

## Focus on Energy – Wisconsin’s Initiative to Reduce Industrial Energy Consumption

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### Abstract

This paper presents an overview of a statewide program to assure an ample supply of reasonably priced, reliable energy for Wisconsin. To help meet this goal, the State of Wisconsin has embarked on a three-year, \$64 million initiative to improve the energy usage of its major industries. The initiative focuses on three aspects of energy use: increased energy efficiency, decreased peak demand, and the inclusion of energy use as a consideration in the decision making and design processes used in industry. Rather than relying on incentives to improve energy usage, as was done in the past, this initiative relies on the process of market transformation: show all the users in a given market sector the benefits of improved energy usage and let the marketplace force the individual users to change. Ancillary benefits of this program include the reduction of the environmental impact from energy use and production, the ability to meet all the energy needs from within the state, and promotion economic growth in rural areas. This program is in addition to the other programs in the state that focus on residential energy use, renewable energy sources, and environmental research. The Milwaukee School of Engineering, as part of a nine-organization team, has been awarded the contract to administer the program. Some of the tasks in the market transformation process include: identify industries to partner with, provide technical assistance and energy audits, develop energy efficiency improvement plans, and measure and verify energy savings.

This paper discusses the genesis of the program – why are we doing this rather than the energy suppliers (utilities), the contract team – the development and organization of the team, or who does what and why, and the first year’s efforts – the implementation phase.

### Introduction

The past decade has seen a significant change in the operation of electrical utilities in the United States. The process of deregulation has resulted in growth of merchant plants, energy marketers, and major blackouts. Before deregulation the utilities were guaranteed a rate of return on their investments and monopoly control over their service territory. In return, the utilities were forced to provide electrical service to all their customers at a reasonable cost. Public Service Commissions (PSCs) scrutinized the actions of the utilities to assure costs charged their customers were reasonable and that the actions of the utilities were in the best interest of the public. The latter resulted in PSCs requiring investor-owned utilities (IOUs) to invest in renewable energy research and develop energy conservation programs for their customers. The utilities were evaluated on the level of service they provided, i.e., outage rates, power quality, and response to customer’s complaints.

Deregulation can be traced to several causes. One of the primary causes was the rush to deregulate all industries that started in the 1970's, in particular, in 1977 when then President Jimmy Carter named Alfred E. Kahn to head the Civil Aeronautics Board (CAB)<sup>1</sup>. Kahn's job was to abolish his own position, thereby deregulating the airline industry. At about the same time, the deregulation of the natural gas industry began. But unlike most industries, the deregulation of the electrical utility faces many problems. One of the primary problems, that both the politicians and business people conveniently forget, is that the laws of physics govern the flow of electricity, not contract law. The second major impediment to deregulation of the electric industry is the tight coupling of the electric utilities that took place after the blackouts of the 1960s to increase reliability. This points to probably the single most difficult problem for those who wish to deregulate the electrical industry, that, unlike the airline and telephone service, most consumers consider electric power essential and will not tolerate long interruptions of service. Despite these problems proponents of deregulation press on<sup>2</sup>.

Two other causes of deregulation are the advent of far less expensive sources of energy in markets with higher energy costs and the desire of large energy users to access low cost power. In California in the 1990s, new gas turbine technologies could produce power at less than one-half the cost of the state's nuclear generators. Once the major customers of the state's IOUs discovered this, they convinced the state's PSC to allow them to obtain power directly from the new low cost producers.

### **Genesis of the Wisconsin Focus on Energy Program**

Wisconsin became involved in electric utility deregulation at about the same as California. But unlike California, Wisconsin stopped short of complete deregulation. Through 1999 Wisconsin Act 9, the Wisconsin Department of Administration (DOA) took over the "public benefits" programs that in the past had been performed by the state's IOUs. The public benefits programs are those programs, or services, that benefit all citizens of the state, but for which there is no immediate incentive for private companies to provide. A good example of this would be energy conservation programs. If energy is treated as a commodity, the IOUs have no incentive to reduce the use of their product. This does not mean that private companies could not eventually become involved. For example, if a private company can provide an energy conservation program that saves money for a utility customer, that company can then contract with the utility customer for a portion of the savings.

The transition from IOU to DOA implementation of these programs is taking place over three years and will be completed by 31 December 2002. The ratepayers of Wisconsin, through their utility bills, provide the funding for administration of these programs by the DOA. This is a continuation of the funding mechanism that was in place when the IOUs administered these programs.

Under this arrangement, the DOA was required to set up an umbrella program called "Wisconsin Focus on Energy." The tenants of this program are as follows, from the request for proposals<sup>3</sup>:

- Focus on Energy will explicitly recognize the inseparable link between energy, the environment and the economy.

- The transformed energy efficiency and renewable energy markets will make contributions to the reliability of Wisconsin's energy supply.
- DOA will design and help create the infrastructure and knowledge base necessary to enable private firms to deliver the public benefits of energy efficiency, renewable energy and environmental research.

