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CAGI
Compressed Air & Gas Institute

CASE STUDY

Case Study – Variable Speed Drive

SITUATION: A contract manufacturer produces precision aerospace components to OEM specifications. As the economy rebounds, demand for parts increases and the company moves to a new, larger facility. Two CNC lathes and one mill are acquired that enable off-line programming of one job while the machine is working on another job. This allows 24-hour operation, including unmanned 'lights out' machining overnight. The old air compressor is not designed to address resulting demand fluctuations. Orders can vary from a few products to a few thousand, so flexibility with machinery is crucial. The old compressor is so loud that the company is looking to build a dedicated compressor room.

SOLUTION: The company's technical staff works with the manufacturer's engineer and selects a 40 horsepower rotary screw compressor with Variable Speed Drive. The compressor automatically adjusts production of air to match demand in real time, and compared to conventional fixed speed air compressors, it runs at a reduced operating pressure, saving even more… (a 2% energy savings for every 4 psig reduction). The unit integrates the compressor, air filter, and air dryer into one compact cabinet. Maintenance and energy costs go down, and the new unit is much quieter in operation. To distribute compressed air efficiently throughout the facility, a new piping network is installed.

OUTCOME: Variable Speed Drive technology is a perfect complement to lights out manufacturing. The compressor speeds up and slows down according to air demand and sets itself on standby when demand drops off. No one has to be there to monitor the compressor.
The new compressor is so quiet the company locates it directly on the shop floor. A dedicated compressor room is not required, eliminating costs for build-out and piping from a remote location. Floor space is preserved for future production expansion.

The new piping system meets the company's desire for easy modification to meet customer needs. Air drops are added in 1/3 the time required with the old black iron pipe network. **In addition to the installation cost savings, the new piping technology has also achieved a 30% reduction in compressed air leaks.**

An energy efficiency rebate from the power utility saves the company about 40% on the installed cost of the new compressor. The reduction in power consumption is projected to repay the company's capital investment in **17 months** or less. Future savings go right to the bottom line. Working with the utility on the compressor rebate reveals additional incentive opportunities and the company installs more efficient lighting, too.

The Payback Analysis:

Air Compressor Power consumed Annually:	52,278	kW/hr
Annual potential power savings:	36,754	kW/hr
Measured and verified demand reduction:	15,524	kW/hr
Ongoing annual energy savings **(including the reduction in air leaks):**	**$10,590**	@ $0.12 kW/hr
Payback (time)	**17**	Months

With the utility rebate and extra savings due to the new piping's reduction of compressed air leaks, the payback time was cut to just over 17 months!

The above chart is an illustration example based on real data. Details of exact performance and available rebates would need to be fully understood and investigated before an investment decision is made.