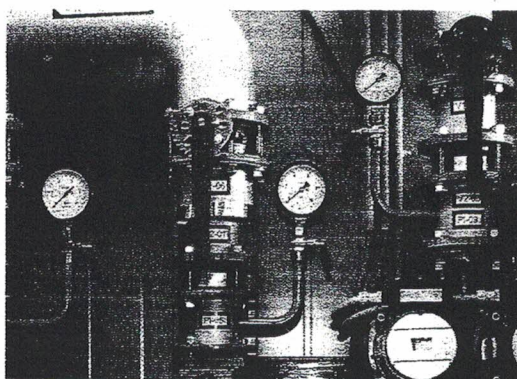
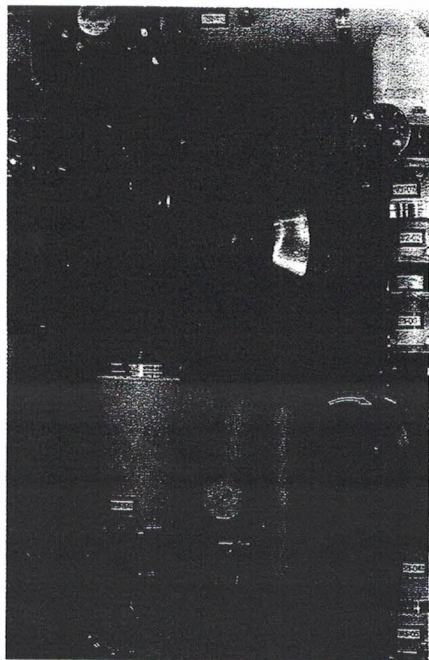


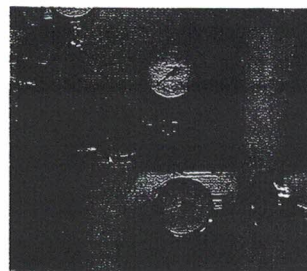
COMPRESSED AIR

BY J. STANTON MCGROARTY, CMFGE, CMRP, SENIOR TECHNICAL EDITOR



LEGACY SYSTEMS

PURCHASING A NEW COMPRESSED AIR SYSTEM TYPICALLY IS A ONCE-IN-A-CAREER ENDEAVOR



Compressing air is a great way to store energy. Since the 1800s, compressed air has been used as a clean, sparkless alternative to electricity throughout industry. Compressed air provides the energy to propel itself wherever piping is available. Once the air has arrived, the compression energy can be recaptured from it by devices as simple as nozzles or pneumatic cylinders. It is a simple, low-cost way to package, transport, and use energy over medium distances.

Compressed air accounts for 10% of electricity use and 16% of motor energy usage in all industrial plants, according to "United States Industrial Electric Motor Systems Market Opportunities Assessment," published by the U.S. Department of Energy's Office of Energy Efficiency and Renewable Energy.

Exact percentages will vary by industry, but compressed air production is an important part of the average factory's energy bill. In addition, an air compressor system lasts 10 to 20 years, and the purchase of a compressor becomes a significant milestone in a factory's history. With electric rates climbing through \$0.12/kWh, this decision can mark the difference between the Fred Jones Eco-

nomical Air System and the Fred Jones Memorial Air System.

Whoever gets the assignment of creating or replacing compressor capacity should know there's good news and bad news. The bad news is that this person has probably never bought a large compressor before. The good news is that, since these systems last so long, most people never buy a second. The market is expecting an inexperienced customer. If the purchaser creates an internal team and an external team of suppliers and contractors, the experience is very survivable.

An orderly approach will help ensure that the new compressor won't be a memorial system.

First, the purchaser should have an air-use survey done by a professional, running around the clock even if production doesn't. It should identify large blocks of air use, like production departments. That way, a variety of different production scenarios can be modeled without additional surveys. Then the purchaser should add a forecast of future needs. This survey becomes the basis for a 10-year needs forecast and the capacity specification for the system that will be purchased now. This infor-

mation equips the buyer to specify the system. Reputable compressor vendors can provide specification formats that will help organize the data.

