

The webinar will begin shortly.

Thank you for your patience.



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USGBC Town Hall

September 2020 | West North Central Region

September 8, 9:00 a.m.

USGBC Central Plains

usgbc.org/chapters/usgbc-central-plains

Business Energy Savings Program





Bring New Life to Any Building

*Retro-Commissioning and Preparing
Buildings for COVID-19 Remediation*

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Senior Business Development
Representative

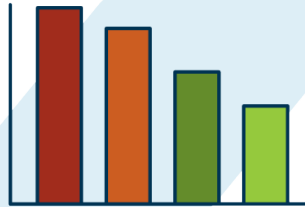


Four Incentive Categories

Standard



Custom



New Construction



Retro-Commissioning





Overview

- What is Retro-Commissioning (RCx)?
- The RCx Process
- Evergy RCx Program & Incentive Tracks
- Retro-Commissioning and COVID-19 Mitigation



What is Retro-Commissioning?





Retro-Commissioning (RCx) is...

...a systematic process to improve the efficiency of an existing building's equipment and/or energy intensive systems.



Retro-Commissioning (RCx) can...

...often resolve problems that occurred during design or construction, or address problems that have developed throughout the building's life, as equipment has aged, or as building occupancy has changed.



RCx Process requires...

...an engineering study that will identify and describe:

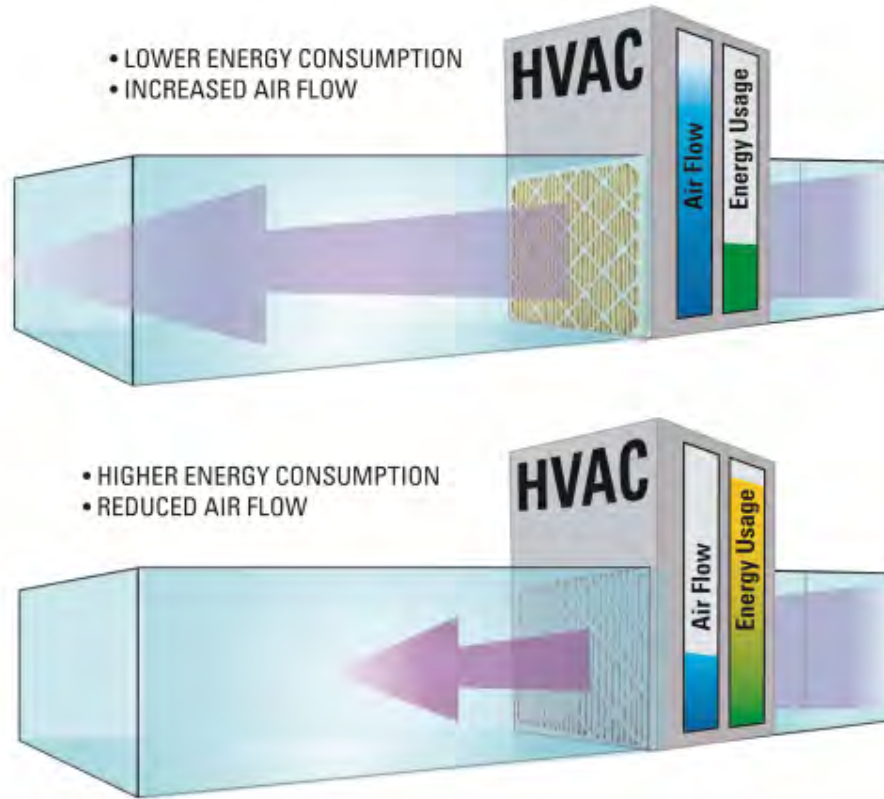
- document building current condition – operations and efficiency
- recommended EE measures for implementation, and
- a verification report describing measures that were implemented.



Our RCx Process is not...

...an energy audit!

Commercial Building Retro-Commissioning



Focus of Retro-Commissioning:

- Low Cost / No Cost Measures
- Improve overall building comfort by improving proper air distribution
- Assuring optimum building automation system performance
- Identifying improvements in maintenance practices

Commercial Building Retro-Commissioning

Frequency of Measures Implemented in Retro-Commissioning Projects

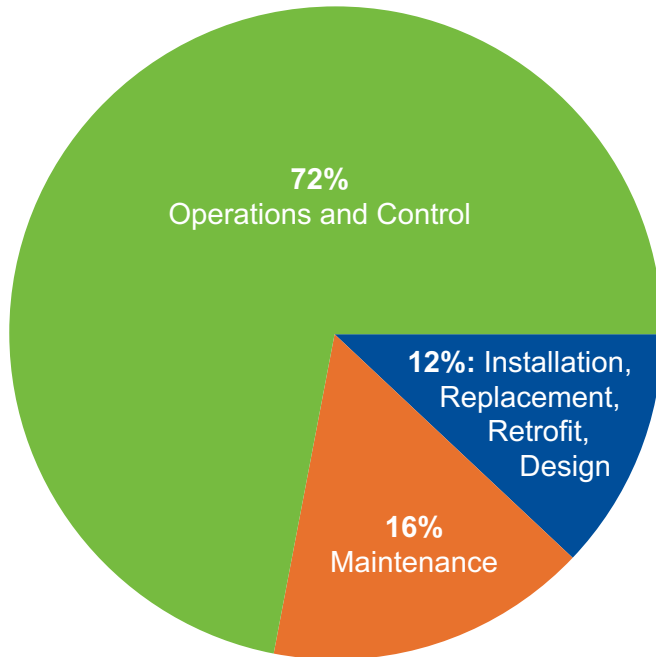


Figure Data Source: Mills, E., 2009. "Building Commissioning: A Golden Opportunity for Reducing Energy Costs and Greenhouse Gas Emissions"

Typical Problem Areas:

