How an energy management plan helps your bottom line

An effective energy management plan can add value for energy intensive industries, such as chemicals, refining, manufacturing, pulp and paper and metals, by enabling them to manage and optimise their energy and utilities usage. While many companies have created in-house tools to monitor and optimise the supply and use of energy and utilities, these do not enable the economic integration of all business processes. AspenTech's Peter Caro talks to PACE about the best ways to optimise your processes with the lowest cost operations, while also maximising profitability.

PACE: What are the key considerations when implementing an energy consumption audit of a manufacturing plant? What are the possible outputs?

Peter Caro (PC): 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. Essentially, the key areas of consideration are as follows:

- Overall operating conditions to limit energy costs
- Maximising production (i.e. not just increasing quantity, but also producing the right product like petrol or diesel)
- Staying within operating constraints (i.e. CO2 emissions, water temperature, gas or electricity consumption)

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.

Peter Caro

Manufacturers must capture opportunities to reduce energy use and emissions and at the same time increase bottom line profitability. Up to 30 per cent of capital equipment impacts some 90 per cent of energy used in most oil refining and petrochemical processes. Major savings are possible, however, by using appropriate analytical and design software alongside suitable energy-saving technologies. This strategy should form best practice for plants wanting to optimise economic performance through production efficiency utilising recovered energy.

Improving operational energy efficiency saves operating costs and most initiatives will have discernible business benefits. An effective energy management plan must be holistic, addressing both sides of the energy equation effectively by monitoring and optimising the supply and demand sides simultaneously. The most effective programmes should include a rigorous model of the utility system, as well as continuous improvement capabilities. By implementing an energy management programme with elements focusing on both supply and demand, organisations can achieve significant returns - sometimes over 15 per cent of their annual energy costs with attractive payback on capital invested.

PACE: To what extent can an energy management plan be implemented in an existing working plant?

PC: Effective energy management is not a one-off project or one area of the business. It needs to be an integral part of managing and operating the plant to achieve optimum levels of energy, while meeting production goals. However, many existing refineries and chemicals companies fail to recognise that energy management needs to be an on going commercial priority. The ability to visualise and analyse actual plant performance in real-time is essential to understanding energy usage and emissions and take necessary action. 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 can control and reduce energy expenditures. Efficient savings made across the enterprise will positively impact plant profitability and, when margins are squeezed, this could mean the difference between success and failure.

For many existing plants, energy is the highest operating cost, second only to raw materials. Most chemical or refining processes experience

variability in energy efficiency because of changes in process conditions, different operating strategies, poor control and visibility issues over wasteful practices. When designing the plant, engineers expect specific conditions. However, during the life of the plant the conditions will vary, so establishing the right operating parameters is vital to optimising this process.

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 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.

Planning systems can help define both the optimal energy use of a plant 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 monitor the operation against target, highlighting any deviation. These can also provide timely advice on optimal changes and the value of making these changes on user-friendly interfaces, such as DCS screens or web browsers.

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 software solutions for energy optimisation.

PACE: How can an energy optimisation solution help manage the consumed energy across the plant? Does it take into account energy cost per source and calculate utilities forecast based on actual and future production demand?

PC: Energy reduction and energy efficiency is increasingly a priority for process industry companies working on driving enhanced profitability and protecting the environment. Together, these developments are adding complexity to the industry and driving demand for solutions that can deliver process optimisation and operational efficiencies. For petrochemical and refinery plants, investment in software tools is essential to manage and optimise the operation.

Many companies have successfully implemented AspenTech's aspenONE process optimisation software to achieve best practices for optimising their engineering, manufacturing and supply chain operations. aspenONE Engineering is a leading suite of software products focused on process engineering and design optimisation. Various process modelling analysis and design tools, such as Activated Energy Analysis, Economic Analysis, Rigorous Heat Exchanger Design and Rating and Aspen Fireheater, are integrated and accessible through process simulators Aspen HYSYS and Aspen Plus.

By applying aspenONE solutions to the lifecycle of production assets, clients can typically save 10-30 per cent energy cost while reducing 10-20 per cent capital cost investment.

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