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INDEEP Annual Report (1995–96)

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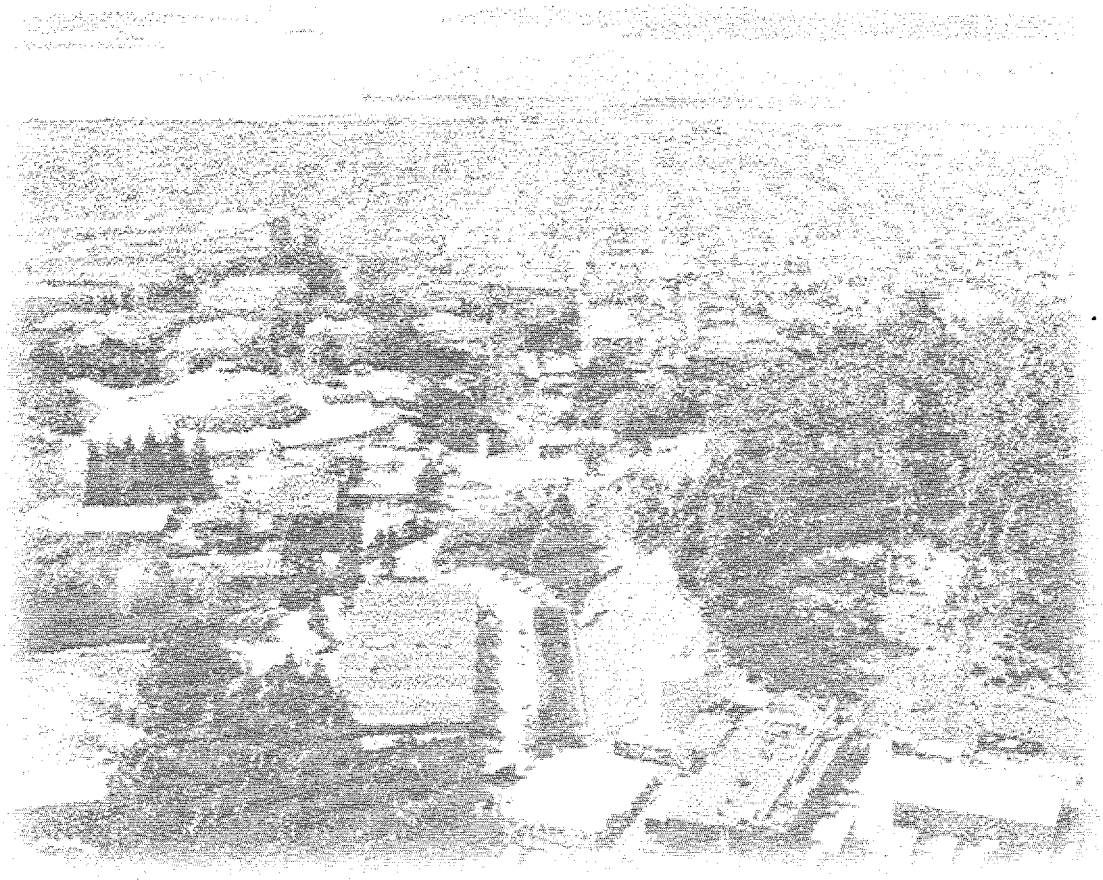
Energy and Environment Division

June 1996



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A Report from the
International Database on Energy Efficiency Programs (INDEEP) Project

INDEEP ANNUAL REPORT (1995-96)

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June 1996

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Executive Summary

The International Database on Energy Efficiency Programs (INDEEP) project is designed to make available information on electric and gas utility demand-side management (DSM) programs, as well as DSM programs carried out by government agencies, energy service companies, and others. This report is the second INDEEP Annual Report , summarizing the activities of the second year of the project (1995 -1996). During this time period, we conducted the following activities: (1) finalized a data collection instrument (DCI) and DCI instructions; (2) developed the contents of an Excel spreadsheet for data entry; (3) collected DSM program data on 104 programs; (4) entered DSM program data onto the Excel spreadsheet; (5) merged Excel spreadsheets; (6) analyzed DSM program data for all countries; (7) organized a workshop; and (8) prepared a report on the activities of the second year.

Because of the efforts of the participants in the project, we were more efficient in the second year than what was expected, so that the work planned for five years (as proposed in the original research work plan) can be accomplished in a shorter period of time (by at least two years) and with a reduced budget (e.g., from $470,000 to $75,000 for the third year). The key findings from the second year are the following:

(1) Based on discussions with DSM experts in the participating countries and during the INDEEP workshop, the INDEEP data base continues to be seen as a unique, nonduplicative data base, containing valuable data for DSM program designers, implementors, and evaluators as well as for policy makers.

(2) The second year has demonstrated that (a) the INDEEP data collection instrument and instructions are easy to use for collecting extensive program data, (b) key program data can be collected on many programs, although the quality of the data is variable, and (c) the preliminary analysis of existing data confirms the potential for the data base to be a very valuable tool for obtaining new ideas, comparing programs, improving program design, and establishing contacts (networking).

(3) Discussions with DSM experts in the participating countries and at an INDEEP workshop attended by over 25 European DSM experts led to a consensus for the project to proceed for another year, focusing on: (a) improving the quality of existing data in the data base; (b) continued development of the data base software; (c) additional data collection and data analysis; (c) preparation of marketing

materials for promoting the data base; and (d) obtaining the support of an organization for managing the project in future years.

Regarding future directions for the INDEEP project, we concluded that the work plan for the third year of the project should contain the following activities: (1) improve the quality of existing data in the data base; (2) develop the INDEEP data base software; (3) collect DSM program data on more programs; (4) analyze DSM program data for all countries; (5) prepare marketing materials for promoting the data base; (6) distribute the data base and obtain information on user reactions to the data base; (7) negotiate a commitment from one organization for supporting the project in future years; and (8) prepare a report summarizing the activities of the first three years. In conclusion, the third year is seen as a transition year as Task 1 comes to a halt and the INDEEP data base and project responsibilities are handed over to another central coordinator.

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1. INTRODUCTION

In the last decade, interest in energy efficiency has increased around the world. Countries are interested in energy efficiency because of its potential to ameliorate local and regional environmental problems, reduce global climate changes associated with the greenhouse effect, provide the foundation for improved economic stability and development, and to reduce global risks and uncertainties associated with non-domestic oil supplies. Developing easily accessible information services and networks on energy efficiency technologies and programs is an important strategy that some countries are promoting in the pursuit of an energy-efficient society. While not all lessons are transferable, the sharing of experience in energy-efficiency policies and programs will help all countries avoid mistakes that can waste scarce resources.

Recognizing these concerns, the International Energy Agency (IEA) established a Demand-Side Management Program to clarify and promote opportunities for demand-side management (DSM). One of the five Tasks in the DSM Program is to establish an international data base on DSM, analyze the data collected, and disseminate the information which results from the analysis. Underlying this task is the assumption that if all of this information is in one place, the cost of obtaining such information is considerably reduced, and the potential for comparing programs and synthesizing program experience is facilitated: data on similar programs can be summarized by marketing and delivery approaches, incentive mechanisms, and other program features to identify indicators of successful programs. These analyses can be used to improve program effectiveness and to develop more reliable DSM resource planning estimates. Most importantly, by including a limited amount of information on the characteristics of the implementing utility or government agency, program planners can assess the transfer of the results to their own geographical areas. Thus, the overall goal of this international project is to lower the costs and increase effectiveness of utility and government implementation of end-use energy efficiency programs. Utilities and others will not have to "re-invent the wheel" with each new DSM program plan or program design, and can, hopefully, avoid costly mistakes by using the information in this international data base.

This report is the second Annual Report of the International Database on Energy Efficiency Programs (INDEEP), summarizing the activities of the second year (1995-1996). The report is organized as follows. In Section 2, IEA's DSM Program is described, and in Section 3, an overview of the INDEEP project is presented. In Section 4, the main activities and accomplishments of the second year are described, including the following: (1) revision of the data collection instrument and instructions; (2) data collection and control procedures; (3) analysis of the data in the INDEEP data base; (4) status of

the development of the data base software; (5) findings from the second INDEEP workshop and its impact on the project; (6) a list of all meetings held; and (7) a list of documents prepared in the second year. In Section 5, the activities of the third project year are presented.

2. IEA DSM PROGRAM

The International Energy Agency (IEA) Demand-Side Management Implementing Agreement is a new international collaboration with 14 IEA member countries, plus Korea and the European Union, working to clarify and promote opportunities for DSM. For the purposes of this program, DSM is defined to include load management, energy efficiency and related activities carried out by utilities. Through co-operative activities, participants collaborate to help DSM technologies reach their full market potential, thereby allowing energy systems to function more effectively and giving utility investments enhanced value for gas and electricity customers.

The DSM Program has five Tasks (the term Task is used to describe the work to be done under the contractual Annex to the Implementing Agreement on Demand-Side Management Technologies and Programs). The first Task will establish an international data base on demand-side management and is the sole subject of this report. The second Task will assess options for applying communications technologies to DSM programs. By conducting competitive procurement of more efficient DSM technologies, the third Task will accelerate the process of market penetration. Utilities and governments in participants' countries will be assisted in the fourth Task to develop and communicate improved methodologies for integrating DSM options in utility resource planning. The fifth Task is to develop improved utility and government strategies for implementing DSM technologies in the marketplace. A complete description of all five Tasks and of the expected results is found in Bengtson (1996).

3. INDEEP PROJECT DESCRIPTION

The objective of Task 1 is to establish an international data base on DSM, analyze the data collected, and disseminate the information which results from the analysis. The international data base on energy efficiency programs (INDEEP) will make available information on electric and gas utility DSM programs as well as those carried out by others (e.g., government agencies and energy service companies). Initially, the data base will consist of programs implemented by the six countries participating in this Task: Denmark, Korea, Netherlands, Spain, Sweden, and the United States. The

other participant in this Task, the Commission of the European Union, will also contribute information on DSM programs funded by the Commission.

As outlined in the original workplan (Vine 1993) and in INDEEP's first annual report (Vine 1995), there are seven subtasks in this project:[1]

Subtask 1. Pilot Project to Explore the Feasibility and Nature of an International Data Base on DSM Programs (1994-1995)

Participants will assess the transfer of DSM program results, the usefulness of existing data collection instruments (DCIs) and data bases on DSM programs, and the level of interest among potential users of an international data base on DSM programs. Participants will review existing DSM program data bases and reports, conduct case studies on one to four DSM programs in each Participant's country, enter program information into DCIs, translate the DCIs into different countries' languages (at their option), and identify and contact potential users of an international DSM program data base.

