

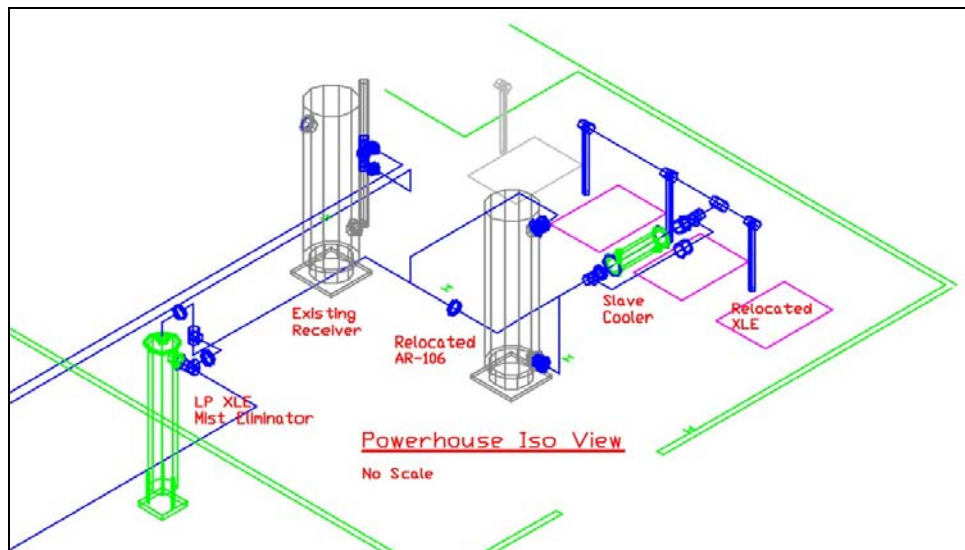
# The Business of Compressed Air Systems

By Robert B. Laine II

Do you operate your compressed air system as a business, understanding the financial consequences of your actions, or as a misunderstood necessity? Do you carefully consider additions and changes as you would with electricity or water? Is the current book value, depreciation life, and trendable cost part of the formula for making normal operating decisions? If the answers to these questions are no, it may be difficult to understand why management seems to place this critical asset so low on the priority list.

How much of the air produced is being used productively to generate revenue for the plant? Is it possible to reduce unnecessary waste usage such as leaks, drainage, dryer purge, and compressor bypass? How much air can be replaced with low-pressure blowers at a fraction of the operating cost? Can you reduce waste in your system to handle an expansion in production and reduce the cost of compressed air simultaneously? Perhaps you should quantify these issues to determine the opportunities available. Any reduction will reflect a dollar for dollar improvement on the pretax profit line.

How much production revenue do you have to produce to avoid dealing with these potential opportunities? It certainly isn't proportional. If the plant produces 10% pretax profit, it will have to generate ten times as much revenue to do nothing about the opportunity expense. In accounting terms, this is called evaluating the return on structured risk. It should come as no surprise that the typical simple return on investment in a compressed air system's retrofit is approximately one year and seldom over two years. Most performance contractors and shared savings contractors use compressed air to buy down other opportunities in their bundled projects. Despite this, less than 2% of system operators ever analyze the compressed air system for opportunities, which almost always exist.



**Most management and production departments force utilities and maintenance to assume responsibility at the supply end of the system for poorly defined point of use issues. The traditional approach is to turn on more compressors and dryers in an attempt to correct the symptoms. This will even happen when there is no apparent problem or change in the status quo in the compressor room. When all the supply equipment is on line and there is no more back up equipment off line, a discretionary capital request is put in to add more compressors and dryers. This can only happen when we rationalize our actions in the absence of knowledge of how to define the underlying problems.**

**The structure of most organizations encourages this situation. The production or process side of the system is the purpose for having the utility. Operation of the utility is subordinate to the operation of the process or production. In many organizations, there is even an internal customer-supplier relationship established. Management sees one as revenue generating, while the other is considered an expense center. Listed here are some of the issues that are uniquely different about this utility, as compared to electrical or water.**

- 1. Unlike water or electricity, compressed air is internally generated.**
- 2. The operating philosophy is typically “Keep It Running”. It is not the intent to fulfill this philosophy at any cost, but when you don’t know what the cost is, that is what happens.**
- 3. Neither the owner nor user of the utility has any formal or informal training in the science of compressed air. Most training is either passed on by prior operating personnel or by suppliers who have also learned experientially. Most learn from bad experience, i.e., “I’ll never do that again”. An engineering degree does not include a single hour on industrial gases or compressed air.**
- 4. Less than 2% of all plants with compressed air have any idea how much they actually require in order to satisfy the production or process requirements. After thorough analysis, it is typically found that less than half of the air produced is useful to revenue generating production or process needs.**
- 5. Neither the supplier nor the user track true costs. Even when the cost is tracked, it is frequently underestimated by 50%, or greater. Most accounting systems have no provisions for coding of complex non-revenue generating cost centers. Typically the only costs that are tracked appear outside maintenance charges, which typically accounts for only 8%-11% of the total cost.**
- 6. With electricity, production depends on accuracy, such as variable amperage at constant voltage. Without this, control systems don’t work and electric drive systems don’t hold up over time. With compressed air, everyone works on minimum acceptable results, i.e., minus nothing.....plus anything. Edward Demming described this as off quality at the highest possible cost.**

7. There are no standards or information about the installation or requirements for the air using equipment. Even when it is available, if anyone asks for it, the original equipment manufacturer of the user equipment doesn't know how to determine the requirement, express it correctly, or establish the requirement based on their test system versus the capabilities of the plant in which it will be installed.
8. Time is a critical factor in the application of compressed air, yet it is ignored. Cycle time (on time versus off time) or diversity must be established to determine the actual impact on the system. The result is that considerably more supply energy is installed than is needed. This results in higher than necessary pressures, which the users will gladly take, resulting in higher volumetric usage.
9. Would you install a 575 volt motor in a 460 volt system and then modify the supply for the higher voltage motor? No way, but it is not unusual to install a 100-psig air user in a system where supply is a maximum of 100-psig and then install a new 125-psig compressor.
10. Changes in the cycle rate time of the air using equipment, dirt loading on the filter element, or leaks down stream of the point-of-use clean-up equipment will degrade performance on an exponential scale.
11. Typically in the unspoken assignment of responsibility, production has the authority to demand utility response with no responsibility for their additions or changes to demand. Utilities have no authority over what is done on the user side, but are held responsible for the results thereof. No management professional would consider this a reasonable approach towards staffing responsibility, yet in the world of compressed air, this is quite normal.

The result of the above issues is *off quality, inconsistent production, and operating costs that can easily be double what is necessary*. You wouldn't operate the electric utility in this manner and you shouldn't do it with the compressed air utility. It is not rational to hold supply responsible for all undefined problems at the point of use while anyone in production can do anything they want with compressed air without discussion.

The travesty of the use of this utility continues with the manner in which investments are made. Despite the fact that utilities are a critical factor in production capacity, it is interesting that capital is seldom set aside to improve the system unless there is an anticipated expansion or the replacement of existing equipment. Since this is considered a non-revenue generating cost center, these capital projects carry relatively low priorities. They are seldom approved until production problems become perceived as intolerable.

Despite this, discretionary projects that treat the symptoms seem to be easier to get approved than remediating the problem while reducing operating cost and improving productivity simultaneously. This type of

**project typically requires a return on investment, and one would think that this would be a much more attractive approach.**

**Robert B. Laine II is President of Southern Corporation, Augusta, Ga., a company specializing in auditing and design.**