



*Leading by example, saving energy and taxpayer dollars in federal facilities*



**ORNL/CON-494**

## **Federal Energy Management Program**

### **Utilities Energy Service Contract Program Activity Analysis**

**FY 2000–FY 2004**

**October 2005**



U.S. Department of Energy  
**Energy Efficiency and Renewable Energy**



**Federal Energy Management Program**

**Utilities Energy Service Contract  
Program Activity Analysis**

**FY 2000–FY 2004**

October 2005

Bruce Tonn, Ph.D.  
Michaela Martin, PE, CEM  
Melissa Madgett, PE, CEM

Oak Ridge National Laboratory  
Oak Ridge, TN



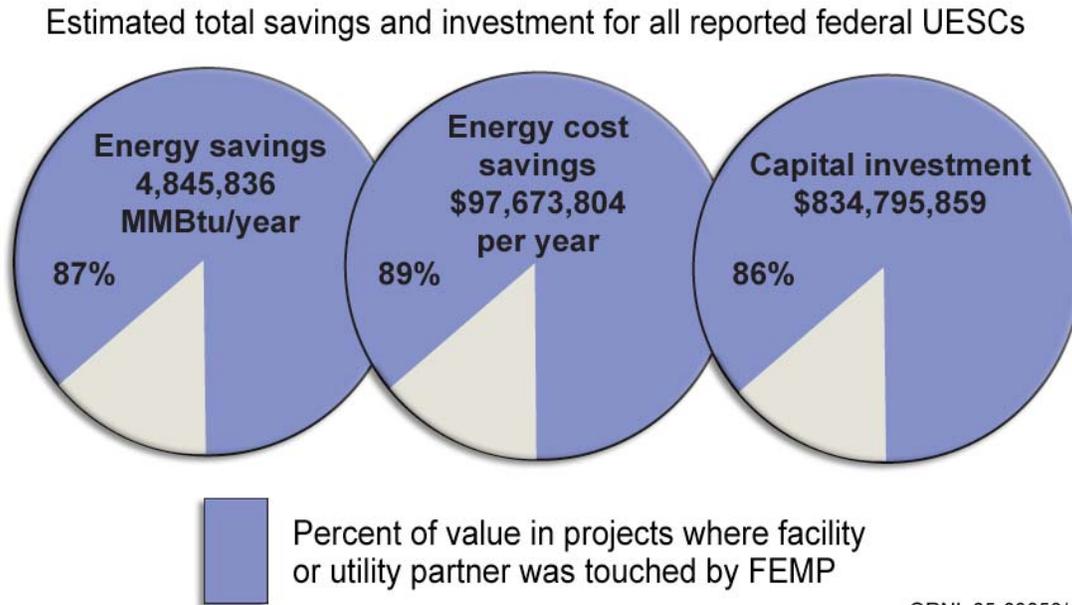
## EXECUTIVE SUMMARY

This report presents the results of a preliminary assessment of the Federal Energy Management Program (FEMP) Utility Energy Service Contracts (UESC) Program. This program assists federal facilities and utilities in awarding UESCs. The FEMP UESC Program provides several services in support of UESCs to federal and utility clients, including publications, training and workshops, outreach, and UESC direct project support. It also hosts a series of high-level agency-utility partnership meetings, known as the Federal-Utility Partnership Working Group (FUPWG).

To guide this research, a program logic model was developed. FEMP UESC is organized into the five activity areas mentioned in the first paragraph. FEMP UESC funds inputs in each activity area to provide services to facility and utility

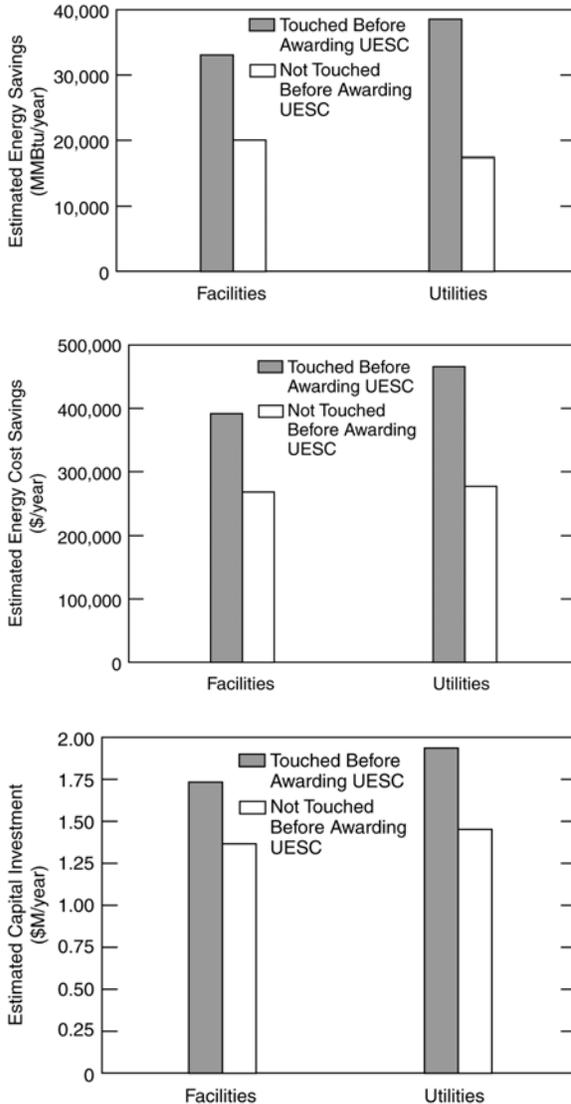
clients. This funding results in quantifiable outputs. The outputs are expected to lead to short-term and intermediate outcomes, of which the establishment of UESCs is most important. Finally, UESCs are expected to result in the most important ultimate outcomes, energy and energy cost savings, and many other ultimate outcomes, such as those related to the environment and national security. These ultimate outcomes are consistent with the missions of FEMP, the Office of Energy Efficiency and Renewable Energy (EERE), and the U.S. Department of Energy (DOE).

The data show that UESC projects that received some level of FEMP services account for the great majority of energy savings, energy cost savings, and capital investment reported by federal UESCs (Figures E.1 and E.2).



ORNL 05-03056/es

**Figure E.1. Projects touched by FEMP account for most of the energy savings, energy cost savings, and capital investment from reported federal UESCs awarded from FY2000 through FY2004.**



**Figure E.2. When facilities and utility partners use FEMP services before UESCs are awarded, energy and cost savings are substantially greater. Capital investments also are greater.**

Federal facilities that received some FEMP services before awarding a UESC reported an average 33,000 MMBtu in estimated annual energy savings, \$392,000 in energy cost savings, and capital investments of \$1.7 million, compared with 19,000 MMBtu, \$277,000, and \$1.4 million, respectively, when FEMP was not involved before the UESC award. Utilities reported average annual energy savings of 38,500 MMBtu, energy cost savings of

\$467,000 and capital investments of \$1.9 million when FEMP services were received before a UESC was awarded, compared with 17,000 MMBtu, \$277,000, and \$1.5 million, respectively, when FEMP was not involved beforehand.

Data were gathered from several sources to support this research. Program outputs, an important component of program evaluation, were summarized from FY 2000 to FY 2004. Relationships between program outputs and program outcomes (i.e., the establishment of UESCs) were explored. Several conclusions are offered:

- The FEMP UESC Program provided a substantial number of documented services during the 2000–2004 period: almost 1000 requests for publications were made, more than 1000 people attended training sessions and workshops, and more than 700 people attended FUPWG meetings.
- During this period, records from a master list of FEMP and non-FEMP related UESCs indicate that 587 UESCs were awarded, representing 16 different agencies, 242 different facilities, and 49 utilities. The master list also identifies nearly 5 million MMBtu in annual energy savings, resulting in almost \$100 million in annual energy cost savings and \$835 million in capital investments.
- Across all UESCs (FEMP and non-FEMP-related), it is estimated that the average UESC resulted in \$327,800 in energy cost savings and 26,200 MMBtu in energy savings and required \$1.64 million in capital investment per project.
- Facilities that were touched by FEMP before awarding a UESC saved, on average, almost 74% more energy per project than did facilities that awarded

a contract but did not receive any FEMP services.

- Of all UESCs recorded in the master list (covering FY 2000–2004), 89% of the total reported annual energy cost savings (\$86.5 million), 87% of the total reported annual energy savings (4.2 million MMBtu), and 86% of the total reported capital investments (\$716.3 million) were linked to at least one FEMP UESC service delivered to the participating facility and/or utility.
- The FEMP UESC Program touched almost 4% of all federal facilities.
- Approximately 5% of facilities that received FEMP services before awarding a UESC or during the year the UESC was awarded have actually awarded a UESC. This can be interpreted as a yield rate of FEMP UESC services. The yield rate for utilities is approximately 13%.
- Approximately 74% of the utility FUPWG participants were from utilities that have participated in one or more UESC contracts.
- Decidedly more facilities and utilities received FEMP UESC Program services during a UESC performance period than before a UESC was awarded.
- Approximately 15% of federal facilities that awarded UESCs were touched by one or more FEMP UESC services.

Based on the data collected, it is unclear exactly what impact FEMP UESC Program services had on facility and utility decisions to establish UESCs. It was hypothesized that facilities and utilities that established UESCs would have received more services than those that have not yet established UESCs. The data revealed the opposite situation: those that have not yet awarded UESCs received

more services. Additionally, it appears that those facilities and utilities that established UESCs used more services after the award than before. The data do suggest that once the UESCs were awarded, many facilities and utilities then decided they needed more assistance in managing the UESC process and, consequently, consumed more FEMP UESC Program services before contract completion. The data also suggest that more energy cost savings and energy savings were achieved per project by facilities that received FEMP services than those that awarded UESCs but did not receive any services.

It is unclear whether a yield rate of 5%, the percentage of facilities receiving a FEMP UESC Program service that went on to award a UESC, is low, meets expectations, or greatly exceeds expectations. This rate, however, is consistent with yield rates experienced in the private sector for similar marketing activities. It is also unclear how much of the energy savings and energy cost savings achieved by the UESCs can be attributed to FEMP.

To help answer these questions and better gauge the influence of the FEMP UESC Program on the award of UESCs, it is recommended that a survey of participating federal facilities be conducted. Facility managers would be asked about the value of FEMP services, their experiences with the UESC process, and barriers that may prevent the award of UESCs. Utility representatives would also be asked similar questions. Federal facility managers can be surveyed without Office of Management and Budget (OMB) approval. Since about nine utilities have been involved in most of the UESCs, it is recommended that only these nine be surveyed to expedite the survey process.

OMB approval is needed for surveys of ten participants or more.

The second general recommendation pertains to the data. It is quite possible that the data sources used in this assessment were not complete. For example, it is possible that many UESCs were not recorded, because reporting is voluntary. Reporting of contract completion dates, project energy and energy cost savings, and capital investments needs to be improved. It is known that information about how many publications were requested in the year 2000 was not available. WebTrends does not provide information about all web site hits and downloads but only for the most frequently hit pages and downloaded documents and software. This data source also does not provide the identities of web users. It is also strongly suspected that attendance at several workshops, especially teleworkshops, was under-reported. Finally, information that could have been helpful in characterizing FEMP UESC program participants and linking participants either to facilities or to agency headquarter operations was often missing. It is recommended that efforts be made to

improve the data collected in all these areas.

Third, it is recommended that improvements in the data collection and record keeping processes be considered. Ideally, data needed for assessments of the FEMP UESC Program would be readily available on demand. This vision is far from the current reality. Much effort was expended to assemble the assessment data, e.g., many special database queries were needed to extract the data from several databases. This process was very time-consuming, and it limited the time and effort expended upon data analysis. Currently, FEMPCentral does not support this specialized record keeping across all activities.

Finally, expanding the scope of the FEMP UESC Program evaluation should be considered. The preliminary design matrix in Appendix B provides an initial framework for this effort. This matrix suggests, for example, that it might prove valuable to assess the relationships between the main participants in the FEMP UESC Program, the agencies/facilities, utilities, and FEMP itself.

## CONTENTS

	<b>Page</b>
EXECUTIVE SUMMARY .....	iii
LIST OF FIGURES .....	ix
LIST OF TABLES .....	xi
1. BACKGROUND .....	1
2. UESC PROGRAM LOGIC MODEL .....	3
3. DATA SOURCES .....	6
3.1 FEMP UESC Program Outputs Data.....	6
3.1.1 Hard Copy Publications .....	7
3.1.2 Downloaded Publications .....	7
3.1.3 Workshops and Training.....	7
3.1.4 Federal Utilities Partnerships Working Group Meeting Database .....	7
3.2 UESC Project Database Outcomes Data.....	8
3.3 Data Exclusions .....	8
3.4 Other Data Issues .....	9
4. SUMMARY OF SELECTED FEMP UESC PROGRAM OUTPUTS AND OUTCOMES.....	10
4.1 Outputs.....	10
4.2 Outcomes .....	15
5. ANALYSIS.....	20
5.1 FEMP UESC Program Touches.....	20
5.2 Timing of FEMP UESC Program Services Received by Facilities and Utilities.....	23
5.3 Types of People Receiving FEMP UESC Program Services .....	30
5.4 Top Services Received.....	30
5.5 Influence of FEMP UESC Program on Ultimate Outcomes .....	40
6. CONCLUSIONS AND RECOMMENDATIONS .....	42
7. REFERENCES .....	45
8. ACKNOWLEDGMENTS .....	46
Appendix A: SUPPORTING TABLES AND FIGURES.....	A-1
Appendix B: EVALUATION DESIGN MATRIX.....	B-1



## LIST OF FIGURES

Figure		Page
1	Generic logic model.....	3
2	UESC logic model .....	5
3	UESC data development—from multiple data sources to an integrated relational database.....	6
4	UESC projects by agency and fiscal year of award.....	15
5	Number of UESC projects awarded and completed, by fiscal year, for FY 2000–2004.....	16
6	Time between UESC award and project completion.....	16
7	Facility participation levels by fiscal year and FEMP UESC activity.....	17
8	Utility participation levels by fiscal year and FEMP UESC activity.....	18
9	Publication requests by facilities with UESCs (years received) by award date (FY 2000–2004) .....	24
10	Publication requests by facilities with UESCs (years received) by completion date (FY 2000–2004) .....	24
11	Publication requests by utilities with UESCs (years received) by award date (FY 2000–2004) .....	25
12	Publication requests by utilities with UESCs (years received) by completion date (FY 2000–2004) .....	25
13	Workshops and training attendees by facilities with UESCs (years received) by award date (FY 2000–2004) .....	26
14	Workshop and training attended by facilities with UESCs (years received) by completion date (FY 2000–2004) .....	26
15	Workshop and training by utilities with UESCs (years received) by award date (FY 2000–2004) .....	27
16	Workshop and training by utilities with UESCs (years received) by completion date (FY 2000–2004) .....	27
17	FUPWG meeting attendees by facilities with UESCs (years received) by award date (FY 2000–2004) .....	28
18	FUPWG meeting attendees by facilities with UESCs (years received) by completion date (FY 2000–2004) .....	28
19	FUPWG meeting attendees by utilities with UESCs (years received) by award date (FY 2000–2004) .....	29
20	FUPWG meeting attendees by utilities with UESCs (years received) by completion date (FY 2000–2004) .....	29
21	Publication requests by facilities with UESCs (years received) by job title and award date (FY 2000–2004) .....	31
22	Publication requests by facilities with UESCs (years received) by job title and completion date (FY 2000–FY2004).....	31
23	Workshop and training by facilities with UESCs (years received) by job title and award date (FY 2000–2004) .....	32
24	Workshop and training by facilities with UESCs (years received) by job title and completion date (FY 2000–2004).....	32

25	FUPWG meeting attendees by facilities with UESCs (years received) by job title and award date (FY 2000–2004) .....	33
26	FUPWG meeting attendees by facilities with UESCs (years received) by job title and completion date (FY 2000–2004) .....	33
A.1	Facility representation levels by fiscal year and FEMP UESC activity .	A-3
A.2	Utility representation levels by fiscal year and FEMP UESC activity ...	A-3

## LIST OF TABLES

Table		Page
1	Hard copy publication requests overview—total number of participants by fiscal year .....	10
2	Workshops and training overview—total number of participants by fiscal year .....	11
3	FUPWG meetings overview—total number of participants by fiscal year .....	12
4	FEMP UESC Program Activity Outputs – Participation Levels and Projects Supported .....	14
5	Number of UESCs by award and completion date .....	17
6	General description of UESC database savings and implementation data .....	19
7	Number of facilities touched by FEMP services before and after awarding UESCs .....	21
8	Number of utilities touched by FEMP services before and after awarding UESCs .....	21
9	Number of facilities touched by any FEMP service before and after awarding UESCs .....	22
10	Number of utilities touched by any FEMP service before and after participating in UESCs .....	22
11	Publication requests by number of facility participants (FY 2000–2004) .....	34
12	Publication requests by number of utility participants (FY 2000–2004) .....	35
13	Workshop and training attendance by number of facility participants (FY 2000–2004) .....	36
14	Workshop and training attendance by number of utility participants (FY 2000–2004) .....	37
15	FUPWG meeting attendance by number of facility participants (FY 2000–2004) .....	38
16	FUPWG meeting attendance by number of utility participants (FY 2000–2004) .....	39
17	Average per UESC project estimated energy cost savings, energy savings, and capital investments by timing of FEMP UESC program touches .....	41
18	Summary of awarded UESC project savings .....	41
A.1	Overall representation output table .....	A-2
A.2	Publication requests by facilities with UESCs (years received) by award date .....	A-4
A.3	Publication requests by facilities with UESCs (years received) by completion date .....	A-4
A.4	Publication requests by utilities with UESCs (years received) by award date .....	A-5

A.5	Publication requests by utilities with UESCs (years received) by completion date.....	A-5
A.6	Workshops and training attendees by facilities with UESCs (years received) by award date .....	A-6
A.7	Workshops and training attendees by facilities with UESCs (years received) by completion date .....	A-6
A.8	Workshops and training attendees by utilities with UESCs (years received) by award date .....	A-7
A.9	Workshops and training attendees by utilities with UESCs (years received) by completion date .....	A-7
A.10	FUPWG meeting attendees by facilities with UESCs (years received) by award date .....	A-8
A.11	FUPWG meeting attendees by facilities with UESCs (years received) by completion date .....	A-8
A.12	FUPWG meeting attendees by utilities with UESCs (years received) by award date .....	A-9
A.13	FUPWG meeting attendees by utilities with UESCs (years received) by completion date .....	A-9
B.1	FEMP UESC Program Evaluation Design Matrix.....	B-2

## 1. BACKGROUND

The Energy Policy Act of 1992 provided the legal authorization for federal agencies to enter into energy services contracts with utilities. These contracts are another source of financial support for federal energy-efficiency investments, in addition to direct federal funding authorizations. In general, the utility or one its agents funds the energy-efficiency investments. The federal facility pays back the utility or its agent from the cost savings accrued from the energy-efficiency investments.

