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# Case Studies for Implementing Energy Efficiency Measures Session 10

# Affton School Districts Path to Improved Energy Efficiency and Renewable Energy





# Affton School District

Located in St. Louis County

Founded in 1855

Affton High School

Rogers Middle School

Gotsch Intermediate School

Mesnier Primary

Early Childhood Center

Admin Building

481,701 SF



# Benchmarking

Building	EUI	\$/SF	Energy Star
ECC	118	\$2.14	NA
Rogers Middle	96	\$1.64	7
High School	93	\$1.46	18
Admin	86	\$1.45	36
Mesnier Primary	62	\$1.00	47
Gotsch Intermediate	52	\$0.95	53

Completed in 2019



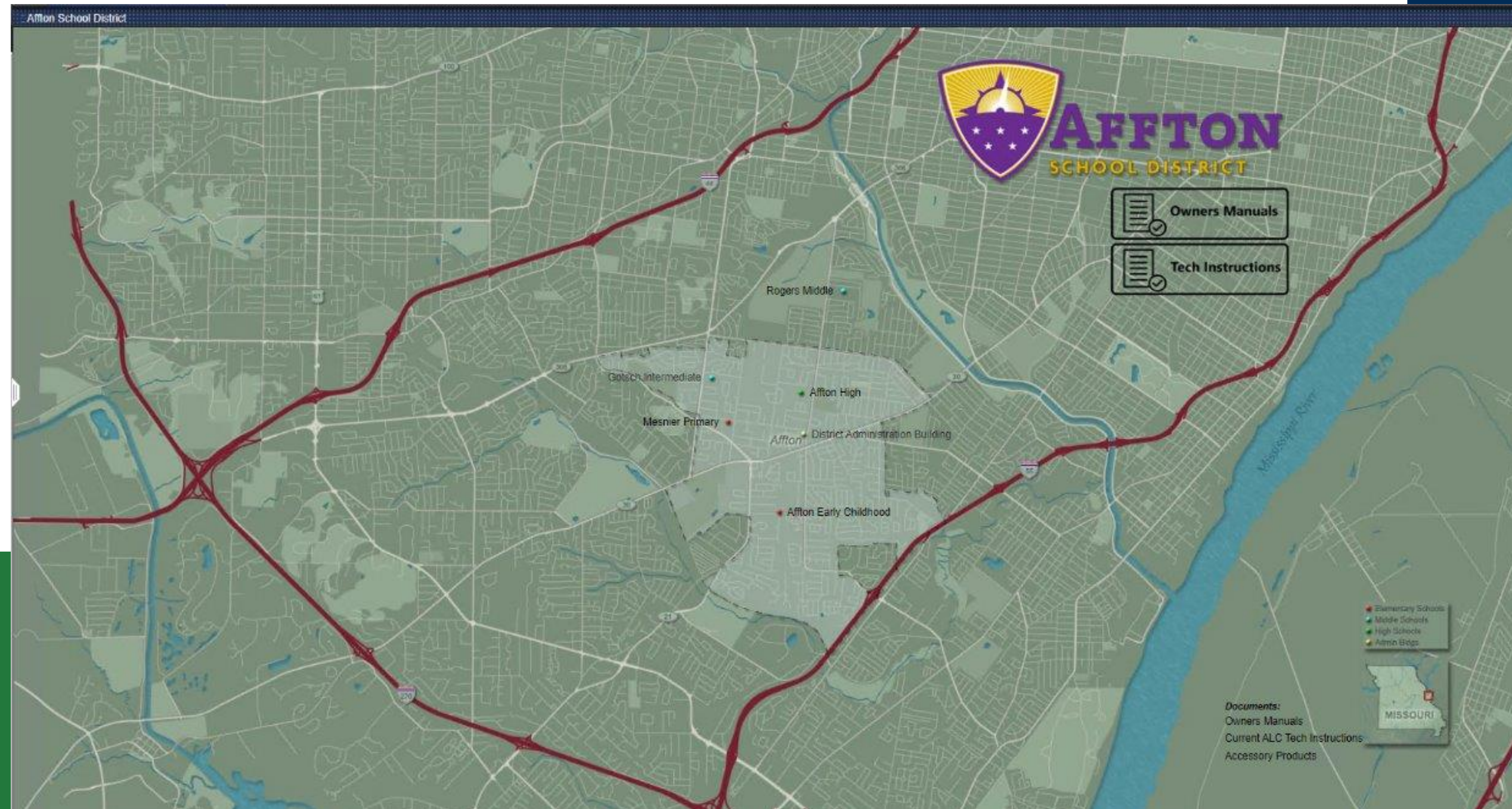
# Building Improvements

Building	New BAS (w/CO <sub>2</sub> )	HVAC Improvements
ECC	X	None
Rogers Middle	X	None
High School	X	RTUs, Boilers, VFDs
Admin	X	VAVs, VFDs, Boilers
Mesnier Primary	X	None
Gotsch Intermediate	X	None





# Building Automation System (BAS)





# Building Automation System



# Building Automation System





# Rooftop Unit (RTU)



# Boilers





# Variable Frequency Drive (VFD)





# Variable Air Volume (VAV) Box





# Building Improvement Results

Building	EUI*	Energy Star*
ECC	118 / 26 (80%)	NA
Rogers Middle	96 / 51 (47%)	7 / 78 (+71)
High School	93 / 56 (40%)	18 / 83 (+65)
Admin	86 / 44 (49%)	36 / 80 (+44)
Mesnier Primary	62 / 34 (45%)	47 / 93 (+46)
Gotsch Intermediate	52 / 32 (38%)	53 / 90 (+37)

\* Through 2023



# District Results

- First Year Savings: \$389,000
- Incentives: \$423,969
- BAS Payback: 2.3 Years
- Savings to Date: \$1,000,000+
- Energy Reduction: 45%





# Solar

## Installed

- ECC: 100 kW (May 21)
