Better Buildings Residential Network Peer Exchange Call Series:

Myth Busters: Exposing Residential Energy Efficiency Misconceptions

April 12, 2018

Agenda and Ground Rules

- Agenda Review and Ground Rules
- Opening Poll
- Residential Network Overview and Upcoming Call Schedule
- Featured Speakers:
  - **Mithra Moezzi**, Independent Consultant
  - **Nate Adams**, Energy Smart Home Performance
  - **Pamela Brookstein**, Elevate Energy
- Open Discussion, Closing Poll, and Announcements

Ground Rules:

1. **Sales of services and commercial messages are not appropriate** during Peer Exchange Calls.

2. Calls are a safe place for discussion; **please do not attribute information to individuals** on the call.

Opening Poll

- Which best describes your organization's familiarity or experience with myth busting and its connection to residential energy efficiency?
  - Very experienced/familiar
  - Some experience/familiarity
  - Limited experience/familiarity
  - No experience/familiarity
  - Not applicable

Opening Poll Results

- Which best describes your organization's familiarity or experience with myth busting and its connection to residential energy efficiency?
  - Very experienced/familiar – *18%*
  - Some experience/familiarity – *37%*
  - Limited experience/familiarity – *27%*
  - No experience/familiarity – *18%*
  - Not applicable – *0%*

Better Buildings Residential Network

Join the Network

Member Benefits:

- Recognition in media and publications
- Speaking opportunities
- Updates on latest trends
- Voluntary member initiatives
- Solution Center guided tours

Commitment:

- Members only need to provide *one number*: their organization's number of residential energy upgrades per year

Upcoming calls:

- May 10: Making the Grid Smart: Moving Toward Two-Way Communication in the Digital Age

Peer Exchange Call summaries are posted on the Better Buildings website a few weeks after the call

For more information or to join, for no cost, email bbresidentialnetwork@ee.doe.gov, or go to energy.gov/eere/bbrn & click Join

Mithra Moezzi
Independent Consultant

U.S. DEPARTMENT OF ENERGY

RESIDENTIAL EFFICIENCY MISCONCEPTIONS FROM US & FROM THEM

US DOE Better Buildings Residential Network's Peer Exchange Call
12 April 2018

Speaker: Mithra Moezzi ◆ Ghoulem Research ◆ California

Rundown

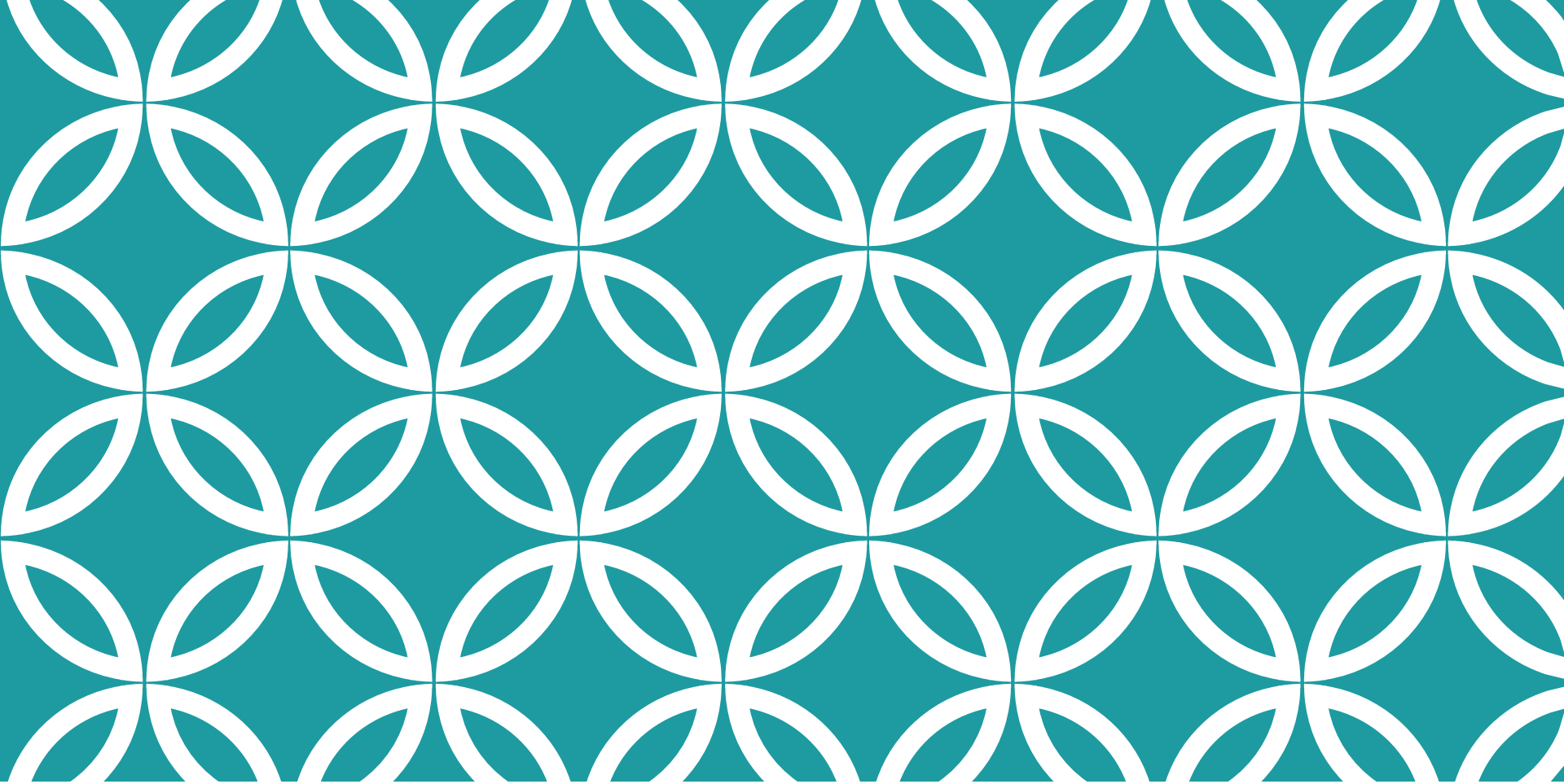
Popular definition of myth: what (some) people think is fundamentally true, but isn't

Told by people in homes

Told about people in homes

Why this happens: knowing, thinking, & the complications of truth

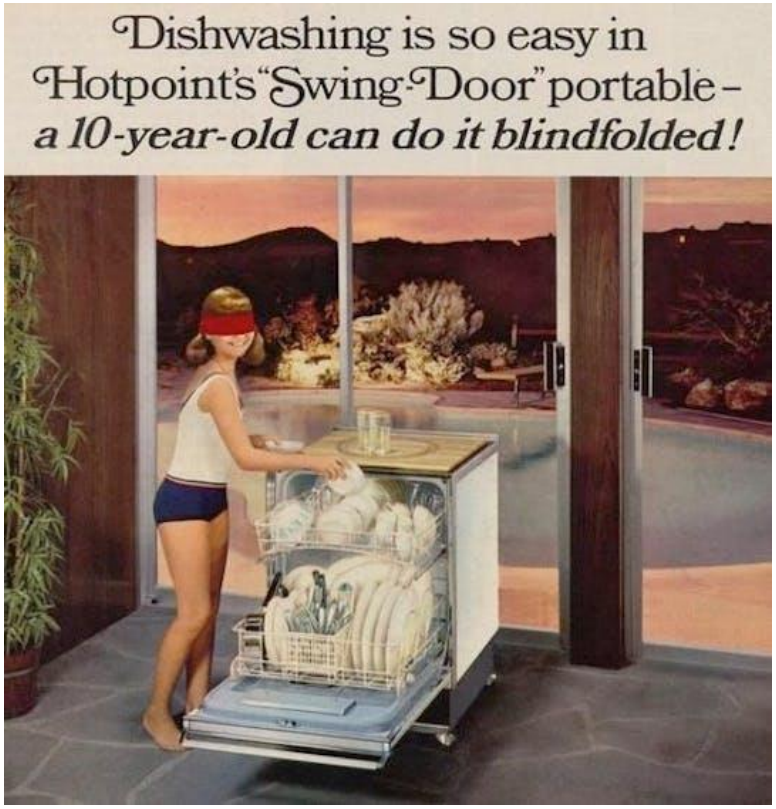
Why this matters: anthropological + statistical perspectives



