MERCK LIFE SCIENCE CASE STUDY

Merck Life Science collaborated with 75F to deliver advanced HVAC optimization solutions using cutting-edge technologies. 75F's integrated BMS and remote monitoring solutions catered to all their needs. This partnership ensured that Merck Life Science benefited from state-of-the-art technology tailored specifically to their requirements.

THE BACKGROUND

Merck Life Science India, a subsidiary of Merck KGaA, Germany, traces its roots back to 1668, making it the world's oldest operating chemical and pharmaceutical company. Globally renowned, Merck operates across three main business lines: Healthcare, Life Sciences, and Electronics. In India, Merck Life Science is a key provider of products and services to the pharmaceutical, biotechnology, and life sciences sectors. It offers a comprehensive range of solutions, including laboratory chemicals, reagents, pharmaceutical ingredients, and biosimilars. Known for its dedication to innovation, quality, and sustainability, Merck Life Science India plays a crucial role in advancing scientific research and healthcare solutions nationwide.

THE CHALLENGE

Merck sought integrated BMS solutions for their three new sites to meet various needs, aiming to transition from traditional BMS methods. They encountered challenges with manual scheduling, prompting them to explore automated options with minimal human intervention. Additionally, they aimed to implement lighting control for the first time and sought remote monitoring solutions, including Energy Monitoring Solutions (EMS) and monitoring of critical room temperatures. At one site with a glass facade affecting temperature regulation, they required a solution to ensure consistent floor temperatures.

AT A GLANCE

Location	Bangalore, Hyderabad, and Mumbai
Building Type	Commercial building
Area	83,000 Square Feet
75F® Solutions	Dynamic Chilled Water Balancing Dynamic Airflow Balancing Outside Air Optimization Indoor Air Quality Management Energy Management System Number of Smart Nodes: 101 Number of HyperStats: 23 Number of CCUs: 13 Number of OAOs: 3 Number of OTNs: 3 Number of Smart Dampers: 30
Turnaround Days	90 days from start to commissioning

THE SOLUTION

Installation and Execution

The turnaround time experienced delays due to coordination issues with Merck's co-vendor. Our installation team had to strictly follow and maintain the client's rigorous safety and security protocols. To ensure the project was completed within the limited timeframe, the team worked in both day and night shifts. This flexibility was crucial to accommodate the Merck's specific requirements and ensure a smooth and successful project execution.

Dynamic Chilled Water Balancing (DCWB)

Dynamic Chilled Water Balancing (DCWB), offers a specialized control solution tailored for the chilled water line of Air Handling Units (AHUs). By leveraging the heat load demand identified by the Dynamic Airflow Balancing (DAB) algorithm, DCWB optimizes chilled water flow by monitoring temperatures at the inlet and outlet and regulating the Chilled Water (CHW) actuator accordingly. This precise control strategy minimizes chilled water consumption while ensuring the desired temperature levels are consistently maintained. Integration with the Central Control Unit (CCU), existing BTU meter, and a new Actuator further enhances efficiency, leading to significant energy cost savings. DCWB extends the benefits of the fully modulating DAB profile for AHUs, providing multiple approaches to reduce overall energy consumption, encompassing both electrical and cooling aspects. Its unique features include addressing low ΔT syndrome, optimizing heat rejection through higher exit temperatures to minimize energy use, and balancing CHWS for improved chiller efficiency and reduced hydronic pump energy consumption. With customizable approaches, DCWB strikes a balance between comfort and energy savings, offering a comprehensive solution for optimizing chiller system performance under various conditions.

Dynamic Airflow Balancing (DAB)

Dynamic Airflow Balancing (DAB) is a proprietary concept of the 75F system, designed to optimize HVAC performance in buildings. Recognizing the varying needs of different spaces throughout the day, 75F developed this feature to address the dynamic nature of temperature requirements within buildings. Unlike traditional approaches that may lead to inefficient zoning or back pressure on HVAC systems, DAB employs an intelligent algorithm to continuously monitor and adjust temperature differentials. By tracking the average current temperature of zones mapped within the system profile, it identifies deviations from the desired temperature settings. When cooling is required, the algorithm instructs modulating equipment to ramp up output, and conversely, when heating is needed, it adjusts the output accordingly. This approach ensures comfort and efficiency by dynamically responding to changing conditions without resorting to fully closing off zones or causing undue strain on HVAC systems.

Outside Air Optimization (OAO)

Outside Air Optimization (OAO) solution incorporates Demand Control Ventilation (DCV) to ensure that indoor air quality (IAQ) is consistently maintained within the recommended levels set by ASHRAE. By utilizing real-time data on occupancy, CO_2 levels, temperature, and humidity, OAO intelligently adjusts the intake of outside air to optimize ventilation. With 75F's OAO, buildings can achieve optimal IAQ and significant energy savings, contributing to a healthier, more sustainable indoor environment.

