BCAS
Compressed Air Services

The BCAS Guide to Compressed Air Energy Efficiency

Reducing energy use in compressed air
Of the total energy supplied to a compressor, as little as 8-10 per cent may be converted into useful energy that can do work at the point of use. Minimising waste is vital, as the right approach can save over 30% of the energy used.

BCAS has outlined some of the ways in which you can improve the energy efficiency of your compressed air system:

Reduce pressure – is it necessary for all of your air system to be pressurised?
Compressed air is often generated at the compressor's maximum pressure. Splitting the area into zones and only pressurising the required area can save generating costs and leakage. For every half bar reduction in pressure, approximately 3% of electrical power required by the compressor can be saved.

Test for and fix leaks
All compressed air systems have leaks. The average leakage rate is 25% but some plants lose as much as 80% of their compressed air due to leaks. A single 3mm diameter leak can cost up to £600 a year.

While it may not be practical to eliminate all leaks, it is not difficult to greatly reduce them. The percentage lost to leakage should be less than 10% of your total compressed air production. A well-maintained system with a proactive leak detection programme in place should allow you to achieve this.

Implementing an on-going air leak reporting and repair programme in conjunction with your supplier can vastly improve the operation and efficiency of your facility and generate significant financial savings.

Only use compressed air where appropriate
Compressed air is expensive to run and yet cheaper options exist for certain jobs. Educate your staff not to allow compressed air to vent to atmosphere (e.g. cleaning benches). If possible, don't use it for drying or ventilation. Implement a usage policy that suggests safe and easy alternatives to compressed air and ensure all staff are fully trained on effective utilisation practices.

Switch off compressors when not in use
An idling compressor uses around 40% of its full load. Where appropriate, turn compressors off when they're not being used, i.e. overnight. This increases energy spend and maintenance costs.

Keep equipment well maintained – regularly serviced and performance tested
Maintenance regimes are critical and should only carried out by qualified personnel. Not all service intervals are equal so make sure you are servicing in accordance with manufacturers’ recommended intervals.

Variable speed compressors
With this new generation of compressor, you only produce as much air as you need, using less energy and eliminating the compressor running in an unloaded state. On average, a variable speed compressor will save 30% of the energy used by a fixed speed compressor so it may well be worth switching.

System design - Check whether compressed air could be delivered more efficiently
Although a lot of emphasis is placed on the air compressor, the ancillary equipment for treating the air consumes energy and therefore is an important part of the energy management equation.

When designing or replacing a system the following should be considered:

- **Pipe diameter** – smaller diameter pipe can have a lower investment cost but this should be balanced against the possible restriction of pipe size causing a pressure drop and therefore greater energy consumption.
- **Support all your piping** – avoidance of movement minimises leaks and corrosion.
- **Air treatment** - consider the right equipment for the air purity required. If only part of the compressed air needs treating to a high standard considerable savings can be made by treating the bulk air to the minimum requirements and then upgrading air purity at point of use.
- **Air inlet** - dust and dirt must be filtered out of the air supply. Have a good inlet filtration system and check the filters routinely to ensure they are replaced before a pressure drop occurs.
- **Fit pre-filters to prolong life and save energy.**
- **Ensure coolers are kept clean.**
- **Temperature** – a 4 degree reduction in the inlet air temperature leads to dryer air at a higher density which can improve compressor efficiency by up to 1%.
- **Desiccant dryers** can have a dew point control fitted to minimise the electricity used.
- **Air receivers** - the correct size of receiver allows the compressor to be sized for average demand rather than for maximum and an under sized receiver causes the compressor to cycle in response to small changes in pressure.
- **Data loggers and air flow meters** enable you to measure pressure, temperature, dew point, flow rate, current and voltage, allowing you to analyse the performance of your compressed air system and ensure it is running properly and efficiently.
- **New equipment -** When purchasing new air treatment equipment consider those with the most energy efficient ratings. Older equipment can consume more energy and the cost benefits can be considerable by changing out old energy hungry equipment for new energy saving models.

This is just a brief summary of some of the areas to consider when looking to make significant savings in the energy efficiency of your compressed air system. BCAS can help you with any of these issues, from system design and maintenance to data logging and air leak detection.

For further advice, please contact us by phone or email or visit our website:

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