

One of Asia's largest diversified Real Estate Groups

Delivering energy and cost savings as well as advanced technologies for effective building portfolio management



About

Leading multinational alternative asset management company focused on real estate, infrastructure and private equity.

Challenge

- The Real Estate Group was looking for an enterprise analytics solution to achieve cost savings and enable a centralized command center.
- Goals:
 - Deliver energy efficiency in 46 buildings in Singapore and 30 buildings in India. The portfolio included a mix of commercial offices, retail and technology parks.
 - Smart Facility Management vision driven by the Singapore Legislation for Building and Construction Authority to deliver facility management productivity.
 - Decrease maintenance cost by centrally managing BMS vendors
 - Improve coordination between various BMS suppliers, themselves and users
 - Provide a single view to operate and maintain buildings
 - Deliver data-driven maintenance to drive improved productivity in their facility management

Solution

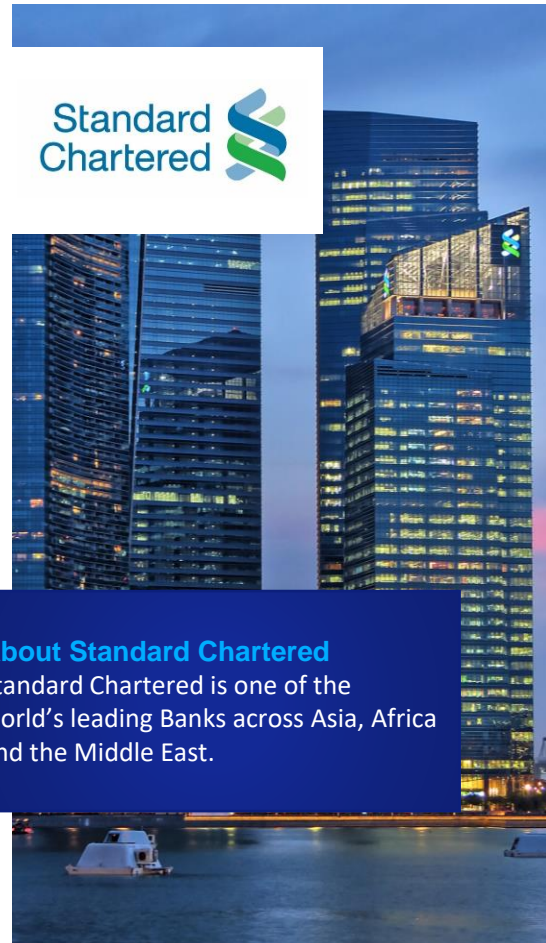
- Johnson Controls OpenBlue technologies delivering command and control center for effective management of global building portfolio
- Audited existing BMS and delivered improvement recommendations. Close collaboration with the customer to write fault detection monetization rules which drove measurable ROI impact.
- Installed technologies to absorb load fluctuation
- Established a metric for operators' performance monitoring in case of fault detection
- Enhanced the fault detection and diagnostic rules with Johnson Controls deep domain knowledge. This has enabled the customer to pinpoint the root cause of the problem which assists in driving facility management staff productivity.
- Datastreams pulled in OpenBlue from Security Video Management systems, Cleaning system and Lift system on top of HVAC systems from different BMS vendors
- Built a system to generate alerts by video analytics - vendors and users receiving alerts in real time

Results

- Cost savings through energy efficiencies and integration of 12 BMS platforms
- Embedded automated and customized reports used by the Leadership team to drive outcomes focused on sustainability goals, maintenance spend and drive facility management staff productivity.
- **15.07% energy savings** in Singapore against a baseline, leading to **\$470K of energy cost avoidance** in the first 4 months
- Automated integration of equipment & CCTV data into one platform
- **Over a 5-year duration, >\$5M of savings projected** across energy and operational benefits

Standard Chartered Bank – Across Asia Pacific

Cloud-based digital technology provides the data needed for building optimization



Challenge

Standard Chartered Bank wanted to reduce energy consumption by 10-15% across 700 leased properties across Hong Kong / Taiwan, India, Malaysia, Philippines, Singapore, Korea, Thailand, Vietnam and Brunei.

