

# OpenBlue

## Healthy Buildings

### Breath of fresh air

How Indoor Air Quality as a Service can boost productivity and well-being



Before 2020, we paid little attention to the air we breathe in buildings. Then the COVID-19 pandemic gave us a crash course in air quality basics.

Now it's common knowledge that spending time with people outside rather than in<sup>1</sup> helps avert the spread of illness, and we've become vigilant about protecting our air quality indoors.

Climate change has also intensified our awareness of respiratory risk. People living in Australia and the American West increasingly need to filter out smoke from wildfires, rising temperatures are leading to longer allergy seasons<sup>2</sup> and worsening outdoor air quality.

So it's not surprising that Indoor Air Quality (IAQ) is now a priority for those facility leaders who oversee the spaces in which we live, work and play. But IAQ is competing for attention on a crowded agenda. These same leaders must also ensure that their buildings are as efficient and sustainable as possible – not to mention delivering a healthy return on capital investments.

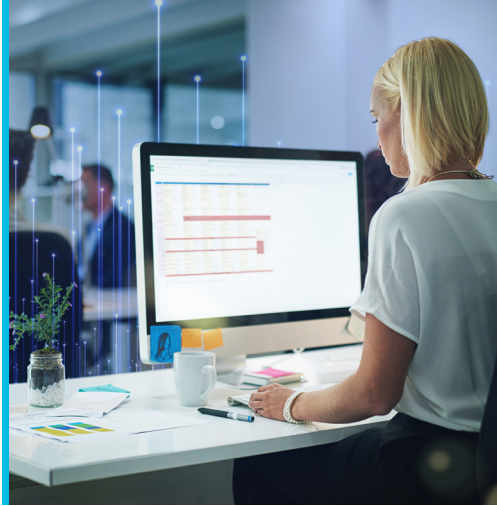
Fortunately, IAQ, sustainability and ROI can happily co-exist. Not only does improving IAQ contribute to the health and well-being of building occupants, but it also boosts productivity and, ultimately, the bottom line. "Our research<sup>3</sup> consistently finds that the value proposition of [better ventilation and filtration] extends to cognitive function and productivity of workers, making healthy buildings foundational to public health and business strategy moving forward," says Joseph Allen, Harvard associate professor and director of the Healthy Buildings Program at the T.H. Chan School of Public Health.

Johnson Controls new OpenBlue Indoor Air Quality as a Service (IAQaaS) offering can take care of the air quality piece of the building-management puzzle. Johnson Controls will assess, improve, consistently monitor and optimize IAQ for clients, charging a predictable monthly rate. Most critically, we can help our customers realize IAQ improvements while also helping them reach their sustainability targets.

#### What is IAQ and why does it matter?

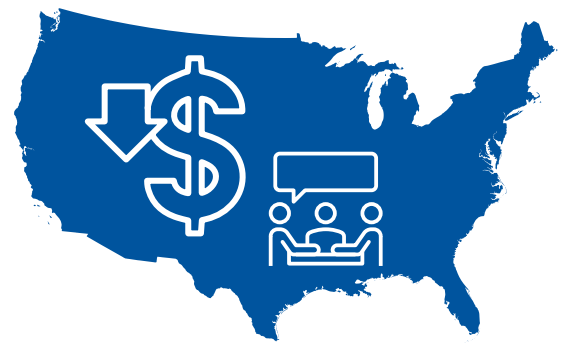
Typically when we think of the air inside a building, we think about the temperature of the air, rather than what's in it. That's because you can feel if you're hot or cold, but you can't directly feel poor air quality. Several factors contribute to indoor air quality, including volatile organic compounds, inorganic gasses (such as carbon monoxide), dust and other particulate matter.

The air that surrounds people at work or school does more than determine whether you need a sweatshirt; it feeds your body and your brain. Better air quality can help people work – and feel – better.



Improving indoor air quality can measurably improve the health and productivity of building occupants. For example, according to an analysis<sup>4</sup> published in the distinguished journal - the Lancet - extensive research in schools shows better indoor air quality can lead to improved academic performance, fewer missed school days and higher cognitive function.

Better health also translates to lower worker absenteeism, which costs US companies billions of dollars a year, according to the CDC Foundation<sup>5</sup>. Presenteeism – when employees show up to work but aren't healthy enough to perform to maximum productivity – may cost more, and could be exacerbated by poor IAQ at the office.



