

Compressed Air Systems



The efficiency of a typical compressed air system can be improved by 20% or more.

Why improve energy efficiency?

- 1 Cuts your operating costs and improves profitability.
- 2 Reduces maintenance demands.
- 3 Distinguishes your business as being eco-friendly or “green.”
- 4 Allows you to use energy savings to finance business growth.
- 5 Qualifies you for rebates from PNM.

For more information about the PNM Business Rebate Program, visit pnmenergyefficiency.com or call the PNM Business Energy Efficiency Team at 505.938.9400.

Project Profile:

A busy Albuquerque-area business running three shifts a day wanted to increase productivity and reduce energy consumption—two goals that can be hard to meet at the same time. The company was operating its compressed air system 6,240 hours per year, so finding savings there was a good place to start.

Upgrades to the company’s compressed air system included the installation of a larger receiver tank and a new compressor with a variable speed drive. The \$45,000 project is expected to save the company more than 100,000 kWh per year. Those annual energy savings coupled with a PNM Energy Efficiency rebate of nearly \$6,400 will help the project pay for itself in a little more than three years.

Compressed Air Facts:

From running simple air tools to operating complex pneumatic controls, compressed air systems are at the heart of today’s commercial and industrial processes. Almost three quarters of all manufacturing facilities in the U.S. use compressed air.

Compressed air may be convenient, but it is also one of the most expensive sources of energy at a facility. At some plants, compressed air generation accounts for one third of all electricity costs.

Powering an air compressor system is the most expensive part of owning and operating one:

energy consumption, usually electricity, accounts for 75% of total operating costs. Unfortunately, that energy is not used very efficiently:

- A significant amount of the energy used to run a compressed air system is lost – some to motor and drive efficiency losses, most to the heat of compression.
- Of the useful energy delivered to the facility as compressed air, half goes to waste.

Gaining Back Lost Efficiencies

There are many ways to gain efficiencies in compressed air systems today. **By making basic changes, the efficiency of a typical compressed air system can be improved by 20% or more.*** To help you install upgrades that can save energy and money for your company, the **PNM Business Energy Efficiency Rebate Program** offers custom incentives of \$0.06 per calculated annual kWh saved.

The table below from the U.S. Department of Energy (DOE) survey shows that more than half of industrial plant air systems have opportunities for large energy savings.

Energy Efficiency Measure	Potential Energy Savings
Reduce overall system requirements	20%
Match compressor size to load	3%
Improve compressor controls	10%
Improve compressor components	5%
Operation and maintenance	10%

Source: DOE

*For an assessment of compressed air system savings at your facility, contact a qualified PNM Business Energy Efficiency Program Trade Ally. A list of Trade Allies can be downloaded at pnmenergyefficiency.com.

Sources

U.S. Department of Energy (DOE) course, "Compressed Air Assessment Basics." http://www1.eere.energy.gov/femp/services/training_compressedair.html

Office of Industrial Technologies, Energy Efficiency and Renewable Energy (EERE), DOE, Energy Tips, Compressed Air, "Determine the Cost of Compressed Air for Your Plant." http://www1.eere.energy.gov/manufacturing/tech+deployment/pdfs/compressed_air1.pdf

Optimizing Compressed Air Systems

Compressors are most efficient when operating fully loaded. To trim costs and reduce waste, match system supply with demand and cut usage back as far as possible. Simply put, the more pressure you have, the more energy you use. For every 2 points in pressure drop, there is an approximately 1% reduction of electricity.

CHECK FOR LEAKS

Thirty percent of compressed air is lost because of leakage, so system optimization should start with leak repair in order to size the system correctly. As leaks will frequently reappear in six months, continual maintenance is necessary.

ADD STORAGE

If the compressed air system is sized for peaks, the compressors are idle most of the time, operating inefficiently and inflating energy demand. One end use with a high-volume, intermittent application can upset the pressure profile, forcing the system to overcompensate. Instead, design storage into the package. Properly designed compressed air storage allows the system to meet its peak demands while minimizing compressor use and pressure.

ENERGY CALCULATION RESOURCES

The DOE's Industrial Technologies Program (ITP) has developed software to help compressed air users analyze energy use and energy system savings opportunities for their facilities. AIRMaster+ LogTool and AIRMaster+ can be downloaded at www1.eere.energy.gov/manufacturing/tech_deployment/software_aimaster.html free of charge.

AIRMaster+ assesses the supply-side performance of compressed air systems using plant-specific data. Results include estimates of potential savings gained from various energy efficiency measures and related payback periods.

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