

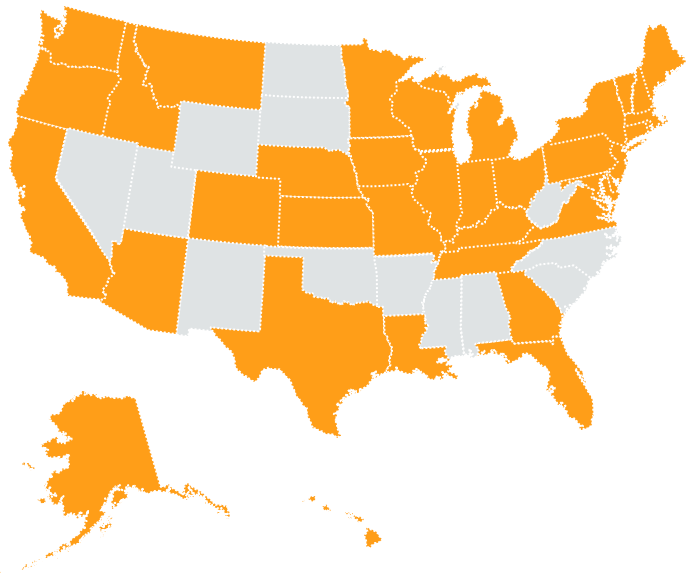


VEIC Training Series

# **HVAC: Unlocking opportunities to maximize energy savings**

**May 29, 2020**

# About VEIC



**We're on a mission to generate the energy solutions the world needs.**

VEIC works with organizations across the energy landscape to create immediate and lasting change. Since 1986, we've served as an objective partner for our clients as they navigate complex energy challenges. With expertise in energy efficiency, building and transportation electrification, and new approaches for a clean and flexible grid, we bring new solutions to the market that meet goals and make change.

