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## Nitrogen & Monitoring

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# Achieving Sustainability Targets by Optimizing Compressed Air Use

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By monitoring compressed air consumption using smart pneumatic sensors, companies can reliably reduce energy use and emissions.

► Sustainability is a top priority for companies around the world. To reduce their environmental impact, many companies are setting decarbonization targets and undergoing digital transformation to reliably achieve them. Digital transformation of equipment, a process or an entire facility can help industrial manufacturers save energy, conserve resources and reach their decarbonization and environmental sustainability goals.

The digital transformation of pneumatic systems is one critical way that companies can improve operational sustainability. Advanced airflow-sensing technology provides compressed air monitoring and valuable insights that allow companies to control and significantly reduce

the energy used to produce compressed air as well as related carbon emissions.

## The Significance of Compressed Air Monitoring

From production to packaging, pneumatic technologies power processes across operations in nearly every industry. To function, these

processes require pneumatic energy, primarily in the form of compressed air. One of a facility's most expensive energy sources, compressed air is produced on-site. Facilities generate the compressed air they need to operate using on-site air compressors, the motors of which usually draw electrical energy.



When installed on a facility's machines, the AVENTICS Series AF2 Flow Sensor empowers operators to monitor air consumption in pneumatic systems according to DIN ISO 50001 for energy management. Image courtesy of Emerson.

Unfortunately, if companies don't have a clear picture of pneumatic systems, the compressed air that is generated is not always used efficiently. It's estimated that, of the compressed air a facility produces, 10% is lost to leaks and some processes use more compressed air than they actually need. However, what makes this a significant loss also makes it a significant opportunity.

Compressed air monitoring can give facilities insight into energy consumption that allows companies to intentionally control usage, save energy and reach their decarbonization targets. Using these insights, facilities can practice predictive maintenance and address leaks early – or even before they happen. Compressed air monitoring also makes it possible for operators to optimize the amount of compressed air a machine uses while maintaining cycle times.

### A Greater Understanding of Energy Use

The digital transformation of pneumatic systems has made it possible for companies to make better decisions when it comes to sustainability. Such advanced monitoring makes it possible for operators to confidently know how much energy their processes are using and why, which positions them to make informed decisions that lead to smarter actions.

Intelligent airflow sensors are key technologies that enable the digital transformation of pneumatic systems. Many sensors are simple to install, are scalable and can be retrofitted on existing equipment, from one machine to machines across all a company's facilities. As such, smart sensors can serve as an effective way for a company to begin or continue its digital transformation journey.

The most advanced airflow sensors can measure many different process parameters, including pressure, temperature, mass flow rate, volumetric flow rate, flow velocity, total mass, total volume and energy at the machine level. These sensors may have a configurable display that operators can use to view data and configure various visualizations and flow charts for measurements, process curves and cumulative values.

The data-capture capability and systematic approach of some sensors, including Emerson's AVENTICS™ Series AF2 flow sensor, is so advanced that these sensors enable operators to monitor air consumption in pneumatic systems according to DIN ISO 50001 for



*The AF2 Flow Sensor sends compressed air to the pneumatic system and measures the overall airflow. Image courtesy of Emerson.*






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## Achieving Sustainability Targets by Optimizing Compressed Air Use

energy management. This ISO standard was created to help organizations establish, implement, maintain and improve their energy management systems.

Smart sensors can offer operators even greater capability when paired with a gateway and software. At this level of digital transformation, operators can access dashboards, store historical data, create parameter thresholds that trigger alert notifications, complete leakage analysis, correlate data with other sensors, complete site accounting and much more.

### Energy Savings in the Real World

The AF2 is one of the primary solutions Emerson uses to support and enable its customers' environmental sustainability efforts. But Emerson recently made it a solution that it uses to improve its own sustainability efforts. It recently installed 19 of these advanced airflow

sensors on half of the machines in its Sissach, Switzerland, plant.

The plug-and-play AF2 is easy to install, keeping time and costs to a minimum with little to no training required, and automatically connects to a pre-built dashboard. The compressed air dashboard collects data from all 19 connected AF2 sensors and makes it possible for operators to gain a wider and deeper understanding about the pneumatic systems. With advanced analytics, including temperature, pressure and volume statistics across time, the dashboard gives operators an aggregated, plantwide overview, as well as allows them to dive into a single machine's metrics.

The impact this complete compressed air monitoring system has had in such a short amount of time is remarkable. The company identified that 850 liters per minute of

compressed airflow, about 20% of total airflow, is lost to leaks. Using the AF2 sensors to proactively detect and address leaks can save 20% of Emerson's compressed air usage per year. This translates to \$58,000 in energy savings and 68,000 kilograms of reduced carbon emissions over 10 years.

What's more, this rate of savings delivers a notable return on investment (ROI), with an estimated payback of 18 to 24 months. Within 5 months, the identified savings opportunities reached 50% of payback.

Perhaps what's most significant is that this compressed air monitoring solution empowers operators to find energy optimization opportunities. Savings can be generated with the available visualizations and input, but the gained insights are the most valuable, and these insights will continue to make an impact over the installation's lifetime.



The AF2 dashboard measures flow rate, speed, volume, temperature and pressure. Image courtesy of Emerson.

This fully developed solution within a company's network can also easily scale across sites, becoming an enterprise-wide solution. In fact, Emerson plans to expand monitoring from 50% of machines to 80% at its Sissach plant and has begun monitoring at other Emerson plants in Singapore, Malaysia and India, too.

**Sustainability Success**

Companies cannot achieve ambitious decarbonization targets on hope alone. It requires accurate analysis, informed decision-making, smart action and support from an experienced digital transformation provider. Compressed air monitoring is a valuable way for companies to reliably meet targets and improve their sustainability. Monitoring delivers valuable insights that give operators the information they need to make decisions that make a difference – decisions that effectively reduce energy use and a company's carbon footprint, while improving reliability, productivity and safety at the same time. **BP**

**About the Authors**

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