There are two types of energy service contracts that federal agencies can enter into: Energy Service Performance Contracts (ESPCs) and Utility Energy Service Contracts (UESCs). The former are typically long-term arrangements with savings guarantees. The latter are typically of shorter duration, and savings are not typically guaranteed.

This report presents the results of a preliminary assessment of the U.S. Department of Energy (DOE) Federal Energy Management Program (FEMP) activities responsible for assisting federal agencies entering into UESCs with utilities. The FEMP UESC Program provides a range of services in support of UESCs to federal clients. These services include training and workshops, publications, outreach, and UESC direct project support. This program also hosts a series of high-level agency–utility partnership meetings, known as the Federal-Utility Partnership Working Group (FUPWG).

Section 2 of this report organizes FEMP UESC activities into a *program logic model*. The logic model links FEMP UESC program inputs (e.g., publications, workshops) to program outputs (e.g., number of people trained about how to award and administer UESCs), to short-term and intermediate-term program outcomes (e.g., signed UESCs), and finally, to ultimate program outcomes (e.g., facility energy savings). The program logic model provides the framework for this assessment. An evaluation design matrix, found in Appendix B, provides a proposed framework for further defining the scope of additional evaluation efforts.

Section 3 describes the data and data sources used in this assessment. FEMP UESC Program activities and outputs are also summarized. A substantial amount of time and effort were needed to acquire, integrate, and conduct quality assurance of data from numerous sources for this evaluation. Section 4 characterizes FEMP UESC Program outputs and outcomes during the 2000–2004 time period.

This research explores in a very preliminary manner the question of how influential FEMP UESC Program services were on the awarding of UESCs. Section 5 presents the results of several analyses used to explore this question. For example, a program yield rate was calculated to indicate what percentage of facilities that received one or more FEMP services went on to award a UESC. Estimates of the energy and energy cost savings resulting from projects linked to facilities that were touched by FEMP were also developed. Appendix A contains many supporting tables and figures that help to provide a more in-depth understanding of the results presented in Sections 3, 4, and 5.

Section 6 contains the conclusions of this research and recommendations for next steps to sharpen our understanding of the impacts of the FEMP UESC Program on UESCs and energy saving outcomes that may be attributable to FEMP UESC activities.

## 2. UESC PROGRAM LOGIC MODEL

A program logic model was developed, jointly by UESC program staff and the ORNL evaluation team, to help describe the program and guide this evaluation. This logic model follows the generic model presented in Figure 1 and is based on the approach recommended by the W. K. Kellogg Foundation (Kellogg 2001). Logic models are defined by the Kellogg Foundation as “a systematic and visual way to present and share your understanding of the relationships among the resources you have to operate your program, the activities you plan to do, and the changes or results you hope to achieve.”

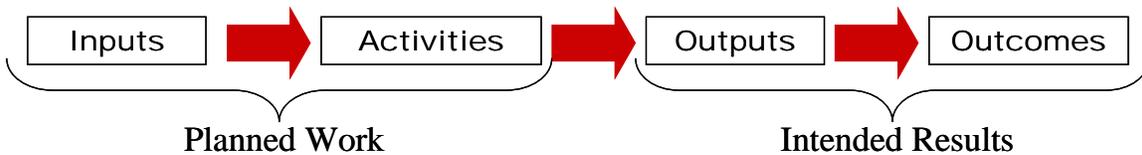


Figure 1. Generic logic model.

The detailed UESC logic model is represented in Figure 2 in matrix format. Each column of the matrix represents a program activity, such as direct project support, publications, and training and workshops. Under each activity are its primary input items, in the jargon of program logic modeling. For example, FEMP UESC funds authors to prepare publications, trainers to provide training, and facilitators to manage FUPWG meetings. These input items benefit several clients, including federal agencies, utilities, and energy service companies. These input items and interactions with clients produce quantifiable outputs. For example, countable outputs under “Publications” include the number of publications distributed through the Energy Efficiency and Renewable Energy (EERE) Information Center. Outputs under “Training and Workshops” include number of training sessions and workshops offered and participants who attended the sessions.

Below outputs is the first set of program outcomes, those that are short-term and intermediate in nature. The primary outcome is number of UESCs established. Other outcomes are related to educating participants about UESCs, improving the use of UESCs, and overcoming barriers to the award of UESCs. The primary *ultimate* outcomes are direct energy savings, peak load reduction, energy cost savings from established UESCs, and agency investments in UESC energy projects. Additionally, energy savings can yield a host of important other, non-energy-related benefits related to the environment, national security, local economies, and human health and safety.

Appendix B contains another evaluation tool, a design matrix. This matrix flows from the logic diagram and helps evaluators develop questions to guide the evaluation. The focus of this evaluation, on program outputs and outcomes, is clearly found in the design matrix. This matrix also suggests, for example, that it might prove valuable as a next step to assess the relationships between the main participants in the FEMP UESC Program, the agencies/facilities, utilities, and FEMP itself.

The simplicity of the program logic model belies two important evaluation challenges encountered by the project team. First, as discussed and documented in Sections 3 and 4, quantifying FEMP UESC program outputs proved to be very time consuming and difficult because the data appear to be incomplete and reside in several different databases. Second, demonstrating that FEMP UESC program outputs resulted in the primary FEMP UESC program outcomes (e.g., number of UESCs awarded and resulting savings) also proved to be a complex task (see Section 5).

Activity Areas	Direct project support	Publications	Training and workshops	Outreach (strategic meetings, presentations)	Federal Utility Partnership Working Group (FUPWG)	Analysis and reporting
<b>Inputs</b> (FEMP-funded)	Project facilitation, technical assistance (national labs, support contractors)	Authors, publisher (DOE, national labs, Information Center)	Trainers, materials (national labs, Information Center)	Presenters, facilitators, materials (national labs, Information Center)	Meeting facilitation (national labs, support contractors)	Data collection, analysis, reporting (national labs)
<b>Customers</b>	Federal agencies	Federal agencies, utilities, energy service providers	Federal agencies, utilities, energy service providers	Federal agencies, utilities, energy service providers	Federal agencies, utilities, energy service providers	Federal agencies, utilities, energy service providers, FEMP and DOE management, policymakers
<b>Outputs</b>	# of UESC projects facilitated or assisted	# distributed through web download to agencies, to others  # distributed through Information Center, to agencies, to utilities, to energy service providers  # of agencies using the DOE/EEI model agreement	# of workshops and training events  # of agencies and facilities represented  # of utilities and energy service providers represented  # of other participants	# of meetings  # of meeting attendees, # agencies, facilities represented, # of utilities, and # of energy service providers represented  # of presentations  # in presentation audience  # of formalized partnership agreements brokered	# of meetings  # of agencies  # of facilities  # of utilities  # of energy service providers	Quarterly updates on all UESC activities; ad hoc analysis and summary reports for customers
<b>Outcomes</b>	<b>Short-term and intermediate</b>					
	Expedite and improve the ease of use of UESC by participating agencies  Participating agencies improve their success with UESC as an implementation mechanism  Agencies trained through facilitated projects replicate their success in other UESC projects  # of UESCs established	Participants are educated and seek opportunities to develop UESC  Participants receive guidance on best practices for UESC  Participating agencies improve their success with UESC as an implementation mechanism  # of UESCs established	Participants are educated on the benefits of UESC and all seek UESC opportunities  Participants understand FEMP's role in providing UESC assistance  Participating agencies improve their success with UESC as an implementation mechanism  # of UESCs established	Raises participant awareness about the use and benefits of UESC as a contracting vehicle  Participants understand FEMP's role in providing UESC assistance  Participants seek additional assistance from FEMP throughout the development of their UESCs  Participants develop UESCs based on partnership agreements  # of UESCs established	Participants address procurement, technical and policy issues related to UESC, as well as a range of other utility-related issues of interest to all  Participants develop partnerships to establish UESCs  # of UESCs established	Feedback to FEMP management and customers on federal UESC demand, application, performance
<b>Outcomes</b>	<b>Ultimate</b>					
Energy Benefits	Direct energy savings, peak load reduction, energy cost savings from established UESCs, agency investments in UESC energy projects; private sector investment					
Non-energy Benefits	Water, environmental, national security, local economic, health and safety from established UESCs					

**External Factors:**

- project funding options- ECIP, rebates, appropriations, 3<sup>rd</sup> party finance, loans;
- contracting mechanisms- areawide contracts, basic ordering agreements, model agreements;
- legislation, executive actions, legal opinions and agency guidance;
- utility commitments such as EEI;
- agency energy infrastructure, environmental and security issues, mission

**Figure 2. UESC logic model.**

### 3. DATA SOURCES

The program logic model specifies output and outcome data required to assess the FEMP UESC Program. This project focused on acquiring data that describe major program activities, publications, workshops and training, and FUPWG participation from FYs 2000 through 2004. The number of UESCs established was the primary short-term to intermediate outcome assessed. Energy savings, energy cost savings, and capital investments in UESC projects were the ultimate outcomes addressed by this project.

This section describes the sources for the outputs and outcomes data. Our approach was to integrate data from different sources into a relational database (Figure 3) through facility and utility affiliations. Each record in the relational database would describe the FEMP UESC Program services received by a facility or utility (outputs) and the resulting UESCs and savings and investment information (outcomes). The data sources for the outputs and outcomes are discussed in Sections 3.1 and 3.2, respectively. Sections 3.3 and 3.4 address data exclusions and other data resource issues.

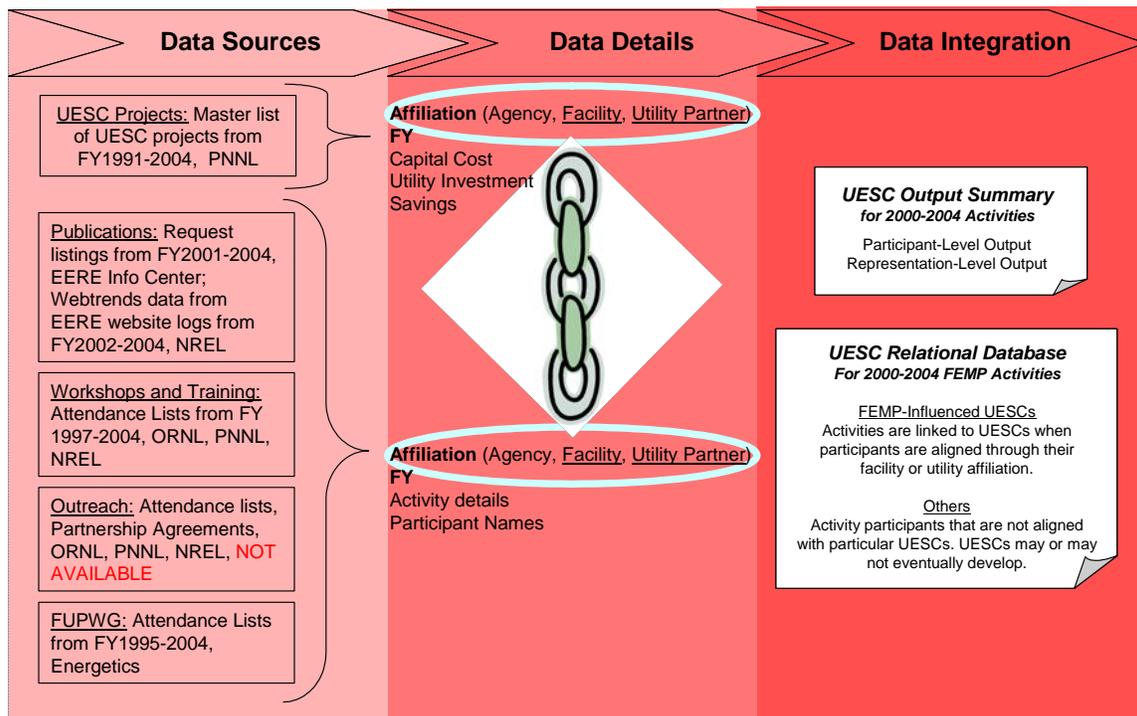


Figure 3. UESC data development—from multiple data sources to an integrated relational database.

### **3.1 FEMP UESC Program Outputs Data**

This sub-section describes the four sources of outputs data.

#### **3.1.1 Hard Copy Publications**

Records of requests for hard copies of publications are recorded in the FEMPCentral database. Queries were developed to identify the requests for hard copy publications distributed by the EERE Information Center from FY 1995 through the beginning of FY 2005. Data were not available for FY 2000. The FEMPCentral query identifies participants (e.g., federal agencies and facilities, utilities) who requested information (e.g., overviews, case studies, enabling documents); the participant's agency or utility, email, mailing address, publication requested, and year of request are typically provided. These data do not include the number of publications requested, only the number of unique requests generated.

#### **3.1.2 Downloaded Publications**

Publications downloaded from the FEMP UESC Web Page were archived by two different versions of WebTrends (a server log analysis program, located on the FEMP server that hosts FEMP's website). Unfortunately, the WebTrends data report is very limited in content. First, the most complete data only cover FY 2002–2003. Second, the WebTrends report includes only the top 20 downloads for each reporting month; thus download totals from the FEMP UESC Web Page are underestimated. Third, WebTrends does not collect information about the recipients. Only the domain names from which the users linked to the FEMP UESC Web Page are saved for further analysis. To estimate the number of downloads likely attributable to FEMP UESC clients, only downloads to domains with .gov and .mil addressed were counted. About 15% of the catalogued downloads went to these domains.

#### **3.1.3 Workshops and Training**

Workshop and Training registration information was provided by Karen Thomas [Pacific Northwest National Laboratory (PNNL)] and Julia Kelley (Oak Ridge National Laboratory) via Excel files. Participant data include the agency or utility identification, email, telephone/fax, and workshop/training attended (date, title of workshop/training, and location). Workshops are considered to be events of a day or less; training sessions are 2 days. However, workshops and training sessions are combined in the overall results.

#### **3.1.4 Federal Utilities Partnerships Working Group Meeting Database**

A list of attendees at FUPWG meetings was provided by Jen Folte (Energetics) in an Excel file. Participant data include agency or utility, email, mailing address, and meeting date attended from FY 1995 through FY 2004.

### **3.2 UESC Project Database Outcomes Data**

A master list of FEMP-related and non-FEMP-related UESC projects by award date for the years covering FY 1991–2005 was provided by Kate McMordie-Stoughton (PNNL) in Excel file format. Information for UESC projects in FY 2000–2004 was retrieved as

the data set for this analysis. The agency, facility, and utility are identified for each UESC project, as well as the year awarded and completed, capital cost, energy cost savings, energy savings (MMBtu), financing vehicle used, type of contract/agreement used, and lab assistance (if appropriate). This information is provided to McMordie-Stoughton, on a voluntary basis, by agencies, facilities, and utilities.

This database seems to contain the most comprehensive list of UESC projects. However, it is incomplete in several aspects. Because the reporting of UESCs is voluntary, it is likely that not all awarded UESCs are represented in the database. Many of the project records are lacking data. For example, the energy savings (MMBtu) values are missing in many cases. Completion dates are also missing for more than 200 UESC projects. Finally, because of proprietary issues, some agency/facility and/or utility information was intentionally omitted.

A few UESC projects identified cover multiple facilities for which only the agency is listed; unfortunately, in these cases, no facility information is available. For agencies, facilities, and utilities that are not specifically identified, the generic label “unknown agency/facility/utility” is assigned so that other parameters that are known can be related to the other data sources in the assessment.

Other data limitations in the database prevent a more robust analysis of FEMP-influenced UESCs. For example, it is not known to what extent the UESC project was implemented in relation to the entire facility; that is, it is not known if the UESC project affected only one of 100 buildings, or more. Floor areas and baselines for energy consumption for facilities and impacted buildings were not available, thus restricting any analysis of UESC impact on the energy usage index (EUI, a key metric used by FEMP for determining program impact).

### **3.3 Data Exclusions**

Participants in FEMP UESC activities were categorized by organizational affiliation and job title (if available), and only those associated with federal facilities or utilities were included in the analysis. Details for participants representing state/local governments, educational institutions, other DOE programs, etc., who requested publications or attended workshops/training or FUPWG meetings were excluded in the output analysis and data summary. These participants do not meet the federal facility or utility categories. Similarly, participants affiliated with FEMP, such as national laboratory staff, support contractors, DOE headquarters and regional office staff were identified; however, since they are not associated with a federal facility or utility, their details were excluded from the output analysis and data summary.

Data on outreach activities were not available for the analysis. Outreach activities included strategic meetings, partnership agreements, and informative presentations.

### **3.4 Other Data Issues**

Much time and effort was expended to link data from various data sources into the facility and utility records. It was not always straightforward how to make these linkages. For example, a federal participant's "agency" could be reported as "Department of Defense," "DOD," "DOD-AR," (for Army) "Army," or as specifically as "Fort Carson." Since the person must be manually linked to a facility in these types of cases, the mailing address and/or email address was used to identify the facility (e.g., Fort Carson).

Job titles of participants receiving services were also categorized into Technical (including energy managers, facility managers, executive staff, and other decision makers) and Procurement (contracting personnel, procurement specialist, analysts, legal staff). An "unknown" category was assigned those participants for whom these data were missing or not readily appropriate for the other categories.

It was difficult to discern if some people were "facility-level" personnel. For example, agency representatives in Washington, D.C., may act as facility engineers for particular facilities or as agency-level decision makers for several facilities. Where such a situation occurred, the person was assigned to a generic facility (i.e., a dummy facility) within the agency.

#### 4. SUMMARY OF SELECTED FEMP UESC PROGRAM OUTPUTS AND OUTCOMES

The FEMP UESC Program outputs and outcomes are characterized in Sections 4.1 and 4.2, respectively. The output data are presented for all participants in FEMP UESC activities and for the subsets of the participants that are affiliated with federal facilities or utilities. These facility and utility participants are assumed to be the main partners in UESCs and serve as the basis for the outcome data.

##### 4.1 Outputs

This section summarizes outputs in three activity areas: publications, workshops and training, and FUPWG participation.

