

Evaluations Demonstrate Federal Technical Assistance Programs Move the Market

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ABSTRACT

This paper documents some of the benefits of the Technical Assistance Program of the U.S. Department of Energy's Federal Energy Management Program (FEMP) at a level of detail seldom seen in Federal evaluations. The paper summarizes the results of three evaluation studies completed between 1997 and 1999 with almost 1000 customers of FEMP. The evaluations were designed to collect data to demonstrate the effectiveness and impact of the programs as well as to help determine customer needs and areas to improve. The paper demonstrates that FEMP technical assistance assisted program participants through the stages of adoption and diffusion of energy technologies. Surveys covered several types of FEMP programs, including those that directly impact the market by providing project-specific assistance, and those that indirectly impact the market through demonstration, decision and analysis tools, education, and information dissemination. The paper also details other impacts of FEMP's services, including 1) the types of projects implemented in part due to FEMP technical assistance, 2) potential case studies for documented energy savings impacts, 3) an assessment of value and satisfaction with FEMP services and tools, and 4) an examination of customers' sharing of FEMP skills, tools and information.

Introduction

As the nation's largest single energy user, the Federal Government spends about \$ 8 billion each year on energy in its facilities and operations. The Federal Energy Management Program (FEMP) at the U.S. Department of Energy assists DOE and other Federal agencies in identifying, financing, and implementing energy efficiency and renewable energy projects in Federal facilities in order to achieve significant cost savings and associated environmental benefits. FEMP's goal is to improve efficiency in Federal buildings by 35 percent by 2010 compared to 1985 levels of energy use.

FEMP is working to move the federal market for energy and water efficiency and renewable energy technologies by having federal decision makers elect to use FEMP recommended technologies and behaviors in their facilities. If FEMP customers elect to adopt recommendations designed to transform federal facilities to be more efficient operations, then FEMP will have moved their market by speeding the adoption of those behaviors and technologies. Specifically, moving a market means that FEMP customers are assisted through the steps associated with the diffusion of innovation (Rogers 1995) and adopt recommendations that lead to more energy efficient or environmentally friendly methods of operation.

The FEMP market for this paper are the customers of FEMP's technical assistance programs. These programs include services that directly move the market by providing

assistance for selecting, financing or installing more efficient technologies or behaviors, or efforts that indirectly move the market by helping customers make these decisions on their own. These include providing demonstrations, decision and analysis tools, customer education, and information dissemination.

Specifically, FEMP Direct Assistance programs include technical assistance in identifying, designing, implementing and monitoring energy efficiency and renewable energy projects. Cost-benefit and efficiency analysis, purchasing information, and case studies are provided in Technology Alerts and the Energy Efficient Procurement Binder and Updates. SAVenergy audits help identify project opportunities. Workshops, both traditional classroom style and distance learning, are provided in many subject areas. Some of these are FEMP Lights, Energy Management, Designing Low-Energy Sustainable Buildings, Utility Financing, Energy Efficient Life Cycle Costing, Super ESPC, Implementing Renewable Energy, and Utility Deregulation. FEMP Working Groups meet to share experiences and help design Federal policies and actions.

Since 1997 the Technical Assistance team in FEMP has annually spoken with its customers to determine customer needs and what to improve, and to demonstrate impacts on Federal energy spending. Three of these studies completed between 1997 and 1999 are reported here (Hall, et.al. 1999a, 1999b, 1999c, Jordan, et.al. 1999, 2000). One of the key goals of this paper is to demonstrate the results of new evaluation techniques for documenting the impacts of technical assistance programs, including documentation that FEMP's technical assistance programs have moved the market by helping program participants move through the stages of adoption and diffusion for energy technologies. This paper documents the benefits of the Technical Assistance Program of the U.S. Department of Energy's Federal Energy Management Program by examining the movement of FEMP customers through the adoption process and by identifying other impacts that can be attributed to FEMP's services. The studies did not examine the related activities for FEMP non-participants. This weakness is a function of limited evaluation resources. Anecdotal evidence collected during these evaluations indicate that FEMP's programs are the single greatest factor in moving the federal markets toward more energy efficient and environmentally friendly operations. This hypothesis, however, has yet to be addressed in this research.

FEMP Technical Assistance Programs

Purpose and Services

The purpose of FEMP technical assistance services is to ensure that Federal building managers and other Federal personnel have the best technical information to identify and implement sound and cost-effective energy efficiency, water conservation, and renewable energy projects at their facilities. FEMP programs and services provide Federal personnel with the technical information, resources, and training to make those decisions. FEMP ensures that agencies have the skills, the means, and the initiative to undertake projects that use energy and water more efficiently and promote the use of renewable resources.