**veic**

**Together with our clients,  
we've been delivering  
customized trainings to  
the market to build  
expertise and drive value  
with end-use customers.**



# Our HVAC expert

## Rachael Mascolino

### Senior Energy Consultant

Rachael is a subject matter expert. She specializes in HVAC, energy management systems, and controls and has extensive experience working within the healthcare and industrial sector.

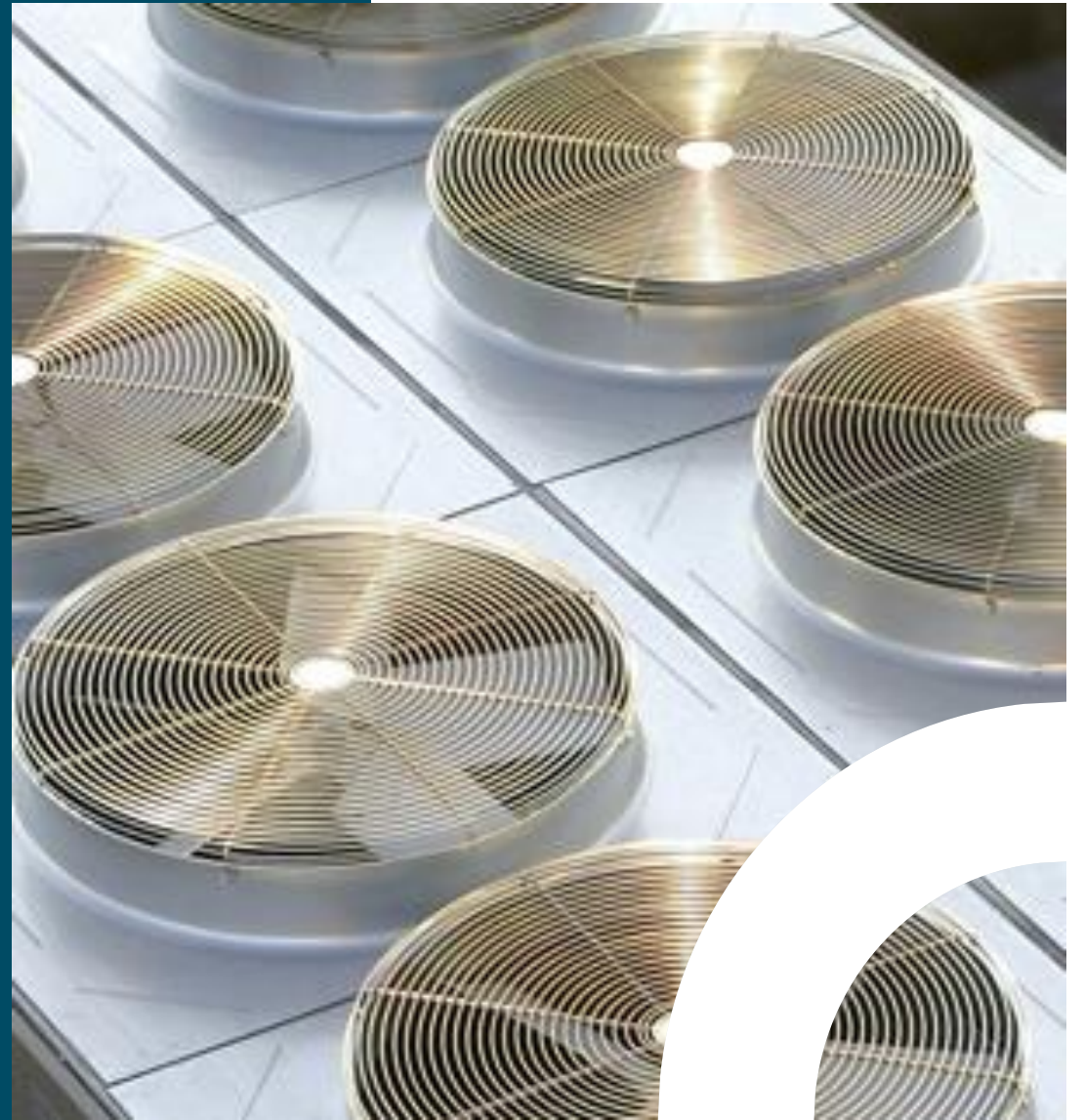
Her specialization has evolved through her evaluations for engineering best practices of design and energy-saving opportunities across multiple measures.



