ENERGY STAR®
Emerging Technology Award

Peter Banwell, U.S. EPA

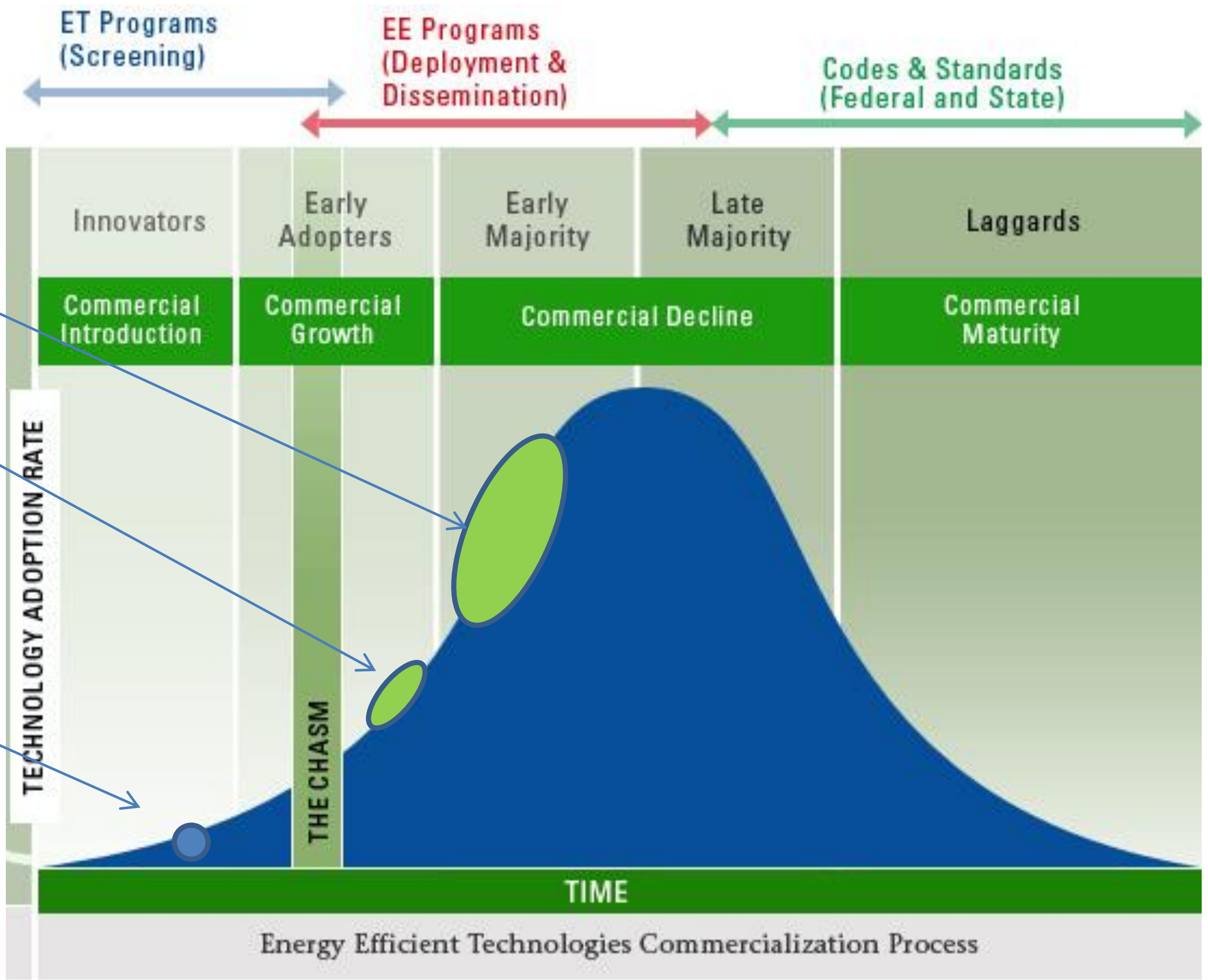
September 12, 2019

The Role of Emerging Tech

ENERGY STAR

ENERGY STAR Most Efficient

Emerging Tech: The Chasm



Benefits of the Emerging Technology Award

- **Recognition**
  - Featured on website
  - Opportunity to promote their accomplishment
- **Match-making**
  - Help match award winners with interested partners
  - 17,000 partners in dozens of sectors
- **Barrier removal**
  - In some cases, EPA may be able to help companies develop strategies to overcome barriers