HOUSEHOLDS

Examples & interpretation

DISHWASHERS USE MORE ENERGY THAN HAND-WASHING



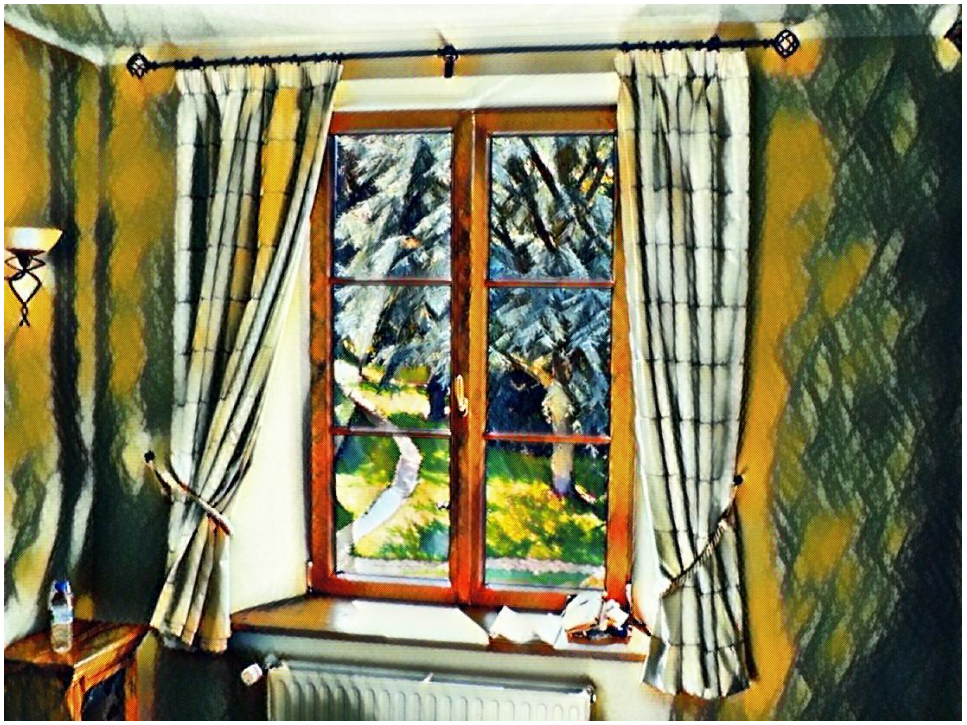
"FACT" SUMMARY ON DISHWASHERS

- In US, hand-washing dishes might use 3.5x the energy 3.5x the water of a standard dishwasher, according to some studies (Snow 2018)
- Nearly half (46%) of US households don't use the dishwasher they have (20% of the 68% with dishwashers) or don't have one (32%) [EIA 2017]
- There are reasons to not use a dishwasher that have nothing to do with the aim of saving energy
- And various ways to use the dishwasher inefficiently (e.g. pre-washing, fractional loads, and to hand-wash efficiently [Richter 2010]

