

Energy and Economics

by B Ferrone

The importance of worldwide environmental change and its ability to affect the quality of life has become widely recognized. Less understood are the future effects that the environmental revolution will have on corporations that design, manufacture and sell products in the 21st century marketplace. The foremost factor in protecting the environment while achieving economic gains will be the generation and conversion of energy.

Over the past decade the world economy has changed profoundly; we are now in a truly global system. International trade has grown rapidly and the ability to change the balance of economic power has been explosive. Today the economic boom can spread from country to country and quickly leave in its path economic recession. The increasing globalization of the world economy is a fact that can no longer be ignored. Global markets are in charge.

Companies must understand that energy is neither created nor destroyed - and this applies to their own processes as well as to universal physics. This means that over a period of time, the sum of energy flowing into a building must equal the sum of energy flowing out. What is created from the use of energy is the ability to do work.

Today global environmental consideration must be given to the way corporations manage operations at the local, national, and now international level. As industry strives to improve its environmental performance, many companies are finding that Environmental Management Systems (EMS) is the key to ongoing improvement. Fancy-sounding policies with no substance, no longer suffices.

On one hand Environmental Management Systems can be viewed as a triumph of technocrats over image makers; but on the other hand, they reflect a growing recognition among stakeholders that performance measures must be oriented to expanding environmental improvements. EMS enables one to measure improvements. If improvements cannot be measured, they cannot be managed.

Environmental Management Systems are an organization's structure of responsibilities, procedures, practices, policies, resources, accounting systems, and other areas that are aimed at minimizing harmful environmental impacts. EMS includes not only the traditional environmental

activities such as pollution prevention, but also the nontraditional activities -- R&D programs, continuous improvement efforts and stakeholder relations.

This approach to environmental control may revolutionize the way industry leaders view environmental issues. As they uncover opportunities to reduce cost, generate revenues, and gain competitive advantage while simultaneously improving environmental quality, they are realizing economic gains by applying the language of business to the environment.

As command-and-control approaches the cul-de-sac of its ability to effect environmental improvements, ISO-14000 is about to become the new paradigm of progress for environmental management systems. Industries that undertake the journey to implement proactive ISO-14000 will rapidly focus on the environment as one of the competitive business issues in the future.

As managers continue to look for inefficiencies and eliminate the most apparent ones, they may not uncover the less obvious ones as quickly as their competitors. The leading companies are those that are focusing on environmental improvements that lead to operational efficiency and reduction of waste. Waste is profits out the door in the form of processed materials and *embodied energy*.

Forward-thinking companies are realizing significant savings. These companies have gained a competitive advantage and harvested unexpected profit by focusing on environmentally sound solutions through the use of EMS. They have also realized that they cannot produce a low-priced product without technologic change, minimization of materials waste and, especially, more efficient use of energy. Economic growth depends on energy, and energy moves the entire economy.

Today at \$100 a barrel, energy-efficiency has become one of the world's leading environmental missions and a high profile watchword for the 21st century marketplace. It is praised as the solution to the excessive appetites of a power hungry society. As population continues to grow with an estimated 15 billion people by year 2030, demand for fuel is projected to increase by 30 percent and demand for electricity by 270 percent.

How will ISO-14000 help in this highly visible area?

Between 1973 and 1988, the U.S. economy grew by 40 percent while the total energy consumption remained nearly constant, disproving the myth that the economy depends on ever-increasing energy consumption. In the U.S. we have focused on supplying energy instead of using it efficiently. Compared to Japan and Germany, the United States consumes twice as much energy to produce a unit of Gross National Product (GNP). This

difference contributes a five percent cost advantage for Japanese and German products. In addition, oil imports, which were the largest component of the U.S. trade deficit 1990, accounted for almost \$44 billion. The mighty fossil-fuel industry today is a \$ trillion+ a year business.

At today's demand rate, the world will have enough oil in known economically viable reserves to last some 40 years, enough natural gas to last 60 years and enough coal to last 230 years. As population grows the demand will grow, as second tier countries grow demand will grow Think about Toyota overtaking the US auto manufacturing cost and world market for energy efficient transportation to take the high ground in the R&D of Hybrid auto's. Think about the fact that GM set the example of lean manufacturing during World War 2 and that they were the teacher to Japan's student management now we are the student. Think about the fact that Henry Ford set the standard in energy use and waste reduction by which Japan built their foundation to the future. In the not so far off future when the search for energy takes place, companies and countries that have made the transition move to energy conservation will be the competitive leaders.

Industries have just begun to tap the potential for energy efficiency and the cost savings associated with the environmental impact of energy. When companies begin to perform environmental management reviews the universality of energy efficiency and its impact on business will play a major role. As management reviews energy performance data, they will obtain a more comprehensive understanding of the risks and of the opportunities to reduce cost while gaining a competitive edge in the global marketplace. For example Sealtest Ice Cream achieved a \$3 million savings by focusing on energy in the low tech world of Ice Cream.

There are two basic uses of energy in manufacturing:

- 1) The most widely understood use is the production of heat and power, and the generation of electricity. This area falls typically in the domain of the facility manager and is imbedded in overhead cost.
- 2) In the design of our products we seldom consider the *imbedded energy* in the raw materials needed to manufacture them and, the energy consumed as a raw material is frequently considered to be feedstock. This is where design plays a major role in designing for the environment and energy conservation.

Another area which is also sometimes goes unnoticed is the office environment. Today office equipment is one of the fastest growing categories of electricity use in commercial buildings in the United States. In 1991, this area consumed 26 billion kilowatt hours or, approximately 3 percent of total commercial energy consumption; this translates into \$2.5 to

\$4 billion in electricity cost to business per year. By developing simple EMS programs and, by providing training on energy in the office, companies will quickly find the benefits of implementing EMS.

An important first step in implementing an EMS that will lure management is to develop a corporate life-cycle cost accounting systems. An effective system will assign full cost of waste generation to the responsible processes. Such systems should include energy data, processing losses, waste disposal, and regulatory cost, liability risk, and losses in goodwill. An effective system that addresses energy will:

- 1) Save money by identifying wasteful operating practices;
- 2) Target opportunities for energy efficiency;
- 3) Identify energy efficiency measures which produce the greatest savings;
- 4) Identify patterns of energy use.

When companies begin to investigate their significant environmental impacts, it will become obvious that energy consumption will require attention. As management addresses the issue of reducing energy in the pursuit of continuous improvement within ISO-14001, they will realize unfound profits. This will come about without large investments in technology, or large teams of people. Improvements in environmental efficiency and energy use are within easy reach today, without sacrifices in economic well-being.

As companies begin to launch EMS programs, energy will play an important role. EMS will demonstrate that environmentalism and economic growth can go hand-in-hand just as quality and profitability did in the 80's.