DOE/CE/40806--T5

ENERGY MANAGEMENT ASSISTANCE FOR SMALL AND MEDIUM-SIZE MANUFACTURERS

Manufacturers' Evaluations of EADCs' Services 1988 - 1989

This report was prepared for the Department of Energy, Office of Industrial Programs, under Agreement No. DE-FC01-87CE40806

by

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October, 1989

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EXECUTIVE SUMMARY

Small and medium-size manufacturers continue to express strong confidence in and satisfaction with the energy-conserving and cost-saving services provided by the Energy Analysis and Diagnostic Centers. That conclusion is based upon in-depth interviews with 227 of the 340 manufacturers (67%) served during 1988-89 by an EADC. These interviews were conducted at the manufacturing plants by engineers from the Industrial Technology and Energy Management (ITEM) division of University City Science Center, which manages the EADC program under agreement with the Office of Industrial Programs, U.S. Department of Energy. University engineering faculty and a mix of graduate and undergraduate students who make up the staff of each EADC perform energy audits under subcontract to the Science Center at manufacturing plants which are located within about 150 miles of the university.

This report presents the chief results obtained during two series of interviews with 67% of the manufacturers in 36 states served by 13 EADCs during 1988-89. These include the principal benefits derived by the manufacturers, the extent to which EADCs' recommendations are being understood and implemented, and the manufacturers' perceptions about the ways EADCs carry out their dual mission of industrial service and educational enrichment.

The 227 manufacturers interviewed represent 19 different industries (2-digit SIC codes), and they collectively employed over 36,000 persons and sold more than $5.0 billion worth of products and services during the past year.

In summary, these manufacturers expressed strong agreement on certain key aspects of the EADC program, such as:

- The EADC program is a good expenditure of taxpayers' money: 94%.
- Energy audit reports are considered extremely well done or well done: 93%.
- Manufacturers agree with all or most of the conclusions expressed in those reports: 86%.
- Manufacturers are implementing at least some energy-conserving and cost-saving recommendations: 92%.

EADCs' audit reports are being widely distributed in these plants to people who are in positions of responsibility and authority. For example, 28.6% of those who saw the reports are company owners or corporate officers, and another 16.7% are plant managers or general managers.

When asked about the primary and the secondary benefits derived from the EADCs' work, the manufacturers chose these most often:

- Confirmation of what had been suspected about energy inefficiency in the plant: 29.8%.
- Identification of ways to lower costs: 27.4%.
- Revelation of sources of energy inefficiency: 15.6%

In addition, another 11.4% of those interviewed said the chief benefit of the EADCs' work was to convince management that the recommendations made would be profitable. The EADCs' independence and objectivity, strengthened by the staff's technological competence and experience, apparently are convincing to the manufacturers.

From the results of these interviews it appears that EADCs as a group are serving manufacturers in an effective manner that fulfills the manufacturers' expectations and the purposes of the EADC program.

RESULTS AND DISCUSSION

Background on the Interviews and the Results

Twice during each period of the Energy Analysis and Diagnostic Center (EADC) program, engineers from the Industrial Technology and Energy Management (ITEM) division of UCSC interview representatives of over 60% of the manufacturers served by each EADC. The standard interview form used is included in the appendix of this report. These interviews, which are structured to generate a progression of information about the performance of each EADC, are held at the manufacturers' plants for their convenience. That setting also provides ITEM's engineers with a first hand picture of the plant's operating conditions and reveals some of the other factors which can influence decisions of plant management about energy conservation.

This report presents the chief results obtained during interviews with representatives of 227 of the 340 manufacturers served by 13 EADCs within the 1988-89 program period. These include the principal benefits derived by the manufacturers from the EADCs' achievements, the extent to which EADCs' recommendations are being implemented, and the manufacturers' perceptions about the ways EADCs carry out their mission of industrial service and educational enrichment.

In addition to the overall program results identified from these interviews, there is another important purpose which they serve. For an individual EADC, the manufacturers' responses to the questions asked can reveal certain strong or weak performance characteristics, especially to a skilled interviewer. It is the responsibility of the ITEM engineer-interviewer to detect such patterns, recognize their implications, and communicate their meaning to the EADC director.

Clearly, the manufacturers' interviews produce two broad kinds of results. One is an overall understanding of how the EADCs' services are performed and perceived. The other is an insight on the performance of each EADC, a complex representation of the impressions created, the efforts expended, the benefits derived (by the manufacturers), the attitudes generated, and the likelihood of implementation. These insights become effective management tools for ITEM's engineers in evaluating EADCs' performance, and the EADC staff members at the universities have come to recognize these interviews as a means to understanding what their manufacturers think about the EADCs' efforts.

The purpose of this report is to communicate what the 227 interviews showed about how the EADCs' services are performed and perceived.

The EADCs which served the manufacturers interviewed are located at and staffed by engineering faculty and students from Colorado State University, Georgia Institute of Technology, Louisiana Tech University, North Carolina A&T State University, Oklahoma State University, Oregon State University, Rutgers University, Texas A&M University, and the Universities of Dayton, Kansas, Massachusetts (Amherst), Tennessee (Knoxville), and Wisconsin (Milwaukee). Each EADC serves small and medium-size manufacturers located within about 150 miles of the university.

