10 Steps To Reduce Air Compressor Energy Costs

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Value, by definition, is a fair return on purchased goods or services. However, real value is routinely sacrificed for the bottom line; initial expenditures or outlays are counted, but the regular operational and periodic maintenance costs go ignored, left to continually, and guilefully, add up. This ignores a common law of business that prohibits paying a little and getting a lot — or the exact opposite of value.

Many times, and usually going unnoticed, the annual cost of operating and maintaining a new procurement can be between two and five times more than the initial purchase price.

Consider the cost of operating a compressed air system, a vital production component in a food manufacturing, processing or packaging facility. Compressed air, often referred to as The Fourth Utility along with water, electricity and natural gas, provides uncompromised and reliable power delivery when properly maintained. It can manipulate pilot valves and open/close the flow of wet or dry ingredients. It can operate and move mechanical linkages for the different pieces of machinery, such as conveyors or packaging equipment.

Capital expenditures are (ideally) included in annual budgets as regular or periodic line items. But how much does that air compressor really cost? For example, if you purchase an air compressor for $44,000 it will cost approximately $122,000 each year to operate, at 8,760 hours at .08/kWh. Over the course of 10 to 15 years — the lifespan of many compressors — a compressor purchased for less than $50,000 will end up costing more than $1 million in energy costs — more than 20 times the purchase price. With that in mind, it pays to look for ways to cut down on energy costs. Just as quickly as energy costs can compound, steps taken to cut those costs can return big savings in the long run. Here are 10 steps you can take to optimize your compressed air system and save energy costs.

1. Turn It Off There are 168 hours in a week, when three shifts run continuous 24 hour-a-day operations. But because most compressed air systems only run at or near full capacity on average between 60 and 100 hours, turning compressors off during the evenings, weekends or when production and shift fluctuations allow could reduce energy bills up to 20 percent.

2. Reduce Pressure Each two psig reduction cuts energy consumption one percent. Check the system pressure and resist the urge to turn up the pressure to compensate for leaks or drops in pressure due to piping problems or clogged filters. A central supply side controller can greatly reduce the operational pressure band and orchestrate air production much more efficiently and effectively.

3. Fix Existing Leaks A quarter-inch air leak at 100 psi can cost more than $2,500 in wasted energy a year, and pipe systems five years or older have been found to leak as much as 25 percent of their pressure and flow. Because four out of five leaks aren't audible, third-party auditing may be a necessity to detect these leaks.

4. Prevent New Leaks Part of the equation of fixing leaks means taking steps to prevent new ones. A clean, dry pipe indicates good quality air and no corrosion issues, and an accumulation of dust in the pipe is caused by particles in the compressed air. When compressed air is not properly filtered, or if the filter isn't regularly cleaned or changed, pressure level drops occur and increase the risk of end product contamination. Sludge in the pipe must also be fixed immediately to prevent corrosion and increased risk of additional leaks.

5. Check Condensate Drains Timed condensate drains should be adjusted periodically to ensure they open as intended or aren't stuck open. Even better, replacing timer drains with zero-loss drains will further prevent wasting compressed air.

6. Change Filters Systematically Inspecting and replacing filters systematically, not once in a while, ensures optimal air quality and prevents pressure drops. Looking for opportunities to improve performance beyond the air compressor and compressor room to air-line and point-of-use filters within the facility will reveal several areas for improvement. Maintaining filters is equally as important as the attention given to the air compressor.

7. Examine and Optimize Piping Infrastructure A piping system should optimize the transfer of compressed air at desired flows and pressures at the point of use. Increasing the size of a pipe from two to three inches can reduce pressure drop as much as 50 percent, and reducing the distance air travels can reduce pressure drops by an additional 20-40 percent.

8. Recover Heat The physical process of compressing air produces heat, and as much as 90 percent of that heat can be recovered for use in your operation. In optimal conditions, heat recovery and use in other areas of the facility can provide a 100 percent return on the cost to operate the compressor. Producing hot water for washrooms or directing warm air into a workspace, warehouse, loading dock or entryway are common uses.

9. Emphasize Proper Maintenance Like almost everything, a properly maintained compressor runs more efficiently. Proper compressor maintenance cuts energy costs around one percent — while it might not sound like a lot, again, a one percent savings on the lifetime operational costs outlined above can return more than $10,000. Even more, maintenance helps prevent breakdowns that result in downtime and lost production.

10. Identify And Eliminate Inappropriate Uses of Compressed Air Inappropriate uses of compressed air include applications that can be done more effectively and efficiently by a method other than compressed air. For example,

high pressure air is often used for cooling or other applications where much lower air pressure is required.

These 10 small changes add up to major savings during the life of an air compressor by significantly reducing energy costs and helping prevent costly breakdowns that result in downtime and lost production.

This article is part one of a three part series on reducing compressed air energy costs. The next article, slated for early November, will inspect how heat recovery in compressed air systems can help manufacturing facilities save additional money, and the third installment will uncover the savings that can be realized with the use of variable speed drive technology.

For a free copy of Atlas Copco's 156-page Compressed Air Best Practices Guide, please send an e-mail to paul.humphreys@us.atlascopco.com *[1]. Put "Manual – Food Manufacturing" in the subject line and provide your delivery address in the body of the e-mail, and Atlas Copco will send you a complimentary copy.*

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