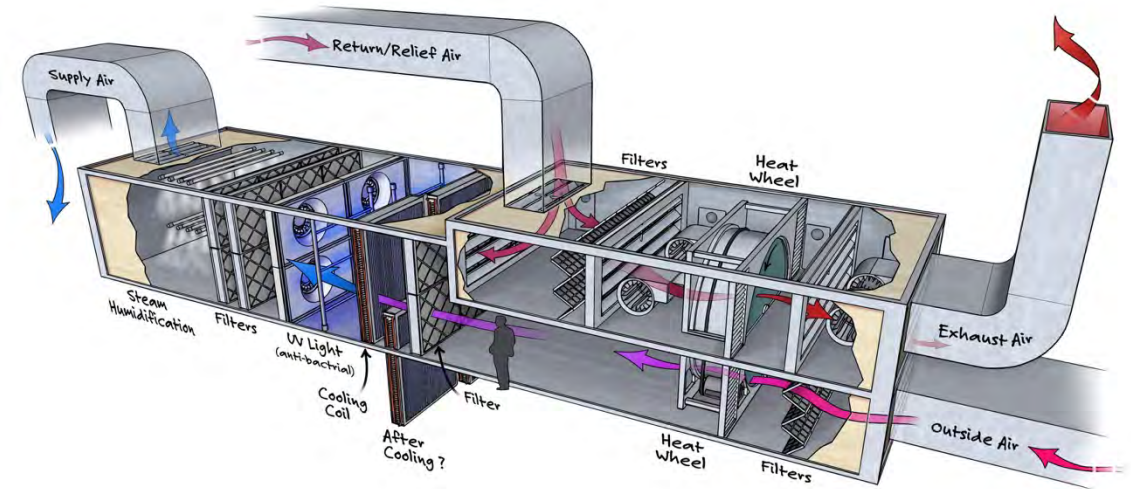
- Equipment or lighting that is on, unnecessarily
- Systems that are simultaneously heating and cooling
- Malfunctioning belts and valves
- Thermostats and sensors that are out of calibration
- Air balancing systems that are less than optimal
- Economizers that are not working as designed
- Controls sequences that are functioning incorrectly
- Variable-frequency drives that operate at unnecessarily high speeds, or that operate at a constant speed even though the load being served is variable



RCx Process requires assessments of ...

Building HVAC Equipment

- OA Damper Operation
 - Does damper fully open and close (not stuck)
- OA Damper Airflow
 - Confirm OA flow measured match BAS
- Sensor Calibration
 - Confirm temp and RH sensor calibration
 - Are RH sensors installed?
- What filters are installed?
 - Converted to MERV 8 to save \$?
 - How dirty are they?
 - Are filter blank-offs installed?
- What is the condition of the coils?
 - Clean or dirty?
 - Maintenance practices?





RCx Process requires assessments of ...

Building Automation System

- Review occupancy schedule
 - Is there an occupancy schedule implemented?
 - Does it match building occupancy?
- Review OA setpoints
 - Do they match design max values
 - Has OA damper been overridden to 100% open or closed?
 - Is demand control ventilation implemented?
- Supply Air (SA) temperature reset Implemented?





Commercial Building (RCx)

RCx is great for:

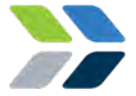
- Office Buildings
- Hospitals
- Schools
- Universities
- Large Manufacturing
- Nursing Facilities





Our RCx Program



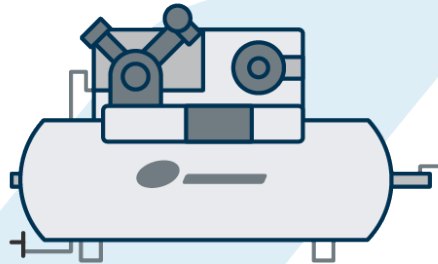


Retro-Commissioning Program Tracks

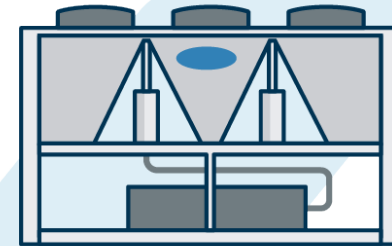
Commercial
Building



Compressed
Air



Industrial
Refrigeration





Commercial Building (RCx) Program



Facility Requirements

- Facility **must have an EMS** (Energy Management System)
- At least one of the following conditions:
 - Facilities with **>100,000 ft²** of conditioned space
 - Facilities with higher than average* energy use intensity (kWh/ft²)
 - Customer must use an experienced RCx Service Provider
- Must be 2+ years since last RCx study was conducted

*based on 2012 CBECS data per building type, or low ENERGY STAR® Portfolio Manager Score



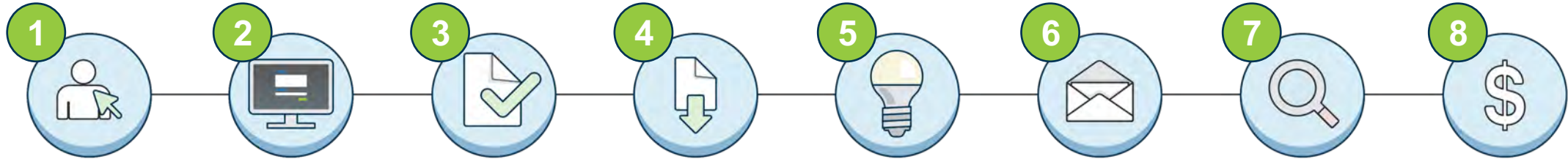
General Guidelines



- Intention of project must be Retro-Commissioning
- Approved RCx measures incentivized up to 100% of implementation cost
- RCx Study costs incentivized up to 100% of study cost for installed measures
- Each measure must pass Benefit Cost Test
- 6 months to complete RCx measures
- Total project payback must be less than or equal to 18 months to qualify for RCx incentives
- Measures with payback greater than 18 months may qualify for a Custom incentive