Table 1 presents the total number of requests by all participants for hard copy publications by fiscal year for each of the publications offered by the FEMP UESC Program. Data for FY 2000 were not available. The data available indicate that there were 972 publication requests. The most-requested publication is a video about UESC contracting. The two next most requested items were a CD on utility restructuring and a publication about UESCs. The number of requests grew steadily during the analysis period.

**Table 1. Hard copy publication requests overview—total number of participants by fiscal year**

Publication Listing	FY of Request					Grand
	2000	2001	2002	2003	2004	Total
Utility Energy Services Contracting Video		16	25	46	86	173
A Primer on Electric Utilities, Deregulation and Restructuring of U.S. Electricity Markets CD—Version 2.0			25	87	53	165
Utility Energy Services Contracts: Enabling Documents Version 2 (10/2001)			52	38	66	156
Utility Energy Services Contracts Lessons Learned			28	14	43	85
Federal Energy Efficiency through Utility Partnerships—Program Overview (7/01)			28	20		48
Case Study—Unique Utility Partnerships at Fort Lewis		3	6	3	27	39
Thermal Energy Storage at a Federal Facility—Utility Services Case Study		8	7	5	19	39
Federal Energy Efficiency through Utility Partnerships 8/97		6			29	35
Innovative Utility Partnership at Fort Lewis, Washington—Utility Services Case Study		4	3	2	23	32
Energy Efficiency Upgrades for Little Rock AFB		5	4	11	10	30
Utility Energy Services Contracts: Enabling Documents		30				30
Partnerships with the U.S. Postal Service		1	3	1	19	24
Energy Efficiency Solution for the Chet Holifield Federal Building - Utility Services Case Study		3	1	1	17	22
Utility Incentives Action Kit		19				19

**Table 1. Hard copy publication requests overview—total number of participants by fiscal year**

Publication Listing	FY of Request					Grand
	2000	2001	2002	2003	2004	Total
Utility Services Case Study—Energy Efficiency Upgrades for Fermilab Infrastructure		1	6	1	9	17
Total-Solutions Approach at White Sands Missile Range—Utility Services Case Study		3	1	3	9	16
Fort Knox Strikes Energy-Savings Gold in Partnership with Utility—Utility Services Case Study				5	9	14
A Primer on the Deregulation and Restructuring of U.S. Electric Utility Markets		5	4			9
Fort Lewis Conservation Program, June 1994		6	2	1		9
Utility Services Case Study—GHPs Improve Housing and Save Energy at Camp Lejeune				9		9
Utility Photovoltaic Group		1				1
<b>Grand Total</b>		<b>111</b>	<b>195</b>	<b>247</b>	<b>419</b>	<b>972</b>

Table 2 presents the number of attendees at workshops and training events for FY 2000–2004. This information indicates that 1141 people attended these educational activities. Similar to the publications data, the number of people attending workshops and training sessions has grown over the years. The workshop/training activity with the highest attendance addressed gas utility issues.

**Table 2. Workshops and training overview—total number of participants by fiscal year**

Workshop and Training Opportunity	FY of Attendance					Grand Total
	2000	2001	2002	2003	2004	
Workshop with the Energy Solutions Center (Gas Utility) Workshop—St Louis 2004					391	391
Energy Management Telecourse: Part 3a, Utility Energy Services Contracting— March 2003				73		73
Opportunities for Renewables & Utility Project Financing Workshop—HI 2001		71				71
Rural Electric Co-op Workshop—San Antonio 2003				58		58
Utility Restructuring Workshop— DC 2001		37				37
Utility Project Financing Workshop—DC 2001		35				35
Securing Energy Savings Projects for Your Facility—HI 2004					34	34
Utility Project Financing Workshop—Golden CO 2001		34				34
UESC Projects Workshop—Air Force—Denver 2004					32	32
Utility Financing Workshop—NY 2000	30					30
UESC Projects Workshop—Philadelphia 2003				29		29
Utility Deregulation Workshop—Tampa 2000	29					29

**Table 2. Workshops and training overview—total number of participants by fiscal year**

Workshop and Training Opportunity	FY of Attendance					Grand Total
	2000	2001	2002	2003	2004	
Utility Financing Workshop—Tampa 2000	28					28
UESC Projects Workshop—Albuquerque 2002			26			26
UESC Projects Workshop—Chicago 2003				25		25
Utility Restructuring Workshop—NY 2000	25					25
UESC Projects Workshop—DC 2002			24			24
Emerging Energy Markets Workshop—DC 2002			22			22
UESC Projects Workshop—Atlanta 2004					21	21
Utility Restructuring Workshop—Golden CO 2001		20				20
Utility Restructuring Workshop—Los Angeles 2001		20				20
UESC Workshop—Chicago 2001		19				19
UESC Projects Workshop—San Diego 2003				18		18
UESC Projects Workshop—Cambridge 2004					15	15
Utility Project Financing Workshop—Los Angeles 2001		15				15
UESC Projects Workshop—Pensacola 2002			10			10
<b>Grand Total</b>	<b>112</b>	<b>251</b>	<b>82</b>	<b>203</b>	<b>493</b>	<b>1,141</b>

Table 3 presents the number of attendees at FUPWG meetings between FY 2000 and FY 2004. Almost 800 attendees participated in these meetings. (*Note: The table does not identify unique participants; it is possible that some of the attendees have participated in multiple meetings.*) Since FY 2001, attendance has held steady at around 150 to 160 participants.

**Table 3. FUPWG meetings overview—total number of participants by fiscal year**

FUPWG Meeting Dates	FY of Attendance					Grand Total
	2000	2001	2002	2003	2004	
October 1, 1999	33					33
April 1, 2000	41					41
August 1, 2000	39					39
December 1, 2000		72				72
March 1, 2001		76				76
June 1, 2001		40				40
October 1, 2001			67			67
April 1, 2002			74			74
November 1, 2002				90		90

**Table 3. FUPWG meetings overview—total number of participants by fiscal year**

FUPWG Meeting Dates	FY of Attendance					Grand Total
	2000	2001	2002	2003	2004	
April 1, 2003				76		76
October 1, 2003					79	79
April 1, 2004					62	62
October 1, 2004					2	34
<b>Grand Total</b>	<b>113</b>	<b>188</b>	<b>141</b>	<b>166</b>	<b>143</b>	<b>783</b>

Table 4 presents more a more detailed accounting of the program outputs in a format similar to that of the logic model. The first two columns of the table show the total number of UESC projects identified by the UESC project database in the respective fiscal year. The second column details the number of unique agencies, facilities, and utilities involved with the respective fiscal year projects. The third column shows these details with respect to the number of UESC projects (agencies, facilities, and utility companies) that received direct assistance from the national laboratories.

The remaining columns show the details regarding the total number of all participants, divided into the subsets of agency, facility, and utility participants for each fiscal year. The sum of the agency, facility, and utility participants does not necessarily equal the total number of participants, since there are “other” categories not shown (e.g., educational facilities, local and state governments) in these tables.

The “publication” column shows the total number of information requests and the number of requests from the aforementioned categories. An information request is recorded for each request made to the EERE Information Center; the number of copies distributed is not available.

The WebTrends data on downloaded materials in Table 1 are incomplete. Unfortunately, WebTrends is the only mechanism currently available to track the number of downloads related to UESC. Only the number of downloads (adjusted to an estimated 15%) by government/military personnel are reported in the table. In the future, more accurate reporting from WebTrends will be necessary to improve the tracking of UESC publication downloads. It is expected that the demand for publications will shift dramatically from hard copy to electronic format over the next few years. For this reason, it is critical that WebTrends reporting be improved.

The “workshop and training” and “FUPWG meeting” columns show the total number of workshop/training and meeting opportunities, as well as the total number of attendees and the breakdown by agency/facility/utility affiliation for each category of UESC activity.

Table A.1 in Appendix A provides the output data based on the number of agencies, facilities, and utilities represented, rather than on level of participation.

**Table 4. FEMP UESC Program Activity Outputs – Participation Levels and Projects Supported<sup>a</sup>**

	UESC Projects <sup>b</sup>		Project support	UESC Publications Requests <sup>c</sup>			Response to FEMP Outreach <sup>c, e</sup>		
							Downloads <sup>d</sup>	Workshops, training	FUPWG
2000	Projects awarded	100	4				No. of opportunities	4	3
	Projects completed	13							
	Agencies represented	9	1	Total requests	NA	NA	Total participants	112	113
	Facilities represented	63	1	Agency requests			Agency participants	86	20
	Utilities represented	27	1	Utility requests			Utility participants	4	55
2001	Projects awarded	140	3				No. of opportunities	8	3
	Projects completed	50	2						
	Agencies represented	12	1	Total requests	111	NA	Total participants	251	188
	Facilities represented	84	2	Agency requests	68		Agency participants	200	39
	Utilities represented	27	2	Utility requests	5		Utility participants	21	102
2002	Projects awarded	171	2				No. of opportunities	4	2
	Projects completed	88	1						
	Agencies represented	14	1	Total requests	195	8,441	Total participants	82	141
	Facilities represented	104	2	Agency requests	136		Agency participants	73	49
	Utilities represented	27	2	Utility requests	21		Utility participants	3	63
2003	Projects awarded	111	10				No. of opportunities	5	2
	Projects completed	109	2						
	Agencies represented	11	4	Total requests	247	16,885	Total participants	203	166
	Facilities represented	52	5	Agency requests	202		Agency participants	106	68
	Utilities represented	23	5	Utility requests			Utility participants	53	66
2004	Projects awarded	65	4				No. of opportunities	5	2
	Projects completed	73	1						
	Agencies represented	5	2	Total requests	419	3,385	Total participants	493	143
	Facilities represented	31	4	Agency requests	348		Agency participants	74	58
	Utilities represented	11	4	Utility requests	42		Utility participants	395	54
TOTALS <sup>f</sup>	Projects awarded	587	23				No. of opportunities	26	12
	Projects completed	333	6						
	Agencies represented	16	5	Total requests	972	28,711	Total participants	1,141	751
	Facilities represented	242	11	Agency requests	754		Agency participants	539	234
	Utilities represented	49	12	Utility requests	68		Utility participants	476	340

<sup>a</sup>Participants that could not be positively identified as either agencies, facilities, or utilities are labeled as “unknown” in the data set. Unknowns are included in the totals in Table 4 but not in the individual tallies of agency, facility, or utility requests or participants.

<sup>b</sup>The number of projects completed in a FY may include projects from previous FY due to the delay between Award and Completion Dates.

<sup>c</sup>In terms of publications requests and responses to FEMP outreach, agency and facility data are considered the same. Each agency is linked to a facility (or HQ function serving multiple facilities).

<sup>d</sup>Data from Webtracks; identification of recipients extends only to their federal government affiliation. NA = not available.

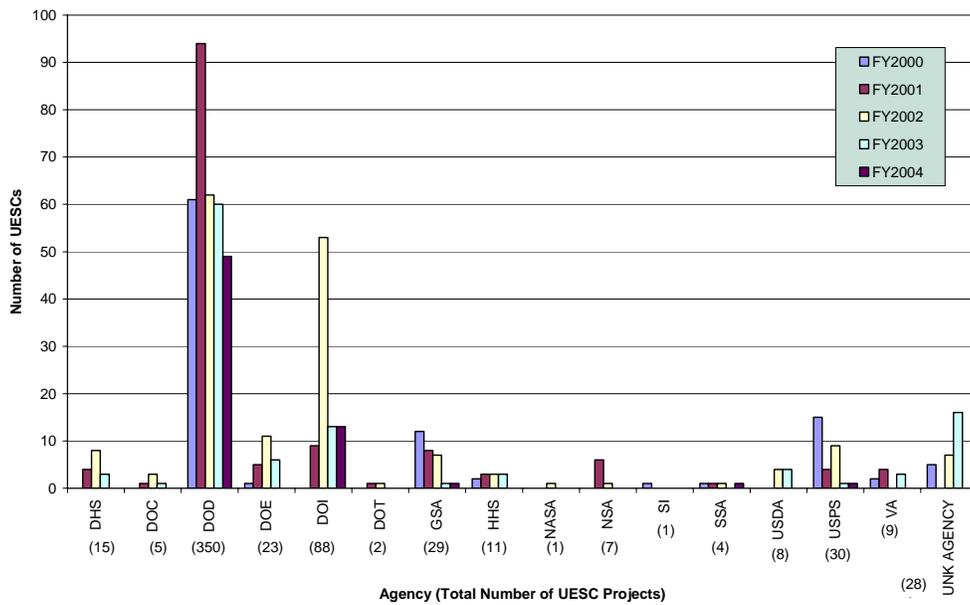
<sup>e</sup>Data on responses to other forms of outreach was not available.

<sup>f</sup>Total number of unique federal agencies, federal facilities, and utilities represented in FY2000 – 2004 data.

## 4.2 Outcomes

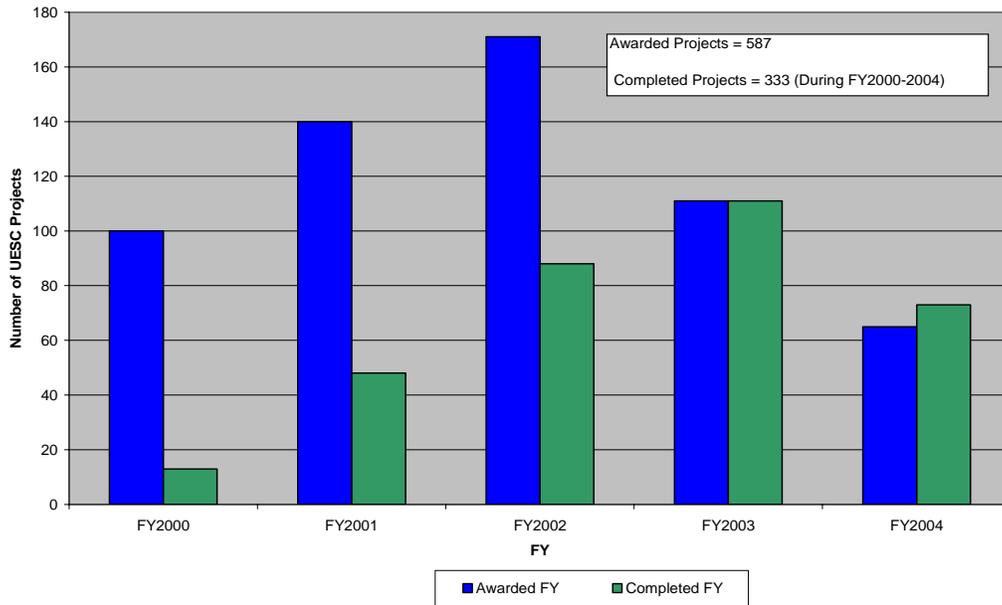
This section summarizes estimates of program outcomes, presenting data concerning the award and completion of UESCs (short to intermediate outcomes) and then energy savings, energy cost savings, and investment results (ultimate outcomes).

Figure 4 summarizes the quantity and agency participants from the UESC Projects database for projects awarded for FY 2000–2004. Most agencies have had multiple or repeat UESCs over the period FY 2000–2004. It is apparent that the Departments of Defense (DOD) and Interior (DOI) have awarded the most UESCs. There are several “unknown agencies” that were not identified in the UESC database.

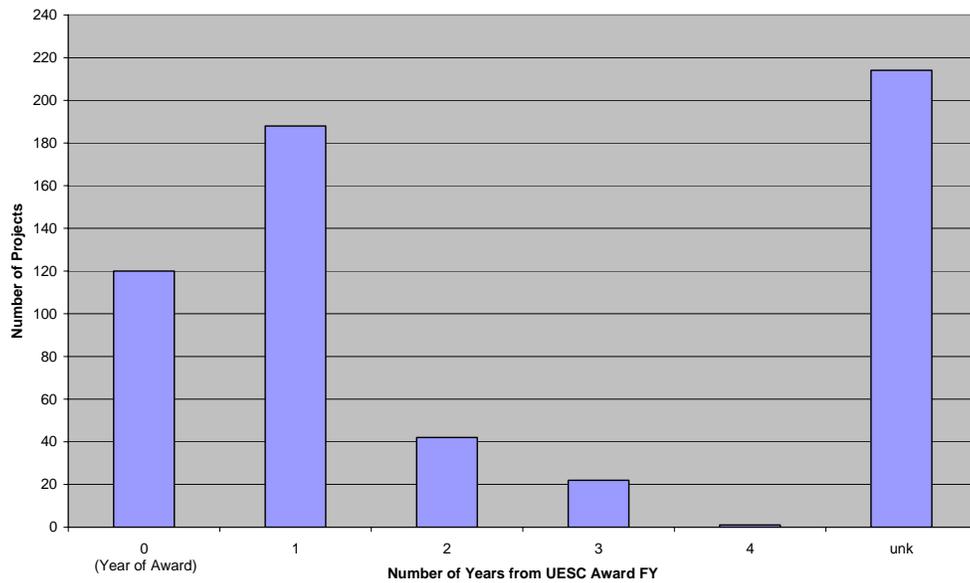


**Figure 4. UESC projects by agency and fiscal year of award.**

Figure 5 depicts the number of projects awarded, and completed. According to the UESC project database, there were 587 awards from FYs 2000 through 2004, while only 333 were completed within the same period. Projects started in one year are not always completed within the same year. As there are several phases in the UESC process, it may take some time before the project is complete, depending upon its complexity. Lighting projects may be complete within 6 months, while a cooling, heating, and power (CHP) project may take 3–5 years. Figure 6 depicts the typical delays identified with the FY 2000–2004 UESC project database. Table 5 presents details associated with project award and completion dates. Clearly, most projects are completed within one or two years of contract award, with many completed the same year the UESC is awarded. For example, of the 100 UESCs awarded in FY 2000, 13 were completed the same year, 28 were completed in FY 2001, 7 in FY 2002, and 4 in FY 2003. Unfortunately, 48 records did not include completion dates.