The next step will be development of system specifications, probably using both fixed- and variable-speed drives (VSDs), to determine investment and power usage estimates. Support is needed here, and great new resources are available, including OEM data sheets produced under Compressed Air and Gas Institute (CAGI) formats for accurate comparisons. Unless the compressors in a system will run most

DISTRIBUTION OF MOTOR SYSTEM ENERGY USE BY APPLICATION

| | |
|-------------------|-------|
| Pump | 24.8% |
| Fan | 13.7% |
| Compressed Air | 15.8% |
| Refrigeration | 6.7% |
| Material Handling | 12.2% |
| Material Process | 22.5% |
| Other | 4.3% |
| All Applications | 100% |

(Source: "United States Industrial Electric Motor Systems Market Opportunities Assessment," published by the U.S. Department of Energy's Office of Energy Efficiency and Renewable Energy)

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of the time at full capacity, it's appropriate to investigate the economics of investing in a VSD, which will add to the drive cost, but may reduce electrical consumption. Alternatively, fixed-output systems that use part-time compressor operation and buffer storage to provide partial capacity output economically may be explored. Here again, CAGI resources, often available through equipment dealers, may be helpful.

The purchaser should remember to include the cost of spare parts in the purchase price. This will help avoid future surprises and help identify the true cost of purchasing systems from distant suppliers with poor local support.

A wide degree of variation exists in the amount of area preparation and installation required by compressor projects. It is essential that these estimates include the actual cost of equipment installation. If a new system is being installed in a space that was formerly occupied by an old reciprocal compressor, a cleanup and some new caging may be all that is required, along with the necessary plumbing. In a new plant, the cost of piping might easily outweigh the investment in the compressors themselves. If buffer capacity differs between two alternatives, this will create two different installation scenarios that must both be developed. As always, accurate estimates are essential.

Another area of possible surprises, particularly in a plant expansion, is the electrical supply to the new compressors. It's essential that these issues be covered in the capital project and the business case.

When the alternative specifications are complete, the purchaser should use total lifecycle cost to develop the business case for each design approach. In today's energy and equipment markets, a 10-year model that uses 80% life cost for energy consumption and 10% each for purchase price and maintenance probably makes sense. This makes it clear that electrical power is the most important cost to optimize. Investments in storage capacity and VSD may be offset by the electricity they'll save.

With this information in hand, it will be possible to support a sound business decision regarding which type of compressor and storage system to purchase.

Once the system specifications and business cases are complete, it's wise to present them to the key decision makers in the organization to create some group understanding and enthusiasm around the project. The overall cost and the opportunity for utility savings both will probably surprise most of the audience. Most also will appreciate the opportunity to participate in the business decision that determines which kind of system to purchase. Their backing will prove helpful throughout the system purchase and installation.

Buying an air compressor system should be a pleasant and instructive experience. With all the technical bases covered and proper team support available within the organization and outside, it should even be a worthwhile addition to the purchaser's resume. ☐

WHAT TO CONSIDER WHEN PURCHASING YOUR FIRST COMPRESSED AIR SYSTEM



Michael O'Hanlon, sales manager, stationary air power, Sullair: The buyer who's looking for the first time to buy an air compressor really needs to engage with somebody from a major manufacturer who

really understands air systems, their applications, and demand-side management because, if you do it wrong, you're going to live with that mistake for years, in terms of efficiencies and operational power draw. Get someone to examine the demand, not just on first shift, but on second shift and on weekends, to truly understand what's going on. Have them advise as to the proper selection of equipment for those applications. If you don't do that, you're making a prescription without proper diagnosis, and that's malpractice.



Tim McDonald, national sales manager of compressor products, Gardner Denver: When considering a purchase of capital equipment, it's very easy to focus on the initial cost of the equipment. What you

have to take into consideration is the lifecycle cost of the machine. When you look at a compressor, for example, the initial cost is only going to be 20% of the overall lifecycle cost of the machine. Things like variable-speed units and energy efficiency are very important when considering a new compressor.



Drew Johnson, branch manager of Kaeser Compressors: Look at the whole system and not just the compressor. Too many times, people focus on the compressor and the price. You've got to look

at the pipe size, the dryers, the filtration, to make sure it's all properly sized to work together to make sure you have the most efficient system possible.



John Brookshire, president of Atlas Copco: One of the first things you should think about is the after-market support of the machine. Everybody makes a good compressor product, but eventually it will need service and somebody to stand behind that product, so always check out the local service, spare parts availability and how the support stands behind that machine.