

SCALING SUSTAINABILITY FOR COMMERCIAL REAL ESTATE

**INTELLIGENT ENERGY EFFICIENCY IN THE NEXT
EVOLUTION OF COMMERCIAL BUILDING PORTFOLIOS**

An Industry Analysis Report



HONEYWELL FORGE

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EXECUTIVE PREVIEW

Commercial real estate (CRE) companies are not immune to the effects of the COVID-19 pandemic and the ensuing recession. Many landlords have felt the impact as their tenants face the challenges of keeping employees safe and staying afloat during an economic downturn that has affected companies in nearly every industry. Many commercial building owners and managers have seen property values and rents decline and delinquencies and vacancy rates rise.

As economic pressures continue, CRE companies are looking for innovative ways to reduce costs and enhance their bottom-line performance, while also attracting and retaining good tenants. They can influence both sides of the equation by improving energy efficiency and reducing their carbon footprint, according to DTZ, which found a direct link between sustainability and tenant satisfaction [1].

Simply put, sustainability is good business. According to S&P Global [2], there are direct links between sustainability and corporate financial performance, while a study performed by Cone Communications found that 87% of Americans prefer to do business with companies that advocate for social and environmental responsibility. Even more significantly, 76% would boycott businesses that don't demonstrate a commitment to sustainability. [3].

No wonder many CRE companies are emphasizing strategies to reduce energy consumption and greenhouse gas emissions in their building portfolio.

Commercial portfolios often include many different kinds of buildings, from high-rise commercial towers to sprawling business parks to standalone office complexes. But they all have at least one thing in common. They consume energy. Over the past decade

innovators have found creative ways to decrease a building's energy use and environmental footprint, as CRE companies set, publicize and work to achieve ambitious sustainability goals.

The buildings CRE companies operate, and the comfort systems that devour the majority of their energy spend, represent a substantial opportunity to cut energy use, carbon emissions and operating costs. From the enterprise perspective, these benefits result from a transformative adjustment in the way executives think about (and manage) energy consumption and occupant comfort across their building portfolio.

This paper will explore the business imperatives behind the need to improve sustainability, the challenges that real estate portfolios face in optimizing energy consumption and recent technological innovations that enable companies to achieve step-change operational improvements.



1 STRATEGIC IMPERATIVES

SUSTAINABILITY AT SCALE

PEOPLE, PLACES AND PLEDGES

When tenants or visitors walk into a commercial building, they expect to enter a safe, healthy and comfortable environment. Creating a great experience at every contact point is the best way to attract, retain and engage tenants. Tenants also need to think about their employees, who are happier, healthier and more productive when the indoor environment is just right.

Cornell University found employee performance decreases when workers are either too hot or too cold; they commit 44% more errors and show less than half their normal productivity in colder temperatures [4]. Similar studies have shown as much as a 2% reduction in personal productivity per degree when temperatures are too hot [5].

Occupant comfort is top-of-mind when it is time to set the thermostat in a commercial building. But it's also important to recognize the huge energy bill and carbon footprint generated by large CRE companies with dozens, hundreds or even thousands of buildings scattered throughout the world.

Commercial buildings account for 70% of the energy used in major cities and almost a third of the world's greenhouse emissions [6]. The truth is that much of the energy it takes to run a building portfolio goes to power simple needs such as heating and cooling across a large fleet of buildings. In fact, heating, ventilation and air conditioning (HVAC) systems alone are responsible for up to 60% of a commercial building's energy consumption [7].

THE BOTTOM LINE RUNS THROUGH YOUR BUILDINGS

Most commercial real estate companies operate multiple buildings with a diverse range of tenants. Each building is different, running on different systems and schedules, and requiring focused attention to operate. Those operations are traditionally performed by people on the ground who know the buildings. So, across an organization, networks of technicians, facilities managers and contractors labor to ensure each building's efficient operation.

In this bustle to keep things operating and ensure people remain comfortable, thought is seldom given to how the systems in these various buildings are performing against the broader P&L. Utilities, maintenance and other operational expenses are difficult to capture and aggregate across a fleet of buildings, each running independently from an operating expense perspective.

In the context of a national or global enterprise with dozens, hundreds or even thousands of buildings, HVAC performance represents a substantial opportunity for carbon reduction and energy savings. The U.S. Office of Energy Efficiency & Renewable Energy says commercial buildings waste as much as 30% of the energy they consume [8] and notes that companies can save energy by applying advanced building technology and improving operating and maintenance practices.