Emerging Technology Award Timeline

1. Seek nominations
2. Develop performance requirements
3. Recognize products that meet the criteria
4. Work with partners to break down market barriers

ENERGY STAR® 2019 Emerging Technology Award Requirements: Room Air Conditioners with Efficient Variable Output (EVO)[1]

Performance Metric	Criteria	Test Method/Required Documentation
Room Air Conditioner Performance		
Energy Efficiency	Outperform the U.S. Department of Energy (DOE) Federal Minimum Combined Energy Efficiency Ratio by: • At least 35% for models with a capacity ≥ 14,000 BTU/hour • At least 25% for models with a capacity < 14,000 BTU/hour	DOE-approved test procedure waiver pursuant to 10 CFR Part 430.27
		Provide documentation of the model information and ENERGY STAR certification for the EVO product
	Energy measurements must be performed at an EPA-recognized accredited lab[2]	
Noise Level	Lowest Operation[3] Sound Pressure Level ≤ 45 dB(A)	Copy of the test method and results[4]
Warranty Minimum	One year parts and labor	Copy of warranty agreement
Certification	Must meet all applicable U.S. electrical safety requirements	Copy of case files
Additional Company Requirements		
Product Commercial Status	This Award is only granted to products that are available for sale in the U.S. Products must meet one of the following criteria: 1) available for sale at numerous retail and/or supplier locations, *or* 2) have commercial orders pending and firm plans to sell products to customers within 3 months of the Award application date.	

ENERGY STAR 2011
Emerging Technology Award

Micro-Combined Heat and Power (MCHP)

ecopower

MARATHON
ENGINE SYSTEMS

February 08, 2011: FOR IMMEDIATE RELEASE

U.S. EPA Presents Prestigious 2011 ENERGY STAR Emerging Technology Award to Marathon Engine Systems

Marathon Engine Systems ecopower™, a micro combined heat and power (Micro CHP) system, surpasses EPA product performance requirements and receives top honor.

EAST TROY, WI – The U.S. Environmental Protection Agency today awarded Marathon Engine Systems, an engineering and manufacturing company, with the 2011 ENERGY STAR Emerging Technology Award for the ecopower™ Micro CHP system. The East Troy, WI, company's innovative product increases overall energy production efficiency and reduces greenhouse gas emissions.

What is Micro CHP?

Micro CHP is an emerging technology for combined heat and electrical power generation in homes and small businesses. Unlike the central power plant or large industrial generator, Micro CHP brings the "power plant" to the consumer. The ecopower™ Micro CHP uses the long life Marathon™ IC engine for durable output. Built-in microcontrollers supervise the energy output with advanced software.

About the ENERGY STAR EMERGING TECHNOLGY AWARD*:

- Recognizes innovative products that have the potential to significantly reduce greenhouse gas emissions.
- Advances promising technologies that may not yet meet key principles associated with categories eligible for the ENERGY STAR label (e.g. broadly available, proven and cost-effective to the consumer) or may be relatively more complex to properly install and operate.
- Raises the profile of products, helping to build demand so cost may ultimately be reduced and availability broadened.
- Is an annual award given to products that meet rigorous performance criteria in a select category.

ecopower™ Micro CHP – Cleaner Distributed Energy

These small home energy systems deliver energy to the home with twice the energy efficiency compared to a typical central power plant.**

The ecopower™ anticipates daily energy needs and also changes output in as little as seconds to meet unscheduled energy requirements (DR – demand response).

