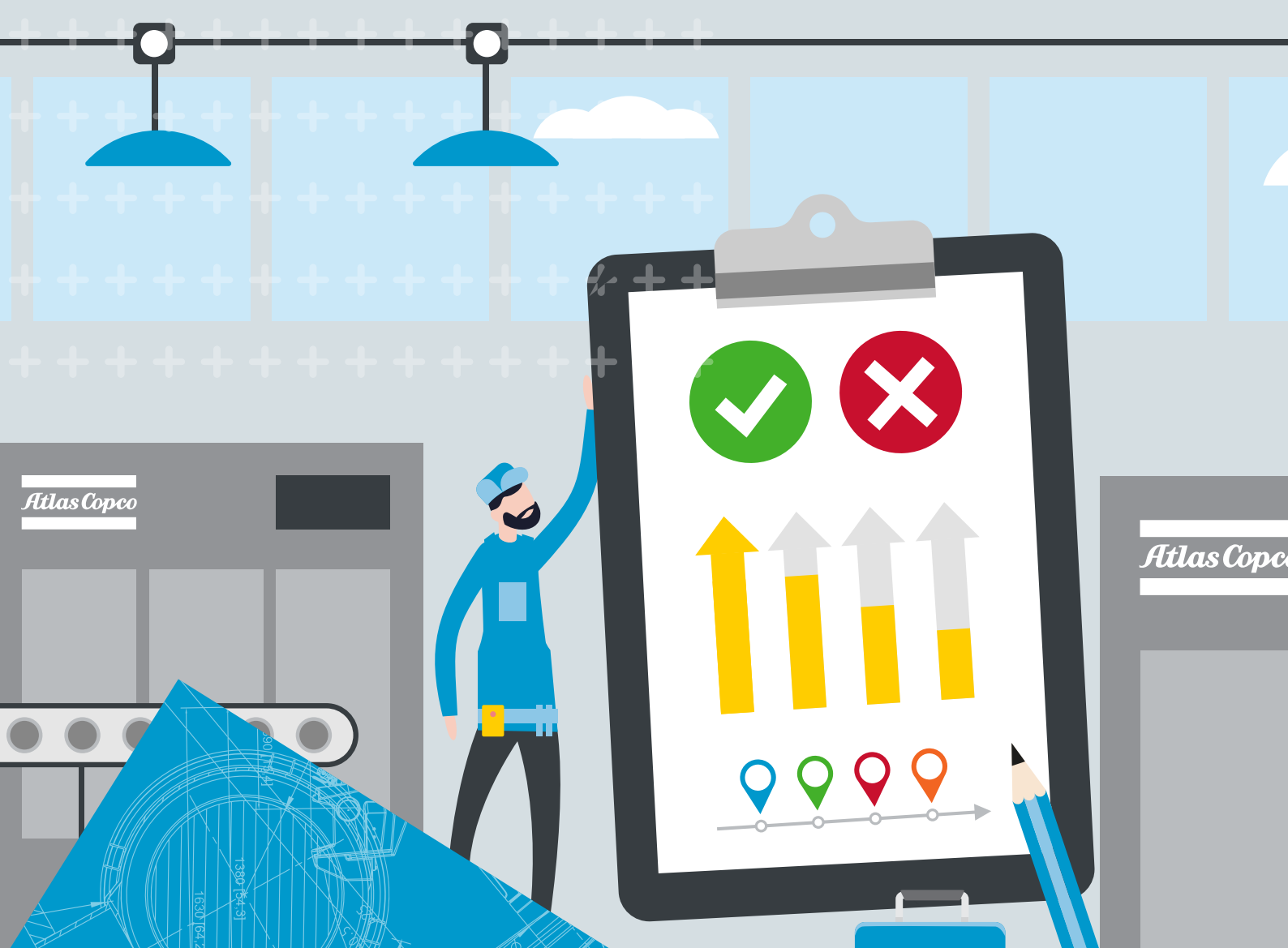


+ MORE THAN A COMPRESSOR

Atlas Copco



Compressed air system health checks, energy audits and leak detection

How health checks and energy audits can reduce costs and improve environmental performance

A BEGINNER'S GUIDE

Introduction: reducing costs and helping the environment

Improving energy efficiency remains a top priority for most manufacturing organisations – for both financial and environmental reasons.

Cutting electricity use across the shopfloor can significantly reduce monthly energy bills, with the savings going directly to the bottom line.

Using less energy is also critical to long-term sustainability efforts, with a growing number of companies embarking on a journey to net-zero emissions.