Retro-Commissioning Process



- | | |
|-----------------------------------|-------------------------|
| 1 Select RCx Service Provider | 5 Implement Measures |
| 2 Complete Online Pre-Application | 6 Send Completion Docs |
| 3 Complete RCx Energy Study | 7 Final Review & Report |
| 4 Complete Application | 8 Receive Incentive |



Pre-Apply Online

The screenshot shows the 'Pre-Apply Online' form for the Business Energy Savings Program. The header features the Evergy logo and the program name. Below the header is a navigation bar with tabs: WELCOME, ELIGIBILITY, GENERAL INFO, PROJECT INFO, STUDY & SCHEDULE, and PAYMENT & SUBMIT. The 'WELCOME' tab is active, displaying a welcome message, terms and conditions, authorization for release of customer account information, and an agreement section. At the bottom, there is a dropdown menu for 'Who is completing this application?'.

Business Energy Savings Program

Retro-Commissioning Incentive Pre-Application

WELCOME | ELIGIBILITY | GENERAL INFO | PROJECT INFO | STUDY & SCHEDULE | PAYMENT & SUBMIT

Welcome!

Thank you for your interest in conducting a Retro-Commissioning (RCx) project in your facility. This form will collect basic project information and data that will be used to determine eligibility for incentives and expedite the application process.

Terms & Conditions

1. Download and read through the Program terms and conditions using the link below.
2. Electronically sign below to indicate you understand and agree to the terms and conditions.

[Evergy Business Energy Savings Program Terms & Conditions](#)

Authorization for Release of Customer Account Information

I authorize Evergy to access energy usage data for the specified accounts at the physical site address of the project and release to the Trade Ally listed on this application. I agree that Evergy may include my name, city or county of business, Program services/incentives and resulting energy savings in reports or other documentation submitted to Evergy and relevant agencies administering energy programs. Evergy will treat all other information gathered through the Program as confidential.

Agreement

I understand and agree to comply with the Terms and Conditions of the Evergy Energy Efficiency Program and that all energy efficiency measures identified in this application comply with program rules.

Who is completing this application? *

If you decide to pursue an RCx project, our simple online application makes it easy to establish eligibility and submit your facility's information to move forward with your project.

A Program Representative will contact you regarding next steps and how to proceed with your RCx application and project.





ENERGY STAR Portfolio Manager



Why Benchmark?

- You can't manage what you don't measure.
- It's available at no cost.
- It can help you prove success to leadership and make the case for future improvements.
- Know your Energy Use Intensity and see how it compares with:
 - Similar building types
 - Your historical energy use



Study Incentives

- Reimbursement of costs associated with Study of the facility
- Available for RCx measures (≤ 18 mo payback) and associated energy savings
- Up to 100% Study cost
- Total energy savings are verified by:
 - $\leq 500,000$ kWh – Installation Verification
 - $> 500,000$ kWh – Operational Verification

Total Verified Annual kWh Saved	RCx Energy Study Incentive Tracks & Rates		
	Compressed Air	Refrigeration	Building Optimization
$\leq 500,000$ kWh	1¢ per kWh	1¢ per kWh	2¢ per kWh
$> 500,000$ kWh	2¢ per kWh	2¢ per kWh	3¢ per kWh



Implementation Incentives

- Custom rate based on End Use Category
- Up to 100% measure cost
- Available for RCx (≤ 18 mo payback) and Custom (>18 mo payback)

Incentive Category	Incentive (per kWh saved)
HVAC Controls Optimization with Peak Demand Reduction	10¢
HVAC Controls Optimization without Peak Demand Reduction	4¢
Compressed Air	8¢
Refrigeration	6¢

RCx Study Example

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Energy	Current Facility	Target	Median Building
ENERGY STAR score (1-100)	18	75	50
Source EUI (kBtu/ft ²)	338.9	133.7	192.5
Site EUI (kBtu/ft ²)	121	47.8	68.7
Source Energy Use	46,218,400	18,234,900	26,252,103
Energy Cost	\$377,864	\$148,878	\$214,334
Total GHG Emissions (Metric Tons CO ₂ e)	3,560	1,405	2,002



Commercial Office Building

RCx PROJECT TYPE: Commercial Office Building

MEASURES INCLUDED: HVAC Optimization

ANNUAL kWh SAVINGS: **1,519,800**

TOTAL INCENTIVE PAID: **\$ 136,114**

ANNUAL ENERGY
COST REDUCTION: **\$ 118,500**

PAYBACK: 1.28 years





Energy Savings Potential

A Review of RCx Projects (2009 – 2019):

147 Projects

Customer Type	RCx Type	Number of Projects	Total kWh Savings	Average kWh Savings	Average Incentive
Healthcare	CB RCx	18	41,757,520	2,319,862	\$ 169,091
Education	CB RCx	40	20,873,167	521,829	\$ 39,726
Manufacturing	CA RCx	58	28,633,413	493,680	\$ 32,330
Office	CB RCx	24	16,192,837	674,702	\$ 69,424
Lodging	CB RCx	7	7,980,768	1,140,110	\$ 56,395

Incentive Category	Incentive (per kWh saved)
Compressed Air	8¢
HVAC Controls Optimization with Peak Demand ¹ Reduction	10¢
HVAC Controls Optimization without Peak Demand ¹ Reduction	4¢
Refrigeration	6¢