PORTABLE HEATERS COST LESS TO USE THAN CENTRAL OR WALL GAS FURNACE

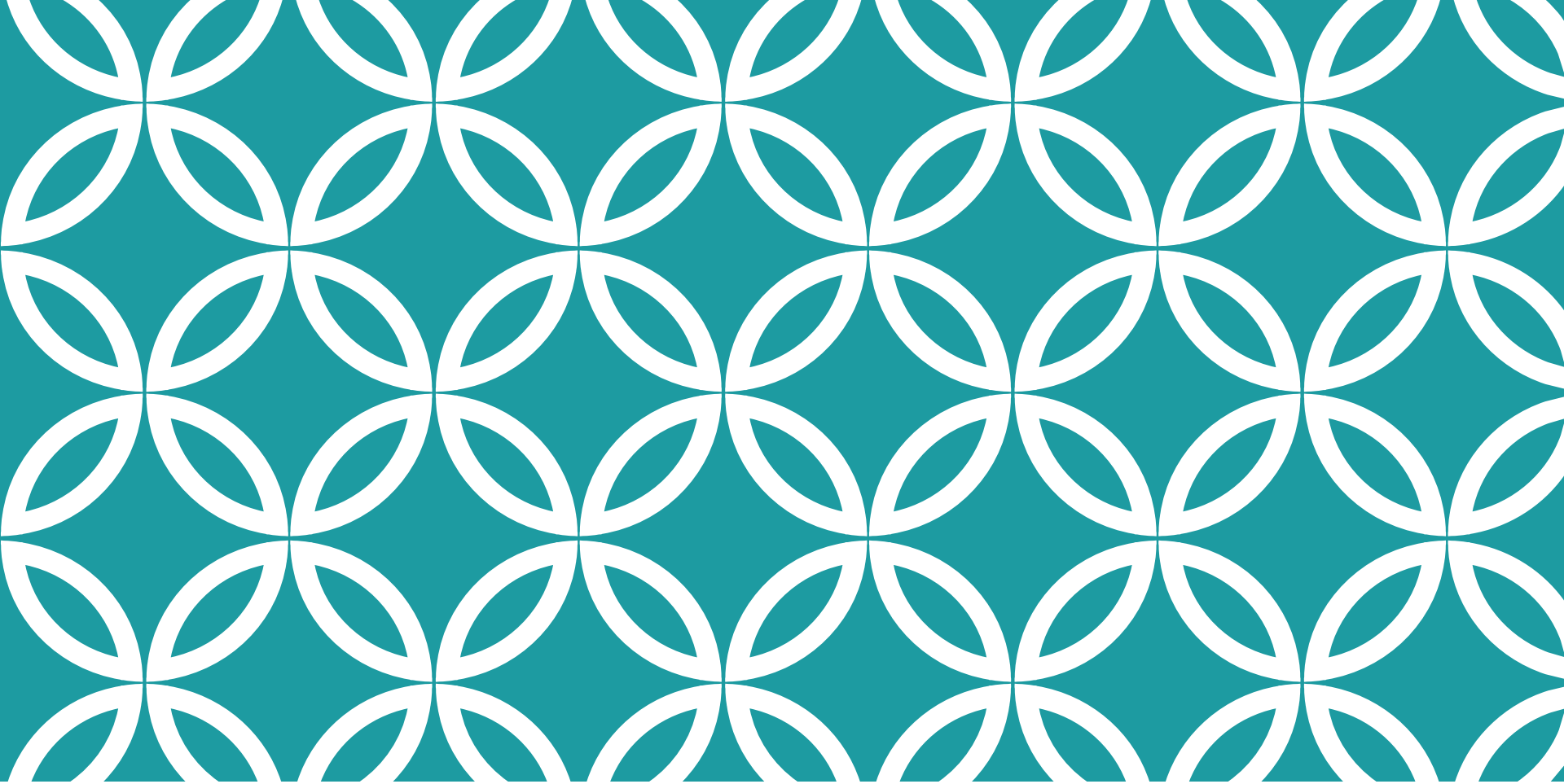
KEEP FANS ON WHILE AWAY

NEW EFFICIENT WINDOWS ARE ONE OF THE BEST ENERGY EFFICIENCY INVESTMENTS



ADDITIONS & INTERPRETATIONS

Misconception	Illustrates
Dishwashers use more energy than hand-washing	Virtues of labor, the costs of machines
Portable heating costs less than central (NG) heating	Size & area comparisons
Windows are a top energy efficiency investment	Sensation, marketing, and appealing non-energy qualities
Leave the heat or cooling on low while away to avoid extra costs from big temperature differences	Mental models of heating, cooling
Turn AC on "super" to cool fast (W. Kempton)	Mental models of heat and coolth; pleasure/power
Keep fans on while away to save energy later	Quiet differences between space temperature & sensation+thermoregulation
Turning something off and back on again uses more energy than leaving it on	Mental models of start-up costs
Turning off lights is the best way to save energy	Historic changes in lighting efficiency and the number of type of energy-using devices in the home
Keep the refrigerator as full as possible to save energy	Mental models of refrigeration; big fridges



PROGRAMS & POLICY

What we say, what we assume, how we think

“WE HAVE TO SAY SOMETHING”

The Dilemma of the Energy Advice Writer

Technologies may not work as predicted

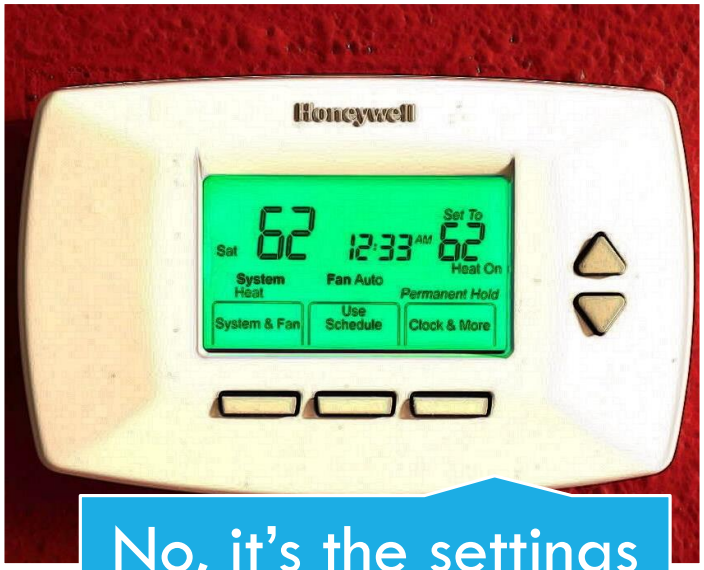
Great diversity across households

Little measurement

Nobody’s a specialist

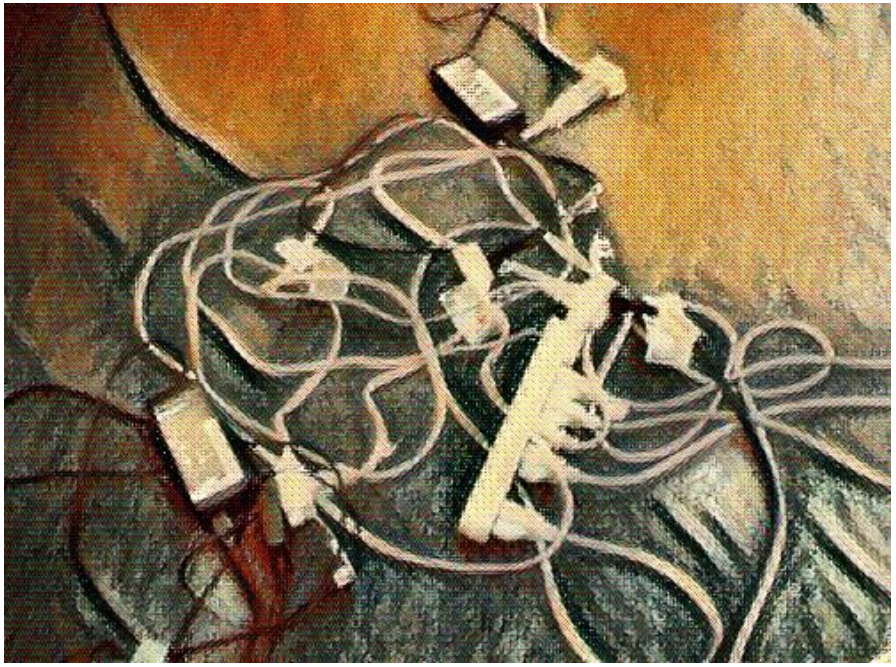
WE DON'T TEST THEORIES: "CLEAN YOUR REFRIGERATOR COILS" (AN OLD ONE)

WE FALL INTO SHORTHAND: "PROGRAMMABLE THERMOSTATS SAVE ENERGY"(AUTOMATICALLY)



No, it's the settings that matter.