## How IAQ became a major concern

At the outbreak of the COVID-19 pandemic in early 2020, we didn't know much about how the virus was transmitted or how to effectively mitigate transmission. We largely improvised – indiscriminately opening doors and windows, disinfecting surfaces, turning on fans and buying air purifiers.

Now that we know COVID-19 is airborne, we can tailor our efforts more effectively. For instance, we now fully appreciate the importance of adequate ventilation and filtration. Putting our new learnings to use is key to safely bringing people back into offices and classrooms, and earning their confidence.

COVID isn't the only concern. Other viruses, such as flu and measles, can spread through the air, as can biological contaminants<sup>6</sup> including bacteria, mold and mildew. Extreme climate events, such as wildfires, are also worsening, and the toxic smoke they produce can infiltrate homes and offices. Research in California shows this can make even indoor air unhealthy to breathe.<sup>7</sup>

What's more, climate change is leading to longer and worse allergy seasons. As many as 60 million Americans<sup>8</sup> suffer from allergies each year, making it a leading cause of chronic illness<sup>9</sup>. One study estimates that productivity loss due to allergies is twice as high as that from migraines and three times higher than for respiratory infections. Tree, grass and weed pollens can easily make their way indoors<sup>10</sup> via open windows and unfiltered vents, or on clothing and hair.

Without sensing and monitoring, facility leaders don't know how healthy the outdoor air is prior to bringing it inside, or how effectively their HVAC systems are cleaning the indoor air. IAQaaS provides an opportunity to investigate and reduce the varied impacts of airborne disease and allergies on society. Not only does IAQaaS enable companies to ensure the health of their current workforce, it can also help with recruitment. As employees demand more transparency into how companies attend to worker well-being, demonstrating a commitment to IAQ will help attract and retain top talent in a competitive market.

## The Johnson Controls Solution

Johnson Controls IAQaaS can guide customers through this complicated process. We will start with a holistic assessment of a building or space's current conditions and needs. And, even after the project is complete, we will continue to monitor and adjust as air conditions change. Here's how it works:



**Assessment:** Johnson Controls starts by measuring temperature, humidity, air flow volume, pressure, and ventilation in key areas of the facility. Temporary sensors are installed to monitor the levels of carbon dioxide, particulates, and other airborne compounds. An Assessment can also include HVAC equipment inspection and infection risk testing using advanced DNA-tagged bioaerosol tracers.



**Recommendations:** Based on the results of the assessment, Johnson Controls recommends and completes repairs, upgrades, installations or a combination of all three. Examples might include: tuning dampers, changing or upgrading air filters, adding rooftop air handling units, or installing air purifiers, UVC lighting or negative pressure rooms for isolation.



**24/7 sensing:** We will perform continuous remote monitoring through permanent IAQ sensors, controlling ventilation and other critical measures based on real-time IAQ data.



**Monitoring and maintenance:** We ensure all IAQ sensors and solutions are in peak operating condition at all times. Each month we will update customers with a report that includes analysis of IAQ improvements and sets new targets.

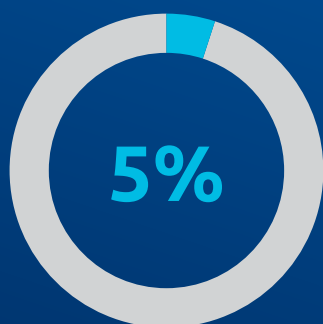


**Optimization:** Our analysis focuses leaders on the mitigation strategies that will have the greatest impact. This balances energy consumption and infection risk, eliminating operational costs and wasted resources associated with cleaning air that's already clean.



