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Don't assume your energy spend has to be on a constant upward curve. With accurate information and effective approaches, you can cut it.

Situation

The sustainable use of energy looks set to become a key leadership issue for organisations. This applies both in the heavy consumption sectors and to service industries. Nor is it just a question of cutting costs. Now all businesses have to work in a new dimension of 'corporate citizenship' where taking environmental responsibility is increasingly important.

Complication

How much do you know about the real reasons for your energy consumption levels? Research and experience confirm gaps in senior management knowledge in several significant areas.

Often, businesses have no well-defined energy Key Performance Indicators (KPIs) in place. It is common to find a lack of rigorous review of spend and usage trends. Poor consumption practices - including maintenance - are not addressed. Overall energy optimisation is not tied to productivity and throughput. Communication of energy optimisation goals and expectations is poor. And departmental and individual accountability for energy consumption and reduction is not clear.

Resolution

What's the insight? The current situation isn't inevitable. Industrial and commercial operations don't have to consume uncontrolled and ever-increasing amounts of energy to prosper and grow.

Lower energy consumption – made in Japan

Japan has created an industrial culture that puts energy conservation at its heart¹. Compare and contrast with the situation in the US². The good news however is that Japan's success is transferable. But, to achieve similar results elsewhere, senior management needs to embed a true culture of energy conservation.

¹ According to the Paris-based International Energy Agency, Japan consumed half as much energy per dollar's worth of economic activity as the EU or the US - and one eighth as much as China and India - in 2005.

² The United States Department of Energy calculates that "on average, 35% of energy (utilised in industrial energy systems) is lost - nearly 6 quads of energy every year. As much as 1.6 to 3.2 quadrillion British thermal units (Btu) could be saved by improving efficiency and reducing energy losses ..."

Energy over-consumption – the implications are even bigger than the costs

Typically, an industrial operation with high, and constantly growing, energy bills will display other symptoms. These include high overtime rates and high spending with external contractors, together with high raw materials costs. Usually, there will also be fluctuations in production output levels and product quality. All these symptoms strongly suggest the operation is not being run in the optimum state: steady and stable.

Reactivity is built-in

Many industrial manufacturers now face a negative cycle. Infrastructure is ageing. There is pressure to reduce capital expenditure and maintenance programmes. And the imperative is to protect and enhance shareholder value. One of the impacts is “built-in reactivity”. Even basic preventive maintenance and support tasks are being cut to the minimum. Work is carried out on a stop-start, running repairs basis. Asset integrity and reliability inevitably drop. Costs go up. Energy efficiency goes down.

A lower energy consumption state: more stable and more productive

Constantly powering down and then powering back up again is less safe and less cost-effective than running in a steady (and typically lower-energy) state. The running repairs approach to production plant causes profound disruptions and fluctuations in output and safety. These can even result in human and environmental disaster. And, in every case, the “on off” approach of frequent interruptions is power-hungry and energy-wasteful.

So just negotiate a better energy deal?

Increasingly, it is only possible to cut supply side costs in areas with a competitive landscape for power supply. You can't negotiate a better deal if the cheap energy is no longer there to be had.

Understand why you consume so much energy (as well as how)

You need to develop a dashboard of management information that gets beneath the top line fact that your energy bills are high. Build an accurate picture of current operational performance. Gather baseline data for future plans. And use the results of analysis to define your real potential for reductions in consumption. You will rapidly create the pre-conditions for a lower energy state operation.

Achieving an energy efficiency culture in practice

Experience confirms there are three distinct levels of effort and effectiveness in energy management.

Energy efficiency - level 1

The first level involves repairs, improvements and adjustments. Importantly, it also provides quick wins. These motivate workers. They show that changes in behaviour and process can make a difference.

Energy efficiency - level 2

The next level of activity creates the foundations for long-term energy efficiency.

It includes tasks that improve data transparency on energy usage and cost. At the second level you can improve your understanding of the factors that drive your energy inefficiency. You can define roles, responsibilities and authority for energy management. And you can identify and implement process changes to improve energy efficiency.

Energy efficiency - level 3

The final and most challenging level establishes a long-term, process excellence-led approach. It seeks to change behaviour and culture to create sustainability and establish an enduring platform for continued energy management improvement.

Six months to make a difference

You can make a measurable and positive difference to your energy consumption in just six months.

The first four to eight weeks involve gathering and analysing data and implementing quick win activities to capture the “low hanging fruit” of energy saving.

The next four to eight weeks are used for design and implementation of a management system to identify additional opportunity and support behaviour change.

The next period then uses the system to aid culture change and drive maximum results.

Then, during the final period, any external support pulls back while the organisation itself drives the process, with further coaching and auditing to encourage success.