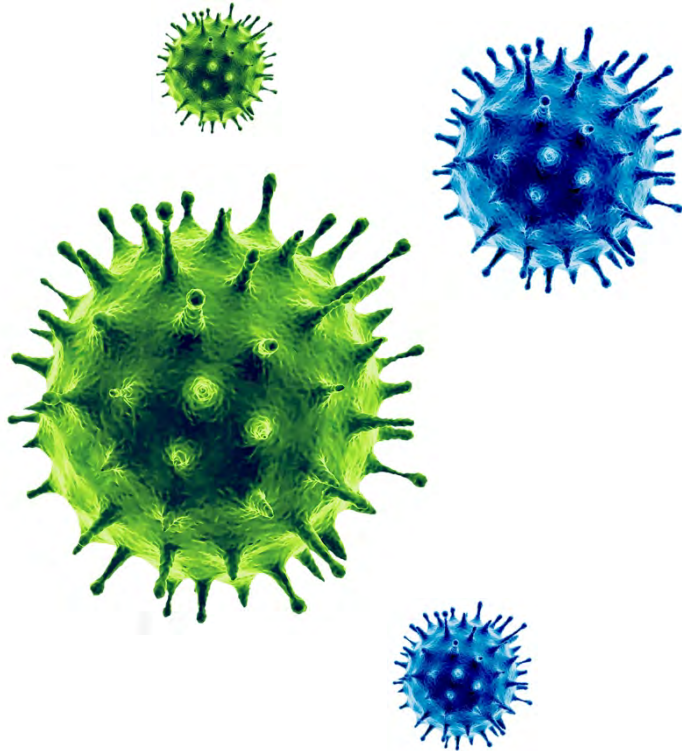
Total Incentive = RCx Study Incentive (1-3¢/kWh) + measure kWh (\leq 18 mo.) x Incentive Rate by Incentive Category + Custom or Standard measures



Retro-Commissioning and COVID-19 Mitigation



COVID-19 Challenges



Owners and Managers

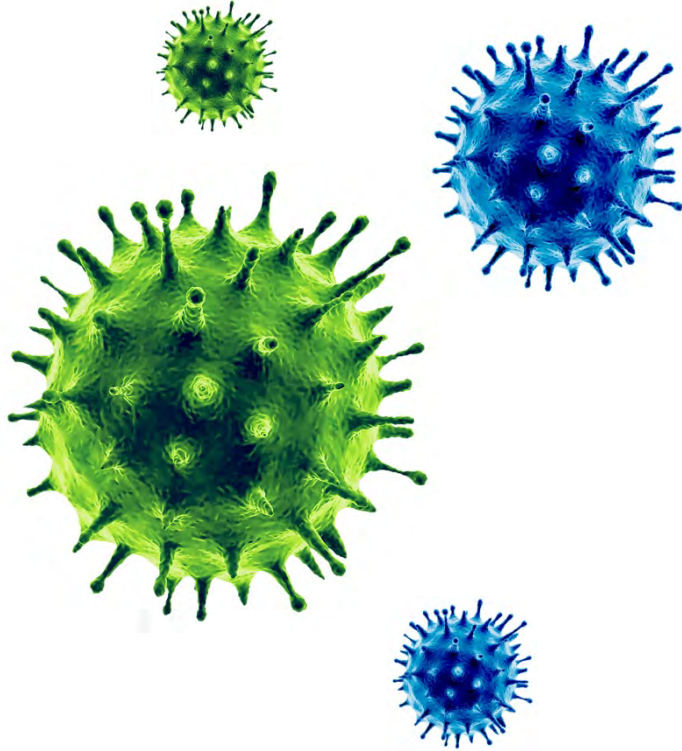
- Buildings with low occupancy and revenue challenges
- Create healthy environments/buildings for tenants

Tenants

- Determine if work-from-home will be the new norm, or if tenants will move back into previous spaces

What is a healthy building, and how do we make that happen?