Energy Star Award: http://www.energystar.gov/index.cfm?c=pt_awards.pt_emerging_technologies

EPA News Release:
http://yosemite.epa.gov/opa/admpress.nsf/d0cf6618525a9efb85257359003fb69d/9b9cc5c9e5fb678d8525783100580264!OpenDocument

*Source: EPA ENERGY STAR Emerging Technology Award website
**Sources: ICES lab testing of ecopower™ efficiency, and EIA for average power plant efficiency

www.marathonengine.com
2050 Energy Drive - East Troy, WI 53120
Ph: 262-642-6436 – Fax: 262-642-6437

ENERGY STAR 2011
Emerging Technology Award

Award Winning Technology: ecopower™

Micro Combined Heat and Power Demonstrates Savings in New York City

Installation of new technology in a New York City apartment building shows that Micro Combined Heat and Power (Micro-CHP) can **save almost $13,000 in building energy costs and reduce CO_2 emissions by almost 94,000 lbs annually.**

What is Micro-CHP?
Micro-CHP is a hybrid technology that provides heating to the home while simultaneously co-generating electricity on-site. While this technology has been used for years in Europe and Japan, it is a fairly new concept to the U.S. market.

What is the ENERGY STAR® Emerging Technology Award?
The ENERGY STAR Emerging Technology Award recognizes innovative products like Micro-CHP that have the potential to significantly reduce greenhouse gas emissions but face certain barriers to U.S. market penetration. EPA's intent in promoting award winners is to raise the profile of the technologies, helping to build demand so cost may ultimately be reduced and availability broadened.

One of the technologies chosen for the 2011 ENERGY STAR Emerging Technology Award is the ecopower™ Micro-CHP manufactured by Marathon Engine Systems.

Case Study Results: Micro-CHP Benefits and Savings
Through assistance from the New York State Energy Research and Development Authority (NYSERDA), the Melrose Five Project was organized to demonstrate the savings from Micro-CHP. A 63-unit multi-family apartment building located in the Bronx, NY was chosen to install two ecopower™ Micro-CHP systems, each providing domestic hot water heating and 4.7 kWh of electricity at the same time. At the end of one year of monitoring, the ecopower™ systems combined:

- Saved $12,936 in building energy costs;
- Avoided 93,607 lbs of CO_2 emissions (equivalent to almost four average U.S. homes);
- Generated 74,100 kWh of electricity for common areas (87% of common area electricity demand); and
- Supplied 574 MBtu of hot water heating and supplemented building space heating (25% of total building heating needs).

The Eltona (The Bronx, New York)

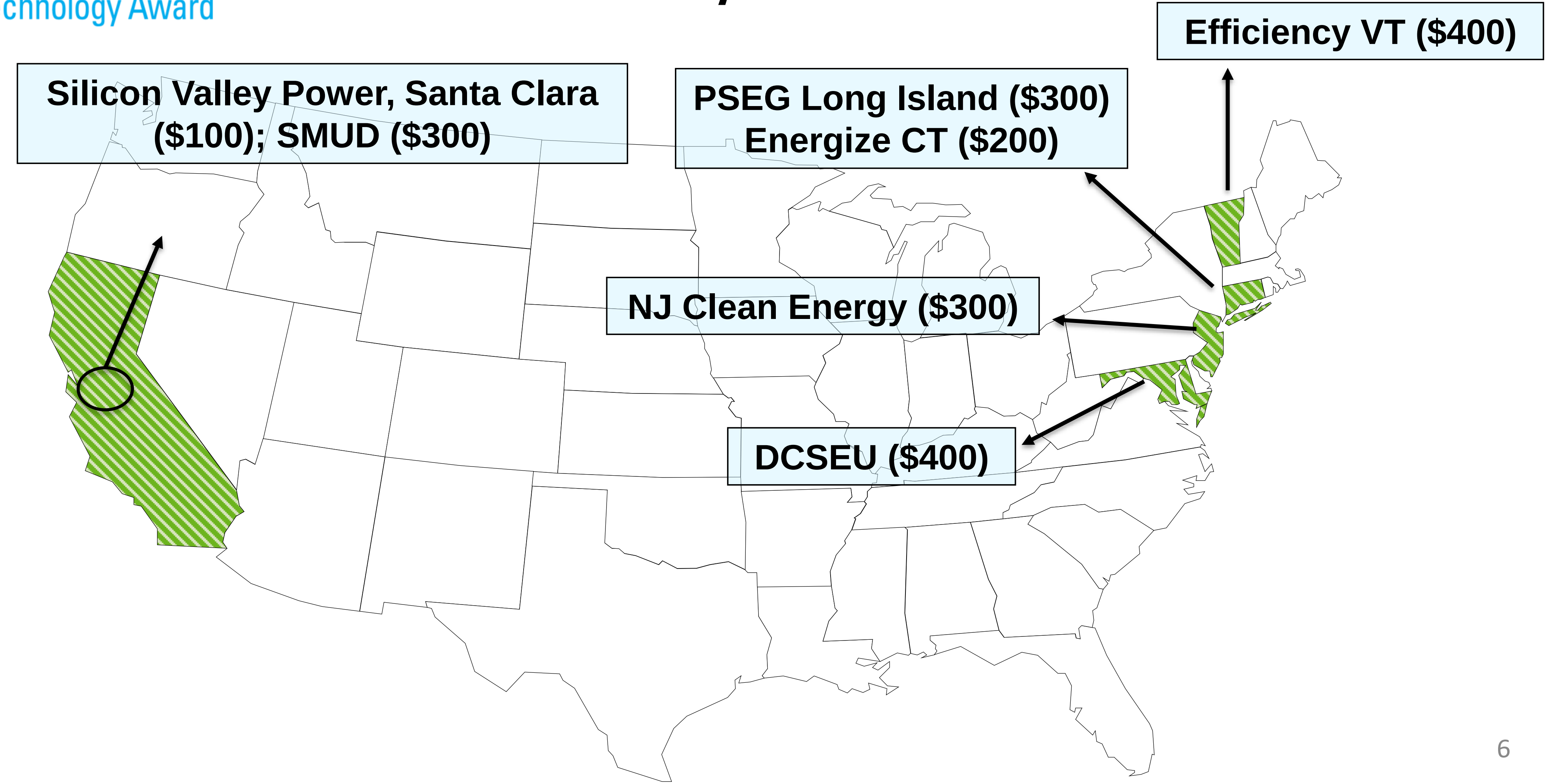
Figure 1 shows the two ecopower™ systems as installed in The Eltona apartment building basement.