Optimising compressed air systems

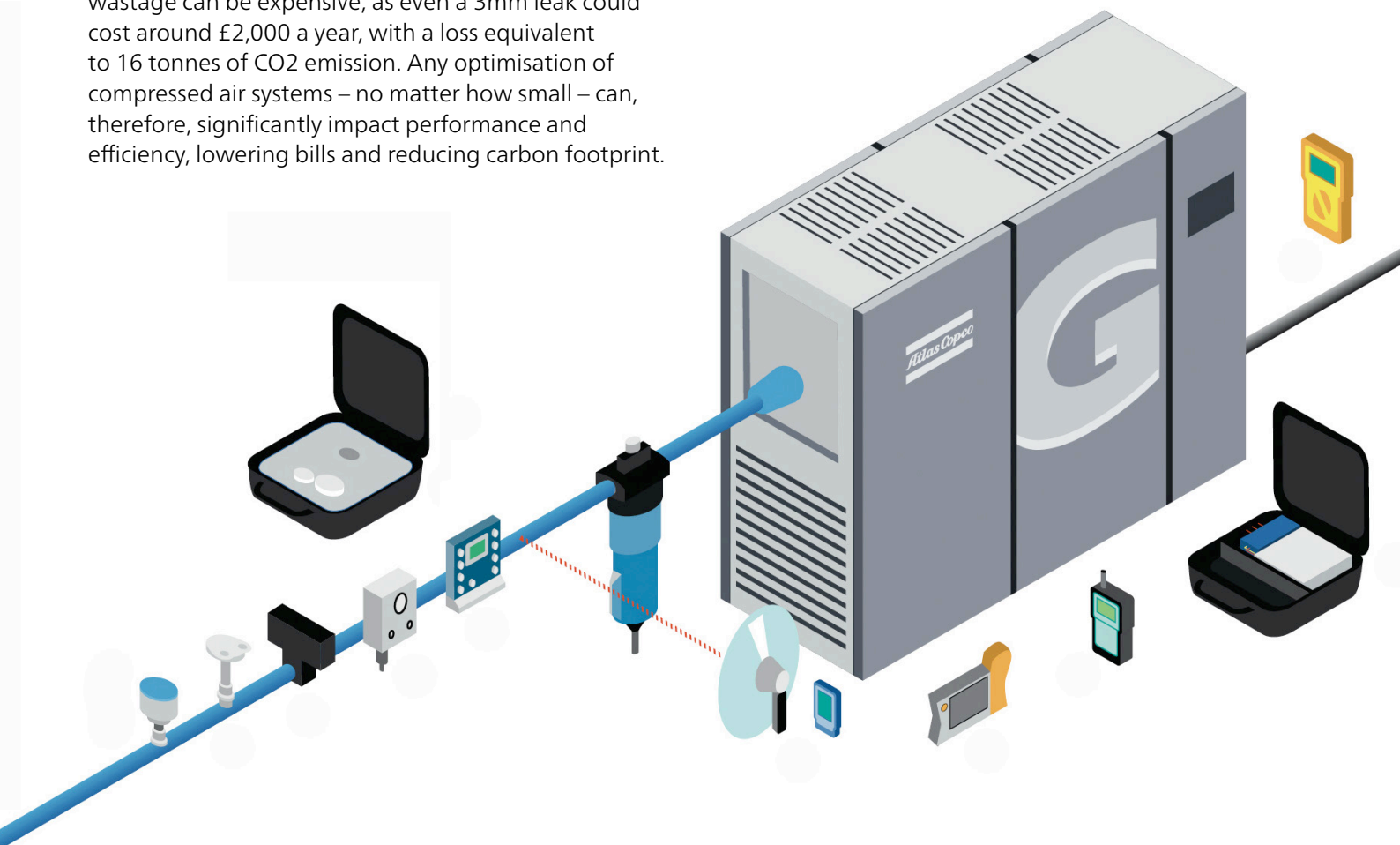
Delivering energy efficiency improvements is often the sum of many parts. Plant managers look to implement various initiatives to provide incremental value that can amount to significant savings over time.

Take compressed air as an example. Conservative analyses estimate that compressed air systems account for 10 per cent of all energy used in global industry - and of that, 10 – 30 percent is wasted on leaks. This wastage can be expensive, as even a 3mm leak could cost around £2,000 a year, with a loss equivalent to 16 tonnes of CO2 emission. Any optimisation of compressed air systems – no matter how small – can, therefore, significantly impact performance and efficiency, lowering bills and reducing carbon footprint.

But how do you ensure that your compressed air system is operating to its full potential? How do you identify and eliminate air leaks – optimising performance, reducing energy consumption and driving down costs?

The simple and most effective means of achieving these ambitions is to perform a health check and energy audit for compressed air installations. These assessments can be performed quickly and accurately, and in some cases, with no cost – and with zero disruption to your production line.

