

TECHNICAL BRIEF

Technical Brief - Sustainability

Sustainability is a very common word these days. It is used to describe a practice that can be maintained at a certain level without depleting the resources it depends on. Another dictionary meaning of *sustainable* is something that can be upheld or defended. The current popular usage of sustainability applies both of these concepts to human activities; both the consumption of natural resources as well as the impact that such consumption has upon the environment. Both producers and consumers share equally in achieving sustainability.

There is a distinctly moral or ethical overtone to *sustainable* that reflects the public's expectation that businesses should be economical in consuming resources, particularly natural resources and energy. Of course, much energy is derived from natural resources, but in addition to the concern for the future cost and availability of coal, oil, and natural gas there is concern about the by-products from the conversion of these resources to energy, i.e., the carbon footprint.

Energy Presents the Biggest Opportunities

The energy consumption used to produce compressed air represents the largest challenge to achieving sustainability. Compressors are inherently energy intensive and nearly all the input energy is converted to heat. Many compressed air systems are inefficient, wasting significant amounts of energy. This inefficiency is the result of improperly sized equipment, poor maintenance, and inappropriate uses of compressed air. These issues multiply as factories change their compressed air demand and expect their original equipment mix to operate efficiently and sustainably under these new conditions. In the past, efficiency was usually overlooked, as energy was a relatively minor cost component and reliability trumped all other considerations.

Fortunately, there is a concerted effort to address these efficiency and sustainability challenges. Compressor manufacturers, distributors, utility companies, energy service companies, and government agencies are all playing a role in helping end users increase energy efficiency through a combination of factors including:

- Raising awareness about the extent of energy wasted in compressed air
- Designing compressors and air system components to be more efficient
- Educating industry professionals, end users, and consultants on best practices in air system design
- Conducting detailed system audits to map current demand profiles and identify inefficiencies
- Incentivizing upgrades to more efficient equipment
- Installing better controls that manage systems and provide usage data
- Capturing waste heat for use in a variety of HVAC and process heating applications that present tremendous savings opportunities

CAGI is the leading organization representing manufacturers of compressed air system equipment, including air compressors, blowers, pneumatic tools, and air and drying and filtration equipment. This document is for information purposes and should not be used as a substitute for instructions from individual manufacturers. Always consult with individual manufacturers for specific instructions regarding their equipment.

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Other Sustainability Actions

A compressed air system requires plenty of resources in addition to energy. Consumable maintenance items that must be manufactured, distributed, installed, replaced, and disposed of present another challenge to achieving sustainability for compressed air production. To combat this, many compressor manufacturers have improved equipment designs to use less consumable maintenance item and/or to extend equipment service intervals. Specific examples include:

- The development of more advanced compressor lubricants/fluids that last longer to reduce the frequency of replacement and total volume of fluid disposed
- Designing equipment to use less of these fluids without compromising lubrication and cooling functions
- Adopting new materials and designs for other consumables such as filters that facilitate recycling

These improvements have reduced the waste stream from preventive maintenance on compressed air systems. They have also reduced the consumption of resources associated with manufacturing, transporting, and storing these items.

In Summary

A sustainable compressed air utility should be the goal of every aspect of compressed air producers, users, and manufacturers of compressed air equipment alike. Energy inefficiency in compressed air systems is the greatest challenge to achieving sustainable compressed air. To begin to address the sustainability of an existing compressed air system, the Compressed Air and Gas Institute and its members always recommend that the sustainability project begin with a compressed air system assessment performed by a trained, compressed air professional. This system audit will provide the data required to benchmark the current system performance, identify opportunities to reduce energy consumption and optimize system performance, and fully understand the balance between the compressor room supply side and the true demand for compressed air within the operation. Beginning with data, rather than with guesses and rules-of-thumb, individuals can make informed compressed air system decisions that will improve both efficiency and sustainability as well as increase profitability.