- High School: 100 kW (Jan 24)
- Mesnier Primary: 125 kW (Jan 24)
- Total 325 kW

## Coming Soon

- ECC: 25 kW (Rate change 3M - 2M)
- Gotsch Intermediate 100 kW
- Rogers Middle: 100 kW
- Total: 225 kW

## Grand Total: 550 kW

742,500 kWh annually, 27% reduction



# Greenhouse Gas Reduction

## Benchmarking

**3,580 Metric Tons of CO2 Equivalent**

## Post Solar Install

**1,368 Metric Tons of CO2 Equivalent**

**62 %  
Reduction**

**Annual energy use  
for 288 homes**



# 2024 Midwest Energy Policy Series

Renewables & Efficiency Case Studies for Implementing Energy Efficiency Measures

***SUPPORTING***

***[DOING]***

***LEADING***

## Motivations for implementing Commercial EE measures

- Equipment at or nearing end of life
- Reduce maintenance costs (money & time)
- Reduce operating costs (utilities)
- Appeal to environmentally conscientious customers and/or comply with company sustainability initiatives
- Take advantage of utility incentives and possible tax incentives







#SchittsCreek



WHAT ARE WE SUPPOSED  
TO DO NOW?

## Where to begin?

- Energy audit, Energy walkthrough, Benchmarking, Utility analysis
- Low-cost, No-cost Measures





## OLD EQUIPMENT



## NEW EQUIPMENT



## Example Case Study School

- Lighting and HVAC replacement projects at a mid-size University
  - Old fluorescent lighting -> New LED lighting
  - Replaced old, inefficient chillers, packaged units and split systems
- Estimated savings impact over 4,500,000 kWh, or over \$315,000/yr.
- Collected over \$298,000 of utility incentives
- Improved atmosphere, more comfortable, more inviting