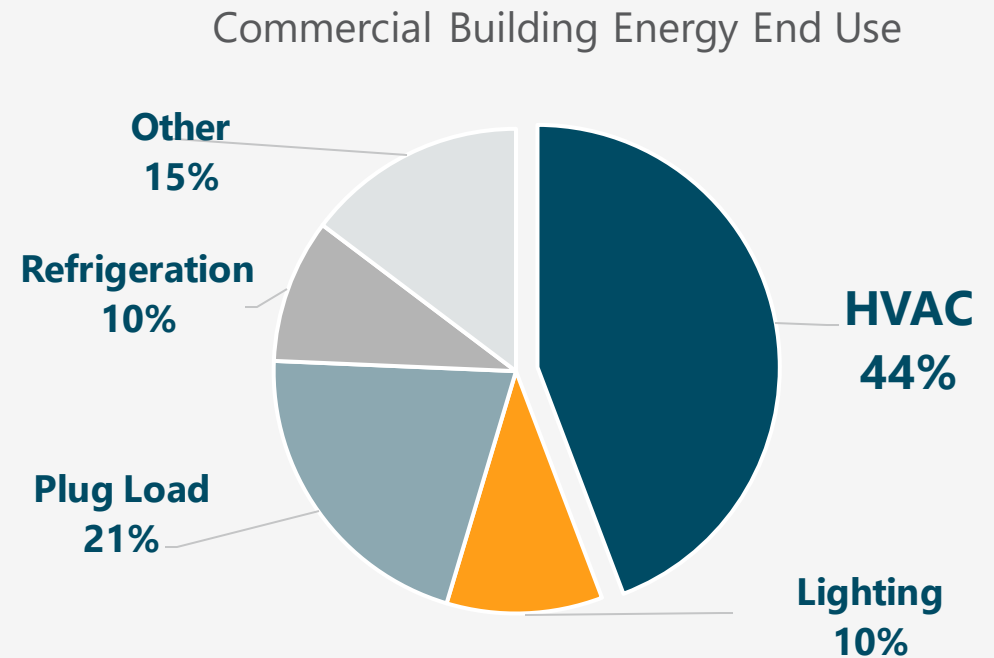
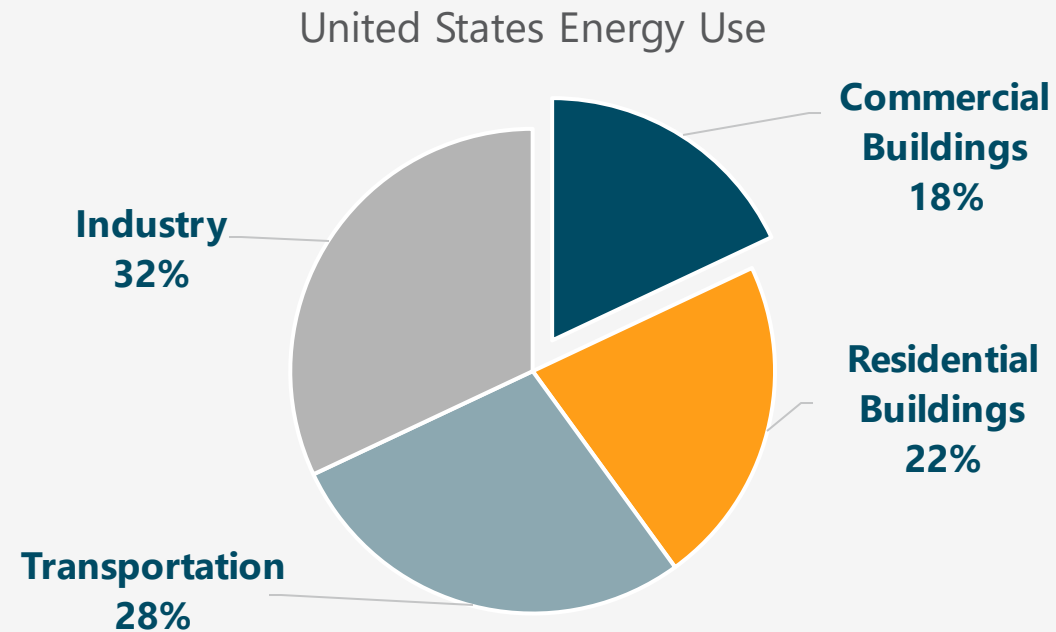
# Agenda

