



APPLICATION STORY

Manufacturers are driving down rising energy bills with acoustic imaging

By Federico de Lucia, FLIR Team Lead of Condition Monitoring Specialists

Businesses are struggling to cope with compounding costs and rising energy bills—that much is clear. In the face of surging costs and in the absence of certainty, businesses across the globe are looking to reduce consumption and cut costs wherever possible.

In this new (increasingly costly) reality, acoustic imaging is offering manufacturers a crucial lifeline; it is helping energy-intensive industries to keep the lights on by driving down operating costs and slashing maintenance expenses.

You've heard of 'lossless sound'. Well, acoustic imaging takes that quite literally.

Detecting previously undiscovered air leaks can plug a costly problem

For the UK and much of the EU, the cost of energy has almost doubled from this time in 2021, with prices now at 34.0p/kWh (versus just 18.9p/kWh in 2021). That's 179% higher. In fact, gas prices have increased in 23 of the 24 EU Member States for which data are available,

with the biggest jumps after the UK being seen in Estonia (+154%), Lithuania (+110%) and Bulgaria (+108%).

This begs the question, "how can energy-intensive industries survive in this climate?" With large-scale industrial processes driven largely by compressors and vacuum pumps to operate machines and transport assets, that's a critical question.

The answer is of course to look at your outgoings and real, tangible ways to cut expenditure on the factory floor. One way that is rapidly picking up traction among manufacturers across the breadth of the EU is acoustic imaging.

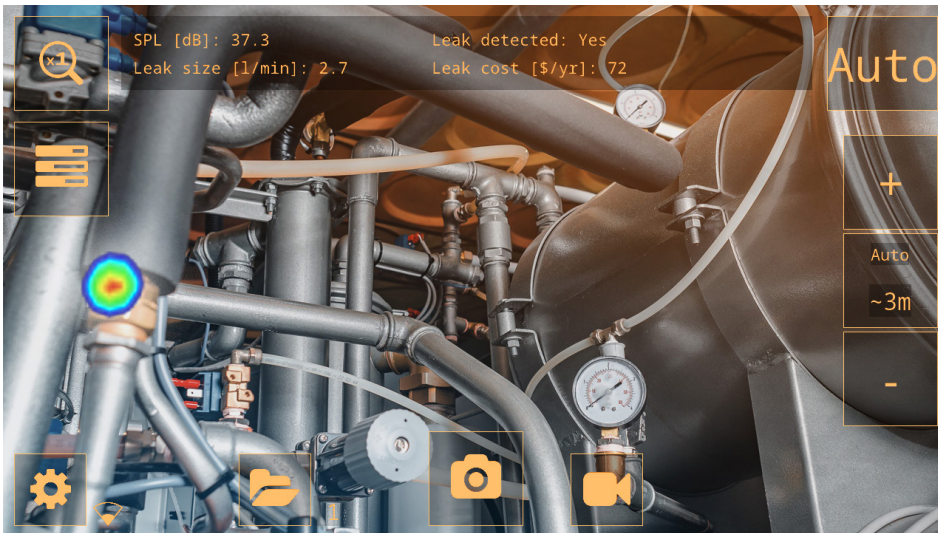
No piece of equipment is immune to the issue of machine failures



FLIR Si2-LD Industrial Acoustic Imaging Camera for Pressurized Leak Detection and Mechanical Fault Detection



The FLIR Si2-LD detects two sources of potential compressed air leaks, distinguished from background noise.



Industrial compressed air leak, as seen by the FLIR Si2-LD.

and wear, however high-tech they are. Machines that aren't operating optimally are costing you money in very real terms. This is where acoustic imaging comes in; on the frontline of condition monitoring, it promises to yield savings by picking up air leaks in real time.

While isolated incidents may seem minimal, the costs of wasted energy can quickly snowball from a minor inconvenience to an acute concern. Consider that with the average compressor system, approximately 80% of energy is lost through heat dissipation, meaning only 20% makes the transition into a usable output on the factory floor. From this, up to a third of this usable energy is lost to leaks. Energy that you're paying more and more to use.

Why are air leaks so expensive?

Let's put a measurable scale on a problem that can vary substantially by application. To do this, operators must first explore exactly how much a leak can impact production costs.

Take, for example, a compressed air leak from a small hole of just 1.5 millimetres on a network of compressed air at seven bars of pres-

sure. Two years ago, with a price of €0.07 per kilowatt hour, that alone would have cost a company roughly €1500 (£1300) if you assume an operating time of 6000 hours per year.

Of course, now the energy situation is worsening, which means that costs may be three, four, even five times higher in some cases—which could be a cost of up to £7500 a year for failing to identify a single small hole in a vital production component.

When you consider the scale of industrial manufacturing and the scope for leaks to crop up unnoticed, it is staggering that such a comparatively small hole can compound into such a large problem.

Driving down energy bills with the FLIR Si-Series

Newer acoustic imaging camera models such as the FLIR Si2-LD use a number of high-spec audible and ultrasound microphones to detect air leaks as they appear and boast an optimal bandwidth range of 2–130 kHz. This range yields unmatched detection accuracy and identification down to even the smallest breach.

The Value of Acoustic Imaging for Leak Detection

- It's a proactive stance against leaks: Compressed air may be cheap but the power needed to run faulty systems is not. By catching leaks through detection systems and sensors early, facilities crews have the opportunity to prevent further energy waste and can schedule repairs.
- It pays for itself: Leak detection with an acoustic imager leads to improved energy efficiency and reduced costs, not only from repairs to compressed air and vacuum systems but also related to any expensive specialty gases that could be leaking during your production process.
- It finds leaks more accurately than traditional methods: Acoustic imagers actually see the leak and display it on a screen, allowing technicians to pinpoint leak locations almost instantly.



Easy-to-view color LCD screen.



FLIR Si-Series acoustic imaging cameras include features such as dual-mode LED worklights and a 12 MP camera with 8x digital zoom.

The technology also gives handlers the ability to identify, photograph or video the location of an air leak up to ten times faster, meaning minimal downtime for the facility and a prompt repair or replacement of the defective component. In addition to this, it also detects partial discharge, floating discharge and corona, helping to curb potentially life-threatening events, as well as general maintenance issues.

Operators benefit from the much quicker identification of problem parts and even have the capability to see the detected leak(s) as they appear. This is because the sound is superimposed by functional AIs to render a visual depiction of where the leak is as well as gauging its

severity, including recommended actions to resolve.

In the case of FLIR Si-Series acoustic imagers, projective algorithms even estimate how much the leak will cost by evaluating the air lost in real-time, calculating the spend per kWh and displaying an expecting saving per year (or on a specified timeframe), ensuring that inspectors have clear evidence needed to solve problems and justify any incurred repair costs across the production line.

If you're a manufacturer struggling with the rising cost of energy, [explore the new Si2 range](#) now to radically improve inspections in your facility.

Why Choose a FLIR Acoustic Imager?



Effortless one-hand operation: improves operator safety and reduces potential neck strain.

Superior sound detection with 124 microphones: optimized dynamic range helps balance frequency capabilities with how far sound travels (you want your detectors to use the lowest frequencies possible to get the farthest distance).

Enterprise scalability: fleet management, cloud data integration, and OTA software updates ensures optimal use in large-scale industrial settings.

Machine learning capabilities: allows Si-Series cameras to distinguish sound patterns created by leaks from background noise.



FOR MORE INFORMATION ABOUT THERMAL IMAGING CAMERAS OR ABOUT THIS APPLICATION PLEASE VISIT: WWW.FLIR.COM/CONDITION-MONITORING

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