

PUBLIC/PRIVATE SECTOR COOPERATION TO PROMOTE INDUSTRIAL ENERGY EFFICIENCY: ALLIED PARTNERS AND THE US DEPARTMENT OF ENERGY

Aimee McKane
Lawrence Berkeley National Laboratory

Chris Cockrill
US Department of Energy

Vestal Tutterow
Lawrence Berkeley National Laboratory

Anthony Radspieler
Lawrence Berkeley National Laboratory

ABSTRACT

Since 1996, the US Department of Energy's Office of Industrial Technologies (USDOE) has been involved in a unique voluntary collaboration with industry called the Allied Partner program. Initially developed under the Motor Challenge program, the partnership concept continues as a central element of USDOE's BestPractices, which in 2001 integrated all of USDOE's near-term industrial program offerings including those in motors, compressed air, pump, fan, process heating and steam systems.

Partnerships are sought with end use industrial companies as well as equipment suppliers and manufacturers, utilities, consultants, and state agencies that have extensive existing relationships with industrial customers. Partners are neither paid nor charged a fee for participation. Since the inception of Allied Partners, the assumption has been that these relationships could serve as the foundation for conveying a system energy-efficiency message to many more industrial facilities than could be reached through a typical government-to-end-user program model. An independent evaluation of the Motor Challenge program, reported at the last EEMODS conference, attributed US \$16.9 million or nearly 67% of the total annual program energy savings to the efforts of Allied Partners in the first three years of operation. A recent evaluation of the Compressed Air Challenge[®], which grew out of the former Motor Challenge program, attribute additional energy savings from compressed air training alone at US \$12.1 million per year.

Since the reorganization under BestPractices, the Allied Partner program has been reshaped to extend the impact of all BestPractices program activities. This new model is more ambitious than the former Motor Challenge program concerning the level of collaborative activities negotiated with Allied Partners. This paper will describe in detail two new types of program initiatives involving Allied Partners: Qualified Specialist Training and Energy Events.

The Qualified Specialist activity was conceived as a way of engaging the supply side of industry, consultants, and utilities to greatly increase use of decisionmaking software developed by USDOE to assist industrial facilities in assessing the energy efficiency of their energy-using systems. To date, USDOE has launched Qualified Specialist training with member companies of the Hydraulic Institute (HI) and with distributors and consultants associated with the Compressed Air Challenge. These activities train and qualify industry professionals to use and to train customers to use USDOE's Pumping System Assessment Tool (PSAT) and AIRMaster+ software programs, respectively. The industry experts provide a public benefit by greatly increasing customer access to the software and assessment techniques. Participating Specialists anticipate a business benefit by providing a valuable service to key customers that is associated with USDOE.

The Energy Event concept was developed in 2001 in cooperation with the California Energy Commission in response to the state's energy crisis and has been extended to other geographic areas during 2002. The three

California events, named “Energy Solutions for California Industry”, relied on Allied Partners to provide system-based solutions to industrial companies as both speakers and exhibitors. These one-day events developed a model for serious solutions-oriented format that avoids the typical trade show atmosphere through strict exhibitor guidelines, careful screening of speaker topics, and reliance on case studies to illustrate cost- and energy-saving opportunities from applying a systems approach. Future plans to use this activity model will be discussed as well as lessons learned from the California series.

BACKGROUND

Beginning in 1992, US DOE Office of Industrial Technologies (USDOE) sought to design a program that promoted increased energy efficiency of motor systems and was responsive to industry needs. The Motor Challenge program began as the result of an industry roundtable discussion and evolved through a series of events that presented industrial end-users and the companies that serve them with a unique opportunity to share in and help shape the program. The result is a program “designed with industry for industry” that relies extensively on existing market forces to bring program messages to the industrial end-users

The program was initiated in 1993-94 with three initial offerings: showcase demonstrations, MotorMaster software, and the Information Clearinghouse. As additional program offerings were developed and the ongoing dialogue with industry matured, a program structure emerged to deliver the program message within existing market mechanisms.

