

CASE STUDY

Analytics-Driven Monitoring-Based Commissioning Improves Building Delivery and Operations

Government, healthcare and other operations with multiple facilities are increasingly turning to firms that provide ongoing data-driven, monitoring-based commissioning services and use tools like Clockworks to improve building and operational efficiency.



Challenge

Federal government operations, the healthcare industry and educational institutions have a history of owning facilities that undergo numerous expansions, renovations and modernizations. As a result, building maintenance and system energy issues can be ongoing, and — during times of a tight labor market which can make the retention of staff who understand building-specific operations difficult — costly building issues can be compounded.

To offset these types of challenges, a confidential healthcare client has historically invested a significant portion of its capital improvement budgets toward value-added services such as facility commissioning. These commissioning programs have traditionally included personnel hours to assist with training and facility turnover, as well as additional occupancy phase site visits and testing.

Project Stats

Client

Healthcare, confidential

Location

Confidential

40K

SQUARE-FOOT FACILITY

12%+

CUMULATIVE ENERGY REDUCTION

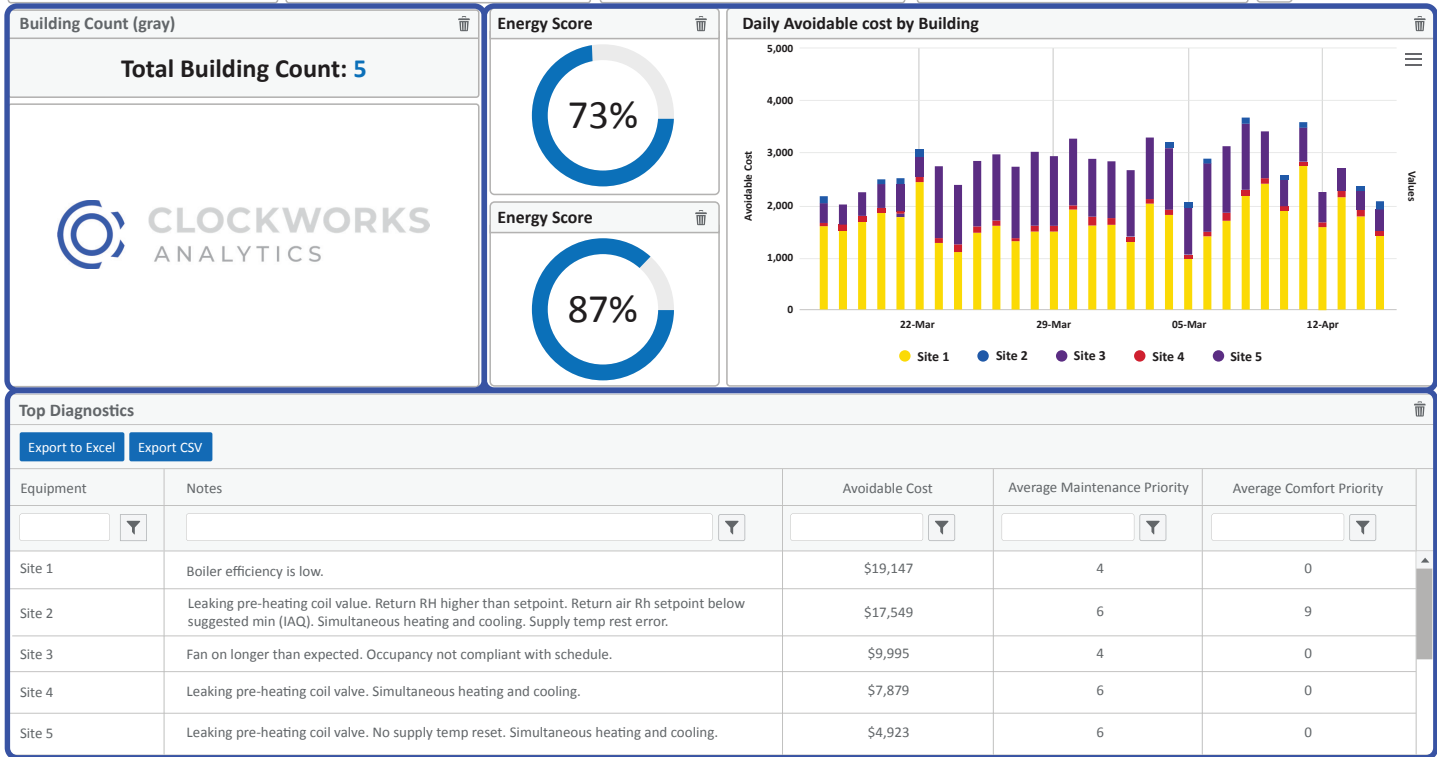


Figure 1: Sample Clockworks dashboard demonstrates building issues in priority order based on cost.