Manufacturers' Size and Other Characteristics

Of the 227 manufacturers interviewed during 1988-89, all but five supplied data on their plants' employment and gross sales. In number, these manufacturers represent 19 different industries (2-digit SIC codes) served by the 13 EADCs. From Table 1, which presents a count of the manufacturers interviewed in each industry together with

TABLE 1

CLASSIFICATION OF MANUFACTURERS INTERVIEWED

SIC	Number Interviewed	Total Employment	Annual Gross Sales ($ Thousand)
20	35	5,572	1,154,800
22	2	175	10,500
23	6	1,073	169,000
24	11	1,781	169,250
25	7	1,340	91,500
26	17	2,192	306,400
27	12	3,915	437,500
28	11	685	216,500
29	0	0	0
30	19	2,514	273,500
31	0	0	0
32	8	993	112,800
33	14	3,006	418,900
34	26	3,296	452,400
35	33	5,303	737,500
36	7	1,515	149,000
37	6	785	100,100
38	2	600	42,000
39	6	1,295	150,000
TOTAL	222	36,040	4,991,650

(Five manufacturers interviewed were not included in this table because of missing employment numbers or gross annual sales data.)

their aggregate data on employment and gross sales, it is reasonable to draw the following conclusions:

- Food processors (SIC 20) continue to be the type of manufacturer served most often (35 plants), and collectively they had the largest total employment (5572) and annual gross sales ($1.15 billion).
- Manufacturers of industrial and commercial machinery (SIC 35) were served almost as often (33 plants), and their total employment was almost as large (5303), but their combined sales were only about 64% as large as those for the food industry.
- Next in frequency was the fabricated metals industry (SIC 34) with 26 plants which employed only 3006 persons and were obviously much less labor-intensive than those in SIC 20 or 35. Also, the total of gross sales for these 26 plants was only about 39% as large as it was for 35 food processing plants.
- Plants served by EADCs in two other industries -- primary metals (SIC 33) and printing (SIC 27) --also had aggregate sales in excess of $400 million, even though only 12 plants were involved in SIC 27 and 14 plants in SIC 33.
- Two industries (SIC 31, leather, and SIC 29, petroleum) were not represented at all, and that is a most unusual occurrence for the EADC program.
- For all 222 respondents, the employment total is 36,040, and the gross annual sales add up to more than $4.99 billion.

The trend toward smaller plants interviewed seems to have been reversed in average gross sales, but it has persisted in average employment, as these data show:

	1986-87	1987-88	1988-89
Avg. Employment (per plant)	195	167	162
Avg. Gross Annual Sales ($ million per plant)	23.3	19.8	22.5

The EADCs are continuing to serve a considerable number of manufacturers within many industries, and ITEM's engineers are interviewing a similarly broad sample of them. One danger of numerical summaries is their tendency to obscure some of the more important details contained within them. For example, seven or more manufacturers were interviewed in each of 12 industries; that means 63% of the 19 industries served by an EADC were represented by a group of manufacturers equal to not less than 3% of the total. There is no doubt about the broad nature of the manufacturers' representatives interviewed for this report.

A variety of opinions is held about how important energy use is to manufacturers at this time. When ITEM's interviewers asked who is chiefly responsible for energy management at a particular plant, slightly more than half (52%) of the answers revealed that responsibility is vested in an owner or company president, a vice president, a plant or general manager, a plant superintendent, a manager of production or manufacturing, or an executive of a corporate parent. That does not imply the others responsible for energy management are not important to their plants. But at least half of those responsible also fulfill managerial roles in these plants, and a very similar figure was found among 243 manufacturers interviewed during the 1987-88 program period. It seems clear that energy management is still considered to be a significant responsibility at many of the plants served by EADCs.

Preparation for the Energy Audit

Once communication has been established between a manufacturer and an EADC representative, some preliminary information must be collected so that the manufacturer's eligibility (to be served by an EADC) can be established and the plant's chief operating characteristics can be learned by the EADC staff who will conduct the energy audit. Moreover, it is important for ITEM's engineer-interviewers to ascertain how an EADC's approach to a manufacturer is carried out and received.

A telephone call from the EADC was the most common means by which manufacturers learned of the EADC program during 1988-89. One hundred fourteen of the 227 interviewed gave that answer, and another 45 said the initial contact had been by mail. Of the remaining 68 manufacturers, seven said they had learned of EADC from a newspaper article; one, from a public service announcement; eight, by word-of-mouth; and 52 others learned of it from none of the foregoing methods.

Considerably more uniformity appeared among manufacturers' other responses about preparatory information gathering. Among the 227 manufacturers interviewed:

- 190 formed an initial impression that the EADC program is a potentially useful university based program.
- 169 knew that the U.S. Department of Energy funds the EADC program (but every report clearly says so).
- 181 knew that their plants' data and audit reports are not identified with their companies' names.
- 193 had supplied the EADC with plants' historic energy use data prior to the audit team's visit.
- 225 considered that data request to be reasonable, and 189 of them had needed less than two person-hours to compile the energy use data.

Manufacturers' Benefits from EADCs' Energy Audits

During each interview the manufacturer's representative is asked to choose a primary and secondary benefit derived from the EADC's energy audit. These choices are requested because ITEM's engineers are interested in learning how beneficial the work of the EADCs is to the recipients. From reports of the energy audits and of their implemented recommendations, a statistical record of energy conservation and cost savings can be compiled. Despite its obvious importance, that record does not communicate the significance of the EADC's work to a manufacturer because it does not reveal how beneficial the people at the plant considered the EADC's findings to be.

