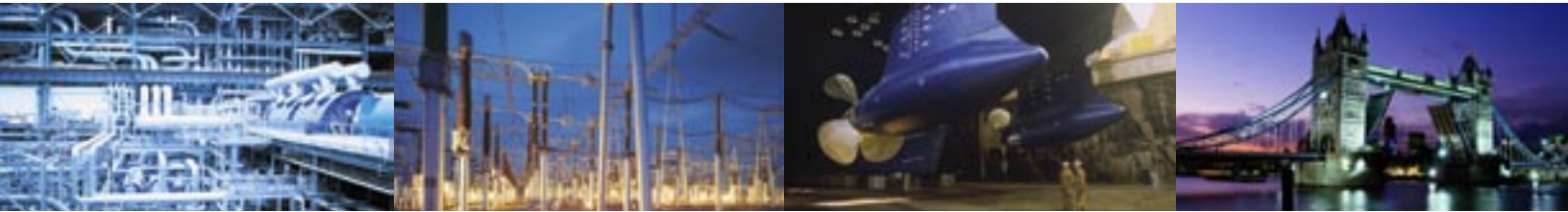


Energy Efficiency – The Other Alternative Fuel



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Proven methods for industry to reduce energy consumption and environmental impact are already at hand. These cost-effective solutions promise substantial return-on-investment now and in the future, without sacrificing performance or quality.

For most companies and organizations, the answers to maintaining a competitive edge in this era of rising energy costs are readily available. By applying a suite of cost-effective power and automation solutions from technology leaders like ABB, these facilities can achieve substantial energy savings today without waiting for the “alternative fuels” of the future.

Through these continuous improvement methods, existing plants and factories can systematically reduce both energy requirements and their impact on the environment. Such improvements will become increasingly valuable as fuel costs continue to rise due to today’s global supply and demand dynamics, and pressures grow for environmental compliance. Products that deliver equal or greater performance while reducing energy consumption will bring greater flexibility in overcoming these pressures.

By selecting proven products and operations strategies that feature built-in energy savings, new plants and factories can start with highly efficient production and immediately begin reaping the rewards of lower costs without sacrificing functionality. Existing plants can achieve the same benefits with techniques for asset optimization that deliver greater performance from installed systems.

A Global Initiative Leads To Energy Savings

Some years ago, as part of a global initiative to reduce greenhouse gas emissions, ABB began to concentrate on designing products that reduce energy usage and minimize environmental impact. To achieve this goal, an entirely new approach towards product design and assembly was required – taking into account the materials used to manufacture products, their energy costs during operation, and even their disposal at the end of the product life. Functionality needed to be comparable to or exceed existing products, as did ease of use, maintenance and replacement. The result: A broad range of energy-saving products that are competitively priced while providing a measurable return on the power and automation investment.

Complementing these products are operations strategies that were developed to address the issue of how products can achieve fuel efficiencies in a systematic and controlled manner.

A Measurable Impact on Efficiency

This global initiative has become increasingly important as energy costs continue to rise. Unlike homes that can achieve some degree of energy conservation by sacrificing comfort, most industrial plants rely on very specific equipment and production processes. Consequently, plant energy conservation must be found in the form of energy-saving products that don’t restrict or otherwise hinder production output or quality.

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Likewise, operations strategies dedicated to energy efficiency can have a profound impact on plant energy demand without compromising output. Most machinery is sized and installed with the emphasis on its applicability to the production process at critical running times. Often, energy saving opportunities can be uncovered through a comprehensive audit such as those developed by ABB. For example, the machinery in one facility was used just a few minutes during a particular production stage. But the machinery continued to run disengaged for several additional hours

simply because control strategies to synchronize it with the production schedule were not in place. After a detailed performance audit, relatively simple adjustments to the plant’s distributed control system allowed demand-based operation of the machinery.

In another plant, air flow to the steam boilers was not optimized to account for changes between several alternative fuels. Combustion performance was compromised, and more fuel than necessary was sometimes burned. A new control scheme based on real-time performance simulations with varied fuels provided the capability to quickly optimize combustion mixtures under varied conditions.

In each instance, annual fuel and efficiency savings were realized in the hundreds of thousands of dollars.

