



# HEALTHY BUILDINGS: FUNDAMENTALS

As a global pandemic continues to press the critical importance of health and infection control, the world is seeking ways to help ensure the health and well-being of people everywhere. And today, experts are finding that one of the keys to a healthier future is the indoor environment. Through healthy building strategies and expertise, we can shift the role of buildings beyond places to live, work and learn, and into powerful tools that drive human health and progress.

## CARRIER HEALTHY BUILDINGS PROGRAM

As the inventors of modern air conditioning and a world leader in HVAC, refrigeration, and fire and security solutions, Carrier has a legacy of creating safe and comfortable buildings. Now we're building on that legacy through the launch of our Healthy Buildings Program. The program helps customers across key verticals develop safe, indoor environments with a holistic suite of healthy building technologies and services to address the immediate pandemic concerns and long into the future.



COMMERCIAL OFFICES



HEALTHCARE



HOSPITALITY



EDUCATION



RETAIL

## THE SCIENCE OF HEALTHY BUILDINGS

As humans, we spend 90% of our time indoors. Consequently, buildings play a significant role in our lives and directly impact our health. Through the [COGfx Study](#), research has shown that healthy buildings can significantly improve cognitive function. In addition, healthy buildings can impact the bottom line for a business – from reducing energy waste and the related costs to increasing worker productivity.



**WE SPEND 90% OF OUR TIME INDOORS**

We can use healthy building environments to:

Sources: <http://thecogfxstudy.com>, <http://thehealthxstudy.com>

**IMPROVE COGNITIVE FUNCTION**

in enhanced green buildings

Crisis response scores 

**131% HIGHER**

Information usage scores 

**299% HIGHER**

Strategy scores 

**288% HIGHER**

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**IMPROVE PERSONAL HEALTH**

in high-performing, green-certified buildings vs. high-performing, non-certified buildings

Sick building symptoms 

**30% FEWER & better environmental perceptions**

Sleep quality scores 

**6.4% HIGHER**

**IMPROVE SOCIETAL HEALTH**

Compared to "conventional commercial buildings," the green-certified buildings studied saved

**€6.1** in energy costs 

**€4.7** in combined health and climate benefits 

**€1.15** from averting negative impacts of climate change 

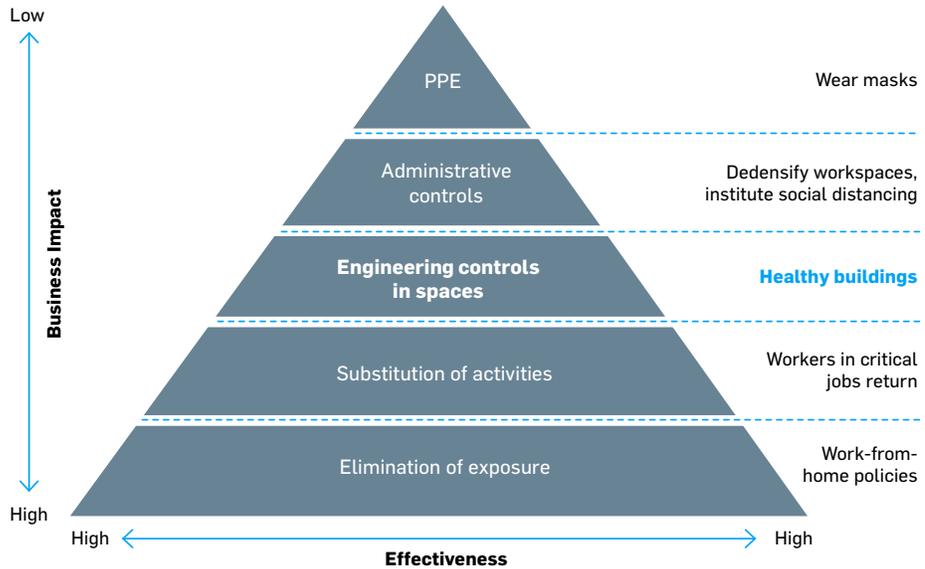
**€3.62** from reductions in air pollution resulting in fewer deaths, hospital visits, lost days of work and school, and more 

**Total benefit of €10.95 for 2000-2016**

## THE ROLE OF HEALTHY BUILDINGS IN REOPENING

Creating a healthy building through engineering controls in spaces is a key component of combatting COVID-19. It's a strategy that balances overall effectiveness with the financial impact it can have on the business.