Because each manufacturer's representative interviewed had an opportunity to name two benefits, a total of 454 responses was possible. Table 2 shows that the benefit most often selected as primary or secondary is a confirmation by the audit team of what had been suspected about energy inefficiency (128 replies, or 28.2%). Also ranked very high are:

- Helping to identify ways to lower costs (26%).
- Opening people's eyes to sources of inefficiency (14.8%).

A less traditional benefit which appeared during 1987-88 with somewhat surprising frequency reappeared during 1988-89 -- convincing management that the audit team's recommendations would be profitable. All together, 49 responses (10.8%) said that they chose this benefit because the EADC offers objective recommendations, free of any potential for personal financial gains or self interest. This independence, strengthened by the audit team's technological competence and experience, carries considerable weight in convincing manufacturers' management to implement EADCs' recommendations.

TABLE 2

MANUFACTURERS' BENEFITS FROM EADCs' ENERGY AUDITS

	Primary Benefit	Secondary Benefit
Opened eyes to sources of inefficiency/waste	49	18
Confirmed what had been suspected about energy inefficiency/waste	86	42
Helped identify ways to lower costs	54	64
Improved monitoring of energy use	3	7
Gave opportunities to increase productivity	1	4
Revealed new technology applicable to your operations	1	13
Assisted decision to install new equipment	6	19
Helped whole operation to be more efficient	3	9
Convinced management recommendations would be profitable by quantifying savings	15	34
Other	1	1
No answer	8	12

In addition, 25 people (5.5%) said that the EADCs' recommendations had assisted in their decisions to install new equipment in the plants.

The benefits attached to the EADCs' work are consistent with the levels of management reached by the EADCs' energy audit reports. From Table 3 it is apparent that 816 persons saw the 227 reports (average = 3.6 persons/report) and that 233 of those persons (28.6%) were corporate officers or company owners and that another 136 (16.7%) were plant managers or general managers. Obviously, the energy audit reports and the benefits which they offer are reaching the decision-makers associated with the manufacturing plants served.

Results Achieved and Expected

ITEM's interviewers question plant representatives about the intelligibility and quality of the EADCs' energy audit reports. Of the 227 interviewed, 214 considered the report understandable to corporate management and 209 held the same opinion about the reports' intelligibility among plant managers. Large numbers of them also thought these reports were either well done (155) or extremely well done (57) and agreed with all of the conclusions stated (61) or most of them (134). When asked whether the energy audit had led to energy conservation and savings or was expected to, 209 plant representatives (92%) said yes. In 139 instances the implementations involve capital expenditures for equipment, categorized in this manner:

- replacements of existing equipment: 72.
- modifications of existing equipment: 73.
- additions of new equipment: 51.

(Obviously some people gave more than one answer.)

TABLE 3

TITLES OF PERSONS WHO SAW ENERGY AUDIT REPORTS

Owner, Board Chairman, CEO, President	103
Vice President	72
Other Corporate Officer	34
Plant Manager, General Manager	136
Plant Superintendent, Asst. Plant Manager	27
Corporate Parent or Division Executive	24
Director of Operations, Manager of Production or Manufacturing	53
Facilities Manager, Maintenance Manager, Superintendent, or Foreman	143
Manager of Engineering	20
Engineer (various kinds)	84
Plant Foreman or Craft Superintendent	26
Others	94
Total	816

Methodology of an EADC Energy Audit

The EADC program is intended to operate in a plant-specific manner. EADC audit teams are expected to draw upon basic knowledge of standard equipment (such as boilers, furnaces, ovens, compressors, refrigeration equipment, and lights), but they should seek to understand each plant, analyze its individual aspects, and recommend energy conservation opportunities applicable under each plant's specific characteristics. The emphasis is upon addressing every plant's needs as they occur, not upon trying to fit a plant into an idealized pattern which adheres to a standardized checklist.