Characterizing buildings for  
energy savings opportunities

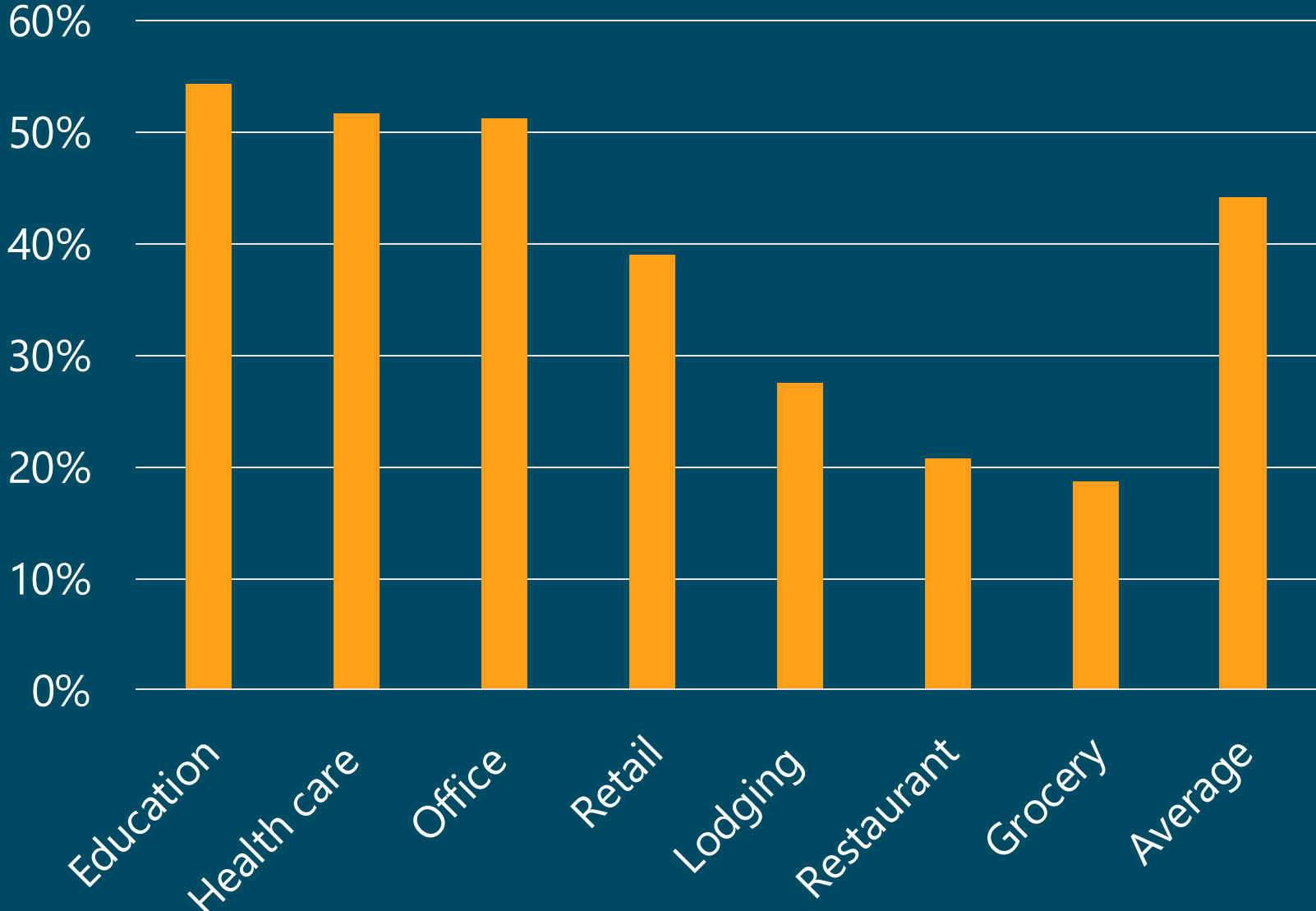
Top thermal and electrical  
measures



# United States Energy Use



# HVAC Energy end use by market



# Characterize your customer

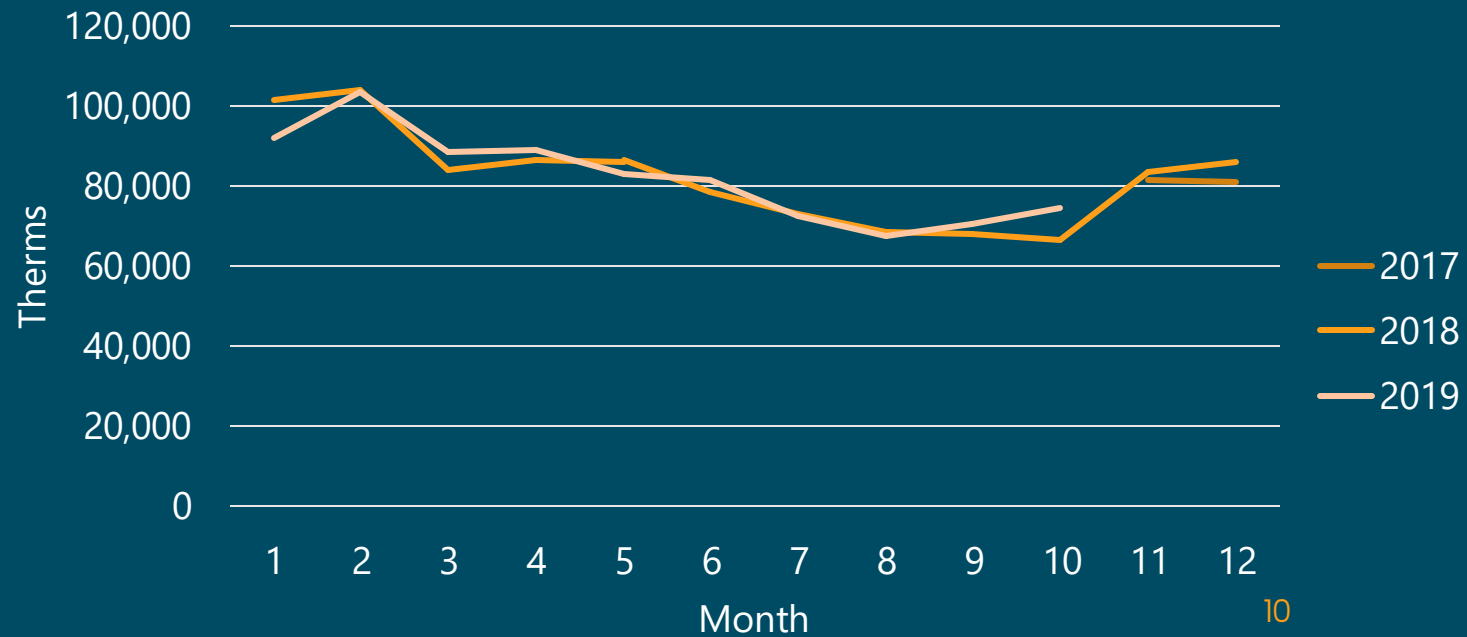
