

Shekell Delivers 50% Energy Savings Using BuildingAdvice

J.E. Shekell Case Study

by the Building Advisor™

J.E. Shekell, Inc., a residential, commercial, and industrial contractor in Evansville, IN offering HVAC, electrical, plumbing, refrigeration, and sheet metal fabrication, formed its energy services division in 2010. President Kevin Shekell saw that offering energy benchmarks, assessments, and measurement services under energy service agreements was the key to finding a new facet of the 33-year old business. The BuildingAdvice suite of products has been part of J.E. Shekell's energy services division since the beginning.



J.E. Shekell

Founded: 1978

Headquarters: Evansville, IN

CEO: John Shekell

No. of Employees:

Website: www.shekell.com

Aaron Derr joined the company in 2008, and was the engineer in charge of a recent project at Evansville ARC (EARC), a nonprofit adult disability rehab and child daycare facility. EARC has been a commercial maintenance agreement customer with J.E. Shekell for 25 years. Last year, as the recession's effects were felt in decreased revenues from fundraising, EARC's executive director was aggressively seeking savings opportunities to offset the bottom line.

The 36-year-old building was ripe for improvement. The original, pneumatic control system was antiquated and outdated. The facility needed a control system to combat indoor comfort issues such as wide temperature swings and temperature variances between spaces. State codes require such care facilities to maintain certain conditions, and the facility would be in danger of temporary closure, or in an extreme case, losing its licensing, if it was not able to maintain conditions within an acceptable range. The leadership's top priority was to quantify what savings in utility bills equipment upgrades would buy them: upgrades they knew they needed, but were not sure they could afford.

Building: **Evansville ARC (EARC)**
Use: **Adult disability rehab/daycare facility**
SF: **34,550 sf, single story**
Year Built: **1974**
Engineer: **Aaron Derr, P.E., LEED AP, EMIT**

Per EARC's executive director and facilities administrator, Derr conducted a BuildingAdvice Energy Audit, which benchmarked the building to have an Energy Star score of 26 (on a scale of 1 to 100, where 100 is most efficient), and shared the results with the Board of Directors. He then proposed \$200,000 in HVAC project work, which included the installation of Verify, AirAdvice's comprehensive measurement and

verification tool providing real-time building performance metrics and gives building managers intelligence needed to reduce building energy waste. Derr used Verify to establish baseline usage and measure in real time the effect of the project work: replacement of dual duct CV boxes with new dual duct VAV boxes, replacement of pneumatic controls with a direct digital control (DDC) system, installation of variable frequency drives (VFDs) on the supply and return fans in the main air handler, and also on the cooling tower fan. The new control system incorporated the required logic to sequence all of the system's equipment together. An additional \$10,000 would go to a lighting retrofit.

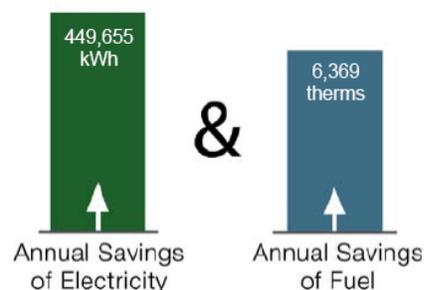
The return on investment, or payback period on the proposed \$210,000 worth of upgrades, was predicted to be less than two years with rebates and grants. The building's annual energy spend was \$82,000 per year, and the BuildingAdvice Energy Audit report showed that J.E. Shekell could decrease that spend by over \$50,000 in under a year; an estimated \$45,899 per year on electric and \$5,095 on gas.

Naturally, there was a lot of skepticism on the part of the client - potential savings was so large, they really didn't believe they could save that much. As Derr says, "I didn't believe the numbers myself at first. Being new to BuildingAdvice, I'd not had an opportunity to field test their system and verify their results against real-time data. But our manual and model calculations were showing that they could."

EARC's subsequent request for proposal used language that had been cut and pasted from J.E. Shekell's proposal, putting competitors without an energy services division at a distinct disadvantage. When EARC selected J.E. Shekell to complete the proposed project work, the cost of the BuildingAdvice Energy Audit was credited towards the project work.

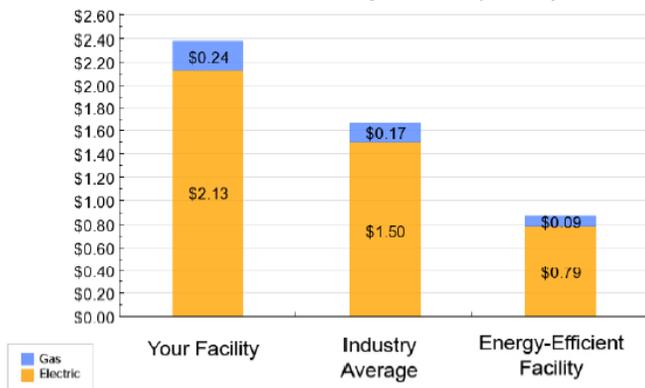
EARC began securing funding for the upgrades. Based largely on data contained in the BuildingAdvice Energy Audit report, the Indiana Office of Energy Development awarded them a block grant in April of 2010 totaling \$100,000. "All of the predicted energy dollars saved came from the BuildingAdvice report," Derr attests.