Goals:

- Optimize energy usage across portfolio
- Establish benchmarking within Standard Chartered Bank portfolio
- Reduce utility and maintenance expenditure
- Gain visibility of consumption in real-time
- Identify operational anomalies and curb waste

Solution

- Johnson Controls OpenBlue technologies integrated with 3rd-party systems to identify and resolve building inefficiencies and enhancing workspace efficiency through smart monitoring and preventative facility maintenance.
- Cloud-based visualization and analytics service enabling enterprise-wide insights.
- Identifies issues, faults, and opportunities for improved performance and operational savings.
- Detects consumption anomalies in HVAC, lighting, PAUs, water circuit, helping solution customization for current pilot and future scope.

Results

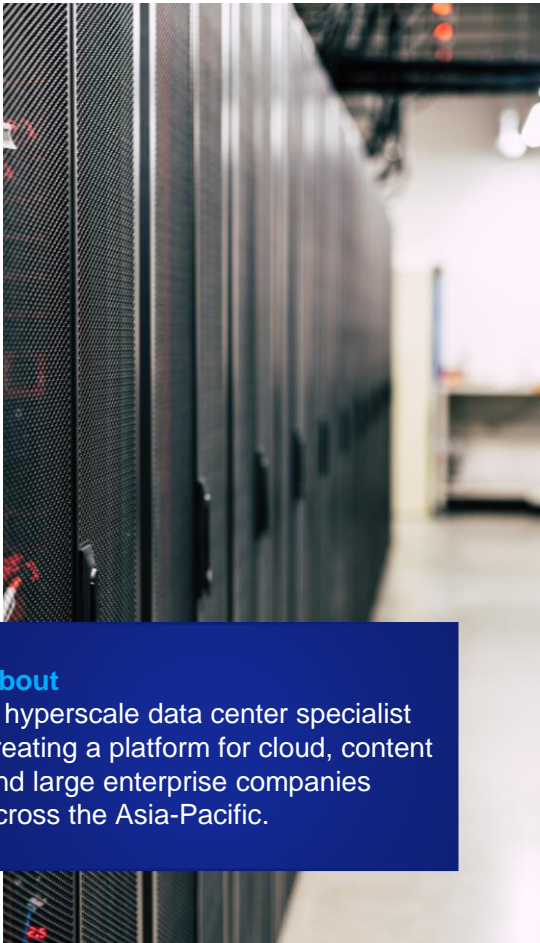
- **\$608,681 energy savings** (meter sites) FY22
- Delivered **efficiency improvement of 13-15%**
- Delivered **energy reduction 10-12%** (YoY)
- Delivered increase waste diversion **10-20%** (QoQ)
- Past six-months tangible benefits: **\$250,000 cost-avoidance** opportunities reported
- Improved meter data reliability: foundational to “measure-and-manage” sustainability goals

About Standard Chartered

Standard Chartered is one of the world's leading Banks across Asia, Africa and the Middle East.

A major hyper-scale data center provider - Sydney, Australia

Powering the blueprint of the future for sustainable data centers



About

A hyperscale data center specialist creating a platform for cloud, content and large enterprise companies across the Asia-Pacific.

Challenge

- This leading data center provider was looking to find better ways to reduce impact on the planet and manage resources responsibly. They wanted to improve operations to maximize efficiency, targeting carbon neutrality at all offices and operations.
- The company aimed to set up hyper-scale data centers across APAC, looking to manage the health and energy efficiency of its mission critical HVAC equipment.
- The team also required a Digital Platform that worked with Johnson Controls as well as 3rd party building systems.