Figure 2 presents the annual cost savings and payback for the Micro-CHP installation at The Eltona.

Figure 1: Installation of the ecopower™ systems

ENERGY STAR 2014
Emerging Technology Award

Advanced Clothes Dryers



ENERGY STAR 2015 Emerging Technology Award

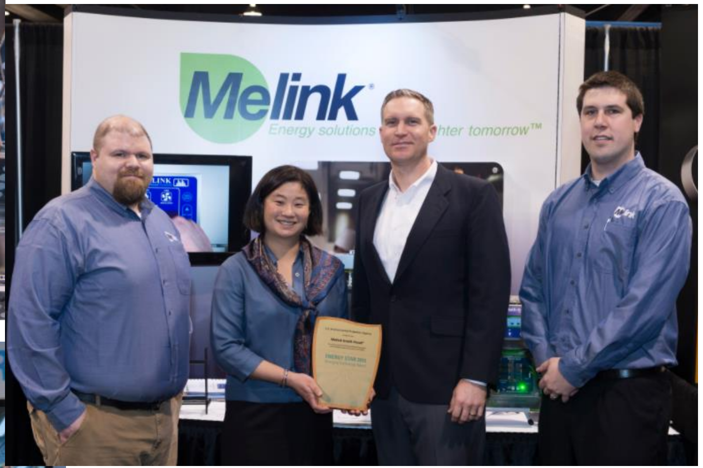
Demand Control Kitchen Ventilation

"We extend congratulations and applause to Melink Intelli-Hood® for the Emerging Technology Award accomplishment. The Intelli-Hood® System is a benchmark for DCKV technology that offers energy savings with financial value."

Franke's VariVent Awarded the U.S. Environmental Protection Agency's 2016 ENERGY STAR Emerging Technology Award

Aug 1, 2016 4:58:27 PM / by Franke

Tweet | Share | 0 | Like 4 | Share | G+



ENERGY STAR 2016
Emerging Technology Award

Innovative Refrigerant Systems

- Models that met the Innovative Refrigerant System criteria:
  - Contain a climate-friendly refrigerant with a **GWP < 15**
  - Show a **99% reduction in global warming** on the refrigerant side
  - Demonstrate an **energy efficiency gain of 5% or greater**
- 30 models from Bosch, Dacor, and Samsung
- 46 commercial models from True Manufacturing

