solution package

Ventilation

A guide to ventilation solutions that improve comfort, marketability, and energy efficiency.

The BE-Ex solution packages are a suite of six documents compiled from the *Anatomy of an Energy Efficient Building* exhibit on view at Building Energy Exchange's downtown resource center, or virtually at **be-exchange.org/anatomy**

be ex
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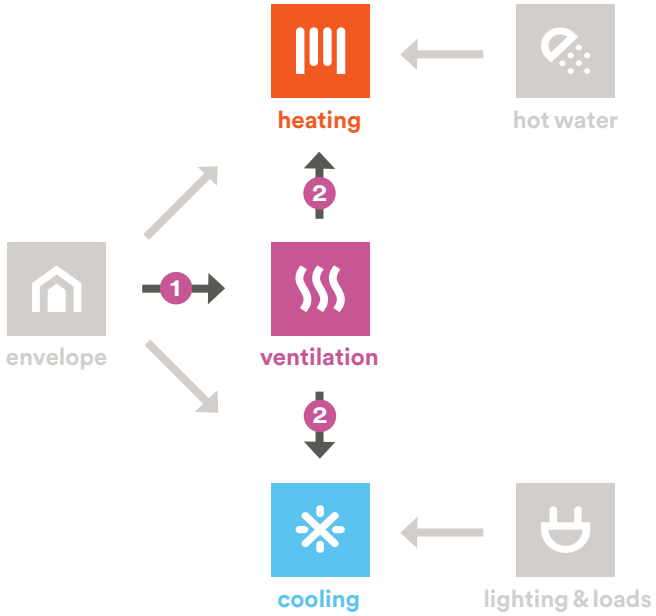
system interaction

The performance of ventilation systems is often contingent on the function of other building systems. Ventilation upgrade decisions should be made in the context of how other systems will impact ventilation operation and performance.



1

envelope → ventilation

High performance building envelopes restrict outside air from entering occupant spaces, requiring balanced ventilation systems to ensure fresh air supply.

2

ventilation → heating & cooling

Energy recovery ventilation systems pre-condition incoming outdoor air, reducing demand on the heating and cooling system.

operations & maintenance

Investing in operations and maintenance best practices ensures that building systems run optimally, enabling proper performance in existing equipment and maximizing return on investment in new systems. Best practices for ventilation sytsems include:

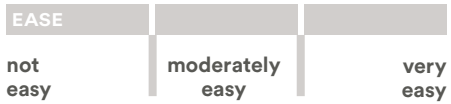
- Clean and inspect ERV units periodically.
- Clean ductwork to clear dust and debris, repair damaged ductwork, and seal gaps and holes along ductwork and at register and fan connections.
- Calibrate fan speed and pressure settings and adjust airflow rates at registers.
- Clean or replace interior air filters.
- Conduct air quality surveys of interior spaces.

ventilation efficiency measures

Balanced, energy-recovery ventilation systems improve indoor air quality while reducing emissions and energy use. Systems components are interdependent and should be addressed together under a comprehensive scope.

Key

EASE OF IMPLEMENTATION



Ease of Implementation reflects technical and financial feasibility.

Measures marked "not easy" are typically expensive, complex, highly disruptive, or pay back slowly, while "very easy" measures tend to be in-expensive, quick, and straightforward.

PROJECT IMPACT

Project Impact reflects potential to reduce energy and emissions and to improve system performance.

"Low impact" measures typically yield minor savings and incremental improvements, while "high impact" measures achieve major savings and comprehensive improvements.

ADDED BENEFITS

operations & maintenance
Keeps building performing optimally when completed on a routine basis

health & comfort
Enhances indoor environmental quality and advances occupant wellbeing

marketability
Improves aesthetics and upgrades occupant spaces, increasing appeal to potential tenants

future-ready
Puts building on path for long-term emissions reduction and legislative compliance

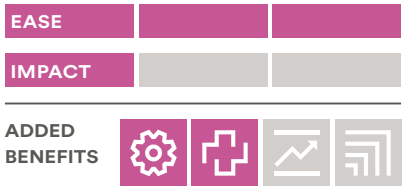
RATING SYSTEM METHODOLOGY

Ratings and benefits of energy conservation measures were assigned based on NYC energy audit data and analysis by industry experts. Actual results will vary by building type, use, and baseline conditions.

Clean & Tune System

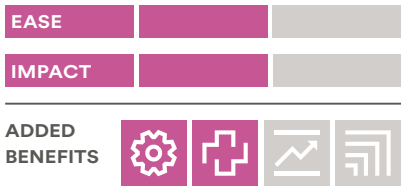
Repair & Calibrate Fans

Replace fans belts and adjust fan settings to ensure every space in the building achieves necessary exhaust levels.