By 1996, a primary feature of the Motor Challenge program model was its reliance on partnerships with industry both to develop new program materials and to deliver this information to industrial customers. Two additional programs, Compressed Air Challenge and Steam Challenge, subsequently emerged based on elements of this program design. By 1999, other sectors, such as process heating, had expressed interest in developing their own program initiatives. Rather than continuing to create separate new programs, USDOE moved to integrate all existing and proposed program initiatives of this type under the program heading of BestPractices.

Existing markets for industrial equipment and services (both supply and demand) traditionally focus on components rather than systems. This piecemeal approach to industrial motor-driven and steam systems in the US typically results in less than optimal system operation, reliability, and efficiency. In addition, for industrial manufacturers production is their top priority, not energy efficiency. BestPractices, pursues an objective to develop best practice information and tools in cooperation with industry associations and energy efficiency organizations. These information and tools are then distributed either directly, or through Allied Partners (vendors, utility companies, end use companies and others) to end users of motor systems to promote a systems approach in the way these systems are managed, maintained, upgraded and improved.

The overall program design evolved over several years with substantial input from the industrial community. Throughout, program development has been guided by the following technical and program design principles:

- Promote a “systems” approach
Industrial engineers have long known that careful matching of the elements of a plant system (in the case of motor systems – motors, controls, couplings, and process machinery) to the work to be performed yields far more savings than upgrading just the individual components. The Motor System Market Assessment found that over 71 percent of total potential savings came from systems-level measures such as improving the configuration and control schemes in pump, fan, and compressor systems. The practical procedures and the benefits of the system approach are stressed in program tools, publications, and case studies.
- Harness the business motivations of end-users, manufacturers, and vendors in disseminating technical information and promoting energy efficiency
The program has and continues to emphasize not only the energy savings associated with improved system efficiency, but other benefits of efficiency improvements such as increased control over production processes, reduced waste, and an improved production environment for workers. Emphasis is placed on demonstrating the links between energy efficiency, system reliability and lower costs of operation through case studies, plant wide assessments, and showcases.
- Recognize suppliers and users of energy-consuming industrial systems who “walk the walk” by applying a systems approach to new systems and retrofits

Allied Partnerships are voluntary, based on shared interests, and have no fees associated with their formation. USDOE currently has more than 200 Allied Partners (APs) who distribute more than 10 times the amount of BestPractices information as is distributed through other program channels. An independent evaluation of the program completed in 2000 found that \$16.9 million in annual energy savings or 67% of the total program savings was attributed to AP activity.

BUILDING PARTNERSHIPS

The first step in developing the Allied Partner effort was to identify why organizations would seek to partner with USDOE. For each type of partnership, USDOE must characterize the public benefit (in this case, energy efficiency) and work with companies to identify the intersecting private interests that have the potential to carry the desired actions forward.

Participant	Potential Contribution	Initial Motivation	Primary Drivers
Equipment Manufacturers & Distributors	Detailed technical & market information Customer influence	Brand enhancement Perceived threat to business	Sales Customer retention Increased profits Increased brand recognition
Specialized Consultants	System engineering Broad knowledge of applications/ problems	Increased visibility Legacy	Increased billable hours Recognition
End Users of Compressed Air Systems	Knowledge of specific applications & organizational dynamics	Alignment w/ green image May fix problem	Reliability Profitability Best Value Efficiency Recognition
Influencers: <i>Utilities</i> <i>Energy-efficiency organizations</i> <i>Government</i>	Market credibility Outreach mechanisms Perceived neutrality	Meets mission Highly leveraged Politically beneficial	Customer education Customer retention Energy savings Pollution prevention Recognition

Figure 1: Partnership Motivation Analysis: Industrial Compressed Air Systems

Key Questions for Partnership Development:

- what is the potential contribution of each participant in the collaboration (why are they desirable partners)?
- § what is their initial motivation to join the collaboration?
- § what are their primary drivers?
- § what do they hope to gain from their participation?

As the result of the proposed partnership-

- What will take place to promote greater energy efficiency?
 - Enhanced existing activity- frequency, scope
 - New type of activity
 - New piece of information, software, training, etc.

If this question cannot be answered, the public benefit has not yet been identified.