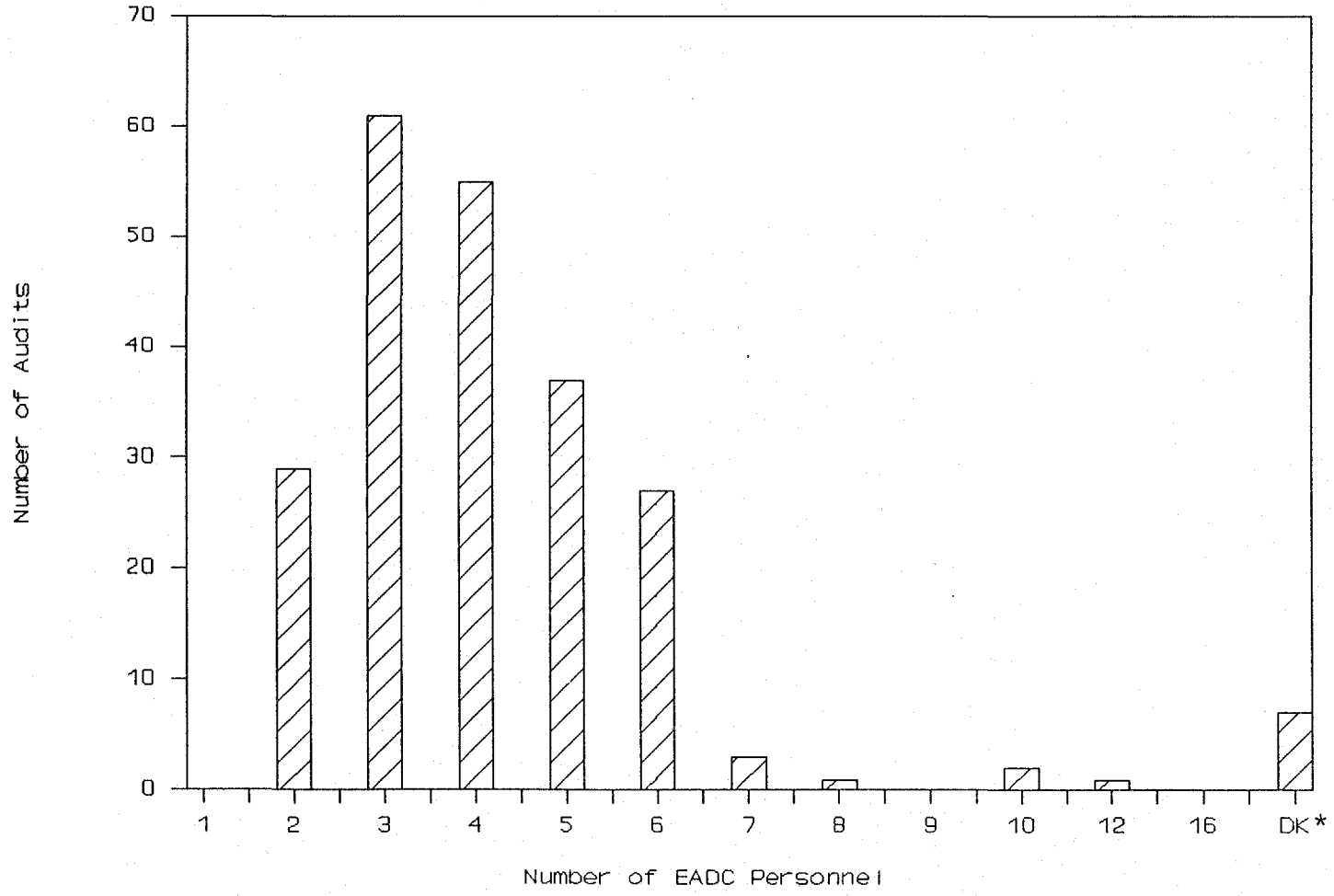
For example, the size of an EADC energy audit team has never been standardized, but Figure 1 shows that 2-7 persons were involved in virtually all the audits. The length of time spent in auditing a plant depends upon the size of the team and the magnitude, complexity, and condition of the plant. Table 4 and Figures 2 and 3 reveal a distribution of visit frequencies and durations, including 4 plants where the length of the first visit was unknown to the one interviewed. Performing a weighted average calculation on the number and duration of the 234 known visits gives a figure of 1.02 day (8 hr = 1 day). However, in only about 133 of the plants (59%) was the first visit for a full day, but in 64 plants (28%) there was a second visit, and 42% of those lasted a full day (Figure 3).

Because an EADC is expected to approach each plant as an individualized operation, every audit is to be based on measurements of equipment performance. At least 207 audits were reported to have included such measurements, and another 15 of those interviewed said they did not know whether measurements had been made. All together, the interviews revealed these judgments of EADCs' audit performance:

- 195 audits performed thoroughly and another 22 considered thorough in some aspects, but not in others.

FIGURE 1

DISTRIBUTION OF EADC PERSONNEL PRESENT DURING ENERGY AUDIT



*Don't know

TABLE 4

DISTRIBUTION OF TIME SPENT IN PLANTS

PERFORMING ENERGY AUDITS

	Number of Plants		
Duration of Visits	Visit #1	Visit #2	Visit #3
1 hour	12	3	3
2 hours	7	11	1
3 hours	9	2	-
Half day	24	12	-
5 hours	-	-	-
6 hours	38	6	1
Full day	133	27	5
Don't know	4	3	1
Totals	227	64	11