WE FORGET ABOUT PAIN V. GAIN: TURNING OFF & SHUTTING DOWN ELECTRONICS

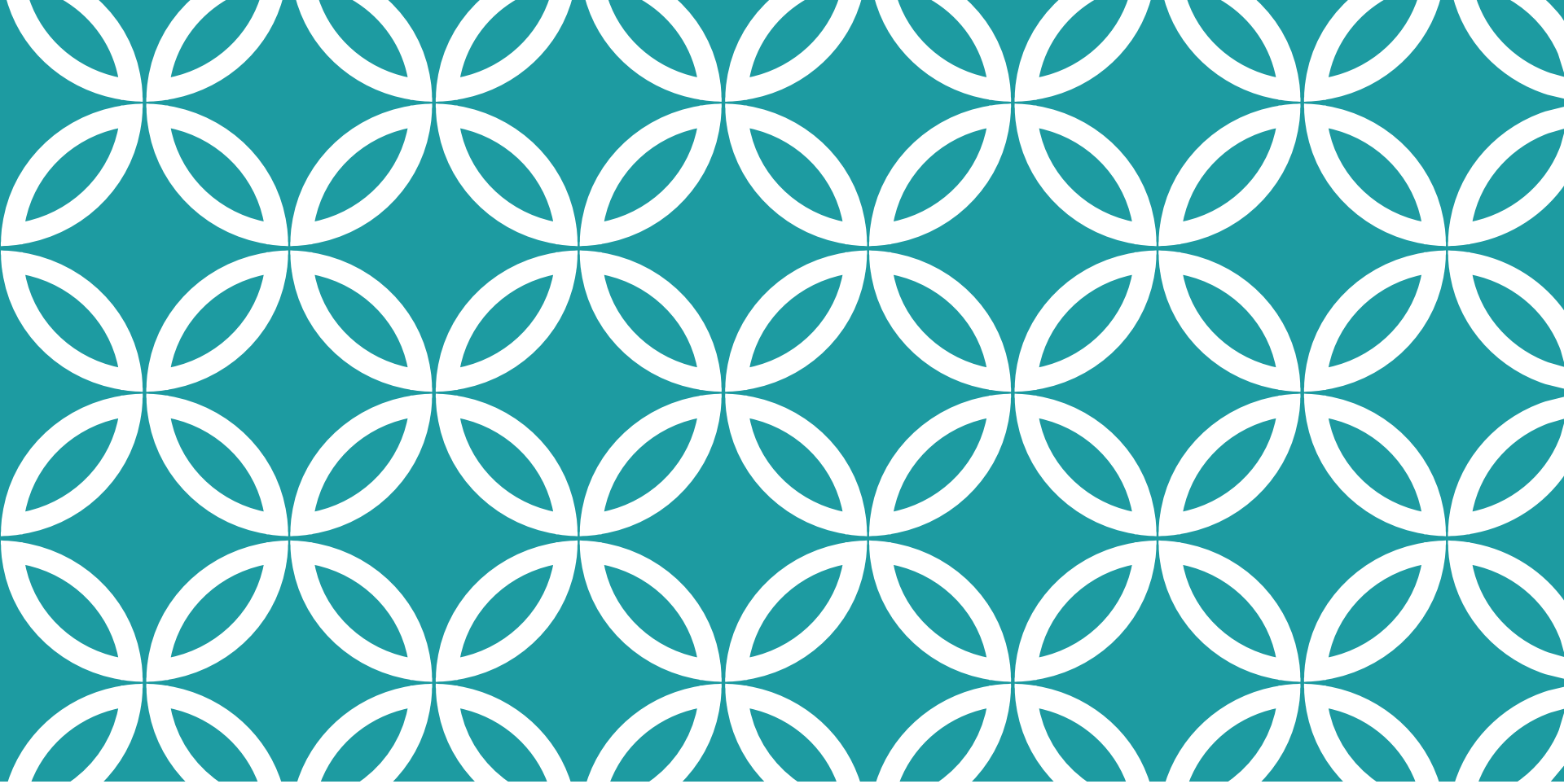


WE UNDERESTIMATE PEOPLE

http://www.famousinventors.org/images/inventor.jpg

WE OVER RELY ON AVERAGES AND "TYPICALS" (+ MISTAKE AGGREGATE FOR THE INDIVIDUAL)

- ✓ Technology is the solution
- ✓ Corollary: Energy-efficiency saves energy absolutely
- ✓ Corollary: Getting people to buy energy efficient products is key
- ✓ Energy efficiency costs more
- ✓ One technology fits most
- ✓ If technologies don't save energy, people are using them wrong
- ✓ Behavioral conservation doesn't persist
- ✓ If people understood global warming, they would save more energy
- ✓ Solar is energy-efficient



DILEMMAS AND PROGRESS

Why is it so hard?
How can it be done better?

DILEMMAS

Households, their practices, & their stuff are extremely diverse

Little fieldwork on what happens in homes

Energy is a minor part of home life, while home life has tremendous effects on home energy use

High faith in technology "as is"

Work requires us to act, despite uncertainty

+ "For every Ph.D. there is an equal and opposite Ph.D."

Need for countability & success for a very tough problem and in a politicized arena

RECOMMENDATIONS & QUESTIONS

How to better wrangle diversity/differences across households, circumstances, practices?

How to better learn what people think and do with respect to energy in their homes? What are the details of usage and how and why do they change? Can we learn this from people who work in the field?

Can to know the energy questions, issues that are really faced, and can we better answer these? What kind of answers can we give besides "buy this big thing"?

Would more and better measurement help?

Can we find better ways to illustrate vs. instruction via "tips"?

Can we integrate more skepticism into the claims, assumptions, and arguments implicit in our daily work?

I WELCOME YOUR REACTIONS, IDEAS, QUESTIONS, AND EXAMPLES OF MYTHS/STORIES ON HOME ENERGY USE

INFO & COMMENTS:
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SELECTED GENERAL REFERENCES

Diamond, RC and MM Moezzi. 2000. "Revealing myths about people, energy, and buildings." *Proceedings of the 2000 ACEEE Summer Study on Energy Efficiency in Buildings.* American Council for an Energy Efficient Economy. Washington, DC. http://aceee.org/files/proceedings/2000/data/papers/SS00_Panel8_Paper06.pdf#page=1

Kempton, W, D Feuermann, AE McGarity. 1992. "'I always turn it on super': user decisions about when and how to operate room air conditioners." *Energy and Buildings* 18(3-4):177-191.

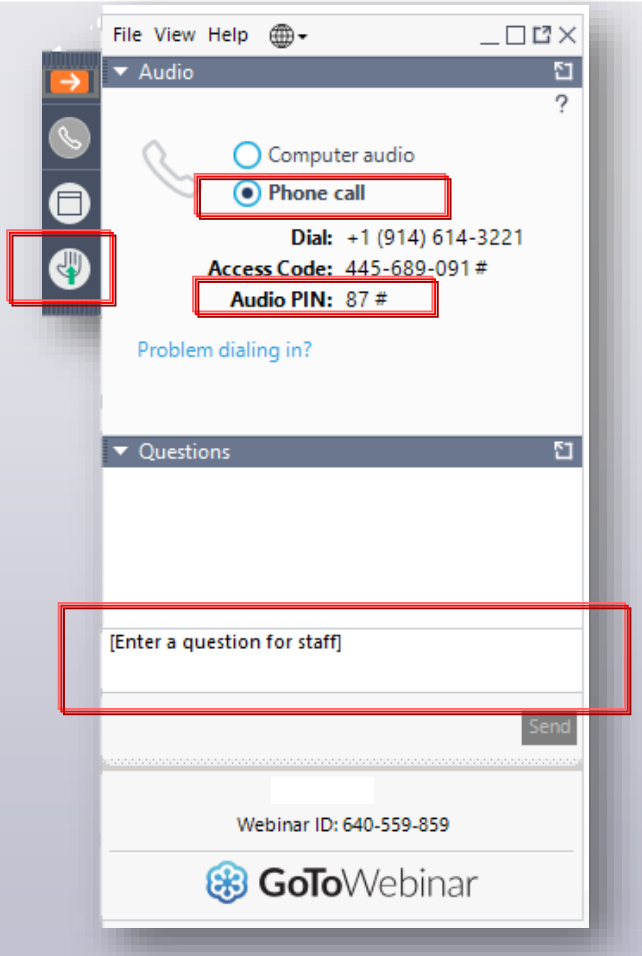
Moezzi, MM, KB Janda, and S Rotmann. 2017. "Using stories, narratives, and storytelling in energy and climate change research." *Energy Research and Social Science* 31(Sept.):1-10. https://doi.org/10.1016/j.erss.2017.06.034

Rajkovich, NB, RC Diamond, and B Burke. 2010. "Zero net energy myths and modes of thought." Lawrence Berkeley National Laboratory. Berkeley, CA. https://www.osti.gov/servlets/purl/991748,

Discussion: Mithra Moezzi

Open and close your **control panel**

Raise your hand to enter the discussion



Please use the **questions box** to submit questions, comments, or alert us of technical difficulties

If you have called in on a phone today, double check that you've selected telephone as your audio option.

Presentation Highlights: Mithra Moezzi

- **We're compelled as an industry to implement solutions despite great uncertainty**
  - Reliance on averages and "typicals" mistakes the aggregate for the individual
  - Compounded by need for countability and success in often politicized arenas
- **This leads to a reliance on shorthand**
  - "Programmable thermostats save energy." (Implied: automatically)
- **At the expense of nuance and context**
  - "Programmable thermostats save energy, when set correctly."

- **We often unfairly judge people**
  - Most are well-meaning, energy-conscious and even innovative
  - They just have lives beyond energy efficiency.