Solution

- Johnson Controls OpenBlue technologies deployed to deliver reduced energy use as well as optimized HVAC equipment and central plant performance
- Deployed energy tracking and AI recommendations
 - Connected equipment to break data silos and drive equipment optimization
 - Advanced digital monitoring of plant room and performance
 - Tailored dashboard to flag high priority events

Results

- **Over \$70k cost savings and more than 1 million kWh of energy savings** over an 8 month duration, which amounted to 4x of predicted goal.
- **Sustainability and energy reduction** - advanced monitoring of plant room data helps identify potential energy savings and proactive maintenance needs
- Centralized system with tailored dashboards showing data analytics that flag high priority events needing immediate attention
- Helps compare vendor provided equipment efficiencies with actual performance – holding vendors accountable and enforce damages based on performance guarantees

Stanford University - Stanford, USA

Autonomous plant optimization to meet net zero, grid interactive, and utility bill savings goals



Challenge

- Stanford University sought to radically reduce its energy, fossil fuels, and water consumption
- They needed to replace an end-of-life gas-fired trigeneration plant

Solution

- Johnson Controls OpenBlue technologies deployed to deliver reduced energy and water use in the central plant
- Key features of the CHC system include:
 - Large heat recovery chillers (heat pumps)
 - Replacing steam production and distribution with hot water;
 - Both hot and cold water thermal energy storage
 - Advanced “model predictive control” energy management software

Results

- Increased system efficiency with **6% more heat recovery**
- **17% reduction** in peak energy demand - 7.3 MW (35.9 MW vs 43.2MW)
- This combined with **the energy use savings** translated to **~\$500,000 per year (10%) in cost savings** vs highly efficient, modern plant baseline
- **Reduced** campus greenhouse gas **emissions by 68%** (and growing)
- **Reduced domestic water use** by an additional **15%**
- **Saved \$459 million** over Business as usual case over next 35 years

About Stanford University

Stanford Energy System Innovations (SESI) project represents a transformation of university energy supply from a 100% fossil-fuel-based combined heat and power plant to grid-sourced electricity and a more efficient electric heat recovery system.

Kent State University - Ohio, USA

Central plant optimization across 10,000 data inputs



Challenge

- Having already completed many energy savings projects, Kent State faced a difficult challenge to meet Ohio House Bill 251 target goals that all state institutions of higher education reduce energy use intensity by 20% over a 10-year period

Solution

- Johnson Controls OpenBlue technologies delivering central plant optimization with its optimization software that continuously monitors ~1,000 input variables, such as:
 - Current loads and operating conditions
 - Seven-day weather forecasts
 - Real-time market prices for economic load demand response
 - Electricity, water, and natural gas rates
 - Campus events that may impact loads
 - Equipment maintenance schedules
- Dispatch every 15 min. of ~150 control decisions to minimize cost over a 7-day horizon
- High pressure steam systems startup is performed by expert operators for safety

Results

- Economic Impact: **\$470k annually (7.4%) in utility cost savings** + \$600k incremental ELDR revenue
- Better Oversight: one place to go for a full picture of accurate information to ensure reliable service. Reduced complexity, now easy to monitor
- Increased Productivity: automates calculations and communications that were previously done manually to free up time for more proactive activities
- Smarter Scheduling: Better-informed maintenance scheduling for critical equipment with a 7-day view
- Meet State Target Goals: Expected to further exceed Ohio House Bill 251 energy use intensity (mmBtu/sq ft) reduction target goals.

About Kent State

Kent State is a sustainability leader with 13 LEED certified buildings and was the first LEED Platinum building among Ohio public universities.

A top ranked public university and one of the leading US research institutions based in Georgia

Leading the way in energy efficiency



About

A leading university with over 200 buildings spanning across 400 acres of campus, with 11 remote.