Customers hear about FEMP's assistance through a variety of different sources. In the 1999 survey the most common way of hearing about FEMP's technical assistance programs is through colleagues (32%). This is followed by FEMP brochures (11%), "other"

ways (11%), FEMP staff (10%), and meetings, training, and trade shows (10%). The FEMP web-site was the first source of information for 9% of respondents.

FEMP technical assistance services are targeted to customer needs, which vary depending on where the customer is along the continuum of the adoption and diffusion of a technology. The Direct Assistance services are geared toward those who have responsibility for design and installation and have decided to begin or who are already on the path toward implementing a technology or project. The Working Group activities are for those who are involved with policy direction which could greatly influence the adoption of technologies, however these customers may or may not be in the process of adopting technologies at the time of participation in the FEMP activity. Technology Alerts and Procurement Recommendation binders are for those who make decisions on purchases and implementation. They may be unaware of these technologies, or coming back for more information with which to make or confirm a decision about adopting a technology. Similarly, the educational workshops cover a variety of customer needs from awareness to specific skills and case studies that display the experience of early adopters of a technology. Many of these services are available now through the FEMP web site. Use of the web-site for technical assistance is up from 41% of FEMP's customers in 1998 to 52% in 1999 as more people move to the "web" for obtaining technical assistance.

Survey Methodology

The FEMP Technical Assistance evaluations surveyed by telephone 300 participants in 12 to 18 different programs or services in each of the years 1998 and 1999. The 1997 evaluation surveyed fewer participants and covered only workshops and associated software packages. The sample for each survey was identified at random from a FEMP customer database following the identification of which program services to target for the surveys. A survey cap of 300 participants was established to correspond to the available research budget and program information needs. The primary purpose of all three evaluations was to provide FEMP managers and leaders with detailed customer feedback about how well FEMP technical assistance is doing (in specific areas of measurement) and to identify areas for improvement. The information enables managers to see the strengths of their assistance, as well as program components that can be improved. Because of page limitations only a small portion of the results of the surveys are presented here.

One of the most significant accomplishments of the FEMP surveys was the development of a battery of questions that allowed FEMP to track the movement of their customers down the diffusion of innovation path, to the adoption of energy efficient methods of operation. Past evaluations within the market transformation literature have failed to show market impacts until an installation was complete or a recommended technology was sold in the market; a period of time from weeks to years after the actual market transformation program induced decision is made by the customer. The majority of market transformation programs are designed to impact customer's decisions long before technologies are sold in the market. Unless the evaluation community uses evaluation techniques that overcome this weakness, the true impacts of market transformation programs go unrecognized in evaluation studies (Reed and Hall, 1997). In 1996 TecMRKT Works designed a battery of questions that enabled FEMP to track customers along a diffusion path, beginning before a customer first hears about a new method or technology, and ending when customers confirm or reconfirm

that they made the right decision by adopting a recommended technology. This evaluation methodology was first used in 1997 and refined over 3 years, and demonstrates the ability to track on-going transformation of markets across each step of the product adoption process. The FEMP studies reported in this paper represent the first time the diffusion of innovation evaluation approach was used to evaluate programs designed to transform energy markets. According to an independent review of market transformation research, the technique has “*significantly advanced the field of market transformation research.*” (Peters, 1998).

To assist FEMP program managers in focusing improvement efforts, statistical analysis was done to determine drivers of overall satisfaction, that is, program or service aspects that most affect overall satisfaction. Stepwise regression analysis is applied to determine where there is statistical correlation between specific service aspects and overall satisfaction scores. Stepwise is different than standard regression analysis because it identifies independent variables that explain the largest amount of variance in customer satisfaction scores, isolates these relationships and then finds the variable that explains the next largest variance. It continues down this process until there are no variables left that explain additional variance between overall program or service satisfaction and the independent variables, typically specific aspects of how that service is provided. The stepped regression methodology is advantageous because it eliminates co-variance among the service aspects, which would distort the results.

Different FEMP technical assistance services are targeted for evaluation each year. The 1998 survey included several technical assistance services and Direct Assistance programs in addition to workshops. Three workshops were targeted for in depth evaluation while the rest were grouped together in a General Workshops category. The 1999 survey included a different selection of targeted workshops and the same FEMP technical assistance programs and services and direct assistance programs, with the exception of SavEnergy Audits which was omitted for the year because the program was in transition. The 1999 survey included for the first time two of FEMP’s Working Groups.

Service-specific questionnaires were developed for each service type. In 1999 each contained from 50 to 70 questions. The telephone survey instrument used in 1997 was a 50 minute in-depth interview. A shorter 15 minute survey instrument was developed for 1998 and modified slightly in 1999. Differences will be seen in the discussions that compare findings across the years.