Retro-Commissioning COVID-19 Mitigation



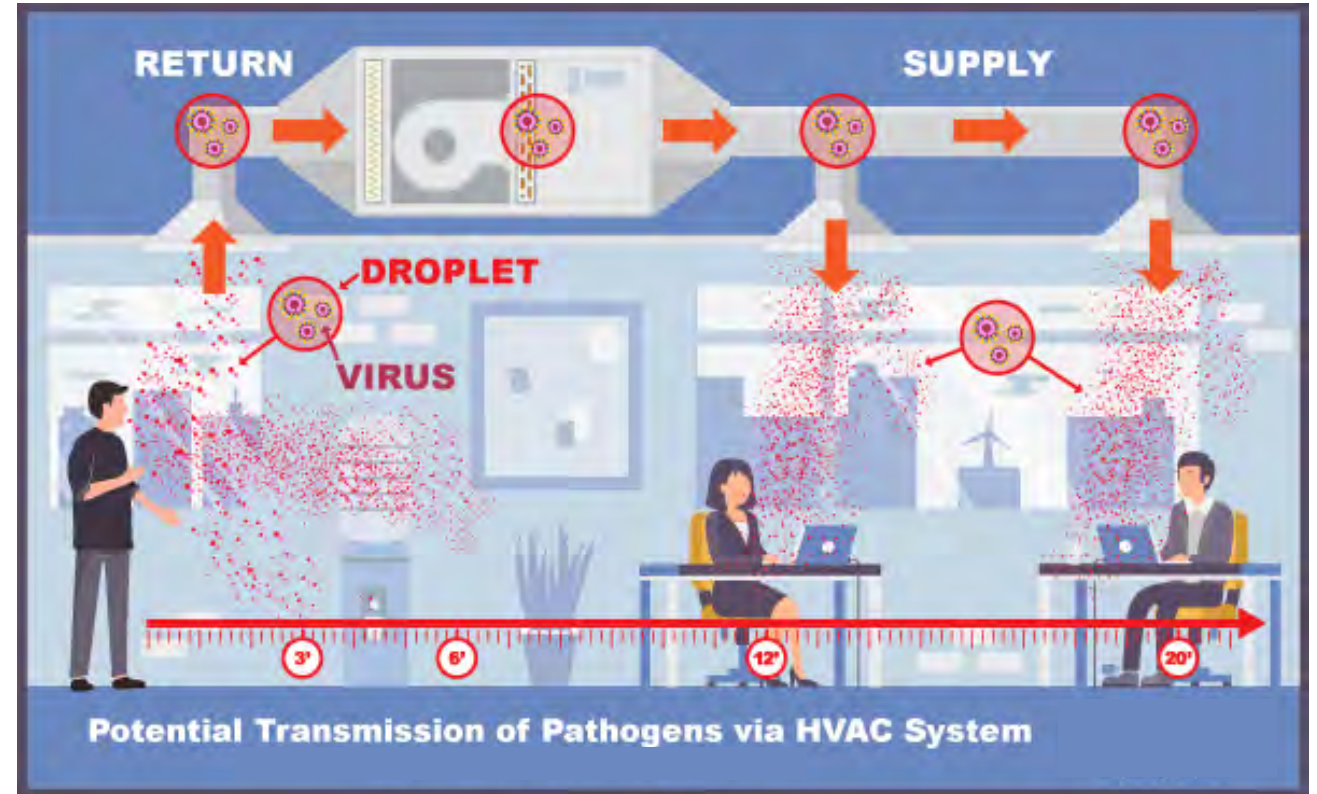
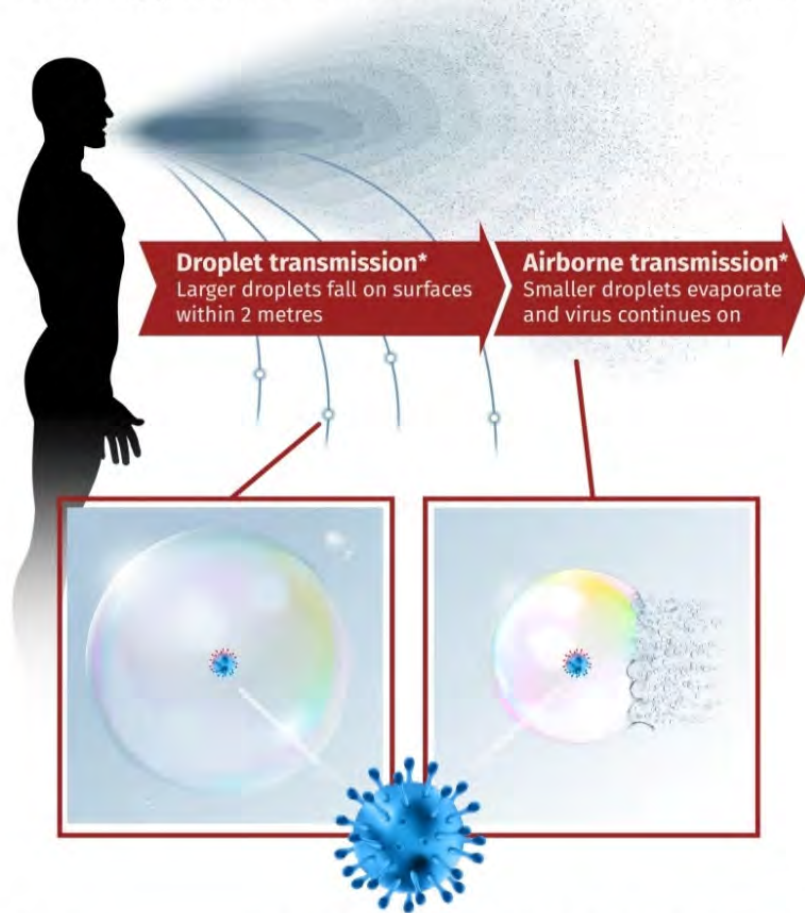
What is a healthy building, and how do we make that happen?

- Keep energy costs controlled
- Keep people comfortable
- Keep people safe

What's the stacking order today?

The HVAC System Concern

What happens at two metres when someone coughs?





Airborne Transmission - ASHRAE

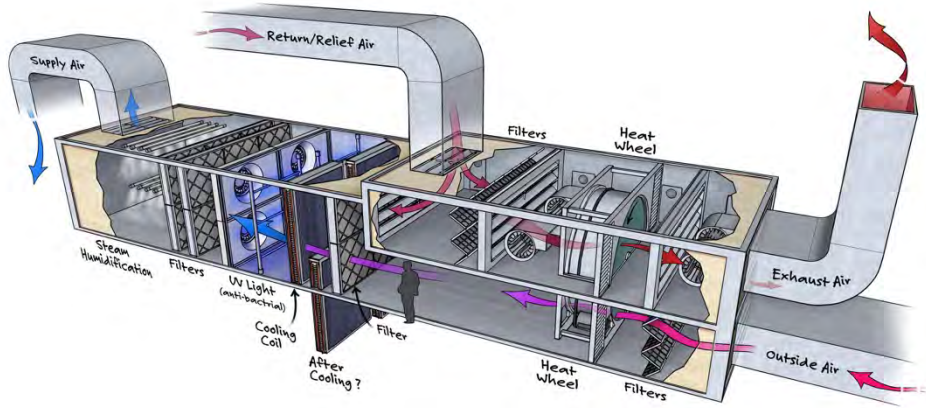
ASHRAE Statement on airborne transmission of COVID-19

- Transmission of COVID-19 through the air is sufficiently likely that airborne exposure to the virus should be controlled. Changes to building operations, including the operation of HVAC systems can reduce airborne exposures.

ASHRAE Statement on operation of heating, ventilating, and air-conditioning systems to reduce COVID-19 transmission

- Ventilation and filtration provided by heating, ventilating, and air-conditioning systems can reduce the airborne concentration of COVID-19 and thus the risk of transmission through the air. Unconditioned spaces can cause thermal stress to people that may be directly life threatening and that may also lower resistance to infection. In general, disabling of heating, ventilating, and air-conditioning systems is not a recommended measure to reduce the transmission of the virus.