Challenge

The university faced many challenges including:

- Increasing equipment maintenance costs
- Limited staff
- High energy spend
- Lack of unified commissioning tool
- Alarm fatigue

The university sought a solution to automatically collect and analyze critical data and a focus on specific building BAS systems to allow for better visibility and management

Solution

- Johnson Controls OpenBlue technologies turned raw data into actionable insights
- Delivered a shift from time-based maintenance to exceptions-based maintenance driven by data insights
- Provided the ease of a customized rules interface to configure tailored analytics
- Expanded from 4 to 40 buildings

Results

- Return on investment in 4 months
- 115 corrective work orders in the first year
- Annual **energy cost avoidance of \$65,000** achieved
- **Annual maintenance avoidance of \$24,000** achieved
- Streamlined manual VAV Box Damper and Heater inspections
- Offset manual CO2 Sensor Calibration

Humber River Hospital - Toronto, Canada

Powering the blueprint of the future for sustainable hospitals

Challenge

- Humber River Hospital is North America's first fully digital hospital with advanced information technology applied and integrated into patient care. As a result, the patient journey throughout the hospital is highly visible, easier to navigate, more interactive and significantly more patient-centered

Solution

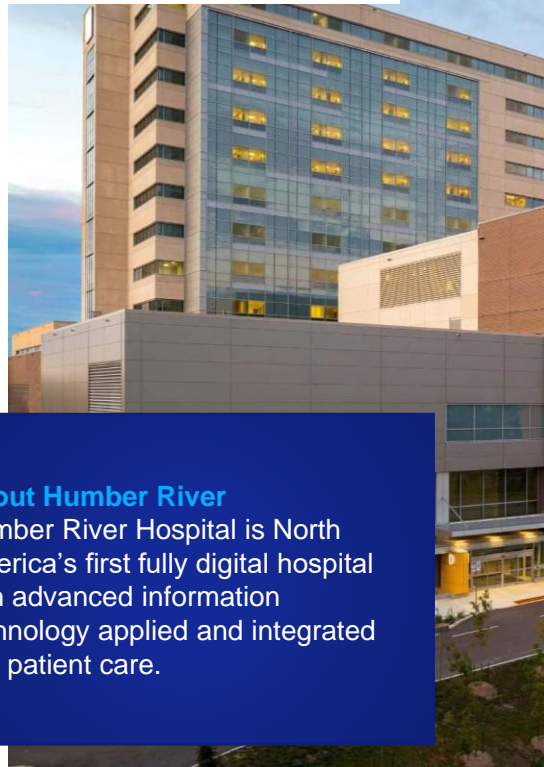
- Through a 30-year contract, Johnson Controls has contributed to Humber's building technology design and implementation and now supports operations and maintenance for the hospital
- Delivered financial guarantees on Humber's operations and maintenance which ties certain payment for services directly to building performance
 - Deployed Johnson Controls OpenBlue technologies and services provide operational teams a more proactive approach to facility management with real-time information for improvements such as energy efficiency, chiller performance, maintenance operations, and space performance which leads to cost savings, energy efficiency, patient and staff satisfaction

Results

- Johnson Controls has **reduced the energy consumption of Humber River Hospital equal to 44.3 million kilowatt hours** since 2016.