**Figure 5. Number of UESC projects awarded and completed, by fiscal year, for FY 2000–2004.**

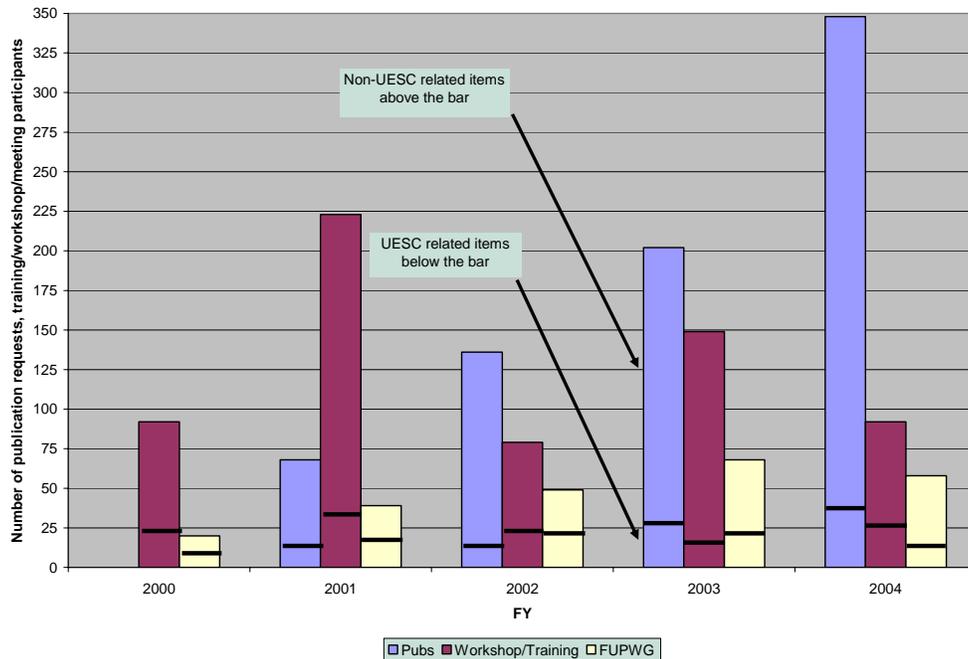


**Figure 6. Time between UESC award and project completion.**

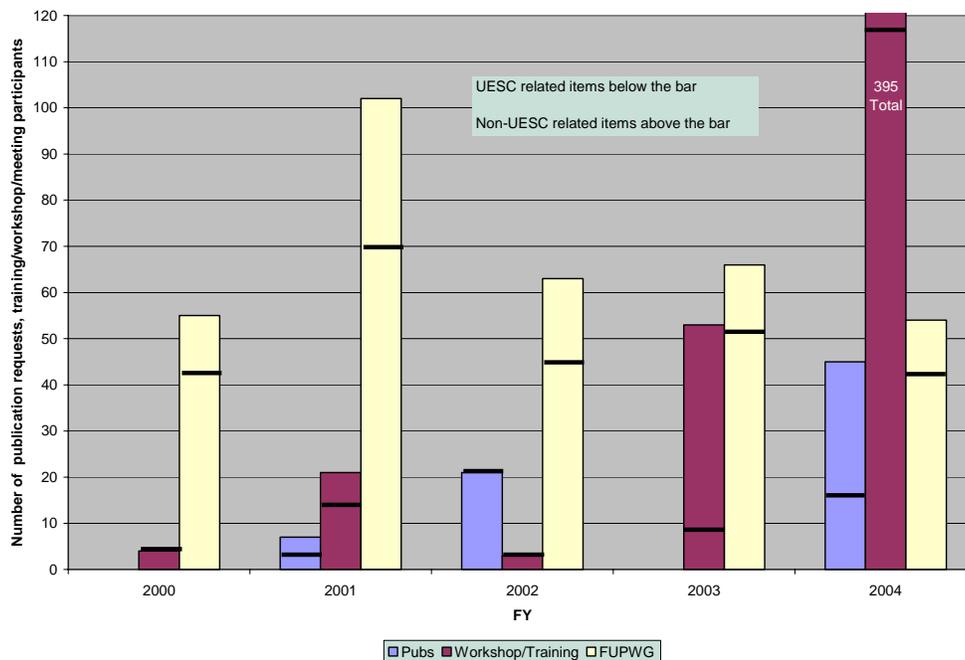
**Table 5. Number of UESCs by award and completion date**

FY of award (Year project began)	FY of completion (Year project was completed or estimated completion date)										Total projects
	2000	2001	2002	2003	2004	2005	2006	2007	2008	TBD	
2000	13	28	7	4						48	100
2001		20	34	11	18					57	140
2002		0	47	64	11					49	171
2003				32	36	4				39	111
2004					8	26	9		1	21	65
	13	48	88	111	73	30	9	0	1	214	587

For each fiscal year, Figure 7 shows the number of publication requests, the number of workshops and training participants, and the number of FUPWG meeting participants for facilities that did award UESCs (below the bars in the histograms), and for those that have not yet awarded UESCs (above the bars). Lack of a bar indicates that all activities are UESC-related. Figure 8 is similar to Figure 7 except that the utility participants are the focus. Figures 7 and 8 suggest that many FEMP UESC Program services have been delivered to facilities and utilities that have not yet entered into UESCs. Additional figures that illustrate representation rather than participation are located in Appendix A (see Figures A.1 and A.2).



**Figure 7. Facility participation levels by fiscal year and FEMP UESC activity.**



**Figure 8. Utility participation levels by fiscal year and FEMP UESC activity.**

Table 6 provides a general overview of the estimates for the UESC projects' energy savings and energy cost savings as well as the capital (implementation) costs of the proposed contracts by fiscal year of award from the UESC project database. This information may have been provided by the participants during any stage of the UESC process and should be interpreted only as estimates of savings and not verified, implemented savings. It is assumed the data reflect the most current phase of the projects represented. Several projects did not have complete data, especially for the energy savings (MMBtu). The number of projects with data is shown in the table for qualification of the data. The summary averages are based upon the data available.

**Table 6. General description of UESC database savings and implementation data**

UESC Project Data	FY of UESC Award						Average per UESC per Year <sup>a</sup>
	2000	2001	2002	2003	2004	Grand Total	
Projects reporting annual energy savings	47	49	31	26	32	185	
Sum of annual energy savings (MMBtu)	1,935,429	955,245	470,155	622,629	862,379	4,845,836	26,194
Projects reporting annual cost savings	77	77	60	44	40	298	
Sum of annual cost savings (\$)	38,824,075	23,541,254	14,710,791	13,657,543	6,940,140	97,673,804	327,764
Projects reporting total capital cost	99	127	131	94	57	508	
Sum of total capital cost (\$)	206,592,568	271,656,655	131,651,884	154,423,789	70,470,964	834,795,859	1,643,299
Total number of UESC projects	100	140	171	111	65	587	117
Annual Averages <sup>a</sup>							
Average savings per UESC (MMBtu)	41,179	19,495	15,166	23,947	26,949		26,194
Average cost savings per UESC (\$)	504,209	305,731	245,180	310,399	173,504		327,764
Average capital per UESC (\$)	2,086,794	2,139,029	1,004,976	1,642,806	1,236,333		1,643,299

<sup>a</sup>Averages are based on number of reported data entries for respective savings and costs.

## 5. ANALYSIS

This section explores in some depth the question of how influential FEMP UESC Program services have been on the awarding of UESCs. A straightforward hypothesis guides this analysis: FEMP UESC Program services can be judged as more influential than not if a high percentage of facilities and utilities receiving the services go on to award UESCs. This hypothesis leads to several additional testable hypotheses. For example, it can be expected that facilities and utilities would receive more services before rather than after awarding UESCs. Additionally, it can be expected that facilities receiving more services would be more likely to award UESCs than facilities receiving fewer services.

A second hypothesis is that facilities and utilities are more apt to seek FEMP UESC Program services after their first contract has been awarded. In this case, it can be assumed that procurement staff may not have needed much guidance to award a UESC. However, once the contract has been awarded, then technical staff are given responsibilities to manage the UESC from design to measure implementation. At this point, technical staff could be expected to attend training sessions and workshops and request various publications.

A third hypothesis is that facilities that have received FEMP services either before the award of or during the life of UESCs will save more energy and money, on average, than facilities that have awarded UESCs but have not benefited from FEMP services. The following subsections explore these hypotheses.

### 5.1 FEMP UESC Program Touches

This first subsection characterizes the number of touches (i.e., FEMP UESC Program services received) on facilities and utilities that awarded UESCs and those have yet to award UESCs. A “touch” is defined as a facility’s or utility’s receiving at least one type of a particular service, regardless of the magnitude of that service. So for example, a facility will be touched by a publication if it has made at least one request for one or more copies of a particular publication. Likewise, a utility will have been touched by FUPWG if it has sent at least one person to at least one FUPWG meeting.

The UESC relational database contains 241 records for facilities that awarded one or more UESCs in the 2000–2004 time period and 275 facilities that have not yet awarded UESCs but that were touched at least once by FEMP services. The relational database contains 49 utilities that have participated in 1 or more UESCs and 119 that have not yet participated in a UESC. Table 7 describes the services received by facilities that have and have not yet awarded UESCs. Table 8 describes the services received by utilities that have and have not yet participated in UESCs. All services received by facilities and utilities that have not yet been involved in UESCs are considered as having been received *before* the award of a UESC.

**Table 7. Number of facilities touched by FEMP services before and after awarding UESCs**

Service	Awarded a UESC?	Touched before first UESC awarded	Touched during same year first UESC awarded	Touched 1–2 years after first UESC awarded	Touched 3+ years after first UESC awarded	Unique facilities touched before or during award year	Total unique facilities touched
Publications	Y	2	3	8	4	4	14
	N	82					
Workshops and training	Y	4	6	18	13	9	30
	N	195					
FUPWG	Y	3	5	9	5	6	11
	N	43					

**Table 8. Number of utilities touched by FEMP services before and after awarding UESCs**

Service	Awarded a UESC?	Touched before first UESC awarded	Touched during same year first UESC awarded	Touched 1–2 years after first UESC awarded	Touched 3+ years after first UESC awarded	Unique utilities touched before or during award year	Total unique utilities touched
Publications	Y	1	0	2	2	1	5
	N	3					
Workshops and training	Y	0	2	6	11	2	17
	N	86					
FUPWG	Y	4	14	19	17	15	24
	N	29					

The results of Tables 7 and 8 do not support the first hypothesis stated. Facilities and utilities that have yet to award UESCs requested many more services than facilities and utilities that were touched before awarding their first contract. The second hypothesis, though, is weakly supported. More services were requested by facilities and utilities after the UESC was awarded than before, although the differences are not that great. The total number of facilities and utilities touched by FEMP that have awarded UESCs is relatively small, especially compared with the number of facilities touched that have not yet awarded UESCs.

Table 9 takes another view of touches and the award of UESCs. In this case, the aggregated number of touches received by facilities not awarding UESCs and those awarding UESCs are summarized. For example, the number in the “1” row, second column, communicates that 237 of the 275 facilities that have not yet awarded a UESC received a type of service (i.e., requested a publication or participated in a workshop and training or attended a FUPWG meeting). The next row down communicates that 31 received 2 services. The numbers in column 7 communicate the combined number of touches before and after awarding a UESC by facilities that awarded UESCs. For

**Table 9. Number of facilities touched by any FEMP service before and after awarding UESCs<sup>a</sup>**

Number of touches by FEMP services	Awarded a UESC?					
	No	Yes				
	Touches before UESC awarded	Touches before UESC awarded	Touches during year UESC awarded	Touches 1-2 years after UESC awarded	Touches 3+ years after UESC awarded	Total number of touches
0	0	234	231	216	224	205
1	237	5	7	17	13	17
2	31	2	2	6	3	9
3	7		1	2	1	5
4						2
7						2
8						1
Total	275	241	241	241	241	241

<sup>a</sup>Each row is the total number of different types of touches received.

**Table 10. Number of utilities touched by any FEMP service before and after participating in UESCs<sup>a</sup>**

Number of touches by FEMP services	Participate in UESC?					
	No	Yes				
	Touches before UESC awarded	Touches before UESC awarded	Touches during year UESC awarded	Touches 1-2 years after UESC awarded	Touches 3+ years after UESC awarded	Total number of touches
0	4	45	33	29	28	22
1	112	3	16	15	12	7
2	3	1		3	9	4
3				2		6
4						7
5						1
6						2
Total	119	49	49	49	49	49

<sup>a</sup>Each row is the total number of different types of touches received.

example, the number in row “1,” column 7, communicates that 17 of these facilities received a total of 1 type of touch before and after awarding a UESC. The number in row “4” communicates that 2 received 4 touches, meaning that one service was duplicated before and after awarding a UESC (e.g., maybe a facility received FEMP UESC Program publications before and after awarding a UESC). Table 10 presents the same information for utilities touched by FEMP services.

The results in Tables 9 and 10 also do not support the first hypothesis stated above. Only about 6% of facilities that awarded UESCs were touched by a FEMP UESC Program service before awarding a UESC or during the year a UESC was awarded, and only about 15% were touched at all. On the other hand, 275 facilities were touched at least once but have not yet awarded UESCs. Thus approximately 5% of facilities that received services

before awarding a UESC actually awarded a UESC. This can be interpreted as a yield rate of FEMP UESC services. It should also be noted that FEMP UESC touched 311 out of about 8000 federal facilities in the 2000–2004 time period, which represents about 4% of federal facilities.

With respect to utilities, almost 35% of those participating in UESCs were touched before the contract was awarded or during the year the contract was awarded. Approximately 13% of utilities touched by the FEMP UESC Program before a UESC was awarded have actually participated in UESCs.

The results again weakly support the second hypothesis. For both utilities and facilities, more were touched after a UESC was awarded than before.

## **5.2 Timing of FEMP UESC Program Services Received by Facilities and Utilities**

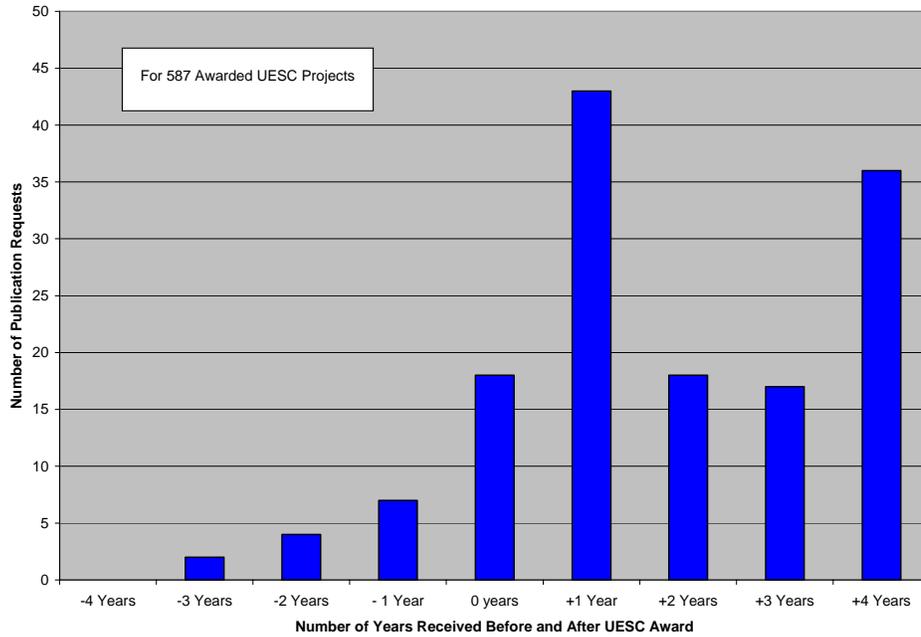
This subsection explores the timing of FEMP UESC Program services received by facilities and utilities that participated in UESCs. It was hypothesized that these facilities and utilities would receive more services before awarding UESCs than afterward. These results are presented in Figures 9–20 (supporting tables can be found in Appendix A: Tables A.2–A.13, respectively). Some figures illustrate the number of services (e.g., publications in Figure 9) that were received the year the UESC was awarded (denoted by 0 years), the number of services received a number of years before the UESC was awarded (denoted by –1 year, –2 years, etc.), and the number of services received a number of years after the UESC was awarded (denoted by +1 year, +2 years, etc.). To support the first hypothesis stated above, the weight of the histograms should be at 0 years or before.

Other figures explore when services were received using contract completion dates as the baseline. For example, Figure 10 illustrates when facilities requested publications during the year the contract was completed (denoted by 0 years), years before the contract was completed (denoted by –1 year, –2 years, etc.) and years after the first contract was completed (denoted by +1 year, +2 years, etc.). To support the second hypothesis stated earlier, the weight of the histograms should be at 0 or one year before the contract completion date.

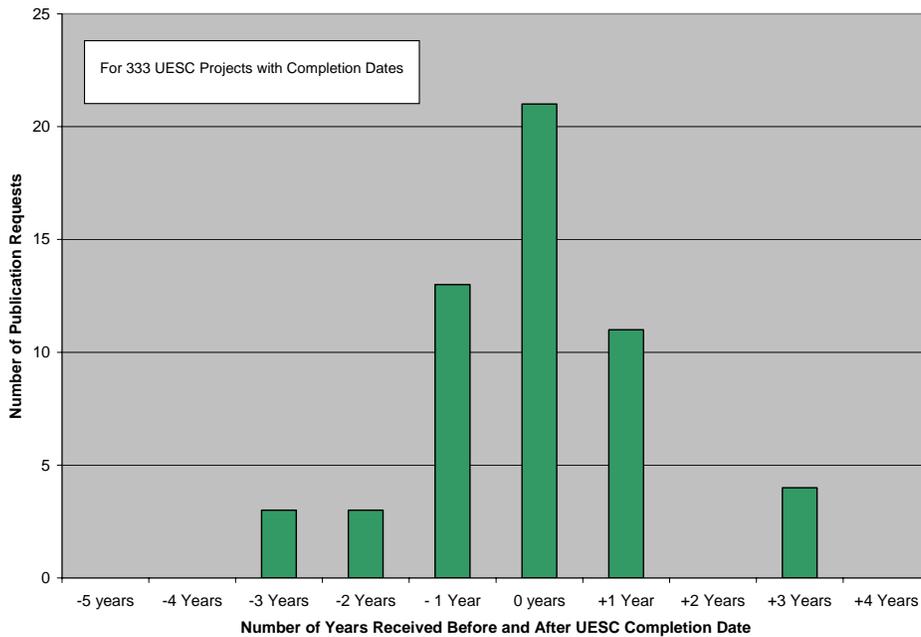
As could be expected from the results presented in the previous subsection, the facilities that awarded UESCs generally received fewer services before awarding UESCs than after. This is very much the case with respect to publications (see Figure 9) and is substantially the case with respect to participating in the FUPWG meetings (see Figure 17). On the other hand, the results captured in Figure 13 do support the first hypothesis, albeit rather weakly; more workshops and training were received before awarding a UESC than after.