This e-Book explains how health checks and energy audits for compressed air installations are carried out within manufacturing environments, while also outlining the cost and environmental advantages that they can bring.



How technology can be used to identify compressed air leaks

It is easy to assume that compressed air systems are running efficiently. But even if leaks are not immediately obvious, it does not mean that they do not exist. Leaks can be caused by many issues including corrosion, poor pipe connections and bad seals. And without investigation, these problems can add up to a significant amount of wasted energy over time, resulting in higher bills.

Fortunately, a variety of techniques can be deployed to find, log, quantify and rectify air leaks. Initial steps involve little or no technology. Some leaks can be found simply by listening, although larger ones may be inaudible, or only occur at certain pressures. Results can be improved by applying a soapy water solution to potential leak points like joints, flanges and valves, with bubbling indicating any leaks. However, this method can be time-consuming and relies on access to all pipework.

Deploying advanced ultrasonic technology

A more precise approach is to use ultrasonic leak detection equipment, which operates without interrupting plant production, reaches system areas that are hard to access, and locates all air leaks. The principle behind ultrasonic air leak detection is simple. As air moves from high pressure to low pressure through a leak site, it creates a turbulent flow. This turbulence has strong ultrasonic components which are detectable. In general, the larger the leak, the

greater the ultrasound level. Ultrasonic detectors are usually unaffected by background noises in the audible range because these are filtered out.

Some hand-held, battery-operated probe devices are available, but state-of-the-art acoustic imaging cameras are far more effective and can help detect leaks in compressed air systems up to ten times faster than traditional methods. Atlas Copco uses a system with a camera that takes measurements with 124 microphones to form an extremely precise acoustic image. The camera's frequency range extends to ultrasonic frequencies, meaning that it can locate sound sources precisely, even in noisy industrial environments. The acoustic image is transposed on top of a digital camera picture to provide real-time sound visualisation of the source of the leaks.

Once ultrasonic inspection has been completed, leaks can be marked on-site with weatherproof tags, along with a supporting written report that can provide more details on leak locations, photographic evidence of holes, leak severity in litres/minute, energy costs, positions, and costs to repair.

Atlas Copco has long-standing experience of deploying advanced leak detection strategies. Indeed, a full range of technologies can be deployed to eradicate compressed air leaks from production facilities, improving efficiencies and delivering dramatic energy savings over time.



Health checks and energy audits for compressed air installations

With the technology in place to provide fast, accurate and cost-effective leak detection, Atlas Copco Compressors has developed three levels of health checks and energy audits for compressed air installation. Some of these services are offered free-of-charge, while others require an upfront investment which is quickly recouped through energy efficiency improvements, and the subsequent cost savings they bring. The health checks and energy audits also result in reduced CO2 emissions and improved regulatory compliance.



Level 1

Free visual inspection and energy potential calculations (EPC)

The #airCHECK visual assessment covers information such as compressor room environment, whether there are any air quality issues, and a visual inspection of all compressed air equipment on site, including appropriate capacity, ISO compliance, unproductive running, and pressure. This results in a summary of equipment health, outlining running equipment improvements, and wasteful practices or non-conformance with ISO standards. Energy potential calculations (EPC) can also be carried out, focussing on the power usage of the compressors, load v. unload hours, and average leak assessment. This calculation identifies whether there is a requirement for a Level 2 assessment, and provides an indication of the tangible savings that would bring.



Level 2

Energy assessment and recommendations through data logging

While EPC delivers an estimation of potential energy savings, this next level service provides a real-world assessment based upon the findings of data logging equipment fitted to each compressor. The iiTrax devices record and then map the energy consumed over a full week period, showing the actual running hours and calculated air usage. Based on this data, Atlas Copco specialists can then calculate a realistic energy savings potential, make simulations and provide recommendations to achieve optimal energy efficiency. This service is also free of charge and always provides high-quality, actionable insight.



Level 3

Full AIRscan audit to ISO 11011 standard

The full AIRscan service provides a premium assessment, covering a range of parameters, such as flow testing, air leak detection, air quality testing, measurement and analysis of pressure and dew point throughout the wider system, from compressor room to production processes. Included in AIRscan is reporting and discussions of the most suitable methods to reduce energy costs and CO2 emissions. This audit always pays for itself in savings. AIRscan follows the ISO 11011 standard for compressed air energy efficiency assessments, ensuring that installations are assessed based on a clearly defined framework. It can also serve as a benchmark for ISO 50001.

Common misconceptions around air energy audits and leak detection

In a typical manufacturing plant with high degrees of automation, plant managers oversee a broad range of inter-linked systems and technologies that must work seamlessly together. In such complex operating environments, it is easy to overlook the importance of high-performing compressed air systems.

