



Looking to Trim
Your HVAC Bills?

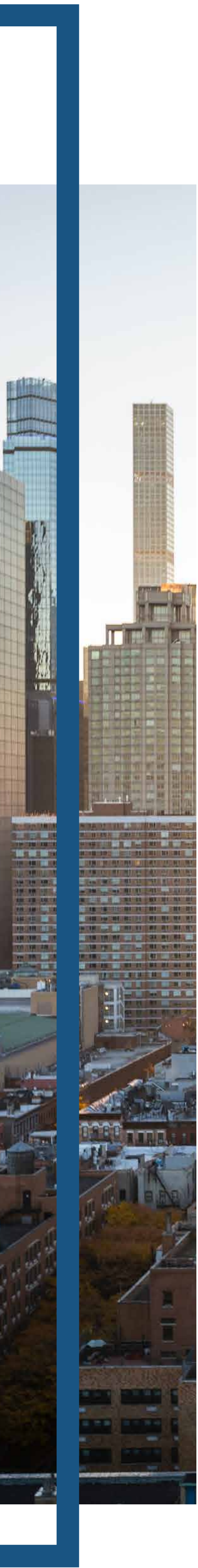
**START WITH
PREDICTIVE
MAINTENANCE**

airkind 



It's no secret that heating, ventilation and air conditioning (HVAC) systems are energy-intensive to operate. After all, they're estimated to make up at least 40% of the average building's total energy consumption. The impact of this is too painful to ignore, especially in light of crippling energy costs. But therein lies the bittersweet irony that all too often gets overlooked. While there's no denying that HVAC systems are energy-intensive, when properly maintained it's possible to reduce their energy load. Because a poorly functioning HVAC system requires more energy to produce the same heating or cooling capacity as a system that's optimized and functioning properly.

And that's where HVAC maintenance comes in. Not only does this ensure HVAC reliability and efficiency, but it also translates into considerable energy and cost savings. This in turn boosts overall thermal comfort. But it's not as simple as that. The reality is that HVAC maintenance tends to be a thorny issue. It can be costly and often amounts to unnecessary downtime. However, it's so much more than just an inconvenience.



Poorly functioning HVAC systems can also pose a serious health risk to certain population groups. And in extreme cases, a malfunctioning HVAC system can cause additional building damage. The reality is that while HVAC systems are a huge expense, maintenance costs don't fall too far behind. Some commercial HVAC maintenance contractors can charge as much as \$140 per hour. And this doesn't take into account downtime, replacement parts or other repairs. All this leaves one wondering: Surely there has to be a better way? And that's where predictive maintenance comes in.

From Reactive to Predictive: A Proactive Approach.

While predictive maintenance can seem intimidating and costly at the outset, it's a real game-changer. But what is it really? In the context of HVAC systems, predictive maintenance is a data-driven approach to maintenance. This involves real-time monitoring of in-service equipment to estimate when maintenance should be performed.

Big data, Machine Learning (ML) and Artificial Intelligence (AI) play an integral role in predictive maintenance and make it possible to leverage data points to identify and prioritize maintenance tasks before they become full-blown system failures. By leveraging data, predictive maintenance enables building owners to pre-empt larger issues before they materialize.

Unlike the reactive approach, which fixes problems as they occur, predictive maintenance identifies minor deviations and abnormalities which may indicate an irregularity. Using this data, it's then easier for building owners to prioritize and manage their HVAC system maintenance in an efficient and timely manner. By embracing a data-driven approach to HVAC maintenance, it's possible to cut costs, reduce truck rolls and ensure better system performance in the long run. A good example of the difference between these two approaches becomes clear when one considers that it would cost about \$100,000 to replace a 100-ton chiller. Instead by embracing predictive maintenance, it would be possible to detect and fix issues before a costly replacement was needed. For example, you might detect a water-flow issue or a faulty water pump which would be easier and far less costly to repair.

“One of the biggest abusers of energy that I've seen, though most energy experts would agree, are outdated HVAC systems that are in desperate need of repair or an upgrade.” - Scott Stiner, CEO & President of UM Technologies



Sounds Too Good to be True. How Does Predictive Maintenance Work?

Even though it shows promise and potential, skepticism about predictive maintenance still exists. Many wonder whether they can trust this approach to pinpoint irregularities before they become real issues. The key to ensuring you get the most out of predictive maintenance is data. After all, data collection and data analysis are at the heart of predictive maintenance. And that's where sensors come in.

In the case of commercial HVAC systems, sensors play a vital role in recording data about everything from the space temperature, humidity, and vibrations to movement within the room. Using machine learning technology and predictive algorithms, it's easy to identify trends and predict when maintenance is needed. Analyzing this data also uncovers irregularities that may hint at a bigger problem.