What are you likely to discover?

A deep dive into your current energy consumption and its causes will likely reveal a great deal about your operation. The main insights will come in three key areas: management, measurement and awareness.

- **Management**

The most important, and typical, gaps in management approach include the following. There is no single accountability for energy consumption within facilities. There is no named person assigned responsibility for reviewing utility bills and usage. Rate structures are not available (and are not understood in any case). And the prevailing mindset is that electrical demand is not controllable.

Because it is not considered to be a factor within anybody's control, energy usage is not routinely evaluated.

- **Measurement**

There is often a factual black hole around energy consumption data, made worse by the following factors. Major energy consumption equipment and systems are not even metered. And energy Key Performance Indicators - KPIs - are not defined, monitored or measured. As a result, overall energy efficiency is not tied to production levels (as units of energy consumed per unit produced).

- **Awareness**

People must become involved. And involvement requires awareness. Often, awareness is suppressed by the fact that no energy conservation expectation is communicated to facility employees: nobody clearly tells workers that saving energy is both a good thing to do and a real possibility. Poor consumption practices are not highlighted and therefore are not addressed. Poor maintenance (including preventative maintenance) of major energy consumers is common. In this culture, even major energy losses are not identified.

What can your organisation do?

With a committed and structured approach, reduced scale and increased predictability of industrial energy consumption is possible. The foundation of positive change is application of the conservation fundamentals. Understand the situation as it is today in reality and get the basics right. This will enable planned consumption, where you set minimum theoretical energy requirements and report regularly on actual consumption.

The next key migration is to controlled consumption, including a focus on start-up and shut-down procedures as part of maintaining a steady state.

Once control is established and maintained, you can then implement maintenance programs to help move toward pro-active energy management. These include requirement forecasting and demand management. By working through these stages and their specific activities, world class energy conservation becomes realistic.

What is the size of the prize?

Expect measurable improvements in the key areas of operations and maintenance, production, work environment, the wider environment, and, of course, cost savings.

- **Operations and maintenance**

The operational measures you take as part of energy conservation will result in reduced maintenance costs and reduced purchases of ancillary materials. You will also see reductions in water consumption and maintenance labour costs.

- **Production**

The 'steady state' approach to production, among many benefits, will yield reductions in product waste and increased production. Expect also to see improved product quality, together with increased production reliability and shorter process/cycle time.

- **Work environment**

For people on the shop floor, a major personal incentive to adopt energy saving behaviours is the improvements those behaviours bring to the work environment.

- **Environment**

The 'green credentials' of every industrial operation are rapidly becoming as important as productivity and profit. A reduced energy consumption approach typically reduces hazardous waste and dust emissions. It also cuts waste water output and reduces CO, CO₂, NO_x and SO_x emissions.

- **Cost benefits**

Of course, one of the greatest attractions of reduced energy consumption is the money saved. Expect to see costs benefits in three key areas:

1. Achieved rebate/incentive (one-time)
2. Reduced/eliminated demand charges (ongoing)
3. Reduced/eliminated equipment rental costs

Conclusion

Companies that consume less energy are typically more efficient, more productive and more profitable. They also benefit in brand profile terms from the hugely positive PR that being a good corporate citizen creates.

All the benefits are there to be had. Today's bills can even become the day after tomorrow's revenue source: many previously wasteful industrial energy consumers are now 'exporting' heat and electricity to their neighbours. So, use your latest energy bill as a spur to taking positive action. And don't let anybody tell you it's not possible! When it comes to industrial energy consumption, you can cut it!



About the Author

David Smith, Vice-President, Energy Sector, EMEA

Over his thirty years in business development in professional services, David has led the growth of a significant number of client relationships across the globe – from the North Sea to the North Slope – and across the full span of energy industry operations. David’s relationships with clients – at super majors and independents alike – have been the platform for the delivery of measurable and significant value to Celerant’s clients in the industry. Over the past two decades, that delivered value has totalled in excess of \$1 billion.



About the Author

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Barry Samria is a Vice-President at Celerant Consulting. He leads Celerant’s Americas Energy Sector, working with Independents, Majors and Super Majors alike.

Prior to taking on this role, Barry was in charge of client delivery as Vice-President, Operations. During his ten years in consultancy, Barry has undertaken a wide range of Chemicals and Energy Sector assignments in Europe, the Americas and Asia that have spanned the industry value chain and have included implementation programmes in upstream, midstream and downstream. The majority of these assignments have utilised each of Celerant’s core capabilities delivering significant value for each organisation that Barry has worked with.

Barry holds an MSc in Economics from London School of Economics, UK and earned a BSc in Business Studies from the University of Surrey, UK.

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