

How can a Consultant increase my plant efficiency?

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Plant operators face competing priorities focused on reliability, throughput and product quality, which leave limited time and attention for energy efficiency concerns. Business objectives are typically set around these operational outcomes rather than energy performance. However, staff generally want to run efficient plants. The challenge is that energy efficiency requires deliberate investigation and measurement to identify opportunities, since inefficient operation often goes unnoticed - particularly over-processing, which doesn't trigger system alarms or quality failures the way under-processing does. We help address this by conducting systematic assessments that reveal efficiency gaps and quantify the potential improvements, enabling operators to integrate efficiency into their existing operational priorities.

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Something that we often hear on industrial sites is that Plant Operators don't have time to optimise for energy efficiency. It's not that staff don't want to run an efficient plant, but that priorities set by the business are often around 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 results that business owners and Operators are seeking. To do this, several barriers need to be overcome:

There are multiple 'optimum' operating points for plant and equipment

Operators each have their own way of doing things

Running plant reliably can achieve throughput, but some settings could be compensating for underlying problems

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

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 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 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 also reduce system capacity, increase the cost of air leaks, and lifts artificial demand.

Energy efficiency is sometimes about the little things. Optimising existing plant is often the cheapest energy efficiency project with the greatest return. 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. 1300 854 561.

Using this guidance

Check the site's operating conditions, data quality, project stage and current program settings before turning the dated discussion into a scope or investment decision.

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Why do plant operators often struggle to prioritize energy efficiency despite wanting to run an efficient operation?

Plant operators face competing priorities focused on reliability, throughput and product quality, which leave limited time and attention for energy efficiency concerns. Business objectives are typically set around these operational outcomes rather than energy performance. However, staff generally want to run efficient plants. The challenge is that energy efficiency requires deliberate investigation and measurement to identify opportunities, since inefficient operation often goes unnoticed—particularly over-processing, which doesn't trigger system alarms or quality failures the way under-processing does. We help address this by conducting systematic assessments that reveal efficiency gaps and quantify the potential improvements, enabling operators to integrate efficiency into their existing operational priorities.

What are the main barriers that prevent plants from operating efficiently even with reliable control systems in place?

Three significant barriers exist. First, plant and equipment have multiple possible 'optimum' operating points, making it unclear which settings deliver true efficiency. Second, operators each develop their own working methods over time, leading to inconsistent practices. Third, plants can run reliably while hiding underlying efficiency problems through compensating settings—for example, increasing

compressed air pressure system-wide to work around poor air system design, which wastes energy without obvious reliability impact. Over years of operation and staff changes, original setpoints and practices often get lost or modified. Our assessment approach identifies these hidden inefficiencies by comparing current operation against theoretical minimums, manufacturer recommendations and industry best practice, helping quantify the 'size of the prize' available.

How can over-processing persist in a plant without being detected by normal operational monitoring?

Under-processing is immediately visible because system alarms and product quality checks flag the problem. Over-processing, however, causes no obvious operational failures—production still meets specifications and throughput appears normal. The only impact is the cost increase noticed by the accounts department, often attributed to other factors. Without periodic energy audits and bottom-up analysis of equipment operation, over-processing can continue unnoticed for years. This is why we recommend establishing clear links between energy consumption and production activity, measuring actual operating conditions against requirements, and documenting what changed when anomalies appear. Making these efficiency losses visible enables management to prioritize addressing them.

What does Northmore Gordon assess when evaluating current plant energy efficiency?

We use three complementary assessment techniques. First, it calculates the minimum theoretical energy requirements for the process—the absolute lowest energy needed to achieve the required output. Second, it compares current operation against the manufacturer's recommendations for installed equipment. Third, it benchmarks performance against industry best-practice standards for similar processes. By applying all three approaches, the assessment identifies performance gaps and quantifies how much efficiency improvement is realistically available. This 'size of the prize' analysis helps management understand how much effort and investment to direct toward optimization. The approach also distinguishes between equipment capability, proper equipment application, and how staff are actually operating the systems.

Why do operator decisions about sequencing and controls have such a significant impact on plant energy efficiency?

Despite sophisticated automated control systems, many operational choices remain manual—operators and maintenance staff decide the sequence in which compressors or refrigeration systems run, adjust pressure setpoints, and modify control logic to solve immediate problems. These human decisions can easily result in inefficient operation without compromising reliability. For example, running refrigeration compressors in an inefficient sequence or maintaining higher compressed air pressure than technically necessary. Our approach is to establish the most efficient sequencing and control settings based on the characteristics of installed equipment, validate them through testing and measurement, then lock in those settings by restricting operator ability to make ad-hoc changes. This ensures efficiency gains persist despite staff changes and competing operational pressures.

Can a plant operate reliably while hiding significant energy efficiency problems?

Yes. Reliability and efficiency are not equivalent. Plants can run reliably while operating inefficiently because compensating settings mask underlying problems. For instance, raising compressed air system pressure throughout a facility to work around poor design or leakage issues maintains reliability but wastes substantial energy and reduces system capacity. Similarly, heating or cooling setpoints may be increased to compensate for insulation problems or equipment faults. Over years of operation and staff rotations, original design specifications and setpoints get lost, replaced by practices that achieve acceptable output but at inflated energy cost. Our investigation approach separates operational reality from design intent, revealing where reliability is being achieved inefficiently. This distinction is crucial because addressing the underlying problem—fixing leaks, improving insulation, repairing equipment—often delivers better outcomes than simply raising supply pressure or temperatures.

Why is optimizing existing plant often a cost-effective energy efficiency strategy?

Optimizing existing plant typically delivers the cheapest energy efficiency improvements with the highest returns because it requires minimal capital investment compared to equipment replacement. Energy savings often come from addressing operational settings, fixing underlying problems that have been masked by compensating practices, eliminating unnecessary demand, and improving maintenance. Many of these improvements involve 'the little things'—adjusting sequencing, reducing idle consumption, fixing leaks, improving controls—that cumulatively deliver substantial savings without disrupting production. We focus on identifying these opportunities through systematic assessment and working with operational staff to fine-tune industrial systems. Because the changes are often low-cost and reversible, the investment risk is minimal, yet the payback can be very attractive, making optimization a priority before considering capital-intensive equipment replacement.

How does measuring energy consumption against production help identify hidden efficiency problems?

Linking energy data to production metrics reveals whether consumption is proportional to output or whether hidden inefficiencies exist. For example, if a facility produces the same volume but energy consumption varies significantly between periods, this indicates operational variables—like compressor sequencing, pressure settings, cooling load management, or equipment idle time—are affecting performance. Monthly bills alone won't reveal these patterns because they aggregate multiple effects. Our approach uses interval metering and production records to establish the expected relationship between energy use and activity, then investigates deviations. This method helps distinguish between legitimate increases from higher throughput versus inefficient operation. It also reveals opportunities to reduce demand during periods of low production and identifies whether 'normal' consumption levels are actually necessary or simply habitual.

What role does measurement and verification play in ensuring energy efficiency improvements are maintained?

Once efficient operating practices are established and equipment is optimized, measurement and verification confirms that improvements are actually achieved in live operation—not just in theory—and that they persist over time. Without ongoing monitoring, operator changes, equipment drift, or subtle control modifications can erode gains. We recommend establishing clear baseline conditions, documenting what was changed, then regularly reviewing performance indicators to check whether consumption remains aligned with expectations. When unexpected changes appear, investigation can identify whether they reflect operational changes, equipment problems, or other factors needing attention. This ongoing discipline transforms a one-time assessment into sustained efficiency performance, ensuring that optimizations become part of standard plant operation rather than temporary improvements that fade over time.