The results for the utilities are similar in that utilities that participated in UESCs generally received fewer services before participating in UESCs than after. As with the federal facilities, this is very much the case with respect to publications (see Figure 11). Unlike the facilities, utilities received the lion's share of their training after UESCs were

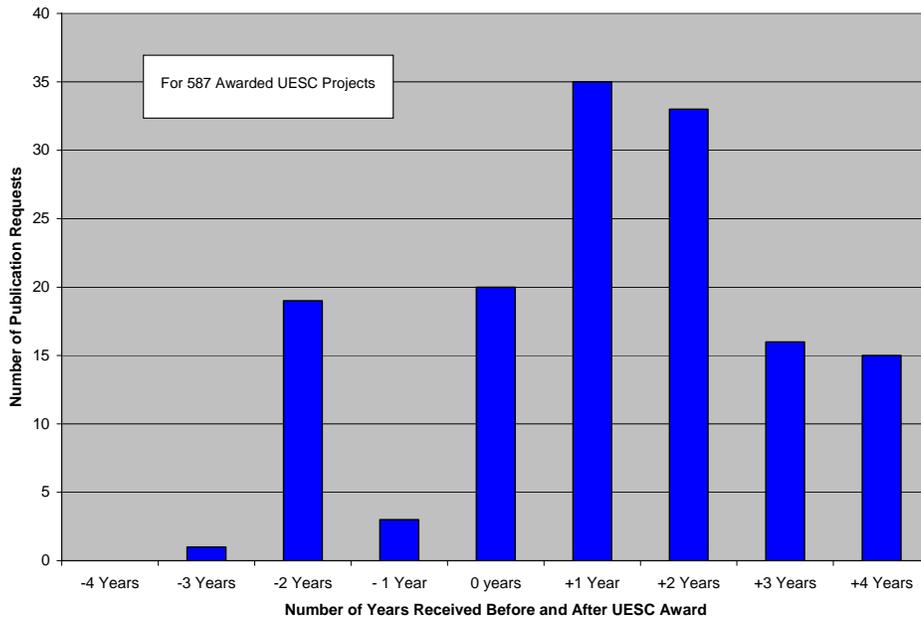
awarded (see Figure 15). On the other hand, the utilities participated somewhat more frequently in FUPWG meetings the year the UESC was awarded and before the award than did the facilities (Figure 19).



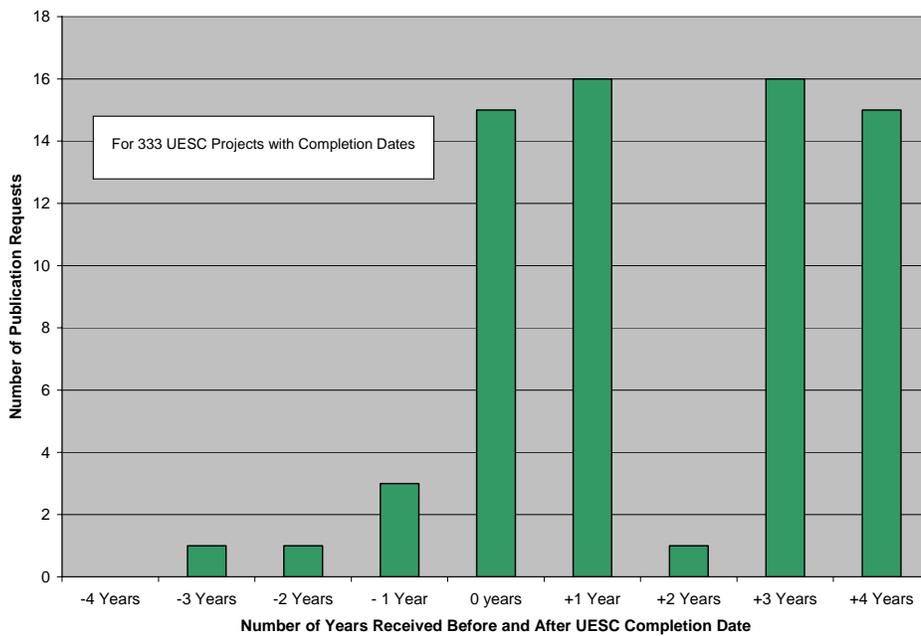
**Figure 9. Publication requests by facilities with UESCs (years received) by award date (FY 2000–2004).**



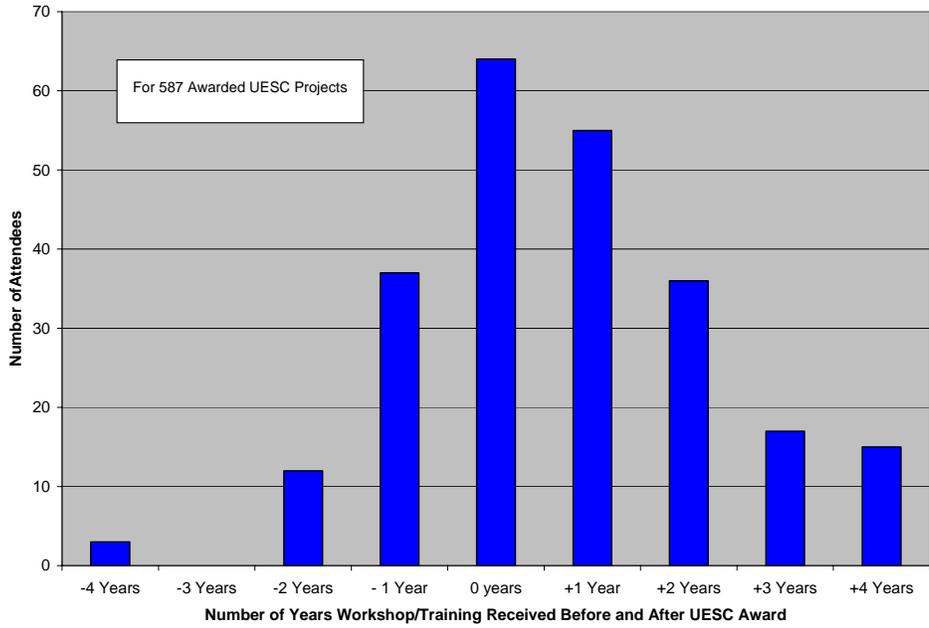
**Figure 10. Publication requests by facilities with UESCs (years received) by completion date (FY 2000–2004).**



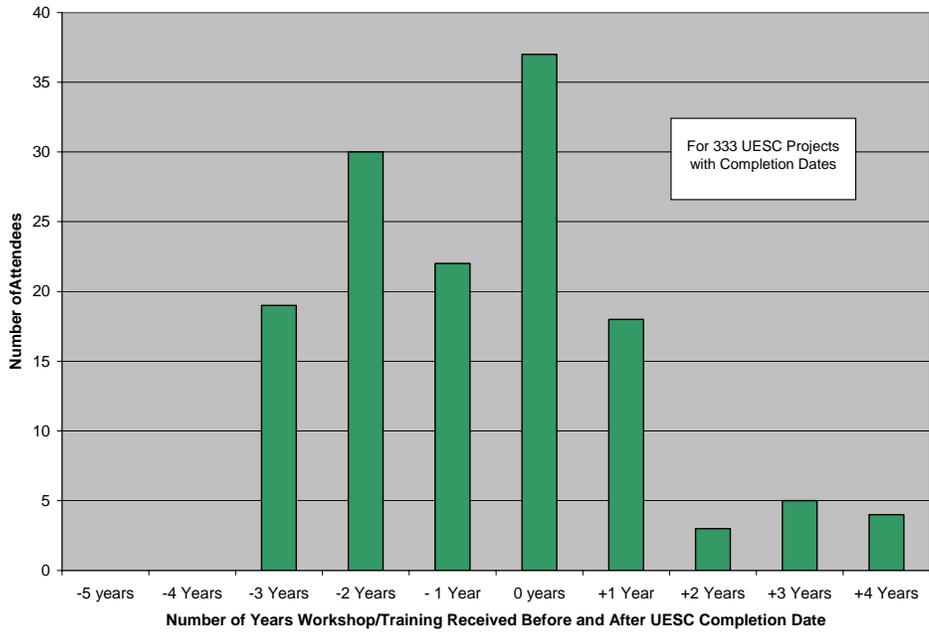
**Figure 11. Publication requests by utilities with UESCs (years received) by award date (FY 2000–2004).**



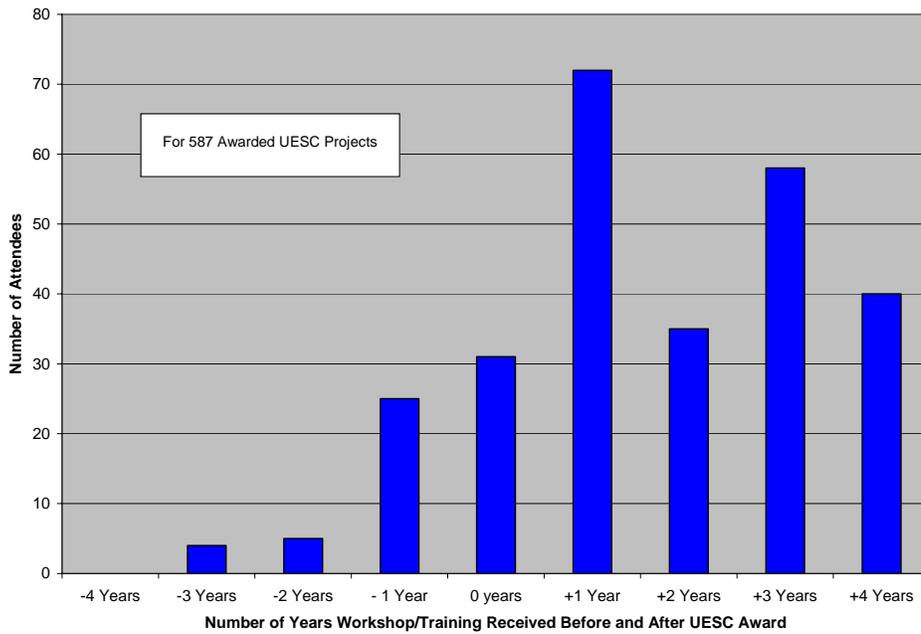
**Figure 12. Publication requests by utilities with UESCs (years received) by completion date (FY 2000–2004).**



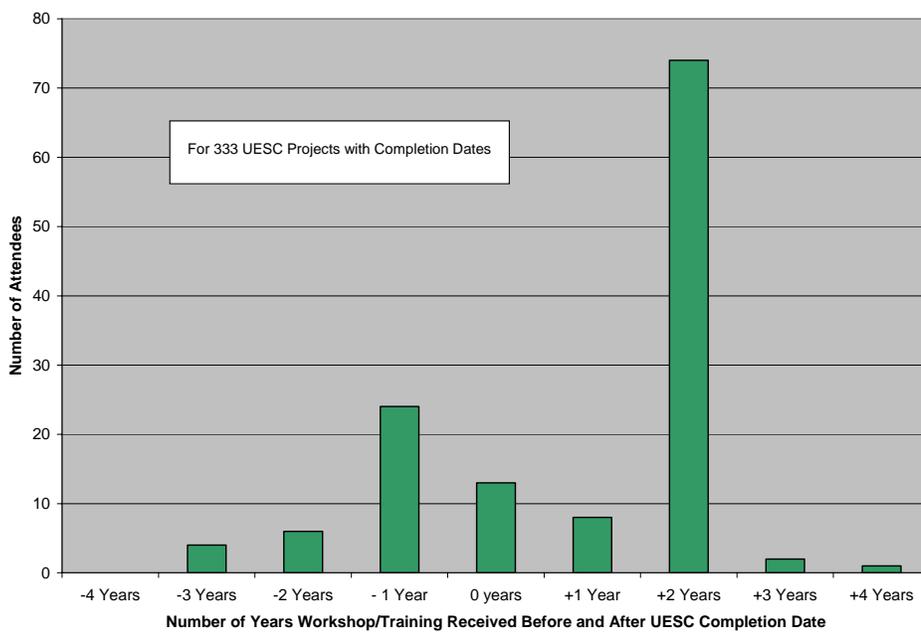
**Figure 13. Workshops and training attendees by facilities with UESCs (years received) by award date (FY 2000–2004).**



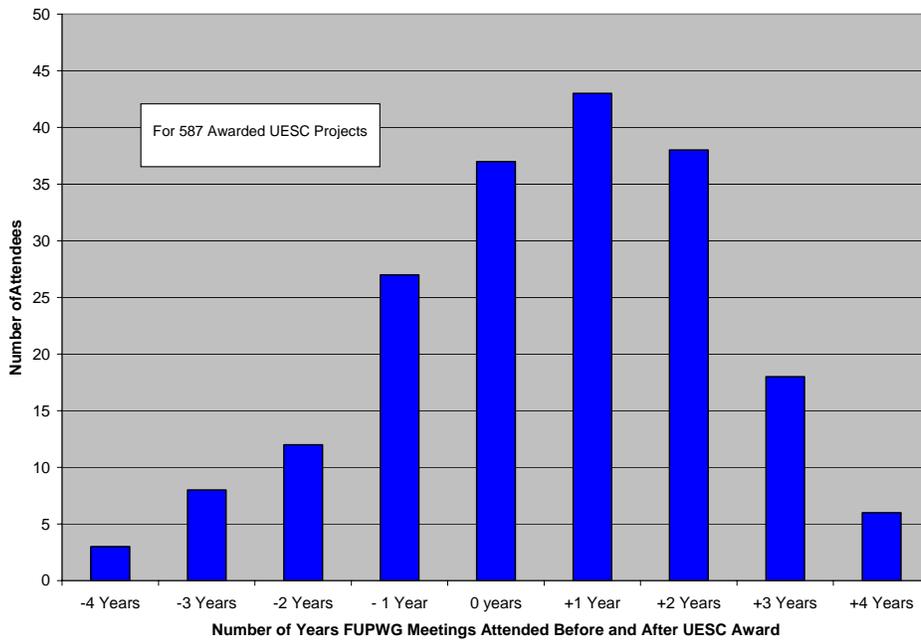
**Figure 14. Workshop and training attended by facilities with UESCs (years received) by completion date (FY 2000–2004).**



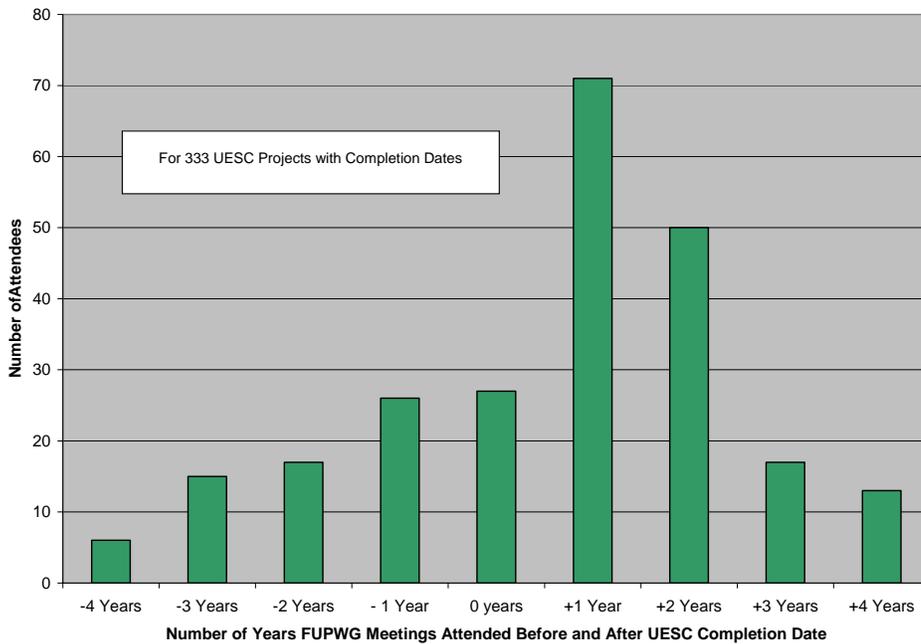
**Figure 15. Workshop and training by utilities with UESCs (years received) by award date (FY 2000–2004).**



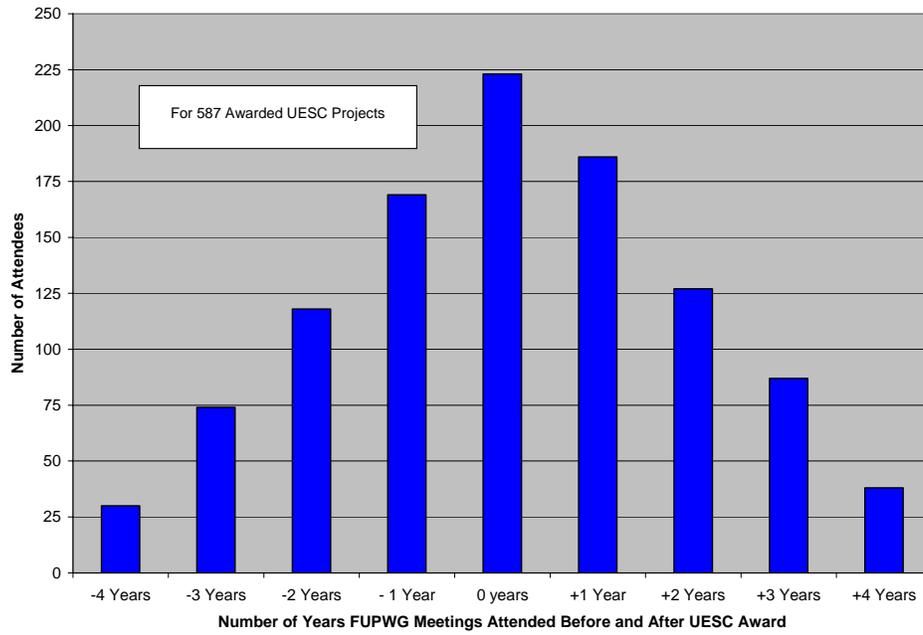
**Figure 16. Workshop and training by utilities with UESCs (years received) by completion date (FY 2000–2004).**