Partnership Strategies

Over time, the approach to developing Allied Partnerships has evolved based on partnership activity and feedback. The current approach emphasizes targeted partnerships- those companies with multiple facilities and groups with a large industrial customer base, such as associations and supply chain companies. The objective is to reach as many industrial end users with each partnership contact through a “multiplier effect” as follows:

- **one to one**- USDOE agreement w/ association
- **one to many**- Association works w/ member companies
- **many to many**- Member companies work with customers or employees

In addition, Allied Partner agreements have a defined scope. They are individually negotiated for a period of one year and are renewable based on mutual agreement.

APPLYING THE ALLIED PARTNER MODEL

An example of a market opportunity for partnership is illustrated by the findings of the Assessment of the Market for Compressed Air Efficiency Services, completed for USDOE, in cooperation with the Compressed Air Challenge in 2001. Phone interviews of 222 industrial compressed air users revealed the following:

- Only 9% identified controlling energy costs as a primary concern
- 71% identified **consistent, reliable compressed air supply** as a principle objective of system management
- 35% had experienced **unscheduled shutdowns** during the previous 12 months- 60% of these shutdowns were for 2 days or more
- 30% had service contracts- had no effect on incidence of shutdowns
- 75% of system operators had **no formal training** in compressed air system efficiency
- 57% had **taken no action** (include leak repair) to improve compressed air system efficiency in past 2 years

The Compressed Air Challenge® (CAC) is an outgrowth of work on Industry Partnerships for the USDOE Motor Challenge Program. The themes which ultimately led to this project were first identified in the April 1995 Roundtable on Market Transformation Strategies for Industrial Motor Systems breakout session on compressed air systems. The CAC, founded in 1997, was incorporated as a separate, not-for-profit organization that includes USDOE, equipment manufacturers and distributors, government agencies, non-government organizations, and utilities. In all the CAC counts 15 separate organizations as sponsoring members, all of which contribute both funding and time to the collaborative efforts. The purpose of the organization is to promote more efficient compressed air systems.

The CAC is a good example of the “one to one & one to many” approach of using a single point of contact, the collaboration, to reach thousands of industrial end users. The results of this collaboration to date are as follows:

- Published & distributed more than 4000 copies of Compressed Air Sourcebook
- Developed 1-Day Training “Fundamentals of Compressed Air Systems” & 2-day “Advanced Management of Compressed Air Systems”
- Qualified pool of 22 qualified CAC Fundamentals instructors; 10 qualified Advanced Instructors
- Trained more than 4000 end users, consultants, suppliers
- Website, more than 20 case studies, new projects

