

OpenBlue Pioneers

This innovative London landlord is using a next-generation platform from Johnson Controls to hone in on net zero.



Derwent London, the largest real estate investment trust (REIT) in London, is known for its state-of-the-art design and innovation. Its flagship buildings, such as White Collar Factory in the heart of London's thriving Tech City, boast high ceilings, abundant natural light and ventilation, and some of the city's fastest broadband speeds. Lately, the REIT, which oversees a portfolio of 75 centrally located buildings that occupy 5.6 million square feet, is further polishing its reputation as a sustainability leader.

In July 2020, when Derwent London pledged to achieve net zero carbon emissions by 2030, it became the first UK-based REIT to provide a detailed pathway to achieving its target. Derwent London's program goes well beyond traditional net zero journeys. It takes direct aim at the source of climate change by committing to reduce its energy consumption, significantly increase renewable power usage and thoroughly audit its activities to shrink its carbon footprint.

For example, the REIT will adopt all electric heating and cooling systems for its new pipeline of developments and retrofit its older properties. It will also use more sustainable building materials, such as low-carbon concrete. Derwent London plans to adapt to more renewable sources of energy. That includes factoring in power generation from its planned solar farm on its land near Glasgow, Scotland, which could cover up to 40 percent of the power consumption of buildings in its London-based portfolio.

For nearly a decade, Derwent London has completed embodied carbon assessments for its projects, giving it an overview of the emissions from the extraction, manufacture and assembly of everything that goes into its buildings. That will allow it to target emissions from the entire life cycle of its built assets.

Derwent London is also looking to artificial intelligence (AI) to achieve its ambitious goals. It will use Johnson Controls Open Blue Enterprise Manager (OBEM), OpenBlue Central Utility Plant (CUP) and a suite of apps to pull together data about energy usage, asset performance, occupancy, indoor air quality, maintenance and space utilization from a cluster of its major buildings in the UK capital.

OBEM offers a wealth of fresh insights about building performance on a single dashboard. Derwent London will be able to transform those findings into actions to accelerate its progress toward sustainability and efficiency.

Early steps

Even before its landmark 2020 pledge, Derwent London was well on its way to net zero. Like many large landlords and property developers, the company had reduced its carbon footprint in preceding years by installing, replacing or upgrading major energy-intensive equipment across its portfolios, such as HVAC systems.

Nearly all of its flagship buildings – such as 80 Charlotte Street, The Featherstone Building and White Collar Factory – own cutting-edge chillers, energy-efficient heat pumps and state-of-the-art cooling towers. Those technologies made a significant dent in carbon emissions, considering a typical HVAC system can account for up to 40 percent of a large office block's total power consumption.

However, more than investing in hardware was needed. Acknowledging that the efficiency gains from HVAC upgrades had achieved their maximum energy reduction, Derwent London began hunting for new ways to squeeze energy waste out of its buildings.

Their facility experts knew that the energy-hungry systems in a typical large commercial building were an untapped gold mine of efficiency gains. Matt Massey, Head of Project Management at Derwent London, acknowledged that the only way to uncover these new efficiencies would be to make sense of the mountains of data churned out by these systems. Derwent London needed to infer from all these measurements before effective action could be taken.

It would be a challenging job. The REIT manages scores of buildings that host hundreds of tenants with their own facilities management providers, IoT devices and networks. A single building might contain multiple electricity, gas and water meters, some of which require painstaking manual readings.

Derwent London needed a software supplier that could get a handle on its data streams and be an intelligent reader of them. Several tech firms offered their services, but few had extensive building management experience. Derwent London searched for the best partnership in intelligent buildings and reached out to Johnson Controls.



System-level efficiency

OpenBlue OBEM gleans system-level efficiencies for large landlords by gathering information from all the different buildings, technologies and systems in an estate into “one clear source of truth.”

Johnson Controls engineers began by taking stock of the monitors, meters and building management systems already in place, whether they related to total energy usage, chilled-water consumption, gray-water usage or lighting power.

“Once you’ve got that framework in place, it makes it very easy to start amalgamating that data and putting it all together,” says Massey.

The team then set baselines for the data, incorporating energy-use intensity benchmarks, London's historical weather patterns and estimates of expected demand and consumption. Only then did the engineers install OpenBlue OBEM itself, linking all the sensors, meters and systems to the cloud, the central data repository. Where appropriate, they harnessed digital modeling that allowed for predictive modeling and real-time analysis.

Array of apps

Once this comprehensive analytical cloud-based platform is fully up and running, Derwent London's facilities teams will be able to track, manage and analyze their buildings' energy use, whether it is thermal, water or electrical storage. AI and machine learning allow them to identify opportunities to improve performance and reduce costs by pinpointing inefficiencies, quickly diagnosing equipment problems and taking corrective action to fix them. The algorithms can also avert unplanned expenses by predicting energy demand and consumption.



For example, an app called Asset Manager will allow Derwent London teams to drill down into the performance of building equipment, such as the HVAC unit on a particular floor. The app uses fault detection and diagnostic (FDD) tools to enable predictive condition-based maintenance. This means building managers can stay ahead of the game: they are up to date on trends and diagnostics and can plan corrective action before problems worsen.

Derwent London can also harness OpenBlue CUP to shrink the carbon footprint of its central plant – the cluster of mechanical, electrical and water systems that serve as the backbone of a building’s energy load.

Every second, networks of sensors – installed on chillers, boilers, heat pumps and hot-water generators – ferry data about equipment performance into the Johnson Controls cloud. OpenBlue CUP’s algorithms, which reside in smart edge devices and the cloud, analyze that data alongside other variables, such as weather forecasts and utility rates. After monitoring thousands of variables and gathering data every 15 minutes, the app identifies operational modes that maximize efficiency and automatically implements optimization decisions.

Fresh air too

While net zero is Derwent London’s primary mission, the REIT can use OBEM’s Location Manager service to learn about its building’s space usage and air quality. Johnson Controls will

install motion and air quality sensors throughout Derwent London’s facilities, dividing the buildings into digital sectors. That way, facility managers get an overview of occupancy by sector or floor and can monitor the levels of CO₂, volatile organic compounds (VOCs) and particulate matter in those areas. If anything is amiss, managers can respond by turning up air-conditioning flow or opening windows to allow fresh air into the building.

Insights such as these will grant an unexpected bonus. “We set out to save engineering costs and reduce energy consumption, which we’re well on our way to achieving,” says Simons. “Having deep air quality control throughout all our spaces is an extra cherry on the top.”

Derwent London will disclose its progress against the metrics set out in its July 2020 pathway every year, but the REIT will begin reaping the benefits of its AI-enhanced software the moment it is active. The Johnson Controls cloud-based platform creates a 24/7 feedback loop that continually identifies additional operational efficiencies and energy savings from assets, freeing up technicians and facility managers to focus on other priorities.

Massey and Simons say that the technology will be an invaluable ally for Derwent London as it hones in on net zero. “Along with technology, one of the biggest challenges is mindset change, whether that’s in design, procurement or operation,” says Massey.

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.