So how are CRE companies leveraging the latest smart technologies to reduce energy consumption? Many are not.

2 THE OPTIMIZATION DILEMMA

“Companies that own vast amounts of real estate are forced to live within the context of their infrastructure. In most large commercial real estate companies, their buildings generally operate with a complex set of disparate systems that turn tech upgrades into lengthy, expensive IT integration projects.”

*David Trice,
Chief Product Officer, Honeywell Connected Enterprise*

TRUE SMART BUILDINGS ARE DIGITAL NATIVES

Consumers are the prime benefactors of today's convenient, connected technologies. It's easy to surmise that enterprise businesses, like CRE companies, are constantly adopting the day's newest technologies to streamline the way they operate and improve the customer experience. But similar to the purchasing decision many consumers will face when 5G connectivity proliferates and they realize they need a new iPhone to dabble in its greatness, enterprise businesses are often forced to forego the “latest and greatest” innovations when their infrastructure doesn't align with new technologies. Buildings are a great example of how this optimization dilemma can play out.

New structures, born in the age of the smart building, are often outfitted with exciting gadgetry, occupant-focused solutions and impressive automated systems. But the majority of the world's commercial buildings were constructed in an earlier time before the advent of such technology.

“Companies that own vast amounts of real estate are forced to live within the context of their infrastructure,” says David Trice, Chief Product Officer for Honeywell Connected Enterprise. “In most large commercial real estate companies, their buildings generally operate with a complex set of disparate systems that turn tech upgrades into lengthy, expensive IT integration projects.” This limitation often forces large organizations to decline investments in new technologies due to the cost and complications of implementation across a large and diverse universe of buildings with disparate operating systems.

DWINDLING TACTICS FOR PERPETUAL IMPROVEMENT

One thing remains constant though – the bottom line. It is common for CRE companies to look to their facilities for incremental savings as they map out quarterly or annual budgets. Those looking to shave off a percent here and there will approve budgets for single-building projects that promise a specific return. An automated lighting installation in an office building, for instance, is a safe bet that yields a small, low-risk return. And so, the general practice for optimizing energy use within buildings is to invest in these types of incremental improvements – one complex integration at a time.

This traditional approach becomes difficult to manage with a large number of locations, but the biggest flaw in this strategy is the law of diminishing returns. As a company seeks more and more savings each year, facilities managers have fewer and fewer options available to continue making these small improvements. There are only so many tweaks you can make to an older building.

THE EXODUS OF THE HANDS-ON WORKER

For these reasons, commercial building portfolios operate as laggards, largely untouched by recent advancements in technology. In the same way, the workers who operate these buildings continue to follow dated processes and procedures to maintain building operation – much of which is manual and relies on personal expertise residing with the workers themselves.



While many CRE companies seek to improve corporate standards for efficiency and sustainability, they're quickly approaching a dilemma shared by all companies that manage building portfolios – the knowledgeable workers who operate their buildings will soon retire. This is of major concern because --like many trade-level skillsets-- the market is low on replacements. Executives know the next wave of building workers is going to include millennials and as the world has seen across all industries, they are going to want to do things differently.

LESSONS IN BUSINESS CONTINUITY

We can't have a complete discussion about modernizing energy and sustainability without considering the impact the global pandemic has had on parts of the commercial real estate industry. All companies have been forced to stretch operationally in reaction to COVID-19. What affects commercial tenants also affects building owners and operators and challenges will continue as companies bring more employees back to work and accommodate CDC safety health and safety precautions, including social distancing.

Within a building portfolio, this volatility produces wild fluctuations in energy demand. As traditional energy-conservation techniques show their true nature, today's companies require technologies that offer flexibility and intelligence in the wake of unexpected circumstances.

Meanwhile, the pandemic also revealed shortcomings in most organizations' digital capabilities, according to a Deloitte survey. Companies are actively looking for ways to optimize operating costs by an average of 20%, with technology a leading strategy for improving operational resilience.[9]

TODAY'S PROBLEMS REQUIRE TOMORROW'S SOLUTIONS

The exposure of new weaknesses in operational sustainability is driving organizations with vast physical infrastructure toward solutions that can automate intelligently. Energy projects that focus on a single building at a time contribute too slowly to impact enterprise goals. It is simply not enough to curb energy consumption and carbon emissions at a single site, or within a specific set of parameters. Pharma organizations need an energy strategy for their buildings that can affect change at a broader level, despite limitations in infrastructure. A solution that reduces dependence on the manual efforts of workers and protects operational continuity can enable an organization to achieve sustainability and respond proactively to unforeseen global calamity.