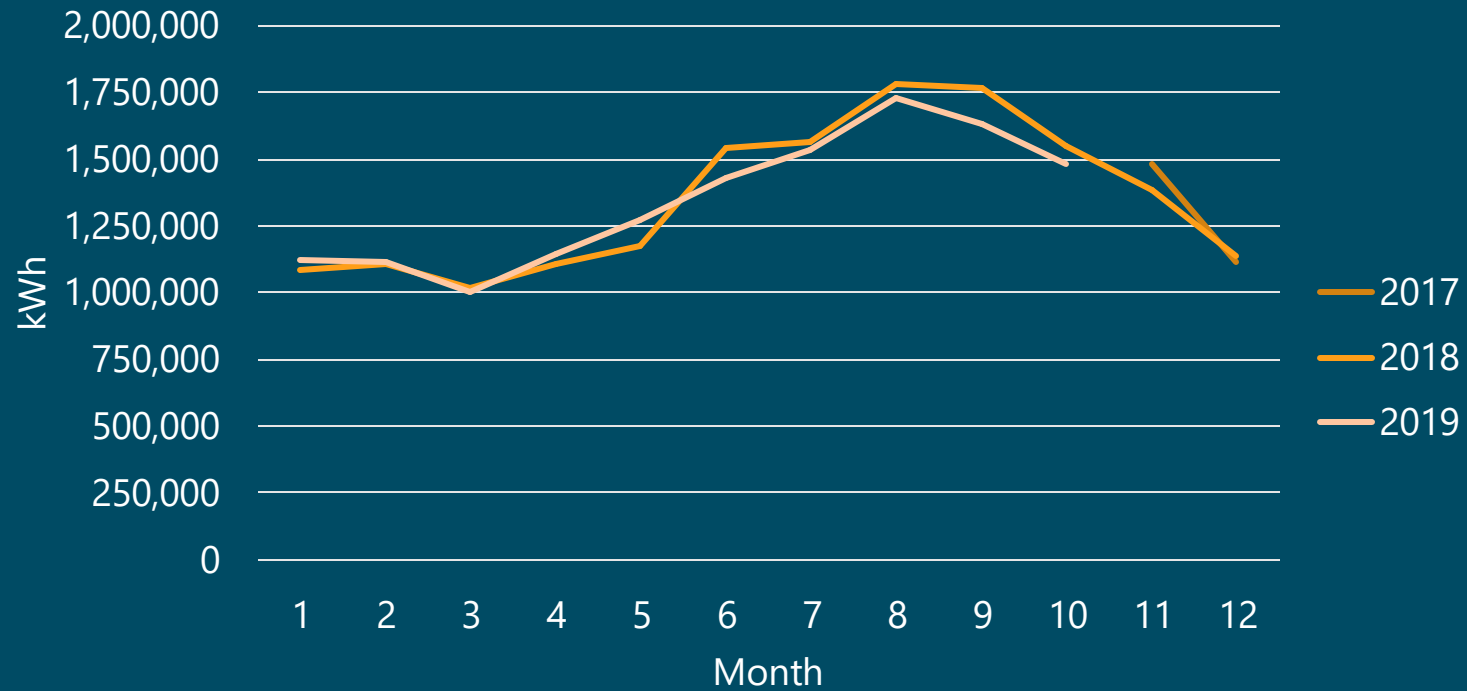
- Before you start talking about efficiency, identify the foundational system to which the efficiency will be applied
- Primary operation and building use
- 2 years of historical usage; electrical and thermal
- Project and efficiency utility engagement history