Allen, J. G., & Macomber, J. D. (2020, April). What Makes an Office Building "Healthy." Harvard Business Review



## BUILDING ON A FOUNDATION

Healthy buildings focus on addressing foundational aspects of the indoor environment to positively impact the people inside. Dr. Joseph Allen and a multidisciplinary team of experts from the Healthy Buildings Program at the Harvard T.H. Chan School of Public Health have identified these key areas as "The 9 Foundations of a Healthy Building." Based on the 9 Foundations, we've outlined actions building owners and operators can take to make their building a healthy building.

<h3>VENTILATION</h3> <p>Maximize outdoor air ventilation Monitor and control target ventilation</p>	<h3>AIR QUALITY</h3> <p>Implement multipoint IAQ monitoring Incorporate advanced IAQ controls</p>	<h3>THERMAL HEALTH</h3> <p>Design to appropriate comfort standard Advanced localized controls</p>	<h3>FILTRATION: DUST &amp; PESTS</h3> <p>Filter air at MERV 13 or higher Implement advanced purification solutions</p>
<h3>MOISTURE</h3> <p>Control to 40%-60% relative humidity</p>	<h3>SAFETY &amp; SECURITY</h3> <p>Implement touchless access Execute advanced access solutions</p>	<h3>NOISE</h3> <p>Design for minimum equipment background noise</p>	

## HEALTHY BUILDINGS ASSESSMENTS

At Carrier, we understand that many of our customers are facing uncertainty with how to move forward in developing a healthy building strategy. Our experts are here to help – starting with assessments across various aspects of a building.

<h3>SAFE START SERVICES</h3> <p>Ensure building is ready for occupancy Rigorous recommissioning of HVAC equipment Implement best practices (possibly remotely)</p>	<h3>EMERGENCY ASSETS</h3> <p>HVAC equipment on demand to reopen quickly and safely Detailed site evaluations Ensure system is able to meet your new ventilation and IAQ requirements</p>	<h3>IAQ ASSESSMENT</h3> <p>Test air quality Develop and implement upgrades for optimal filtration, ventilation, airflow, controls, etc. Develop corporate-wide IAQ engineering standards</p>	<h3>WELLNESS ASSESSMENT</h3> <p>WELL building standard certification WELL performance testing</p>	<h3>SECURITY ASSESSMENT</h3> <p>Provide security solutions and upgrades Contactless access management, body temp screening and video analytics Remote monitoring and diagnostics</p>
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## HEALTHY BUILDINGS SOLUTIONS

Carrier offers a full suite of products and services designed to help customers create healthy building environments. The following are just a few highlights of our offering.

### ADVANCED AIRSIDE SYSTEMS



FRESH AIR MANAGEMENT  
ENERGY MONITORING  
CO<sub>2</sub> LEVEL CONTROL

### AIR HANDLING UNITS



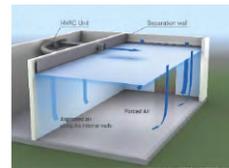
FRESH AIR MANAGEMENT  
HEPA FILTERS / CARBON FILTERS  
UV LIGHTS / BIPOLAR IONIZATION

