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Posted: Aug 26, 2014 | **By:** Aspen Technology Australia Pty Ltd
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Ease the squeeze on profitability with effective energy management

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Reducing energy usage and associated greenhouse gas emission is a widely recognised business requirement for many process manufacturers and delivers tangible business benefits. Less energy consumption is a key factor for commercial profitability and environmental compliance. However, if energy management is a significant objective with clear benefits, why are some manufacturers much better at it than others? For example, the least efficient refinery may consume as much as twice the energy required by the most efficient refinery to produce the same products (eg, gasoline, diesel, etc) from the same feedstock (crude oil). This discrepancy raises natural questions - Why does this happen? What factors differentiate the best from the worst? How can refiners close the gap?

The answer is that effective energy management is not a one-off project or one area of the business. Energy management needs to be an integral part of managing and operating the plant to achieve optimum levels of energy while meeting production goals. However, many refineries and chemicals companies fail to recognise that energy management needs to be an ongoing commercial priority. The ability to visualise and analyse actual plant performance in real time is essential to understand energy usage and emissions and take necessary actions. The notion that energy costs are fixed is a myth. They are a variable entity that can eat away profit margins and even affect plant performance.

By adopting a sustained approach to energy efficiency supported by integrated processes and managed by leading-edge process optimisation software, companies have the ability to control and significantly reduce energy expenditures. Efficient savings made across the enterprise will positively impact plant profitability and, when margins are squeezed, this capability could mean the difference between commercial success and commercial failure.

Understanding where you are today

In the process industries, energy is typically the highest operating cost, second only to raw materials. Most chemical or refining processes experience significant variability in energy efficiency as a result of changes in process conditions, different operating strategies and poor control or visibility over wasteful practices.

When pursuing a comprehensive energy management program, a basic starting point is to ask are you doing all you can to drive down energy costs? Many companies suffer from a lack of focus with regards to controlling energy usage because other priorities often take precedence. As a parallel example to illustrate this point, we observe what the

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process industries have accomplished in health and safety over many years. Health and safety has become the most important discipline in the process industries to safeguard both personnel and the plant. Standards have risen dramatically over the past few decades and this is now seen as a vital practice that is embedded within the overall running of the operation. Therefore, what actions can process manufacturers take to elevate energy management to the same priority level and bring an energy management focus to everything that is done?

Plant energy management itself can be divided into two key areas: first, the reduction of energy demand and consumption in production processes; second, the reduction of the supply costs of the energy used to meet the energy demand. An effective energy management plan must address both sides of this energy equation simultaneously and from the initial planning of the operations to the minute-by-minute safe operation of the plant. Energy management must be performed by all key stakeholders and these should, in turn, be given the right tools and procedures for the job in hand.

Software supports effective energy management

In much the same way that all personnel need to be involved in energy management, companies also need to use every available means to improve energy efficiency and reduce costs. Software technology can make a big contribution in helping companies to design, plan and operate their production facilities in the most energy-efficient way.

At the first step in the life cycle of any production facility, software systems can help the designer to optimise the plant's design from an energy-efficiency perspective. Many case studies have demonstrated that energy-efficient processes cost no more to build than inefficient ones because an energy-efficient process will require less hot utility (steam, fuel, etc) and also less cold utility (cooling water, refrigerants or air cooling). As a result, the utility equipment designed to service the production units, such as process heaters, heat exchangers and steam boilers, will be smaller and, therefore, cost less to build and operate. In this respect, the ongoing reduced operating cost is just a bonus. Energy-efficient companies recognise this and now build energy reviews into each step of their design process.

Once the plant has been built, planning systems can help define both the optimal energy use and also schedule the utility system's operation to closely match the requirements of the production units, thereby reducing costly and unnecessary standby operations and ensuring the lowest cost purchase of external utilities. During plant operations, real-time software systems can both monitor the current plant operation against target, highlighting any deviation, and provide timely actionable advice on the optimal changes that could be made and the value of making these changes on user-friendly interfaces, such as DCS screens or a web browser.

For energy-intensive process manufacturing sites, such as an oil refinery, petrochemical or chemical plant, investment in software should not be seen as a cost barrier. In fact, companies of all sizes have experienced enormous energy cost reductions by using energy optimisation software solutions. According to a recent Gartner energy management report, one chemical company stated, "Five years ago, it was difficult to make the case with senior executives, even when improvements with good internal rates of return were identified. Today, senior leadership is on board and clearly understands that it needs to fund good energy-efficiency initiatives when they come along."

Many companies have successfully implemented AspenTech's aspenONE process optimisation software to achieve best practices for optimising their engineering, manufacturing and supply chain operations. Advanced process control (APC) software is intelligent technology that delivers sustainable, measurable benefits and allows companies to operate their facilities better. APC can increase throughput and improves product quality and energy efficiency, thereby delivering improved financial performance. By applying aspenONE solutions to the life cycle of production assets, clients can typically save 10-30% energy cost while reducing 10-20% capital cost investment.

Prioritising energy management

Energy efficiency is fundamental to achieving a sustainable business, and reducing energy cost should be a key performance indicator for all process manufacturers. As global energy demand continues to increase and environmental regulation is tightening, initiatives to optimise energy efficiency are essential. The difference between those companies that are energy efficient and those that are less so is the commitment to incorporate energy efficiency into everything they do. Consequently, this approach will help differentiate the organisation with best practice and close the gap on the competition.

An effective energy management plan must be tackled holistically and integrated across all aspects of the business. To be truly energy efficient, a clear action plan elevates the importance of energy management, defines the targets and timelines, tasks the workforce to execute the plan efficiently and maintains controls for the operation.

Equipping key stakeholders with leading-edge software delivers long-term benefits to help reduce costs and improve the overall performance of the plant. In today's dynamic and competitive market, energy management is a key way to ease the squeeze on profit margins. The consequence of ignoring energy costs could be the difference between being commercially robust and profitable and not being in business at all.

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