## OLD EQUIPMENT



## NEW EQUIPMENT



## Example Case Study Hospital

- Lighting replacements at a large hospital
  - Old fluorescent lighting -> New LED lighting
- Estimated savings impact over 1,600,000 kWh, or over \$150,000/yr.
- Collected over \$266,000 of utility incentives
- Safer environment for patients and staff



## OLD EQUIPMENT



## NEW EQUIPMENT



## Example Case Study Industrial

- Process chiller replacements, fan and VFD installation, Compressed Air system optimization at a manufacturing facility
- Estimated savings impact over 2,900,000 kWh, or over \$232,000/yr.
- Collected over \$230,000 of utility incentives
- More productive site, less downtime while also improving efficiency



## OLD EQUIPMENT



## NEW EQUIPMENT



## Example Case Study Office

- Lighting and HVAC replacement projects at a mid-rise office building
  - Old fluorescent lighting -> New LED lighting
  - Replaced old, inefficient chiller and HVAC controls
- Estimated savings impact over 1,000,000 kWh, or over \$139,000/yr.
- Collected over \$150,000 of utility incentives
- More marketable location for prospective tenants, frees capital for other improvements



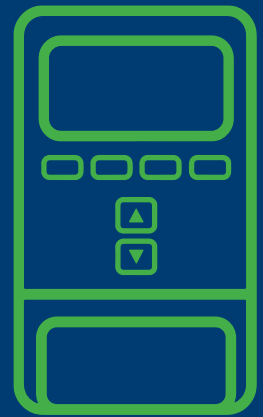
# Common Themes

- Starting with Lighting and HVAC
- Unexpected benefits

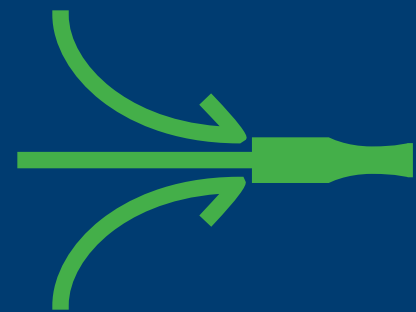




## Zoom out...Energy Efficiency measures that could be overlooked



**VFDs**



**Compressed  
Air**



**HVLS fans**



**Refrigeration**



**Exterior  
Lighting**



# Thanks!



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# → Navigating Changes in the HVAC Industry

08/21/2024

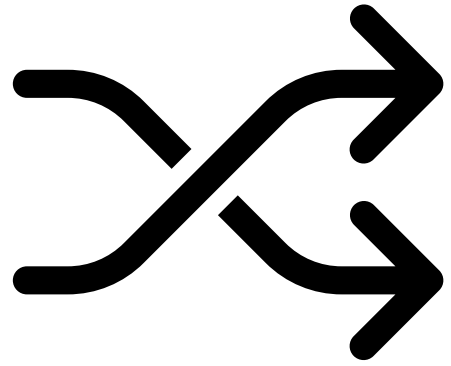
Kimberly Wallis  
Portfolio Manager





# Simultaneous Changes

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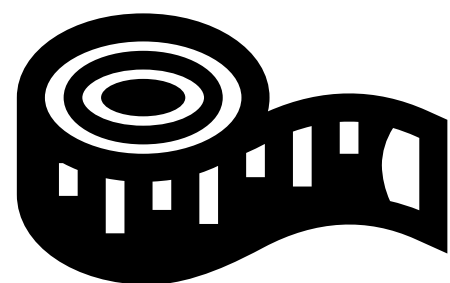
There were two significant changes to heating and cooling equipment standards that took effect on Jan. 1, 2023:

1. Updated **testing procedure** and metrics
2. An **increase in the performance standards** – higher minimum standard cooling and heating efficiencies

The Challenge:

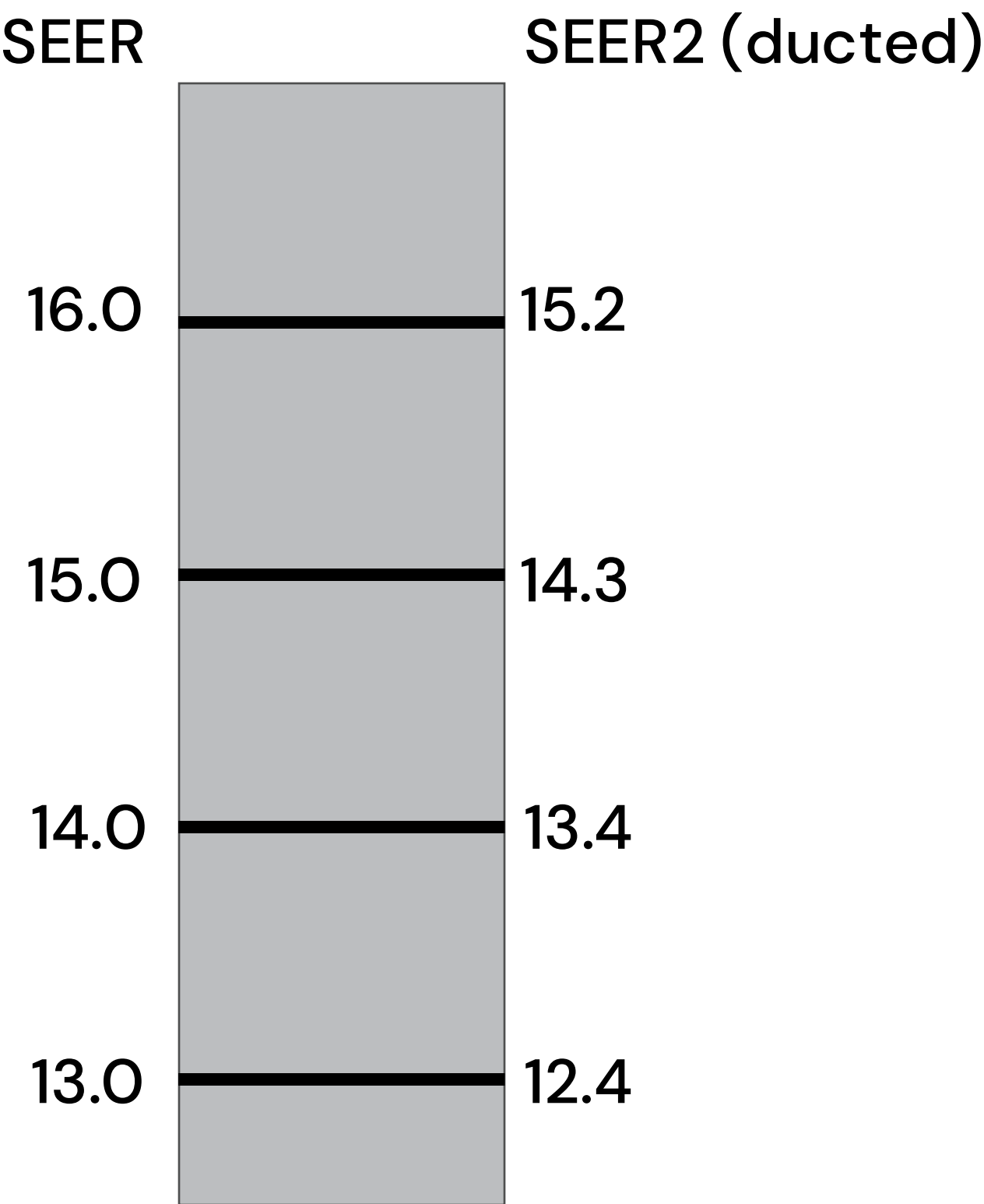
- What program updates were needed to prepare for these changes?
- What role did the program have in educating contractors and customers?

# 1. A change in the testing procedure and metrics



The new testing procedure more closely reflects how systems operate *in the real world*.