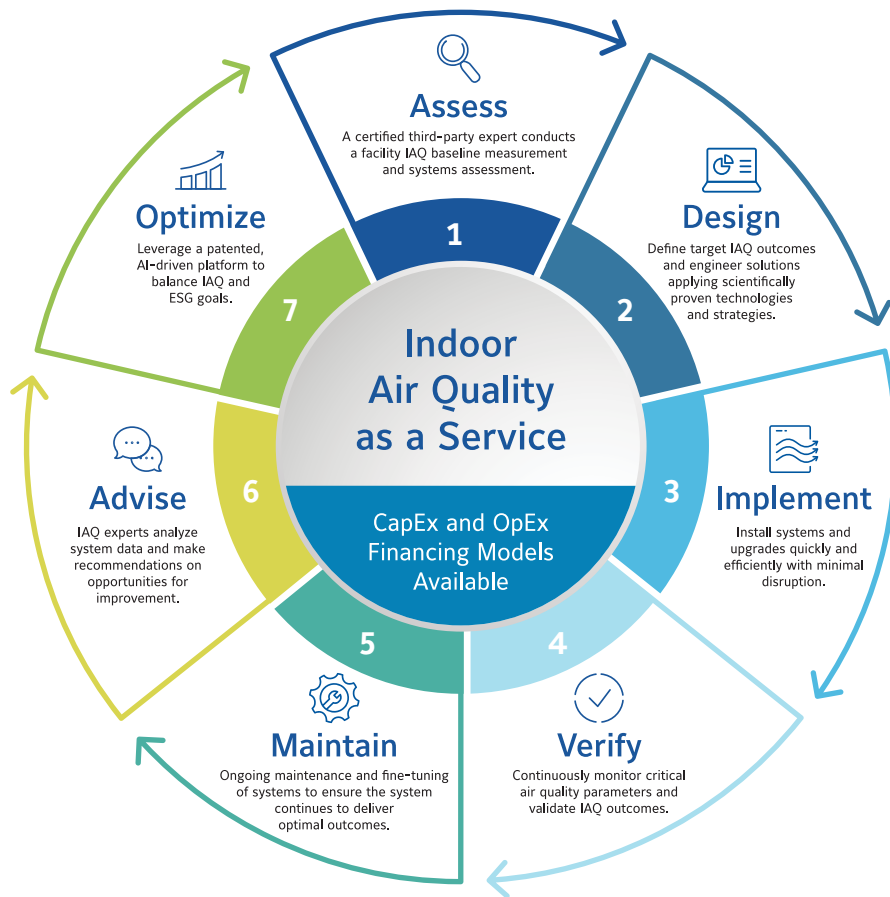
**Financing:** Rather than requiring major upfront outlays, financing for IAQaaS is provided via a monthly service charge. Johnson Controls can help schools or businesses find financing options with government funding opportunities, such as under the CARES Act for customers in the United States.

The payoff for customers will return in the form of improved performance. The Lancet study found that improving ventilation in a Texas school district significantly boosted math and reading test scores, while poorly ventilated classrooms caused a 5 percent decrease in students' "powers of attention". The researchers equated the effect of students breathing bad air to skipping breakfast.



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Combined with a reduction in absenteeism and presenteeism, the effects of improved cognitive functioning could have significant bottom line impact. Consider the 3/30/300 rule popularized by commercial real estate services firm JLL<sup>12</sup>, which estimates that, for every square foot of commercial space, companies spend \$3 on utilities, \$30 on real estate and \$300 on labor and human capital. Increasing worker productivity by just 1 percent with improved IAQ would produce savings equal to a year's energy expenditure<sup>13</sup>.

IAQaaS analysis ensures managers concentrate efforts where they're most needed and don't waste money cleaning air that's already clean. This is particularly important in schools, where large rooms like cafeterias and gymnasiums go unused

for much of the day. It's also crucial in the return-to-work process, as many commercial buildings are at, or below, 30 percent occupancy. This eliminates operational costs and wasted resources associated with unhelpful mitigation efforts, lowering expenditures and supporting sustainability goals.

While some building managers might not have IAQ on their radars, the pandemic has made it clear that they should. The continued march of climate change only adds to the urgency. Johnson Controls IAQaaS allows them a way to manage air quality issues without having to reallocate already stretched resources. The air we share is more important than ever. Johnson Controls is committed to making buildings healthier – and keeping them that way.

- <https://www.cdc.gov/coronavirus/2019-ncov/your-health/gatherings.html>
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## About OpenBlue

OpenBlue is a complete suite of connected solutions that serves industries from workplaces to schools, hospitals to campuses, and beyond. This platform includes tailored, AI-infused service solutions such as remote diagnostics, predictive maintenance, compliance monitoring, advanced risk assessments, and more. A dynamic new space from Johnson Controls, OpenBlue is how buildings come alive.



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