Subtask 2. Identification of DSM Programs for the Data Base

Participants will identify candidate DSM programs for inclusion in an international data base on DSM programs and will obtain brief descriptors of energy-efficiency programs being implemented in each Participant's country. To do so, they will develop a questionnaire, identify a representative sample of utilities with DSM programs, distribute the questionnaire to the sample, collect responses to the questionnaire, and analyze the responses.

Subtask 3. Design of International Data Base on DSM Programs

Participants will develop DCIs, glossary of terms, and data base software for implementing an international data base on DSM programs, in order to ensure that the terms, units and measurements are highly similar or identical. Site visits will be conducted to ensure that the DCI and data base software are used in a consistent fashion in all of the Participants' countries.

[1] The original plan has been revised since the start of the project, as described in Sections 4 and 5.

Subtask 4. Collection and Entry of Data on DSM Programs

Participants will collect data on energy efficiency programs using the DCIs and software developed in the previous subtask and will create a repository for the data collected. In particular, Participants will distribute a survey, collect survey responses, conduct a quality review of the responses, and enter the responses into an international data base on DSM programs. To ensure accuracy, the data base will focus as much as possible on those programs with measured data, though some key programs with estimated data on energy savings, costs, and market penetration will also be included.

Subtask 5. Analysis and Dissemination of DSM Program Information

Participants will analyze information collected in the international data base on DSM programs, prepare reports that analyze and synthesize the collected data, and publish the reports to transfer knowledge gained within their countries. The reports will compare alternative program approaches in Participants' countries, in order to arrive at common judgments as to which approaches are most effective, which can be improved, and which are best avoided.

Subtask 6. Updating of International DSM Program Data Base

After the initial data collection, Participants will undertake annual updates of the data base to ensure that the data on new and existing programs remain current.

Subtask 7. Promotion of International DSM Program Data Base

Participants will promote the international DSM program data base project on a regular basis throughout the Task, in order to ensure that it is a current and useful resource. Literature describing the data base to potential users will be prepared, and the Operating Agent will work with users to help ensure that the data base is user friendly.

The results from this Task will include: (1) an international data base on DSM programs, (2) reports on DSM programs and program approaches, (3) updates to the data base, (4) promotional materials on the data base, and (5) annual progress reports.

INDEEP will focus on program descriptions and key summary data on program costs, participation rates, energy and demand savings, market delivery designs, and evaluation methodologies. Practical information, such as program contacts, will also be included in the data base. In addition, summaries of pertinent data will be provided periodically in order to present the lessons learned in particular types of programs (e.g., lighting programs in commercial buildings, or appliance rebate programs for energy-efficient refrigerators). As more energy-efficiency programs are implemented, their experience will be transferred to the data base.

Two advisory groups provide guidance to INDEEP activities. The Executive Committee (composed of one representative from each of the participating countries) provides management oversight to the Task and provides advice at critical junctures during the process of designing and implementing the data base. The Experts Group (composed of government and utility representatives, data base specialists, and DSM professionals - see Appendix A) provides advice on data base design, data collection and data analysis activities, and the direction of the Task.

Task 1 officially began May 1, 1994. The pilot project (Subtask 1) was conducted in the first year and was the subject of INDEEP's first annual report (Vine 1995). In the first year of the project, Task 1 Experts conducted the following activities: (1) reviewed international DSM program data bases; (2) conducted case studies on 3-5 DSM programs per country; (3) tested the INDEEP data collection instrument (DCI); (4) contacted potential users of the data base to assess their DSM information needs; (5) conducted an INDEEP workshop in Vienna; and (6) prepared a project report and conference paper. The Experts concluded that the work was difficult and challenging, but that it was possible to collect DSM program data consistently using a standardized DCI. As discussed below, the work accomplished in the second year (Subtasks 3-5, May 1, 1995 to April 30, 1996) exceeded our expectations, so that the project subtasks can be completed in a shorter period of time (by at least two years) than envisioned in the original work plan.

4. SECOND YEAR

During 1995-1996, we conducted the following activities:

(1) finalized a data collection instrument (DCI) and DCI instructions (Subtask 3);
(2) developed the contents of an Excel spreadsheet for data entry (Subtask 4);
(3) collected demand-side management (DSM) program data on 104 programs (Subtask 4);
(4) entered DSM program data onto the Excel spreadsheet (Subtask 4);
(5) merged Excel spreadsheets (Subtask 4);
(6) analyzed DSM program data for all countries (Subtask 5);
(7) organized a workshop (Subtask 7); and
(8) prepared a report on the activities of the second year (Subtask 7).

4.1 Data Collection Instrument and Instructions

The INDEEP data collection instrument (DCI) and instructions form the basic tools for collecting DSM program data. Based on the input of the Experts Group (Appendix A) and discussions at the June 10 Experts meeting, we revised the DCI and DCI Instructions for data collection in the second year (see Appendix B). In addition, a Spanish version of the DCI and Instructions was prepared by the Expert from Spain, and a Dutch version by the Expert from The Netherlands.

4.2 Data Collection and Quality Control Procedures

In the second year, we collected data on 104 programs: 29 for US, 19 for Korea, 16 for The Netherlands, 15 for Denmark, 4 for Sweden, 2 for Spain, and the rest (19) were collected by the European Commission in the following countries: France, Germany, Ireland, Italy, Portugal, and the United Kingdom (Figure 1). In our sample of programs, most (90%) were implemented by a utility company (Figure 2) and almost two-thirds were still operating, offering the possibility of additional evaluation data.

Figure 1. Distribution of Programs by Country

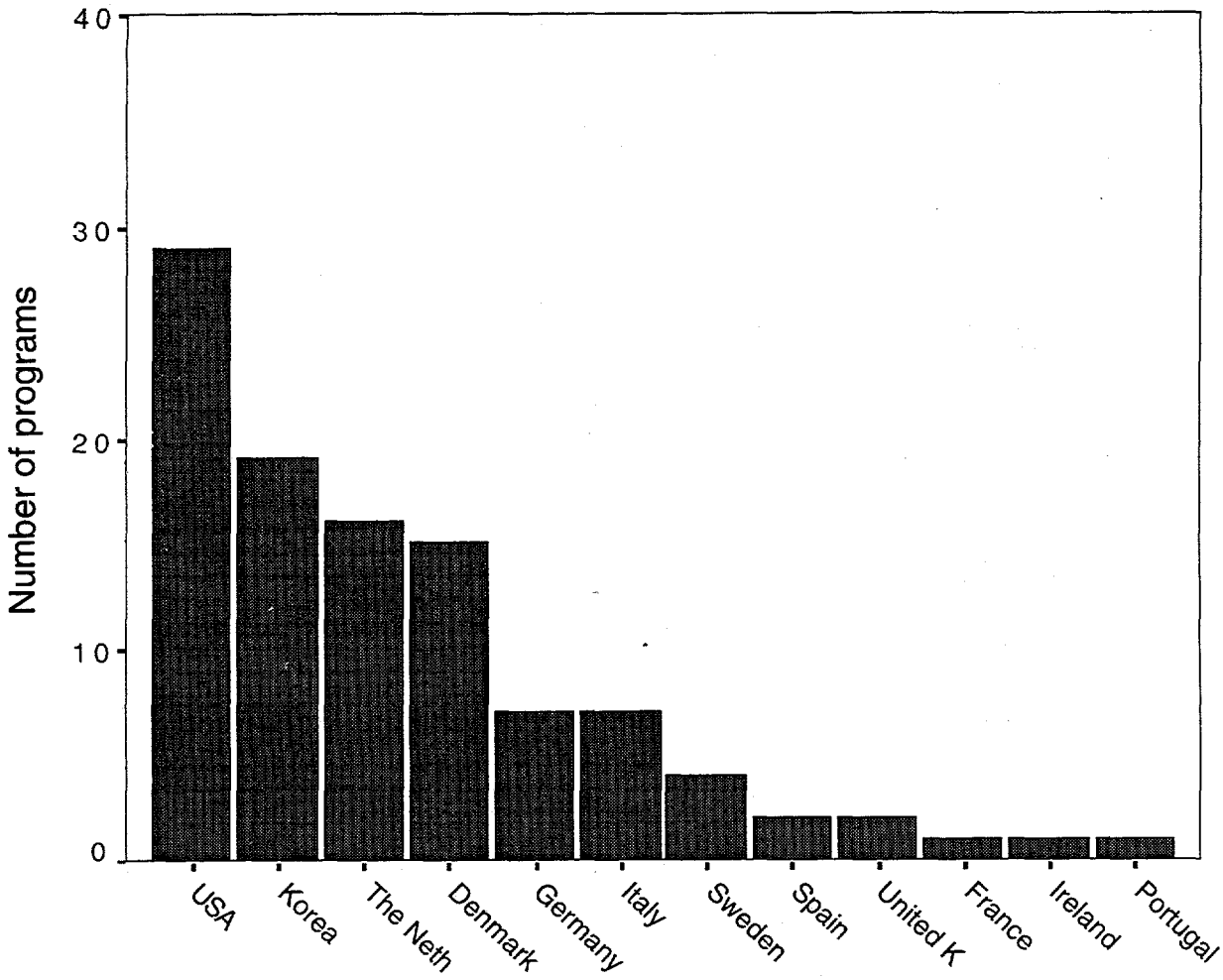
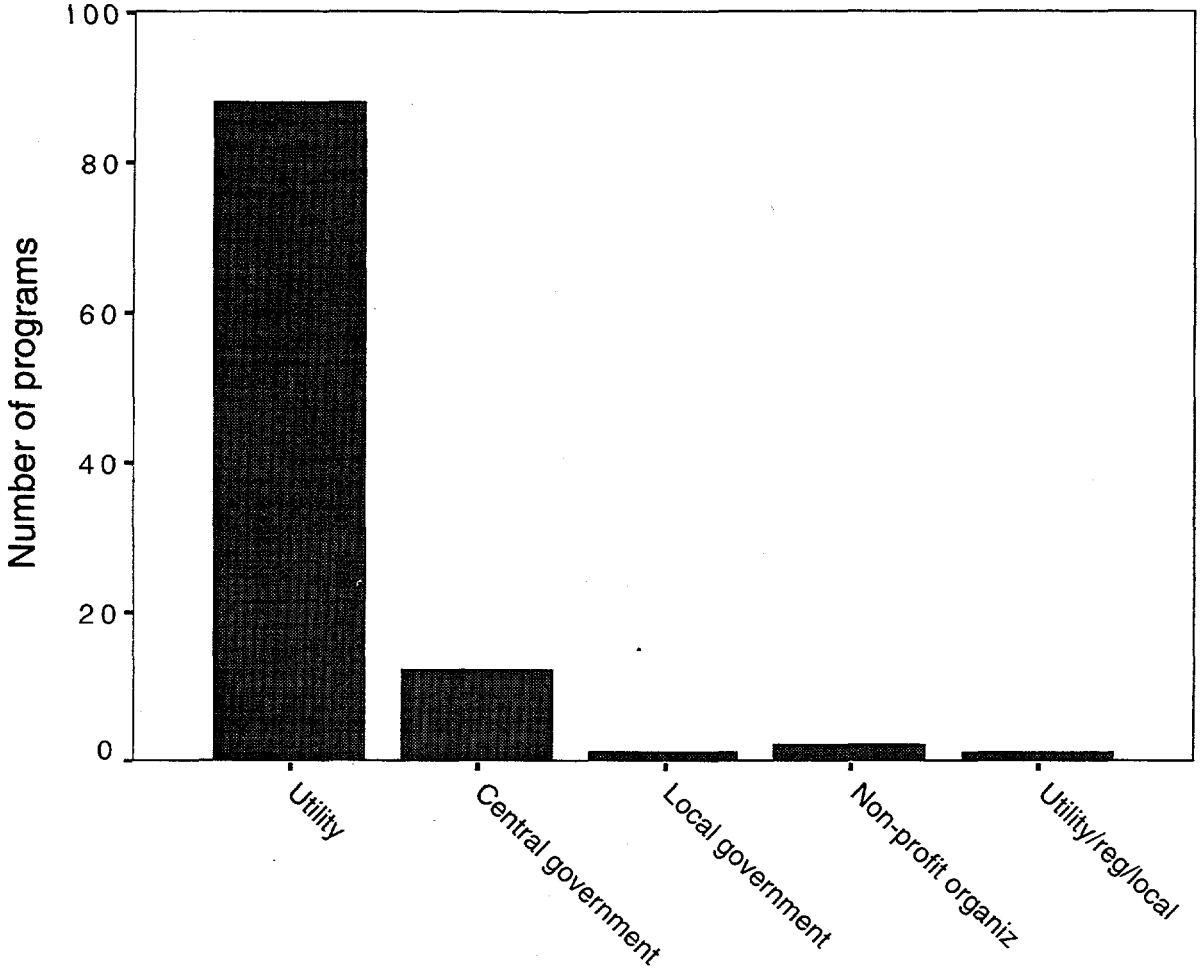