In order to combine enough data to make the analysis for these services meaningful, however, the 300 respondents from the numerous programs or services are placed into reporting categories grouped by the name of the program or service. For example, the 18 services in the 1999 evaluation were placed in 8 service categories comprised of similar programs or services. The category of “General Workshops” includes 7 different types of workshops. The Direct Assistance programs include four types of Direct Assistance and the Working Groups category includes two different Working Groups. For the 8 grouped survey categories, the confidence intervals range from 95% plus or minus 10%, to plus or minus 20%. A sample of 1,276 customers would be needed for 95% plus or minus 5% confidence interval for each of the 8 service areas. The following sections of this paper provide a summary of selected results from the FEMP surveys.

Customer Job Responsibilities

In order to transform or impact a market you must first be sure that you are reaching the market you need to change. All three survey findings (1997,1998,1999) show that FEMP services are indeed reaching the desired target audience. Government employees represent over two-thirds of FEMP participants in 1997, 1998 and 1999. In the 1999 survey, 68% work for the federal government, 21% work for private companies with government contracts, 9% work for state government, 7% work for private companies without government contracts, 2% are academic, 1% work for local government, and 1% are with non-profit organizations. There has been some increase in involvement from private sector employees with government contracts in 1999, 21% compared to 12% in 1998 and 10% in 1997.

The surveys also collected information about respondents' job responsibilities to further investigate customer needs and targeting and to verify that FEMP was reaching the right customers within the targeted market. A 1-10 scale is used, where a 1 means no responsibility in the area and a 10 means a significant and large part of their job responsibility. The five areas of job responsibility asked are:

- Analysis and evaluation of technology,
- Policy direction,
- Decision making for purchases and implementation,
- The carrying out of those decisions, and
- Design, installation, or maintenance of technology.

The 1998 and 1999 survey results show significant variation in the customer job responsibility. In most cases the results are as expected, with responsibilities tracking with a targeted service or spread across the responsibilities for more generic services. Many FEMP customers have either no responsibility in some areas or extreme responsibility in those areas. This is evidenced by the fact that overall, the two most frequent responses in all five job responsibility areas are "1s" and "10s."

Satisfaction Levels of Participants

Customer satisfaction is an important measurement for assessing the ability of a program to meet customer expectations or to effect customer behaviors. Customers who are dissatisfied with a program's products or services are less likely to adopt the recommendations of the program or to stimulate market acceptance within customer networks. As noted in the diffusion of innovation literature (Rogers, 1995) customer networking is the key driver for strong market acceptance for a new technology. Customer satisfaction must be strong enough to allow networks to favorably impact acceptance. Dissatisfied customers can cause customer networks to work against the new technology just as satisfied customers can work to support the technology. It is critical for customer satisfaction to be high enough to gain customer acceptance and to stimulate customer networks critical for sustained market impact. Programs with low customer satisfaction levels cannot be expected to have the kind of performance enjoyed by programs with high levels of satisfaction.

As a general rule, satisfaction scores on a 10 point scale can be viewed with thresholds in mind. A satisfaction score of 9 or 10 typically denotes very satisfied customers who may have few minor concerns or recommendations about a product or service. Scores around 8 usually mean strong satisfaction, but not as strong as some would like to see. Fine tuning program services are needed to increase satisfaction scores in the 8 area. Satisfaction scores of 6 or 7 mean that the service is somewhat acceptable, but that there are usually one or more things that the customer needs improved about a service or product. Satisfaction scores below 6 indicate very serious problems with the program or service in the eyes of the customers. As a general rule, program managers will want to set program satisfaction goals of 8 or higher and concentrate improvements to increase scores that are less than 8.

The key measures of satisfaction in the FEMP evaluations are:

- Overall satisfaction,
- Satisfaction with specific aspects of technical assistance, and
- Key components or “drivers” of customer satisfaction

Overall Satisfaction

Overall, participants in FEMP’s programs and services have been consistently satisfied with the assistance they have received. In 1999 seventy-three percent of participants report overall satisfaction scores in the 8 to 10 range, where “10” is “Very Satisfied”. Forty-one percent rate the assistance at 9 or 10. The mean satisfaction score for all respondents is 8.0. This is comparable to results from 1997 and 1998, where mean satisfaction was 8.2 and 8.0 respectively. See Figure 1 below. Not shown in Figure 1 are slight differences in the satisfaction ratings by service category.

