Why traditional machine maintenance is no longer sufficient in the energy sector

## — and the potential of using AI monitoring

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Current challenges in the energy sector

The energy sector is one of the most critical infrastructures in our society. Whether it is gas, electricity or renewable energy, an uninterrupted supply is essential for households, industry and the economy. At the same time, the sector is under pressure:

- **Regulatory requirements** are increasing and operators have to comply with stricter safety guidelines.

- **Rising energy costs** and volatile market conditions make total cost control more important than ever.

- **New technologies** must be efficiently integrated while existing infrastructure is modernised. Systems often consist of complex, high-stress components such as compressors, turbines or heat exchangers.
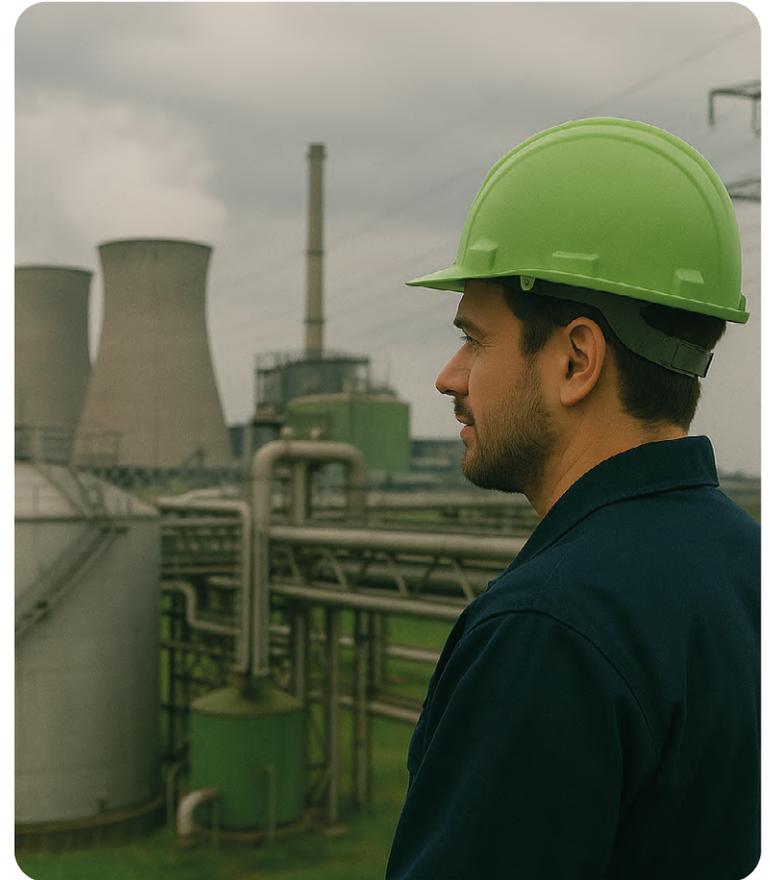
The importance of predictive maintenance

Unplanned downtime and inefficient maintenance are among the biggest challenges in industry. Conventional maintenance strategies are risky: companies rely on fixed intervals for preventive maintenance measures - which is often expensive and inefficient.

Reactive maintenance, on the other hand, is only carried out once a component has already failed. This results in long downtimes and production losses.
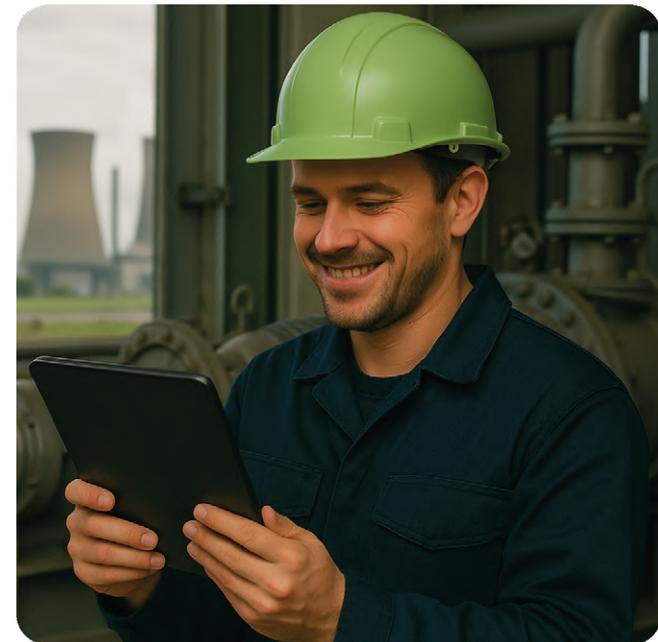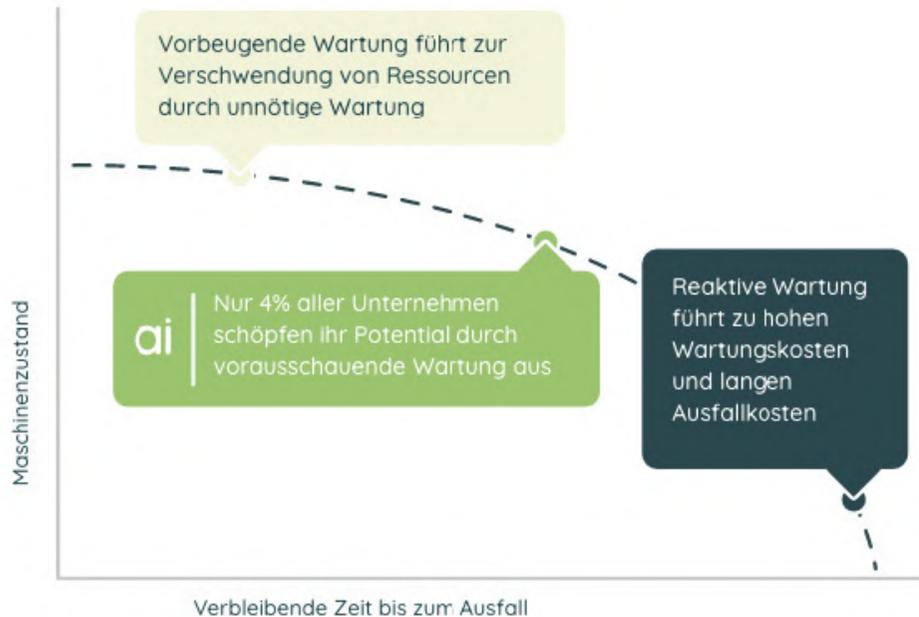
The risks of conventional monitoring solutions