To achieve this, organizations need to refocus their investment thesis to the core issue behind energy use in their buildings – optimizing the way comfort systems function. Considering that heating and cooling accounts for over half of the energy consumed by commercial buildings, the potential benefit to enterprise sustainability – and Opex costs – is undeniable. The reality is, the traditional manner in which HVAC systems are configured does little to curb energy use at the source. But to capture this opportunity, modern organizations need buildings that are capable of responding to variation and running themselves autonomously, even when there's no one to occupy them.

3 FOCUS ON THE CORE



Energy Optimization in Commercial Real Estate

AN ECOSYSTEM OF VARIABLE DEMAND

Buildings aren't static, they are ecosystems of variation that can change minute-to-minute. The same goes for energy demand within these environments. Yet, as they have for decades, facility operators configure HVAC systems using conservative, static setpoints. The reason? This strategy provides generally consistent comfort levels to safeguard occupant and visitor experience.

Meanwhile energy optimization remains an afterthought. These conservative strategies are often set for an entire season, and then forgotten until new setpoints are keyed in months later. For organizations with a vast real estate portfolio, this means energy is being wasted in each building it operates, every day of the year.

Consider this example: A 10-story office building with multiple tenants opens for business on a typical spring morning. Employees of the various companies arrive to start their day at 9 a.m. and enter the building through a busy lobby that also hosts

a coffee shop, newsstand and a few retail stores. The building's HVAC setpoints have been prearranged for the season and the building management system turns the system on at 6 a.m. to get the building ready for the day. But today is a little different, because the building's largest tenant, who occupies the first two floors, is holding its annual sales meeting.

Extra people fill offices and meeting spaces, driving up temperatures on floors 1 and 2. The sliding doors in the main lobby receive extra use and visitors congregate in the lobby to sign in, catch up with colleagues and grab a cup of coffee. The HVAC unit works harder to maintain the spring setpoint and keep things cool in common areas. Meanwhile, visitors in crowded 2nd floor conference rooms take off their jackets to cool off while tenants in upper-floor offices reach for their sweaters.

There are numerous variables at play here, all of which have an effect on the amount of energy the HVAC system needs to

maintain optimal comfort levels throughout the building. The additional visitors affect traffic patterns, sliding doors are letting in more of the cool morning air than usual and the increased occupancy has forced employees to congregate more densely in general-use areas and other spaces. As the day continues, traffic increases and occupancy levels, indoor traffic patterns and outdoor temperatures vary. So does the price of natural gas and electricity, which shifts minute-to-minute throughout the day.

Using today's methods to manage building comfort none of these variables are taken into account. The HVAC system doesn't know if the lights are on, if the doors are open or if there's anyone in the building at all. The only focus is the temperature targets assigned at the beginning of the season. This scenario is damaging from a comfort, energy efficiency and sustainability perspective, and it's a cycle that repeats day-in and day-out.

NOT A JOB FOR A HUMAN MIND

"The commercial real estate organization needs a sustainable HVAC solution that scales, and that implies a solution that's intelligent enough to know when a building is empty and to react when a cold front is coming or when energy is bargain-priced," says John Boothroyd, Global Director of Product Management. "Considering the variables involved, this dilemma is simply too complex for human minds to overcome."

To properly heat and cool even a single building without wasting

energy, a number of vital data points must be collected and evaluated. First, an understanding of current occupancy levels needs to be collected, not just for a building, but broken out by building zone to recognize hot spots and cold zones. Then, current outdoor temperatures, indoor temperatures and humidity levels should be incorporated. With this snapshot, predictions can be made about how occupancy levels and outdoor climate will change in the near term and these expectations can be correlated with the estimated rise and fall of utility prices for gas and electricity.

