Breath of fresh air: How clean air technology can give your building a new lease of life.

The power behind **your mission**

Johnson Controls

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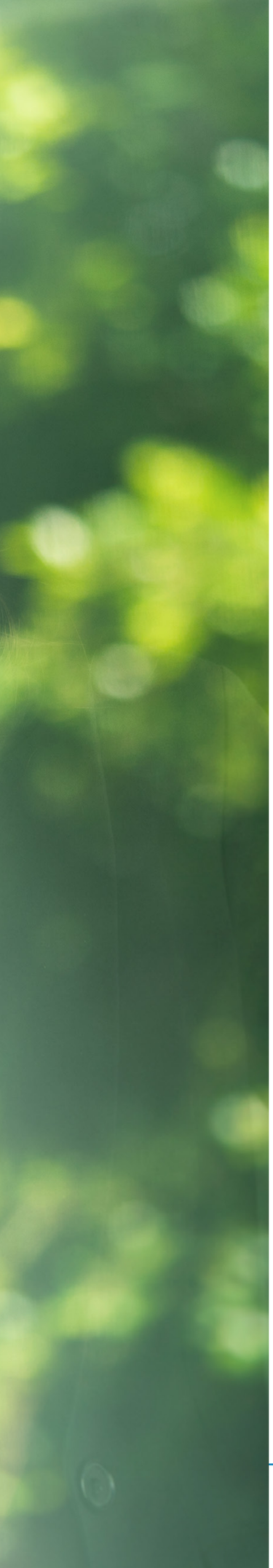

Clean air; business success

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The truth is, on average, we only spend 10% of our day outdoors. Therefore, while outdoor air quality must remain the priority for the future of this planet, indoor air quality must also be given stronger consideration. While there are some regulations around indoor air quality, it can be argued that these are rarely enforced or monitored. When it comes to hospitals, schools, offices and any building we spend most of our day in, this needs to change.

From a government perspective, there needs to be greater monitoring of existing indoor air quality regulations and any gaps in legislation need to be filled. Meanwhile, landlords and businesses have the opportunity to get ahead of these regulations and implement the necessary clean air solutions to safeguard their buildings and the people within them.

Johnson Controls commissioned this research, conducted in April 2021, to discover the extent to which businesses have already recognised the importance of clean air technology and implemented it.

The respondents, of which there were 826 across the EMEA and LATAM regions, were exclusively people responsible for making and influencing purchase decisions for healthy buildings solutions. This includes solutions for clean air, healthy spaces, health operations and emergency response. To stay on top of the latest healthy building trends, a follow-up piece of research will be commissioned and released soon.

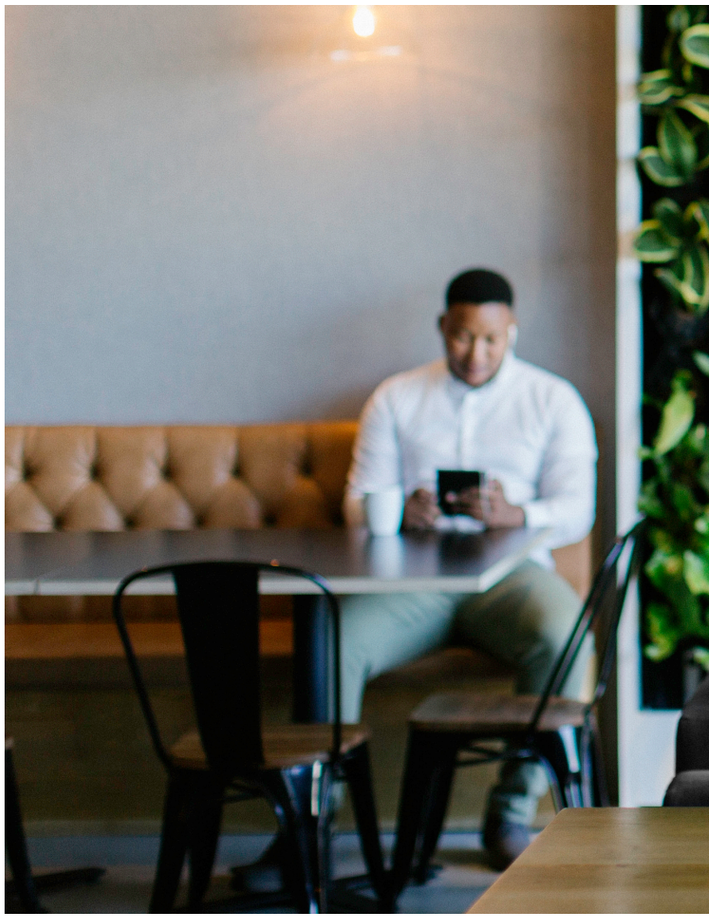
As a result of the COVID-19 pandemic, we have seen an increasing number of businesses adopt clean air technology to tackle how quickly the virus can spread indoors. A study[1] by the University of Cambridge found that, in poorly ventilated indoor spaces, the virus can spread further than two metres in just seconds. While it is encouraging to see businesses implement clean air technology, given the importance of indoor air quality, the percentages are still too low. Aside from limiting the spread of airborne viruses, businesses that invest in clean air technology today will improve the health and productivity of their staff and customers immediately. And, as we strive to improve the health of our planet and the people on it, getting a head start by addressing the places we spend most of our time is not just smart – it's essential.

