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Protecting and Maximizing the Value of Your Compressed Air Investment



Executive Summary



Compressed air systems are among the largest and longest-lived utility assets in industrial facilities. Yet many organizations focus heavily on acquisition and installation while placing less emphasis on how value can be sustained and enhanced throughout the asset lifecycle.

In an environment characterized by energy volatility, increasing productivity demands, aging infrastructure, skilled labor shortages, and heightened expectations around reliability and sustainability, industrial leaders are rethinking how they manage compressed air assets.

Rather than viewing compressed air as a fixed utility that simply supports production, leading organizations increasingly recognize it as a strategic asset whose performance can be continuously improved over time.

The conversation is evolving beyond equipment selection alone. The focus is shifting toward preserving asset health, sustaining energy efficiency, improving visibility, reducing operational risk, and maximizing lifecycle return on investment.

This paper explores how industrial organizations can maximize the long-term value of compressed air infrastructure through maintenance, performance visibility, audits, connectivity, monitoring, optimization, and lifecycle performance management.

The objective is simple:

Protect the investment. Extend the value. Continuously improve performance.



1. Maximizing Value Starts After Installation

Selecting the right compressed air system is a critical decision. However, installation should not be viewed as the conclusion of the investment journey.

It is the beginning.

The performance achieved during the first year of operation rarely remains unchanged throughout the life of the asset. Production requirements evolve. Energy costs fluctuate. Facilities expand. New processes are introduced. Existing production lines are modified.

As these changes occur, compressed air systems must continue delivering:

- Reliable airflow
- Stable pressure
- Consistent air quality
- Energy-efficient operation
- Operational flexibility
- Predictable performance

The organizations that achieve the strongest return on investment understand that value creation is not a one-time capital event.

It is an ongoing operational process.

The fundamental question therefore shifts from:

"Did we purchase the right equipment?"

to:

"How do we ensure this system continues creating value for the next 10, 15, or 20 years?"

This shift in mindset represents the foundation of lifecycle performance management.





2. Performance drift is one of the most underestimated risks

One of the most common threats to compressed air value is not sudden failure. It is gradual performance drift.

In many industrial systems, losses do not appear all at once. They accumulate over time through changes that may seem minor in isolation but become significant in combination. These may include:

- increasing leakage
- rising pressure drop
- reduced filtration performance
- inefficient compressor sequencing
- changes in demand profile
- extended unloaded operation
- control settings that no longer reflect current needs
- maintenance conditions that reduce efficiency or reliability[2][3][4][5]

These issues can increase energy use, reduce stability, create avoidable maintenance burden, and weaken overall lifecycle return. Because the degradation is gradual, it can become normalized within day-to-day operations and remain undetected for long periods.

This is why simply knowing that a compressor is running is not enough. Operation alone does not confirm efficient or optimized performance.

Protecting investment value requires organizations to periodically verify that compressed air systems are still performing as intended under actual operating conditions.

3. Maintenance should be treated as a value preservation strategy

Maintenance is often discussed as an operating necessity. In practice, it should be viewed more strategically: as a core method of protecting asset value.

The purpose of maintenance is not only to reduce the likelihood of failure. It is also to preserve performance over time. Well-managed maintenance supports:

- more stable operating conditions
- more consistent energy performance
- reduced risk of unplanned downtime
- improved production confidence
- longer equipment service life
- stronger lifecycle economics[2][5][6]

This is especially important in compressed air systems because declining component condition can affect both reliability and efficiency. Filters, drains, controls, seals, coolers, treatment equipment, and other system elements all influence how effectively the overall installation performs.

When maintenance is approached as proactive asset stewardship rather than reactive repair, organizations are better positioned to prevent value erosion before it affects production or cost.

The focus shifts from fixing problems after they appear to preserving performance before it declines.





4. Why condition-based maintenance is gaining importance

Preventive maintenance remains an essential part of compressed air asset care. However, many industrial organizations are increasingly complementing time-based service models with condition-based approaches.[5][6]

Condition-based maintenance uses operating information and equipment condition indicators to help determine when intervention is most appropriate. Rather than relying only on elapsed time or operating hours, organizations can also consider how the asset is actually performing in service.

This can support:

- earlier detection of emerging issues
- better maintenance planning
- more targeted resource allocation
- reduced unplanned downtime risk
- improved asset life management
- greater confidence in ongoing system performance[5][6]

This approach reflects a broader shift in industrial asset management. As monitoring and connected diagnostics become more accessible, maintenance decisions can increasingly be informed by current system behavior rather than schedule alone.

For compressed air systems, that helps move maintenance from routine compliance toward performance-informed decision-making.



5. Visibility leads to better compressed air decisions

Many industrial sites maintain strong visibility into production assets while utility systems remain less closely monitored. Yet compressed air often has direct influence on energy cost, reliability, and production support.[2][3]

Without sufficient visibility, key questions are harder to answer:

- Is demand increasing, decreasing, or becoming more variable?
- Are pressure levels stable across the system?
- Is the equipment operating in line with expected duty?
- Are energy performance improvements being sustained?
- Where are the most important opportunities for intervention?[2][4][5]

When this information is not available, decisions are more likely to rely on assumptions, anecdotal observations, or isolated events. That makes it harder to prioritize action, validate improvements, or identify deterioration early.