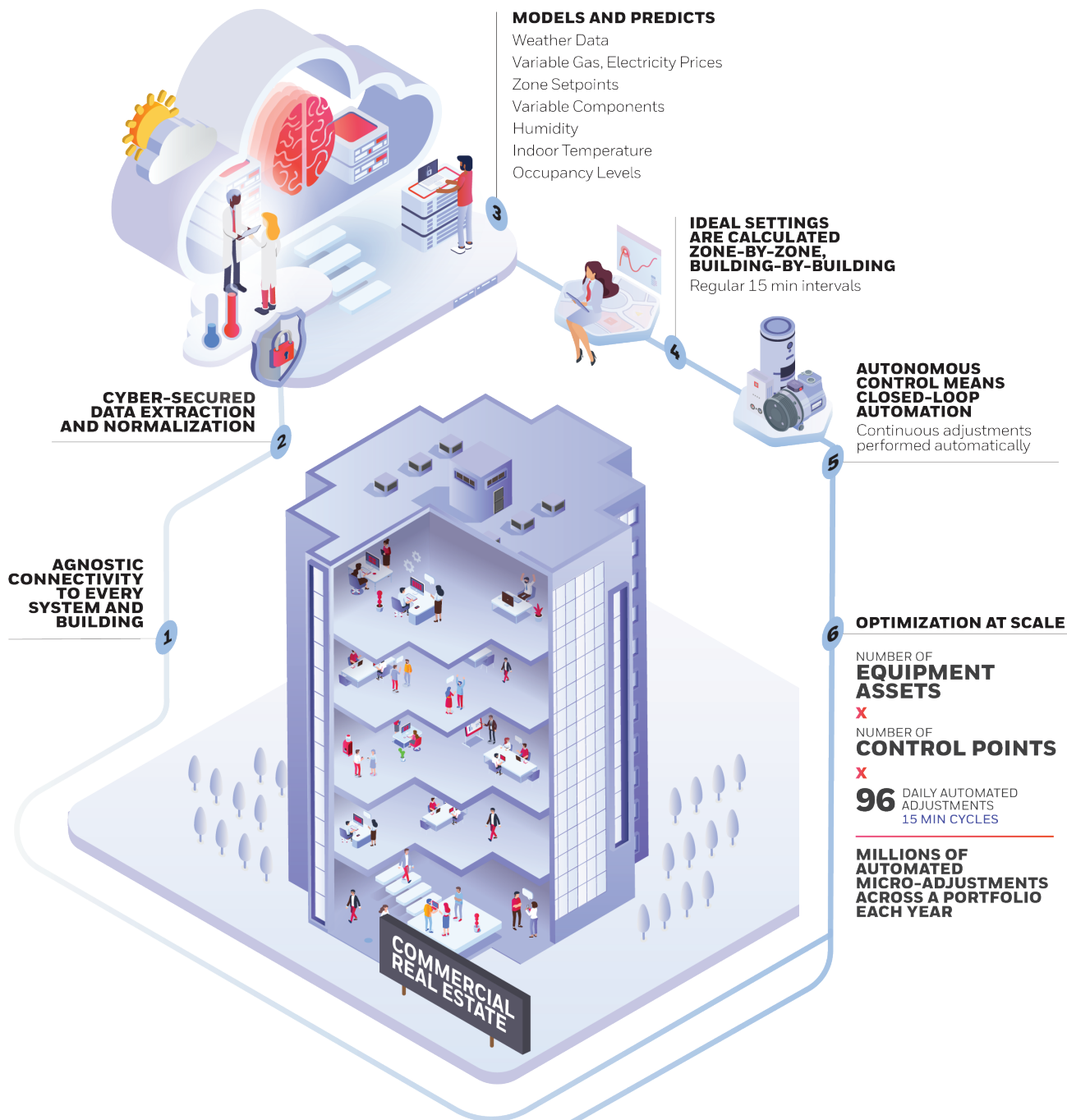
With all of these data points measured and estimated in real time, a calculation can be made to derive an ideal setpoint for each building zone that protects indoor comfort levels while optimizing energy use. If, for instance, it's a cool morning outside but the afternoon is expected to be warmer and utility prices are estimated to rise around lunchtime, a decision can be made to overcool the building while it's easier and cheaper in the morning.

Calculations like this are entirely possible. What is not realistic is relying on humans to manage this sort of strategy. The variables change too quickly and with too many nuances to account for with any level of accuracy - unless a more capable intelligence is handed the task and asked to continually monitor and update its predictions throughout the day. This level of optimization may seem out of reach, but the days when building comfort and sustainability are a zero-sum equation are coming to an end.

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*John Boothroyd,
Global Director of Product Management*

4 THE FUTURE IS STASHED IN YOUR DATA



BENEFITS

- Increased Energy Savings
- Reduced Carbon Emissions
- Continuous Learning, Continuous Improvement
- Occupant Comfort is Maintained
- Zero Rip and Replace
- Zero Human Intervention
- Zero Process Changes

Energy Optimization in Commercial Real Estate

THE BUILDING BLOCKS OF SCALABLE SUSTAINABILITY

Most building portfolios are a smattering of old and new, advanced and analog, making actionable data and control mechanisms a rare commodity across the whole. This is a major limiting factor that has largely stalled modernization in the way organizations approach energy savings and manage the comfort systems that consume the majority of energy in their buildings. Bearing this reality in mind, any scalable solution for sustainability in buildings must accommodate two vital components – brain and brawn.