### ROOFTOPS



CARBON FILTERS  
BIPOLAR IONIZATION  
CO<sub>2</sub> SENSORS

### STRETCH CEILING TECHNOLOGY



HIGH INDOOR AIR QUALITY AND HIGH ENERGY EFFICIENCY  
THERMAL AND ACOUSTIC COMFORT COMBINED  
WITH INFINITE CUSTOMIZATION

### ACTIVAIR HYBRID HYDRONIC AIR TERMINAL



LOW HEIGHT PROFILE  
MODULATING CAPACITY AND LOAD REACTIVITY  
HIGH VENTILATION CAPABILITIES

### AIR PURIFIERS



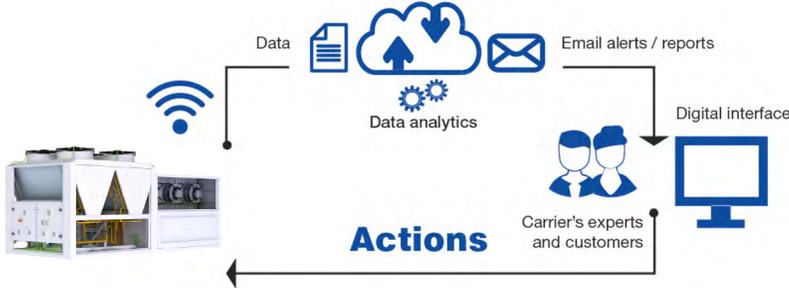
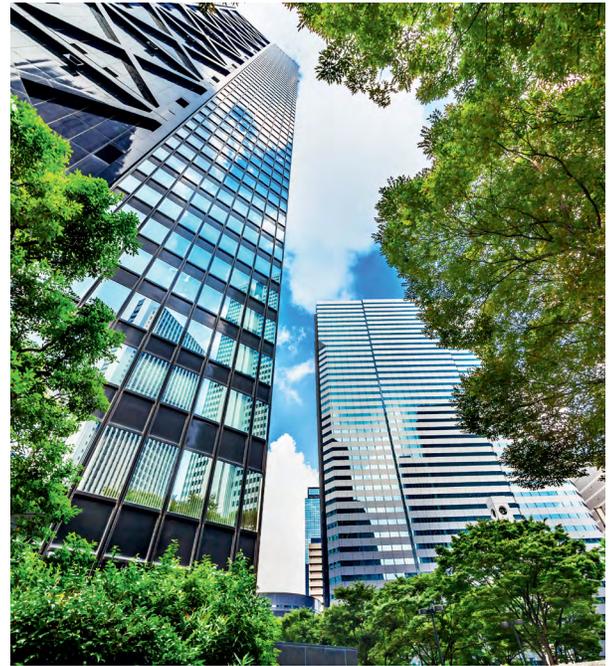
PORTABLE SOLUTIONS  
HEPA FILTERS / CARBON FILTERS  
UV LIGHTS / BIPOLAR IONIZATION



We will work with you to fully understand the needs of your business.

Our building protection services help to ensure high-quality air by keeping the building's HVAC system properly maintained.

Our BluEdge service platform is designed to meet your requirements and keep your equipment running efficiently.




### PREDICTIVE MAINTENANCE

- Remote connection through BMS manages IAQ and ventilation in line with best practices
- Make changes and fix issues remotely
- Optimize maintenance and operational costs
- 24 x 7 command center



### HVAC EUROPEAN CONNECTED SERVICES PORTAL

- Provide advanced remote analytics
- Optimize energy efficiency, equipment uptime, occupant comfort and operational productivity
- Actionable insights by different communication protocols
- Optimize autonomously or through a remote application

RETROFIT SPARE PART SOLUTIONS



### INNOVATIVE TECHNOLOGIES

- M5 filters
- New filtering media technologies
- High filtration efficiency on PM2.5 particles



### ADD-ON RETROFIT ALTERNATIVES

- AHU-UVC add-on kits
- Carbon surface & F7 filtering technology options
- Add-ons are easy to install in the universal frames of existing AHUs
- Effective against viruses, bacteria, small particles and VOCs



### RANGE OF FILTRATION SOLUTIONS

- High-efficiency filtration solutions
- A large variety of air filters
- Solutions for our full product range (AHU, RTU, TFCU)
- More than 1300 references of air filters to cover all sizes / filtration needs

GET STARTED WITH AN EXPERT

From safe business reopening to ongoing enhancements to customer experiences, a healthier future starts indoors. Let's work together to unlock the potential of healthy building spaces. Visit us at [carrier.com/healthybuildings](https://carrier.com/healthybuildings) to learn more about our Healthy Buildings Program and connect with one of our experts.