Resources Mentioned

- Litt, Barbara, Megowan, Andrew and Meier, Alan, 1993. "[Refrigerator] maintenance doesn't necessarily lower energy use," Home Energy Magazine, January/February 1993. **http://homeenergy.org/show/article/id/914**
- Meier, Alan. 1995. “Refrigerator Energy Use in the Laboratory and in the Field.” Energy and Buildings 22 (3): 233–43. **https://doi.org/10.1016/0378-7788(95)00925-N**

Nate Adams
Energy Smart Home Performance

U.S. DEPARTMENT OF ENERGY

Energy Efficiency Myth Busting:

1. It’s Really Efficiency Last
2. Not Your Father’s Heat Pump

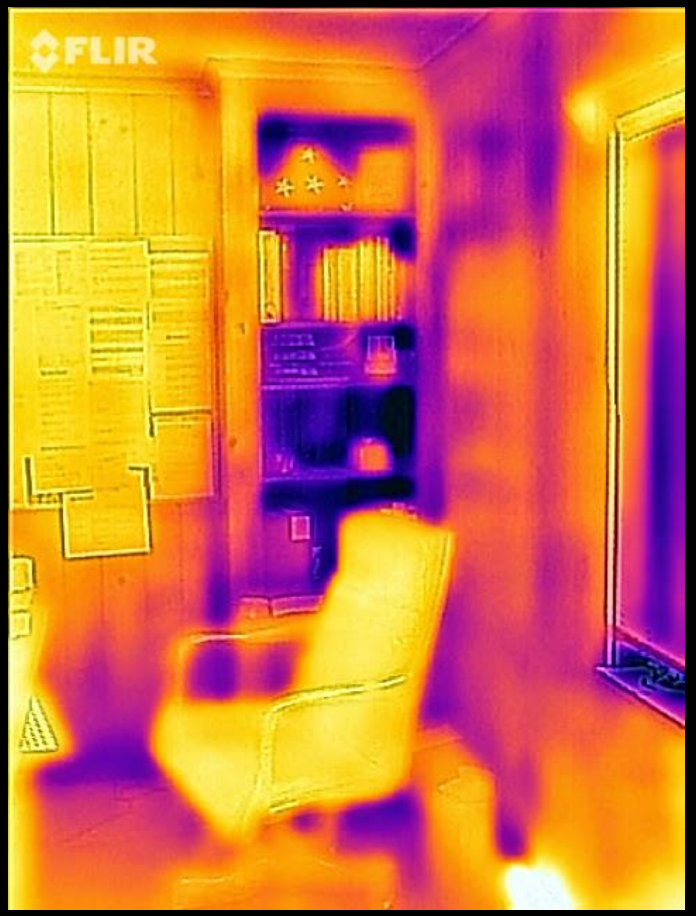
Efficiency Last

Audit Number (date)	Name	Projected SIR	Projected Payback	Customer Concerns	Blower Door	sf	Pre EUI	Pre Electric Use	Pre Gas Use (therm)	Pre Fuel Oil (gal)
131101	Brian & T	0.8	22.20	Second floor not heating well, twins waking up from naps cold	3200	3300	55.0	9000	1469	
140505	Jon and K	0.42	47.64	Uneven temperatures, electrification	2550	1764	55.2	4500	800	
140701	Adam Ga	0.4	48.40	2nd floor 15 degrees warmer, son didn't sleep well, pipe freezing concern, resilience	5800	2450	74.2	5800	1580	
141105	Alec and	0.67	24.50	Son's allergies, addition comfort, moisture	3850	2800	51.6	12300	1000	
150121	Kevan Mc	0.22	69.90	Second floor comfort, stop moist basement, overall comfort	8000	1728	82.1	7000	1150	
150223	Carlton ar	0.23	67.10	Office comfort, general comfort, reduce ice dams, don't crack string instruments, craft room comfort	9000	2852	59.9	11000	1300	
150311	Jim and J	0.14	169.00	Icicles, poor comfort in master	3250	2568	48.7	7200	980	
150406	Ryan and	0.5	44.50	Ice dams, cold bedroom, hot second floor	6475	2565	102.6	17000	2000	
140424	John and	0.13	134.20	Ice dams, addition comfort, 2nd floor comfort, allergies	3450	1700	82.6	16000		618
150501	Paul and	0.1	153.00	Add AC, create comfortable house	4000	1300	99.9	8000	1000	

Efficiency Last

Projected SIR	Projected Payback	Customer Concerns
0.8	22.20	Second floor not heating well, twins waking up from naps cold
0.42	47.64	Uneven temperatures, electrification
0.4	48.40	2nd floor 15 degrees warmer, son didn't sleep well, pipe freezing concern, resilience
0.67	24.50	Son's allergies, addition comfort, moisture
0.22	69.90	Second floor comfort, stop moist basement, overall comfort
0.23	67.10	Office comfort, general comfort, reduce ice dams, don't crack string instruments, craft room comfort
0.14	169.00	Icicles, poor comfort in master
0.5	44.50	Ice dams, cold bedroom, hot second floor
0.13	134.20	Ice dams, addition comfort, 2nd floor comfort, allergies
0.1	153.00	Add AC, create comfortable house

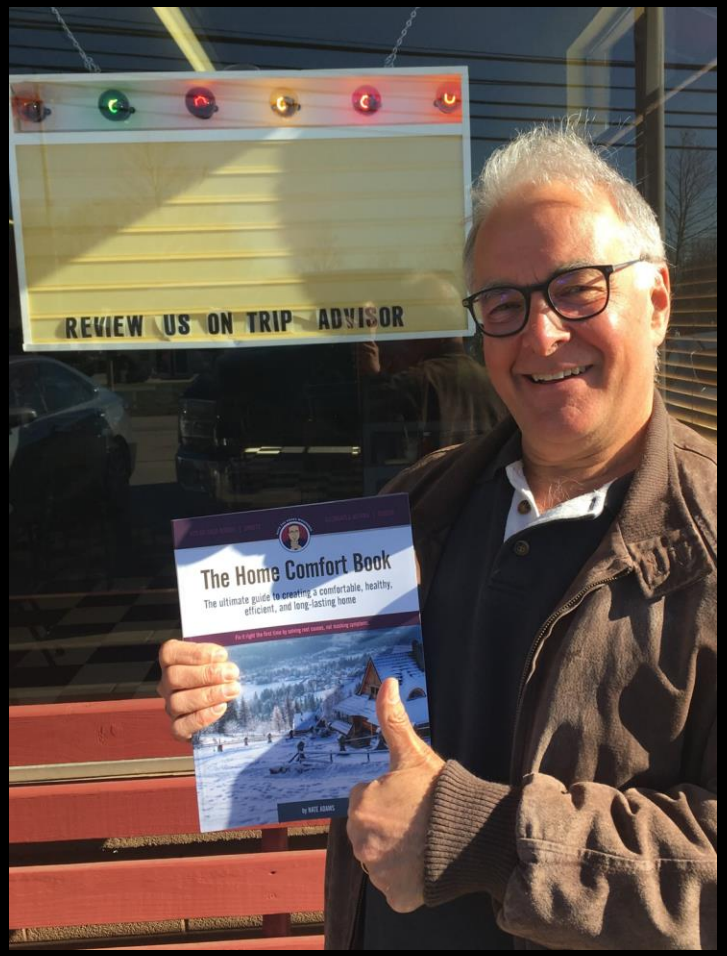
Efficiency Last



Office comfort problems in 1957 Cape Cod Case Study

Efficiency Last

Carlton Sears:
"My office used to dip into the 50s on cold days. It was 7 degrees out the other day, my office was within 1-2 degrees of the rest of the first floor."