[1] https://www.imperial.ac.uk/news/213573/coronavirus-more-likely-spread-inside-through/

A floorplan for the future

The pandemic was a catalyst for us all to reassess workspaces. Many have now realised, whether it's by leveraging working from home or using space more efficiently, that there is an opportunity to reduce the amount of workspace they are paying for. This is a new level of efficiency that businesses cannot overlook. In fact, 82% of businesses across the UK are planning to reduce permanent workspace and instead provide temporary work modules/cubes.

However, there is a challenge that these businesses must overcome if they are to make this a reality. Whilst there is a desire to reduce office space, businesses are also keen to get many of their employees back into the workplace. Just 16% of businesses will offer the majority of their employees the option to work from home once the pandemic eases. Meanwhile, a quarter (24%) stated that working from home will either be significantly reduced or completely eliminated for their staff.



The extent to which businesses plan to reduce workspace, split by industry

Industry	Businesses that will reduce workspace for over 20% of employees	Businesses that will reduce workspace for between 1% and 20% of employees	Businesses that have no plans to reduce workspace for any employees
Healthcare	27%	42%	31%
Data centres	26%	55%	20%
Commercial businesses (banking, retail etc)	25%	53%	22%
Pharma/Biotech	20%	51%	28%
Hotels	19%	60%	20%
Other	15%	55%	30%
Manufacturing	13%	65%	22%

This dual desire to reduce permanent workspace and bring people back to the workplace means that, moving forwards, employees will likely be asked to work in smaller workspaces and share those spaces more regularly.

While businesses will be juggling lots of decisions and changes regarding the workplace, clean air ideally needs to be the very top of that priority list. This will help to ensure that employees and other building occupants are breathing air which is clean and safe. While vaccination rollouts are helping to curb the spread of COVID-19, there still remains a risk of infection and there are other viruses, such as the common cold, which can spread through an office or building without the necessary clean air measures in place. Outside of that, good air quality can also help to mitigate against the negative impacts of CO2. If CO2 levels are above recommended levels, building occupants can suffer from drowsiness, difficulty concentrating and even dizziness.

Outside of the health risks that this poses, businesses could also suffer from lower rates of productivity. Research shows[2] that productivity can increase by up to 11% if buildings have a constant flow of clean air.

With workspaces set to reduce in size, the danger of these risks becoming a reality is increasing. Therefore, indoor air quality has never been more important. If we want to cut costs and ensure our building occupants are safe and productive, we need to ensure that the air in our buildings is constantly clean and fresh.

[2] Productivity increases by up to 11% if buildings have a constant flow of clean air

www.worldgbc.org

[2] https://www.worldgbc.org/news-media/health-wellbeing-and-productivity-offices-next-chapter-green-building

A fresh start with clean air

The introduction of government policies and regulations means that sustainability will have to become a key part of the business agenda. Currently, it is a priority for 27% of building decision makers. This number will rise to 49% in the next ten years, though, demonstrating its growing influence on business decisions. This will help to achieve lower levels of pollution and, therefore, cleaner air outside.