Taking a gas compressor as an example

Initial situation	Problem	Risk
A gas compressor consists of many interconnected components such as bearings, seals, drive unit, cooling system and vibration sensors. Measured values such as pressure, temperature, friction and vibrations influence each other.	Monitoring solutions are usually based on static limit values that do not adapt dynamically to changing operating conditions. Complex interactions between components are therefore not taken into account.	A small pressure drop in the cooling system, for example, increases the temperature, worsens the lubrication in the bearings and increases friction, which leads to faster wear. This in turn can be detected by increased vibration.
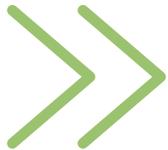
» If such correlations are not taken into account, it is not possible to detect machine faults at an early stage. At the same time, many companies lack the data science expertise to evaluate operating and status data in a targeted manner. Yet it is precisely this ability that is crucial for recognizing patterns, identifying faults at an early stage and planning maintenance with foresight. **This is where our aiomatic software enters the picture.**

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Our AI-based maintenance software

Our AI-supported software for analyzing sensor data precisely evaluates the condition of machines and helps to detect potential faults at an early stage. The innovation lies in intelligent data analysis: by using neural networks and statistical methods, we can not only make more accurate predictions, but also make the causes of changes visible. This makes the AI process, which is often perceived as a "black box", more transparent and comprehensible.

Special features of the aiomatic approach

Multidimensional AI analysis

Our software takes into account interacting processes that occur in complex systems (e.g. compressors). It brings together data from different sources and perspectives, evaluates it and thus enables a more precise prediction of possible malfunctions.

Integration of expert knowledge

Our solution combines the operator's valuable expert knowledge with AI-based models. This means that the machine not only reacts to standardized parameters, but also adapts to specific requirements and the company's operating environment. This ensures even more precise error analysis and early warnings that are optimally adapted to real operations.

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Congfigurable warning messages

Alerts can be configured individually for each model, component and machine directly in our dashboard - tailored to each component and its operating status. Alerts are only triggered if a relevant data anomaly occurs.

Hardware-free connection possible

Thanks to our standardized onboarding via the OPC UA digital interface, our software can be seamlessly integrated into existing IT systems. Companies benefit from quick and easy implementation without the need for additional hardware.

Scalability & flexibility

Our solution adapts flexibly to the operator's requirements and can be extended to new circumstances at any time.

Potential of predictive maintenance

1. Early detection of critical changes	**2.** Reduced maintenance costs through proactive maintenance measures	**3.** Higher efficiency and extended machine life cycle

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About aiomatic

aiomatic was founded in 2020 and today has 35 employees with interdisciplinary expertise in data science, software development, mechanical engineering and related fields.

With our AI-supported software, we enable condition-based monitoring of machines.

In addition to our product packages, we offer a wide range of services - including workshops, proofs of concept and the analysis of historical operating data. In the energy sector, we support large, internationally active companies such as EWE.
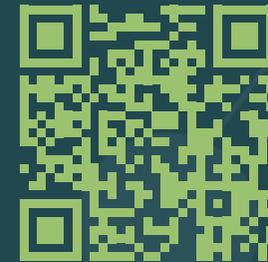
EWE

Management of aiomatic

Photo: Oliver Vonberg

Are you ready for automated AI monitoring of your machines?

Feel free to contact me at any time if you have any questions!

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Book a meeting

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