Estimated Annual Savings



Annual energy spend, March 2009 to Feb. 2010: **\$82,096**
 EnergyStar score, Feb. 2010: **26**
 Proposal total: **\$210,000**
 Estimated payback period: **Under two years**
 Predicted annual energy savings: **\$50,718**
 Date of proposal: **April 21, 2010**
 Completion of project work: **Nov. 15, 2010**
 Predicted annual energy spend Nov. 2010 through Nov. 2011: **\$31,378**
 Savings to date (over the last three month period as compared to year-ago payments): **\$7,917**
 Percentage decrease in utility costs to date (non-normalized): **45%**
 Funding assistance: **Indiana Office of Energy Development, \$100,000, local utility rebate funding: Vectren, \$20,348**

Annual Cost Comparison (\$ / ft²)



Physical installation of the new equipment commenced. Led by HVAC & Design/Build project manager, Mark Unfried, J.E. Shekell installed the control system and completed installation of all physical replacement of equipment in November 2010. By reviewing the measurement and verification data from Verify reports, Derr was able to see usage decreases and trends showing improvement immediately.

The building's new control system is, to an extent, pre-programmed by the manufacturer, but Derr uses Verify to check its work. For example, controls had been programmed to set-back the system on evenings and weekends, but by checking against baseline measurements at the outset of labor, reports helped to show that the air handler was running at low speed constantly, instead of shutting off when it could. By monitoring these reports daily, Derr has been able to remain in communication with the control programming professionals to confirm programming optimization.

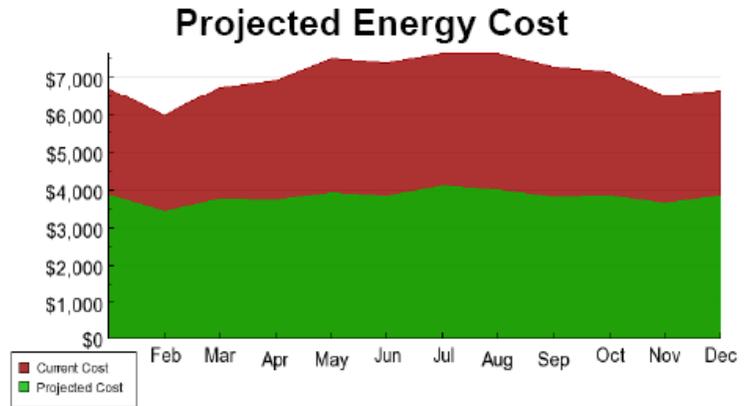
What looked good on the surface - 36% electrical energy savings, and \$2,065 less than the year previous' bill in the month following equipment installation - went to great after the air-handler was reprogrammed. Energy savings then totaled over 50% less in each of the next two months than compared to year-previous usage, dropping a total of \$5,852. Comparisons aren't normalized for weather yet, and the year anniversary of the work completion date won't happen until November 2011, but so far Derr is on target to achieve the 50% energy savings projected in the proposal stage. These savings are being recognized despite current demand charges based on last summer's peak usage. EARC will see additional savings once the high demands from the old system are outside of the 12 month utility demand reference window.

Currently, controls programming is also being fine-tuned to squeeze every bit of savings out of the system. As Derr continues to tweak the controls system, he can see the effect he's making day to day. Controls calibration will be complete by midsummer, 2011, to check the efficiency of the air conditioning system. As the building's system is now in economizer mode for cooling, Derr can't evaluate its effectiveness fully until the onset of summer's demands. In the summer, Derr will also put BuildingAdvice monitors back into spaces for CO2 level measurement, and adjust outside air set-points accordingly.

In early 2011, EARC received rebates totaling over \$20,000 from their local utility Vectren, which uses a third party company, Nexant, to verify proposed savings before awarding rebates.

Nexant didn't believe the numbers coming out of BuildingAdvice either. Consultants with the company requested supporting documentation for all of the proposed savings numbers and the calculations behind them. Over a period of months, Derr was able to

work closely with the AirAdvice support team members to “back out,” or expose, all of the BuildingAdvice calculations into a spreadsheet of data more commonly produced by energy engineers, showing all the calculations manually. The BuildingAdvice support team was able to provide that level of detail, and worked directly with Nexant to answer all of their questions.



In comparison to prior utility bills, the building’s energy usage has dropped radically. Last year’s lowest monthly winter demand was 112 kilowatts, where the building has averaged 50 kilowatts demand since the project work was completed. The company has saved \$7,917 in electric bills over the last three month period as compared to year-ago payments. J.E. Shekell, Inc. is directly on target to achieve the over 50% savings on the Evansville ARC’s annual energy spend initially projected.

About AirAdvice and BuildingAdvice™

AirAdvice is a Portland, OR company that is an acknowledged leader in developing cutting edge technology and programs for improving buildings’ energy efficiency and performance. The BuildingAdvice™ energy services program enables commercial HVAC professionals, energy consultants, and engineers to use automated benchmarks, assessments, and audits to deliver cost savings and greener buildings for their clients through energy efficiency.

airadvice.com/solutions

AirAdvice
707 SW Washington
Suite 800
Portland OR 97205

866.247.4800