Visibility changes that. When organizations can observe system behavior more clearly, they are better able to understand not just what is happening, but what may be causing it. That supports more confident decisions around maintenance, optimization, energy performance, and capital planning.

In that sense, visibility is not simply an operational convenience. It is a prerequisite for stronger lifecycle management.



6. Periodic audits remain essential

Industrial operations change continuously. New equipment is added. Production lines are modified. Throughput patterns change. Demand profiles evolve. As a result, compressed air systems may operate very differently from the way they did when originally commissioned.[4][5] That is why periodic system assessment remains essential.

Compressed air audits and structured energy assessments help organizations understand current system behavior and identify where performance has changed. Depending on scope, an assessment may provide insight into:

- demand profile and variability
- pressure behavior
- capacity utilization
- leakage
- control effectiveness
- energy performance
- future infrastructure needs[2][4][5]

These assessments are important not only because they identify inefficiencies, but because they reconnect decision-making to measured operating reality. They help organizations evaluate present conditions rather than relying on historical assumptions.

The strongest investment and optimization decisions are typically grounded in observed system behavior, not theoretical expectations alone.



7. Connectivity is changing compressed air asset management

Across industry, asset management is becoming more data-driven.

Compressed air systems are part of that shift.

Connectivity enables organizations to move beyond occasional inspection and periodic review by improving access to ongoing system information. Connected compressed air environments can help teams observe:

- equipment operating status
- pressure and performance trends
- maintenance indicators
- alarms and events
- operating variability
- energy-related behavior[5][6]

This increased awareness can support earlier intervention, more effective planning, and stronger coordination between operations and maintenance teams.

Connectivity should not be treated as a technology trend in isolation. Its value lies in what it enables: better operational awareness, faster recognition of change, and more informed performance management over time.

For organizations looking to protect long-term compressed air value, that visibility can be highly important.





8. Connected platforms are becoming more strategically relevant

As industrial organizations manage larger asset bases and pursue more consistent operating performance across sites, many are placing greater value on centralized visibility and coordinated decision-making.[5][6] Connected asset management platforms can support capabilities such as:

- consolidated equipment visibility
- remote monitoring
- maintenance planning support
- alarm awareness
- energy performance review
- multi-site comparison
- trend-based reporting[5][6]

Their value is not limited to data collection. More importantly, they help create a shared operating picture across maintenance, engineering, energy management, and leadership functions. That can improve alignment around priorities, accelerate response to emerging issues, and make lifecycle decisions more evidence-based.

As industrial operations become more performance-driven, access to connected, actionable information is becoming more strategically relevant to long-term asset value.



9. Energy should be managed as a performance variable

Energy is often treated as an operating expense. In compressed air systems, it should also be managed as a performance variable.

Because compressed air is a significant electricity-consuming utility in many industrial facilities, inefficiencies can materially affect long-term operating cost and investment value.[2][3] Organizations seeking stronger lifecycle return should regularly review energy consumption, load profile, pressure efficiency, demand variability, and other key performance indicators.[2][4][5][6] The objective is not only to reduce energy use. It is to ensure the system continues converting energy into productive output as efficiently and reliably as possible.



10. Data-driven optimization creates compounding value

Compressed air optimization was once treated mainly as a series of isolated projects. Increasingly, industrial organizations are adopting a more continuous model of improvement supported by better operating data.[4][5][6]

That model follows a simple cycle:

Measure → Understand → Optimize → Verify → Improve

Over time, this creates compounding value through improved efficiency, stronger reliability, better asset utilization, and more informed investment decisions.[2][4][5][6]

Optimization is no longer just a project. It is an ongoing management discipline.

11. Building a lifecycle strategy for compressed air

The most mature organizations do not manage compressed air through disconnected activities alone. They take a lifecycle view.

A lifecycle strategy aligns maintenance, monitoring, assessment, optimization, and operational planning around one objective: maximizing long-term system value.

A practical compressed air lifecycle framework can be described in five stages:

Understand: Build visibility into demand, performance, asset condition, and operating behavior.[4][5]

Protect: Preserve performance through structured maintenance and sound asset care practices.[5][6]

Monitor: Track system behavior over time to identify change, drift, and emerging risk.[5][6]

Optimize: Use measured insight to improve efficiency, utilization, and control performance.[2][4][5]

Adapt: Ensure the system continues to support evolving production requirements and business priorities over time.[1][5][6]

This framework helps move organizations beyond equipment ownership alone and toward continuous value realization.





12. Creating a continuous improvement culture around compressed air

For many years, compressed air was often managed as a background utility. Today, that position is changing.

Organizations that take a more mature approach increasingly integrate compressed air performance into broader operational improvement and energy management practices.[5][6] That can include:

- defining performance indicators
- reviewing energy-related trends
- tracking reliability and maintenance outcomes
- conducting recurring system assessments
- comparing site performance over time
- identifying and validating optimization opportunities[4][5][6]



This approach elevates compressed air from a necessary cost center to a managed industrial asset. It also helps ensure that the system continues supporting production, efficiency, and lifecycle value rather than gradually drifting away from intended performance.

For industrial leaders across EMEA, that shift is becoming increasingly important.



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