Figure 2. Implementing Agent



The data were collected by the Experts, usually in association with one or more data providers. The Experts reviewed the quality of the data and then entered the data onto an Excel spreadsheet that had been organized by the Experts. Each Expert sent their country's data set to the Operating Agent who reviewed the quality of the data prior to merging the individual spreadsheets. The Operating Agent worked with each of the Experts in addressing questionable or problematic data. A merged data set was then sent to each Expert for further quality control review and data analysis.

4.3 Data Analysis

During the second year, the INDEEP data were analyzed using a framework of analysis that was developed by the Experts (Figure 3). In our sample of programs, we found that energy efficiency was the key energy objective being promoted (90% of the cases) (Table 1). When respondents were asked to list the five most important reasons for selecting a DSM program, the most popular reason was that the program represented a long-term resource option (42% of the cases), followed by public image (38%), quality of service (36%), reduction of local emissions (31%), and regulatory incentives (29%) (Table 2). Most of the programs involved the installation of energy efficiency measures (50% of the cases), while general information was also offered by many programs (42% of the cases); the next three program types promoted were site-specific information programs (28%), market transformation[2] (22%), and load control (14%) (Table 3).

Over half of the programs offered rebates and cash awards (59% of the cases); the next three types of marketing incentives were financing, loans and leasing (21%), billing rate discounts (21%), and direct installation (14%) Table 4). In terms of marketing methods, most programs used some type of advertising (via newspaper, radio and/or television) (70%), followed by direct mail (66%); personal contact (48%) was another popular method (Table 5). The two sectors typically addressed by these programs were the residential (52% of the cases) and commercial (49%) sectors, followed by the industrial (36%) and agricultural (14%) sectors (Table 6). The principal energy source targeted by these programs was electricity (91%); about 20% of the programs targeted gas use, and a few tried to reduce fuel oil use (Table 7).

[2] Market transformation programs are programs that try to influence the attitudes and behavior of individuals and organizations, so that investments in energy efficiency persist even after the program is changed or eliminated.

Figure 3. Framework of Analysis

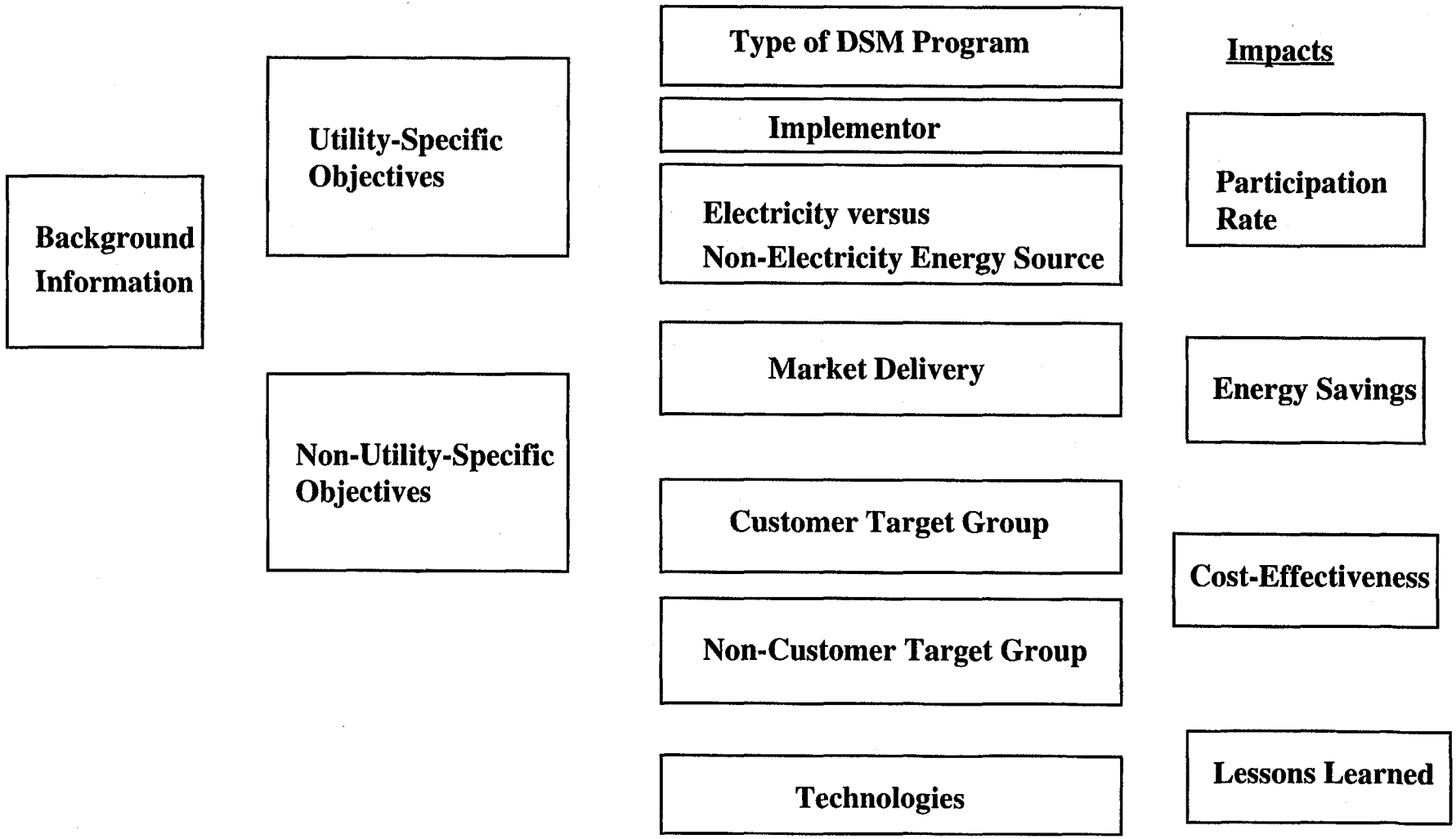


Table 1. Energy Objectives

	Number of responses	Percent of cases (%)
Energy Efficiency	91	88
Load Optimization	30	29
Fuel Switching	6	6

Valid cases = 104

Table 2. Reasons for Selecting Program

	Number of responses	Percent of cases (%)
Long-term Resource Option	42	42
Public Image	38	38
Quality of Service	36	36
Reduction of Local Emissions	31	31
Regulatory Incentive	29	29
Result of Screening Process	26	26
Reduction of Global Warming	24	24
Market Transformation	23	23
Market Penetration	22	22
Political Pressure	18	18
Business Opportunity	18	18
Cost of Service	14	14
Economic Development	12	12
Legislated/Mandated	8	8
Customer Retention	7	7
Result of Other Competitive Analysis	3	3
Other	8	8

Valid cases = 99

Table 3. Type of Program

	Number of responses	Percent of cases (%)
Installation of Measures	52	50
General Information	44	42
Site-Specific Info (Audits)	29	28
Market Transformation	23	22
Load Control	15	14
Education & Training	8	8
Research and Development	8	8
Operations & Maintenance	7	7
Hook-up Fees	4	4
Time-of-use Rates	4	4
Appliance Stds. and Labels	3	3
Interruptible/Curtailable Rates	2	2
Building Stds. and Labels	1	1
Other Type of Program	2	2

Valid cases = 104

Table 4. Marketing Incentives

	Number of responses	Percent of cases (%)
Rebates and Cash Awards	51	59
Financing, Loans & Leasing	18	21
Billing Rate Discounts	18	21
Direct Installation	12	14
Bulk Purchasing	4	5
Gifts and Merchandise	3	4
Other Incentives	11	13

Valid cases = 104

Table 5. Marketing Methods

	Number of responses	Percent of cases (%)
Advertising	68	70
Direct Mail	64	66
Personal Contact	47	48
Energy Audits	25	26
Other Methods	27	28

Valid cases = 104

Table 6. Targeted Customers

	Number of cases	Percent of cases (%)
Residential	55	52
All	38	36
Commercial	51	49
All	37	36
Industrial	37	36
All	32	31
Agricultural	15	14
All	14	13

Valid cases = 104

Table 7. Targeted Energy Source

	Number of cases	Percent of cases (%)
Electricity	91	91
Gas	21	21
Fuel Oil	5	5
District Heating	4	4

Valid cases = 100

In addition to this general framework, we developed a list of perspectives one could assume in analyzing the data: e.g., government, utility, regulator, customer, non-customer target group, environmental association, consumer association, or trade ally (Table 8). For example, one could assume the role of a utility program evaluator or a government program designer.

