

Steel is expensive, controls are cheap – optimising your plant for energy efficiency

Canonical: <https://northmoregordon.com/news/steel-is-expensive-controls-are-cheap-optimising-your-plant-for-energy-efficiency/>

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About this update

This dated news record has been reorganised for clear reading and connected to current guidance.

Publication date: October 11, 2019.

Status note: Present-tense statements, market figures, deadlines and program details in the archived record belong to its publication date. Check current official sources before making a decision.

What this article reported

Something that we often hear on industrial sites is that Plant Operators don't have time or focus to optimise for energy efficiency. It's not that staff don't want to run an efficient plant, but that priorities are set by the business are skewed toward reliability, throughput and product quality, and therefore they have little time to think about much else.

Our experience, however, is that running an efficient plant will help to deliver the quality, output and reliability results that Business Owners and Operators are seeking.

To do this, several barriers need to be overcome:

Multiple optimums: There are multiple 'optimum' operating points for plant and equipment

Operator differences: Operators each have their own way of doing things

Reliability does not equal efficiency: Some 'conservative' equipment set points could be compensating for underlying problems.

Multiple optimums

The concept of multiple optimum operating points is well proven in control theory. Without periodic auditing and bottom-up analysis, your systems could be operating in an over-processing state for years. Under-processing gets picked up by system alarms and product quality checks, whereas over-processing may not cause any 'headaches' (except in the accounts department) and so tend to continue unnoticed.

Some techniques we use to assess the current energy efficiency of a process are (i) assess the minimum theoretical energy requirements, (ii) compare current operation to manufacturer recommendations, and (iii) compare current operation to industry best practice. This can highlight the gap in performance, which helps to identify the 'size of the prize', and how much effort to spend on further optimisation.

Operator differences

It is well known that Operators have a strong influence over plant performance. Despite the wide-scale application of sophisticated control systems, many choices are still made by humans. One good example is the ability for Operators and maintenance staff to change the sequence in which refrigeration compressors, or air compressors are run. This is a recipe for inefficient operation, even though it won't be compromising reliability. From a total cost of ownership perspective, the most efficient sequencing should be established based on the characteristics of the installed machines, tested and measured, and then locked in by restricting the ability for people to make changes.

Reliability does not always equate to efficiency

Reliability does not equate to efficiency, and some operating modes can in fact be hiding underlying problems. Over years of plant operation and staff rotations, original setpoints or operational practises may get lost or changed to compensate for other issues. An example is the compressed air pressure required to run a piece of plant. Most plant needs less than 6 barg to operate reliably, but over the years the supply pressure at the compressors is increased higher and higher to compensate for poor air system design. Rather than fixing the underlying problems, energy is wasted. Higher air pressures reduce system capacity, increase the cost of air leaks, and lift artificial demand.

Conclusion

Energy efficiency is sometimes about the little things. Optimising existing plant is usually the cheapest energy efficiency project with the greatest return, especially when compared to an upgrade of plant and equipment.

At Northmore Gordon, we work with your staff to fine-tune a range of industrial systems to cut out energy 'fat' while maintaining plant reliability and operational efficiency.

Get in touch today to find out what approach is best for you.

Contact Us

How to use this information now

For current use, confirm the applicable scheme rules, regulator notices, market date and reporting period. Keep historical prices or forecasts separate from present quotes and verified outcomes.

Separate source-reported facts from forecasts, targets and commentary. For a current project, retain the official source, version, effective date, assumptions and decision record in the evidence file.

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What is the main argument of Northmore Gordon's article 'Steel is expensive, controls are cheap'?

The article argues that optimising existing plant and equipment through controls and operational adjustments is usually the cheapest energy efficiency project with the greatest return, especially compared to upgrading plant and equipment (i.e., steel). This reflects a practical hierarchy: before investing in new equipment, investigate whether current systems can be tuned to deliver required services more efficiently. Controls and sequencing changes often cost far less than replacement while offering substantial savings.