FIGURE 2

DISTRIBUTION OF TIME SPENT IN PLANTS PERFORMING ENERGY AUDITS

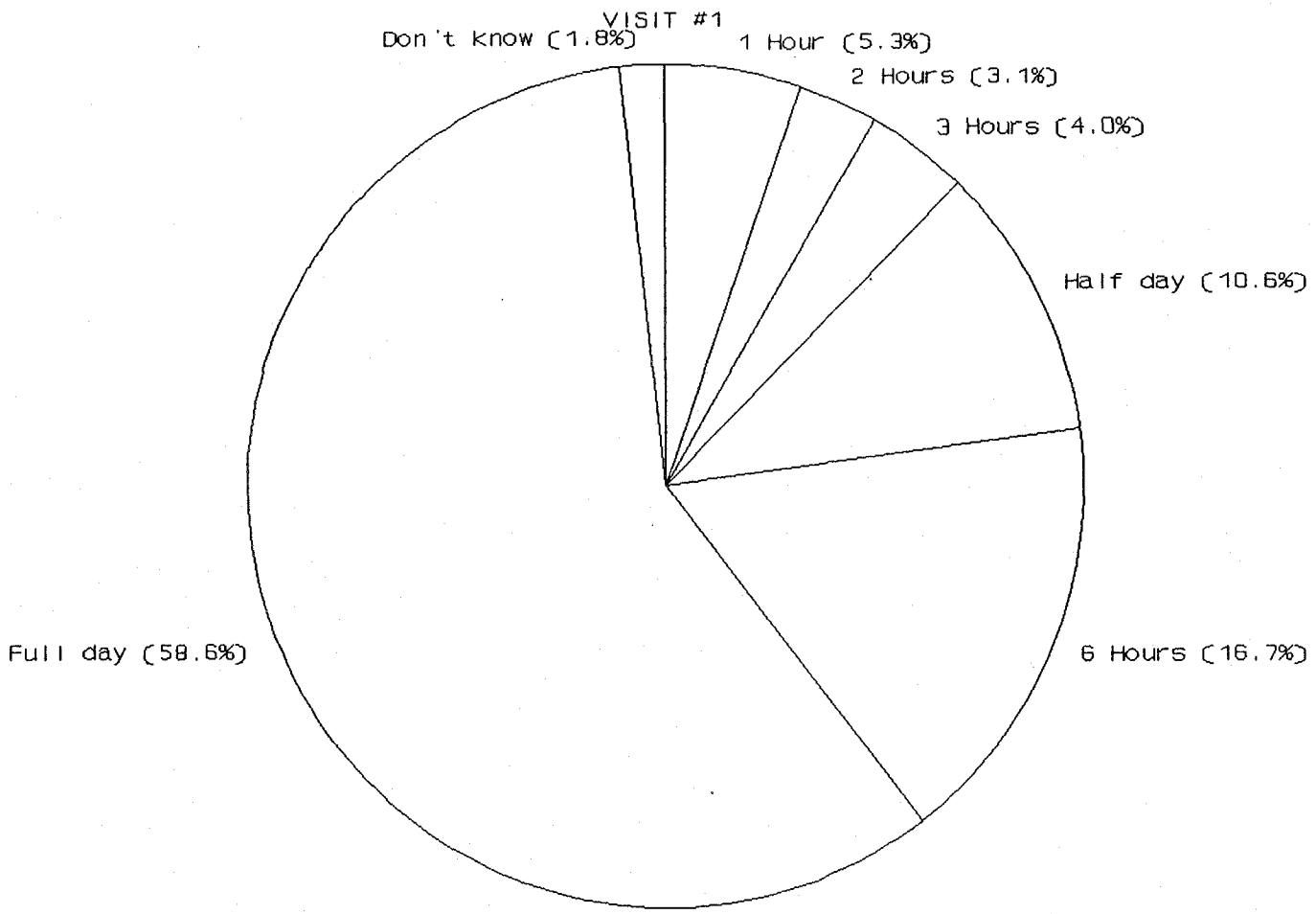
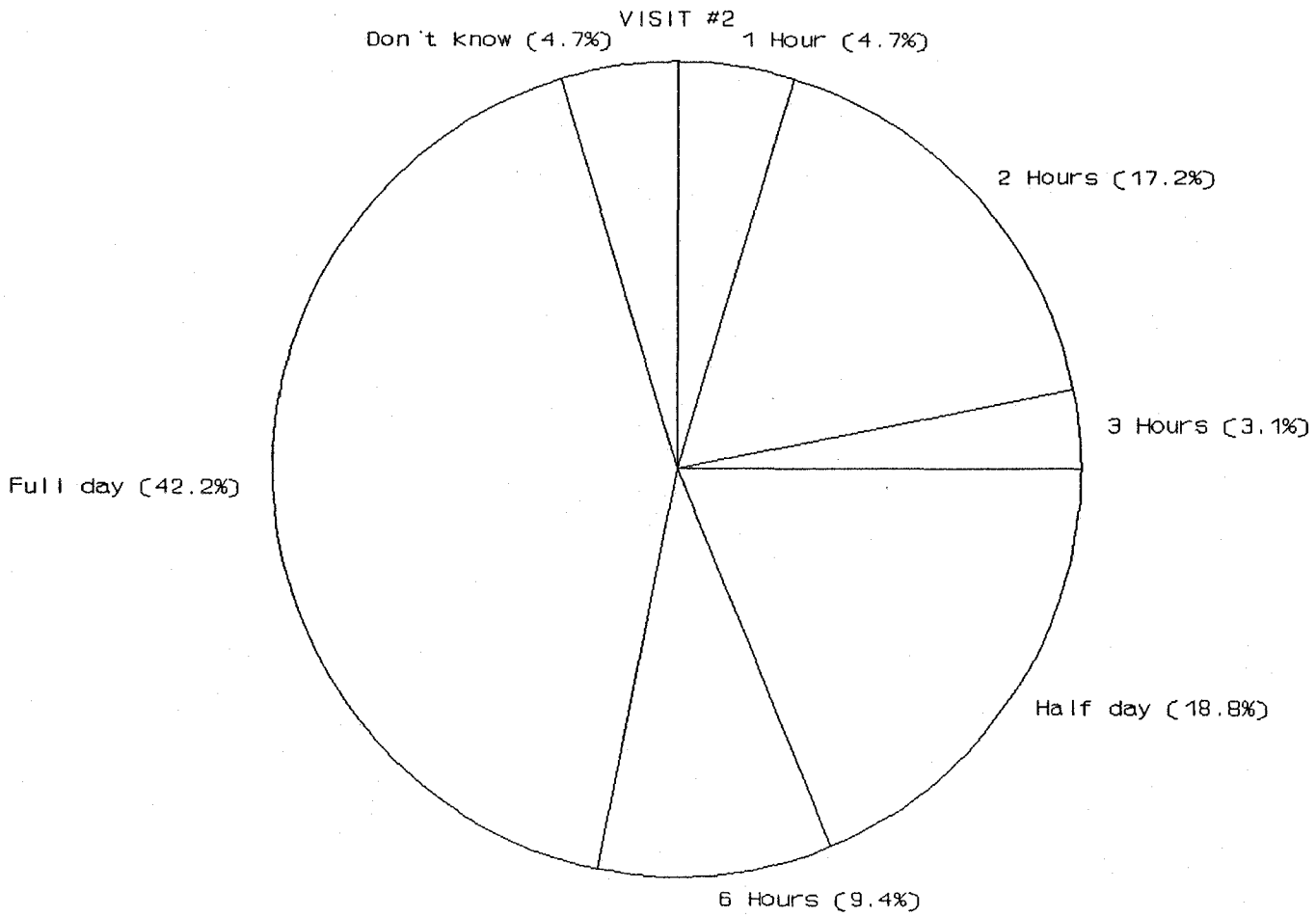