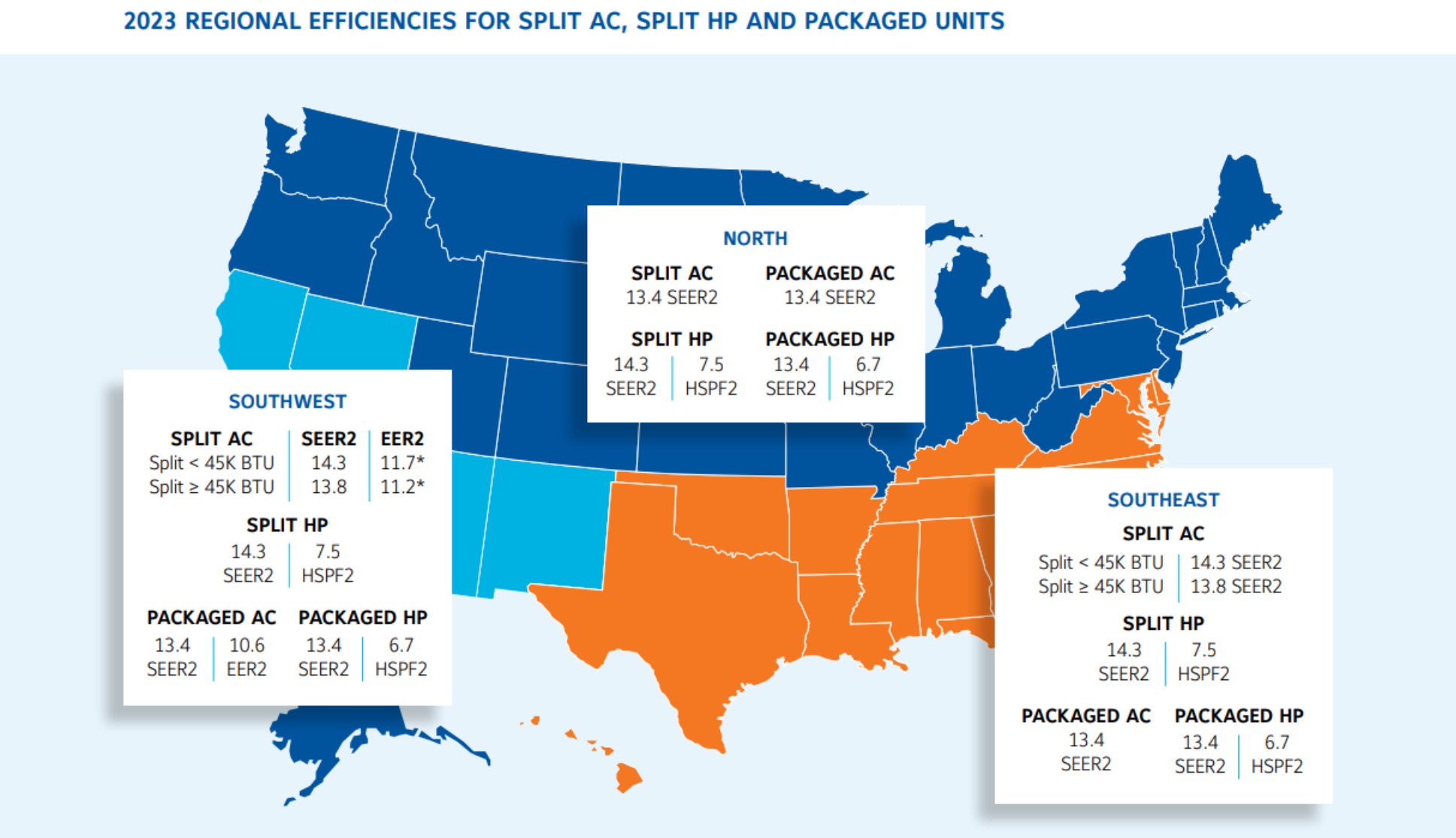
With the new procedure, equipment combinations were certified using new metrics, such as SEER2 instead of SEER.