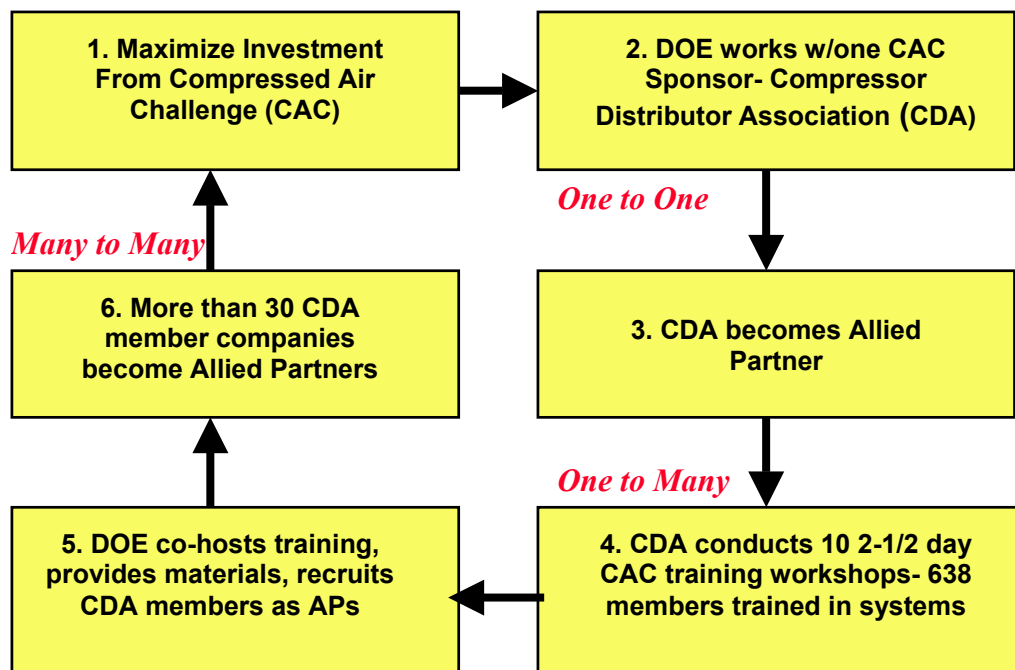


Figure 2: Applying the Multiplier Effect to the Compressed Air Market

INCREASING USE OF USDOE SOFTWARE THROUGH ALLIED PARTNERS

Since the development of MotorMaster+ in 1993, USDOE has worked with industry experts & key associations to develop software tools to help industrial end users identify and assess the relative importance of system improvement opportunities. The purpose of the software, which now includes MotorMaster+, Pump System Assessment Tool (PSAT), AIRMaster+, Process Heating Assessment Tool (PHAST), and the Steam System Scoping Tool, is to make it easier to identify the substantial energy efficiency opportunities that are frequently overlooked in industrial systems. Feedback from software users revealed that few people use the full capability of these tools as designed to identify system improvement opportunities. The primary barriers to effective use are 1) the time required to understand the tools and collect required input data and 2) the specialized systems expertise required to use the tools effectively.

Allied Partner Qualified Specialist Training

To substantially increase the use of USDOE software tools with and by industrial end users, USDOE worked with Allied Partner industrial trade associations and their member companies in developing a Qualified Specialist training and recognition program. This approach, which was initially conceived for PSAT in cooperation with the Hydraulic Institute and its member companies, is designed to build use of the assessment software into existing interactions between industrial customers and their suppliers. The Allied Partners, who are already highly skilled in their respective area of specialty (in this case, pumping systems) also become skilled, qualified users of the assessment software. There are several advantages to this approach. First, it addresses the two major barriers to increasing effective use of the software- the time required to understand the tool and technical expertise in systems required to make full use of the software's capabilities. The goal is to increase the number of professionals qualified to use each software tool from <5 to >50 and greater in a relatively short period (two years).

In addition, the process of developing the delivery program also encourages industry suppliers to provide detailed technical input to fine-tune the software, while building ownership in the final product. The long-term goal of USDOE is to develop a well-defined Qualified Specialist program element for each type of system assessment software and to seek out transfer of long term stewardship of Qualified Specialist programs to key industry associations. By involving these associations in the early stages of developing the software and the corresponding Qualified Specialist delivery mechanism, it is hoped that this transition can gradually evolve over a period of approximately five years from each Qualified Specialist program launch.

In order to engage industrial suppliers and consultants in the Qualified Specialist effort and sustain their interest in participating, USDOE offers the following benefits:

- Recognition as a skilled user of the software(PSAT, AIRMaster+, PHAST, etc) each Specialist gets a signed, numbered certificate;
- Listing on the DOE BestPractices Website & access to quantities of software;
- DOE refers callers and trainees interested in software to the website list of Specialists;
- May also become qualified to offer DOE software training classes to customers;
- Invitation to provide referrals for possible DOE case studies on energy-efficiency projects identified by using software;
- Invitation to participate in review of proposed changes to software; and
- Ongoing technical support.

It is important to note that the work with the Hydraulic Institute (HI), an industrial trade association for the pumping industry, and its member companies on the Qualified Specialist activity is based on an ongoing cooperative relationship with USDOE that began in 1993. To date, the Allied Partnership with HI and its member companies has resulted in the following activities:

- 1997- DOE and HI co-produce Energy Reduction Video Program
- 2000- DOE works with HI members and the Federal Energy Management Program (FEMP) to develop a FEMP Product Efficiency Recommendation How to Select an Energy-Efficient Centrifugal Pumping System
- 2000-2001- DOE works with HI and EUROPUMP to create Pump Life Cycle Costs: A Guide to LCC Analysis for Pumping Systems

- 2001- DOE publishes Executive Summary of the LCC Guide - available to pump users both in print and as a pdf on the BestPractices website
- 2001- HI and DOE launch the Qualified Pump System Specialist training using the Pump System Assessment Tool (PSAT)

The Qualified Pump System Specialist training includes 1-1/2 days of classroom and hands-on training followed by a written qualifying exam. To date, five classes have yielded 44 Qualified Pump System Specialists. In addition, five individuals have become Qualified PSAT Instructors and are offering pump system end user training.

