Maximise energy savings when designing a compressed air system

A compressed air system is just that – a system. Every element of the system impacts on its energy consumption.

With compressed air typically accounting for 10% of an industrial company's electricity bill, it's vital that decision-makers take targeted action to help make sure the entire system as efficient as possible. It would be a mistake to just concentrate on one aspect of the system to the exclusion of others. This will only result in missed opportunities to save energy.

While there are many energy-efficient compresors available, it is important to concentrate on broader system issues first, such as fixing leaks, considering air treatment requirements or even basic housekeeping routines.

The good news is that your supplier of the compressor has many great ways of improving your system efficiency and helping you to reduce the leak rate, making a real difference to your energy costs. And it's important to remember that not only will reducing wasted energy help save money but lead to improved reliability and productivity for your site too. Here we discuss how to design a system that can maximise energy savings.

The 10% Taskforce!

Join our campaign to cut compressed air energy wastage and take the equivalent of **317 thousand cars off the road,** saving UK business over **£147.5 million**.

Visit the **BCAS 10% Taskforce website** below and share your energy saving tips. Working together, we can cut our carbon footprint from compressed air for a brighter future!

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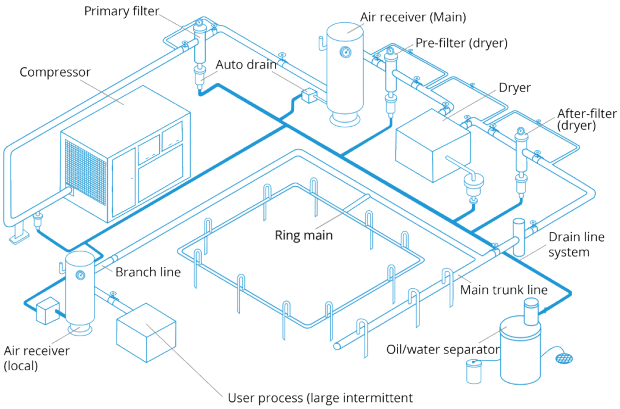
A typical compressed air system



How to calculate your system's annual cost

There are a number of ways that you can determine a compressed air system's total cost for a year. You can then identify opportunities for maximising energy savings.

Option 1

The actual electrical consumption of the compressor(s) in kilowatt hours (kWh) can be obtained by sub-metering the compressor house.

Option 2

Install a data logging system for a period of at least seven days, to determine:

- The pattern of demand (demand profile)
- The off-load running time when there is no demand for air

This does not account for the off-load power consumption, when the compressor will be consuming energy without generating air.

Option 3

Estimate the energy consumption of each air compressor* by following the below worked example...

A **75kW** compressor operates at **7 bar**. It is on load for **80%** of the production time, which is **2,000 hours per year**.

Energy consumption of the compressor = **75** x **0.8** x **2,000** = **120,000 kWh/year**.

If electricity costs **£0.1249/kWh**, the annual energy cost is **£14,988**. Should production time increase to **6,000 hours per year**, for example, then the annual energy cost would rise to **£44,964**.

*While this calculates only the cost of the compressor, not the system, it's a starting point and helps you understand the scale of expenditure your organisation faces.

Did you know?

While the compressor is the largest energy-consuming component, it is the usage, the overall design, and how well the system is maintained that determines the demand placed on the compressor and, therefore, its overall energy consumption.

Pressure losses can arise from poor system design, incorrectly dimensioned distribution piping and of course the purification equipment.

There is a cost associated with generating compressed air at a higher pressure to overcome pressure losses.

Remember!

If you are planning to purchase equipment to save energy, ensure you compare alternatives based on whole life cost, not just the initial capital outlay.

If you buy less efficient equipment at the outset to save money, you will be locked into higher running costs for the long term.

More info

For more compressed air energy savings tips and advice, visit www.taskforce10.bcas.org.uk

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