Indoor Air Quality Management (IAQM)

75F's Indoor Air Quality Management (IAQM) solution is designed to monitor and maintain optimal air quality within commercial spaces. The system employs HyperStats to track various IAQ parameters, including CO2 levels, volatile organic compounds (VOCs), temperature, relative humidity, light levels, occupancy, and sound levels. These HyperStats are strategically placed across different locations within the workplace to provide a comprehensive view of the indoor air conditions experienced by occupants. Unlike traditional systems that measure air quality at the return air duct, 75F's IAQM solution offers real-time visibility to facility managers, enabling them to take necessary actions to ensure a healthy and comfortable environment for all building occupants.

Lighting Automation & Control

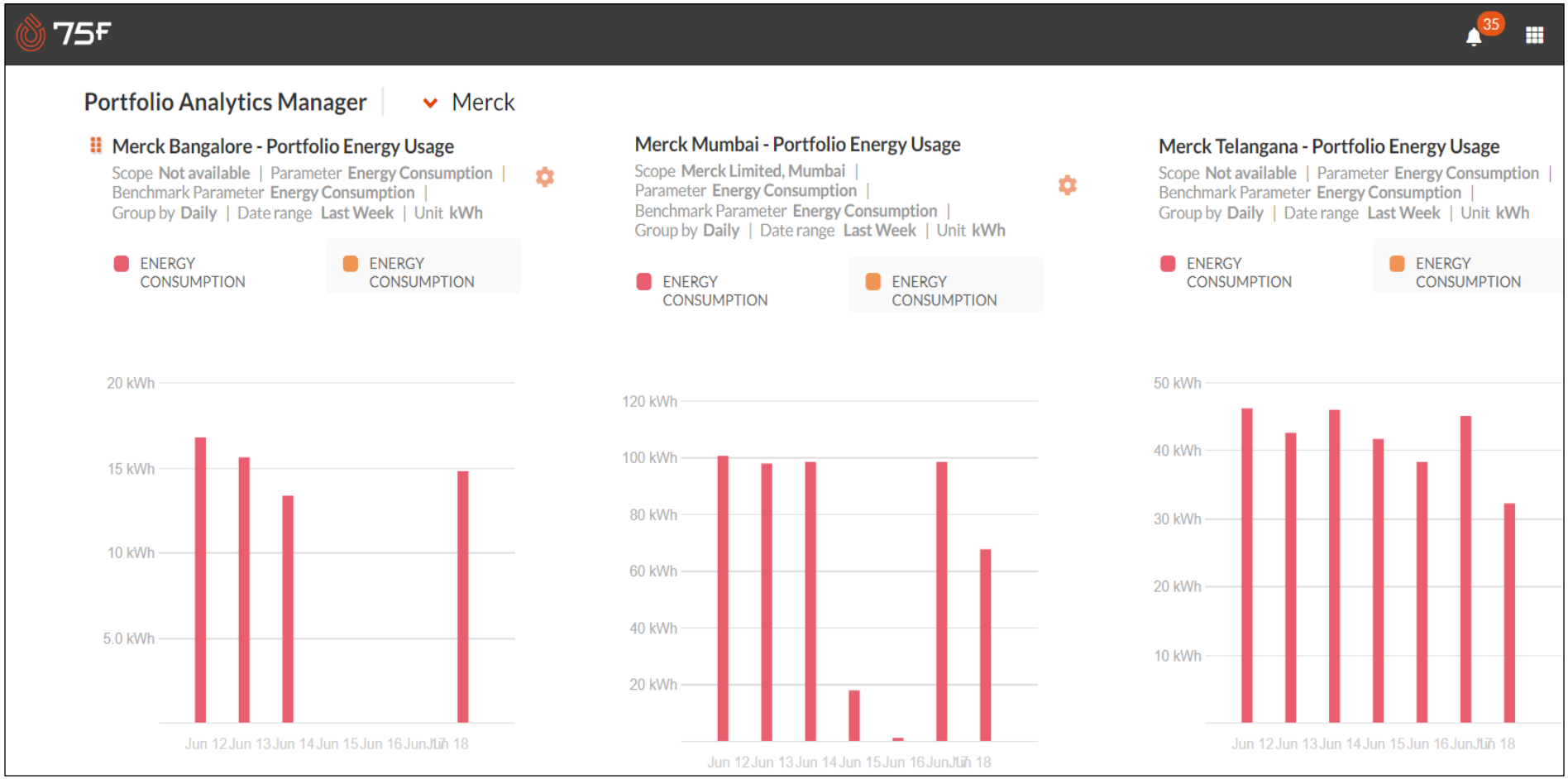
75F's system automates lighting in the facility based on real-time factors such as weather forecasts, occupancy, scheduling, user preferences, etc. 75F installed motion sensors across the facility so lights turn on/off automatically based on occupancy, saving energy and time. Daylight harvesting in areas which get direct sunlight offset the amount of energy needed to artificially light the space. The LED lights automatically dim or brighten as per the sunlight, making sure optimal lux levels are maintained.