# A little goes a long way.

With a little information, you can facilitate a succinct and personalized conversation about a customer's energy use and opportunities.



# Characterize your customer

- Lead with relevance
- Make the invisible visible
- Provide technical value as soon as possible in the first engagement
- Don't be the author of another dust collecting report
- Money is cheaper than time



# Thermal measures

## Steam

- Burners
- Traps
- Condensate return
- Pipe, fitting, tank insulation

## Water

- Burners
- Boiler staging/ idling
- Supply temperature reset
- Pipe, fitting, tank insulation
- Air and dirt separation



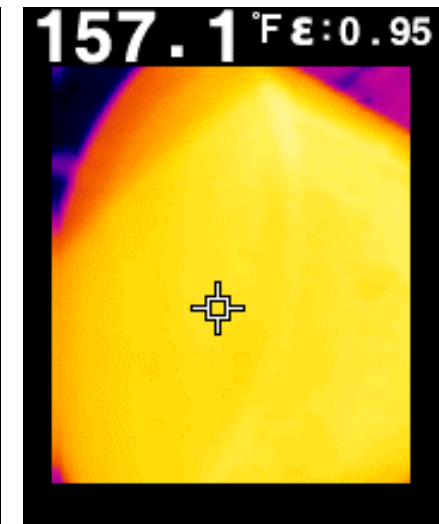
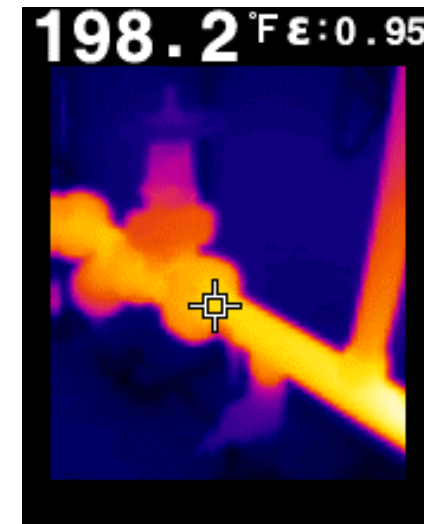
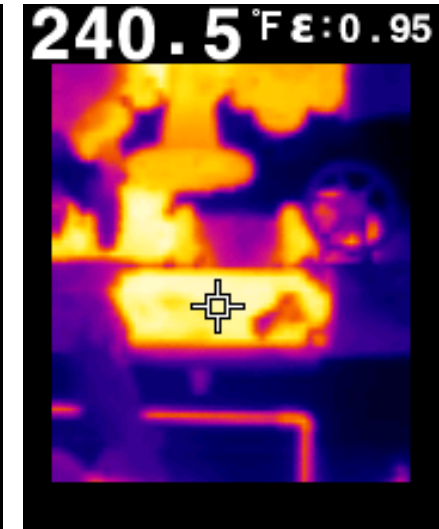
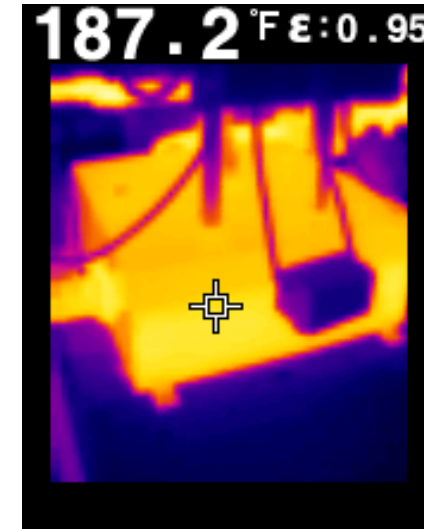
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Measure	Simple Payback
Steam trap audit & repair/replace failed traps	< 6 months
Optimize boiler staging	< 6 months
Reduce boiler pressure	<1 week
Add insulation to steam pipes and valves	<18 months
Add outside air temperature reset control to hot water boilers	<2 years
Enable differential pressure control of hot water pump VFDs	<2 months
Add O2 trim to boiler burner controls	1 year

# Demand side efficiency

## Thermal and Electrical Savings

- What are you asking your equipment to do?
- You don't need to be a controls savant or programmer. Follow the communication path.
- Visibility = energy savings.
  - kw/ton of the chiller
  - Air flow
  - Damper and valve positions



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Measure	Simple Payback
Space no longer requires 100% OA. Add damper actuator and controller.	< 6 months
Calibrate air flow stations	< 3 months
Correct schedule to reflect occupancy	< 1 month
Complete differential pressure SOO. Take VFDs out of hand	<1 month
Add supplemental cooling to critical zone	< 3 years
Air balance to correct excessive air changes	< 1 year
Optimal start stop logic	< 1 year