FIGURE 3

DISTRIBUTION OF TIME SPENT IN PLANTS PERFORMING ENERGY AUDITS



- 221 audit teams who knew what they were doing.
- 207 audit teams that understood the plants' operations; 213 that recognized the plants' key energy problems; and 222 that seemed to be genuinely interested in their work.
- 208 audits which helped the people at the plants to understand their energy usage better.

Manufacturers' Outlook on Energy Conservation

ITEM's engineer-interviewers always ask whether a plant had received other offers of energy conservation assistance. Though not every plant had, a total of 322 such offers was identified, of which 201 (62%) had been accepted and 171, rejected.

Table 5 shows that aside from the few offers from state government and miscellaneous sources, the highest rates of acceptance occurred with offers from electric utilities and vendors and representatives of equipment manufacturers. Offers from gas utilitites also had a fairly high acceptance rate at 70%.

Consulting firms did not fare as well. Although they had been the source of most previous offers (100), they enjoyed only a 35% rate of acceptance, and not all of those led to payment of a fee. The fewest offers (16) had come from state government and miscellaneous sources, and only 2 were accepted.

It should also be noted that manufacturers often recalled their disappointment with other offers of assistance and contrasted that with their favorable attitude toward the EADC audit.

These results resemble those reported from 243 interviews during the 1987-88 period of the EADC program. Small and medium-size manufacturers seem willing to accept more than half the offers of energy conservation assistance received, some of

TABLE 5

OTHER OFFERS OF ENERGY CONSERVATION ASSISTANCE

Source	Number of Offers	Types of Assistance				Acceptance	
		Literature	Training	Individual Analysis	Rate Schedule Analysis	Yes	No
Electric Utility	80	3	7	52	20	62	18
Natural Gas Utility	30	0	5	18	7	21	9
Consulting Firm	100	1	1	77	21	35	65
Manufacturer Vendor	96	15	4	61	16	71	25
State Government	5	0	0	2	3	4	1
Other	11	1	0	6	2	8	3
Totals	322	20	17	216	69	201	121

which involve a cost for the service or the equipment recommended. However, the present acceptance rate has consistently been found among consulting firms, but that is not necessarily attributable to consulting firms.

The experience of ITEM's interviewers suggests that this low acceptance rate is somewhat endemic among small and medium-size manufacturers. A consulting firm provides its services for a fee and, if that fee is to be based upon costs saved, there has to be a baseline of energy costs in order to measure savings. Small and medium-size manufacturers have difficulty in establishing that baseline and relating it to product mix and volume. ITEM's experience suggests only 1 or 2% are willing to base the fee on savings. If a flat fee is to be charged by the consulting firm, the small and medium-size manufacturer sees that dollar figure as a bigger risk than a large manufacturer does and declines the offer. Thus the low acceptance rate seems to be due more to a wariness about risk than a negative attitude toward energy conservation assistance.

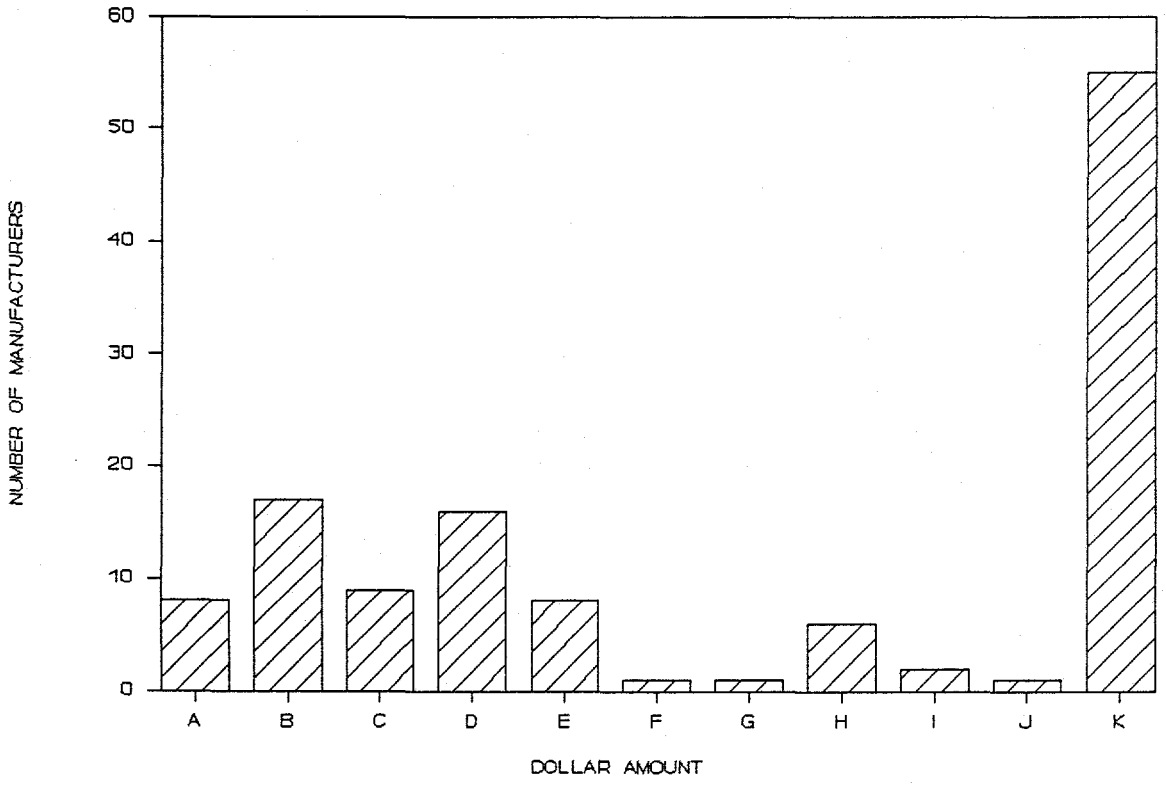
This aversion to risk is reflected in the replies of manufacturers' representatives when they are asked whether they would have paid a fee for the EADC audit if one had been requested beforehand (Figure 4). Only 131 (58%) said they would, and the amounts they would have paid are either very small (38% of the affirmatives chose amounts less than $2000) or unknown (42%).