Efficiency Last

What do consumers care about?

Ask them.
Large projects happen, as do energy savings.

Efficiency Last,
Comfort First.

Customer Concerns
Second floor not heating well, twins waking up from naps cold
Uneven temperatures, electrification
2nd floor 15 degrees warmer, son didn't sleep well, pipe freezing concern, resilience
Son's allergies, addition comfort, moisture
Second floor comfort, stop moist basement, overall comfort
Office comfort, general comfort, reduce ice dams, don't crack string instruments, craft room comfort
Icicles, poor comfort in master
Ice dams, cold bedroom, hot second floor

Not Your Father's Heat Pump

- Built 1915
- 1728 square feet
- 1 occupant
- Foamed walkup attic
- 1960 cfm50 leakage
- 57,611 BTU/hr Manual J

- Built 1918
- 1764 square feet
- 1 occupant
- Foamed walkup attic
- 1860 cfm50 leakage
- 54,713 BTU/hr Manual J

Not Your Father's Heat Pump

Furnace Heated

Air Source
Heat Pump Heated
(cold climate aka ccASHP)

Not Your Father's Heat Pump

Furnace Heated
Cost to Operate
12/15 - 12/16
$1813.62

ccASHP Heated
Cost to Operate
12/15 - 12/16
$1730.00

Not Your Father's Heat Pump

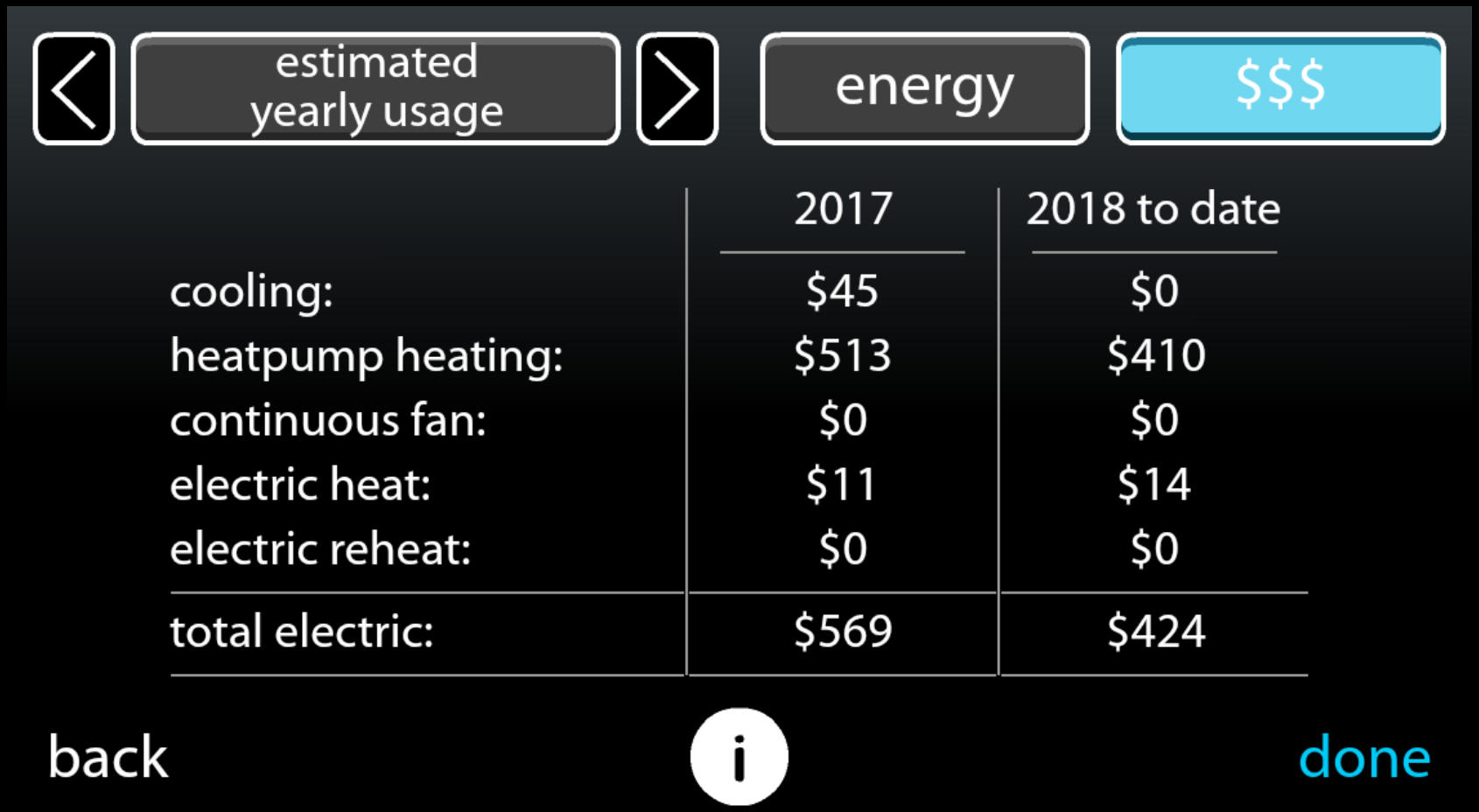
estimated yearly usage | energy | $$$

	2017	2018 to date
cooling:	415 kwh	0 kwh
heatpump heating:	4650 kwh	3720 kwh
continuous fan:	212 kwh	6 kwh
electric heat:	96 kwh	128 kwh
electric reheat:	0 kwh	0 kwh
total electric:	5373 kwh	3854 kwh

back

done

Not Your Father's Heat Pump



I have daily data on 5 electrifications and one hybrid through the 2017-2018 cold snap.

Myth Busting:

1. It’s Really Efficiency Last
2. Not Your Father’s Heat Pump

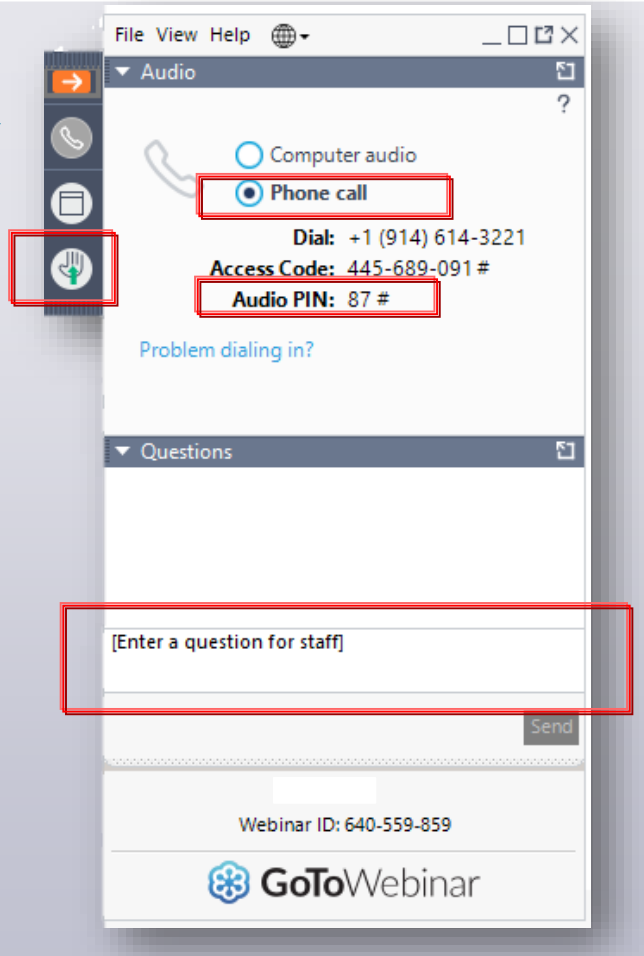
nate@energysmartohio.com

natethehousewhisperer.com

Discussion: Nate Adams

Open and close your **control panel**

Raise your hand to enter the discussion



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Presentation Highlights: Nate Adams