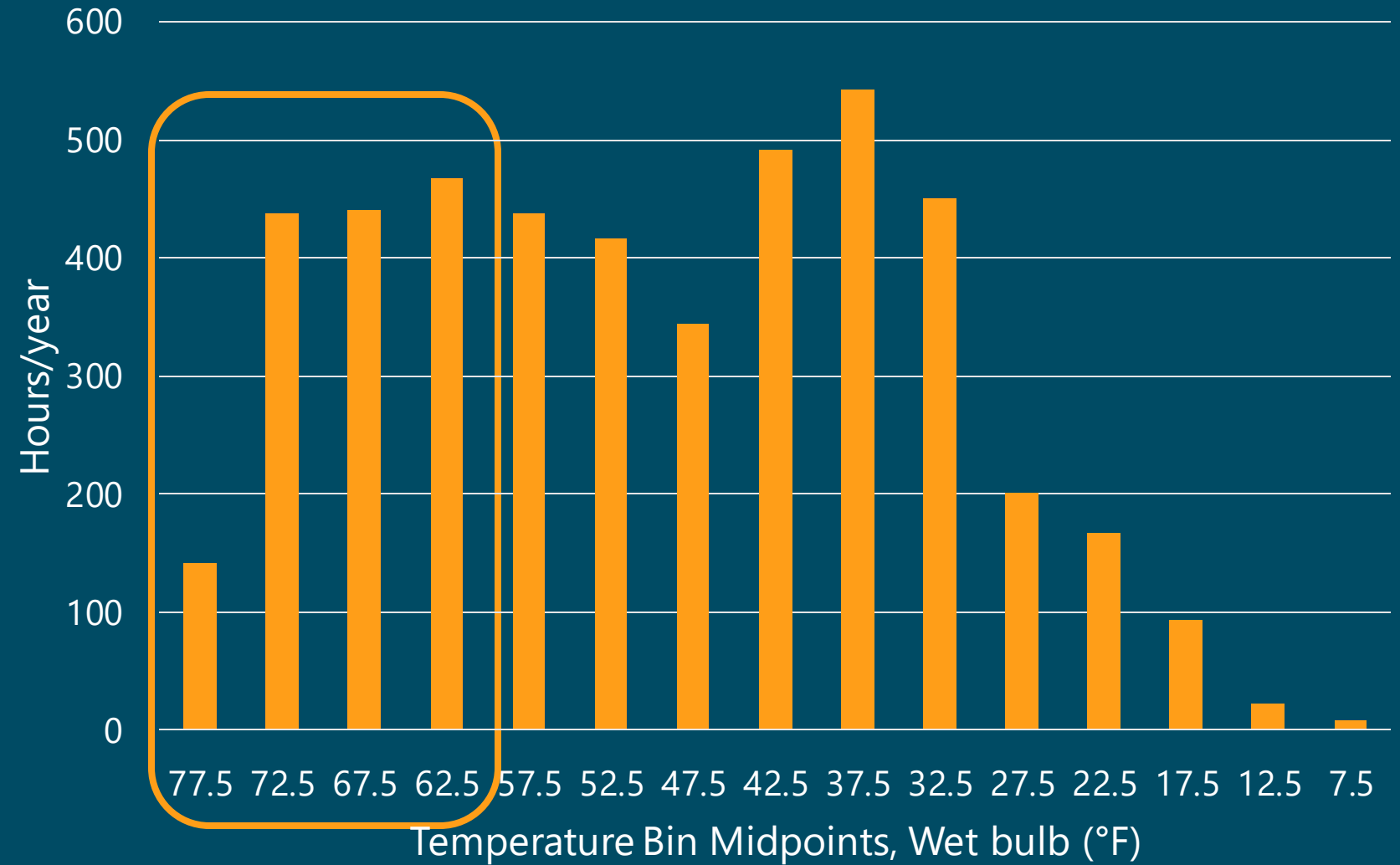
# Ventilation

- Significant and invisible
- Required for human health and productivity
- Where to look for efficiency:
  - Energy recovery
  - Damper actuators and controls
  - Coupled vs decoupled strategy and associated controls