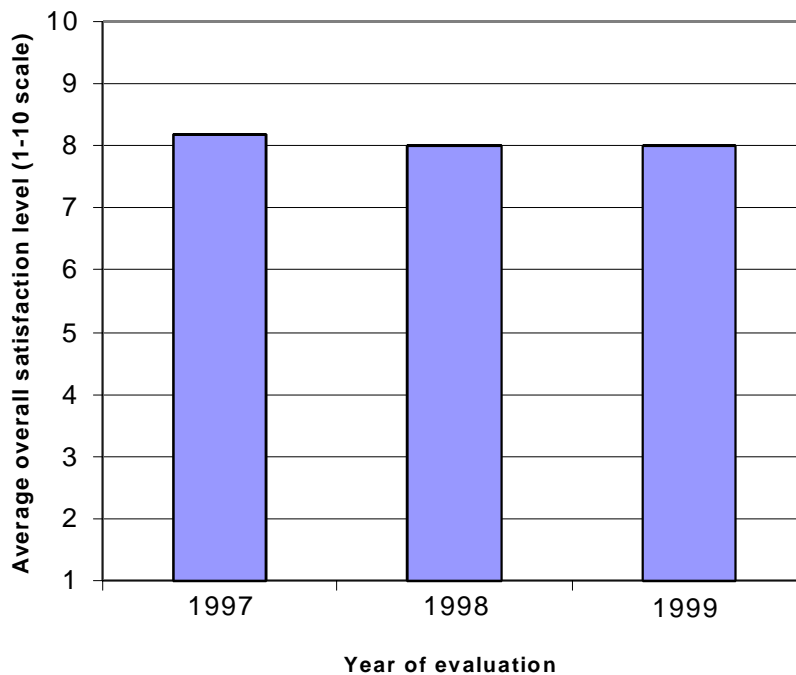


Figure 1. Overall Satisfaction with FEMP Service in 1997, 1998, and 1999

Satisfaction with Specific Aspects of FEMP Programs

FEMP customers are also satisfied with specific aspects of the assistance. Table 1 provides a presentation of the overall satisfaction scores with specific program aspects for all of the FEMP services targeted in the 1999 evaluation combined. Customer satisfaction scores pertaining to the knowledge of the FEMP instructors or persons providing assistance and the facilities where assistance was provided are both high (averaging 9.0 on a 10-point scale). The presentation skills of the instructors or assistance providers and the technologies used to present or provide the assistance also scored high, (8.6 & 8.7 respectively). The quality and accuracy of the assistance or the written materials provided and the location of where the assistance was provided also scored high at 8.5 each. A special set of service aspects was applied to the Working Groups. These are not shown in Table 1.

Table 1. Satisfaction Level with Specific Aspects of FEMP Programs or Services

Program Aspect	Satisfaction (1-10 scale)	Applies to...
Knowledge of instructor or technical staff	9.0	All but Working Groups, Technology Alerts, and Procurement Binder and Updates
Facilities where training was held	9.0	General Workshops and Energy Management and Low E Buildings Tele-courses
Technologies used to present assistance	8.7	General Workshops and Energy Management, Low E Buildings, and FEMP Lights Tele-courses
Presentation skills of instructor or technical staff	8.6	Direct Assistance, General Workshops, and Energy Management, Low E Buildings, and FEMP Lights Tele-courses
Location of assistance	8.5	General Workshops and Energy Management and Low E Buildings Tele-courses
Quality and accuracy of presentation, materials or information	8.5	All but Working Groups
Comprehensiveness of presentation and interaction with FEMP assistance staff	8.2	All but Working Groups
Stories and anecdotes provided	8.0	All but Working Groups and Direct Assistance
Ease of obtaining assistance	8.0	Direct Assistance Only
Timeliness of obtaining assistance	8.0	Direct Assistance Only
Instructor and attendee interaction	7.8	General Workshops and the Energy Management, FEMP Lights, and Low E Buildings Tele-courses

Drivers of Satisfaction

To assist FEMP program managers in focusing improvement efforts, statistical analysis was done to determine drivers of overall satisfaction, that is, program or service aspects that most affect overall satisfaction. Drivers may correlate either positively or inversely to overall satisfaction. Program improvements focused in areas that drive satisfaction are most likely to improve that overall satisfaction. Primary drivers are denoted in Table 2 by a large black ball “●” and secondary drivers are identified with a half ball “◐.” Non-drivers are marked with an empty ball “○”. Both primary and secondary drivers are

statistically significant at the 95th percentile. The primary driver is the service or program aspect that most strongly explains variation in overall satisfaction scores (on a respondent by respondent basis), while secondary drivers are ranked 2nd or 3rd in this regard. In other words, a relationship is strong and may be considered a driver when respondents who scored a service aspect high or low, also score their overall satisfaction high or low, respectively and when correlation between the relationship is strong across the surveyed population. . The percentages displayed next to the drivers in the table below represent the amount of total variation in the overall satisfaction scores explained by the driver The stepwise regression methodology used tends to slightly over-exaggerate the primary driver, while slightly under-representing the contribution of secondary drivers.