ASHRAE Recommendations

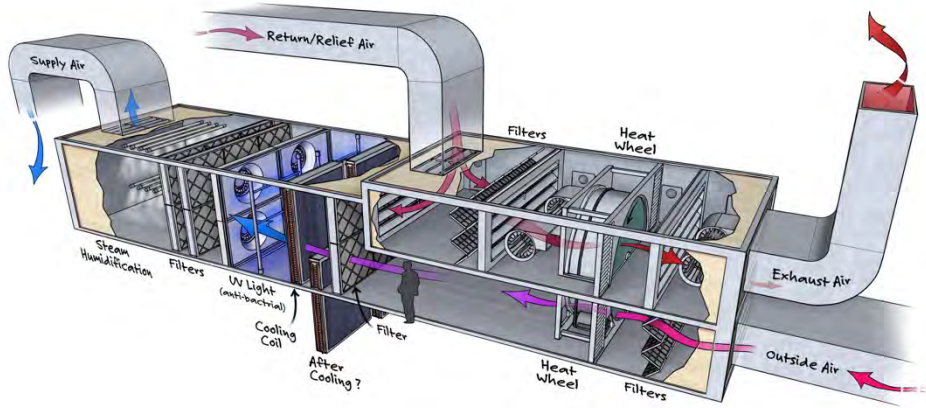


Approach Methodology: must be specific to the building

- How are the systems in the building operating?
 - Ventilation
 - Filtration
 - Air distribution effectiveness
 - Temperature and humidity control
 - Air cleaning (filters, air disinfection)
 - Building Automation System operation
- What level and kind of occupancy in the building?
- What kind of scheduling for building occupants?

Can be answered through RCx

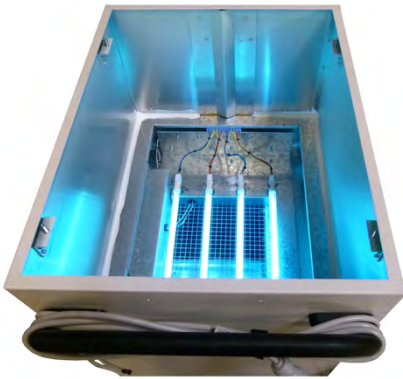
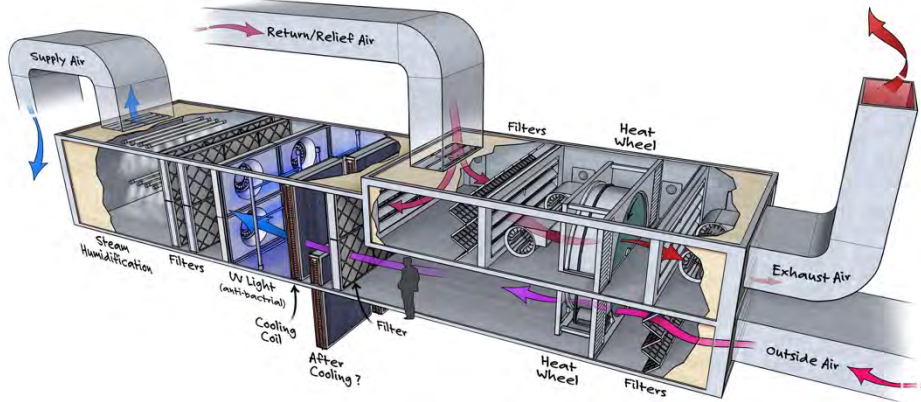
ASHRAE Recommendations



ASHRAE General Recommendations:

- Evaluate building systems to check that it is operating in proper order – per design and current operating strategies (RCx)
- Increase outside air ventilation to as much as the cooling coil will allow, or what space conditions will allow. Control system modification and air balancing may be necessary to avoid additional issues.
- Maintain space relative humidity 40–60%
- Implement pre- and post-building flushing strategy, or 2 hours before and after occupancy

ASHRAE Recommendations

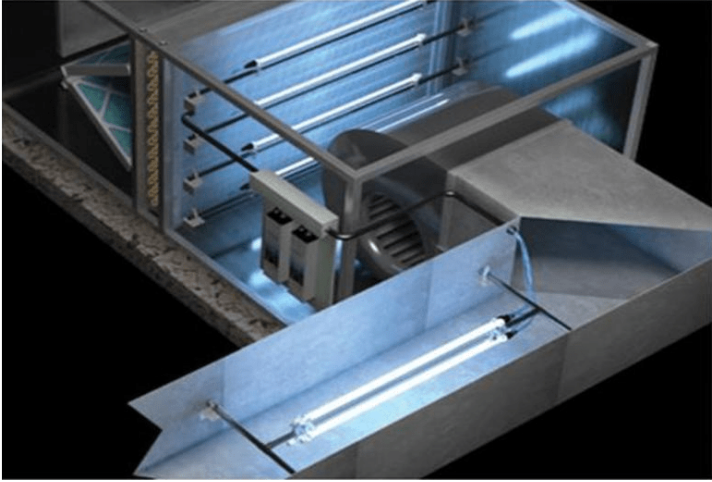


ASHRAE General Recommendations (cont.):

- Upgrade filtration to *at least* MERV 13 or 14, and confirm upgrade does not adversely affect system performance
- Air distribution system maximum airflow may be limited by the increased efficiency of the filtration system. This may require air stream disinfection
- Most common applications for air stream ductwork disinfection:
 - Germicidal UV-C of coils and air stream
 - Bi-Polar Ionization
- Combination of high MERV filtration and germicidal UV-C or some Bi-Polar ionization have proven effective in generating a 95–99% kill rate



