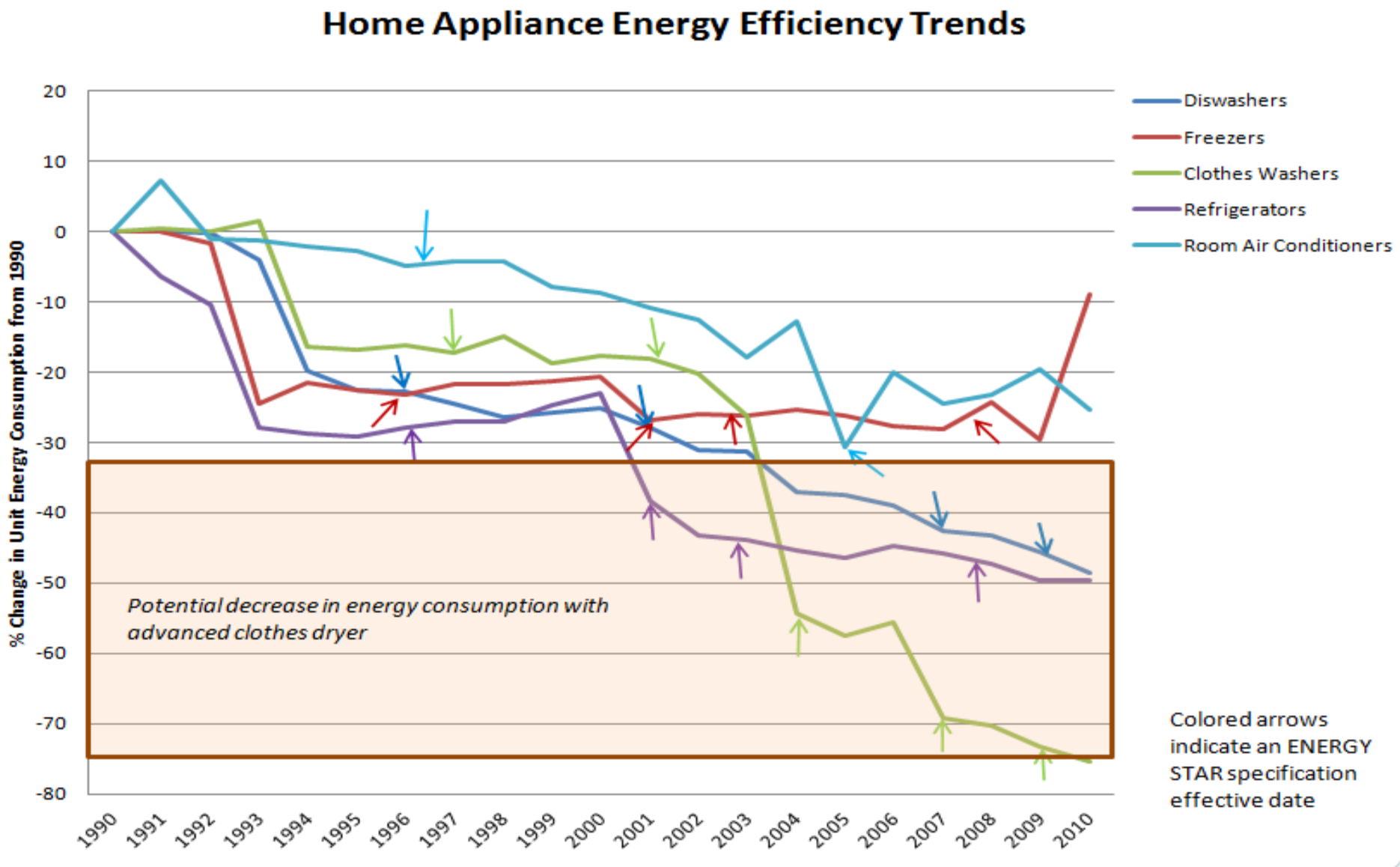
Melrose Five Project – organized by NYSERDA

- 63-unit multi-family building in the Bronx, NY
- 2 ecopower™ units: heat, hot water, electricity

The Eltona (The Bronx, New York)

Figure 1: Installation of the ecopower™ systems

Planning: New Categories



2012 Award Decision: Dryers

- Advanced clothes dryers chosen due to:
  - Performance verified by DOE test procedure
  - Advanced designs available, selling overseas
  - CO_2 reductions of $\geq$ 30%
  - Utility interest

- Final award criteria released Feb 2012
  - Manufacturer/retailer discussions in progress

Bosch Condenser Tumble Dryer with Heat Pump – Available in Europe

Emerging Tech Award vs. ENERGY STAR

Energy Star	Emerging Technology Award
Mainstream (10-13% savings)	Cutting Edge (30-50%+ savings)
Cost effective	Cost effectiveness not required
Proven technologies	New, advanced technologies

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Dryer Savings

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Table 3: Household Penetration of Clothes Dryers by Energy Source[5]

