# Q+AUDIT

*Compressed Air Services—the Enersize Software-as-a-Service suite for energy optimisation of industrial compressed air supporting all stages of a compressed air audit.*

## Audit with a view to optimize the compressed air system

We developed Q+AUDIT to support a compressed air audit of the facility and the subsequent leakage detection survey and repair project.

During the compressed air audit, the Enersize solution supports people in their work to baseline the system. We provide all the tools needed to measure power, pressure and dew point under different operating conditions, as well as a calculated flow and estimating leak load.

This means that you can establish current energy performance levels and costs of the compressed air system and compare the results with the facility's present production levels. The Software-as-a-Service suite in combination with mobile loggers provides comprehensive support for you to capture all data in the process.

## Where is the savings potential?

The savings potential for compressed air systems can be broken into four areas:

1. *Compressed air generation* – including compressor efficiency and compressor control.
2. *Compressed air treatment* – including operation of dryers and filters, and pressure losses across treatment.
3. *Distribution system* – including pressure losses and zone isolation.
4. *Use of compressed air* – including artificial demand, inappropriate use, and leakage.

## Characteristics of a well optimised system

A well optimised industrial compressed air system would have the following characteristics:

- Compressors carefully controlled and matched to demand
- Compressors efficient and properly maintained
- Treatment to the minimum required standard
- Dryers running efficiently
- Condensate collected and treated correctly
- Piping correctly sized in all areas
- Operating pressure minimum required
- Pressure drop <0.5 bar in compressor house
- Pressure drop <0.2 bar in system
- Leakage <10% of mean demand
- Air ON only when required

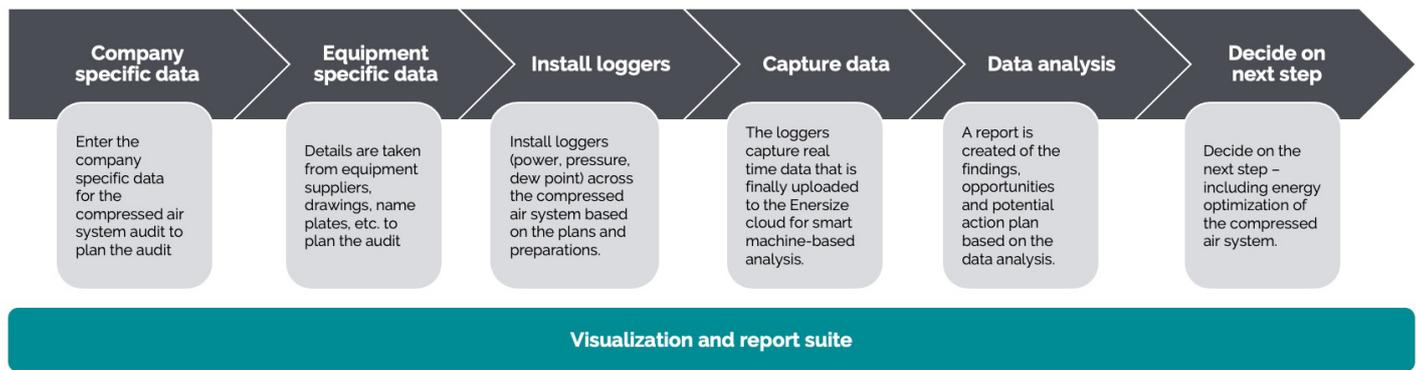## Capture company specific data

*A strong foundation for an audit*

The first step in an audit is to capture data about the company and the facility.

Before the audit of your compressed air system, we need to understand the following:

- What is the pressure profile of the site?
    - At the compressors before treatment
    - After treatment
- Around the site
- What is the demand profile?
- What condition are the compressors and dryers in?
- How is the air distributed around the site?
- How is the air used?

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## Software support for a compressed air audit

| Company specific data | Equipment specific data | Install loggers | Capture data | Data analysis | Decide on next step |
|---|---|---|---|---|---|
| Enter the company specific data for the compressed air system audit to plan the audit | Details are taken from equipment suppliers, drawings, name plates, etc. to plan the audit | Install loggers (power, pressure, dew point) across the compressed air system based on the plans and preparations. | The loggers capture real time data that is finally uploaded to the Enersize cloud for smart machine-based analysis. | A report is created of the findings, opportunities and potential action plan based on the data analysis. | Decide on the next step – including energy optimization of the compressed air system. |

**Visualization and report suite**

### Install loggers

*Loggers are the key to an optimal Q+AUDIT output*

For most compressed air systems, power, pressure and flow  should be measured for a period of 10-14 days to obtain an accurate system snapshot. Flow can be calculated if flowmeters are lacking. The measurement period should include nights, weekends, or any other down-time to identify non-productive demands.

True power used by the air compressors is assessed using kW loggers, which measure current, voltage and power factor. Other data points, such as pressure, dew point and flow, should be measured as needed based on system requirements.

Loggers record data points every second to capture the dynamics of the system.

The Enersize logger system meets all the requirements described above.

### Real time data capture

*Data captured for smart machine-based analysis*

After 10-14 days, the data from the loggers is wirelessly uploaded to the Enersize base station. The complete data set is later transferred to the Enersize cloud database via internet.

> *25-30% of compressed air is lost to leakage, and an additional 5-10% is lost to inappropriate use.*
>
> *A compressed air audit gives you the information you need for optimisation.*

### Analyse the results

*Collate the results and present the audit report*

The way loggers are utilized allows for the recording of synchronized data from the entire compressed air system, including the compressor station/s, the supply system and, where the compressed air is used, the demand side.

The Q+AUDIT supports a more comprehensive audit compared to only analysing the operation of the compressors. Q+AUDIT enables the efficient operation of the entire

compressed air system, including savings from leakage management, inappropriate use of compressed air and artificial demand.

### Equipment Utilisation

The Equipment Utilisation report shows the utilisation of each individual compressor based on the data, which was captured by the logger(s). The total system utilization for the audit period is also calculated.

### Performance KPIs

For the overall plant we deliver a cost performance indicator and an energy performance indicator based on a calculated flow (if flow meters are not installed). The KPIs are used for benchmarking.

### Annual Cost of Assets

The Annual Cost of Assets report shows the total energy consumption and associated cost of each individual compressor for the audit period. Data is then scaled up to annual consumption.

### Annual Cost Flow

The Annual Cost Flow report displays output data for the supply side of the system in [%] and in [m3/min] and how energy consumption is distributed on the output (supply-side). Data for consumption and associated costs is then scaled up to annual consumption for the compressed air system.

### Charts

A series of charts and graphs is available in the Q+AUDIT to display all data from the loggers.

### Decide your next step

The overall findings from the compressed air system audit are collated and presented in a final audit report, which includes an action plan and a number of suggestions for improvements.

Then it is time to decide on next steps.

If you choose to initiate a leakage detection survey and repair project, all the data from the compressed air audit is readily available in the Enersize SaaS suite.

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