Can compressed air contribute to a greener future?

Discovering ways to increase sustainability is one of the key focuses of the food and beverage (F&B) sector. This article looks at how compressor developments, such as variable speed drives, Industry 4.0 and heat recovery systems, are helping to reduce their impact on the environment.

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According to one UK newspaper, over 20 meat and dairy firms produce more greenhouse gases than Britain, France or Germany. F&B companies are under more pressure than ever before to reduce their carbon footprint, and with the Food and Drink Federation committing to net zero by 2040, most F&B businesses are setting themselves ambitious environmental targets. One way to help reach this is through a more efficient and eco-friendly air compressor.

Identifying the right compressor can offer a major way for businesses in the meat and processing industries to reduce their impact on the environment. With compressors using over 10% of all industrial electricity in Europe, choosing an efficient and greener model can go a long way to helping to reduce a business's emissions and running costs.

Unlike other industries, there are no legal requirements surrounding the purity of the compressed air generated by F&B manufacturers. While there are codes of practice that require the air used in the delivery of these goods to be contaminant-free and pose no risk, there is no legal requirement for the manufacturer.

However, F&B manufacturers have a duty of care to manufacture goods to the highest possible standards and should therefore be seeking ways to improve air quality and lessen the environmental impact of their processes.

Considering this, one way the industry can improve both its sustainability credentials, as well as a site's operational efficiencies, is by carefully specifying a compressed air system. Decision-makers can take advantage of a range of features or enhancements.

Increasing efficiency with variable speed

Variable speed compressors use an intelligent drive system to alter the speed of the motor, so the speed constantly changes to match the required demand. The drive controls the speed of the unit depending on the demand, altering the amount of power that is used to match the output required. Therefore, when demand slows, the amount of energy used will fall too.

Variable speed technology can potentially have a big impact on the productivity, efficiency and sustainability levels of businesses. When compared with a fixed speed compressor, a variable speed model can easily achieve energy savings of up to 30%, and can help reduce power surges, avoiding peak currents from starting the compressor's motor. Furthermore, their precise electrical controls ensure motors can be easily slowed down, stopped, or revved up, and the risk of leaks is minimised through the lower system pressure that is achieved with a variable speed drive.

With variable speed technology only generating the level of the power needed based on demand, it stops wasting power, and therefore money, when it is not needed.

Using Industry 4.0 to reduce emissions

Through advances in technology, compressors are now part of the Industry 4.0 infrastructure. Businesses can monitor their compressors without having to be on site, so they can view the efficiency levels of their system, while also being able to spot faults and potential problems before they arise. These insights not only help highlight immediate issues but enable operators to forecast for potential future problems too.

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Through the power of analytics, operators can view historic, real-time, predictive and cognitive analytics, to help them make informed decisions about their systems.

Industry 4.0 platforms, such as CompAir's iConn system, are driving the industry forward, allowing key decision-makers to remove risks, improve productivity and reduce energy consumption.

Achieving air purity with oil-free technology

For decision-makers seeking peace of mind and greater air purity, oil-free air compressors offer an alternative to traditional oil-based air compressors that can potentially save energy and costs.

Oil-based compressors still offer great air purity, with filters protecting the air from contamination, but going oil-free is recommended for production sensitive environments, such as F&B manufacturing and processing sites, where the standard of compressed air cannot afford to be compromised.

This can be vital within the F&B sector, with certain processes requiring completely pure, clean, dry, oil-free air. Through oil-free technology, high-quality air is assured. Also, because there are a limited number of moving parts, they produce less noise pollution and less vibration than typical oil-lubricated compressors.

Oil-free compressors also offer the same performance as traditional oil-based air compressors but without the need for filters, meaning that there is one less thing to worry about when dealing with the unit's maintenance. Also, thanks to the fact there is no oil in the compression chamber, downstream filtration requirements are minimised, and the pressure drops, which directly translates into energy savings for businesses.

Oil-free compressors are also better for the environment, as they are more compliant with international environmental regulations than lubricated systems. This makes oil-free models the environmentally conscious choice for decision-makers when picking a new compressor.

Heat recovery savings

Another way that modern air compressors can increase sustainability and reduce their impact upon the environment is through heat recovery systems.

Recovering heat allows businesses to reduce the amount of carbon used while being able to capture heat and use it for other applications.

Typically, between 70-94% of the heat generated by a compressor during operation is recoverable. Capturing this heat, in turn, reduces the need to purchase energy from the grid, resulting in lower CO_2 emissions and operating costs. And because of the high cost of energy, these savings can be significant in terms of helping companies meet their carbon reduction targets and improve overall profitability. Heat recovery can be achieved with both air-cooled and water-cooled systems. Air-cooled compressors usually consist of a high hot air flow rate at a low temperature, and so might be used for space heating or heat exchanging to a preheating battery.

Meanwhile, water-cooled compressors can be used to recover energy that can be used for applications such as central heating, hot water washing and steam systems.

Other uses for the heat include replacing the gas, electricity or oil supply that is used to heat water supplies for bathrooms or industrial processes.

Due to the high cost of these methods of supplying heat, the use of heat recovery systems could have a huge impact on businesses lowering their impact upon the environment, and in terms of making their production processes more profitable and efficient.

With the F&B industry under pressure to reduce their emissions and to become more sustainable, choosing the right air compression system can go a long way to meeting greener goals, thanks to new technologies and processes that are really helping to reduce their impact upon the environment. ■