So, what is being done to improve indoor air quality? The good news is that 83% of businesses have already implemented clean air technology or plan to in the next 12 months. This will be crucial as businesses continue to welcome people back into their buildings following the pandemic. In fact, over a third (37%) said that clean air technology was either critical or essential to keeping their building open during the height of the pandemic. Having used clean air technology to manoeuvre through what many see as the greatest business disruption of our time, this will give many the confidence to keep their buildings open and safely welcome people back once restrictions are fully lifted.

Perhaps unsurprisingly, it's the healthcare sector leading the way in clean air technology implementation. Nearly two-thirds (62%) of healthcare organisations, including hospitals and GPs, have installed clean air systems already and a further 31% have plans to implement it in the next year. This will help to minimise the risk of airborne viruses being transmitted, safeguarding the staff and patients within the building.

Comparatively, just 47% of commercial real estate, including offices, retailers and banks have implemented clean air technology. Many of these businesses are calling for their employees and customers to return to their buildings, while reducing the amount of office space they have to offer. After a global pandemic, it is only natural that people will seek reassurances that they are safe to return to the workplace. Ensuring a constant flow of clean air can go a long way to providing these assurances.

The extent to which businesses plan to reduce workspace, split by industry

Industry	Businesses that have already implemented clean air technology	Businesses that plan to implement clean air technology in the next year
Healthcare	62%	31%
Hotels	61%	32%
Pharma/Biotech	58%	35%
Manufacturing	55%	37%
Commercial businesses (banking, retail etc)	47%	39%
Other	47%	28%
Data centres	45%	46%

"Many businesses will be keen to return their staff to the workplace. However, it's important that they make their staff and customers feel safe in doing so. Implementing clean air solutions is a crucial step to achieving that.

The benefits of clean air technology go above and beyond making the workplace a safe environment, though. It will also help businesses to make their buildings more conducive to productivity. By monitoring the number of people in the office and supplying an appropriate amount of clean air, the technology can help to reduce CO2 levels. By keeping the volume of CO2 at a minimum, businesses can optimise the cognitive functions of their employees. A study[3], conducted in partnership with the public health school of Harvard University, found that, in healthy, green buildings, where CO2 levels are reduced, cognitive scores increased by 101%. This can only benefit the business."

Mark Bouldin

Digital Solutions Business Development Manager
Johnson Controls UK&I

Overall, it's clear that businesses are increasingly seeing the benefits of healthy buildings and clean air. However, when it comes to the implementation of the technology which turns this from a theoretical idea to a real-world benefit, there is scope for the numbers to be much higher. Even in hospitals, where sanitation is of crucial importance, there are still 38% of healthcare businesses that do not have the technology to ensure high indoor air quality. This is creating an unnecessarily high level of risk for the staff and patients in those facilities. Therefore, the question to ask is not: 'should we implement the technology?' Instead, businesses should be asking: 'what technology do we need and how do we best implement it?'

[3] https://ehp.niehs.nih.gov/doi/10.1289/ehp.1510037

A clean air strategy

For businesses and landlords striving for good indoor air quality in their buildings, there are five key pillars to consider: ventilation, filtration, isolation and monitoring and maintenance.

1 Ventilation ensures that there is an avenue from which fresh air can enter a building and used air can be taken out of the atmosphere. It's also crucial for controlling temperature levels within a building. Measuring and managing occupancy levels can help businesses determine how regularly air needs replacing, keeping it in line with the minimum standards set by the CIBSE.

2 Filtration and ventilation work hand in hand. Filtration measures must be put in place to help reduce levels of CO2, TVOC and particulate matter in the air.

3 Disinfection is the next step. Recirculated air needs disinfecting to prevent people from breathing in airborne viruses and particulate matter. There is technology available which can capture 99.7% of airborne pathogens, ensuring the air people breathe is safe.

4 Isolation is also an important part of the process. Negative pressure isolation environments can be used to contain particles, such as particulate matter, to stop them spreading through the building before disinfection has taken place.

