



GETTING YOUR AIR COMPRESSION SYSTEM TO MEET YOUR CARBON NEUTRAL GOALS

By Peter Modrow



Carbon neutral status has become the mantra in many businesses' sustainability team. Considered in many ways the holy grail of sustainability, it is achieved when a company's carbon dioxide emissions are offset by carbon savings elsewhere in the manufacture, use or disposal of the product. Achieving carbon neutrality or achieving any higher-level climate action is no longer a secondary business issue, but necessary to ensure the protection of our planet and our very existence—and nothing is more primary than that.

So, finding ways for companies to begin—or continue—to cut down or offset their carbon emissions is vitally important and more than just a competitive

advantage or feather in your company's proverbial cap. Compressed air accounts for 30 percent or more of a typical manufacturing plant's energy usage. It is one of the single largest consumers of energy and considered by many to be the fourth utility. For this reason, your compressed air system is an important area to ensure is operating as optimally and efficiently as possible. The following are 10 areas where compressed air efficiency can be improved, thus helping your operation edge closer to the carbon neutral certification holy grail.

1. Audit Your Air

Start with an air audit to make sure you are utilizing your system efficiently. An air compressor operates at its most efficient when it is running at full load. A seasoned air audit specialist can tell you if you are using the right size compressor for your job and advise whether the type of compressor is the most efficient for your unique conditions. Selecting the proper compressor for the job such as a variable speed drive or spiral valve technology can mean a significant difference in your utility usage (more on that later). Secondly, the air auditor can perform a leak inspection. A quarter inch leak on a 125psi pipe can cost anywhere from \$2,500 up to \$8,000 a year in energy costs. Right-size/right-typing your compressor and remedying any leaks in the system can often recover the investment cost for a new or upgraded system in as little as six months.

2. Recycle and Re-Use

Tools such as the Energy Efficient Solution tool (EES) offered by Sullair, is added to an air compressor and directs the residual hot air by-product discharged from the compressor for facility heating in the winter months. Adding duct work to heat your manufacturing facility with compressor by-product is a great way to save on utility bills. In the summer months or for operations in warmer climates, the excess heat can be sent outside to help keep the facility cool.

Other tools such as an Energy Recovery System takes heat load from the compression cycle and uses it to heat boilers or other process water. This technology has a roughly 85% waste heat recovery rate helping the carbon savings add up quickly.

3. Upgrade Your Technology

Creating only the air you need and none that you don't is the efficiency sweet spot in any air compression system. To achieve this balance, your system needs an air compressor with spiral valve or variable speed drive (VSD) technology. Both systems offer superior efficiency with variable system demand air, but an air system expert should be consulted to determine which design is better for your business. With VSD, there is more turndown capability, which can manage larger system demand swings. A spiral valve is the superior choice in dirty environments where a VSD would not survive or where the system demand swings are between 45 and 100 percent.

Additionally, many states offer energy rebates with Variable Speed Drive machines. Check the rules for your specific state as the newer Spiral Valve Technology is not yet recognized in all states for the rebate but is gaining traction. The spiral valve is also typically less expensive to purchase and more efficient than a load/no load machine. The Sullair electronic spiral valve air compressor as featured in the LS Series for example, can maintain a pressure control bandwidth within +/- 1 psi.

4. Use Logic

For operations using multiple air compressors (2-16 machines), load sharing is a great way to improve efficiency. With control logic, the system automatically turns the compressors off and on depending on demand. The software finds the most efficient way to provide air and knows which machines to shut down and which to keep on for maximum efficiency.

5. Automate Your Monitoring

Automated system monitoring can provide a plethora of useful information on the efficiency and health of your air compressor system. Monitoring discharge temperature for example can indicate an issue (clogged filter, etc.). The system will send an alert when separators start to clog up or there are other areas in need of service to expedite repairs that keep the air compressor system running at peak performance.

6. Dryers, Filters and Clogs, oh my!

If you don't have an automated air monitoring system, create a sequence checklist to ensure the compressor is performing at its optimal level each day. Check the filters and review the differential pressure gauges to determine if there are any clogs hampering your machine's performance. High performance equals energy savings.

7. Perfect Your Piping

There are a number of advantages of aluminum piping versus iron, steel or other ferrous material, not the least of which is better air flow. With debris settling or building up—particularly in cast iron that can rust and interact with the air—there is a risk of increased drag (coefficient of friction) and decreased inner pipe diameter which means a loss of energy. In addition to the energy loss, having corrosion contamination in your distribution system can result in higher frequency for servicing your point of use filters, or worse, getting contamination in your equipment or product. Certain piping or pipe fitting systems may also not be compatible with certain compressor lubricants. The change in air flow in the wrong piping system may be subtle, but over time, that energy loss can really begin to add up.

8. Stop “Draining” Your Air

You could literally be washing efficiency down the drain if you don't have the proper system drains in place. Zero loss drains don't allow air loss in cycling and while this is a surprising area of efficiency loss it is an easy and inexpensive fix that can make a real difference in your energy bill.

9. Get More Life Out of Your Lubricant

While you may be tempted to think that all air compressor lubricants are the same, just like in many other instances, you get what you pay for. Buying the right, higher quality lubricant—one that is designed to perform for the given air compressor, can make a substantial difference. The proper lubricant can increase service interval time, reducing your carbon footprint by not having to recycle your oil as frequently. Sullube® by Sullair for example, can last up to 10,000 hours and won't form varnish or sludge. It is also biodegradable and is excellent at removing heat from the air compression process. Like many things, there just isn't a substitute for fluids engineered to perform for their specific machine.

10. Buy Quality Equipment

Finally, one of the best ways to be environment-forward is to buy machinery that will last so it doesn't end up in a landfill—or worse, before its time. While you may save a few bucks on the front end of your air compressor purchase by buying a lower quality item, between the repairs, lower efficiency and shorter life span, you end up paying more and doing less to reduce your carbon footprint. It is also vital when you repair your machine that you select OEM components. Modern air compressors are meticulously engineered with efficiency in mind, but only if you use the parts designed to work in that machine. Don't be fooled by fake, lower cost options—they simply won't last and won't get you the efficiency level you want/need.

Conclusion

Achieving carbon neutral status is a long but important road and finding savings in every nook, cranny and corner of your operation is necessary to reaching this goal. Fortunately, there are some steps you can take now to make sure your air compression system is running as efficiently as possible and keeping that fourth utility in check.

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Peter joined Sullair in 2020 as a product manager in air treatment, bringing 10+ years of product development and launch experience to his role. He moved to his current position in stationary air compressors in August 2022. Peter holds a Bachelor of Science degree in Mechanical Engineering Technology from Texas Tech University in Lubbock, Texas.