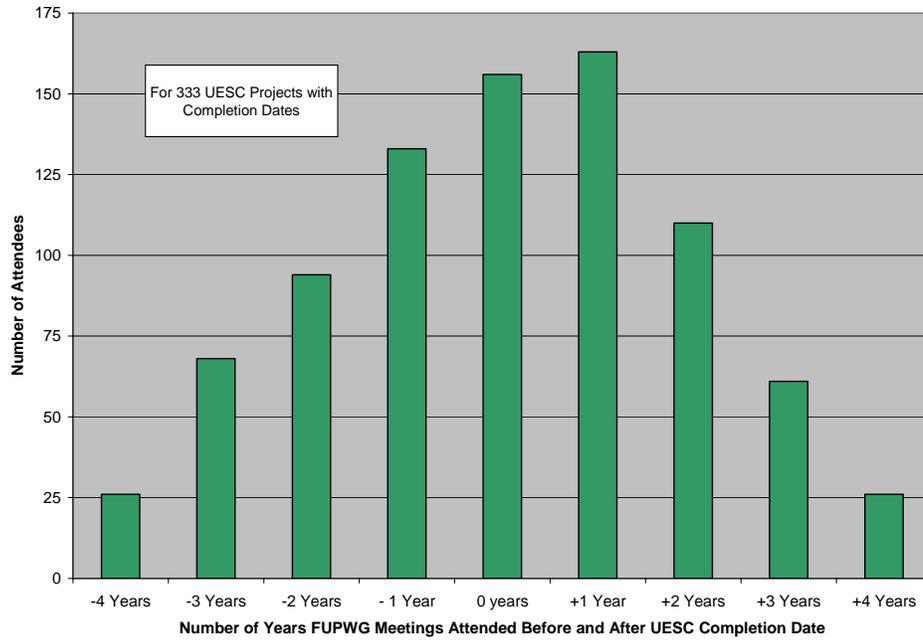
**Figure 17. FUPWG meeting attendees by facilities with UESCs (years received) by award date (FY 2000–2004).**



**Figure 18. FUPWG meeting attendees by facilities with UESCs (years received) by completion date (FY 2000–2004).**



**Figure 19. FUPWG meeting attendees by utilities with UESCs (years received) by award date (FY 2000–2004).**



**Figure 20. FUPWG meeting attendees by utilities with UESCs (years received) by completion date (FY 2000–2004).**

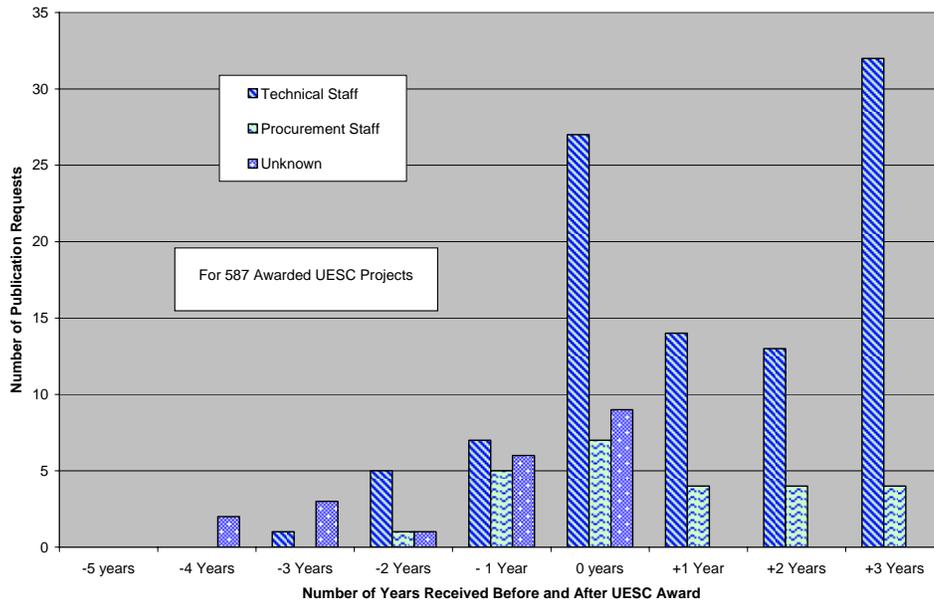
### **5.3 Types of People Receiving FEMP UESC Program Services**

This sub-section explores another component of the second hypothesis. It was stated earlier that if facilities requested more services after an UESC was awarded than before, then one could argue that procurement staff would be more likely to have received services before the UESC was awarded and technical staff after the UESC was awarded. The following figures tend to support this secondary hypothesis. For example, Figure 21 indicates that facility technical staff received the lion's share of publications the year the UESC was awarded and afterward. Figure 22 supports this observation: most publications were received by technical staff one year to zero years before project completion. Figures 23 and 24 support this hypothesis even more strongly: technical staff were much more likely to attend workshops or training sessions after the UESC was awarded than before. On the other hand, procurement staff were more likely to attend these educational events before the UESC was awarded or during the year the UESC was awarded. Figure 24 makes this point most strongly. The same observation can be made about FUPWG participation (See Figures 25 and 26).

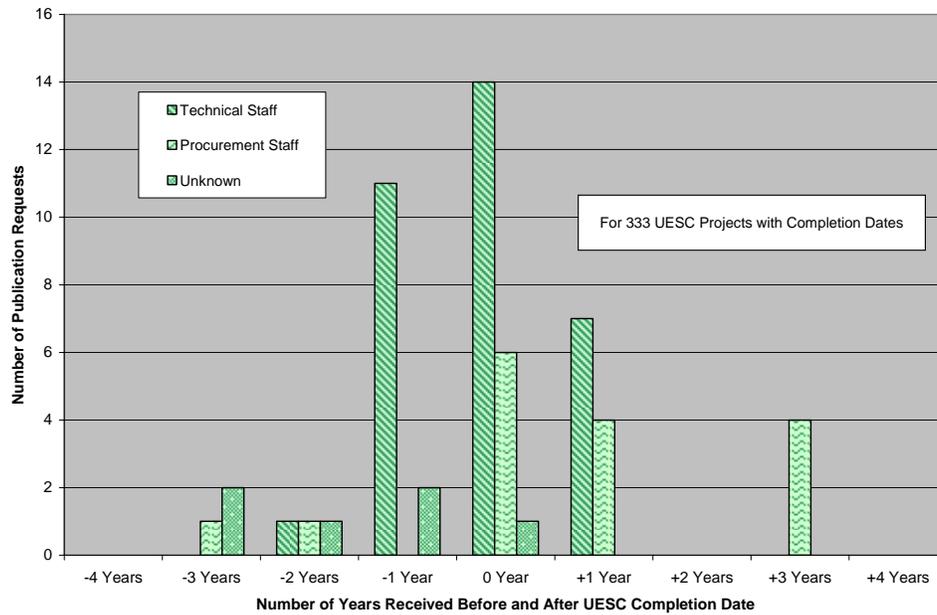
### **5.4 Top Services Received**

The results presented in the two previous subsections suggest that facilities and utilities that have not yet awarded UESCs have received many more FEMP UESC Program services than have those facilities and utilities that have awarded UESCs. This observation prompted a more in-depth assessment of the identities of the top services received by both categories of facilities and utilities.

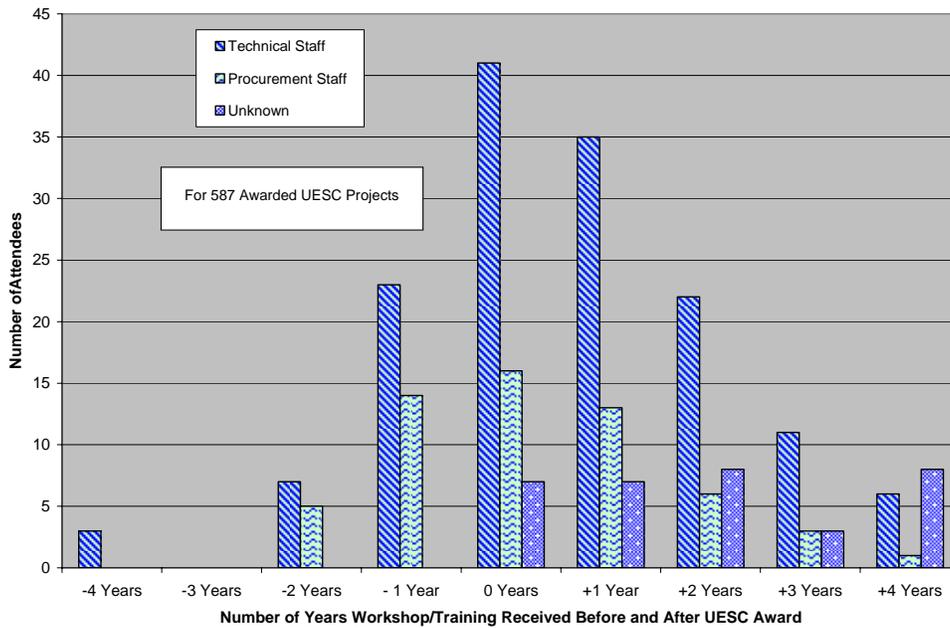
Tables 11 and 12 list the publications requested by the facilities and utilities during the 2000–2004 time period, broken up into four periods: before and the year the UESC was awarded, and two time periods after the UESC was awarded. Almost all the publications were requested after the UESC was awarded, supporting the second hypothesis but not the first. The same observations can be made with respect to workshops and training (see Tables 13 and 14) and FUPWG participation (see Tables 15 and 16). The only significant pre-UESC activity was exhibited by utilities' participation in FUPWG meetings. It is notable that approximately 74% of utility-related FUPWG participants represented utilities that received at least one UESC.



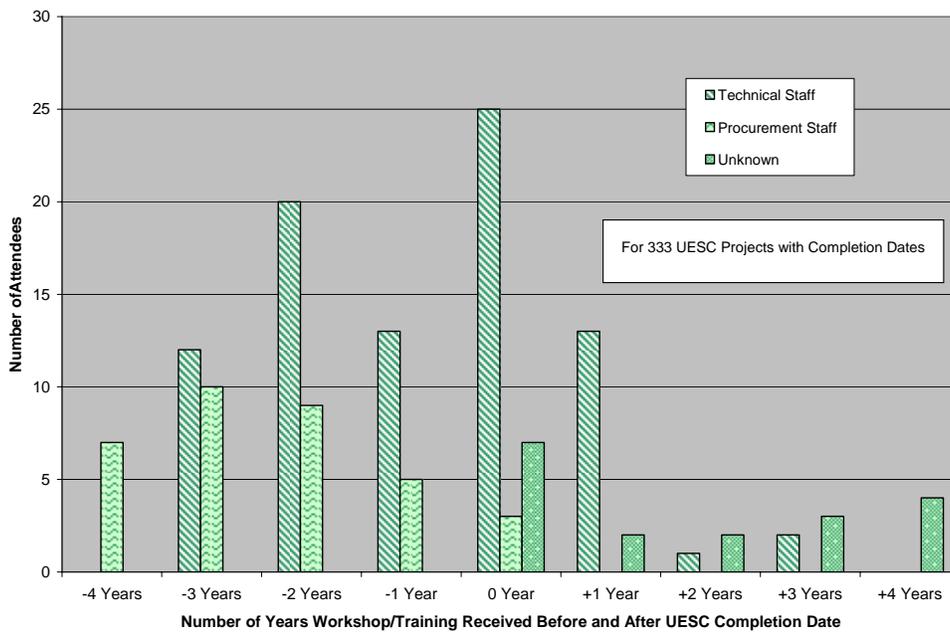
**Figure 21. Publication requests by facilities with UESCs (years received) by job title and award date (FY 2000–2004).**



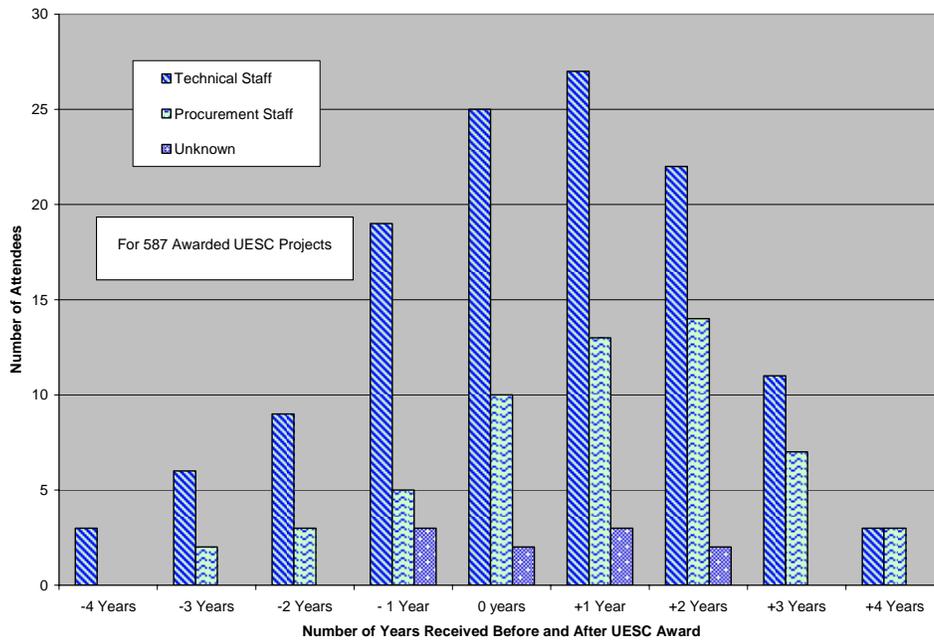
**Figure 22. Publication requests by facilities with UESCs (years received) by job title and completion date (FY 2000–2004).**



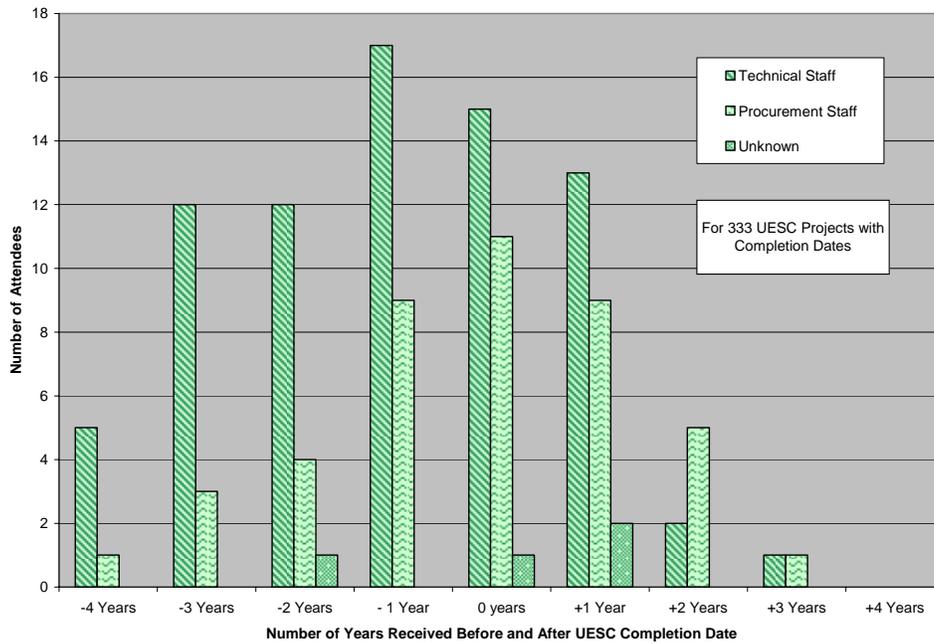
**Figure 23. Workshop and training by facilities with UESCs (years received) by job title and award date (FY 2000–2004).**



**Figure 24. Workshop and training by facilities with UESCs (years received) by job title and completion date (FY 2000–2004).**



**Figure 25. FUPWG meeting attendees by facilities with UESCs (years received) by job title and award date (FY 2000–2004).**



**Figure 26. FUPWG meeting attendees by facilities with UESCs (years received) by job title and completion date (FY 2000–2004).**

**Table 11. Publication requests by number of facility participants (FY 2000–2004).**

Publication title	All requests	UESC related					Non-UESC related
	Total requests FY00-04	Before UESC award	Year of UESC award	1-2 years after award	3+ years after award	Total request UESC-related	Total requests FY00-04
A Primer on Electric Utilities, Deregulation and Restructuring of U.S. Electricity Markets CD—Version 2.0	158	0	0	9	10	19	139
A Primer on the Deregulation and Restructuring of U.S. Electric Utility Markets	9	0	0	1	0	1	8
Case Study—Unique Utility Partnerships at Fort Lewis	39	0	1	2	9	12	27
Energy Efficiency Solution for the Chet Holifield Federal Building - Utility Services Case Study	14	0	0	0	0	0	14
Energy Efficiency Upgrades for Little Rock AFB	27	1	1	1	0	3	24
Federal Energy Efficiency through Utility Partnerships—Program Overview (7/01)	36	0	0	8	0	8	28
Federal Energy Efficiency through Utility Partnerships 8/97	17	1	0	2	0	3	14
Fort Knox Strikes Energy-Savings Gold in Partnership with Utility—Utility Services Case Study	10	0	0	0	0	0	10
Fort Lewis Conservation Program, June 1994	5	0	0	0	0	0	5
Innovative Utility Partnership at Fort Lewis, Washington—Utility Services Case Study	22	0	0	0	1	1	21
Partnerships with the U.S. Postal Service	16	0	0	0	0	0	16
Thermal Energy Storage at a Federal Facility—Utility Services Case Study	36	0	1	0	8	9	27
Total-Solutions Approach at White Sands Missile Range—Utility Services Case Study	16	0	0	0	0	0	16
Utility Energy Services Contracting Video	137	0	1	2	4	7	130
Utility Energy Services Contracts Lessons Learned	64	0	0	4	3	7	57
Utility Energy Services Contracts: Enabling Documents	18	0	2	2	0	4	14
Utility Energy Services Contracts: Enabling Documents Version 2 (10/2001)	107	0	1	2	7	10	97
Utility Incentives Action Kit	9	0	2	1	0	3	6
Utility Photovoltaic Group	1	0	0	0	0	0	1
Utility Services Case Study—Energy Efficiency Upgrades for Fermilab Infrastructure	13	0	0	0	0	0	13
<b>Grand Total</b>	<b>754</b>	<b>2</b>	<b>9</b>	<b>34</b>	<b>42</b>	<b>87</b>	<b>667</b>
Grand Total Percents		0%	1%	5%	6%	12%	88%