Stories and anecdotes are the primary drivers of satisfaction for the Procurement Binder, the Energy Management Tele-course, and the General Workshops. Comprehensiveness of the presentation is the primary driver for the Technology Alerts and the FEMP Lights Tele-course. Quality and accuracy of the information and assistance is the primary driver of satisfaction for the recipients of Direct Assistance, and the presentation skills of the instructor is the primary driver for the Designing Low-E Sustainable Buildings Tele-workshop. Ability to obtain support from other peers and professionals for projects is a primary driver of overall satisfaction for the Working Groups.

Table 2. Drivers of Overall Satisfaction by Service Category

Aspect of FEMP service or program	Tech Alerts	Binder and Update	FEMP Lights	Energy Management	Des Low-E Sus Build	Gen WrkSp	Direct Asst
Knowledge of instructor or technical staff			○	◐ 17%	○	◐ 3%	○
Facilities where training was held				○	○	◐ 3%	
Location of assistance				○	○	○	
Instructor and attendee interaction			○	○	○	○	
Technologies used to present assistance			◐ 7%	○	○	○	
Presentation skills of instructor or technical staff				○	● 42%	◐ 4%	○
Stories and anecdotes provided	○	● 47%	○	● 59%	○	● 64%	
Quality and accuracy of presentation, materials or information	○	○	○	○	○	○	● 68%
Comprehensiveness of presentation and interaction	● 66%	○	● 65%	○	○	○	○
Ease of obtaining assistance							◐ 8%
Timeliness of obtaining assistance							○

- “●” is a primary driver and “◐” is a secondary driver, ○ applicable but are not drivers.
- blanks indicate aspects that are not applicable to the service category.
- The percentages below the drivers indicate the amount of total statistical variation in overall satisfaction that is explained by that driver.

FEMP Is Moving Customers through the Technology Adoption Cycle

The Diffusion Model

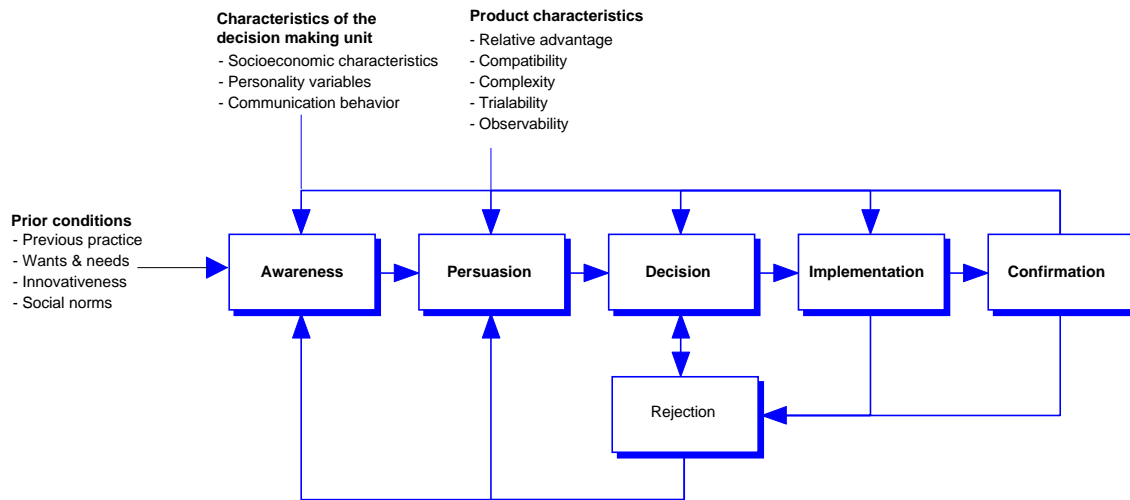
Technology diffusion and adoption theory suggests that customers move through a systematic series of events before they adopt a new energy or water efficient method of operation or technology. The diffusion literature lists six stages including: an *un-awareness* stage, *awareness* stage, a *persuasion* stage (information gathering), a *decision* stage, an *implementation* stage, and a *confirmation* stage in which the behavior is reinforced. This model is shown in Figure 2.

The Diffusion Survey Module and 1999 Findings

Survey results show that large percentages of customers have moved through the technology adoption process between the time prior to receiving the FEMP assistance and the customer survey. Survey results also indicate that most FEMP customers moved further down the adoption path following their interaction with FEMP's technical assistance programs, a clear indication that FEMP is impacting the adoption and use of energy efficient, water efficient or environmentally friendly technologies and behaviors. The studies did not employ control groups which could have established a direct causal link between technology diffusion and FEMP program participation. However, it appears that FEMP customers are moving down the diffusion path and adopting energy and environmental behaviors and technologies several times faster than other markets. Several independent reports on the buildings markets in California have noted that significantly slower adoption of similar technologies occur in the non-FEMP building markets. (Reed, et.al. 1999a, Reed, et.al. 1999b, Reed 2000) While the studies are not directly comparable in terms of markets and market actors, comparisons do suggest that FEMP is moving the markets faster than non-FEMP markets in a state with strong building codes aimed at improving the efficiency of private buildings. The reasons for this rapid diffusion within FEMP markets needs to be examined. The single most obvious hypothesis to test in future studies is that this movement is a result of FEMP participation.