Humber River Hospital

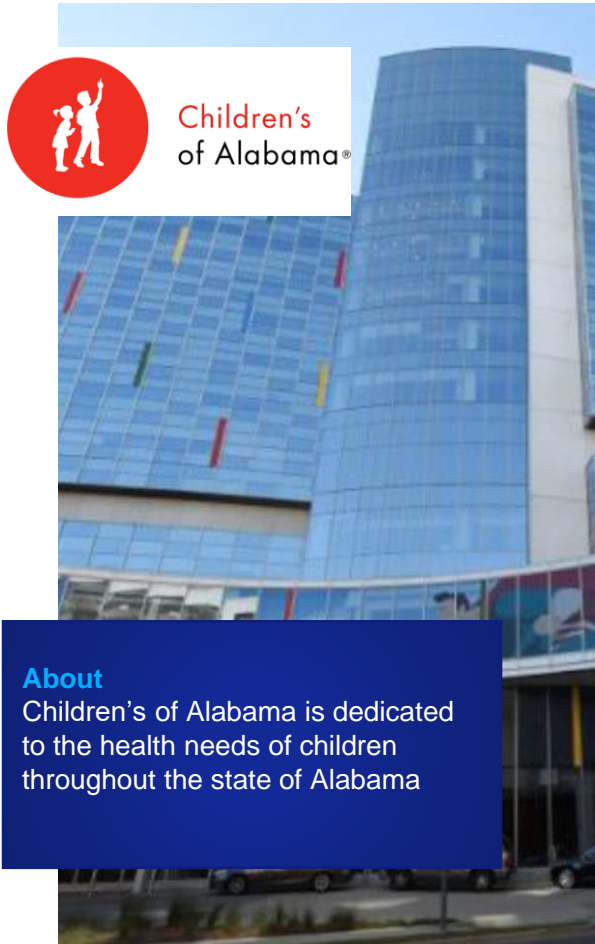


About Humber River

Humber River Hospital is North America's first fully digital hospital with advanced information technology applied and integrated into patient care.

Children's of Alabama - Birmingham Alabama, USA

Powering the blueprint of the future for sustainable hospital



About

Children's of Alabama is dedicated to the health needs of children throughout the state of Alabama

Challenge

- Ranked as one of the best pediatric medical centers in the nation, Children's of Alabama holds a valuable position as the only medical center in Alabama dedicated solely to the care and treatment of children and is a Level 1 state designated trauma facility
- In 2008, the non-profit hospital sought a way to maximize energy savings in their new 14-story patient tower in the heart of Birmingham
- Emphasizing the need to be good stewards of financial donations, the hospital sought a partnership to find innovative solutions to drive maximum efficiency of operations, lower energy costs, reduce risk of failure, and provide guaranteed outcomes

Solution

- The hospital looked to Johnson Controls to design, build, operate and maintain its new central utility plant through a 25-year contract where Johnson Controls operates and holds all the risk for building systems
- Children's of Alabama is an early adopter of Johnson Controls OpenBlue Enterprise Manager

Results

- By meeting or exceeding yearly performance guarantees, Johnson Controls has provided nearly **\$250,000 in annual savings**
- **Reduced** the use of natural gas by **69%**
- When complete, Children's of Alabama expects this portion of the project to save **\$450,000 a year**

First Smart Hospital in Canada

Johnson Controls enabled Smart Hospital with smart workplace solution for employee and patient comfort, health and safety.



About

The first “smart” hospital in Canada, facilitating a more streamlined, patient-focused delivery of healthcare services. This facility has incorporated several sustainable measures, including low overall energy use, water conservation, green roofs, and construction waste diversion; they are seeking LEED Silver Certification

Challenge

- Newly constructed acute-care hospital for which Johnson Controls has a 30-year service agreement. In first year of operation; there is currently a high volume of work requests
- Performance-based agreement requires meeting defined targets such as temperature, humidity and negative pressure in critical spaces
- Requires a unified energy management solution

Solution

- Johnson Controls OpenBlue technologies continuously and proactively identified HVAC issues
- Provided alerts to compliance variance and optimal performance of systems
- Automated monthly energy reporting and identified energy faults in near real-time

Results

- Reduction in preventive maintenance efforts of 600 hours per year for estimated avoided maintenance costs of **\$60,000 per year**
- Asset Manager in first year of operation already **mitigated 4,000 hours of non-compliance** not captured in the BAS
- Automated reporting has reduced manual effort by 16 hours per month for an estimated **annual savings of \$20,000 per year**

A global leader in next generation digital services and consulting, headquartered in India

Improved fault detection and reduced maintenance expense by 10%



About

Leading multinational that provides business consulting, information technology and outsourcing services. The company is headquartered in Bangalore, India.