Moreover, failure to instigate compressed air health checks and energy audits can also sometimes be based on outdated misconceptions that do not reflect real-world experience. Here we address some of the most common fallacies.

“ I don't have any compressed air leaks in my manufacturing facility

This is highly unlikely to be correct. Even the most modern compressed air system is likely to have some level of leakage within six months of installation. Manufacturing facilities are often harsh operational environments. Over time, leaks can occur due to factors such as human error, sub-standard welding or pipe connections and damaged valves and seals. Often, you won't know that leaks exist unless you look for them, which is why leak detection surveys are crucial.

“ Health checks and energy audits will disrupt my production lines

Again, this assumption is untrue. The initial steps, such as an #airCHECK, couldn't be easier and involves a visual assessment that can be conducted in as little as 10 minutes, with no downtime whatsoever. By its very nature, this type of exercise is intended to flag-up 'quick-win' opportunities, enabling end-users to fix costly air leaks and address inefficient operating practices. Even more sophisticated data logging and ultrasonic testing, and the fitting of flow meters, can be performed in a completely unobtrusive manner.

“ Compressed air audits and leak detection surveys will cost me a lot of money

Many of the air audit services offered by Atlas Copco are free of charge. Even when there is an upfront cost - such as with the full AIRscan service - the efficiency savings discovered always amount to more than the initial outlay. Indeed, far from being a drain on resources, air leak detection surveys can in fact facilitate significant energy bill reductions with returns dwarfing any expenditure. Audits and health checks can also deliver significant savings on the installation of new equipment, eliminating the risk of over-specification.

Real-life customer applications



Midas Pattern Company

Precision polyurethane moulding manufacturer Midas Pattern Company, based in Bedford, achieved substantial energy savings through data logging of its compressor system, while reducing its carbon footprint by a significant amount.

Initially, the company used Anglian Compressors, Atlas Copco's premier distributor for the area, to conduct a free performance survey of their compressed air system. This comprised two Atlas Copco 22 kW, fixed-speed rotary screw compressors plus a small VSD unit which had been installed ten years earlier.

The review identified several critical areas of inefficient operations, resulting in the purchase of more modern equipment including the GA37VSD+ compressor from Atlas Copco. The survey also resulted in a lowering of the air system pressure within the plant, reducing the energy requirement by 10.5 per cent. Other performance optimisations, such as shutting off the swarf removal air blast immediately after the process was completed, were also initiated.

The combined effect of these measures has been considerable. The level of energy used on site for generating compressed air at the plant has reduced by about two thirds to just 78,104 kW/h, representing a total saving of £14,554 per annum. This has resulted in an estimated ROI payback of just 1.5 years.

The compressed air system upgrade has also helped reduce the company's carbon footprint by some 50 tonnes of CO₂. When combined with the effect of other vital measures the company has taken in using less energy and improving its green credentials right across its business, that figure is closer to 60 tonnes.



Wienerberger

Brick maker Wienerberger has benefited from the results of an iiTrack data logging study at its Manchester plant, providing valuable insight into energy usage, air demand requirements and compressor system capability.

The study identified several areas of inefficient operation, resulting in the specification and installation of new Atlas Copco compressed air and vacuum systems. This equipment has resulted in significant energy savings, estimated to be around £38K per annum. It has also helped the company to reduce its carbon footprint and achieve higher levels of reliability and performance.



Fabricon

Design engineering company Fabricon has also benefited from an iiTrak study of the compressed air usage patterns, revealing the need for a new compressor, with its existing unit relegated to standby duty. Calculations indicated long term savings with a 5-year payback from the upgrade plan.

The installation included an Atlas Copco GA15 VSD+FF rotary screw compressor with integral refrigerant dryer, together with a 900 litre-air receiver, quality air and condensate treatment ancillaries. As well as delivering increased efficiency and lower noise levels, the installation of the new compressor and other plant modifications was shown to save the company approximately 51% of its energy consumption, a figure which equated to £2,479 per annum based on 10p/kWh for the electricity supply.





Get in touch

Book your free compressed air health check, energy audit or leak detection survey today.

It is clear, then, that compressed air health checks, energy audits and leak detection can have a transformative effect on business operations. Atlas Copco experts are on hand to help tailor the various levels of service to your needs, resulting in a unique set of findings that will relate to the specific requirements of your organisation.

Get in touch today to find out how we can help you reduce costs and improve your environmental performance:

Call: 0800 181085 **Email:** compressor.sales@atlascopco.com

Or visit our dedicated health check and energy audit web page [here](#)

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