- **Efficiency is last (on the list of homeowner concerns)**
  - Customers DO care about comfort – but what else?
  - Ask them, and focus on what the customer is trying to solve
  - Have the homeowner list their issues, rank them and say how much they'd be willing to spend to resolve each

- **ASHPs should be considered at the start of most every project**
  - Cold-climate ASHPs especially have made great technological progress
  - Very often meet (or even beat) operational costs of gas furnaces in cold climates
  - GSHPs have their applications, but higher initial costs often tip the balance

Pamela Brookstein
Elevate Energy

U.S. DEPARTMENT OF ENERGY

MythBusters

The Real Estate Episode

April 12, 2018

ELEVATE ENERGY
Smarter energy use for all

Elevate Energy

https://www.elevateenergy.org/

Myth Number One

All real estate agents are full-time, making a living selling property.

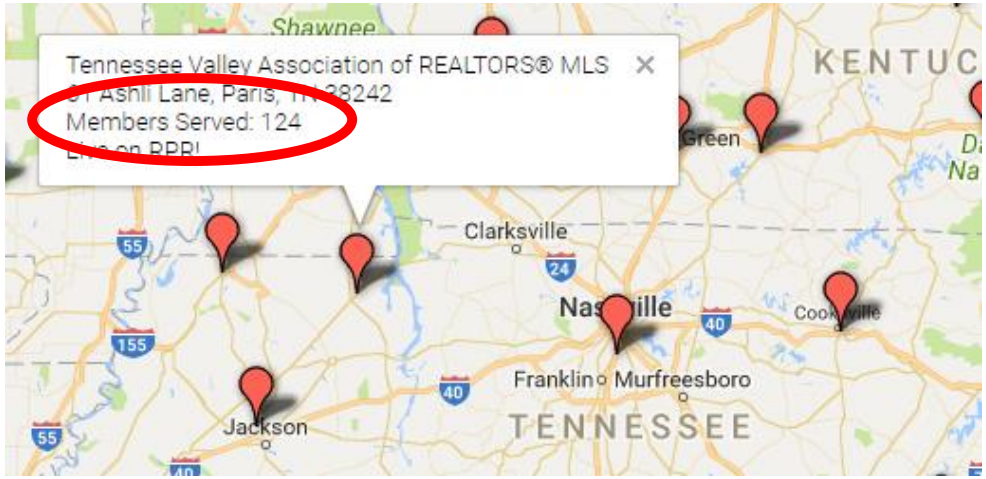
Myth Number Two

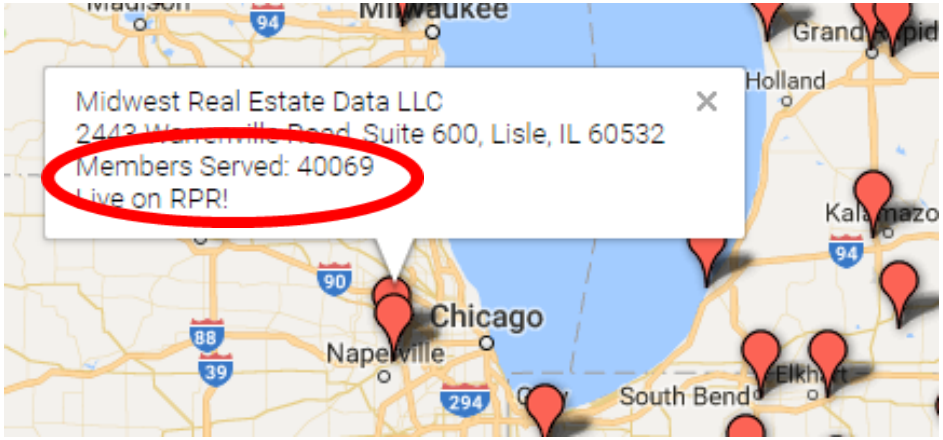
There is an MLS.

(Multiple Listing Service)

Truth!

http://blog.narrpr.com/rpr-partners/





Myth Number Three

If I want help reaching my real estate community, I should call the National Association of REALTORS®!

Let's go straight to the top!

