

Identifying the Obvious and Hidden Costs of Compressed Air Systems

The Case for Compressed Air Utility Services

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Compressed Air: Critical Systems for Process and Manufacturing Facilities

Process and Manufacturing facilities rely on sophisticated compressed air systems that are adequately monitored and maintained, to insure reliable sources of compressed air. CFM, pressure and dew point are key measurements of air quality for production equipment that is dependent on a steady source of regulated compressed air.

As compressed air equipment

ages, it becomes expensive to service and repair. In recent years, some sophisticated compressed air users have turned to custom-packaged, Compressed Air Utility Services to provide compressors, filters, dryers and controls to replace portions, and in some cases all, of their compressed air system requirements.

Compressed Air Utility Services, where compressed air is provided on a fee-for-service basis, is often more economical than outright ownership of compressed air systems. Let's identify some of the reasons for this trend toward outsourc-

ing complete compressed air systems, as we explore some of the hidden costs of owning, maintaining and servicing the major components of an industrial compressed air system.

Buying and owning compressed air system components is a combination of a few, very defined up-front and on-going costs, as well as a laundry list of hidden and not-so-obvious expenditures.

OBVIOUS COSTS ASSOCIATED WITH COMPRESSED AIR SYSTEMS:

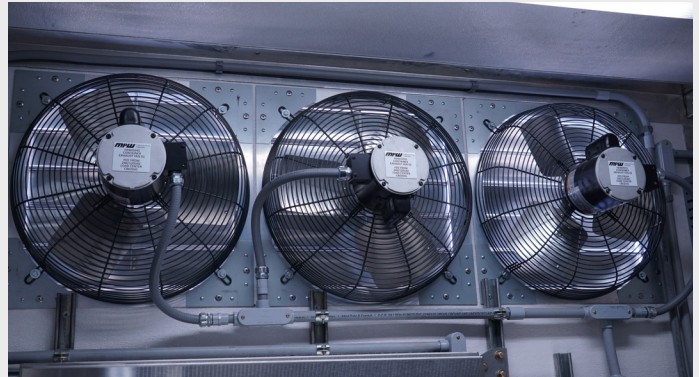
- 1. Initial Equipment Purchase:** Traditionally, a large capital expenditure is required for investment in new or replacement compressors, dryers and ancillary equipment. For example, the purchase price of a medium or larger 100 to 1000HP screw or centrifugal compressor—with required filters and dryers—can range in cost from tens of thousands to hundreds of thousands of dollars. Larger air compressor systems can require a capital investment into the millions of dollars. Most companies must budget for months, or even years, in advance for these types of expenditures.



OBVIOUS COSTS ASSOCIATED WITH COMPRESSED AIR SYSTEMS:

2. Electrical Energy Costs: The Department of Energy indicates that up to 85% of a compressor's total cost in any 10-year period is for the electrical energy consumed to run it. Even at an average 8 cents per kWh, a 500 HP compressor, running continuously at full load, will consume more than \$260,500 in energy in one year. This does not include required dryer energy consumption. Of course, this energy cost is reduced by part-load operation and further reduced with control schemes used to enhance compressed air system efficiencies.

3. Maintenance Costs: Costs incurred for quarterly and annual maintenance depend on the manufacturer and the type of compressors used. Routine maintenance, per the compressor manual, is always recommended to provide the best reliability and longest service life of the equipment. Total maintenance cost considerations are also dependent on the cost of the personnel utilized to provide for maintenance and service. Utilizing "in-house" personnel is generally less expensive than hiring outside compressor maintenance services for the required basic oil and filter changes needed to keep most compressors running. In many facilities, however, maintenance personnel are in short supply and their departments are often understaffed. Simple routine maintenance as suggested by the compressor OEM, if ignored, will always result in major premature, high-cost parts and service requirements. Major service interventions generally require the use of well-qualified (i.e. expensive) highly trained compressor technicians and expensive parts replacements.