Room Thermal Profiling Case Study: Stay Comfortable; Cut Costs.

But how do you actually implement this? The first step is to establish baselines. This happens before you even install sensors in the space. At this stage, you need to collect data so you have a control or baseline to compare with and, in that way, can identify any abnormalities that may arise. Once you've done this, it's time to install your IoT devices or sensors. These will be placed in strategic places in the space to ensure optimum performance. With all your sensors in place, it's time to connect them to the dashboard. This is an essential step as it enables you to collect, analyze and make sense of all the data you're collecting.

Typically there are three main types of predictive maintenance. These include:

Vibrational Analysis:

- This form of predictive maintenance is often used inside manufacturing plants
- It can be used to detect irregularities like imbalance, misalignment and wear

Acoustical Analysis:

- Analyses of sound waves made by components within different types of equipment
- It is often used in the music recording industry

Infrared Analysis:

- This type of analysis doesn't focus on speed or acoustics
- Used to identify things such as cooling or airflow issues



Predictive Maintenance on Steroids: Deeper and Data-ier

Airkind's approach to predictive maintenance is unique and a little different. We're one of the only indoor climate control solutions with built-in predictive maintenance, powered by AI and ML algorithms, which runs silently and seamlessly in the background.

Using AI, ML algorithms, we're able to automatically check and monitor the status of every room's HVAC system. We also use the technology to create alerts and notifications about any important system changes. Our system automatically alerts the building manager/owner whenever there's a hardware malfunction, whether with the HVAC system or the Airkind solution.

What's significant about this approach is the diverse range of issues we can detect. Our system can pinpoint everything from obvious issues (like a malfunctioning HVAC system) to irregularities that are almost impossible to spot. These could include everything from humidity levels in a room, a filter that needs cleaning or replacing, an AC unit that is functioning poorly, an open window or whether there are toxic particles in a space to a temperature sensor that has malfunctioned.

Our approach consists of three elements:

- **AC Diagnostics:**

- This constantly evaluates the HVAC unit's performance
- This detects whether the HVAC unit is able to maintain climate comfort
- Focuses on the overall functioning of the HVAC unit

- **Exceptions Report:**

- Can detect which rooms or spaces have a faulty HVAC system
- This could be a sensor malfunction and may indicate the need to change batteries or check sensor connectivity

- **AC Filter Timer:**

- This indicates when you need to change the AC filter, ensuring top performance and avoiding malfunctions. This feature also helps avoid the unnecessary work of checking the filters to see if they are clean or not.
- Our system prioritizes rooms that need their filter changed over rooms with clean filters

What does all this mean for building managers and owners? One of the most obvious benefits of this comprehensive approach is that units function better for longer, ensuring climate comfort. The other huge advantage is a reduction in costly, unnecessary repairs. And because we're able to detect issues before equipment fails, there's no need for maintenance staff to go from room-to-room performing routine maintenance checks. This is especially relevant in light of COVID, where building owners are working with skeleton crews with severe manpower shortages.

"We're doing a lot to think about what our customers want and need. Our technology is designed to predict what could make their experience more comfortable. These predictive maintenance features are part of a much bigger picture: Climate comfort," Hanna Stein, Head of Marketing, Airkind.