Again from the DOA request for proposals<sup>3</sup>, the desired outcomes of this program are:

- Increase the efficient use of energy in the residential, commercial, industrial, institutional and agricultural sectors of Wisconsin.
- Oversee programs in all of the above sectors that will reduce energy consumption, reduce peak demand, reduce dependence on imported energy, reduce the environmental impacts of the energy use and transform the energy marketplace.
- Provide safe, reliable and affordable home energy to residents of Wisconsin.
- Provide energy services to households with the lowest incomes and highest energy needs while taking into account both energy cost burden and vulnerable household members.
- Manage energy efficiency programs that address three additional key areas including market transformation, reliability, and rural economic development.

### **Development of the Team**

The Division of Energy of DOA selected private, non-profit administrators to subcontract with expert individuals or companies to provide the services required. The Focus on Energy program was divided into four main areas: major markets, residential, renewable energy, and environmental research. The Milwaukee School of Engineering (MSOE), along with eight industrial partners, won the major markets segment of the program. The total, three-year, expenditure on this portion will be \$64 million. The initiative will focus on improvement of the energy usage of Wisconsin's major industries. For every dollar spent on the program, at least one dollar of energy savings must be obtained.

The major market segment of the program was further divided into sectors. Those sectors and sub-sectors include:

- Commercial Markets

This sector consists of the approximately 230,000 commercial customers served by IOUs in Wisconsin. It is further divided into three sub-sectors.

- New Construction
- Existing Buildings
- Small Retail and Services

- Industrial Markets

This sector consists of the approximately 3,500 industrial customers served by IOUs in Wisconsin. It is broken into "Industries of the Future" and general industries. Industries

of the Future (IOF) is a U.S. Department of Energy program aimed at energy intensive industries.

- **Agricultural Markets**

This sector incorporates farms and farm commodity suppliers and distributors. It is also broken into IOF and non-IOF sub-sectors.

- **Schools**

This sector includes public schools, private schools, and technical colleges. It is in addition to several existing state and federal programs.

- **Government Buildings and Operations**

This sector includes the approximately 15,000 government buildings in Wisconsin. It is broken into two sub-sectors: Energy Star Buildings and Water and Wastewater IOFs.

- **Other**

This includes financing methods for the major markets sector, market assessments, renewable energy plans, and technology research and development.

MSOE's main task is administrator of the major markets sector. In addition to this task, MSOE has individual or shared tasks in most of the sectors.

### **First Year's Technical Tasks**

The technical tasks assigned to MSOE in the first year of the program are extremely varied. They include tasks in the general and IOF industries sub-sectors, new commercial buildings, existing commercial buildings, and government buildings.

In the General Industrial program the tasks for the first year are 1) determine where opportunities and barriers exist for high-impact technologies to affect energy usage, 2) review participant needs for research and development (R&D) and integrate them into the program's R&D plan, and 3) to identify and develop R&D opportunities that will benefit Wisconsin industry. As an example of the work in this area, a senior electrical engineering (EE) student was given the task to evaluate a patent submitted by one of the participants. This patent is for an ac line current controller that would purportedly save energy by reducing distortions in the current waveform.

In the Energy Intensive Industries program the tasks for the first year involve preparing the Compact for the State Industries of the Future, scoping studies on technology transfer centers, developing industry roundtables, and developing assessment tools. This work is all being done in conjunction with the other participants and the DOA.

In the New Commercial Building program the tasks for the first year include providing engineering analysis of energy-efficient and renewable energy options. The other team partners will collect data from the FOE clients and MSOE faculty, staff, and students will perform the simulations and analysis. Another aspect of this program would be to provide MSOE students as interns to assist in the data collection efforts and to act as liaisons with smaller FOE clients.

One of the features of the New Commercial Building program is “second-look” design assistance. In this process, the designs submitted by architects and engineers during training sessions (i.e., Daylighting Seminars) are reviewed for possible energy savings by the team partners providing the training and/or individuals from MSOE.

In the Existing Commercial Building program the tasks for the first year included assisting on the State of the Future Compact and scoping studies for the Technology Transfer Centers. This program, along with the Government Buildings and Operations program, are substantially smaller than the other FOE programs in terms of MSOE technical involvement.

In the Government Building and Operations program the tasks for the first year include assessing technologies for building operating controls and control systems. The primary focus of MSOE technical tasks in this program will be on applications.

## **Conclusions**

As with most endeavors of this magnitude, the majority of the first-year tasks involve development of the organization; liaisons with other state, regional, and national organizations; and identification and ranking of potential opportunities. As seen above, some of the more unique tasks underway or anticipated include: providing interns for data collection and energy audits, review of ongoing projects (second look design assistance) to determine if energy efficiencies could be improved, and modeling of renewable energy and energy efficiency options.

While it is too early to tell if this initiative will be successful, one thing is certain, Wisconsin is attempting to deal with proactively with its energy concerns.

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