Manufacturers' Summary Evaluation

At the close of each interview, the representative of the plant is asked whether the EADC program is a good expenditure of taxpayers' money. During 1988-89, 211 (93%) of those asked said that it is. Almost from the beginning of the EADC program, this figure has consistently been 90-98%, and most of those who answer negatively add that their verdict is based upon personal viewpoint rather than the quality of the EADCs'

FIGURE 4

DOLLAR AMOUNTS MANUFACTURERS WOULD HAVE SPENT
FOR ENERGY SERVICES COMPARABLE TO THE EADC PROGRAM



Legend

A = $0 -200
B = $201 - 500
C = $501 - 1000
D = $1001 - 2000
E = $2001 - 5000
F = $5001 - 10,000
G = 1% Identified Savings
H = Unspecified % Identified Savings
I = 1% Energy Bill
J = 5 - 10% Energy Bill
K = Don't Know/No Opinion

work. This strong degree of public approval is reassuring to those who carry out the program and to those who sponsor it.

APPENDIX

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ENERGY ANALYSIS AND DIAGNOSTIC CENTER PROGRAM

Evaluation Form

1. SIC Code _____ 2. Name of Industry _____

3. Principal Product _____

4. Number of Employes _____ 5. Gross Annual Sales _____

6. How did you first learn of the EADC program?

(a) direct mailing	_____	(d) word-of-mouth	_____
(b) newspaper article	_____	(e) telephone call from EADC	_____
(c) public service announcement	_____	(f) other (specify)	_____

7. What was your initial impression of the EADC program?

(a) a potentially useful program _____
(b) not optimistic, but worth a try _____
(c) a student training program _____
(d) other (specify) _____

8. Do you know that DOE funds the EADC program?

(a) Yes _____ (b) No _____

9. Do you know that, to protect your confidentiality, your data and report do not leave the EADC with your name on it; except in your copy of the report?

(a) Yes _____ (b) No _____

10. (1) Who is your primary contact at the university? _____

(2) Who was in charge of the energy audit team that came to your plant? _____

11. Did you supply the EADC with utility bills and other energy costs prior to the site visit?

(a) Yes (before the audit) _____ (b) No (later) _____

12. How long did it take you or anyone on your staff to compile these data?

(a) 15 minutes or less _____ (d) half-day _____
(b) half-hour _____ (e) other (specify)_____
(c) 1-2 hours _____ (f) do not know _____

13. How many times did the EADC audit team come to your plant?

(a) 1 _____ (c) 3 _____ (e) other (specify) _____
(b) 2 _____ (d) 4 _____

14. How long were they here each time?

First Visit

(a) 1 hour _____ (d) half-day _____ (f) full day _____
(b) 2 hours _____ (e) 6 hours _____ (g) other _____
(c) 3 hours _____ (specify)

Second Visit

(a) 1 hour _____ (d) half-day _____ (f) full day _____
(b) 2 hours _____ (e) 6 hours _____ (g) other _____
(c) 3 hours _____ (specify)

15. In your opinion was this time:

(a) about right _____ (b) too short _____ (c) too long _____

16. How many EADC team members came to your plant for the primary energy audit?

(a) 1 _____ (c) 3 _____ (e) other (specify) _____
(b) 2 _____ (d) 4 _____ (f) do not know _____

17. Did they make measurements with their instruments in your plant?

(a) Yes _____ (b) No _____

18. How did they interact with your staff?

(a) They talked chiefly to management. _____
(b) They talked chiefly to foremen and plant workers. _____
(c) They talked to all kinds of people involved in plant operation and management. _____

19. In your opinion how was the audit conducted?

(a) thoroughly _____
(b) thoroughly in some aspects, but not in others _____
(c) superficially _____

20. If the answer to 19 is (b) or (c), specifically what was missed?

_____

_____

_____

21. Would you say that the auditors:

(a) knew what they were doing _____
(b) knew what they were doing only from an academic standpoint _____
(c) knew only a little about their business _____
(d) seemed nice but naive _____
(e) appeared to be incompetent _____

22. In your opinion, would you say that the auditors:

(1) Understood your operations?