Challenge

- Our customer is looking to demonstrate sustainability leadership & become a new benchmark of efficiency & sustainability in the industry. Specific goals were to
- Reduce utility and maintenance expense
- Create a scalable solution for other facility locations as well
- Disparate building systems and data pools

Solution

- Johnson Controls OpenBlue technologies consolidated all data from the many disparate Building Management Systems to identify inefficiencies and deviations
- Optimized the performance of 19 York Chillers and 2000 meters by connecting the systems, providing live monitoring and delivering 50,000 data points to provide continuous operational insights.
- *Solutions include:*
 - Energy management
 - Data visualization
 - Interactive Kiosk
 - Fault detection and diagnostics
 - Equipment management
 - Work order management

Results

- Annual energy **cost avoidance of up to 7%**.
- Reduced maintenance **cost down by up to 10%**
- **~20% of operational productivity** improvement
- Recommended ~90 corrective work orders in the first year of phase 1
- The green initiatives and the customer's sustainability team utilized the platform to achieve the targeted energy savings
- Productivity improvement for the facility team - Usually a facility team member will go around the entire park to note down meter readings manually. Approx. \$10K/year of savings.

India's largest investor, developer, and manager of Grade A industrial and logistics real estate

Single pane of glass to view Energy & Water consumption data for all their facilities across India



About

The largest pan-India industrial and logistics park developer with 46 parks spread over 51 million square feet in 10 cities.

Challenge

- The customer was looking for solution to capture readings from their energy and water meters through a wireless solution
- Customer was also looking for a platform which could later be utilized for other requirements as water level tracking etc.

Solution

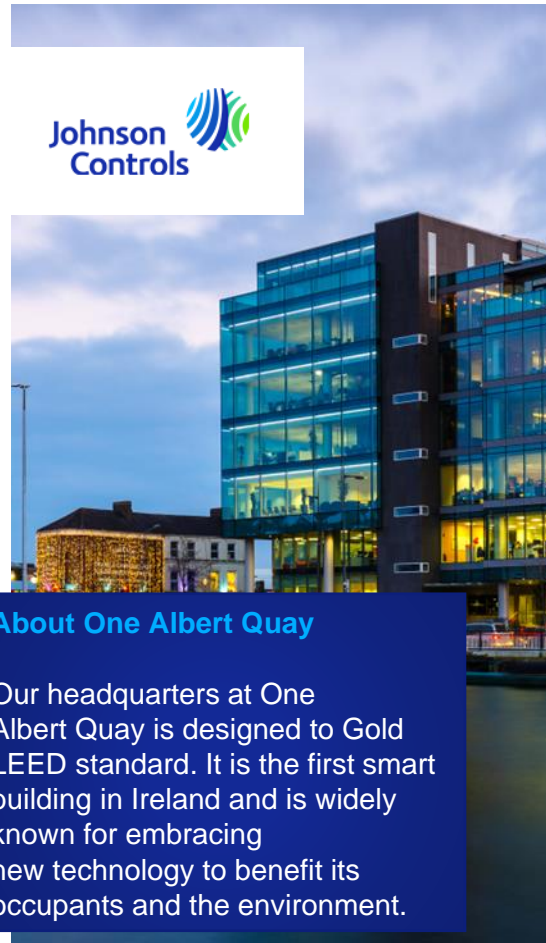
- Johnson Controls OpenBlue technologies provided a single view across all customer facilities achieved via gateway with a LoRaWAN protocol metering solution. This enabled the wireless water & energy meters to communicate across 13 sites
- The team worked closely with the LoRaWAN solution partner to tailor the solution for the customer site requirement
- Johnson Controls also delivered its leading cloud-based CCTV solution

