

Continuous Energy Improvement brings efficiency to the next level

THE FUTURE OF EFFICIENCY
FOR BUSINESSES



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An Overhead Cost within Reach

At most facilities, everyone consumes energy but only a few are accountable for the costs incurred. Continuous Energy Improvement (CEI) is a new model in energy efficiency which assures, in effect, that energy efficiency and conservation become an integral part of the business culture, and that controlling energy costs is important to everyone. The CEI model goes far beyond capital upgrades – which have traditionally been the major driver of business energy efficiency initiatives – and applies innovative strategies to achieve process improvements, update maintenance cycles, and increase employee engagement. This holistic, long-term, and data-driven approach enables businesses to fully understand how they use energy, and to also generate an actionable “roadmap” for effectively managing this critical component of their production costs against a variable landscape.

Key Recommendations

- Analyze energy consumed at every stage in the production process
- Use data to set long-term energy goals
- Create a culture of engagement among employees
- Continually seek opportunities to achieve your energy goals

Measuring and Evaluating Energy Costs in a Variable Environment

Many organizations strive for continuous improvement across the full range of their operations, including safety, productivity, and quality. Similarly, many businesses are taking strong steps to integrate data as a key driver in setting strategic goals and informing tactical decisions. These efforts are influenced by increasingly complex and rapidly changing business conditions which necessitate that we all access and analyze a profusion of information, every day, to

achieve success and thrive. In other words, no intelligent decision can be made in a vacuum - and every choice must be subject to regular re-evaluation, with an eye towards constant improvement.

A common – and faulty – assumption is that it is not possible to control expenses related to energy. This is simply not the case. Energy, like economics, can be divided into two parts: the supply side and the demand side. The demand side is where all businesses can make a difference through thoughtful implementation of energy efficiency technologies and by adjusting their approach, philosophy, and processes to promote energy conservation.

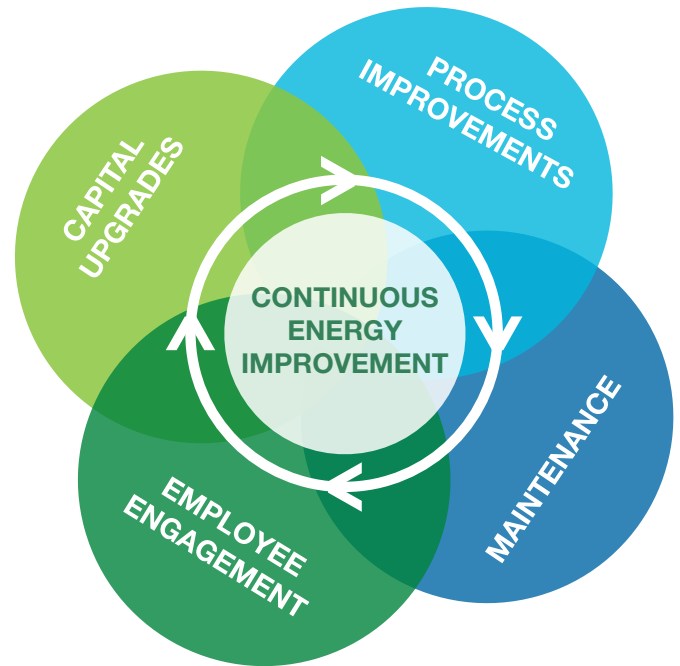
That being said, you cannot manage something you are not measuring. With the price of metering equipment having declined over the past few years, most processes can be monitored at a relatively low cost. A truly effective measurement and management approach requires establishing performance targets, monitoring current status, sharing results with management and staff, and continually taking action across the organization to improve performance over time. Recently, many tools have begun emerging in the marketplace to empower companies to bring this level of energy management and accountability to tracking, understanding, and controlling energy consumption and costs. At Efficiency Vermont, we are one of several leading edge utilities and energy efficiency organizations that have worked to support the adoption of these tools among our customers. The results from program participants have been very positive with demonstrated success in implementing and realizing cost-effective savings from Continuous Energy Improvement (CEI).

How does Continuous Energy Improvement work?