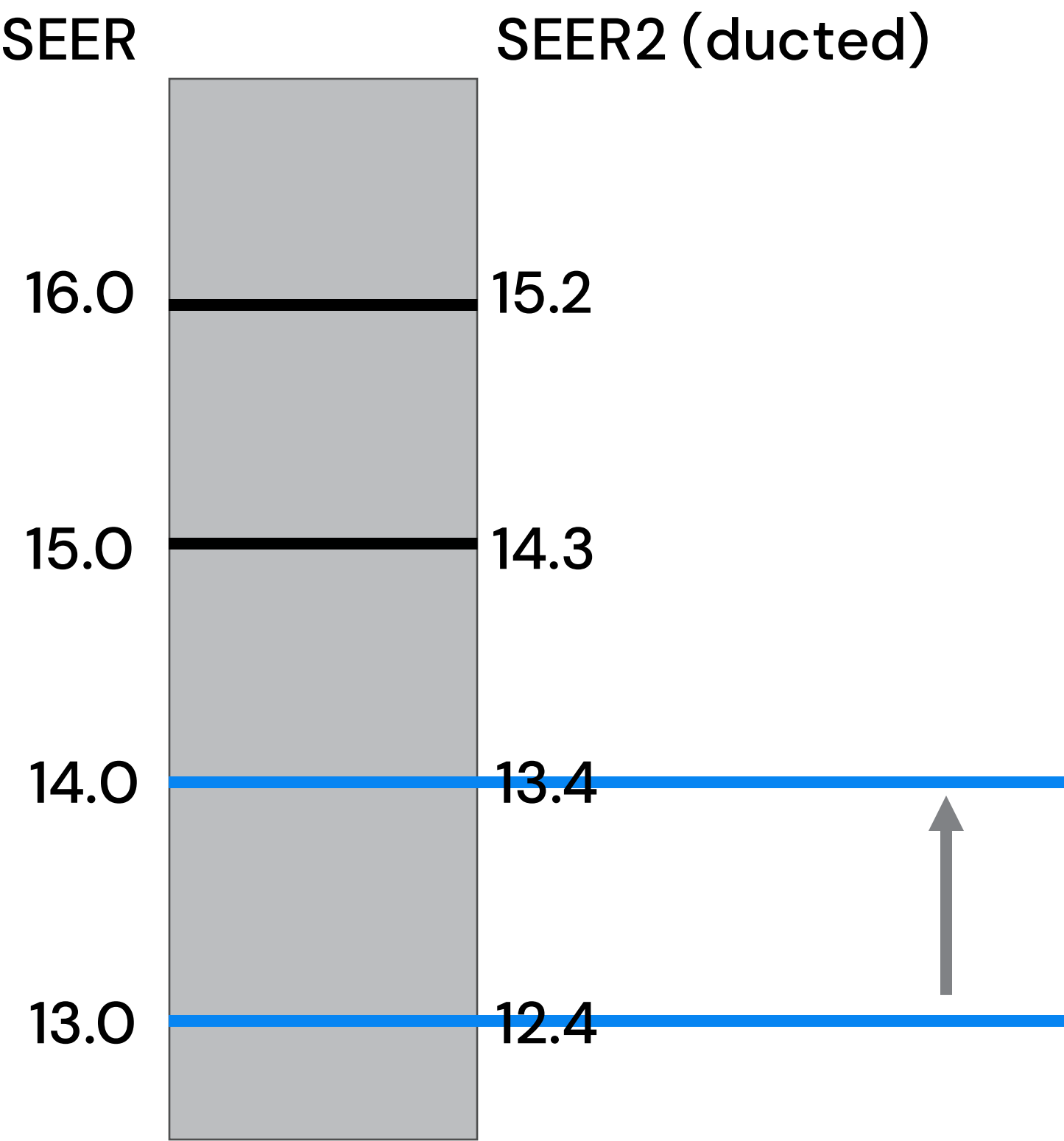


# 2. Performance Standards Change

The federal standards for CACs and HPs increased.