From the perspective of a program evaluator, we addressed the following four evaluation questions:

(1) Have all of the programs been evaluated? Almost 50% have completed evaluations, 38% were planned, and 14% were ongoing, and the evaluation status varied by region (Figure 4). As a result, many of the program case studies had incomplete information; for example, we could only analyze approximately 50% of the programs for estimating annual electricity savings (Fig. 5), 22% for annual demand savings (Fig. 6), and 10% for annual fuel savings (Fig. 7).

(2) Have measured data been used to evaluate these programs? Engineering data have been used in 80% of the cases, but utility bills and site specific data have been used in over 30% of the cases (Table 9).

(3) How much energy have these programs saved? On average, the annual savings were: 29,921 MWh, 78 MW, and 138 TJ (Figures 5 to 7).[3] However, because of the large standard deviations of these savings relative to the mean (43,396 MWh, 138 MW, and 257 TJ), median savings might be a more appropriate indicator: 3,982 MWh, 16 MW, and 24 TJ.

(4) What is the total resource cost of these programs? On average, the levelized total resource cost was 0.063 ECUs/kWh (Figure 8). Due to incomplete data, we could only examine 38% of the programs. Because of the large standard deviation relative to the mean (0.084 ECUs/kWh), median savings might be a more appropriate indicator: 0.032 ECUs/kWh.

[3] In Figures 7-9, the first column indicates that the programs had positive savings greater than zero but less than 5,000 kWh for annual electricity savings, 25 MW/a for annual demand savings, and 50 TJ/a for annual fuel savings. There were no negative or zero savings. Similarly, in the first column in Figure 10, the TRC was greater than zero but less than .0125 ECUs/kWh.

Table 8. Organizational Perspectives

Government: DSM program designers, implementors, evaluators, and planners

Utility companies: DSM program designers, implementors, evaluators, planners, and system managers

Utility regulators: public utility commissions

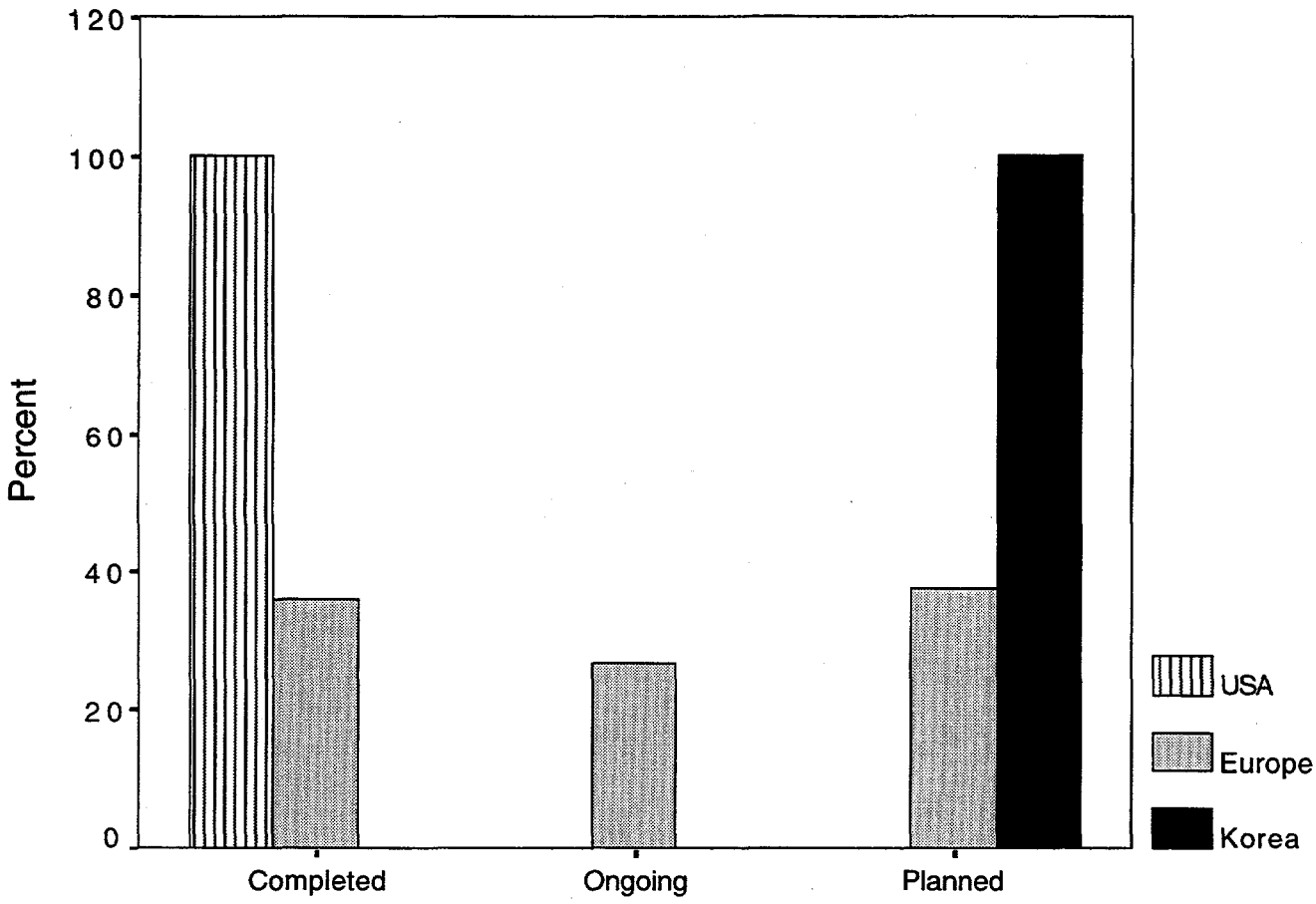
Customers: residential, commercial, industrial, and agricultural

Non-customer target groups: appliance manufacturers, retailers, building owners, architects and engineers, etc.

Environmental associations

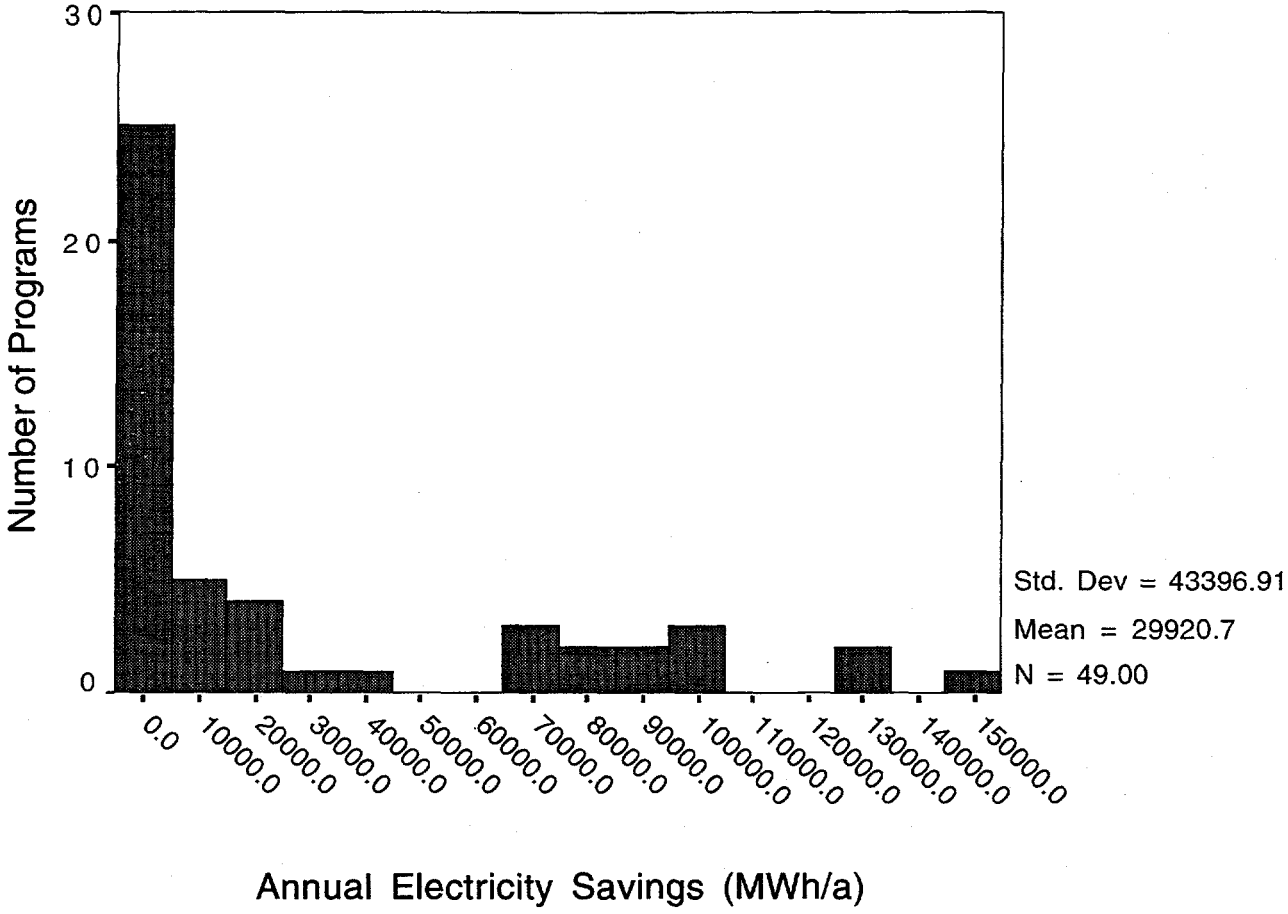
Consumer associations, trade unions, etc.

