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A new look at airside economizers

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Most commercial buildings require cooling due to the heat gains generated from typical building operations. During the more temperate parts of the year cooling costs can be offset through the use of an economizer. Economizers work to increase the percentage of outside air when it is more economical to increase its use rather than cool the building's return air.

In recent years there has been an increasing focus through standards and regulations on the use of economizers in commercial buildings. In fact, ASHRAE standard 90.1-2010 states that an air-side economizer is a conditional requirement (when a waterside economizer is not used) for systems having a capacity of 54,000 Btu/h or more. With this increase in the use, quality and proper functionality are becoming a growing concern.

There are multiple approaches to implementing an economizer including fixed drybulb, differential drybulb, fixed enthalpy and differential enthalpy. While each of these work and do deliver energy savings, they have their limitations and yield erroneous economizer hours on either side of spectrum- both opening the damper when conditions are not ideal and not transitioning into economizer mode when energy savings could be captured. Out of the four traditional approaches differential enthalpy (utilizing enthalpy measures of return and outside air to account for latent and sensible loads) is thought to function the best. However, all economizing approaches are limited in their performance if the systems are based on discrete sensors which historically deliver poor accuracy and reliability over time. In addition to sensor accuracy and reliability, some of the more significant issues affecting economizer performance relate to simple mechanical problems, including stuck dampers, linkages, and actuator issues along with malfunctions of other components associated with the air handler. Unfortunately these issues can be hard to detect and can lead to significantly increased energy consumption—the opposite of what an economizer should do for building owners!

Aircuity is developing a unique solution to the issues surrounding traditional methods of providing an economizer lockout function. This solution includes their patent pending approach to providing a lockout signal called Differential Energy. It uses Aircuity's centralized sensing system, OptiNet, to continuously monitor the outside air, return air and supply air performing cooling load calculations based on actual sensed dewpoint and drybulb temperature values. Differential Energy takes advantage of opportunities to operate in economizer mode, which ensures that savings are not left on the table. Aircuity's approach also will provide advanced performance monitoring capabilities to profoundly enhance reliability and savings through Aircuity Advisor. Advisor will deliver intelligent analytics on energy savings and can quickly tell the building manager such things as whether the damper is stuck open or shut, saving time on a trip up to the roof.

Implementing an economizer is an important part of operating an energy efficient building. Differential Energy not only maximizes energy savings potential, but also provides powerful analytics

that assure these savings are being achieved.

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