**Table 12. Publication requests by number of utility participants (FY 2000–2004)**

Publication title	All requests	UESC related					Non-UESC related
	Total requests FY00-04	Before UESC award	Year of UESC award	1-2 years after award	3+ years after award	Total UESC-related	Total Requests FY00-04
A Primer on Electric Utilities, Deregulation and Restructuring of U.S. Electricity Markets CD—Version 2.0	4	0	0	0	4	4	0
Energy Efficiency Solution for the Chet Holifield Federal Building—Utility Services Case Study	8	0	0	0	0	0	8
Federal Energy Efficiency through Utility Partnerships 8/97	3	0	0	0	3	3	0
Innovative Utility Partnership at Fort Lewis, Washington—Utility Services Case Study	8	0	0	0	0	0	8
Partnerships with the U.S. Postal Service	8	0	0	0	0	0	8
Utility Energy Services Contracting Video	13	1	0	6	3	10	3
Utility Energy Services Contracts Lessons Learned	10	1	0	6	3	10	0
Utility Energy Services Contracts: Enabling Documents	4	1	0	2	0	3	1
Utility Energy Services Contracts: Enabling Documents Version 2 (10/2001)	10	1	0	6	3	10	0
Grand Total	68	4	0	20	16	40	28
Grand Total Percents		6%	0%	29%	24%	59%	41%

**Table 13. Workshop and training attendance by number of facility participants (FY 2000–2004)**

Workshop and Training Opportunities	Attendance by facilities	UESC related					Non-UESC related
	During FY00-04	Before UESC award	Year of UESC award	1-2 Years after award	3+ years after award	Total UESC-related	Total Attendees FY00-04
Emerging Energy Markets Workshop—DC 2002	20	0	2	2	0	4	16
Energy Management Telecourse: Part 3a, Utility Energy Services Contracting—March 2003	40	0	0	0	4	4	36
Opportunities for Renewables & Utility Project Financing Workshop—HI 2001	31	2	0	10	0	12	19
Rural Electric Co-op Workshop—San Antonio 2003	8	0	0	0	1	1	7
Securing Energy Savings Projects for Your Facility—HI 2004	13	0	0	0	4	4	9
UESC Projects Workshop—Air Force—Denver 2004	32	0	0	6	7	13	19
UESC Projects Workshop—Albuquerque 2002	22	0	6	2	0	8	14
UESC Projects Workshop—Atlanta 2004	19	0	0	2	2	4	15
UESC Projects Workshop—Cambridge 2004	10	0	0	0	3	3	7
UESC Projects Workshop—Chicago 2003	13					0	13
UESC Projects Workshop—DC 2002	21	0	2	3	0	5	16
UESC Projects Workshop—Pensacola 2002	10	0	3	2	0	5	5
UESC Projects Workshop—Philadelphia 2003	28	0	0	5	0	5	23
UESC Projects Workshop—San Diego 2003	17	0	0	0	5	5	12
UESC Workshop—Chicago 2001	19	0	0	1	0	1	18
Utility Deregulation Workshop—Tampa 2000	22	1	6	0	0	7	15
Utility Financing Workshop—NY 2000	23	4	0	0	0	4	19
Utility Financing Workshop—Tampa 2000	22	1	7	0	0	8	14
Utility Project Financing Workshop—DC 2001	34	0	0	1	0	1	33
Utility Project Financing Workshop—Golden CO 2001	32	0	0	6	0	6	26
Utility Project Financing Workshop—Los Angeles 2001	13	0	0	4	0	4	9
Utility Restructuring Workshop—DC 2001	36	0	1	1	0	2	34
Utility Restructuring Workshop—Golden CO 2001	18	0	0	1	0	1	17
Utility Restructuring Workshop—Los Angeles 2001	17	0	0	4	0	4	13
Utility Restructuring Workshop—NY 2000	19	3	0	0	0	3	16
<b>Grand Total</b>	<b>539</b>	<b>11</b>	<b>27</b>	<b>50</b>	<b>26</b>	<b>114</b>	<b>425</b>
<b>Grand Total Percents</b>		<b>2%</b>	<b>5%</b>	<b>9%</b>	<b>5%</b>	<b>21%</b>	<b>79%</b>

**Table 14. Workshop and training attendance by number of utility participants (FY 2000–2004)**

Workshop and Training Opportunities	Attendance by utilities	UESC related					Non-UESC related
	During FY00-04	Before UESC award	Year of UESC award	1-2 Years after award	3+ years after award	Total UESC-related	Total Attendees FY00-04
Emerging Energy Markets Workshop—DC 2002	1	0	0	1	0	1	0
Energy Management Telecourse: Part 3a, Utility Energy Services Contracting—March 2003	2	0	0	0	2	2	0
Opportunities for Renewables & Utility Project Financing Workshop—HI 2001	18	0	0	12	0	12	6
Rural Electric Co-op Workshop—San Antonio 2003	47	0	0	0	2	2	45
Securing Energy Savings Projects for Your Facility—HI 2004	2	0	0	0	2	2	0
UESC Projects Workshop—Atlanta 2004	1	0	0	0	0	0	1
UESC Projects Workshop—Cambridge 2004	1	0	0	1	0	1	0
UESC Projects Workshop—Chicago 2003	2	0	0	0	2	2	0
UESC Projects Workshop—DC 2002	2	0	0	2	0	2	0
UESC Projects Workshop—Philadelphia 2003	1	0	0	0	1	1	0
UESC Projects Workshop—San Diego 2003	1	0	0	0	1	1	0
Utility Deregulation Workshop—Tampa 2000	2	0	2	0	0	2	0
Utility Financing Workshop—Tampa 2000	2	0	2	0	0	2	0
Utility Project Financing Workshop—DC 2001	1	0	0	1	0	1	0
Utility Restructuring Workshop—DC 2001	1	0	0	1	0	1	0
Utility Restructuring Workshop—Los Angeles 2001	1	0	0	0	0	0	1
Workshop with the Energy Solutions Center (Gas Utility) Workshop—St Louis 2004	391	0	9	20	85	114	277
<b>Grand Total</b>	<b>476</b>	<b>0</b>	<b>13</b>	<b>38</b>	<b>95</b>	<b>146</b>	<b>330</b>
<b>Grand Total Percents</b>		0%	3%	8%	20%	31%	69%

Table 15. FUPWG meeting attendance by number of facility participants (FY 2000–2004)

FUPWG Meetings Attended by Facilities							
FUPWG Meeting Opportunities	Attendance by Facilities	UESC Related	Year of UESC Award	1-2 Years After UESC Award	3+ Years After Award	Total Request UESC-Related	Non-UESC Related
	During FY 2000-2004	Before UESC Award					Total Attendees During FY2000-2004
October 1, 1999	5	2	1	0	0	3	2
April 1, 2000	10	1	4	0	0	5	5
August 1, 2000	5	1	0	0	0	1	4
December 1, 2000	12	2	1	2	0	5	7
March 1, 2001	19	1	0	7	0	8	11
June 1, 2001	8	1	1	0	0	2	6
October 1, 2001	24	0	0	8	0	8	16
April 1, 2002	25	0	1	11	0	12	13
November 1, 2002	31	0	0	3	6	9	22
April 1, 2003	37	0	0	8	3	11	26
October 1, 2003	40	0	0	3	7	10	30
April 1, 2004	18	0	0	1	2	3	15
<b>Grand Total</b>	<b>234</b>	<b>8</b>	<b>8</b>	<b>43</b>	<b>18</b>	<b>77</b>	<b>157</b>
Grand Total Percents		3%	3%	18%	8%	33%	67%

**Table 16. FUPWG meeting attendance by number of utility participants (FY 2000–2004)**

<b>FUPWG Meetings Attended by Utilities</b>							
<b>FUPWG Meeting Opportunities</b>	<b>Attendance by Utilities</b>	<b>UESC Related</b>	<b>Year of UESC Award</b>	<b>1-2 Years After UESC Award</b>	<b>3+ Years After Award</b>	<b>Total Request UESC-Related</b>	<b>Non-UESC Related</b>
	<b>During FY2000-2004</b>	<b>Before UESC Award</b>					<b>Total Attendees During FY2000–2004</b>
October 1, 1999	17	1	11	0	0	12	5
April 1, 2000	18	2	13	0	0	15	3
August 1, 2000	20	1	15	0	0	16	4
December 1, 2000	45	0	3	26	0	29	16
March 1, 2001	38	3	2	22	0	27	11
June 1, 2001	19	0	1	13	0	14	5
October 1, 2001	27	2	0	15	0	17	10
April 1, 2002	36	2	0	26	0	28	8
November 1, 2002	40	0	2	0	29	31	9
April 1, 2003	26	0	2	1	18	21	5
October 1, 2003	26	0	0	1	19	20	6
April 1, 2004	28	0	0	2	21	23	5
<b>Grand Total</b>	<b>340</b>	<b>11</b>	<b>49</b>	<b>106</b>	<b>87</b>	<b>253</b>	<b>87</b>
Grand Total Percents		3%	14%	31%	26%	74%	26%

## **5.5 Influence of FEMP UESC Program on Ultimate Outcomes**

This part of the analysis examines the potential influence of FEMP UESC services on ultimate outcomes of energy savings and energy cost savings. It explores the third hypothesis of whether FEMP UESC served to improve UESC performance. The potential for attribution of savings as a result of FEMP's influence on UESC is also addressed.

This last sub-section explores the third hypothesis: whether facilities and utilities that were touched by the FEMP UESC Program prior to awarding a UESC entered into contracts that were estimated to save more energy and result in higher energy cost savings than contracts entered into by facilities and utilities that were not touched by the program before awarding UESCs. The hypothesis is that having prior exposure to UESC expertise in some form would help participants take fuller advantage of UESCs and, therefore, save more energy. In other words, it could be argued that ultimate outcomes would be higher if participants knew more about UESCs before acting.

Table 17 sheds some light on this hypothesis. The data do support the hypothesis. For example, facilities that were touched by FEMP before awarding a UESC saved almost 74% more energy per project, resulting in almost 46% more energy cost savings. The projects awarded also required higher facility capital investments, which could reflect a higher confidence that the UESC would prove successful.

Finally, an estimate of the maximum potential for attribution of savings to FEMP UESC is examined in Table 18 for UESC projects from FY 2000 to FY 2004. Using the UESC relational database, awarded UESCs with utility and/or facility participation in FEMP UESC activities were identified. On the basis of reported energy and energy cost savings for awarded projects, Table 18 indicates that most of the savings estimated to be generated by UESCs were touched by FEMP's UESC Program services. For example, 30% of the energy costs savings are associated with facilities with activities that were identified in the UESC relational database. When both utility and facility participants in a UESC are considered, a very high percentage of savings is linked to the case where both received at least one FEMP service: 89% of total energy cost savings and 87% of total energy savings. It should be noted that not all awarded projects identified in the UESC Project database reported energy and energy cost savings data, and that this savings estimate is based only on the data reported.

This estimate of maximum potential for savings attributable to FEMP is based on participant activity levels and not on the customer's assessment of the actual value of the FEMP services provided. A more accurate determination of the value of FEMP's UESC services to facility and utility customers should be addressed through a direct survey of the UESC participants.

**Table 17. Average per UESC project estimated energy cost savings, energy savings, and capital investments by timing of FEMP UESC program touches**

	Facilities		Utilities	
	Touched before awarding UESC	Not touched before awarding UESC	Touched before awarding UESC	Not touched before awarding UESC
Estimated energy savings (MMBtu/year)	33,000	19,000	38,500	17,000
Estimated energy cost savings (\$/year)	392,000	269,000	467,000	277,000
Estimated capital investment (\$)	1,741,000	1,366,000	1,929,000	1,451,000

**Table 18. Summary of awarded UESC project savings**

	Total reported for all UESCs (From Table 6)	All UESCs where facility was touched by FEMP services		All UESCs where facility or partner utility were touched by FEMP services	
		Sum	% of total	Sum	% of total
Estimated energy savings (MMBtu/year)	4,845,836	2,602,711	54	4,218,840	87
Estimated energy cost savings (\$/year)	97,673,804	29,372,602	30	86,475,713	89
Estimated capital investment (\$)	834,795,859	320,693,798	38	716,325,002	86

## 6. CONCLUSIONS AND RECOMMENDATIONS

This report presents the results of a preliminary assessment of the FEMP UESC Program. The assessment considers program input and output. Several analytical approaches were used to assess the influence of program services on the award of UESCs.

Several conclusions are offered:

- The FEMP UESC Program provided a substantial number of documented services during the FY 2000–2004 period: almost 1000 requests for publications were made, more than 1000 people attended training sessions and workshops, and more than 700 people attended FUPWG meetings.
- During this time, records from a master list of FEMP and non-FEMP-related UESCs indicate that 587 UESCs were awarded, representing 16 different agencies, 242 different facilities, and 49 utilities. The master list also identifies nearly 5 million MMBtu in annual energy savings, resulting in almost \$100 million in annual energy cost savings and \$835 million in capital investments.
- Across all UESCs (FEMP and non-FEMP-related), it is estimated that the average UESC resulted in \$327,800 in energy cost savings and 26,200 MMBtu in energy savings and required \$1,643,300 in capital investment per project.
- Facilities that were touched by FEMP before awarding a UESC saved, on average, almost 74% more energy per project than did facilities that awarded a contract but did not receive any FEMP services.
- Of all UESCs recorded in the master list (covering FY 2000–2004), 89% of the total reported annual energy cost savings (\$86.5 million), 87% of the total reported annual energy savings (4.2 million MMBtu), and 86% of the total reported capital investments (\$716.3 million) were linked to at least one FEMP UESC service delivered to the participating facility and/or utility.
- The FEMP UESC Program touched almost 4% of all federal facilities.
- Approximately 5% of facilities that received FEMP services before awarding a UESC or during the year the UESC was awarded have actually awarded a UESC. This can be interpreted as a yield rate of FEMP UESC services. The yield rate for utilities is approximately 13%.
- Approximately 74% of the utility FUPWG participants were from utilities that have participated in one or more UESC contracts.
- Decidedly more facilities and utilities received FEMP UESC Program services during the UESC performance period than before the UESC was awarded.
- Approximately 15% of federal facilities that awarded UESCs were touched by one or more FEMP UESC services.

It is unclear exactly what impact FEMP UESC Program services had on facility and utility decisions to award UESCs. It was hypothesized that facilities and utilities that awarded UESCs would have received more services than those that have not yet awarded UESCs. The data revealed the opposite situation. Those not yet awarding UESCs received more services. Additionally, it appears that those facilities and utilities that awarded UESCs used more services after the award than before. It could be that once the UESCs were awarded, the parties then decided they needed more assistance in

administering the contracts and consequently consumed more FEMP UESC Program services.

It is unclear whether a yield rate of 5%—the percentage of facilities receiving a FEMP UESC Program service that went on to award a UESC—is low, meets expectations, or greatly exceeds expectations. It should be noted, however, that this yield rate is consistent with yield rates experienced in the private sector for similar marketing activities. Despite the low yield rate, 87% of the energy savings and 89% of the energy cost savings identified (for FY 2000–2004) in the master list within the UESC Project database are associated with UESC projects that were touched by FEMP UESC activities, through either the facility or the utility. It does suggest that attribution of UESC project savings to FEMP UESC activities may be high. A more complete picture of the attribution of savings from FEMP UESC would be obtained through direct feedback from federal facility and utility participants.

To help answer these questions and to help gauge the influence and attribution of the FEMP UESC Program on the award of UESCs, it is recommended that a survey of participating federal facilities be conducted. Facility managers would be asked about the value of FEMP services, their experiences with the UESC process, and barriers that may prevent the award of UESCs. Utility representatives would also be asked similar questions. Federal facility managers can be surveyed without OMB approval. Since about nine utilities have been involved in most of the UESCs, it is recommended that only these nine be surveyed so as to expedite the survey process. OMB approval is needed for surveys of ten or more.

The second general recommendation pertains to the data. It is possible that the data sources used in this assessment were not complete. For example, it is possible that many UESCs were not recorded, because reporting is only voluntary. Reporting of contract completion dates, project energy and energy cost savings, and capital investments needs to be improved. It is known that information was not available about how many publications were requested in the year 2000. WebTrends does not provide information about all website hits and downloads, only for the most frequently hit pages and downloaded documents and software. This data source also does not provide the identities of web users. It is also strongly suspected that attendance at several workshops, especially teleworkshops, was under-reported. Finally, information that could have been helpful in characterizing FEMP UESC program participants and in linking participants either to facilities or to agency headquarter operations was often missing. It is recommended that efforts be made to improve the data collected in all these areas.

Third, it is recommended that improvements in the data collection and record keeping processes be considered. Ideally, data needed for assessments of the FEMP UESC Program would be readily available on demand. This vision is far from the current reality. Much effort was required to assemble the assessment data; e.g., many special database queries were needed to extract the data from several databases. This was very time-consuming and limited the time and effort that could be expended upon data analysis.

Currently, FEMPCentral does not support this specialized record keeping across all activities.

Finally, consideration should be given to expanding the scope of the FEMP UESC Program evaluation. The preliminary design matrix found in Appendix B provides an initial framework for this effort. This matrix suggests, for example, that it might prove valuable to assess the relationships among the main participants in the FEMP UESC Program, the agencies/facilities, utilities, and FEMP itself.

## 7. REFERENCES

Kellogg Foundation 2001. *Logic Model Development Guide*, W. K. Kellogg Foundation, Battle Creek, MI, December. <http://www.wkkf.org>.