Despite these quality control efforts, the client felt project delivery and ongoing maintenance processes were not making optimal usage of available system trend data. Additionally, the abundance of general system alarm notifications observed at each facility produced “alarm fatigue” that made it time-consuming and difficult for building operators to prioritize issue resolution and maintenance tasks.

The client sought improvements by adopting a continuous monitoring-based commissioning (MBCx) approach to their projects that would use system data to optimize the performance and maintenance of facilities. The goal was to develop a set of institutional standards that would allow capital projects to perform more efficiently during construction and more predictably after turnover to the owner.

Solution

MBCx is gaining in popularity among facility owners and operators in both the public and private sectors. MBCx is a highly automated, extended commissioning process that uses sophisticated controls technology to give operators the visibility needed to make data-driven capital investment decisions.

Since working with the client as a commissioning service provider in 2019, Burns & McDonnell has been a crucial partner in helping this healthcare giant achieve its goals for its various facilities. From the outset of this project, the client’s leadership stressed the importance of innovation, particularly with the usage of trended system data, which had long been an underutilized resource.

In order to replace an outdated structure, the client collaborated with a local firm to construct a 40,000-square-foot facility. The building represented an opportunity to establish an overall improved standard for building delivery and operation for the healthcare client. The directive of the project was to enhance the process for delivering high-quality facilities, improve long-term building performance and simplify the client’s ability to maintain buildings at an optimal level. As a template to accomplish our client’s goals, our commissioning team used the U.S. Green Building Council’s LEED v4 Monitoring-Based Commissioning program.

To execute this data-driven approach to commissioning services, the client tasked Burns & McDonnell with establishing specific building performance acceptance criteria that had to be proven with two weeks of trend log data as a contingency for substantial completion.



Our team advocated for establishing performance benchmarks that would verify interior temperature control, interior relative humidity fluctuations, the status of negative pressure examination rooms, demand control ventilation usage and rooftop unit discharge air performance. In addition to advising our client on the creation of building acceptance criteria, our team assisted with the implementation of the Clockworks analytics platform, which was a first-of-its-kind usage for the client.

The Clockworks platform represents a significant improvement in the client's ability to overcome "alarm fatigue" by filtering system data through customized algorithms that sort and prioritize issues such as energy consumption, occupant comfort and maintenance constraints. The real-time costs associated with system faults were calculated by Clockworks, allowing the client to address the costliest issues first.

To assist our client's operations staff, our MBCx team provided monthly trend analysis and Clockworks output reviews for the first year of occupancy. This lengthened monitoring phase allowed Burns & McDonnell to pass on valuable system insights to facility operators and pursue warranty phase contractor assistance where necessary. The project team used manual trend analysis along with Clockworks-identified system faults and key performance indicators to create a thorough picture of the building's performance as part of the ongoing commissioning program.

Results

Using a program like Clockworks to prioritize performance indicators allowed the company to save valuable time and money. Our MBCx analysis confirmed that several of the building's primary air systems were periodically operating outside of the project's temperature and humidity acceptance criteria.

This information was used to fine-tune the building's dehumidification and discharge air temperature setpoints. A 12% cumulative reduction in energy consumption, comparing data from the year prior, was realized. This could be the result of continuously trending the performance of systems and seeking their optimization, as well as optimizations made through the MBCx process.

Additionally, since implementation, the Clockworks platform discovered issues with the major air handling unit systems. Put simply, the primary building air system was in normal operation when it should have been deactivated or set to unoccupied mode whenever the building was unoccupied. Clockworks calculated that fixing this single issue to the air handling rooftop unit could save thousands of dollars in avoidable operational costs over the lifetime of the unit. The value here is compounded when all the building's equipment and systems are considered. It is a reasonable assumption that the building's systems would be subject to potential performance degradation or maintenance-driven issues that could have gone unnoticed if not for the implementation of a MBCx program.

Through the increased usage of facility data, Burns & McDonnell successfully assisted the client with the delivery of a new healthcare facility that will serve as a template for the organization's future construction and commissioning projects across the United States.

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