The Qualified AIRMaster+ Specialist training is being offered in cooperation with the CAC. Again, this program element was developed in cooperation with industry suppliers and consultants within the context of a long term cooperative relationship. The training includes 2 days of classroom training on AIRMaster+ and measurement techniques, a practical exam on measurement techniques, a take home exam using AIRMaster+, and a 4-1/2 hour written qualifying exam. As with the Qualified Pump System Specialist exam, the AIRMaster+ Specialist exam is open book and designed to test the individual's ability to apply systems knowledge as well as use the software. To date, five classes have yielded 41 Qualified AIRMaster+ Specialists. These Specialists are being used as the primary avenue for delivering AIRMaster+ training to industrial end users through an awareness training module.

ENERGY EVENTS

Another avenue for working with Allied Partners was developed in response to the needs of the energy crisis in California in 2001. The goal was to promote a "many to many" approach to increasing awareness of the systems approach by organizing events that provide opportunities for individual Allied Partners to meet while providing service to industrial customers. The desired results were twofold: to create new business opportunities for Allied Partners and strengthen the market for energy-efficiency services.

Three "Energy Solutions for California Industry" events were held in California in 2001 and early 2002. The model for the events was developed cooperatively by USDOE and California Energy Commission, in conjunction with an Advisory Committee of representative Allied Partners. Local Sponsors were sought to publicize events and provide topical speakers. Allied Partners were invited to exhibit and demonstrate DOE software. Care was taken to coordinate speakers and exhibits to present system solutions. Standard signage was used and product displays were not allowed. The idea was to keep the emphasis was on systems-oriented assistance to participants.

The three events attracted 563 participants from 338 companies. Six months later, 85% of participants interviewed stated that the event had a positive effect on the energy efficiency of their business. USDOE is evaluating how the model for these events can be applied in cooperation with other states and regions in the US.

LESSONS LEARNED

Partnerships with industry (suppliers, utilities, large end users, utilities) can highly leverage the ability of the public sector to reach and influence the energy-consuming behavior of industry. These partnerships take time to develop and involve understanding the goals and agendas of all involved. Key partnerships that represent very large constituencies, such as trade associations, can take several years to mature to the point where they result in concrete outcomes. Properly managed, this infrastructure-building phase provides a foundation of ownership and trust essential to obtaining highly specialized technical assistance and broad-based organizational support for joint projects. The Qualified Specialist activities and the Energy Events are two examples of joint projects made possible through this type of partnership development.

REFERENCES

[DOE] US Department of Energy. 1998. United States Industrial Electric Motor Systems Market Opportunities Assessment, Office of Industrial Technologies, December 1998, Washington, DC

[DOE] US Department of Energy. 2001. Assessment of the Market for Compressed Air Efficiency Services, Office of Industrial Technologies, August 2001, Washington, DC.

McKane, Aimee T, Chris Cockrill, and Vestal Tutterow. 2001. Making Industrial Energy Efficiency Mainstream and Profitable: Where Public Benefit and Private Interests Intersect. In Proceedings of the 2001 ACEEE Summer Study on Energy Efficiency for Industry, Tarrytown, NY, July 2001

McKane, Aimee T., Joseph P. Ghislain, and Karen Meadows. 1999. Compressed Air Challenge: Market Change from the Inside Out, Proceedings of the 1999 ACEEE Summer Study on Energy Efficiency in Industry, Saratoga Springs, 15-18 June 1999

XENERGY Inc. (2000): Evaluation of the Motor Challenge Program. US Department of Energy and Oak Ridge National Laboratory, Washington, DC (unpublished)