

A COO's energy efficiency primer: responses to five common myths

In the course of serving diverse clients at manufacturing sites around the world, we have heard similar objections on energy efficiency. We created this primer to help dispel some of these myths and prepare COOs who are tackling this important topic.

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Some companies are capturing valuable savings in operating costs by improving energy efficiency. Yet many are not. In our work across a wide spectrum of manufacturing—from automotive to steel to packaged goods—we've come to understand that gaining energy efficiency requires first appreciating the value at stake, then understanding the nature of the energy contribution and all of the factors around it, and finally devising the solution based on the true metrics, whether they be marginal prices or normalized performance indicators. Only by appreciating both the commercial and technical aspects can companies gain energy efficiency without burdensome processes or costly investments. But first, COOs should understand some common misconceptions about energy efficiency.

Myth 1. "Energy is cheap."

Response: *Don't look at price, look at cost.*

While energy may be cheap relative to other costs, in fact energy costs are a sizeable portion of the profit and loss statement of companies in many industries, even in countries with relatively low energy rates. In regions with high labor cost, even with cheap prices—gas priced at €3 per gigajoule and electricity at €40 per megawatt hour—the energy to power a hot strip steel mill producing four million metric tons of steel per year still represents a cost three times greater than that of direct labor, and one-and-a-half times greater than maintenance labor and direct labor combined.

Rather than regarding energy as a relatively unimportant cost, companies need to look at their annual energy cost as a variable cost they can reduce by up to 10 to 15 percent.

Myth 2. "Energy is not core."

Response: *Designate clear responsibility for managing total energy efficiency.*

As a significant cost, energy expended on core and non-core activities deserves the same attention as core topics such as quality and production scheduling. Yet even when it makes up 10 percent of total costs companies often outsource the management of energy to utility or facility providers. We've observed that the companies who benefit from energy efficiency tend to manage energy use with a clear demarcation of responsibility within the organization. Even if they do outsource, these companies ensure that efficiency improvement goals are part of

the provider's contract and they reject high fixed-cost items. Moreover they also tackle non-core energy activities. These often make up about 30 percent of the total energy bill and can be a source of significant inefficiencies.

Companies should put in place the right in-house organizational structure with clear responsibilities for all energy use—core and non-core—and manage energy efficiency, whether they outsource or not.

Myth 3. “Energy impact is difficult to measure.”
Response: *Manage for performance.*

Managers often express concern about the number of meters they might need throughout a plant in order to see the impact of any improvements in energy efficiency. While a good measurement system helps, a good performance measurement system built on the proper set of indicators and supported with regular performance meetings is fundamental to success.

One way to think about indicators is that a leading KPI is one that your engineers can act upon on an ongoing basis; in contrast, a lagging KPI is something that managers review at the end of a shift, day, or month. Status indicators on the other hand operate over a longer time horizon as they report a gradual deterioration of equipment, such as seawater pump efficiency.

Carefully chosen leading indicators for processes (such as temperature ranges or concentrations) shine a spotlight on areas of real opportunity to improve energy efficiency.

Results-oriented indicators that lag, such as gigajoule per metric ton, are helpful for senior management, but they must first be normalized for process factors that have high energy impact such as product mix, production speed and equipment availability (downtime of the line). This normalization will help to make sure that KPIs are aligned with other production goals.

Instead of focusing on measuring energy usage, companies should manage operations for energy efficiency using a variety of leading, status and lagging indicators normalized to production activity.

Myth 4. “The CAPEX never pays back.”
Response: *Pull operational levers to gain efficiency.*

Rather than pulling the lever of machine through capital expenditure (CAPEX), companies can pull the lever of operating parameters (man and method) to improve true energy efficiency. Managers often look to standard technological solutions requiring additional CAPEX, as they are convinced that the main route to energy efficiency is through new or upgraded equipment. In fact, complex manufacturing operations hold a lot of potential for energy efficiency without high equipment costs.

As a first step, many operating parameters such as temperature, flow and pressure can be easily tuned to capture energy efficiency. The key here is in viewing energy efficiency more holistically, so that factors such as concentration levels produced in a previous step don't get in the way of energy efficiency in a succeeding step.

When we look at countless studies over the last five years we see that with a payback threshold of three years, about one-third of savings can be achieved without additional CAPEX, around one third with a small CAPEX and about one third with a large CAPEX. Furthermore we note that large, off-the-shelf retrofit projects rarely pay back over three years.

Companies can improve overall energy efficiency, without burdensome investment, by pulling levers across the whole system.

**Myth 5. “Energy efficient drives don’t make a difference.”
Response: *Focus on energy—not on electricity.***

Three-quarters of global energy is actually used as heat¹, in forms such as steam, and often up to 30 percent of electrical energy is used to provide cooling media, so companies should focus on how to make heating and cooling processes more efficient. Given the rare need for electricity as an input, such as in processes like chlorine electrolysis, companies should focus on the drivers for mechanical processes where there is the most improvement potential.

A classic example is the case of an oversized pump, where the easy remedy might be to treat the mechanical issue of the pump with an electrical solution, i.e., by installing a VFD (variable frequency drive) motor. While the VFD would capture the energy loss caused by excessive pressure, it would not capture any loss due to the inefficient running regime of the pump. Downsizing the pump to recover both the pressure loss and enable an efficient running regime is both a better solution and one that requires less capital.

Companies can attain better energy efficiency by looking more closely at the underlying heating and cooling processes and the mechanical processes delivered by the equipment.

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Energy is often a substantial cost of manufacturing that can be reduced through both performance management and cost-effective technical improvements, especially if these are focused on heating processes and mechanical equipment. In a resource-constrained world, COOs should increasingly look to energy efficiency as an important way to address variable costs ■

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¹ Source: Enerdata