

Case Study

Proper Ventilation Reduces Roof Top Annual Operating Costs by \$2,300 in a Small School

The Problem

With funding from the Massachusetts Green Communities Grant Program, AEI studied a small 150,000ft² middle school campus in Carlisle, MA to uncover energy savings opportunities through O&M changes that are no/low cost to the Town. The campus has several connected buildings, wild occupancy



swings, and recently installed a thermal wheel as part of a major renovation to the largest building on the campus. The scope also includes building several years of baseline performance data for use when considering future capital projects.

Discovery

By evaluating the Johnson Controls BAS data we uncovered several opportunities, one of which was an the outside air damper that was ~50% open during the heating season (NIST APAR Rule #2 Mode 1) when the Outside Air Damper Command was 10%. The CO₂ levels in the space during this time period are rarely above 425ppm, indicating there is no reason for this excessive amount of ventilation. This would indicate that the outside air dampers are stuck, not operating smoothly, or are operating through a narrow range.

The introduction of excessive outside air was costing the school approximately \$2,300 per year in fuel to condition the air. The data led us



to the roof of the school where a disconnected actuator was found as the cause. The corrective action also saves the school approximately 1,565 therms (3.0 tons of landfill waste) in GHGe. We also recommended the installation of a VFD on the RTU to generate an additional savings of \$1,509 and 10,800kWh (2.7 tons of landfill waste) from reduced electricity usage.



Building Energy Efficiency with AEI

Take Back Control with AEI SoftStart™

AEI energy data analytics help you take back control of your facility's energy use. The first step is an inexpensive main meter AEI SoftStart[™] review using the data collected by your time-of-use (TOU) facility meters. Even with just the main meter, we can:

- Profile your facility's energy use by time of day, day of week, season/ season, year/year, including weather normalization,
- Show dynamic demand visualizations that quickly identify your peak demands during the year,
- Calculate the Energy Use Intensity (EUI) of your buildings and compare them to each other and to the DOE national database.

From these analytics, we can start to understand how your buildings operate:

- Do your buildings set back appropriately during unoccupied hours?
- What are the base, heating and cooling loads of the buildings?
- What are the top peak demand moments in the billing period? How does your peak demand compare to the average load?
- How do your buildings perform relative to each other per square foot, and to the national averages for similar building types?

An AEI SoftStart review is the inexpensive way to answer these questions and others, pointing you in the right direction to choose the next best steps toward energy efficiency.





With BAS Data, Deeper Insights and Savings

With the Building Automation System (BAS) data from your facility, AEI kicks into high gear and goes well past what the main meter has told us. We'll dig deep into the air handlers, chillers, boilers and other assets to see that they are operating efficiently and to plan. We'll discover the typical inefficiencies such as simultaneous heating and cooling, excessive ventilation, VFDs in override, and hundreds of other performance indicators. We'll identify the simple and quick ROI O&M savings opportunities, and also give you the reference data for making capital improvement decisions. How well do your current assets perform against an ideal cost-to-operate model? We'll tell you all this and more, and in plain English. Commissioning a new BAS? We can qualify the installation to be sure it's been properly configured.



Lower Costs and Maintained Savings over Time

AEI is with you through the entire life cycle of your building, from early main meter insight, through renovations, and all the way to steady-state continuous commissioning. As your energy management partner, AEI and its CEMs deliver reporting and insight to your secure and private web portal. Your engineers and ours share a low-cost reference desk where your data is presented in logical and meaningful ways that are tuned to your staff's needs.

For more information, please visit our web site at <u>www.aeintelligence.com</u>, write to us at <u>info@aeintelligence.com</u>, or call us at +1 (978) 758-8883.

Operating Hours for Air Handlers Discharge and Return Air Fans, Including RTUs Report D A42.0022 Data Data Regist Wed 2014-01 Of this This 2016-12-01 (720 days)