In this analogy, the brawn is a simple strategy to establish a secured, physical, two-way connection with each building in a portfolio. Data must be available for collection and analysis, and control mechanisms must be harnessed to enable regular, automated adjustments to HVAC control points. The brawn portion of this solution must have the capability to connect with building systems agnostically, regardless of the systems each particular building is using. This connection is foundational to the scalable solution because it empowers the closed-loop, autonomous function necessary to enact meaningful change across a fleet of facilities without reliance on manual intervention.

With the brawn in place, a path is forged to allow the brain to do its work. Artificial Intelligence (AI) provides the unique capability that has been missing, which can make these complex calculations a daily operational reality. In order for the AI to successfully manage the control of an enterprises' comfort infrastructure, it needs to be trained using data models that represent years of facility and HVAC operations. This means not just any AI will do and that an AI is only as good as its source is familiar with the way buildings and HVAC systems function. The better the data models, the better the training, the better the results.

Finally, the brain must continue learning. In order to affect continuous improvement and drive sustainability in the longer term, deep-learning algorithms must be incorporated to learn from particular distinctions in the way each building functions, and to increase its effectiveness in reacting to new and unexpected scenarios. This is a long-term, transformative style of solution, and one that demands consideration from the senior leaders in a CRE company because the entire enterprise stands to benefit through better financial, operational and reputational performance.

RIPE FOR THE PICKING

As is apparent day after day, global enterprises are already headed in this direction. Solutions that leverage the internet of things (IoT), cloud technologies and all levels of machine-learning algorithms are becoming more prominent, and for good reason.

First, Software as a Service (SaaS) makes advanced technology viable from a fiscal perspective because large sums aren't necessary to purchase robust solutions. In addition, cloud technologies allow SaaS customers to seamlessly reap the rewards of continual software updates and improvements without making additional purchases. This protects the customer from legacy solutions that eventually age out and empowers AI to continue improving and delivering outcomes for customers over time. Similar benefits apply to smart edge devices and the IoT. As more and more applications for these technologies are discovered and propagated, costs continue to drop – thus continuing the cycle and making additional applications viable.

We are in a unique period where solutions that leverage all three of these technologies are gaining foothold with big companies, where they can affect the most change. This trend is causing digital transformation to broaden its scope and, in turn, the opportunities available to forward-thinking companies.

PERPETUAL IMPROVEMENT - BY DESIGN

As we consider the next generation of sustainable solutions, a distinction can be made between the traditional and the innovative. That distinction is perpetual improvement. Small energy-focused projects that roll out at a single-building level provide a limited, static benefit to the broader organization. These investments do provide value, but the measure is whether that value dilutes into tomorrow's status quo or increases over time.

Sustainability solutions like Honeywell Forge Energy Optimization (as described in this paper) differentiate themselves based on their capacity to scale and their fundamental ability to learn, improve and drive increased benefit over time. Enterprise-oriented solutions share this transformative characteristic, enabling a next-step change in the way CRE organizations approach intricate imperatives like sustainability. This future-focused attitude is replicated across the products that comprise the Honeywell Forge Enterprise Performance Management (EPM) platform and should be the deciding factor for CRE executives seeking an enterprise-level impact year-over-year.

5 CONCLUSION

This is an interesting time in our economic history, and not just because of the unprecedented global pandemic. Over the past few years thought leaders in global corporations across all industries have begun publicizing their efforts to improve the impact they have on the planet.

Some of the world's largest and most prominent companies in commercial real estate and other industries are leading this charge and making bold pledges for carbon neutrality and even carbon negativity. What this period has taught us is that companies need operational flexibility. Often flexibility means the ability to control operations remotely or, better yet, improve efficiencies with closed-loop automation. It is technologies like these that serve to futureproof an enterprise and transform the way leaders look at operational investments.

For any company operating a large real estate portfolio, taking strides toward a sustainable future requires finding opportunities that complement the core business model. For commercial real estate companies, it's time to pivot from seasonal energy strategies and labor-based building operations toward software-based automation systems and autonomous solutions, because these technologies benefit the whole: customers, associates, the planet and the bottom line.

It's time to stop buying for your buildings and start buying for your enterprise, so the facilities your tenants occupy can become a strategic lever for sustainability achievement - at scale.

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