Efficiency in Asset Use

ABB operations strategies for plants and factories are the result of many years of learning the customer’s business and developing a “best practices” approach to facility optimization. These strategies range from potential savings areas that can be readily observed, to sophisticated software simulations that help determine whether a plant should add new production capacity to increase output or use alternative ways to run existing production lines to achieve higher output objective.

Advanced diagnostic software is now available that uses artificial intelligence techniques to monitor irregularities in equipment performance. These diagnostics are linked directly to central control systems and can indicate whether anomalies are isolated or are symptomatic of a pending mechanical problem. The software can even forecast when corrective maintenance will be required, replacing many routine physical inspections with remote diagnostics. This approach offers big potential savings. Prior to the installation of remote asset management software, one ABB customer estimated that some 60% of the plant maintenance visits resulted in no action – representing instead either routine checks or responses to “false alarms.” With the software, the number of these visits has been dramatically reduced.

Efficiency of Motion

Energy efficiency is also a byproduct of research and development programs dedicated to optimizing the efficiency of motion. For example, ABB is one of the world’s leading manufacturers of industrial robots that work with consistent, programmed precision for everything from making vehicles to packing chocolates. Tooling and synchronizing of multiple robot tasks has long been a costly challenge. Today, as many as four robots can be synchronized from one ABB controller, producing

a virtual ballet of motion in which one robot holds a work piece in various orientations while others install multiple subcomponents. Efficiency of motion helps to ensure that when energy is used, it is used wisely.

On the seven seas, a unique modular podded propulsion system from ABB now replaces a ship's standard rear propeller, drive shaft and rudder to offer a new dimension in maneuverability. The arrangement features a drive train consisting of self-powered pods mounted outside the vessel that swivel like giant outboard motors, providing both freedom of movement and lower fuel use. A typical luxury cruiser can save up to 40 tons of fuel weekly with this approach.

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Variable speed drives, which closely regulate speed and torque for electric motors, can save energy by precisely matching the output of pumps, fans, conveyors and similar systems with real-time demand. ABB calculates that its global installed base of variable speed drive systems currently save the equivalent energy of ten average power plants, while eliminating more than 60 million tons of greenhouse gas emissions annually. With only five percent of the world's electric motors equipped with such drive systems today, the potential for additional savings is great.

Even the movement of energy itself can become more efficient, illustrated by research that now allows moving large amounts of electric power efficiently to where it is needed without building new power plants. For example, power can be transferred from one power grid to another safely and cost effectively using proven technology such as High Voltage Direct Current (HVDC). This ABB-developed approach reduces cabling costs versus conventional alternating current links, and allows power to travel in either direction to compensate for demand variations.

Energy Efficiency as an Energy Solution

With dramatic surges in fuel costs, procrastination in adding fuel efficiency to existing operations can be an expensive error. Hoping that the current energy crisis is temporary, and that price spikes will eventually become valleys of lower costs, is most likely wishful thinking. Today's crisis has manifested itself through a host of different dynamics.

While yesterday's energy crises were often the ramifications of politics, the situation in 2005 is driven by classic market forces of supply and demand. The thirst for fossil fuels in the developed world is barely quenched by known reserves. Added to this is the growing demand from nations in the developing world, be it Asia, Latin America or Africa, who are putting ever-increasing demands on dwindling energy reserves.

Surely, one can assume that necessity is the mother of invention, and greater demand and less supply will result in new energy resources being introduced. Even if new alternative fuel sources appear promising, they are not a quick fix. It will take years, if not decades, to create substitutes for current fuels. Additionally, chances are good that alternative fuel sources will not bring down the cost of energy at all. Indeed, while alternative fuels may make energy more plentiful in the years to come, it is very likely they will be even more expensive than current fuels due to the highly technical processes required for extracting and processing them.

In the meantime, what can companies and organizations do? They can take control of the situation and install proven fuel efficient products and applications that increase their return on investment in today's economic climate. The technology for achieving this energy efficiency is here today. The products and applications are available, and the expertise from technology leaders such as ABB is in place to bring optimization methods to the plant and factory floor without delay. Investing in energy efficiency will not take the place of searching for new energy resources. It will, however, help industry to blunt the effects of higher fuel prices and develop the mindset that "the other alternative fuel" is already in hand.



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