Figure 4. Evaluation Status by Region



Valid cases = 104

Figure 5. Annual Electricity Savings



Two outliers removed

Figure 6. Annual Demand Savings

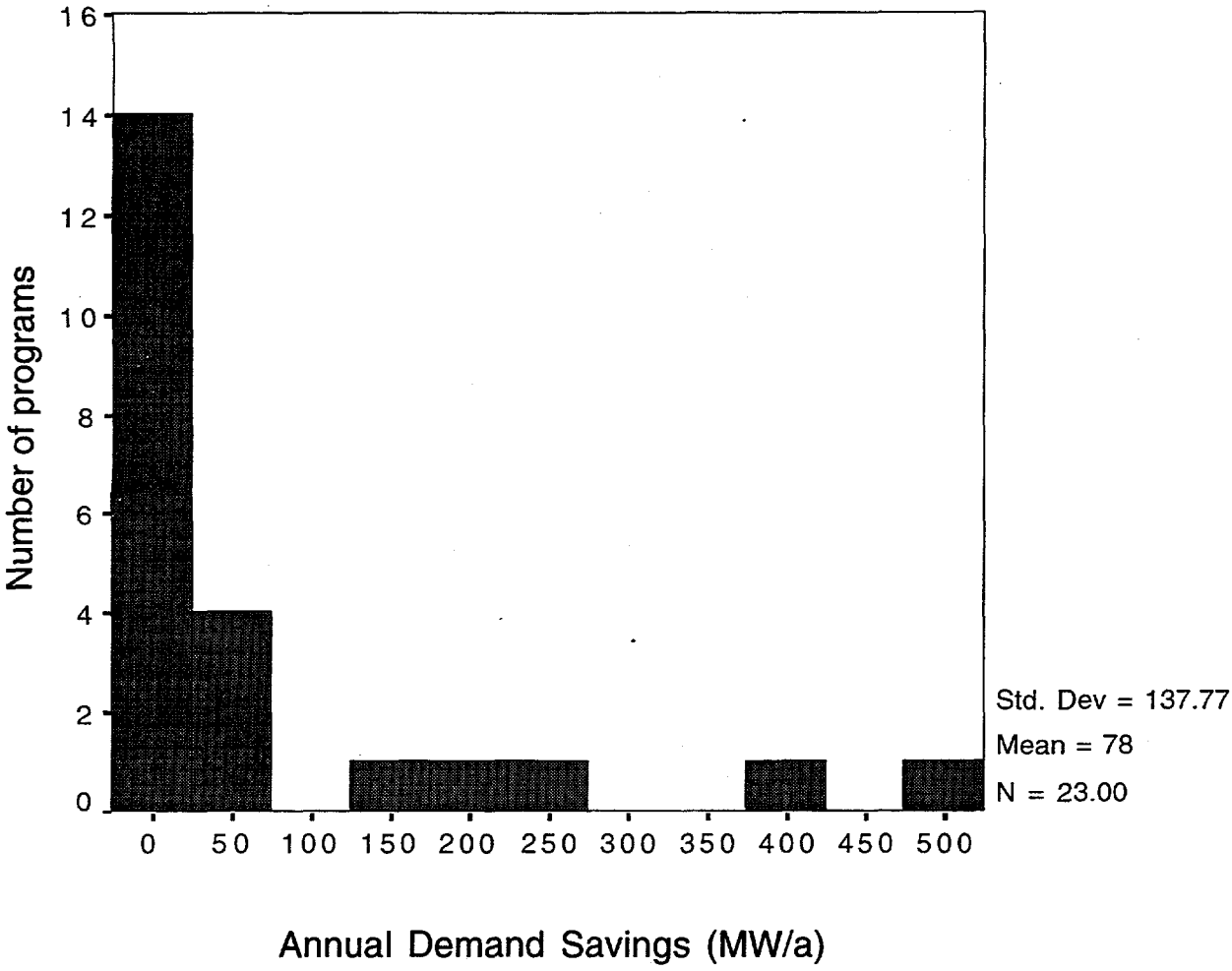


Figure 7. Annual Fuel Savings

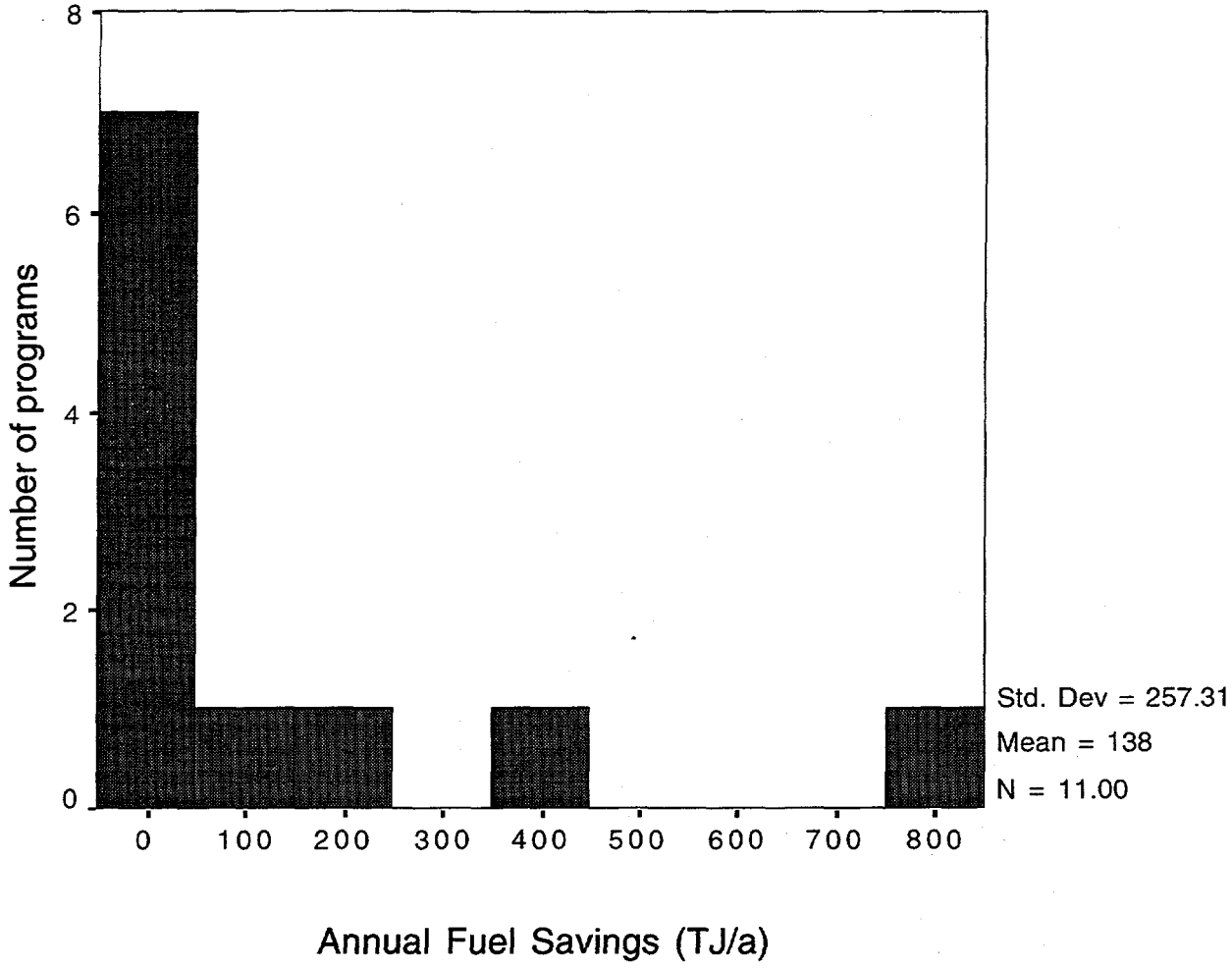
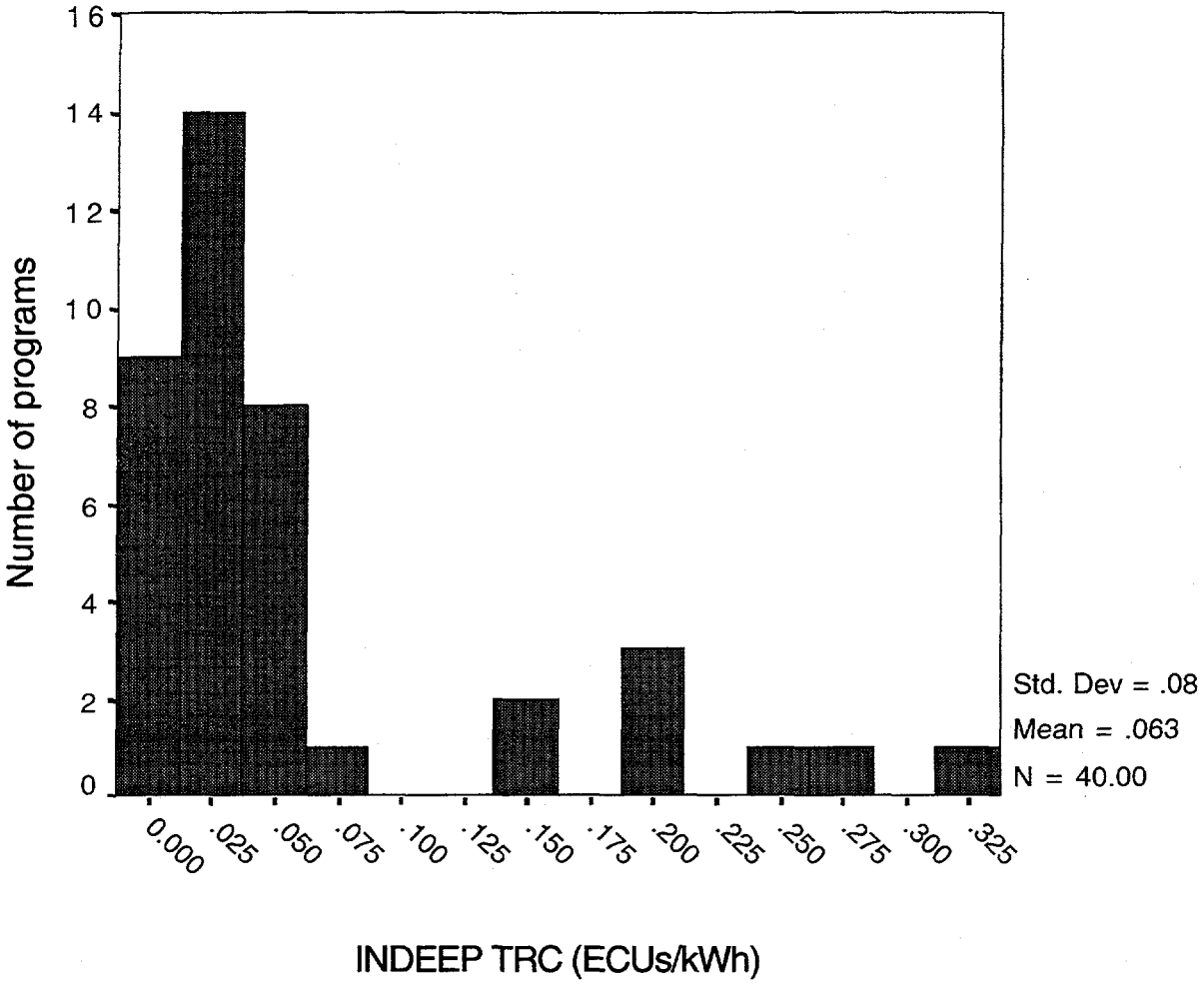


Table 9. Data Used to Calculate Energy Savings

	Number of responses	Percent of cases (%)
Engineering Data	56	80
Utility Bills	24	34
Site Specific Data	21	30
Equipment Specifications	17	24
Spot Metering	8	11
Appliance Sales	8	11
End-use Load Data	7	10
Whole-building Load Data	4	6
Other Data	7	10

Valid cases = 70

Figure 8. Total resource cost



From the perspective of a DSM program designer, we had the following objectives: (1) focus on ideas for new activities; (2) discover the most cost-effective programs; (3) observe failures that program designers should not repeat; and (4) compare with similar activities so that existing programs could be improved. We first focused on high efficiency lighting technologies, and evaluated the total number of participants (size of program), participation rate (success of marketing), program costs (size of investment), electricity savings, and total resource cost (Figure 9). We also examined the same indices for programs that promoted only one technology (Figure 10). We found several problems in analyzing the data base, including the following: (1) many technologies (as well as marketing methods) are implemented together, making it difficult to evaluate the impacts associated with one specific technology (or marketing method); (2) results depend on which combinations of technologies are selected; and (3) many programs report information only at the aggregated level of the customer sector (e.g., residential or commercial), making it difficult to evaluate the impacts of programs on subsectors (e.g., hospitals or schools). Nevertheless, we conclude that one can still evaluate the data base to help address the objectives of a program designer (see above).