Hidden Costs of Compressed Air System Utilization:

Beyond the obvious ownership costs associated with buying, running and maintaining compressed air systems, there are several additional hidden cost considerations involved. These are highly variable to the application situation and the personnel available to handle some of the less obvious cost Factors.

SYSTEM DESIGN COST CONSIDERATIONS

While it's often "easy" to replace a compressor or dryer in an existing system, extreme care should be utilized in the design and layout of a new air system, or in the design of major renovations to existing air systems. Qualified compressed air system design engineers, utilized from a local distributor or OEM air center, should be enlisted for advice on how to best optimize the equipment and efficiencies required when designing or redesigning a multi-compressor system. As well, the layouts and design ideas provided by these advisors should be carefully considered, but also double-checked. Care should be exercised to avoid under sizing or oversizing the compressed air supply vs. the required system demand. Maintenance space requirements should be considered. Final major design decisions often require the time, efforts and expertise of an experienced in-house or outside independent project manager to achieve the optimum system design results.

COMPONENT SELECTION

Individual compressor and dryer equipment selection can be simple or highly complex. Replacement of a "like" compressor from a pre-selected compressor OEM or distributor can be a relatively simple exercise; however, selecting a complete compressor system for a new project often requires major engineering expertise and can be time-consuming. OEM compressor and dryer specifications often need multiple stages of review and rigorous competitive component comparison. The equipment must be properly matched and applied to the application requirements. In-depth component reviews are critical to optimum system implementation success and can take considerable time and extra costs.

SYSTEM CONTROL INTEGRATION CONSIDERATIONS

Integration of additional compressed air system components into existing air systems may also be straightforward, or much more complex, depending on the equipment and the application. Compressors, filters and dryers should be easily "visible," i.e. easily locally or remotely monitored, and the components should feature the most advanced energy-efficient controls and communication. High reliability compressed air components are much more costly to run, maintain and service when they are not properly monitored and controlled as parts of an integrated system.

INSTALLATION COSTS

Most compressed air system purchases do not include installation costs unless otherwise specified. Installation, as well, should include adequate compressed air storage tanks (reservoirs) large enough to prevent compressor short cycling. Additional installation costs may also be incurred for site leveling, piping and electrical requirements. Starters for large centrifugal compressors are often required as separately specified and purchased components



BACK-UP

The number one biggest mistake that compressed air users often make is not having reasonable, immediately available back-up for their compressed air requirements. In most major cities, rental compressors are available in a matter of hours or days, but is that an acceptable downtime proposition? Keep in mind that portable compressed air equipment is often costly to rent. Is the space available with the required electrical and air piping connections for rental utilization? Diesel drive compressors can be used where electrical hook-ups are not available, but diesel fuel is much more costly than electricity as a source of compressor power. Compressed air system component back-up is a critical consideration to prevent major process interruptions.



AUDITS AND LEAKS DETECTION

Two key analysis tools that improve compressed air optimization, and reduce system costs, are air audits and leak detection. Outside experts utilize specialized measuring equipment to detail the operation of compressed air systems. These system audits take multi-day "snapshots" of compressed air system energy usage, cfm and pressure fluctuations. The data gathered is compiled into reports which can be analyzed and interpreted to help optimize the performance of compressed air systems. Likewise, leak detection can be used to reduce the overall horsepower demand of a compressed air system. The Department of Energy (DOE) estimates that 20-30% of compressed air generated in most process and manufacturing plants is lost to leaks. Identifying the leaks with ultra-sonic leak detection is important, but fixing the leaks is key to insuring the cost-savings. Each of these fairly low-cost services are requirements that can enhance and significantly optimize most compressed air systems.



OWNING COMPRESSED AIR VS. UTILITY SERVICE IMPLEMENTATION

Medium and large-scale compressed air system implementation and utilization, for the reasons indicated, is a costly proposition. Reliability, energy efficiency and over-all cost effectiveness are the primary goals of using a successful air system. Now that we have reviewed the obvious expenditures and considered the laundry list of some of the more hidden costs associated with buying, installing and owning a compressed air system, let's indicate why some compressed air system users are making the decision to forego all of these costs by buying Compressed Air Utility Services.