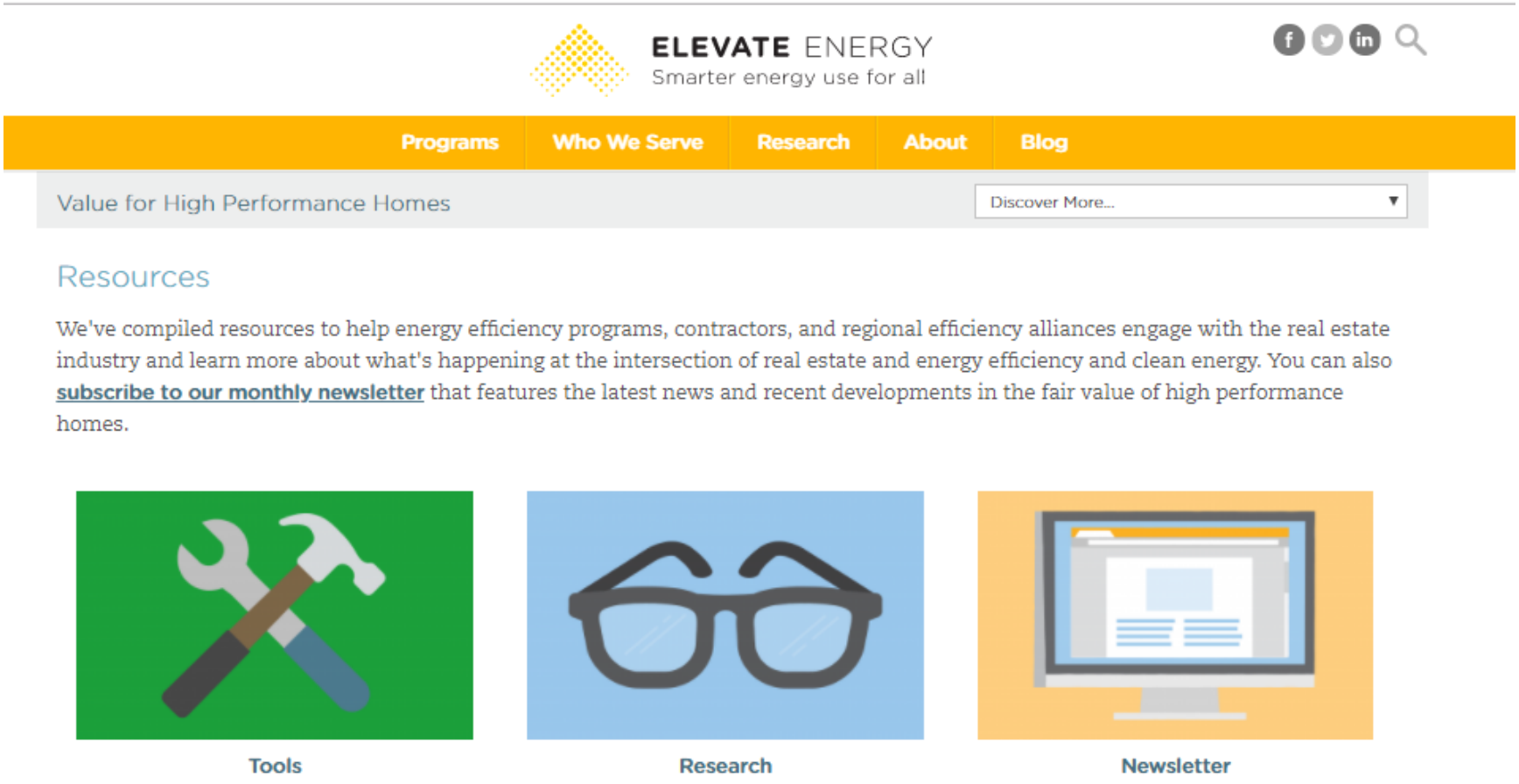
Truth! Real Estate is Local

REALTORS® State and Local Boards

STATE	ASSOCIATION	WEBSITE	PHONE	FAX
AK				
AL				
AR				
AZ				
CA				
CO				
CT				
DC				
DE				
	DELAWARE ASSOCIATION OF REALTORS®	www.delawarerealtor.com	(302) 734-4444	(302) 734-1341
	KENT COUNTY ASSOCIATION OF REALTORS®	www.kcar.org	(302) 678-9750	(302) 678-0848
	NEW CASTLE COUNTY BOARD OF REALTORS®	www.nccbor.com	(302) 762-4800	(302) 762-4840
	SUSSEX COUNTY ASSOCIATION OF REALTORS®	www.scaor.com	(302) 855-2300	(302) 855-2319
FL				
GA				
GU				

https://www.nar.realtor/leadrshp.nsf/?OpenDatabase

https://www.elevateenergy.org/value-high-performance-homes



Pamela Brookstein
Market Transformation Specialist
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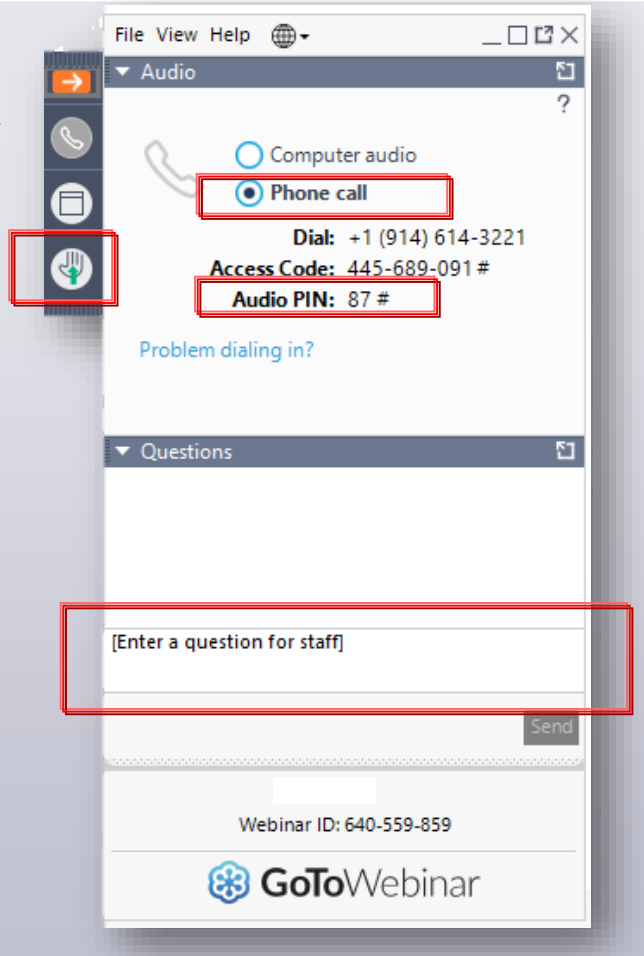
773-269-2220

https://www.elevateenergy.org/value-high-performance-homes

Discussion: Pamela Brookstein

Open and close your **control panel**

Raise your hand to enter the discussion



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Presentation Highlights: Pamela Brookstein

- **Most real-estate agents work part-time, and sell few houses**
  - Find the “rock stars”: full-time, sell many homes and great at marketing
- **There are many hundreds of MLS services, not one central platform**
  - 700 nationwide, and 95/100 covering the largest metro areas have Green Fields (entry fields for green information)
- **All real estate is local**
  - Work with your local real estate community (state and local associations rather than the NAR)
  - Contact the education director of your local association and find out what kind of outreach might be helpful to their members
- **It’s our job to communicate the value of energy efficiency**
  - Can’t expect everyone to be knowledgeable and passionate
  - Understand customer needs and wants first

Open Discussion

What are the gaps in knowledge around residential energy efficiency and the myths presented that, if filled, would help improve work in this area?

Closing Poll

- **After today's call, what will you do?**
  - Consider implementing one or more of the ideas discussed
  - Seek out additional information on one or more of the ideas
  - Make no changes to your current approach
  - Other (please explain)

Closing Poll Results

- **After today's call, what will you do?**
  - Consider implementing one or more of the ideas discussed – *26%*
  - Seek out additional information on one or more of the ideas – *53%*
  - Make no changes to your current approach – *18%*
  - Other (please explain) – *3%*
    - Other responses: Picked up some new concepts but not specific ideas to implement

Upcoming Seasonal Messaging Opportunities

Now is the time to start planning energy efficiency messaging!

Summer is cooling season

PRESS RELEASE - JUNE 28, 2017

Cut Energy Costs this Sun

Burlington, VT

On hot summer days, stay cool while spending less on energy with these
Vermont.

- **Block the Heat.** Caulk around window and exterior door frames and
  exterior doors. When it's hotter outside than inside, close your wind
  coverings against direct sunlight.
- **Is the House Hotter than the Outdoors?** Open your windows and u
  blowing out. That will push out hot air and pull in cool air through c
  windows.

Efficiency Vermont

5 Ways to Beat the Heat

July 13, 2013 / 0 Comments / in Energy Efficiency Tips / by Nicole Klosterman

Greater Cincinnati Energy Alliance

Finds us at the HPC Conference

- **Home Performance Industry Round Up** (Mon. 10:30 – 5:00)
- **Better from A Distance: Saving Money and Improving Quality with Remote Techniques** (Tues. @ 10:30)
- **Home Performance with ENERGY STAR: All the Ingredients You Need for a Successful Program** (Wed. @ 8:30)
- **Advanced Residential Energy Efficiency Technologies** (Thurs. @ 10:30)

Explore the Residential Program Solution Center

Resources to help improve your program and reach energy efficiency targets:

- Handbooks - explain *why* and *how* to implement specific stages of a program.
- Quick Answers - provide answers and resources for common questions.
- Proven Practices posts - include lessons learned, examples, and helpful tips from successful programs.
- Technology Solutions NEW! - present resources on advanced technologies, **HVAC** & **Heat Pump Water Heaters**, including installation guidance, marketing strategies, & potential savings.

https://rpsc.energy.gov

Thank You!

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Share with us your top stories on how your organization is accelerating energy savings through efficiency upgrades, strategies, and investment!

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Better Buildings LinkedIn

Please send any follow-up questions or future call topic ideas to:
bbresidentialnetwork@ee.doe.gov