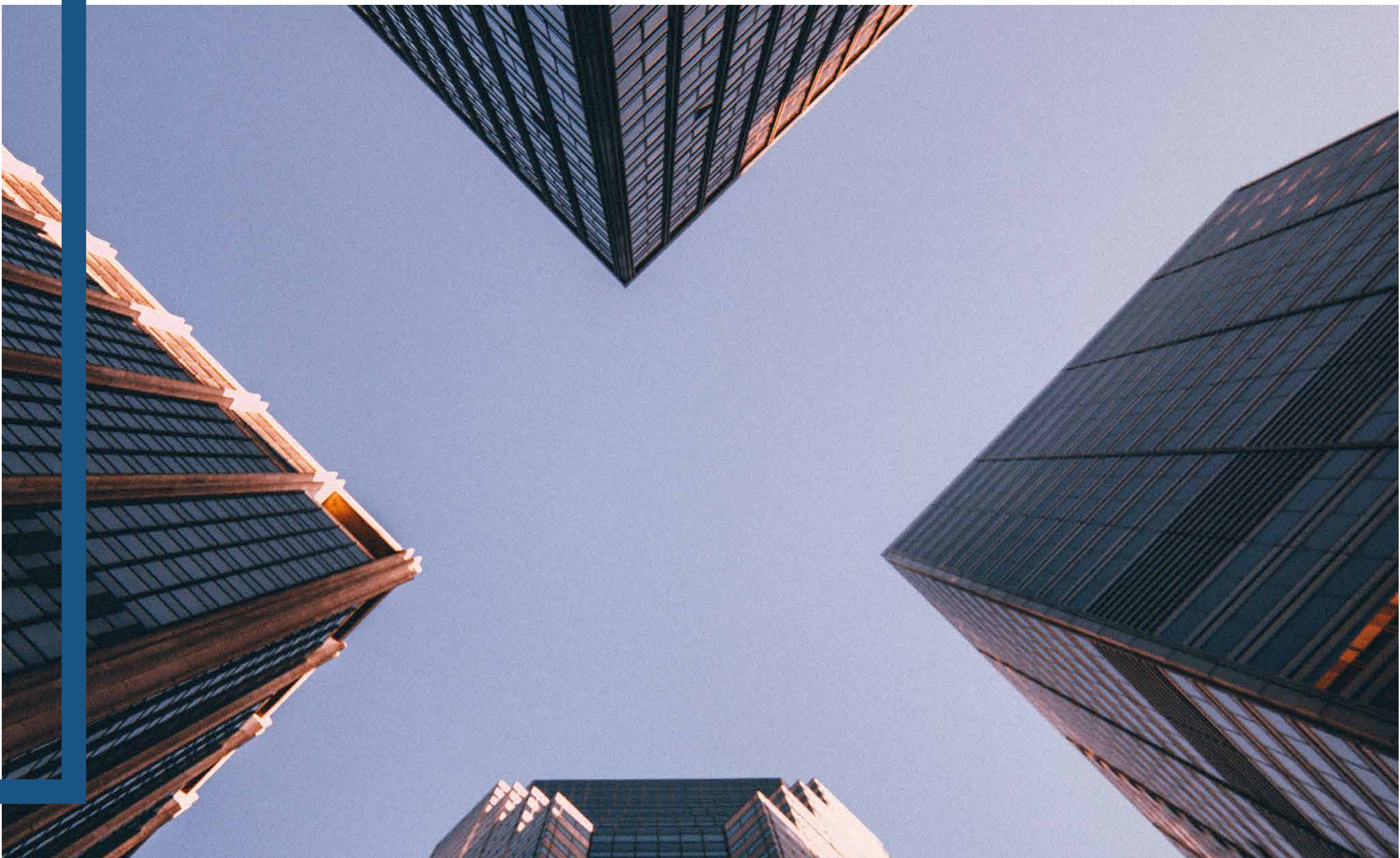
Climate Comfort Done Right: What All This Means For Your Building?

Predictive maintenance isn't just nice to have. It's essential. A must-have. And yet, it's estimated that less than 50% of commercial buildings actually perform predictive maintenance. Not only is that shocking and eye-opening, but it speaks to a missed opportunity.

Consider this: Effective HVAC maintenance can reduce energy costs by between 5% and 40%! But of course, the energy-saving could be higher depending on the system. It's more than that, though. It's estimated that 30% of all energy consumption from HVAC systems is due to overconsumption. Smart predictive maintenance can reduce this.

There's also tons of research on how proper maintenance (i.e. predictive maintenance) can improve a commercial building's energy efficiency:

- Building maintenance best practices can reduce energy consumption by as much as 20%. The opposite, poor maintenance practices, has been found to increase energy usage by as much as 60%
- According to the Portland Energy Conservation Inc., maintenance programs that focus on increasing efficiency have been found to decrease commercial energy bills by as much as 20%
- The National Center for Energy Management and Building Technologies had similar findings. Based on their research, effective building maintenance has the potential to decrease energy bills by between 15% and 20%.



Predictive Maintenance in Action: Airkind Case Studies

We're proponents of predictive maintenance because we've seen that it actually works. Many of our customers have cut costs and have transformed their maintenance processes for the better thanks to this data-driven approach.

1. Managing Vacant Hotel Rooms: CrownPlaza in Springfield, Illinois

The CrownPlaza in Illinois approached us after having to replace carpets on 13 floors because of burst pipes. The damage was caused by windows in vacant rooms being left open at a time when temperatures had dropped. As a result, pipes in bathrooms froze, cracked and burst. After completing a thorough analysis of CrownPlaza's rooms, we decided to install window sensors to alert the hotel when windows in the vacant rooms were left open. Additionally, we set a minimum temperature limit for these rooms. This would prevent the rooms from dropping below freezing point.

Key Takeaway:

Predictive maintenance enabled CrownPlaza to maintain vacant rooms and prevent unnecessary and costly damage.