<https://www.achrnews.com/>



# Program Goals



- Align program to market
- Ensure program meets energy savings goals
- Communicate with contractors
- Communicate with customers
- Keep it simple, silly





# Lessons Learned

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- **Start early, but don't jump the gun**
- Talk to the trade allies
- Ask the right questions to the right people
- Timing matters
- Details matter ... but not all of them
- Partner with evaluation teams
- Build in flexibility

Regulation changes are planned years ahead of time, but not all of the details are available at the start.

**Start talks with evaluators early.**

**Wait on program design changes.**

# Lessons Learned

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Surveys are good ... but one-on-one conversations are better.

Surveys are best for gauging the current awareness of the market about the coming change and where the knowledge gaps are.

A trade ally is more likely to share meaningful input and concerns in a small group setting.



# Lessons Learned

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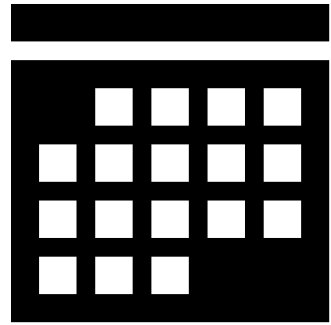
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Manufacturers, distributors, contractors, and customers each have unique perspectives to offer.

Ensure your questions are geared to the right group.

# Lessons Learned

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Distributors and major contractors place equipment orders and plan marketing campaigns in the fall for the following year.

Communicate program changes in time for the market to react.



# Lessons Learned

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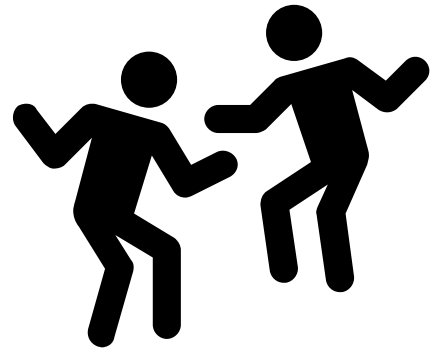


- Start early, but don't jump the gun
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- ✗ The nuances of the testing methodology
- ✓ Which efficiency level high-volume equipment in the program would achieve
- ✓ Which equipment would be discontinued
- ✓ How long "old" equipment would be in the market

# Lessons Learned

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What will the new baseline be?  
When will it take effect?

How to compare new equipment  
to old removed equipment?

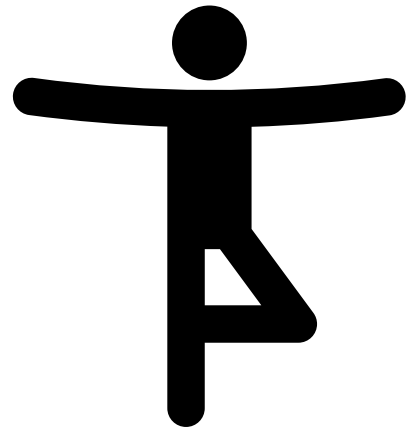
What reports needs to be  
updated?

What updates need to be made  
in the Technical Resource  
Manual?



# Lessons Learned

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- Start early, but don't jump the gun
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- Ask the right questions to the right people
- Timing matters
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- **Build in flexibility**

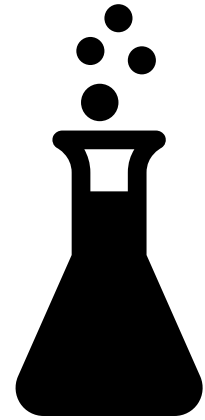
Requirements and timeline for grandfathering in systems.

Setting conversion rates from old to new metrics.

Plan for “edge cases” so you don't leave your customers high and dry

# Upcoming Changes in the HVAC Industry

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## New Refrigerant Requirements

- Equipment manufactured after January 1, 2025, must use the new refrigerants.
- Equipment manufactured before this date has a grace period to be installed.
- How will this impact efficiency levels?
- How will this impact the decision of whether to replace or repair old equipment?



Right Now





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