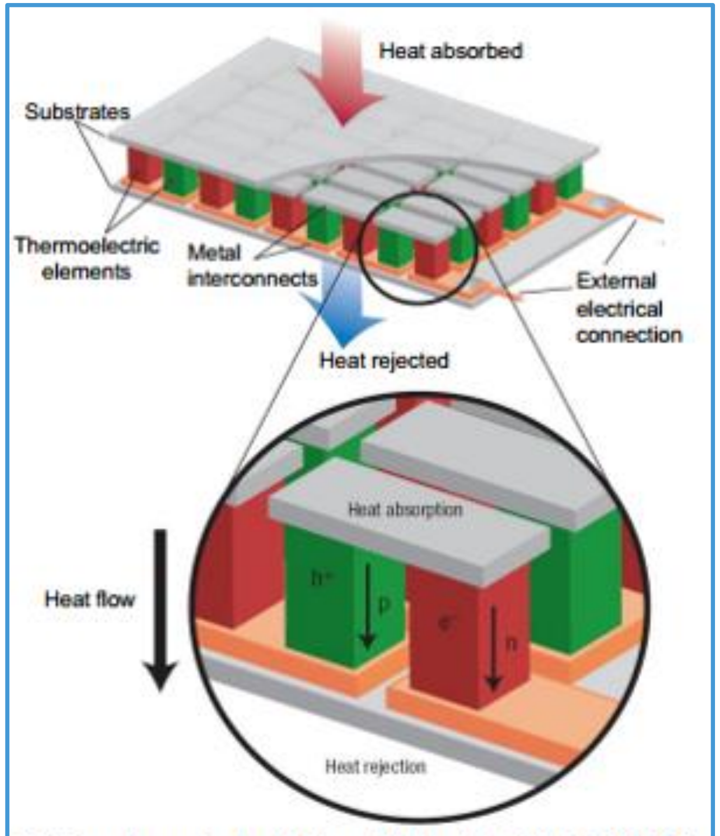
ENERGY STAR 2017
Emerging Technology Award

Solid-State Refrigeration

- Award winning model from Phononic

phononic

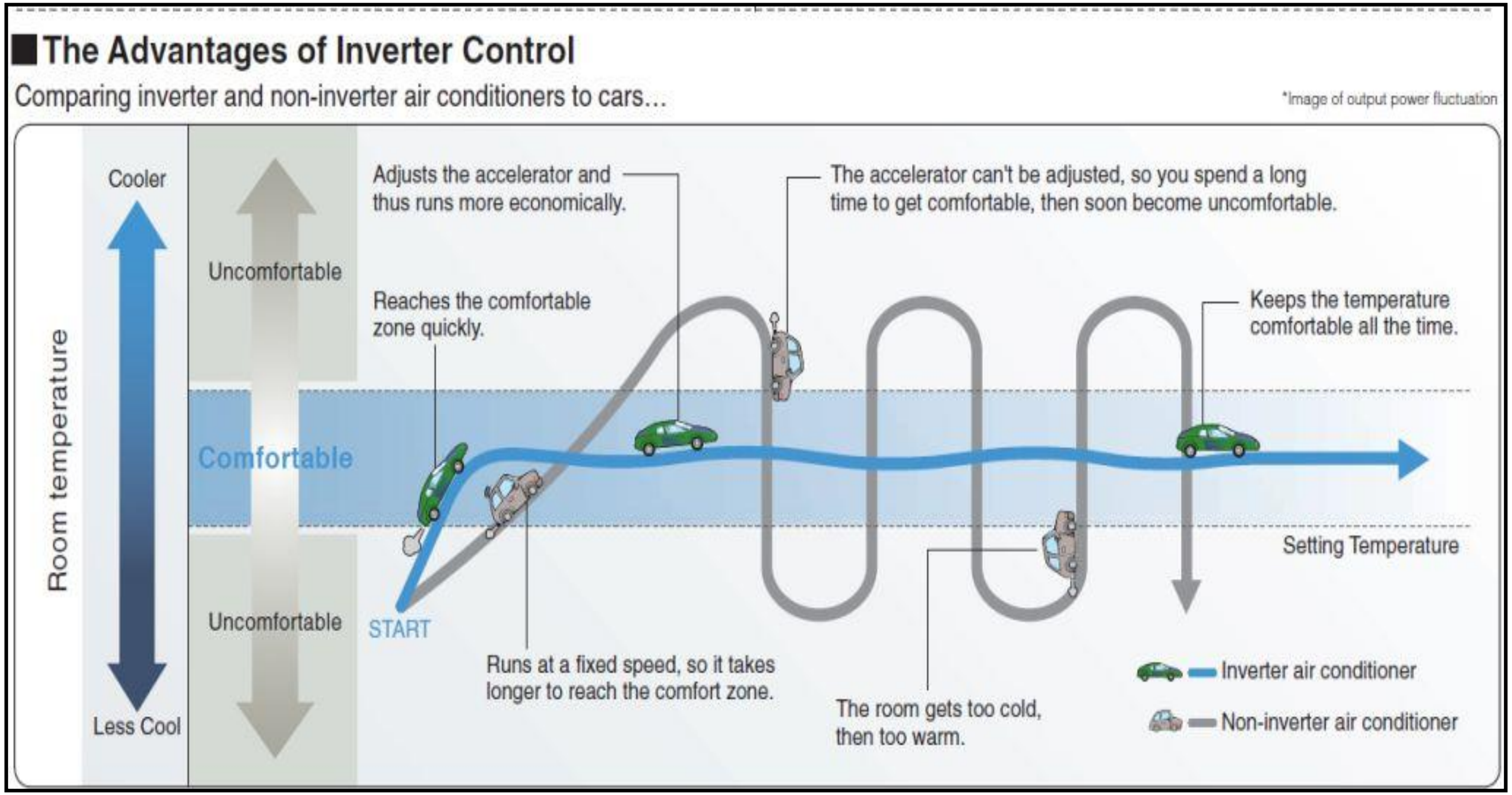
Phononic Earns U.S. Environmental Protection Agency's 2017 Emerging Technology Award for Solid-State Refrigeration Design



