FlexTech IAQ

Indoor Air Quality

Museum of Modern Art – Main Campus

Building Owner:
Museum of Modern Art

Region: New York City

Number of Buildings: 1

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

Sector:
Museum

Square Footage:
743,800 sq.ft.

Pre-COVID Condition:

- Filters: MERV 15 primarily; MERV 8 observed in 3 units
- Ventilation: Ninety-two (92) variable air volume central air handling systems deliver air to variable air volume boxes with reheat capabilities. These units serve a variety of galleries, offices, stores, restaurants, theaters, corridors, lobbies, unoccupied spaces, mechanical spaces, etc. The units utilize demand control ventilation but do not have airside energy recovery.
- Outside Air: 138,646 CFM/ 16%

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	-356,018	-6,157	-$157,154	$2,000
2 Hour Flush Pre and Post Occupancy	Not Recommended	-575,781	-3,049	-$132,151	$2,000
MERV 13 Filters	Recommended	-4,381	0	-$596	$252
Disable Demand Control Ventilation	Recommended	-30,952	-457	-$12,278	$2,000
Totals:		-967,132	-9,663	-$302,179	$6,252
Energy Efficiency Package Measures Evaluated					
Portable Air Cleaners	Not Recommended	-290,000	0	-$39,440	$386,400
UV-C In-Unit	Not Recommended	-110,000	0	-$14,960	$247,260
Decrease to Design Level Outdoor Air	Recommended	356,018	6,157	$157,154	$0
3 Outdoor Air Change Flush Pre & Post Occupancy	Recommended	385,797	2,797	$101,856	$2,000
MERV 16 Filters	Optional	-190,267	0	-$25,876	$3,550
Recommended Measures Totals:		741,815	8,954	$259,010	$2,000

- *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

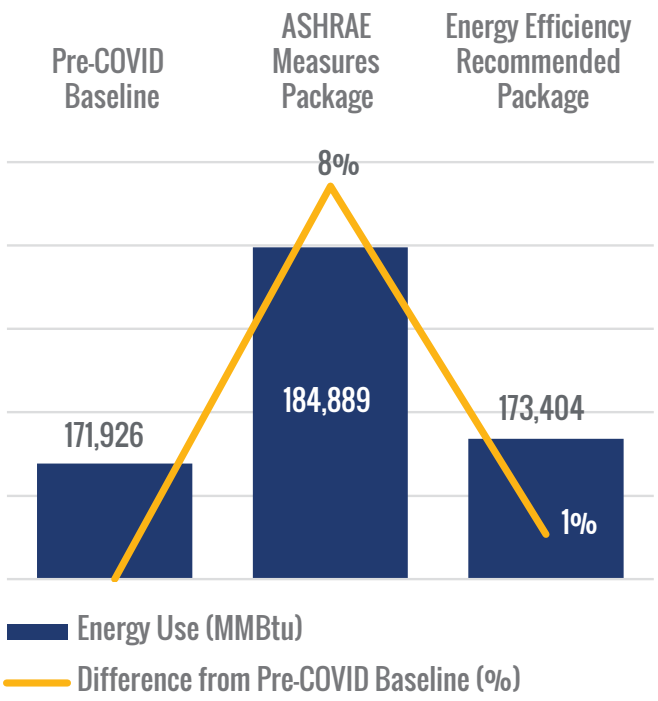
Measure recommendations are based on the ability to achieve 5 effective air changes per hour (ACHe) at design airflow rates with minimized energy, carbon and cost impact. This study revealed that increasing outdoor air , installing ultraviolet germicidal irradiation (UVGI) units, or portable air cleaners would not be necessary based the pre-COVID operations exceeding 5 ACHe at design airflow.

Early ASHRAE guidance suggested a 2-hour flushing period before and after occupancy, however targeting 3 outdoor air changes before and after occupancy would only take 88 minutes and is therefore a more energy efficient method.

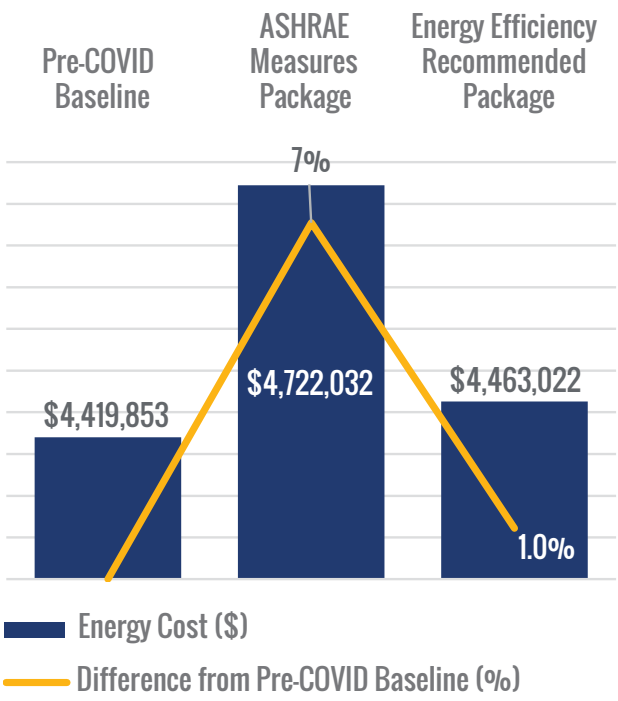
During the course of this study, MERV 8 filters were increased to the minimum ASHRAE recommended MERV 13 filters.

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.

See the results of other Energy Efficient Indoor Air Quality Pilot Studies. Visit nyserda.ny.gov/FlexTech/IAQ