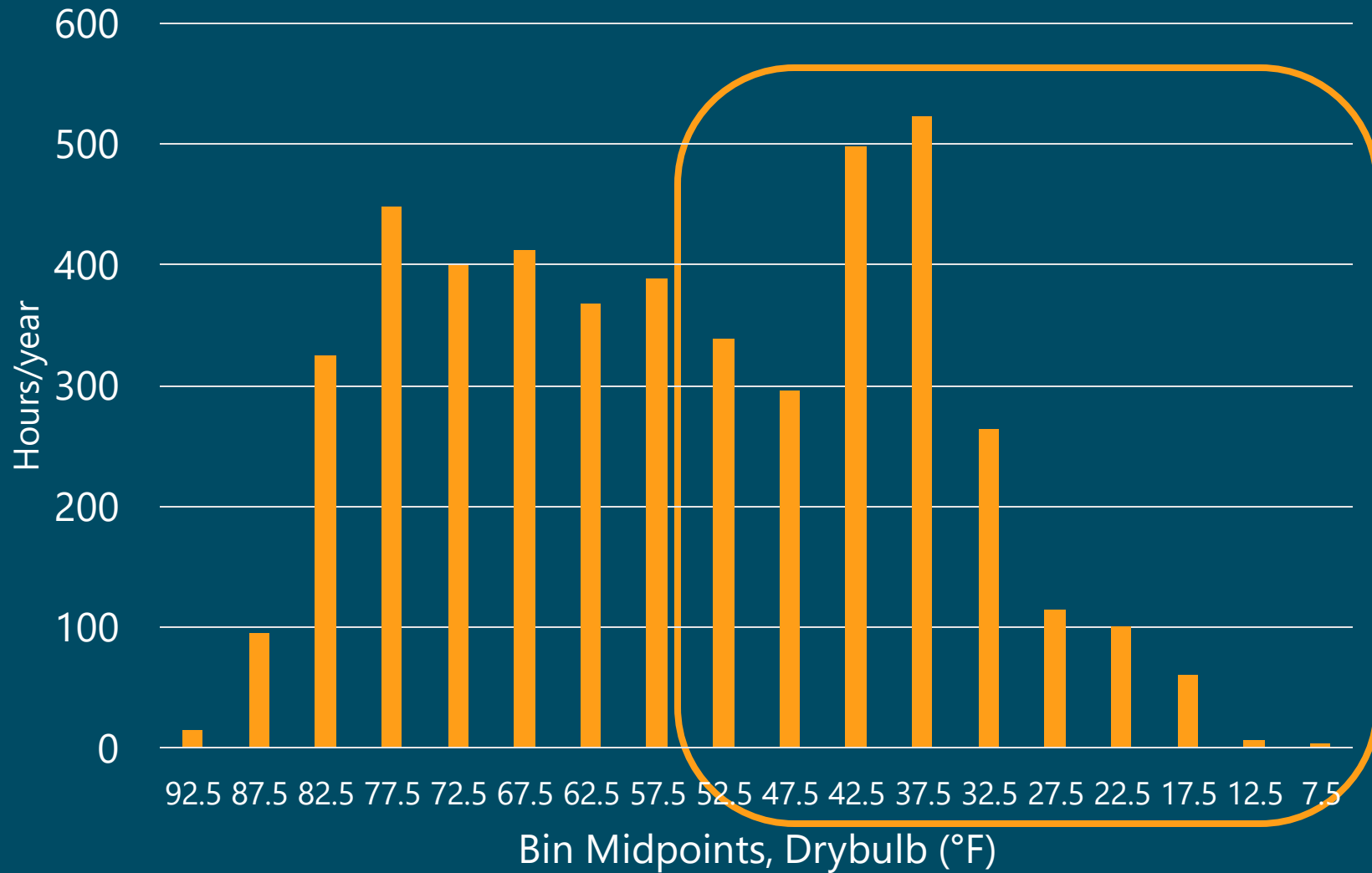
**Hours where  
OA is in a  
higher energy  
state than  
indoor air.**

TMY3 Bin Data, JFK Airport



**Hours where  
OA has a lower  
energy state  
than indoor air.**

TMY3 Bin Data, JFK Airport



# Ventilation Strategies

## Pre Pandemic

- Meet but do not exceed 62.1
- Occupancy schedules
- What is ACH?
- “there is ventilation air in the hallway, it will get into the conference room.” (magic?)
- MERV 8 filters will keep the pollen out

## Pandemic Mode

- Energy use will undoubtedly increase.
- Over ventilate, as much as possible.
- Pre and post occupancy flush for 2 hours.
- Evaluate use of MERV 13 filters
- RH control 50 +/- 10%
- Control, visibility, proof.

## Coronavirus (COVID-19) Response Resources from ASHRAE and Others

ASHRAE has published two statements to define guidance on managing the spread of COVID-19 with respect to the operation and maintenance of HVAC systems in buildings. ASHRAE recommends operators continue to run systems during this time to help control the spread of the virus. Read the official statements and affiliated guidance on ASHRAE's official COVID-19 page. [www.ashrae.org/covid19](http://www.ashrae.org/covid19)

 Centers for Disease Control and Prevention  
CDC 24/7: Saving Lives, Protecting People™

Coronavirus Disease 2019 (COVID-19)

<https://www.cdc.gov/coronavirus/2019-ncov/community/guidance-business-response.html>



# Keys to unlocking HVAC energy savings

Be a building scientist and a building psychologist. There is an art to motivating change, and it isn't about the money.

Manage expectations of savings vs. expense. Don't lead with capital improvements. Help build confidence with savings momentum.

Invest the time and resources to bolster the foundation of your mechanical systems knowledge (or hire VEIC to do it for you).

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# Questions



# Trainings, services, and more...



**Energy  
Efficiency**



**Building  
Electrification**



**Transportation  
Electrification**



**Clean & Flexible  
Grid**



**Thank you!**

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 **Vermont**





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