Why do plant operators often lack focus on energy efficiency, according to the article?

Business priorities are typically skewed toward reliability, throughput and product quality, leaving operators little time to focus on energy efficiency, even though they do want to run an efficient plant.

This competing pressure means efficiency improvements must be designed to protect operational outcomes and require minimal operator intervention. Locked-in, tested control settings and clear responsibility for performance monitoring help embed efficiency gains without compromising core operational priorities.

What is the 'multiple optimums' problem in plant control theory described in the article?

Control theory shows there can be multiple 'optimum' operating points for plant and equipment. Without periodic auditing and analysis, a system could operate in an over-processing state for years. Under-processing typically triggers alarms and quality checks, but over-processing often goes unnoticed except in rising cost terms. This hidden inefficiency underscores why external assessment and benchmarking against manufacturer recommendations and industry best practice are valuable.

How does the article suggest addressing operator differences to improve plant efficiency?

The article recommends establishing the most efficient sequencing based on tested machine characteristics—such as the optimal order for starting refrigeration or air compressors—and then locking it in by restricting operators' ability to change it. This preserves operational reliability while preventing individual operator preferences from reintroducing inefficiency. Clear operating instructions, commissioning records and periodic reviews help sustain these locked-in improvements.

What does the article cite as an example of reliability being confused with efficiency?

Compressed air pressure is cited as a key example: most plant needs less than 6 barg to operate reliably, but supply pressure is often increased over years to compensate for poor air system design rather than fixing the underlying problem. This approach wastes energy, reduces system capacity, increases leak costs and creates artificial demand. The better approach is to investigate actual user requirements, repair leaks and optimise sequencing before accepting higher pressure as necessary.

What assessment techniques does Northmore Gordon use to identify energy efficiency opportunities in plant operations?

We assess the minimum theoretical energy requirements for a process, compare current operation to manufacturer recommendations, and benchmarks against industry best practice. This multi-angle approach highlights performance gaps and identifies the 'size of the prize' for further optimisation. These techniques apply across compressed air, refrigeration, heating and process control systems, and help distinguish over-processing, leakage and control inefficiency from equipment age.

What should a site check before purchasing additional compressed-air capacity?

Before buying capacity, investigate unnecessary uses, leaks, idling and compressor sequencing; establish what service is actually required at each location; and optimise existing equipment to deliver that service efficiently. This assessment avoids paying for new capacity when existing equipment could meet demand after waste is eliminated. Government guidance and utility benchmarking support this investigation, often revealing that pressure adjustment, leak repair and better sequencing deliver substantial savings without capital cost.

In what order should a site optimise a refrigeration system?

The recommended sequence is: first reduce cooling demand (fixing leaks, improving insulation); then eliminate avoidable heat gain (layout, design); then optimise controls and pressure settings; and only then consider replacing equipment. This order ensures you are not replacing equipment to handle artificial loads. Each step should be assessed within operational and quality constraints, and measurement should be arranged before changes remove baseline evidence for evaluating combined results.

What role does Northmore Gordon play in turning control optimisation findings into sustained improvements?

Our delivery approach moves from assessment (identifying opportunities through audits and benchmarking) through build-the-case (feasibility and investment analysis) to implementation with measurement and verification. Measurement and verification establishes baselines before changes, tracks commissioning outcomes and verifies that locked-in operating changes deliver intended savings under actual conditions. This systematic approach protects operational reliability while anchoring efficiency gains to evidence rather than assumption.

How does the 'controls-first' approach affect the business case for energy projects?

Optimising controls typically delivers payback in months or a few years with minimal capital cost, providing a strong financial case before more expensive equipment upgrades are considered. This approach also reduces risk: the operational improvements are tested and reversible, and actual performance can be measured against forecast before committing to major capital. Our investment-case guidance recommends comparing this controls-first option against equipment replacement on a common basis, including operating requirements, costs and assumptions.