



# MONITORING-BASED COMMISSIONING Data-Driven HVAC Optimization

2016 Excellence in Engineering Award • ASHRAE Illinois Chapter

**500 West Madison is One Place. Every Thing.** Originally constructed in 1987, the 1.46-million-square-foot building underwent major renovation in 2014–2015. Tenants enjoy best-in-class service and amenities at this LEED Gold, ENERGY STAR-certified building. Transwestern performs property management and office leasing. 500 West Madison was purchased by KBS Realty Advisors in December 2013.

Sieben Energy Associates, together with 500 West Madison staff and building engineers, and ComEd’s energy efficiency incentive program administrator Nexant, performed monitoring-based commissioning.

<i>Implemented Measures</i>	7
<i>Annual Electricity Savings</i>	1,992,000 kWh
<i>Annual Energy Cost Savings</i>	\$113,000
<i>Implementation Cost</i>	\$55,000
<i>Simple Payback</i>	3 Months

## What is Monitoring-Based Commissioning?

Monitoring-based commissioning (MBCx), also known as continuous or ongoing commissioning, is the practice of optimizing energy performance by capturing, observing, and analyzing large HVAC data sets. MBCx leverages big data to reduce operating costs. In addition to uncovering measures and highlighting anomalies, MBCx helps ensure the persistence and ROI of previous efficiency investments.

## Project Summary

The team collaborated on a well-executed MBCx project, generating actionable data to justify energy-saving adjustments, and helping Transwestern achieve more ambitious energy goals.

Sieben Energy Associates (SEA) established protocols to acquire 5-minute interval data for all monitored BAS points. SEA employed specialized software to observe HVAC equipment trends, identify dozens of operational anomalies, and propose and evaluate energy-saving measures.

Over the course of 24 months, 7 measures were implemented, yielding annual electricity savings of nearly 2 million kilowatt-hours. The 7 measures included:

- Staged winter optimum-start control sequences and less dependence on supply fan heaters.
- Automatic reset of discharge air temperatures and static pressure setpoints.
- Closing of minimum outside air dampers at specified times.
- Repairing of unoccupied temperature setback controls.

Although the measures are not particularly complex or costly, none of them would have been readily found without SEA’s data analytics and engineering expertise. 500 West Madison’s increasing ENERGY STAR score and decreasing energy expense demonstrated the success of SEA’s MBCx program.

The graphic below depicts AHU and FPB operations following staged optimum-start implementation.



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