The diffusion module in the 1999 telephone survey was tailored for each of the 18 FEMP programs or services targeted in the evaluation, using a single set of base questions pertaining to customers activities and knowledge prior to and after receipt of the targeted services. A similar approach was used in 1998 and in 1997.

Figure 3 illustrates the position of FEMP customers in the adoption cycle before and after receiving specific FEMP assistance, from the 1999 customer evaluation. The left side of the figure indicates the customer's position in the adoption cycle prior to participation. The right side indicates their position at the time of the most recent survey (Nov-Dec, 1999) approximately one year after participation. As indicated in this figure, 29% of FEMP customers were unaware of the recommended energy efficient, water efficient, or environmentally friendly product, technology or concept (technologies) prior to exposure from FEMP. Sixteen percent had just become aware of the technology before FEMP's exposure and 8% had already begun collecting information about the technology.



Source: Revised from Rogers 1995 by N Hall

Figure 2. Stages in the Diffusion of Innovation

Nineteen percent were in the process of making a decision about using the technology at the time of contact, and 12% had already implemented the FEMP recommended technology in their organization. An additional 16% were in the confirmation stage and had repeatedly implemented the technology prior to the FEMP assistance targeted in the survey.

Following FEMP's assistance no customers remained unaware of the recommended technologies as a result of the FEMP programs and only 6% indicated that they were just becoming aware of the technology. These figures indicate that about 40% of the customers that FEMP reached through these programs have moved at least through the first two stages of the adoption cycle, a significant accomplishment.

The same type of movement also occurred at the top end of the diffusion scale. Prior to FEMP's assistance 28% of all customers were in the implementation or confirmation stage. This increased to 67% following FEMP's assistance, indicating that an additional 39% moved into these two stages following FEMP's assistance.

Comparison of 1999 Results with 1998 and 1997

Similar movement in the market was seen in the 1997 and 1998 customer evaluations. Table 3 compares the 1999 results to the two previous years. The far right column displays the average stage FEMP customers are in at a given time period. Caution should be used in interpreting these results for several reasons. Although the numbers assigned to the stages of adoption are sequential (ordinal data), they are not considered ratio data. In other words, movement from stage 4 to stage 5 may be more significant than a move from stage 2 to stage 3. Despite this difference, each sequential stage is simply given a numerical value one greater than the previous stage. Also, different programs are evaluated and included in this data each year. For example, more Direct Assistance programs were added to the 1999 sample than were present in the 1998 or 1997 sample. Since participants in Direct Assistance

tend to already be far along in project development (often in stage 5 prior to participation), the average movement of 1999 is inherently less dramatic.