Clean Ducts & Calibrate Registers

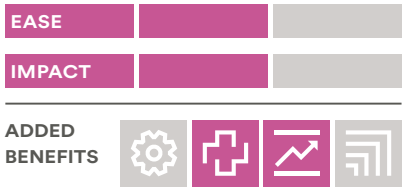
Clean ducts to improve airflow and indoor air quality.
Clean and calibrate registers when adjusting fans to maintain building-wide ventilation targets.



Exhaust Stale Air & Pollutants

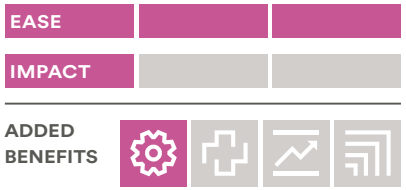
Install Self-Balancing Registers

Install grilles/registers that automatically damper airflow to achieve consistent ventilation. New grilles provide an updated aesthetic.



Repair Damaged Ductwork

Coordinate repairs with cleaning and sealing work to streamline scheduling and costs.



ventilation efficiency measures

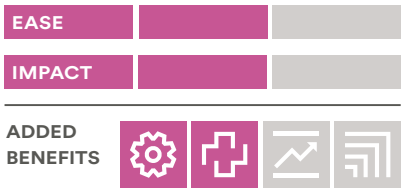
Exhaust Stale Air & Pollutants, cont.

Install Direct-Drive Exhaust Fans

Install right-sized fans with built-in, variable speed controllers. Adjust settings to meet pressure requirements for the system.

Seal Leaks in Ducts & Shafts

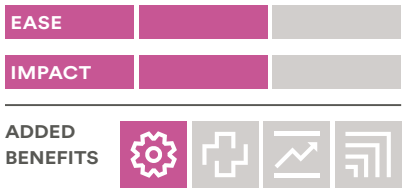
Seal leaks to improve airflow control. Use mineral wool/ fireblocking foam for large holes; use remote spray sealing for finer holes.



Provide Fresh Air While Reducing Energy Loads

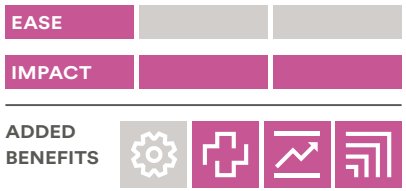
Install or Commission an Economizer

Install or program economizers to use outdoor air for free cooling when the temperature drops below a designated point.



Install Energy Recovery Ventilator (ERV)

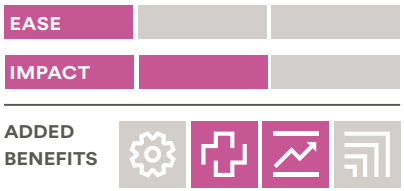
Install ERVs to recover waste heat air from exhaust and pre-temper supply air. Reducing heating and cooling loads may allow for equipment to be downsized, freeing up roof space.



Provide Fresh Air While Reducing Energy Loads, cont.

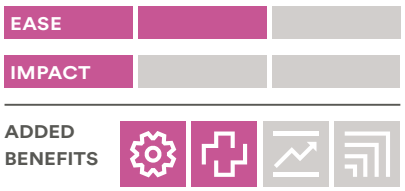
Install Dedicated Outdoor Air System

Install separate air handling units for ventilation and for heating/cooling systems to increase efficiency.



Recalibrate Fans & Registers

Recalibrate system components after any major work to ensure ventilation and efficiency levels are maintained.



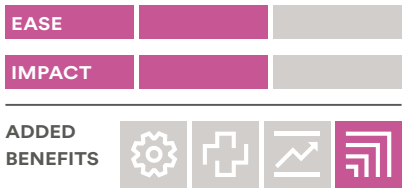
Run Ventilation Only As Needed

Install Zoning Wiring & Controls

Establish zoning to enable the use of automated ventilation control strategies like scheduling, occupancy, and demand-based controls.

Install Occupancy Sensors

Install motion or CO2 sensors to adjust ventilation rates according to occupancy levels. (Must also have variable speed fans and damper controls in place).



ventilation efficiency measures

Run Ventilation Only As Needed, cont.

Install Fan Timers/Schedule Setbacks

Install timers or schedule setbacks to reduce ventilation rates in places with predicatable occupancy patterns.

EASE

IMPACT

ADDED BENEFITS

Upgrade/Integrate HVAC Controls

Upgrade to a centralized building management system or integrate ventilation, heating, and cooling controls.

EASE

IMPACT

ADDED BENEFITS

Further Reading

The BE-Ex solution packages cover the following building systems:

- Heating
- Cooling
- Ventilation
- Domestic Hot Water
- Lighting & Plug Loads
- Envelope

To access the suite of solution packages, visit:
be-exchange.org/anatomy-solutions

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