## **8. ACKNOWLEDGMENTS**

We would like to thank many persons for their assistance by providing data and various information to aid in the development of this report. A few key persons are

Jen Folte (Energetics)

Julia Kelley (Oak Ridge National Laboratory)

Kate McMordie-Stoughton (Pacific Northwest National Laboratory)

Karen Thomas (Pacific Northwest National Laboratory)

Amy Vaughn (National Renewable Energy Laboratory)

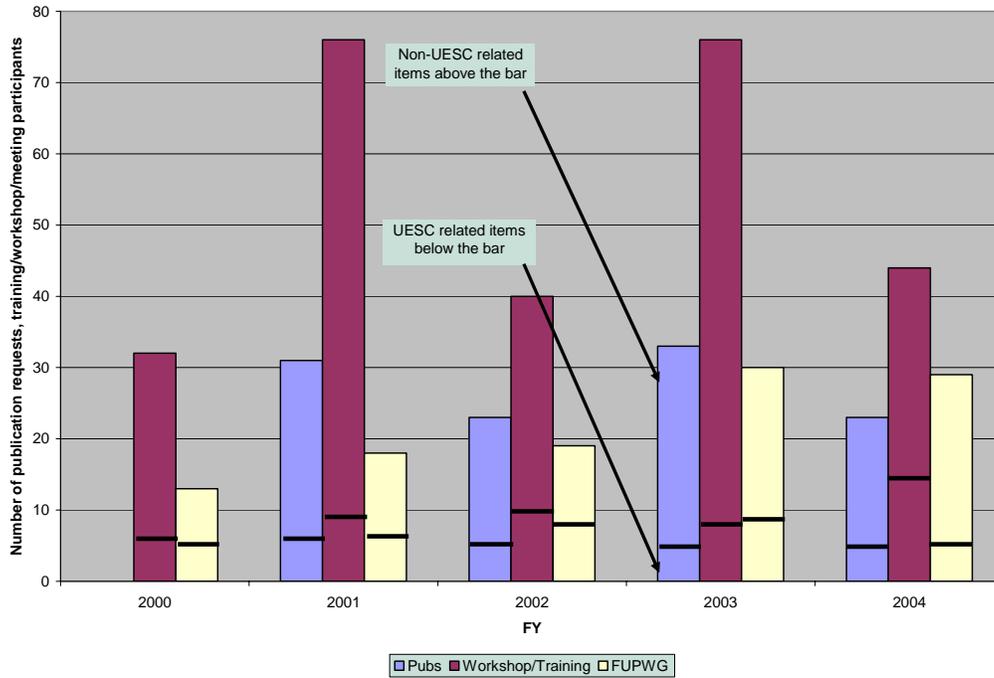
Rosie Field (McNeil Technologies)

## **Appendix A: SUPPORTING TABLES AND FIGURES**

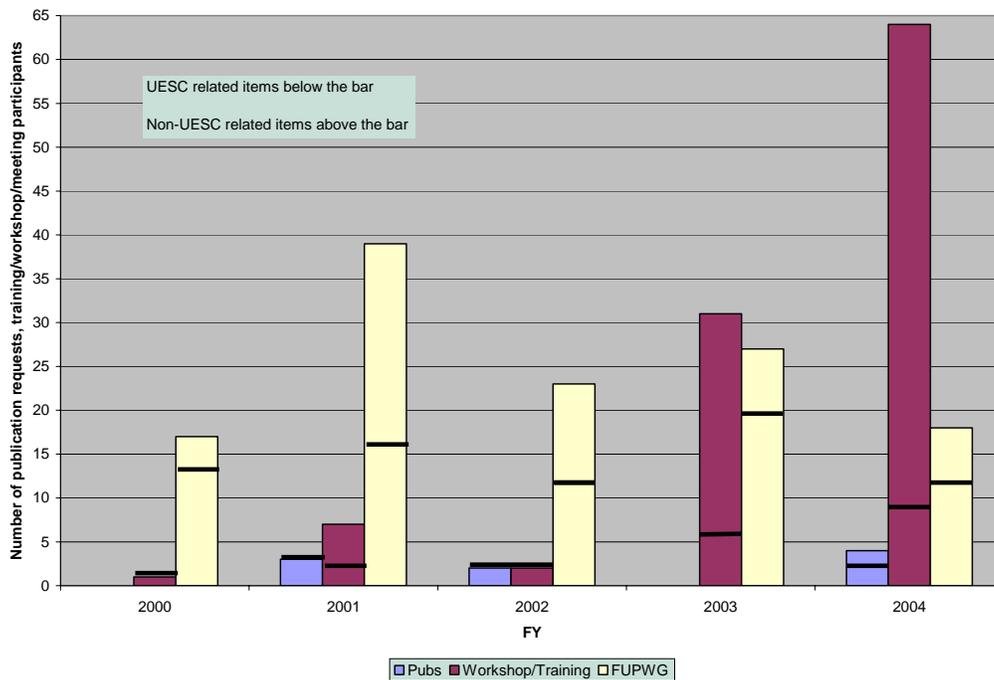
**Table A.1. Overall representation output table**

Programs	Total UESCs	Project Facilitation (Direct Support)	Programs	Publications	Webtrends <sup>(3)</sup>	Programs	Workshop and Training (1 and 2 day courses)	Outreach (Strategic Meetings & Presentations)	FUPWG (Meeting Facilitation)
Channels			Channels			Channels			
2000	Number of UESC Projects Awarded	100	4 UESC Publication Requests			Number of Training/Workshop/Meeting/Outreach Opportunities	4		3
	Number of Agencies Represented <sup>(2)</sup>	9	1 Total Number of Requests	not available	not available	Total Number of Participants	112	not available	113
	Number of Facilities Represented <sup>(2)</sup>	63	1 Number of Agencies Represented <sup>(1,2)</sup>			Number of Agencies Represented <sup>(1,2)</sup>	12		7
	Number of Utilities Represented <sup>(2)</sup>	27	1 Number of Facilities Represented <sup>(1,2)</sup>			Number of Facilities Represented <sup>(1,2)</sup>	32		13
			Number of Utilities Represented <sup>(2)</sup>			Number of Utilities Represented <sup>(2)</sup>	1		17
	Number of UESC Projects Completed <sup>(4)</sup>	13	-						
2001	Number of UESC Projects Awarded	140	3 UESC Publication Requests			Number of Training/Workshop/Meeting/Outreach Opportunities	8		3
	Number of Agencies Represented <sup>(2)</sup>	12	1 Total Number of Requests	111	not available	Total Number of Participants	251	not available	188
	Number of Facilities Represented <sup>(2)</sup>	84	2 Number of Agencies Represented <sup>(1,2)</sup>	11		Number of Agencies Represented <sup>(1,2)</sup>	18		7
	Number of Utilities Represented <sup>(2)</sup>	27	2 Number of Facilities Represented <sup>(1,2)</sup>	31		Number of Facilities Represented <sup>(1,2)</sup>	76		18
			Number of Utilities Represented <sup>(2)</sup>	3		Number of Utilities Represented <sup>(2)</sup>	7		39
	Number of UESC Projects Completed <sup>(4)</sup>	50	2						
2002	Number of UESC Projects Awarded	171	2 UESC Publication Requests			Number of Training/Workshop/Meeting/Outreach Opportunities	4		2
	Number of Agencies Represented <sup>(2)</sup>	14	1 Total Number of Requests	195	8,441	Total Number of Participants	82	not available	141
	Number of Facilities Represented <sup>(2)</sup>	104	2 Number of Agencies Represented <sup>(1,2)</sup>	10		Number of Agencies Represented <sup>(1,2)</sup>	12		7
	Number of Utilities Represented <sup>(2)</sup>	27	2 Number of Facilities Represented <sup>(1,2)</sup>	23		Number of Facilities Represented <sup>(1,2)</sup>	40		19
			Number of Utilities Represented <sup>(2)</sup>	2		Number of Utilities Represented <sup>(2)</sup>	2		23
	Number of UESC Projects Completed <sup>(4)</sup>	88	1						
2003	Number of UESC Projects Awarded	111	10 UESC Publication Requests			Number of Training/Workshop/Meeting/Outreach Opportunities	5		2
	Number of Agencies Represented <sup>(2)</sup>	11	4 Total Number of Requests	247	16,885	Total Number of Participants	203	not available	166
	Number of Facilities Represented <sup>(2)</sup>	52	5 Number of Agencies Represented <sup>(1,2)</sup>	11		Number of Agencies Represented <sup>(1,2)</sup>	19		8
	Number of Utilities Represented <sup>(2)</sup>	23	5 Number of Facilities Represented <sup>(1,2)</sup>	34		Number of Facilities Represented <sup>(1,2)</sup>	76		30
			Number of Utilities Represented <sup>(2)</sup>	-		Number of Utilities Represented <sup>(2)</sup>	31		27
	Number of UESC Projects Completed <sup>(4)</sup>	109	2						
2004	Number of UESC Projects Awarded	65	4 UESC Publication Requests			Number of Training/Workshop/Meeting/Outreach Opportunities	5		2
	Number of Agencies Represented <sup>(2)</sup>	5	2 Total Number of Requests	419	3,385	Total Number of Participants	493	not available	143
	Number of Facilities Represented <sup>(2)</sup>	31	4 Number of Agencies Represented <sup>(1,2)</sup>	9		Number of Agencies Represented <sup>(1,2)</sup>	6		13
	Number of Utilities Represented <sup>(2)</sup>	11	4 Number of Facilities Represented <sup>(1,2)</sup>	24		Number of Facilities Represented <sup>(1,2)</sup>	44		29
			Number of Utilities Represented <sup>(2)</sup>	4		Number of Utilities Represented <sup>(2)</sup>	64		18
	Number of UESC Projects Completed <sup>(4)</sup>	73	1						
	Number of UESC Projects Awarded	587	23 UESC Publication Requests			Number of Training/Workshop/Meeting/Outreach Opportunities	26		12
	Total Number of Agencies Represented <sup>(5)</sup>	16	5 Total Number of Requests	972	28,711	Total Number of Participants	1,141	not available	751
	Total Number of Facilities Represented <sup>(5)</sup>	242	11 Number of Agencies Represented <sup>(2,5)</sup>	20		Number of Agencies Represented <sup>(2,5)</sup>	26		17
	Total Number of Utilities Represented <sup>(5)</sup>	49	12 Number of Facilities Represented <sup>(2,5)</sup>	96		Number of Facilities Represented <sup>(2,5)</sup>	226		54
			Number of Utilities Represented <sup>(2,5)</sup>	9		Number of Utilities Represented <sup>(2,5)</sup>	103		53
	Number of UESC Projects Completed <sup>(4)</sup>	333	6						

1 FEMP Federal customers only.  
2 Agencies, facilities, and utilities with limited ID info are labeled as "unknown" and included in output data.  
3 Federal downloads only. Exact recipient data unknown.  
4 The number of projects completed in a FY may include projects from previous FY due to the delay between Award and Completion Dates.  
5 Total number of unique Federal Agencies, Federal Facilities, and Utilities Represented between FY2000 - 2004.



**Figure A.1. Facility representation levels by fiscal year and FEMP UESC activity.**



**Figure A.2. Utility representation levels by fiscal year and FEMP UESC activity.**

**Table A.2. Publication requests by facilities with UESCs (years received) by award date**

		Number of Publication Requests by Facilities by Award Date FY2000-04					
	Number of UESCs	Number of Unique Facilities					
2000	100	63	0	6	2	6	36
2001	140	84	0	6	7	5	11
2002	171	104	0	6	8	26	11
2003	111	52	0	3	1	0	4
2004	65	31	0	2	1	0	4
	587	334					
			2000	2001	2002	2003	2004

**Table A.3. Publication requests by facilities with UESCs (years received) by completion date**

		Number of Publication Requests by Facilities by Completion Date FY2000-04					
	Number of UESCs	Number of Unique Facilities					
2000	13	12	0	0	0	0	0
2001	50	34	0	0	0	0	4
2002	88	60	0	1	3	0	0
2003	109	68	0	2	7	7	11
2004	73	34	0	3	1	5	11
	333	208					
			2000	2001	2002	2003	2004

**Table A.4. Publication requests by utilities with UESCs (years received) by award date**

		Number of Publication Requests by Utilities by Award Date FY2000-04					
	Number of UESCs	Number of Unique Facilities	2000	2001	2002	2003	2004
2000	100	63	0	0	0	0	0
2001	140	84	0	2	18	0	16
2002	171	104	0	3	3	0	15
2003	111	52	0	1	0	0	15
2004	65	31	0	1	18	0	15
		587	334				

**Table A.5. Publication requests by utilities with UESCs (years received) by completion date**

		Number of Publication Requests by Utilities by Completion Date FY2000-04					
	Number of UESCs	Number of Unique Facilities	2000	2001	2002	2003	2004
2000	13	12	0	0	0	0	15
2001	50	34	0	0	0	0	16
2002	88	60	0	3	0	0	1
2003	109	68	0	1	0	0	16
2004	73	34	0	1	0	0	15
		333	208				

**Table A.6. Workshops and training attendees by facilities with UESCs (years received) by award date**

		Number of Workshops/Training Attendees by Facilities by Award Date FY2000-04					
	Number of UESCs	Number of Unique Facilities					
2000	100	63	13	28	7	10	15
2001	140	84	4	20	8	15	7
2002	171	104	2	19	17	9	14
2003	111	52	0	0	10	4	10
2004	65	31	3	0	10	4	10
	587	334					
			2000	2001	2002	2003	2004

**Table A.7. Workshops and training attendees by facilities with UESCs (years received) by completion date**

		Number of Workshops/Training Attendees by Facilities by Completion Date FY2000-04					
	Number of UESCs	Number of Unique Facilities					
2000	13	12	11	0	0	1	4
2001	50	34	0	0	5	1	4
2002	88	60	0	3	2	5	2
2003	109	68	4	19	9	11	8
2004	73	34	0	15	11	10	13
	333	208					
			2000	2001	2002	2003	2004

**Table A.8. Workshops and training attendees by utilities with UESCs (years received) by award date**

		Number of Workshops/Training Attendees by Utilities by Award Date FY2000-04					
	Number of UESCs	Number of Unique Facilities					
2000	100	63	4	14	3	8	40
2001	140	84	4	14	3	8	50
2002	171	104	4	12	2	7	24
2003	111	52	4	0	2	6	48
2004	65	31	0	0	1	7	5
	587	334					
			2000	2001	2002	2003	2004

**Table A.9. Workshops and training attendees by utilities with UESCs (years received) by completion date**

		Number of Workshop/Training Attendees by Utilities by Completion Date FY2000-04					
	Number of UESCs	Number of Unique Facilities					
2000	13	12	4	0	0	1	1
2001	50	34	4	0	0	7	1
2002	88	60	4	12	2	6	67
2003	109	68	4	2	2	6	2
2004	73	34	0	0	0	6	1
	333	208					
			2000	2001	2002	2003	2004

**Table A.10. FUPWG meeting attendees by facilities with UESCs (years received) by award date**

		Number of FUPWG Meetings Attendees by Facilities by Award Date FY2000-04					
	Number of UESCs	Number of Unique Facilities					
2000	100	63	5	9	15	9	6
2001	140	84	5	9	17	14	9
2002	171	104	6	9	11	13	9
2003	111	52	3	3	6	7	4
2004	65	31	3	5	3	7	5
	587	334					
			2000	2001	2002	2003	2004

**Table A.11. FUPWG meeting attendees by facilities with UESCs (years received) by completion date**

		Number of FUPWG Meetings Attendees by Facilities by Completion Date FY2000-04					
	Number of UESCs Completed	Number of Unique Facilities					
2000	13	12	1	2	2	1	0
2001	50	34	0	2	7	3	1
2002	88	60	1	2	3	7	2
2003	109	68	5	8	10	12	8
2004	73	34	6	10	8	14	9
	333	208					
			2000	2001	2002	2003	2004

**Table A.12. FUPWG meeting attendees by utilities with UESCs (years received) by award date**

**Number of FUPWG Meetings Attendees by Utilities  
by Award Date FY2000-04**

	Number of UESCs	Number of Unique Facilities					
2000	100	63	39	61	39	47	38
2001	140	84	40	65	41	48	40
2002	171	104	41	57	43	49	40
2003	111	52	36	51	37	44	35
2004	65	31	30	38	26	35	32
	587	334					
			2000	2001	2002	2003	2004

**Table A.13. FUPWG meeting attendees by utilities with UESCs (years received) by completion date**

**Number of FUPWG Meetings Attendees by Utilities  
by Completion Date FY2000-04**

	Number of UESCs Completed	Number of Unique Facilities					
2000	13	12	13	16	6	16	13
2001	50	34	30	45	32	37	30
2002	88	60	25	44	29	36	24
2003	109	68	34	45	29	41	32
2004	73	34	26	34	24	30	28
	333	208					
			2000	2001	2002	2003	2004

## Appendix B. EVALUATION DESIGN MATRIX

Table B.1 presents an evaluation design matrix for the FEMP UESC Program. The design matrix has three focus areas: context, implementation, and outcomes. The context focus area is concerned with relationships among the major participants in this FEMP program—the agencies and facilities, utilities, and FEMP itself—and the capacity of the participants to take full advantage of the program. The implementation focus area addresses the quality and quantity of program services. The outcome focus area is self-explanatory.

For each focus area, the audience for that element of the evaluation is presented. The audience in each area includes the agencies and facilities, utilities, and FEMP. It should be noted that Congress and EERE-Planning, Budgeting and Analysis are included in the audience for the outcomes element of the evaluation. This is because the evaluation can help answer questions that these two entities might have about this FEMP program: Is the program cost-effective, and how much energy has it saved? As indicated in the last column of this table, the information generated by answering these questions is expected to have specific uses, in this case with respect to future program funding decisions and the development of energy savings metrics, respectively.

The evaluation research reported in the main body of this report suggests that this evaluation mainly addressed the implementation and outcome focus areas. Output was documented and the most important outcomes—number of UESCs awarded and resulting energy and energy cost savings—were estimated. The design matrix suggests that future evaluation research could focus on customer satisfaction with program services and on the overall cost-effectiveness of the program.

The design matrix also suggests that future work could begin to assess context issues. Specifically, the relationships between agencies and utilities, as brokered by FEMP, could be valuable to study.

**Table B.1. FEMP UESC Program Evaluation Design Matrix**

<b>Evaluation focus area</b>	<b>Audience</b>	<b>Question</b>	<b>Information use</b>
Context—Relationships and capacity	FEMP	Has FEMP created strong relationships with agencies/facilities and utilities?	Program design and marketing decisions
	Agencies and facilities	Do agencies/facilities benefit from FEMP brokered relationships with utilities?	Facility energy management planning
	Utilities	Do utilities benefit from FEMP brokered relationships with agencies/facilities?	Business market planning
Implementation—quality and quantity	FEMP	Do agencies/facilities and utilities find services valuable?	Program design, planning and implementation
	Agencies and facilities	Are FEMP UESC services valuable?	Training and FUPWG participation decisions
	Utilities	Are FEMP UESC services valuable?	Training and FUPWG participation decisions
Outcomes—effectiveness, magnitude, and satisfaction	FEMP	Do program outputs influence intended outcomes?	Program design decisions
		What are program outcomes?	Budget justification
	EERE–PBA	How much energy is saved?	Energy savings metrics
	Congress	How cost effective is program?	Future funding decisions
	Agencies and facilities	Is it worthwhile to award UESCs?	Whether to use UESCs
	Utilities	Is it worthwhile to participate in UESCs?	Whether to use UESCs

## **DISTRIBUTION**

1. Jennifer Folta – Energetics
2. Bill Golove – LBNL
3. Patrick Hughes – ORNL
4. Julia Kelly – ORNL
5. Melissa Madgett– ORNL
6. Michaela Martin – ORNL
7. David McAndrew – FEMP DOE
8. Kate McMordie-Stoughton – PNNL
9. Mitch Olszewski – ORNL
10. Karen Thomas – PNNL
11. Bruce Tonn– ORNL
12. Tony Wright – ORNL