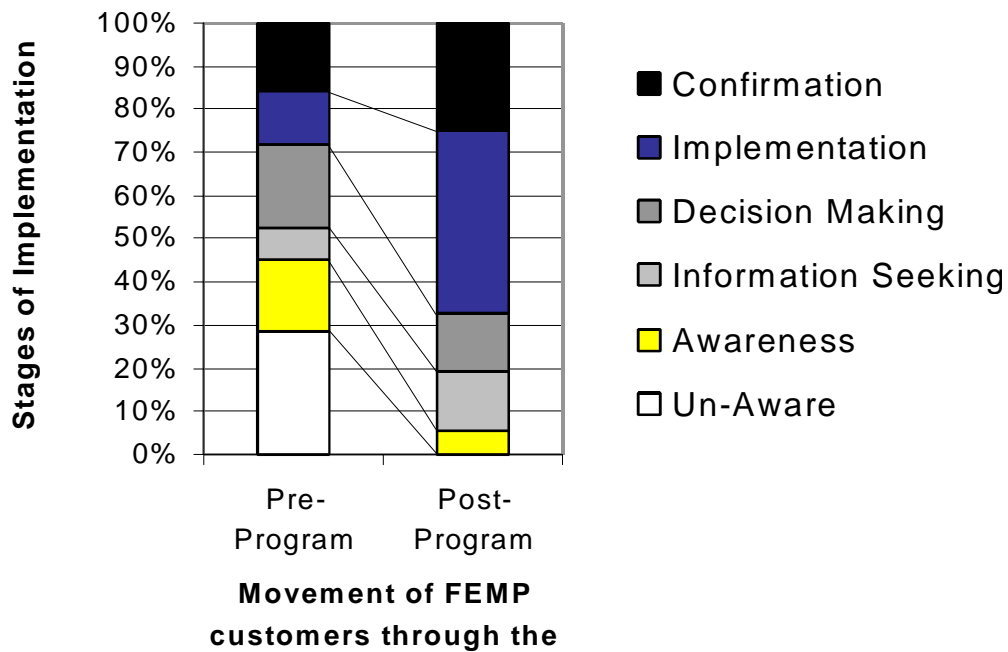


Figure 3. Movement of FEMP Customers through the Diffusion Stages

Despite these limitations, it is still useful to look at the average number of stages that FEMP participants have moved in the three evaluation years. There is a net movement in 1999 of 1.4 stages (3.01 before FEMP up to 4.41 afterwards). Despite the addition of more Direct Assistance participants, the 1999 “net stage movement” is up from the 1998 average of 1.18 stages. 1997 net movement is highest at 1.98 (from 2.95 pre-FEMP up to 4.93 post FEMP). Though beyond the scope of this research, possible explanations for this result include: 1) the 1997 study provided an additional year between receipt of assistance and the survey, giving customers significantly more time to move through the process, and 2) pre-FEMP 1997 participants started at the lowest average stage of 2.95 and had more room to move up.

Table 3. Comparison of Stages of Adoption for 1999, 1998, and 1997 Studies

Time-period	Percent Unaware	Percent Stage 1 Aware	Percent Stage 2 Persuasion	Percent Stage 3 Decision	Percent Stage 4 & 5* Implementation and Confirmation	Average stage
1999 Post-FEMP	0	6	14	13	67	4.41
1999 Pre-FEMP	29	16	8	19	28	3.01
1998 Post-FEMP	0	0	12	4	83	4.67
1998 Pre-FEMP	15	24	6	12	44	3.49
1997 Post-FEMP	0	1	1	2	96	4.93
1997 Pre-FEMP	36	17	3	4	40	2.95

* Implementation and confirmation are necessarily combined due to the data resolution presented in earlier evaluations.

Projects Influenced by FEMP Technical Assistance

Projects and Technologies Enumerated

One of the key questions FEMP managers wanted to know from the survey was the type and number of energy or water saving projects that were, directly influenced by FEMP's programs. It is not enough to know that customer are moving along the diffusion path, but managers also need to know if FEMP diffusion efforts are impacting more than one project per customer.

In the 1999 survey 112 customers who reported being moved through the adoption process to the implementation or confirmation stages indicate that they have completed 2,903 projects following the FEMP assistance, that were, according the surveyed customers, directly influenced by FEMP' programs (an average of 26 projects per respondent moving into these two stages). These data indicate that not only is FEMP assisting customers down the diffusion path, but they are doing it over and over again, repeating and confirming that the recommendations made by FEMP are the right ones for these customers. The projects influenced by FEMP for these customers include the following project types.

- Lighting systems
- HVAC systems and controls
- Motors, pumps, and drives,
- Building envelope or components
- Energy Management Systems (EMS)
- Industrial processes or equipment
- Renewable energy
- Water

Attempts to Collect Additional Information

In the 1998 and 1999 surveys, respondents were asked if their organizations document energy savings, dollar savings, or pollution reduction on at least some of their FEMP related projects, and if so, if they were willing to have FEMP staff call for more information. FEMP staff would use the documentation of impacts influenced by FEMP technical assistance in case studies and to demonstrate the effectiveness and impact of FEMP. Fifty-seven percent of all respondents, or someone else in their organizations, document energy savings, dollar savings, or pollution reduction on at least some of their FEMP related projects. Eighty-eight percent of these respondents are willing to have FEMP staff call them for more information about their projects.

Documentation includes: metering, case studies, application for an award, and measurement and verification. Unfortunately very few of the 100 people called after the 1998 study were able to easily provide additional documentation, indicating that while addition information is sometimes kept it is not easily accessible to the individuals surveyed. To avoid this inability to collect additional information in the future, filter questions were asked in 1999 to ensure that written documentation would be available when FEMP staff phoned. The form of documentation maintained by FEMP customers varies. Thirty-two percent have applied for a DOE energy savings award on at least one project. Forty percent

have written something for the press about these projects and 52% have written summary sheets, fact sheets, or evaluation studies on one or more projects.