Results

- Improved facility team productivity by completely removing manual intervention for the measurement of water and energy meter readings at site (**\$10,000 savings per year**)
- Quicker and more accurate billing: Data aggregation helps with faster billing and early realization of payment from respective clients without rework of consumption bills
- **20% improvement in operational productivity** by enabling facility team to concentrate on business outcomes and remove operational hurdles
- Cloud based CCTV system ensured facility monitoring activities have zero downtime with near zero operational maintenance

Johnson Controls Headquarters – Cork, Ireland

Our global headquarters is a LEED gold certified building leading by example with effective space utilization, minimized energy consumption and optimized equipment performance




 Johnson
Controls

About One Albert Quay

Our headquarters at One Albert Quay is designed to Gold LEED standard. It is the first smart building in Ireland and is widely known for embracing new technology to benefit its occupants and the environment.

Challenge

- Johnson Controls global headquarters to become a pioneer in smart buildings by optimizing occupant experience, safety and security, and sustainability
- OpenBlue technology and its suite of connected solutions to serve as a showcase for the blueprint of the future for smart buildings and to demonstrate the impact from the insights gained and the value generated

Solutions

Johnson Controls OpenBlue technologies delivered:

- Optimized space performance through insights into space utilization
- Energy audit and advisory delivering insights and recommendations
- Measurement, monitoring and evaluation of progress toward carbon emissions and net zero energy goals
- Green Hub kiosk screens in the building to highlight carbon goal accomplishment for occupant awareness
- Automated equipment fault detection and diagnostics to optimize comfort, reduce costs and ensure operations continuity
- Seamless workplace experiences for occupants, such as space booking, navigation, phone as badge and comfort controls

Results

- **Reduced energy usage by 45%** - approximately **2,500 kwh per month** - through lighting optimization in unoccupied rooms
- Energy savings around **\$12,000 per year** and approximately **0.4 MT CO2e per month** – a significant improvement for a **LEED gold building**
- **Reduced energy consumption** and increased asset performance through data driven HVAC and lighting control strategy
- **Certified zero waste**, which prioritizes environmentally conscious waste collection, treatment, and disposal, meeting the stringent waste management standards of Johnson Controls' global sustainability program
- Defined a roadmap to net zero through an energy audit
- Delivered a more comfortable and efficient heating and cooling control strategy based on occupancy trends and patterns
- Living laboratory for customers and visitors to experience

100 Skyring Terrace – Brisbane Australia

Sustainability initiatives drive class-leading 6 NABERS energy star rating



About 100 Skyring Terrace

Built in 2014, this modern 12-level A-Grade office building features office accommodation and retail amenities. 100 Skyring Terrace is Brisbane's #1 NABERS rated office building in its class for Growthpoint Properties Australia.

Challenge

A building's base energy consumption is critical to managing energy efficiency and sustainability.

100 Skyring Terrace was designed with a 4.5 star NABERS (National Australian Built Environment Rating System) rating.

Building owners Growthpoint Properties wanted to further optimize the building's central chilled water plant, airside systems and mechanical equipment to improve the NABERS rating of the building and to control costs.

Solutions

Over a period of five years, Johnson Controls delivered a data driven maintenance approach leveraging Johnson Controls OpenBlue technologies and facility performance specialists to optimize building operations.

Building optimization efforts included:

- Optimization assessment and return on investment (ROI) calculations
- Over 10 improvement strategies related to mechanical facilities and controls delivered with Johnson Controls building automation
- Chiller plant optimization
- Ongoing monitoring of equipment and faults delivered with OpenBlue technologies, and dedicated professional maintenance service
- Delivered for a fixed monthly fee "as a Service"

Results

- Improved NABERS energy star rating from **4.5 stars to 6 stars** and has been maintained since 2019
- Delivered significant early energy savings in base building with over **1.7 million kWh** saved since 2019 and more than \$259K in cost savings.
- Reduced fault hours by **24% year on year** through predictive data driven maintenance
- Increased building efficiency without the CAPEX investments for retrofits