

Spotting the Savings

In the winter of 2011, the University of Dayton Industrial assessment center (UD-IAC), led by Dr. Kelly Kissock, performed an energy assessment for Honeywell Sensing and Control in Columbus, OH. The team identified 11 specific energy savings opportunities with potential savings of 16% of current utility costs and 7% of current CO2 emissions with a combined simple payback of about 2.5 years.

This is typical for the team at UD, which generally finds 10-15 energy saving opportunities that result in 10-15% energy savings and CO2 reductions with about a 2 years simple payback. The team is tasked by the Department of Energy (DOE) to perform 20 of these assessments each year for small to mid-sized manufacturers at no cost to them. Less than a year later, Honeywell had implemented 6 of these recommendations, many at no cost, saving them over \$7,000 each year in electricity and natural gas costs.

The Inside-Out Approach

The UD-IAC approaches energy efficiency from the inside out, meaning they start at the end use to identify savings, then the distribution system if there is one, and lastly the equipment (i.e. an air compressor). Using the end use more efficiently and improving a distribution system can have a multiplier effect on energy savings. This approach leads to fast simple paybacks and low capital costs for energy efficiency measures.



Tim Raffio, Jeremy Smith, and Dustin Pohlman (left to right) of the University of Dayton Industrial Assessment Center after inspecting rooftop unit economizers at Honeywell.

Working With, and For Clients

UD-IAC energy engineers have a trained eye for spotting energy saving opportunities. However, plant personnel understand their plants better than UD ever will, and often times have excellent ideas for saving energy. The UD-IAC makes a point of working with clients to explore their ideas. Sometimes they just need some help quantifying the savings in order to justify costs. The UD-IAC provides neutral 3rd party advice based on engineering fundamentals, does not recommend one company over another, and does not sell anything. Through the cloud of advertising for emerging technologies and ideas, the IAC's offer unbiased advice.

In exchange, the engineers in the Industrial Assessment Centers are exposed to real world manufacturing equipment and processes, giving them an unparalleled internship like experience. We like to think of it as a win-win-win; for the client, the student, and for the environment.

Turning Opportunities into Dollars

Some of the energy saving opportunities the UD-IAC identified were simple and obvious, such as turning off or disconnecting unnecessary or blocked lighting. Often clients are aware of the them but have bigger projects to take care of. Part of the expertise of the UD-IAC is to take those opportunities and turn them into accurate dollar values in terms of potential savings. In this case, dollar values were only in the hundreds, but in the clients mind, that transforms it from something inconsequential to a tangible amount.

Time for an Upgrade

Many times energy efficiency savings alone do not justify the capital purchase of a new piece of equipment. However, if the equipment is going to be replaced anyway, the UD-IAC can typically justify the cost premium of more efficient equipment when the operating expenses (i.e. energy) are

included in the analysis.

At this plant, an older reciprocating air compressor was costing the plant a considerable amount of money in maintenance each year. The UD-IAC helped management confirm that a variable speed drive (VSD) air compressor was their most energy efficient replacement option, and although it costs more than other compressor types, it would quickly pay back the cost premium in energy savings.

Advanced Software

Dr. Kissock and the UD-IAC team are constantly working to develop new ways of modeling and analyzing energy use in systems and facilities. Using Dr. Kissocks Energy Explorer, the UD-IAC was able to determine that Honeywell’s rooftop unit economizers were not likely

Honeywell Sensing and Control

Honeywell is dedicated to protecting the environment with a comprehensive and contemporary commitment to address some of the world’s toughest challenges. In 2007, Honeywell established five year greenhouse gas and energy efficiency objectives for internal operations. Honeywell met these goals, reducing greenhouse gas emissions by more than 30 percent, and increasing energy efficiency by more than 20 percent, both measured from a 2004 baseline year. Annual goals will continue to reduce greenhouse gas emissions and increase energy efficiency.

Implemented Recommendations

Assessment Recommendations	Annual Resource Savings	Total Annual Savings	Project Cost	Simple Payback
AR 1: Disconnect Unnecessary Lighting	3960 kWh 1 kW	\$362	\$0	Immediate
AR 2: Install VSD Air Compressors	12,375 kWh	\$15,877	\$33,000	2.1 years
AR 3: Lower Compressed Air Pressure from 125 to 110 psig	8,043 kWh 2 kW	\$648	\$0	Immediate
AR 4: Establish Compressed Air Leak Maintenance Program	9,325 kWh 2 kW	\$451	\$1,000	2.3 years
AR 5: Turn Off Production Exhaust When Not in Use	14,293 kWh 229 MMBtu	\$2,781	\$200	0.1 years
AR 6: Fix Rooftop Unit Economizers	33,121 kWh	\$2,348	\$9,000	3.8 years
Total	81,117 kWh 5 kW 229 MMBtu	\$22,467	\$43,200	1.9 years

functioning properly.

A regression analysis was performed using Energy Explorer that resulted in a facility change point temperature of around 50 F, meaning that when the outdoor air is at least 50 F, the air conditioning is on. With air conditioner economizers, the change point temperature should be closer to 55 F, and ideally around 60-65 F.

Honeywell has since serviced these units, fixed the malfunctioning economizers, and will save an estimated \$2,300 per year from doing so.