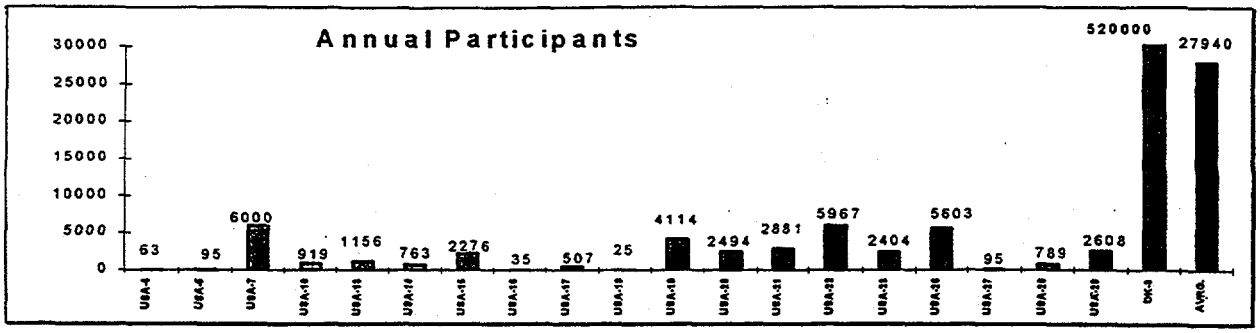
Finally, it is important to note that the data base is valuable for its qualitative information as well as its quantitative results. Key issues for DSM success (as well as failure) can be examined in the data base: for example, we are able to group the responses from our case studies in the following categories: general criteria, building improvement, and appliances (Table 10). Another added value of the data base is the number of examples of practical suggestions (general and technical) as well as financial and economic issues (e.g., difficulties and barriers, and types of financial opportunities) mentioned by program managers and evaluators (Tables 11 and 12).

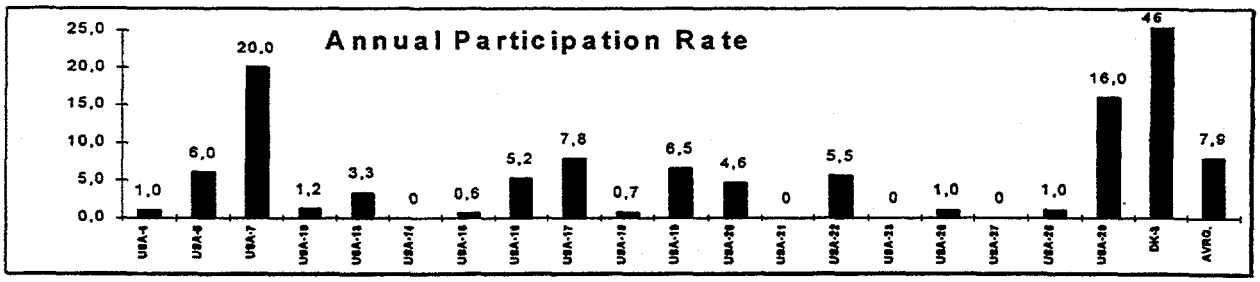
4.4 Data Base Software Development

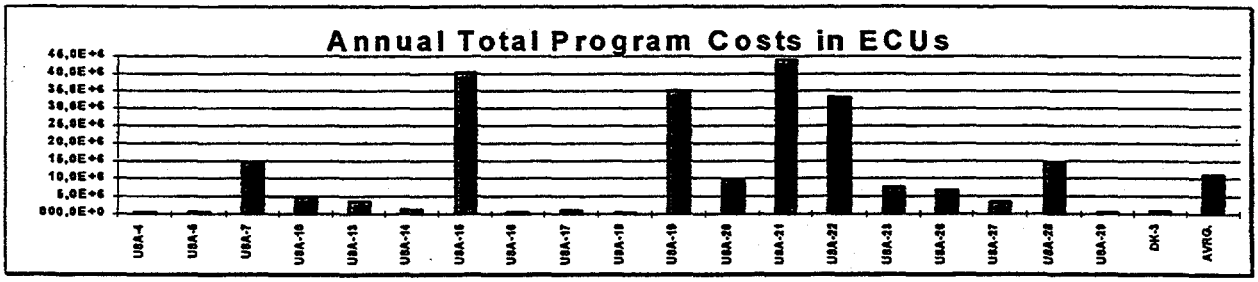
Through the assistance of KEMA (a Dutch independent service organization, jointly owned by electricity producers and distributors), an early prototype of the INDEEP data was developed. Both English and Dutch versions of the software were created. The software (created on Access) was demonstrated at the INDEEP Workshop and, as noted below, several suggestions were made for improving the software.

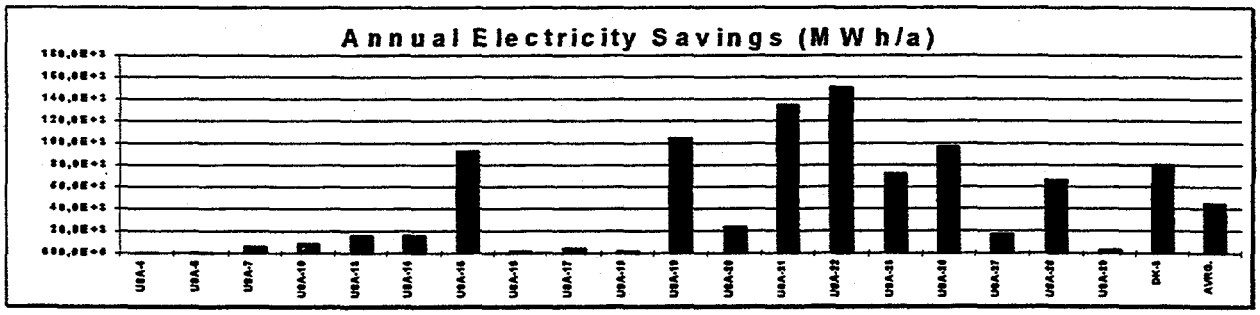
Figure 9. TECHNOLOGY 81 - High Efficiency Lighting Systems

(81.1 - 81.8)