5 Monitoring and maintenance is the final pillar. As part of the commissioning process, it's important to make sure all these systems, and the relevant technology, are adequately monitored, serviced and tested. A faulty or malfunctioning piece of equipment can be the difference between building occupants breathing clean air and breathing unhealthy air. Regularly measuring CO2, TVOC and particulate matter levels will also help businesses prove that the measures are working. Businesses can then use this information to make necessary upgrades, enhancing the quality of their clean air project.

When it comes to putting these five pillars into place, there is no one-stop shop. There are multiple clean air technologies which must be implemented together. These technologies range from air purification to UV sanitation technology, which works to increase the size of particles, making them easier for filters to capture and isolate.

It's clear that many businesses are starting to adopt these crucial clean air technologies. Other businesses must follow suit if they are going to operate out of a building which can truly be branded 'healthy'.

Clean air technologies that businesses have implemented in their buildings	
Clean air technology	Businesses that have implemented said clean air technology
Air purification technology	73%
IAQ-Indoor air quality technology	60%
Air quality monitoring technology	60%
UV sanitation technology	57%
Filtration technology	32%

"While it's certainly encouraging to see many adopting crucial clean air technology, there's more to be done. If businesses are implementing these technologies as point solutions, they will not have the desired effectiveness. The technologies need to be able to communicate with and learn from each other in order to create a clean air environment. To achieve this, they must be installed across an integrated platform, where data can be fed back and forth. That is how businesses will get the best results from their clean air technology.

This is particularly true when it comes to air quality monitoring technology. This technology can identify how many people are in a room, and feed that data to the clean air technology, providing it with the information it needs to optimally supply clean air at the right temperature. For example, if the occupancy monitoring sensors identify three people in a room, then it may only need four air changes per hour. Whereas a room with six people present, might need eight air changes per hour. Without this technology, the effectiveness of the other technologies is compromised.

By focusing on the five key pillars of clean air and implementing the appropriate technology, businesses can safely return both employees and customers to their buildings at a rate which suits them."

Jamie Cameron

Director, Digital Solutions
Johnson Controls UK&I

Clean air technology helps a school re-open during the pandemic

A school serving over 800 students and 100 teachers required a reopening strategy to resume in-person classes during the COVID-19 pandemic. Along with implementing other CDC recommendations, the school consulted with their local Johnson Controls branch on how they could update their HVAC system to meet current CDC and ASHRAE guidelines.

After analysing the school's most occupied spaces and current airflow system, Johnson Controls installed UV-C lighting troffers to replace the standard 2x4 light fixtures to filter and disinfect air. The troffers are able to capture 99.97% of airborne pathogens.

To efficiently add more air changes per hour to spaces, standalone portable HEPA units were installed. This increased the amount of air changes to help dilute and mitigate the spread of airborne pathogens. Johnson Controls' portable HEPA filters also have the lowest decibel levels in the industry, ensuring that clean air doesn't come at the cost of a peaceful working environment.

A breath of clean air

For years, the focus of businesses and governments has been to tackle climate change and improve outdoor air quality. The importance of this cannot be overstated. However, what has been underestimated is the importance of indoor air quality. Following the worst pandemic in living memory, it's an issue that can no longer be ignored.

It's clear that, moving forwards, many businesses want to reduce the amount of office space they are paying for, while asking for staff and customers to return to their buildings. The first step to achieving this is gaining the trust and confidence of the very people that inhabit these buildings. Guaranteeing that the air they are breathing is clean and safe is a crucial part of doing exactly that, and it's a guarantee that can only be provided by clean air technology.

For many sectors, ensuring people feel safe will be enough to justify the installation of clean air technology. However, the benefits stretch beyond this. Businesses that invest in clean air solutions will not only protect their building occupants but enhance their productivity as well. When it comes to clean air, there is a huge amount to gain and not a lot to lose.

About this research

This report was commissioned by Johnson Controls in April 2021 to uncover what businesses are doing and plan to do to ensure they are operating out of a healthy building. The survey was conducted among 826 healthy building decision makers, including those responsible for making or influencing decisions regarding clean air, healthy spaces and emergency response initiatives. Industries covered include healthcare, manufacturing, hotels, data centres, pharma/biotech and retail. All respondents came from businesses and organisations with 500+ employees, across the LATAM, Continental Europe, MEA and UK regions. The interviews were conducted in conjunction with Visions Research via an online survey.

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