Clothes Dryer	U.S. Households (millions)	Percentage of Total Households
Use a Clothes Dryer At Home	**90.2**	**79%**
Electric	*71.8*	*80%*
Natural Gas	*17.5*	*19%*
Propane/LPG	*1.0*	*1%*
Do Not Use a Clothes Dryer At Home	**23.4**	**21%**

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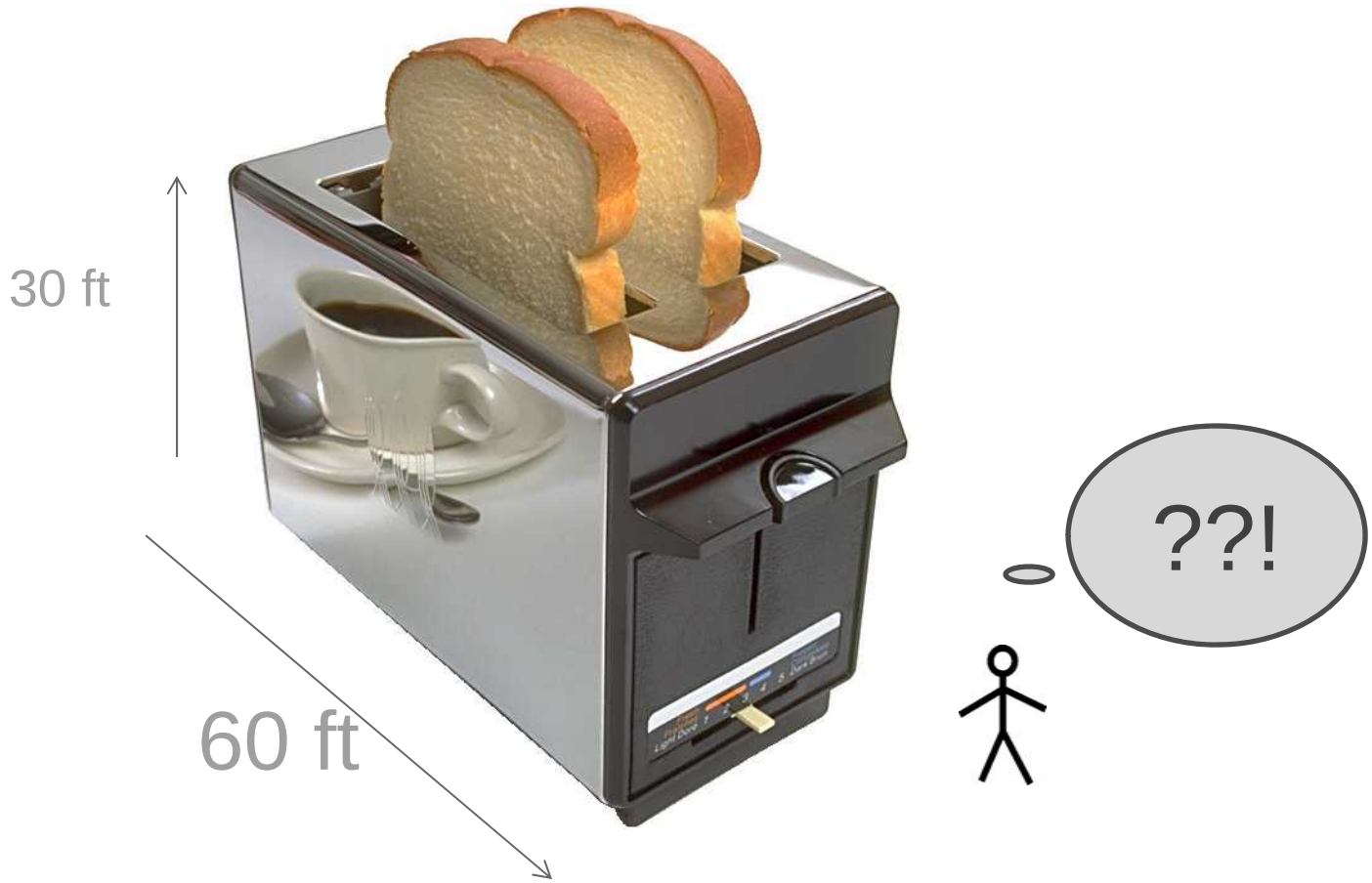
Performance Tradeoffs

How do we get here?

We are here

Consumer Education



Dryers: Key Performance Criteria

Energy Efficiency	**EF > 4.1, achievable in at least one temperature setting** **EF > 3.5, achievable in maximum temperature setting**
Drying Time	**< 75 minutes to finish one complete cycle in temperature setting that achieves EF > 4.1**
Sensors	**Temperature and moisture sensing controls, at a minimum**

Award Activities Moving Forward

- Micro-CHP : Sunset, Dec 31, 2012
- Dryers
  - Criteria development complete
  - Applications being accepted
  - Next step: LAUNCH!

Emerging Technology Award Announcements

- Award for Advanced Clothes Dryers will be extended into 2013

- Super Efficient Dryer Initiative session
  - 11:15 am to 12:15 pm
  - Kellogg Suite
  - Continue conversation about advanced clothes dryers
  - Contact Chris Badger, VEIC, with questions or for more information

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