How to Maximize Energy Efficiency

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Air conditioning and dehumidification can account for more than one-third of total energy consumption in food processing facilities. *Food Manufacturing* spoke with Hannah Granade, president of Advantix Systems, about how optimizing energy efficiency can help improve competitiveness in a food manufacturing environment.

Q: Where does the most energy use occur in food manufacturing facilities?

A: Many food processors use enormous amounts of water, whether to cook, wash or sanitize, and all that water leads to internal humidity levels that can be unsafe if not appropriately treated. The sources of energy use vary widely across types of food processors, but heating, ventilation and air-conditioning (HVAC) systems consume as much as 35 percent of energy in most food processing and beverage manufacturing operations. And often more than half of HVAC-related energy use is expended to dehumidify the space.

Q: What limits the energy efficiency of traditional HVAC systems?

A: Traditional air conditioning systems must deliver more than just cooling to reach the required design conditions. Equally important is reducing the humidity level to a tolerable range. High humidity, even in a cold space, negatively affects production lines, creates a dangerous breeding ground for mold and bacteria and causes uncomfortable, sticky conditions.

Traditional HVAC systems have only one method of removing excess humidity: overcooling. By cooling the air to dew point, these HVAC systems pull humidity from the air through condensation. The condensation is collected on coils and drip pans which often produces algae and bacteria buildup. The remaining air is excessively cold and must be reheated to the appropriate level, resulting in an energy-intensive loop. Alternative dehumidification systems such as desiccant wheels are effective for drying the air but require heat, consuming more energy and involving high maintenance costs.

The Advantix Systems’ products utilize liquid desiccant -- a natural salt water

solution that removes humidity directly from the air. Because the units do not require the extra step of adding excess cooling or heating that conventional dehumidification processes use, the technology reduces energy consumption by 30 to 80 percent and operating expenses by 55 to 65 percent.

Q: What is liquid desiccant technology, and how does it work to reduce energy usage?

A: Liquid desiccant is a natural salt solution -- a brine -- that absorbs moisture directly from the air. By tapping into this solution’s natural hygroscopic properties, air can be dehumidified without exerting the energy used in conventional approaches to overcool or post-cool the air.

Liquid desiccant is also unique because, in addition to being energy efficient, it is a natural disinfectant. The salt solution removes almost all airborne bacteria and microorganisms in a single pass, and eliminates the need for drip pans or coils to collect condensation. As a result, the technology has the additional benefits of improving air quality, removing odors and eliminating many of the hazards associated with food safety.

Q: What general steps can food manufacturers take to use energy more efficiently throughout their facilities?

A: Saving energy in food processing is always a tough thing to generalize, because the processes themselves are very different, and because reducing the energy consumption of the process is usually secondary in importance to ensuring high product quality. The great thing about investing in HVAC improvements with systems like ours is that food processors can achieve substantial energy savings without having to interfere with the core processing operations of the facility -- and they often see improvements in quality by avoiding the risk of condensation and achieving more consistent, higher quality air conditions.

Q: What developments do you see in the future for energy efficient technologies?

A: The playing field for energy efficient technologies is a really diverse one, which is great news for our energy independence. More and more equipment is emerging that offers simple solutions to using less or using more wisely. I think one positive advance we're seeing more of is equipment that tries to integrate more seamlessly into the way buildings are actually built and operated right now, rather than relying on the new build market -- whether it's window films, lighting fixtures or HVAC equipment. The emphasis on practical solutions for retrofit is one positive thing we've seen come out of the real estate downturn and slow-down in new construction.

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