FlexTech IAQ

Indoor Air Quality

Horace Mann School

Building Owner:
Horace Mann
246th Street Campus

Region: New York City

Number of Buildings: 4

FlexTech Consultant:
Jaros, Baum & Bolles
Consulting Engineers, LLP

Sector:
PreK-12 School

Square Footage:
101,023 sq.ft.

Pre-COVID Condition:

- Filters: MERV 8 or MERV 14
- Ventilation:
  - Pforzheimer Hall: one 100% outdoor air unit
  - Science Building: Four air handling units that serve variable air volume boxes with reheat capabilities. One of these units is a 100% outdoor air unit, one of these units utilize demand control ventilation
  - Aquatics Center: two air handling units with strictly enforced humidity and temperature setpoints
  - Tillinghast Hall: two mixed air rooftop units that serve variable air volume boxes with reheat capabilities
- Outside Air: 136,000 CFM/ 26%

Study Overview

NYSERDA funded this energy efficiency indoor air quality study that identified the energy use associated with the ASHRAE Epidemic Task Force (ETF) Building Readiness guidance[1] HVAC-related measures aimed at preventing the risk of COVID-19 infection that are feasible at the building. Additionally, the study investigated alternate opportunities that were more energy efficient, yet equally risk adverse from an indoor air quality perspective, as the ASHRAE guidance measures.

Measures Evaluated

Measure Name	Measure Status	Electric Savings (kWh)	Fossil Fuel Savings (MMBtu)	Energy Cost Savings ($)	Measure Cost ($)
ASHRAE Epidemic Task Force (ETF) Guidelines Measures Evaluated					
Maximum Outdoor Air Increase	Not Recommended	-85,190	-2,662	-$40,419	$2,000
2 Hour Flush Pre and Post Occupancy	Not Recommended	-189,272	-1,043	-$41,089	$2,000
MERV 13 Filters	Recommended	-8,105	0	-$1,313	$336
Disable Demand Control Ventilation	Recommended	-1,822	-160	-$1,899	$2,000
Totals:		-284,389	-3,865	-$84,720	$6,336
Energy Efficiency Package Measures Evaluated					
Decrease to Design Level Outdoor Air	Recommended	85,190	2,662	$40,421	$0
3 Outdoor Air Change Flush Pre & Post Occupancy	Recommended	115,034	864	$27,275	$2,000
MERV 16 Filters in Science Corridors & Great Room	Recommended	-16,425	0	-2,661	$620
Portable Air Cleaners in Pforzheimer Hall	Recommended	-21,462	0	-$3,477	$34,500
Totals:		162,337	3,526	$61,558	$37,120

- *All energy use and energy cost values are presented on an annual basis*
- *Negative values represent increased use/cost*
- *The Energy Efficiency Package Measure savings are presented with the ASHRAE ETF Guidelines Measures Totals as the baseline*

[1] *The ASHRAE ETF guidance used for this study was based on one or more of the following document versions: Building Readiness v.5-21-2020, Commercial v.4-20-2020, Schools & Universities v. 5-5-2020, Healthcare v. 6-17-2020, Filtration & Disinfection v. 5-27-2020, ERV Practical Guide v. 6-9-2020*

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Key Notes

The measure recommendations are based on the ability to achieve five effective air changes per hour (ACHe) at design airflow rates with minimized energy, carbon, and cost impact. This study revealed that only the Science Building Corridor and Great Room and Pforzheimer Hall's pre-COVID operations fall below the five ACHe target. Additionally, it was found that strategies other than increasing the outdoor air levels above design airflow rates could achieve the five ACHe target with lower energy impacts.

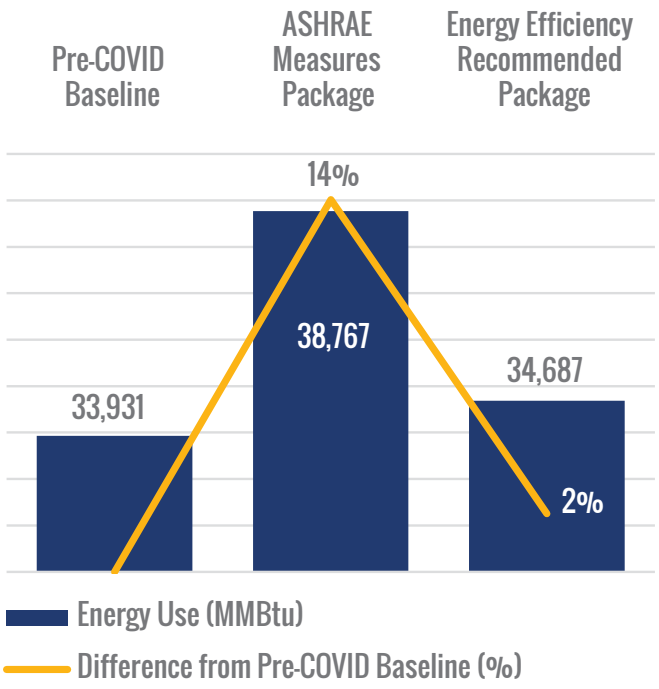
Early ASHRAE guidance suggested a two-hour flushing period before and after occupancy at maximum outdoor air levels. An alternative flushing approach of targeting three outdoor air changes before and after occupancy at design outdoor air levels is recommended instead as the alternative approach achieves the same results in a shorter time period.

MERV 13 filtration is recommended across the buildings and MERV 16 recommended in units serving the Science building corridors and great room.

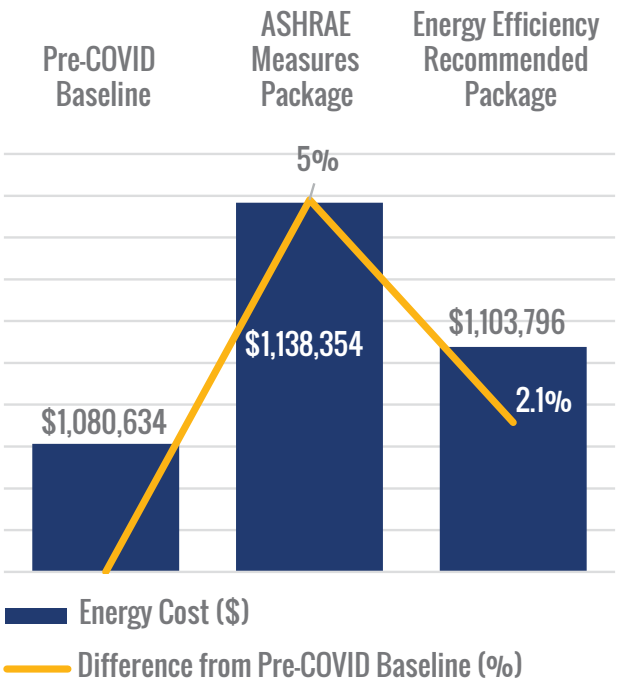
Portable air cleaners are recommended in Pforzheimer Hall.

Impact Results

Energy Use Impacts



Energy Cost Impacts



The NYSERDA Flexible Technical Assistance (FlexTech) Program

Through the FlexTech Program, NYSERDA provides cost-sharing for objective, site-specific, and targeted studies on how to best implement clean energy and energy efficient technologies. A NYSERDA-approved FlexTech Consultant will work with customers to complete an energy study and provide expert, customized services and information.

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