Customers Share FEMP Information

Sharing FEMP information with others has the potential to multiply FEMP's impacts within their target markets and greatly speed market transformation. Sharing information (or customer networking) is identified as the single most effective method for spreading the diffusion of innovation (Rogers 1995). If FEMP customers share their information with other professionals inside or outside of their organizations, FEMP's impacts can be multiplied across markets and within organizations. When customer information sharing becomes the dominate mode of information transfer about a new technology the market is said to be in the maturing stages of being "transformed" with respects to a specific product or service (Moore 1991)

On average, 1999 FEMP customer respondents each share information with 11 people within their organization and 10 people outside of their organization. This is comparable to the 1998 result of 13 people within the organization and 10 people outside of the organization, with the difference likely to be a function of program targeting for the two survey efforts.

From 1997 to 1998 to 1999, there is an increase in the percent of participants sharing FEMP technical assistance information both internally and externally (outside of organization). The percent sharing both externally and internally has gone from 31% in 1997 to 43% in 1998 up to 46% in 1999. The number of customers sharing information internally only has remained about the same (44% in 1997, 41% in 1998 and 43% in 1999). See Figure 4 below.

Process and Service Improvements

Wanting to continuously improve programs and identify new customer needs, each of the FEMP customer evaluations requested information for process and service improvements. Additionally, within each service module, participants were asked about their needs such as what other technologies they wanted to read about in the Technology Alerts or Procurement Recommendations. Also, when satisfaction scores were below 7 for a particular item respondents were asked to explain the reasons for their dissatisfaction. Finally, every respondent was asked for recommendations on improvement and additional services needed.

Forty percent (119) of respondents provided 120 improvements and/or additional services they would like to see FEMP offer. These give an indication of what is needed to continue moving their projects down the diffusion path. The items most frequently mentioned were funding for projects and financial assistance; a Life Cycle Costing (LCC) decision support tool; more advertisement of FEMP services and more media attention for FEMP; ESPC (Energy Service Performance Contracting) support from FEMP; a telephone hotline for technical assistance that refers people to technology specialists; and more case studies.

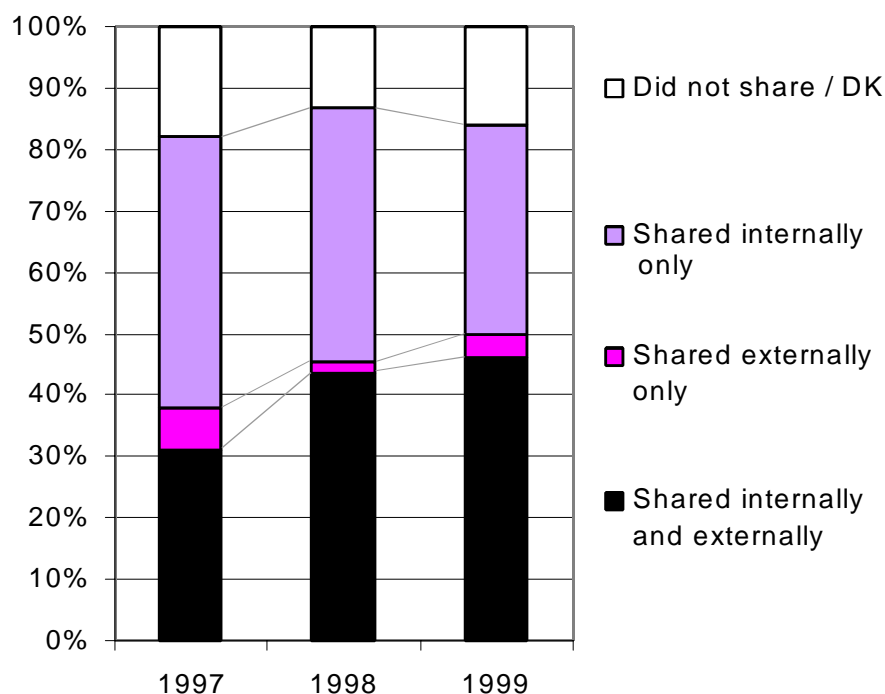


Figure 4. Participant Sharing of FEMP Assistance for 1997, 1998, and 1999

Summary and Conclusion

This paper reports many of the benefits of the Technical Assistance Program of the U.S. Department of Energy's Federal Energy Management Program. The FEMP programs are of two types, those that directly impact the market by providing project-specific assistance, and those that indirectly impact the market through demonstration, decision and analysis tools, education, and information dissemination. This paper demonstrates that FEMP technical assistance is impacting the market by assisting program participants through the stages of adoption and diffusion of energy technologies. The paper also details other impacts of FEMP's services, including 1) the types of projects implemented in part due to FEMP technical assistance, 2) potential case studies for documented energy savings impacts, 3) an assessment of value and satisfaction with FEMP services and tools, and 4) an examination of customers' sharing of FEMP skills, tools and information. The evaluation studies reported demonstrate techniques that should be useful for others interested in documenting the impacts of technical assistance programs, including documenting movement within the marketplace.

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