2. HVAC System Maintenance:

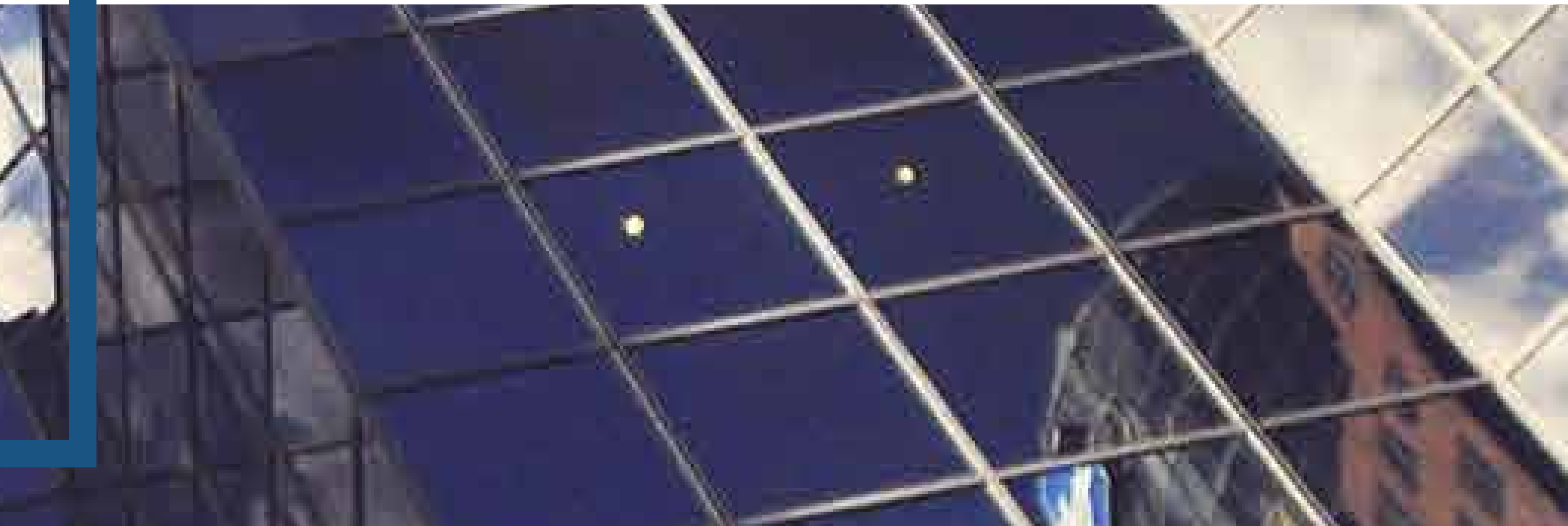
Neve Horim, Nursing Home in Jerusalem, Israel

The Neve Horim nursing home approached us because they wanted to free up their maintenance team. Typically, they were called on in the middle of the night to fix HVAC systems that had malfunctioned. The nursing home was looking for a more efficient and reliable approach to detect HVAC system abnormalities before they become real issues.

After analyzing their rooms, we installed sensors to help the nursing home's maintenance team monitor and maintain all HVAC systems. This enabled them to detect and fix irregularities before they caused harm. It also helped them see exactly where the malfunction was and bypass it remotely.

Key Takeaway:

Predictive maintenance helped the nursing home boost thermal comfort for residents while also reducing HVAC downtime and other costs.



3. Automatically Detect & Control Humidity: A Large Hospitality Chain in Thailand

A large hotel chain in Thailand approached us because they were struggling to manage their humid hotel rooms. The humidity was so bad that there were moldy wet walls in some of the rooms. To sidestep these issues, the hotel maintenance staff would turn AC units on every four hours to dry out the air. This only made things worse. It resulted in excess energy consumption and meant the maintenance staff were overworked.

After analyzing the rooms, we installed sensors to help the hotel maintenance team automatically detect humidity and other conditions which may lead to wet walls and mold. This allowed the hotel to fix these issues before any real damage was caused. In this way, it was possible to manage thermal comfort in the hotel.

Key Takeaways:

Predictive maintenance helped the hotel monitor and control humidity. This kept energy consumption to a minimum while ensuring safe and comfortable humidity levels indoors.



Final Thoughts

The savings associated with an optimally functioning HVAC system as a result of predictive maintenance are often overlooked. And yet, predictive maintenance has the potential to increase an HVAC system's energy efficiency while also reducing energy costs and other maintenance-related expenses. Additionally, this technology reduces the human touchpoints in the maintenance process, amounting to impressive cost savings. This may be a paradigm shift for many building owners, yet it's a no-brainer and an adjustment worth making.



Want to see what our [Climate Intelligence Platform](#) can do for you? [Schedule a demo.](#)