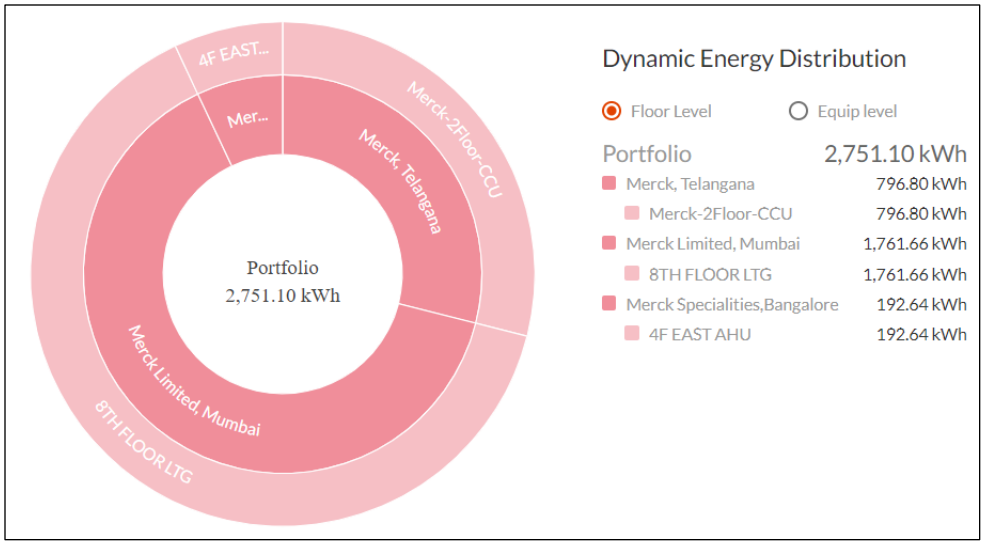
Energy Management System

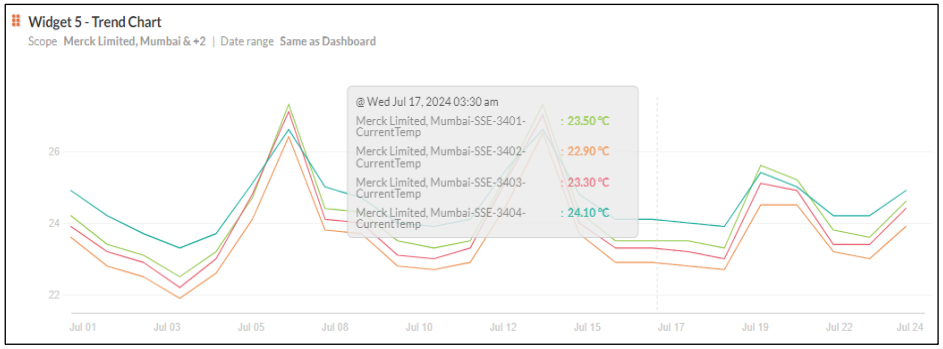
Systems deployed to modulate the Variable Frequency Drives (VFDs) based on inputs from sensors automatically re-aligned the temperature and cooling demand to maintain optimal temperature levels with higher energy efficiency levels. To measure improved energy efficiency, the 75F team installed energy meters and BTU meters at each AHU level. Energy meters have been installed at floor level and DB level to provide SMDB breaker-level energy management.

75F Facilisight

Facilisight offers multi-site visibility into HVAC energy consumption, allowing for automated control and monitoring. This AI-powered data analysis tool offers real-time insights for key metrics, including heatmaps and occupancy trends, allowing for minimal intervention of facility controls while enhancing energy efficiency and occupant comfort.







HyperStat for Smaller Capacity CHW AHUs

For smaller-capacity CHW AHUs, 75F's HyperStat provides optimal control and savings in terms of energy use. This advanced thermostat not only manages TFA valves but also measures and displays essential parameters including IAQ, temperature, humidity, CO_2, VOC, PM2.5, Lux level, sound, and occupancy. The HyperStat seamlessly replaces older versions of thermostats and integrates effortlessly with the 75F IoT Platform for efficient remote monitoring.

THE RESULTS

The solution engineered for Merck significantly **improved energy management** and ensured **superior indoor ambient quality**. By incorporating advanced features such as **remote monitoring**, **live reporting**, and **insight-driven data metrics** with intuitive user interface dashboards, the **operational efficiency** was greatly optimized. These enhancements not only streamlined Merck's processes but also provided valuable insights for **proactive management**. Consequently, 75F was able to fulfill its commitment to delivering a **high-quality** and **comfortable workspace** for its clients, demonstrating its dedication to innovation and excellence.