The first step is to understand where a business uses energy in its operations. Most likely areas are support systems like HVAC, compressed air, and motor systems. Another equally important consideration is every piece of equipment that is used to manufacture and process product. Understanding these key areas of energy consumption and how they are impacted by production levels is critical, because it enables a business to look deeper and understand the energy cost per unit of production. On a macro level this is simply dividing the total facility energy consumption by the parts produced during that same timeframe. Truly understanding the factors that affect this cost, though, requires a more granular look at the entire production process and the energy consumed by each and every step. Failure to dig deeper and calculate a product's true energy cost can have a significant impact on marginal cost structures.

Understanding all the inputs to a process - whether labor, raw materials, or energy - allows us to step back and consider what can be done differently. Some improvements may indeed

require a capital expense to upgrade older and inefficient equipment. Examples of commonly-upgraded equipment include HVAC systems that supply cold air or water to a space; the replacement of old, inefficient motors; or swapping traditional throttling control valves for variable frequency drives capable of adjusting pump speed and output.



The four components of a Continuous Energy Improvement approach can be applied by any business to take control of energy costs.

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Beyond equipment upgrades, though, there is a massive - and largely untapped - potential for improvements that are small in scope and cost but have a huge impact on the energy consumption of a manufacturing process. This can be as simple as engaging with employees to encourage them to be mindful in shutting off equipment rather than allowing it to idle during times of no production, or asking a maintenance technician to replace dirty air filters on a regular basis. Both of these low-cost actions offer huge potential for improving the overall efficiency of a facility's manufacturing process.

An incremental improvement approach can be applied to the activities of purchasing agents responsible for acquiring equipment spares in case of breakdowns. Process downtime can be extremely costly, and maintaining a ready supply efficient spares for quick repairs will generate significant savings over the long run, even when compared to the higher upfront cost of efficient equipment. It is also extremely important to be conscious of capital equipment life cycle costs

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when bid against cheaper, lower efficiency choices, and to build this consideration into the formula for all purchasing decisions.

The final and critical piece of the CEI puzzle is in some ways the most challenging to tackle. Effectively implementing a CEI program requires that a business fully engage its employees and make efficiency and conservation central to its culture. This means ensuring that they not only share in the success of energy efficiency projects, but that they are asked to contribute

insights based on their unique knowledge of facility operations. Ultimately they begin to understand the impact that their activities can have on energy costs, and they become more invested in the results of efficiency and conservation initiatives. Over time, employee engagement can become a key driver of continued improvement, providing new and valuable ideas that encourage a deep commitment to efficiency, and help set a long-term vision of success.

It is important to emphasize that the four components of the CEI approach (capital upgrades, process improvements, maintenance, and employee engagement), must be pursued in a coordinated and deliberate way in order to be most effective. There are many great resources in the marketplace that have a role to play in enhancing the efforts of a business that is pursuing different facets of CEI. This could mean partnering with a company that helps dig deep into energy data analysis, or one that can offer insights on human resources policies to encourage employee engagement. These efforts would undoubtedly have merit, and help generate energy savings. At the end of the day, though, the strength of CEI lies in the fact that it is integrated and long term, with each individual effort helping to promote progress in other areas - and all leading towards an overall goal. In working with our customers to apply its principles, Efficiency Vermont has found that the total impact of CEI is much more than the sum of its individual parts.

Energy Efficiency: Taking it further than ever before

In recent decades, businesses have had to react to massive shifts in technology and culture in order to survive. These changes, though jarring, can also enable a nimble and efficient business to achieve incredible success. A new profusion of energy data presents an enormous opportunity for businesses to take full control of their energy costs and lay a foundation for long-term growth. The CEI model can guide any business in articulating - and achieving - ambitious energy goals that will help set them apart in the marketplace of the 21st century.



Greg Baker has more than 10 years of experience in the energy efficiency field, working almost exclusively with large commercial and industrial customers. He has held positions as an engineer, senior energy consultant and key account manager at VEIC. This unique combination offers a deep and thorough understanding of energy efficiency implementation in the commercial and industrial market sector. Greg holds a degree in Mechanical Engineering and Applied Mechanics from the University of Pennsylvania, as well as certifications in Certified Energy Manager (CEM) and Certified Energy Auditor (CEA), and is a member of the Association of Facilities Engineers (AFE) and the Association of Energy Engineers (AEE).