Needed: A Manhattan Project For Energy

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The security and economy of the nations of the world literally floats on oil. No other single resource has as much impact. Japan bombed Pearl Harbor to destroy our fleet, which could have blocked their oil imports from Indonesia. During WW II we had a strategic plan to take over the Middle East's oil, if necessary. In 1973, because of our support of Israel, OPEC, which had just taken control of its own resources, instigated an oil embargo against the United States. In 1979, there was a perceived five percent shortage of the production of oil. Oil companies panicked and started purchasing and filling every empty tank on land and sea. The price per barrel of oil nearly doubled overnight—with just a five percent oil shortage. The recent hurricanes in the Gulf of Mexico damaged both supply and refining capacity, sending gasoline prices soaring.

We put both blame and expectations on our elected officials to solve the security and economic problems caused by these interruptions. The solutions, however, are the most complex of any to face our nation. The Department of Energy has been effective, but its efforts have been fragmented as far as a long-range strategic plan is concerned. It has failed so far to develop a nuclear waste depository, which it was assigned to do in the 90s, and is necessary for further development of nuclear power plants. National energy policies developed by previous administrations do not provide comprehensive long-range strategies for energy security. Political and environmental issues have dominated. It is too much to expect elected officials alone to have the necessary skills to develop and implement a strategic plan that has so many economic, political, and technical components. But we are now at a point in history where we need to draw a hard line and make tough decisions.

What is needed is a 'Manhattan'-type project to study and develop a workable long-range strategic energy plan. The Manhattan

Project, established early in WWII, had as its objective the development of the world's first nuclear weapon. Top experts were identified, isolated, and given the resources needed to accomplish their objective. The same should be done with energy. There are individuals in this country who have the knowledge and skills, and if isolated from political and vested interests, could develop such a plan.

The plan should, as a minimum, address the following issues: available resources—both domestic and foreign; alternative fuels; industrial, commercial, and institutional usage; transportation; residential; regulation of energy resources; and, last but not least, an intensive energy education program for all levels.

Each domestic and foreign energy resource used by this country should be identified as to present and projected capacity, in addition to economic and political stability. A contingency plan should be developed which could be implemented immediately when and if any of the resources dropped out. Our delay in making decisions once a resource is lost due to hurricanes, war, or embargoes causes confusion and economic losses.

There are many alternative energy sources just waiting in the wings for either further technical development or for energy prices to rise enough to provide economic justification. These include the oil sands of Canada, solar and wind energy, hydrogen fuels, fuel cells, coal and many more. The government has in the past attempted to support development and commercialization of some of these technologies, such as solar. Because they failed to fully evaluate all influencing factors, such as the continued low cost of electric energy, many of the projects are still in the wings. We are the Saudi Arabia of coal, but clean-burning technologies should be further developed and implemented. Within the past twenty years, every new power plant coming on line has been fueled by natural gas because it burns cleaner than other fossil fuels. This is a major reason natural gas costs will continue to be higher for residential heating and other natural gas uses. Nuclear energy is now being proposed. Previously, each nuclear plant built had its own unique design, which made safety issues difficult to define and implement. Designs are now being standardized as was done in France—which is now 70 percent nuclear—so safety will be much improved. All alternative energy sources should be evaluated for both technical and economic feasibility, then put in a priority order for implementation.

Industry, commercial, and public institutions have done reasonably well in their efforts to use energy efficiently. In my previous work with energy survey teams, we determined the major problem was the lack of a proper internal organizational structure to manage energy. We found, almost without exception, that employees wanted to save energy but simply didn't know how. These groups have come a long way, but many dollars are still being left on the table.

Transportation is a major component of our energy usage. It would be very expensive and disruptive to change. Our interstate system, built by the Eisenhower administration primarily for defense purposes, has diverted products previously hauled by rail to trucks. It has made personal travel much more accessible by automobile, making larger ones more desirable for comfort and safety. Could the long line of trucks now plowing along on our interstate system be replaced with rail? And if so, would the general public feel safe enough to again drive smaller cars? When I was a child, an electric-powered street car ran through the heart of the city. It was bought out and closed down by one of the automotive companies. Corporate power and individual freedoms would be the greatest challenge to any significant changes to the transportation system.

Improved efficiency in the residential segment is impeded by two factors: lack of knowledge and lack of resources. Very few homeowners have a good concept of priorities for reducing energy. Many think turning out lights will save lots of energy. On a pie chart showing energy usage in a residence, lighting comes under "other." For example, if a 100-watt light bulb is allowed to be on for ten hours, the kilowatt hour usage would be 1000 or 1kW-hr, which has an average residential cost of only eight cents. Many know heat pumps are the most efficient way to heat and cool a home, but don't have the financial resources to install one.

Deregulation of many previously regulated industries has, in my opinion, been detrimental to the industry, to the public, and to the energy conservation effort. When the trucking industry became deregulated, more trucks came on the road, many with unsafe equipment, especially brakes. Deregulation of the electric industry has simply turned it over to corporate greed—for example, Enron and California. The recent blackout, which started in Ohio, was caused by a deregulated company not having proper safety equipment. Many corporations have a 'risk analysis' department where, in many cases,

they determine that it is more economical to take a risk and pay for collateral damage than to implement safety features. The claim for deregulation was that costs would go down. Six years ago, I was part of a study mission with the Association of Energy Engineers that met with key energy officials in several of the northern European countries. They were the first to deregulate their electric industry. In neither of the countries visited did they report electric energy costs reduced as a result of deregulation. Residential electrical costs are expected to rise in every part of this country when deregulation occurs, along with a decrease in reliability.

A comprehensive energy education program should be developed and instigated for all levels—ECOs, managers, employees, and homeowners. Two programs have been providing intensive training for energy managers in industry, commerce, and government for the past twenty years. These are the Certified Energy Manager program conducted by the Association of Energy Engineers, and the Energy Management Diploma program, which, incidentally, I started in 1978, and is now being conducted by NC State University. Certification from either of these two programs is recognized by the federal government for government employees designated as energy managers. I have conducted a workshop in the Energy Management Diploma program for over twenty years, and have always asked the same question, "What are the barriers to your energy management program?" The answer has always been the same: lack of top management support and lack of funding. Our efforts to involve top management in training have been less than successful. Their training and interest seems to be more oriented to the bottom line. Our colleges of business should be providing energy management training to their students who may someday become operational managers and CEOs.

The strategic plan developed by such a 'Manhattan'-type energy group should be given wide dissemination so all people will have an understanding of the implications and magnitude of such an effort. Tough decisions and sacrifices will have to be made in many cases. With such a document, elected officials would have solid information as a basis for legislation to meet our energy requirements. It may require a reorientation of some elected officials to be less controlled by political and vested interest influences so they will have the courage and long-range vision necessary for the welfare of our country.

ABOUT THE AUTHOR

Bill Mashburn, P.E. C.E.M., is a professor emeritus of mechanical engineering, and a former director of the Energy Management Institute at Virginia Tech. In 1990 he won the International Energy Professional Development Award from AEE, and in 1994, at WEEC, he was inducted into the Energy Managers Hall of Fame. He was the 1996 president of AEE. He is an avid outdoorsman, now spending most outdoor time fly fishing.

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