Germicidal UV-C: Air Treatment

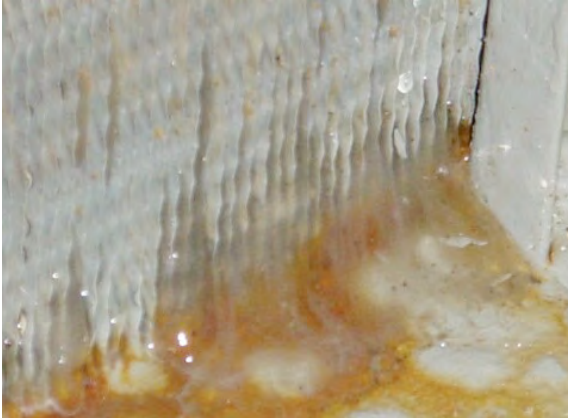


- Ultraviolet energy inactivates viral, bacterial, and fungal organisms.
- The entire UV spectrum is capable of inactivating microorganisms, but UV-C energy (wavelengths of 100 – 280 nm) provides the most germicidal effect
- HVAC ductwork UV-C treatment depends upon airstream speed, filter MERV efficiency and meeting minimum exposure time of 0.25 second for one-pass effectiveness.
- 1,500 $\mu\text{Ws} / \text{cm}^2$ recommended minimum UV-C intensity - ASHRAE





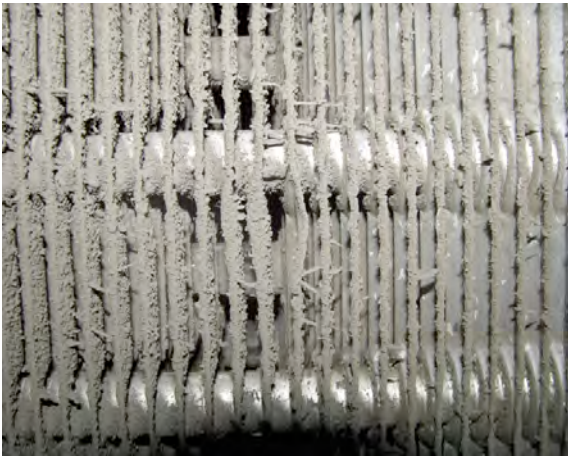
Germicidal UV-C: Cooling Coil Treatment



Biological build-up on cooling coils



UV-V treatment of cooling coils



Before

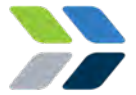


After

Germicidal UV-C Treatment of Cooling Coil and Condensate Pan

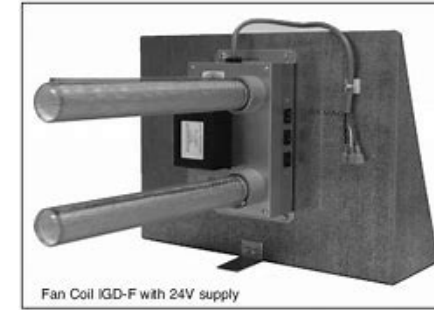
- UV-C light destroys biological growth on cooling coils
- Dirt accumulation on cooling coils eliminated
- Rule of thumb sizing: 7.5w /sq. ft. of coil surface area

Federal Energy Management Program estimates that fouled cooling coils increase building costs up to 30% but produce 10% less cooling.