(a) Yes _____ (b) Partially _____ (c) No _____

If there was a lack of understanding, please explain. _____

_____

_____

(2) Recognized your key energy problems?

(a) Yes _____ (b) No _____

(3) Seemed genuinely interested in their work?

(a) Yes _____ (b) No _____

23. Before the audit team left the plant, did they meet with you or your staff to discuss what they had found?

(a) Yes _____ (b) No _____

24. Do you think that the auditors addressed your plant's unique energy problems, rather than just presented a standard set of recommendations?

(a) Yes _____ (b) No _____

25. Did the energy audit improve or reinforce your understanding of your plant's energy use?

(a) Yes _____ (b) No _____

26. Which two of the following do you think have been the primary and secondary benefits of the audit? (Indicate by 1 and 2):

(a) _____ Opened your eyes to sources of energy inefficiency/waste.
(b) _____ Confirmed what you had suspected about energy inefficiency/waste.
(c) _____ Helped you to identify ways to lower costs.
(d) _____ Improved monitoring of your energy use.
(e) _____ Gave you opportunities to increase productivity.
(f) _____ Revealed new technology applicable to your operations.
(g) _____ Assisted your decision to install new equipment.
(h) _____ Helped your whole operation be more efficient.
(i) _____ Convinced management that recommendations would be profitable by quantifying their savings.
(j) _____ Other (specify) _____

27. Would the audit report be easily understandable to:

	Corp. Mgt.	Plt. Mgr.	Engr.	Plt. F./Mnt.
(a) Yes	_____	_____	_____	_____
(b) No	_____	_____	_____	_____
(c) N/A	_____	_____	_____	_____

28. Did you think that the completed audit report was:

(a) extremely well done _____ (c) satisfactory _____
(b) well done _____ (d) poorly done _____

29. Would you say that, in reference to the report, you agreed with:

(a) all of the conclusions _____ (c) some of the conclusions _____
(b) most of the conclusions _____ (d) none of the conclusions _____

30. (1) Did you think that any of the recommendations given in the report were not practical?

(a) Yes _____ (b) No _____

(2) If yes, which ones and why? _____

_____

_____

31. (1) Please name (by title) all persons in your company who have seen the energy audit report.

_____

_____

_____

(2) Who is chiefly responsible for energy management in your plant?

_____

32. Did the energy audit lead to energy and dollar savings or do you expect it to do so?

(a) Yes _____ (b) No _____

33. Did (or will) the energy audit lead to any capital investments for equipment?

(a) Yes _____ (b) No _____

34. Is that investment for:

(a) replacement of existing equipment _____
(b) modification of existing equipment _____
(c) addition of new equipment _____

35. If not, why?

(a) recommendations did not call for capital investments _____
(b) business climate is too uncertain _____
(c) a product is being discontinued _____
(d) other uses for funds have a higher priority _____
(e) we disagree with the recommendations _____
(f) the plant is in bankruptcy proceedings _____
(g) the plant has been merged with or acquired by another company _____
(h) other (specify) _____

36. (1) Has your plant made other capital investments of $10,000 or more within the past year?

(a) Yes _____ (b) No _____

(2) If not, do you expect to within the next year?

(a) Yes _____ (b) No _____

(3) Is this other equipment primarily for:

(a) replacement of worn-out equipment _____
(b) improvements in existing processes or products _____
(c) expansion of plant capacity _____
(d) addition of new product or process _____

37. Would you have paid a fee for the energy audit if it had been requested in advance?

(a) Yes _____ (b) No _____

38. What percentage of your energy bill or what dollar amount would you have been willing to spend for this service? _____

39. Has there been any follow-up or other contact by people from the university since the audit report has been received?

(a) Yes _____ (b) No _____

40. (1) If yes, please specify the type of follow-up received:

(a) telephone call to see if report received/understood _____
(b) other telephone conversation _____
(c) meeting _____
(d) plant visit _____
(e) other (specify) _____

(2) Who contacted you? _____

41. (1) Have you requested any follow-up?

(a) Yes _____ (b) No _____

(2) If yes, what did you request?

(a) additional information _____
(b) clarification of report _____
(c) additional plant visit _____
(d) other (specify) _____

42. Has any other organization offered you any energy conservation assistance?

(a) Yes _____ (b) No _____

43. If yes, please specify:

(a) electric utility _____
(b) natural gas utility _____
(c) private consulting firm _____
(d) manufacturer/vendor _____
(e) government agency (local, state and federal) _____
(f) other _____

44. What kind of assistance was offered by each?

	From 43					
	a	b	c	d	e	f
(a) literature						
(b) training						
(c) individual analysis						
(d) rate schedule						

45. (1) Have you taken advantage of it?

	From 43					
	a	b	c	d	e	f
(a) Yes						
(b) No						

(2) If not, why did you decide against it?

(a) _____

(b) _____

(c) _____

(d) _____

(e) _____

(f) _____

46. Do you feel that the EADC program represents a good expenditure of taxpayers' money?

(a) Yes _____ (b) No _____

47. Do you have any suggestions of ways in which this program could be improved to serve manufacturers better?

_____

_____

_____

Revised September, 1989