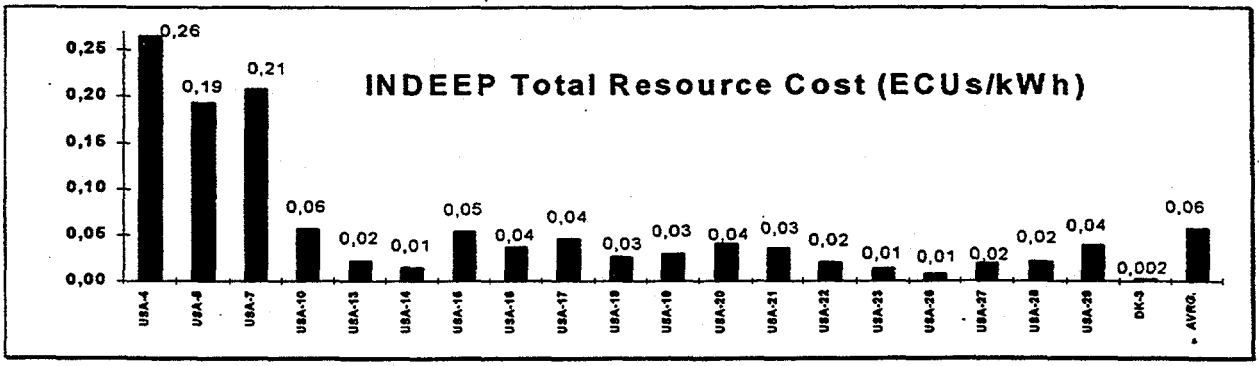


Figure 10. Cases with single technology

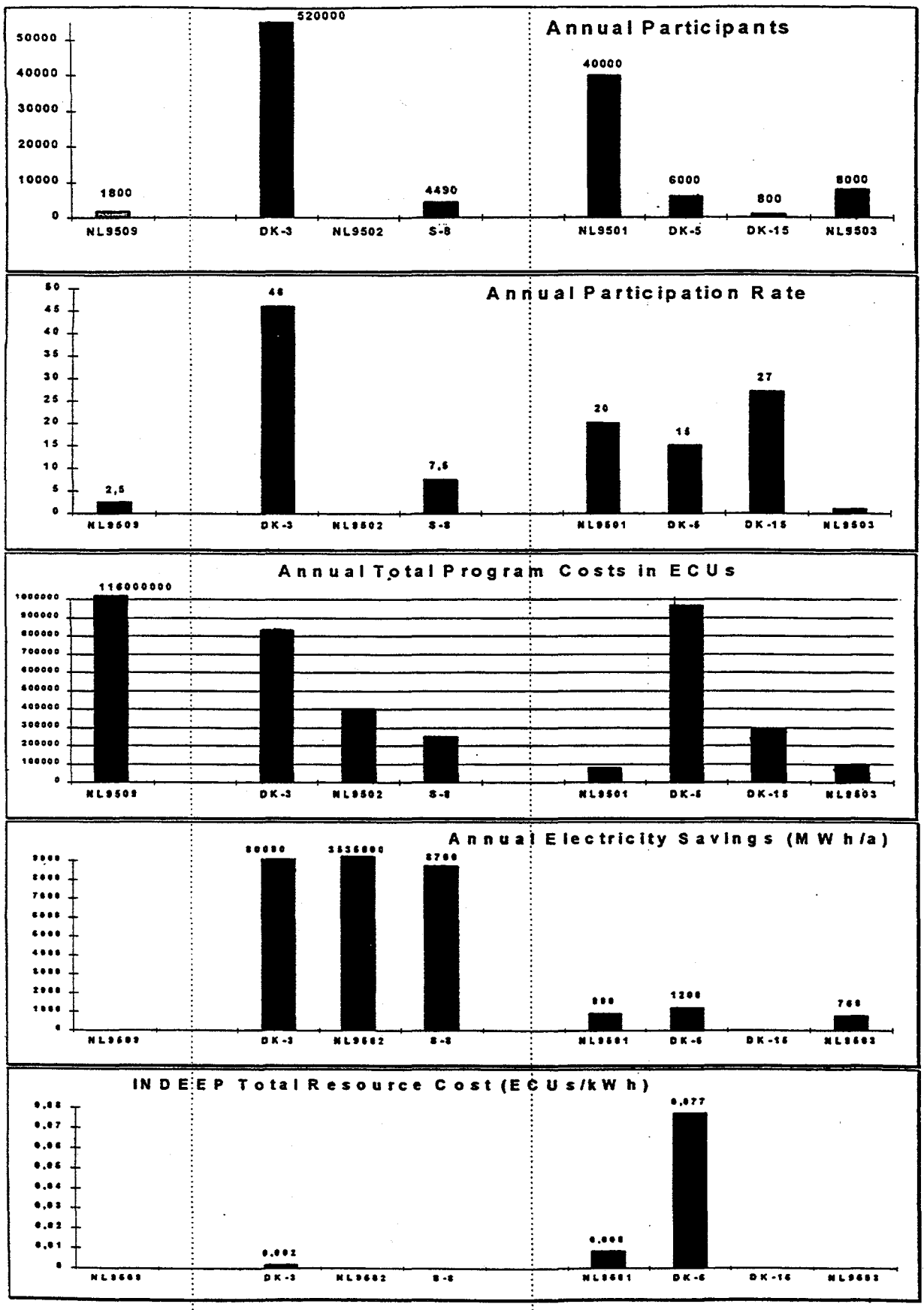


Table 10. List of Key Issues for DSM Success

General Criteria

- Simplicity as part of the success.
- Attain complete top management support before implementation.
- Detailed information, not only to the top managers but also to operational staff and employees.
- Very important to target the salesmen.
- Trade allies play a large role in marketing the program.
- Monetary incentives attract a high level of interest.

Building Improvement under DSM

- Reward builders according to savings achieved in excess of state code requirements.
- Provide mandatory training course for builders.
- Ensure on-site building inspection.
- Provide comprehensive analysis, design, installation, and financing services.
- Involve contractors.
- Continue to market program to non-participating (large) customers.

Appliances

- Rebate is an essential part of the program.
- Full payment leads to very high participation rates.
- Free installation of products leads to immediate savings.
- Coordination with manufacturers' programs are needed.
- Appliance labelling and standards are needed.

Table 11. Practical Suggestions

General

- Develop programs on a broader horizon.
- Energy efficiency must be associated with the image of improved comfort and quality of life. Any impression of restricted consumption must be avoided.
- Duration of program must be sufficiently long for it to become well known.
- Appointment of energy managers in public institutions and directives on energy management do not guarantee that program goal will be achieved.
- Continous updating of energy managers' expertise is needed.
- A few industrial customers are a very easy way of making substantial gains; more effective than targeting domestic customers.

Technical

- Automatize energy monitoring data
- Fewer and smaller customers for pilot phase are preferable.
- Inform clients about building code and labelling for energy efficiency.
- Provide comprehensive analysis, design, installation, and financing services.
- Provide on-site validation of installed equipment.
- Building commissioning, operations, and maintenance need to be incorporated into the program.
- Installers' on-site time can be optimized by carrying out other, non-energy measures.
- A procedure must be set up to ensure that savings continue.

Table 12. Financial and Economic Issues

Remarks and Suggestions

- Full payment leads to high participation but may also lead to shortages of funds suboptimization of energy savings.
- Offer incentives for advanced technologies only.
- In building programs, commissioning, operation and maintenance need to be incorporated into program incentives.

Difficulties and Barriers

- Customers' financial situation.
- Poor response of third parties to energy savings at a time of low energy prices.
- The corporate budgeting cycle: since programs often require an upfront investment, funds often cannot be budgeted until the next year.

Types of Financial Opportunities

- Utilities can obtain very low prices from manufacturers after a bidding procedure.
- Provision of a special coupon to the customer offering a 30% discount from manufacturers.
- Loans to be repaid by monthly installments at a competitive interest rate or by a monthly charge on electricity bills.
- Financial services should be provided jointly with with audit, design and installation of energy saving measures.

4.5 INDEEP Workshop

Over 25 participants attended the second INDEEP workshop, held at Red Electrica de España (REE) in La Moraleja, Madrid, from February 8-9, 1996. The agenda for the workshop and a list of participants are in Appendix C. The purpose of the workshop was the following: (1) assess the usefulness of the INDEEP project; (2) evaluate the DSM information needs of potential users; (3) assess the relative value of potential INDEEP products; and (4) provide guidance for the third year of the INDEEP project. A summary of the workshop is available upon request.

Three types of presentations were given at the workshop: (1) plenary talks given by guest speakers; (2) plenary talks given by the Operating Agent and selected Experts; and (3) small, interactive discussion groups. In the latter, workshop participants provided feedback on the data analysis that was presented earlier in the day by Ed Vine, Casper Kofod, and Flavio Conti (and summarized in the previous section on analysis), and provided guidance for the direction of the project in the third year. In addition, Harry Vreuls demonstrated a preliminary model of the data base (see above).

In this section, we highlight some of the key points of the presentations, describing critical issues discussed by participants (in small groups as well as in plenary discussions), and presenting the key lessons learned from the workshop.

1. **DCI.** The INDEEP data collection instrument (DCI) was easy to fill in. The DCI instructions were clear and helpful for completing the DCI.

2. **Additional data.** Additional data should be collected, some of which may be put in a separate form:

   a. Background information on the country and/or implementor of the program.
   b. Industrial programs and programs that target (summer) peak load reductions.
   c. Miscellaneous: cost-effectiveness test results, avoided costs, definition of eligible population targeted by program, program financing, and cost recovery.
   d. Add more programs.

3. **Data analysis.** The preliminary data analysis represented a good first step in analysis. Future analyses should explore in greater depth: data quality and reliability, and indicators of program success and failure.

4. **Data base software.** In the beginning, the data base software should be simple, easy to use (especially graphics), easy to understand, and easy to export data to other data bases. Filters for selecting data are needed.

5. **Expert role.** In the third year of the project, the Expert should conduct the following activities: (a) add background information, (b) update existing cases and

background information, (c) add new case studies, and (d) conduct quality control of the data.

6. **Central coordinator.** In the third year, the Operating Agent should continue to be the central coordinator of the project. However, after the third year, other organizations will be needed to assume the role of central coordinator such as, the European Commission, IEA, a combination of the two, a national government energy agency, a nonprofit organization, or an entrepreneur.

7. **Willingness to provide data.** Utility and government staff indicated that they would be willing to provide data in the future; however, this may change as the relationship between government and utilities evolves. They also indicated that there might be opportunities to combine the INDEEP data collection instrument with existing national information data needs and requests.

8. **Access to data.** Access to data should not be restricted. Rules for sale to nonparticipants should be written. Confidential data should not be collected. Data from the data base should not be released until a "critical threshold" had been reached so that the data base would be considered a valuable data source (the number of programs was not specified).

9. **Funding of project/data base.** The Experts need to think of multiple users of the data base and multiple funders. If people value the data, then they should be expected to contribute funds to maintain and update the data base. Possible sponsors: government, utilities, energy saving companies, manufacturers, telecommunication companies, and the European Commission.

We received the following guidance for the future of INDEEP, particularly for the third year:

1. **Data collection.**

   a. Improve the quality of existing data (e.g., fill in the data holes where possible).
   b. Collect data on new programs (e.g., industrial programs, peak reduction programs), even if they have not been evaluated.
   c. Update data on existing programs.
   d. Encourage nonparticipating countries to contribute program data, even if they do not want to participate in the INDEEP project.
   e. Obtain data on publicly funded programs (e.g., SAVE programs).
   f. Collect background information on program implementors and marketing information.
   g. Explore the opportunities to combine the INDEEP data collection instrument with existing national information data needs and requests.

2. **Data analysis.**

   a. Continue to analyze the data: observe improvements in program performance and distinguish single-technology programs from multiple-technology programs.

3. **Products.**

   a. Data base.
   b. One-pagers (e.g., program summaries).
   c. Brochure on data base .

d. Index page - programs sorted by program type, marketing type, program objectives [could be part of data base, too].
e. Web page on World Wide Web.

4. Data base.

a. Add standardized filtering (or query procedure) for selecting cases.
b. Develop quality control guidelines, and assign responsibilities for data base maintenance, updating, and data collection.

5. Access to data base.

a. Unrestricted access in third year.
b. Develop rules for access.
c. Set subscription rates for creating a fund to support project.

6. Funding future.

a. Develop a plan for handing over data base at end of the third year to a central coordinator such as, the European Commission, IEA, a combination of the two, a national government energy agency, a nonprofit organization, or an entrepreneur.
b. Ensure that Euroelectric is supportive of the project.

In summary, the workshop participants found the workshop to be very productive and instrumental in guiding the development of Task 1 in future years. As noted below, the work plan for the third year reflects the consensus of the workshop.

4.5.1 Market Research Survey

A market research questionnaire was developed to ascertain the level of interest in the type of data collected in Task 1, the usefulness of INDEEP data, and the type of products that potential users would want to see resulting from this project (a copy of the questionnaire is in Appendix D). The market research questionnaire was distributed to the workshop participants. The results from the market research survey supported the INDEEP project in the following way: (1) all of the types of DSM information collected in the INDEEP project were considered very important (ranging from 4.0 to 4.8, based on a scale of 1 (not important) to 5 (very important)); (2) there was much dissatisfaction with existing information sources supplying the DSM information that was to be collected in the INDEEP project;[4] and (3) there was a need for a diverse set of formats for receiving information on energy efficiency programs (e.g., one-page summaries of programs, ten-page analyses of programs, and a computerized database).

[4] Participants were dissatisfied because existing data sources were not collecting the kind of data that they wanted and because access to the needed data was restricted.