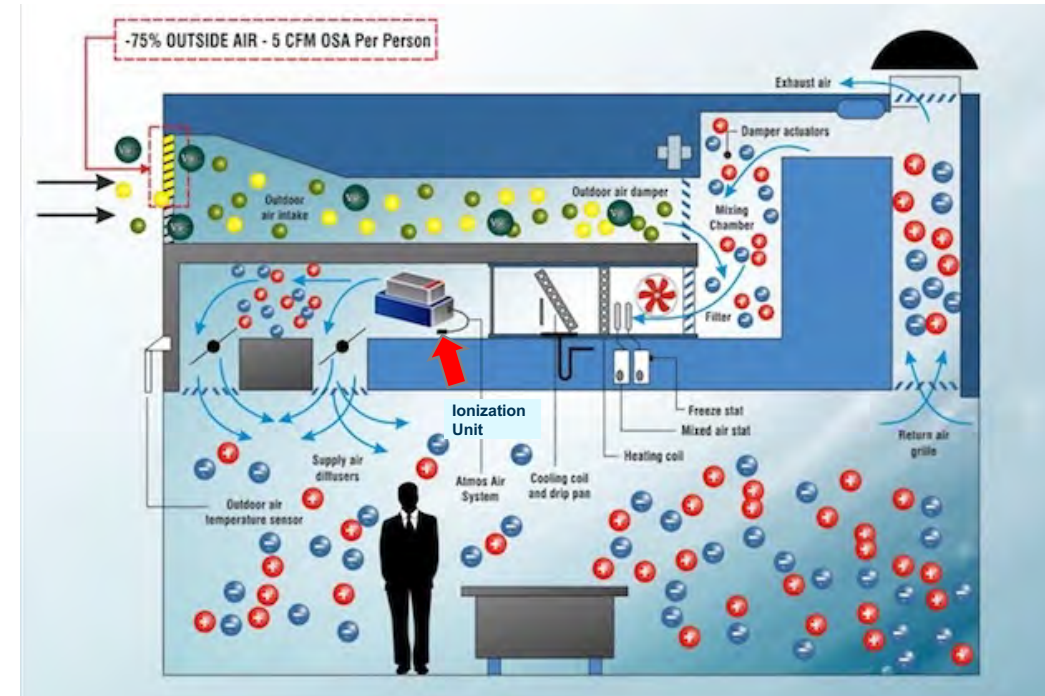


Bi-Polar Ionization

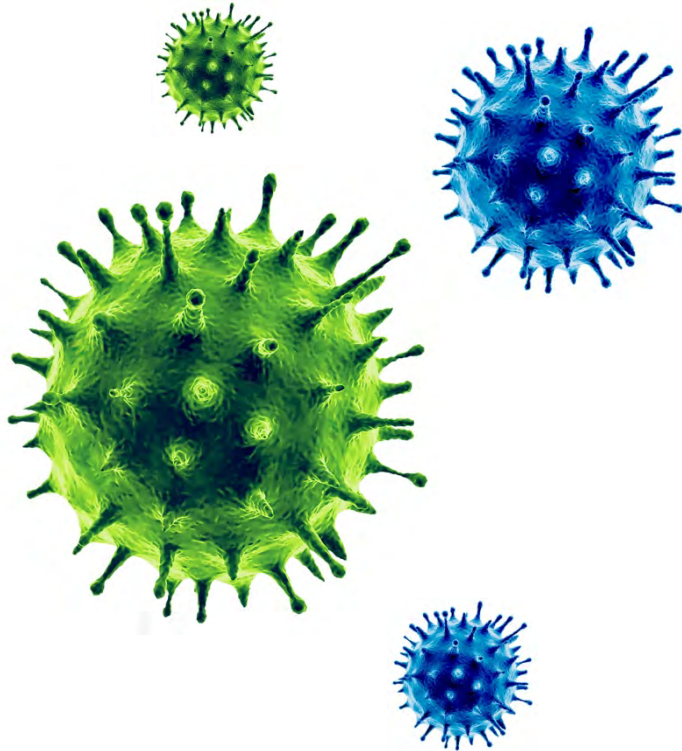
- Airborne particles are charged by the ions causing them to cluster and be caught in filters
- As they divide to reproduce, bacteria and virus cells bond with oxygen ions and are destroyed
- Some units create ozone, which is dangerous and not approved by ASHRAE
- UL Test for ozone UL 867



Fan Coil IGD-F with 24V supply



COVID-19 Treatment Summary



Methodology should be specific to your building:

- A RCx study can help identify areas for improvement.

Follow ASHRAE's recommendations:

- Recommendations include using adequate filtration, maintaining 40–60% humidity, and implementing flushing and/or disinfecting strategies
- Recommended disinfecting strategies:
 - Use germicidal UV-C light to inactivate viral, bacterial, and fungal organisms
 - Use bi-polar ionization to catch and destroy airborne particles, including viruses



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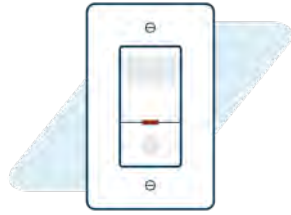


Incentive-Eligible Technologies

Lighting



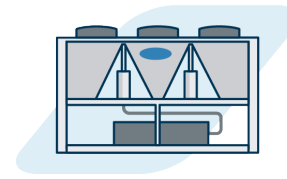
Lighting controls



HVAC



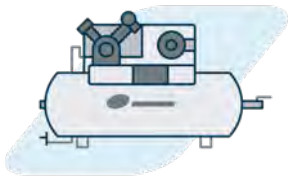
Chillers



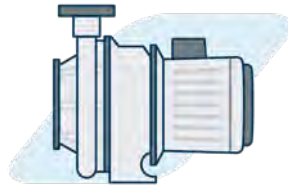
Building Automation System



Compressed Air



Motors & Drives



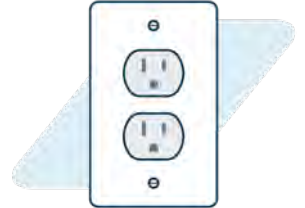
IT/Data Center



Refrigeration



Miscellaneous





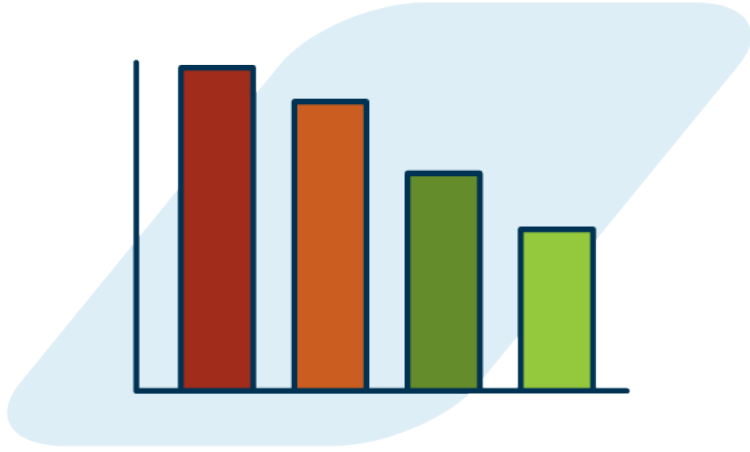
Standard Incentives



- “Prescriptive Incentives” (\$xx / Unit)
- Lighting, lighting controls, HVAC, motors, compressed air, refrigeration incentives
- Incentives paid on a per-unit basis and capped at unit cost
- Pre-approval required for incentives > \$10,000
- Pre- and post-inspections required for incentives > \$10,000
- Baseline – IECC 2012



Custom Incentives



- “Performance-Based Incentives” (¢/kWh or \$/kWd)
- Almost any energy-saving measure not on the standard incentive list
- Incentives paid on a per-kWh-saved basis
- Incentives capped at 75% of total measure cost, or 100% of incremental cost
- Pre-approval required
- Pre- and post-inspections required



New Construction Incentives



- Increase energy efficiency above that of standard or planned systems
- Available for ground-up construction, additions/expansions, “gut rehab” and building repurposing
- 4 types of incentives available:
 - Interior Lighting
 - Standard Incentives
 - Custom Incentives
 - Whole Building Performance Incentives
- **We must be brought in before the Design phase.**
- Baseline – IECC 2012



New Construction Incentives



Building Size	Establish Baseline	Eligible Incentives
< 20,000 ft ²	Evergy will send established baseline over email	Interior Lighting and/or Standard
20,000 – 100,000 ft ²	Baseline will be established during Design Team Meeting	Interior Lighting, Standard and Custom
> 100,000 ft ²	Baseline will be established during Design Team Meeting	Interior Lighting, Standard, Custom and Whole Building Performance