G. Snyder, et al., Nature Materials Vol 7 (2008)

ENERGY STAR 2018
Emerging Technology Award

Room Air Conditioners with Efficient Variable Output (EVO)



Source: Panasonic, ftp://ftp.panasonic.com/heatairconditioner/sellsheets/pac14256cat_sellsheets.pdf

Room Air Conditioners with Efficient Variable Output (EVO)

- To meet the proposed ETA criteria, RACs with EVO will need to **outperform** the DOE Federal Minimum Combined Energy Efficiency Ratio by:
  - **At least 35%** for models with a capacity ≥ 14,000 BTU/hour
  - **At least 25%** for models with a capacity < 14,000 BTU/hour
- They also much be capable of operating at noise levels below 45 decibels (dBA)
- There are currently 4 qualified products from LG

LG
Life's Good

www.LG.com

FOR IMMEDIATE RELEASE

LG'S NEW ROOM AIR CONDITIONERS BLOW AWAY COMPETITION WITH ADVANCED COOLING, 40% INCREASE IN ENERGY EFFICIENCY*

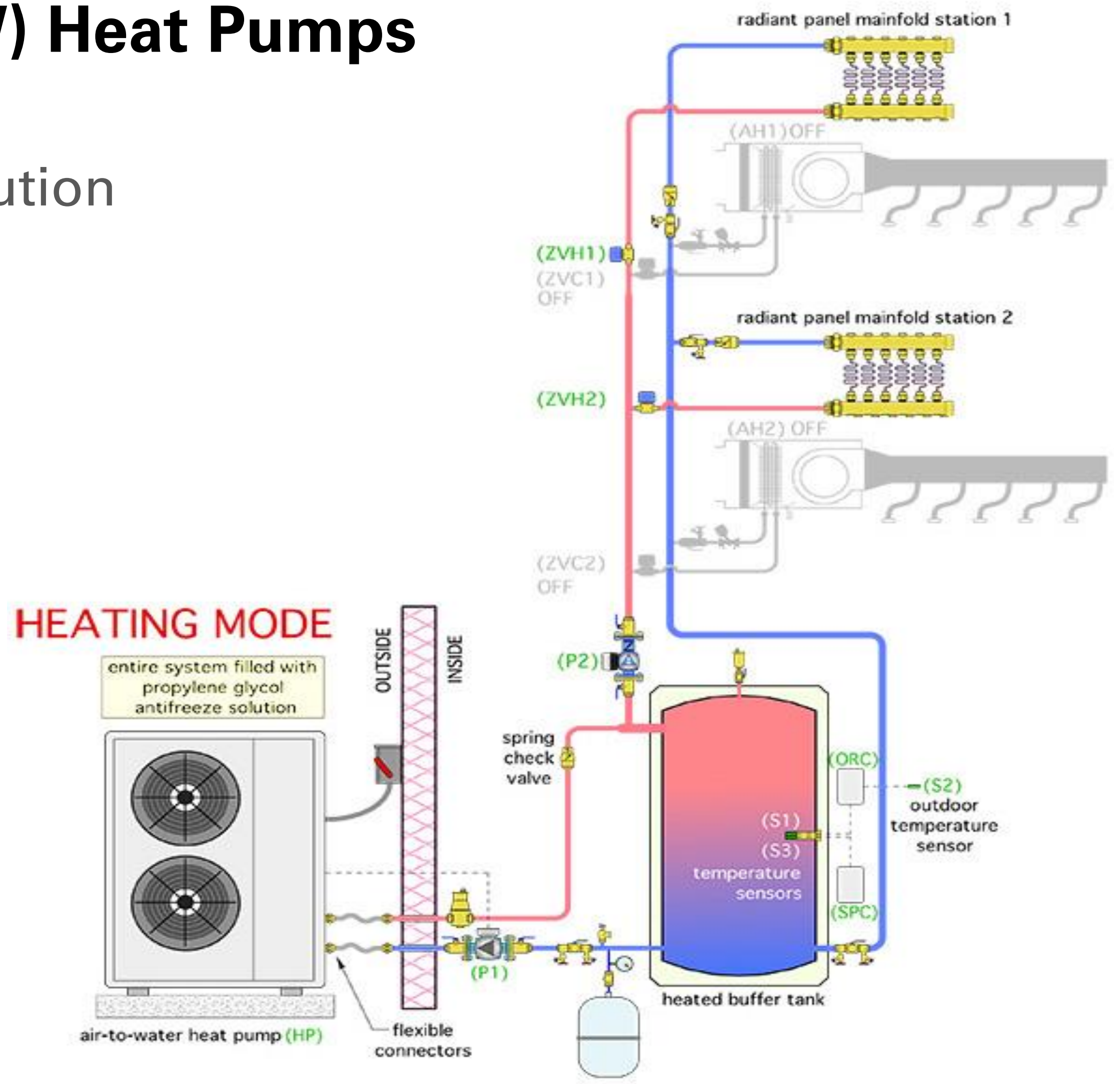
Super Efficient, Quiet-Operating Smart Window Air Conditioners Earn 2018 ENERGY STAR Emerging Technology Award

ENGLEWOOD CLIFFS, N.J., July 23, 2018 – LG Electronics USA is reinventing room air conditioning with the launch of three new window air conditioners – the first in the United States to deliver quiet, advanced cooling with an unprecedented increase in energy efficiency of 40 percent on its best-performing model – thanks to the proprietary LG Dual Inverter Compressor™ technology.* In recognition of this innovation, LG is the first to earn the 2018 ENERGY STAR® Emerging Technology Award, which honors new and promising technologies that deliver significant energy savings during operation.

ENERGY STAR 2019
Emerging Technology Award

Air-to-Water (ATW) Heat Pumps

- **Space heating** through hydronic distribution
- **Air conditioning**
  - Hydronic or
  - Forced air
- **Energy savings up to 47%**
- **Coefficient of Performance** of 1.7 - 3.0.



Source: Heating, Plumbing, and Air Conditioning (HPAC) Magazine

2020 Call for Nominations

- EPA has issued a call for nominations for the 2020 Emerging Technology Award category
- There is no restriction on who may provide feedback or submit a nomination
  - Nominations should meet the key criteria and, if available, they should be accompanied by laboratory or field performance data
  - Submissions are due by **September 9, 2019** to emergingtech@energystar.gov

If you have any question about the Emerging Technology Award, visit:
www.energystar.gov/emergingtech

Or email us at:
- Peter Banwell: Banwell.Peter@epa.gov,
- Emmy Feldman: Emmy.Feldman@icf.com, or
- EmergingTech@energystar.gov