The Compressed Air Utility Services concept began more than 25 years ago with the "Air-Over-the-Fence" supply/service concept. At the time,

compressed air experts would design and build a compressed air system to meet the customers requirement for cfm, pressure and dewpoint, and pipe it "over the fence" into the customers facility under a long-term contract. Process and manufacturing customers, which utilized very large amounts of compressed air, liked the idea of having an extremely reliable supply of compressed air that was built, installed, maintained and continuously monitored by compressed air service professionals. Over time, Compressed Air Utility Services evolved to include smaller, complete air systems built into modules, or sometimes housed in small, dedicated buildings, which were placed in convenient locations.



BENEFITS OF UTILIZING A COMPRESSED AIR UTILITY SERVICE

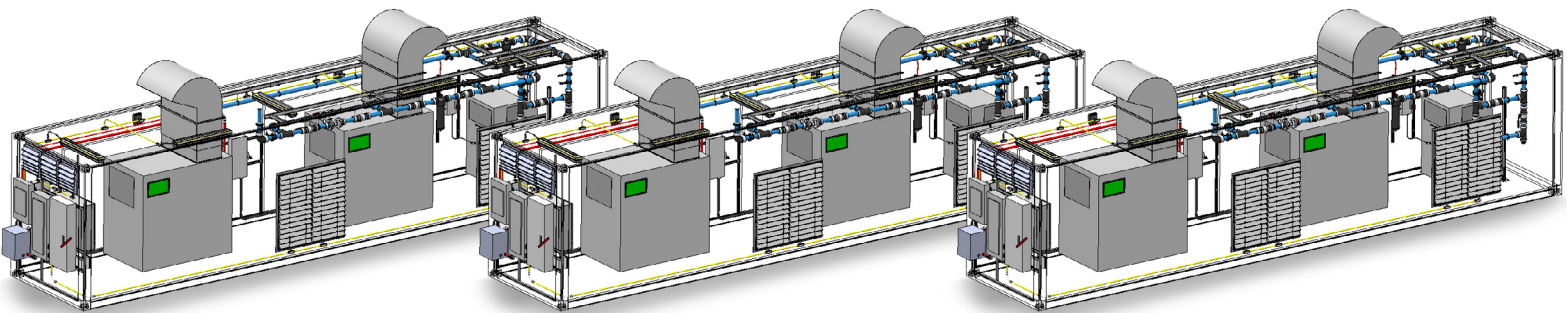
I've focused on the obvious, and some of the more hidden costs of owning and running a compressed air system. **Most of the hidden costs discussed are eliminated by buying compressed air as a utility.** Also, each Compressed Air Utility System is built to specific customers' requirements for cfm, pressure and air purity. System components are completely matched, integrated, wired, piped, controlled and ready for electrical and water connections where required. Utility air systems generally provide redundancy (back-up), and each system is continuously monitored to insure optimum efficiency and performance. The following are the key reasons to consider a Compressed Air Utility System:

1. No Capital Requirement. The major up-front capital costs of buying and installing a

compressed air system are eliminated. The costs incurred for obtaining the equipment are monthly fee-for-service expenditures. The customer only provides the necessary electrical supply and any cooling water needed, should the system require it.

2. No Maintenance or major service costs to incur . . . ever! The Compressed Air Utility service is all inclusive. The Utility Service includes all OEM recommended maintenance costs and any OEM required service or compressor/dryer rebuild costs.

3. Compressed Air purchased as a Utility is all inclusive. There are none of the hidden costs of design, project management, vendor meetings, component evaluation/selection, system integration, installation, or continuous system monitoring. Back-up is assured for complete reliability. Audits and leak detection can be provided by the Utility provider as a means of proving optimum system performance.



Buying Compressed Air as a Utility:

Saving Capital and Reducing Overall Costs

For Industrial Process or Manufacturing users, compressed air systems purchased as a Utility Service offer maximum flexibility and significant capital cost-savings. Compressed Air Utility Service allows customers to focus on their core business by removing most of the obvious and hidden costs of compressed air system utilization.