4.6 INDEEP Meetings

Five Experts meetings were held in the second year of the project (May 1, 1995 to April 30, 1996):

June 1995:	Mandelieu, France
Oct. 23-24,, 1995:	Fukuoka, Japan
Jan. 18, 1996:	Copenhagen, Denmark
Feb. 7, 1996:	Madrid, Spain
Feb. 9, 1996:	Madrid, Spain

The minutes of these meetings are available upon request.

4.7 INDEEP Documents

In addition to this report and two task status reports to the Executive Committee, the following internal working documents were prepared in the second year:

1. The **INDEEP Data Collection Instrument and Instructions (revised)** that serve as a tool for collecting DSM program design, implementation, and evaluation data in a consistent and systematic fashion (Appendix B).

2. A **Research Work Plan for the Third Year** (March 1996); the activities planned for the third year are described in Section 5 (the work plan is available upon request).

3. A **journal article** that summarizes some of the work in the first year and a preliminary assessment of the cost and performance of selected DSM programs (Vine 1996). An earlier version had been presented at the 1995 European Council for an Energy-Efficient Economy Conference in June 1995 at Mandelieu, France and had been published in the Conference proceedings.

4. **DSM information brief.** The INDEEP project was described ("International DSM and DSM Program Evaluation") in a *DSM Information Brief* prepared by the U.S. Department of Energy (DOE) and mailed to DOE's DSM mailing list. The information brief is in Appendix E.

5. SUMMARY AND FUTURE DIRECTIONS

This report is the second Annual Report of the International Database on Energy Efficiency Programs (INDEEP), summarizing the activities of the second year (1995 - 1996). During this time period, we conducted the following activities: (1) finalized a data collection instrument (DCI) and DCI instructions; (2) developed the contents of an Excel spreadsheet for data entry; (3) collected demand-side management (DSM) program data on 104 programs; (4) entered DSM program data onto the Excel spreadsheet; (5) merged Excel spreadsheets; (6) analyzed DSM program data for all countries; (7) organized a workshop; and (8) prepared a report on the activities of the second year.

Because of the efforts of the participants in the project, we were more efficient in the second year than what was expected, so that the work planned for five years (as proposed in the original research work plan) can be accomplished in a shorter period of time (by at least two years) and with a reduced budget (e.g., from $470,000 to $75,000 for the third year). The key findings from the second year are the following:

(1) Based on discussions with DSM experts in the participating countries and during the INDEEP workshop, the INDEEP data base continues to be seen as a unique, nonduplicative data base, containing valuable data for DSM program designers, implementors, and evaluators as well as for policy makers.

(2) The second year has demonstrated that (a) the INDEEP data collection instrument and instructions are easy to use for collecting extensive program data, (b) key program data can be collected on many programs, although the quality of the data is variable, and (c) the preliminary analysis of existing data confirms the potential for the data base to be a very valuable tool for obtaining new ideas, comparing programs, improving program design, and establishing contacts (networking).

(3) Discussions with DSM experts in the participating countries and at an INDEEP workshop attended by over 25 European DSM experts led to a consensus for the project to proceed for another year, focusing on: (a) improving the quality of existing data in the data base; (b) continued development of the data base software; (c) additional data collection and data analysis; (c) preparation of marketing materials for promoting the data base; and (d) obtaining the support of an organization for managing the project in future years.

Regarding future directions for the INDEEP project, we concluded that the work plan for the third year of the project should contain the following activities: (1) improve the quality of existing data in the data base; (2) develop the INDEEP data base software; (3) collect DSM program data on more programs; (4) analyze DSM program data for all countries; (5) prepare marketing materials for promoting the data base; (6) distribute the data base and obtain information on user reactions to the data base; (7) negotiate a commitment from one organization for supporting the project in future years; and (8) prepare a report summarizing the activities of the first three years. In conclusion, the third year is seen as a transition year as Task 1 comes to a halt and the INDEEP data base and project responsibilities are handed over to another central coordinator.

6. ACKNOWLEDGMENTS

This work was supported by the Assistance Secretary for Energy Efficiency and Renewable Energy, Office of Utility Technologies, of the U.S. Department of Energy under Contract No. DE-AC03-76SF00098. The following organizations also supported this work: DEFU (Denmark), Commission of the European Union (Joint Research Center), RaCER (Korea), NOVEM (Netherlands), Red Electrica de España and UNESA (Spain), and NUTEK (Sweden). The author is especially grateful for the assistance and review comments provided by the following INDEEP project experts: Flavio Conti, Changseob Kim, Casper Kofod, Anders Lewald, Felix Martinez, and Harry Vreuls.

7. REFERENCES

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APPENDIX A

List of Participants in Task 1

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APPENDIX B

INDEEP DCI

and Instructions

INDEEP DATA COLLECTION INSTRUMENT

Refer to the instructions for a description of terms

INDEEP Expert: _____ Country: _____

Date Submitted: _____ ❒ First Data Submittal ❒ Data Update

Primary Program Implementing Agent

- ❒ Electric or Gas Utility
- ❒ Central Government
- ❒ Regional Government
- ❒ Local Government
- ❒ Local Organization
- ❒ ESCo (Energy Service Company)
- ❒ Other (specify: _____)

Contact Information

Name: _____

Address: _____

_____

_____

Phone: _____

Fax: _____

Email: _____

Implementing Agent Name: _____

Program Name: _____ **Project ID #:** _____

Program Summary

(describe after rest of form is completed)

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

Program Start Date: _____ ❒ **Ongoing**

❒ **Terminated - Program End Date:** _____

Program Status

- ❒ Pilot (Demonstration)
- ❒ Full Scale at National level
- ❒ Full Scale at Regional level
- ❒ Phase Out

Evaluation Status

- ❒ Completed
- ❒ In-progress
- ❒ Planned
  Start Date: _____

Energy Objectives

- ❒ Energy Efficiency
- ❒ Load Optimization
- ❒ Fuel Switching (from _____ to _____)

Program Goals

Number of participants: _____
Energy savings: _____
Demand savings: _____
Fuel savings: _____
Appliance #1 sales: _____
Appliance #2 sales: _____
Other (specify:_____) _____

Reasons for Selecting This DSM Activity (Choose 1-5 Reasons)

- ❒ Regulatory Incentive
- ❒ Legislated/Mandated
- ❒ Political Pressure
- ❒ Public Image
- ❒ Result of Screening Process
- ❒ Result of Other Competitive Analysis
- ❒ Economic Development
- ❒ Business Opportunity
- ❒ Other (specify): _____
- ❒ Long-term Resource Option
- ❒ Market Penetration
- ❒ Quality of Service
- ❒ Customer Retention
- ❒ Cost of Service
- ❒ Reduction of Global Warming
- ❒ Reduction of Local Emissions
- ❒ Market Transformation

Eligible Markets: ❒ New Construction ❒ Replacement/Retrofit

Energy Source Affected: ❒ Electricity ❒ Fuel Oil ❒ Gas ❒ District Heating

Program Type

- ❒ General Information (Brochures, etc.)
- ❒ Site-Specific Information (Audits, etc.)
- ❒ Installation of Conservation Measures
- ❒ Operations and Maintenance
- ❒ Load Control
- ❒ Hook-Up Fees
- ❒ Education/Training
- ❒ Research and Development
- ❒ Building Standards and Labels
- ❒ Appliance Standards and Labels
- ❒ Market Transformation

Alternative rates:

- ❒ Time-of-Use
- ❒ Interruptible/Curtailable
- ❒ Other (specify): _____

Customers Targeted By Program

Residential:

- ☐ All
- ☐ 1-2 Family Houses - With Electric Space Heating
- ☐ 1-2 Family Houses - Non-Electric Space Heating
- ☐ Multi-Family Houses/Apartments - Central Heating
- ☐ Multi-Family Houses/Apartments - Indiv. Electric Space Heating
- ☐ Multi-Family Houses/Apartments - Indiv. Non-Electric Heating
- ☐ Multi-Family Houses/Apartments - District Heating
- ☐ Other (specify: _____)

Non-customers Targeted by Program

- ☐ Bldg. owners
- ☐ Retailers
- ☐ Wholesalers
- ☐ Appliance manufacturers
- ☐ Builders
- ☐ Realtors & developers
- ☐ Architects & engineers
- ☐ Bldg. mgrs. & administrators
- ☐ Bldg. & equipment operators
- ☐ Energy service companies
- ☐ Other (specify: _____)

Commercial: ☐ All ☐ Other (specify 6-digit NACE code(s)): _____

Industrial: ☐ All ☐ Other (specify 6-digit NACE code(s)): _____

Agricultural: ☐ All ☐ Other (specify 6-digit NACE code(s)): _____

Technologies

Technology Code (see DCI Instructions)	Payback time in years

Marketing Incentives

- ☐ Rebates and Cash Awards
- ☐ Financing, Loans, and Leasing
- ☐ Direct Installation
- ☐ Billing Rate Discounts
- ☐ Bulk Purchasing
- ☐ Gifts and Merchandise
- ☐ Other (specify: _____)

Marketing Methods

- ☐ Direct Mail
- ☐ Advertising
- ☐ Energy Audits
- ☐ Personal Contact
- ☐ Other (specify: _____)

Participation Summary

	Most Recent Year (19__)	Cumulative (19__ to 19__)	Units
Participants			
Eligible Customers			
Participation Rate			*Leave Blank*

Program Costs, Energy Savings, and Appliance Sales

		Most Recent Year (19__)	Cumulative (19__ to 19__)
Costs in country monetary units	**Total Utility/Organizer Costs**		
(Specify years(s) used: 19____)	**Total Non-Utility/Organizer Costs**		
(Specify monetary unit used: ____)	**Total Program Costs**		
	Incentive Costs (%)		
	Non-Incentive Costs (%)		
Energy Savings	**Electricity savings (MWh)**		
	System peak demand savings (MW)		
	Fuel savings (Terajoules (=10^{12} joules))		
Appliance Sales (# units)	#1 Specify units: ____(use code on p. 3)		
	#2 Specify units: ____(use code on p. 3)		

Data used to calculate savings:

- ❒ Engineering data
- ❒ Utility billing data
- ❒ Spot metering
- ❒ Whole-building load data
- ❒ End-use load data
- ❒ Equipment specifications
- ❒ Site-specific data
- ❒ Appliance sales data
- ❒ Other (specify): _____

Life-Cycle Program Costs

Levelized Total Resource Cost: _____
Levelized Utility Resource Cost: _____

Cost Units:

- ❒ ____ per MWh
- ❒ ____ per MW
- ❒ ____ per cubic meter
- ❒ ____ per MBtu
- ❒ ____ per MBtu
- ❒ Other (specify): _____

Values Used:

Average measure lifetime _____
Real societal discount rate _____
Real utility discount rate _____

Lessons Learned

(For example, key elements for program success or failure; consider program design, financing, implementation, and evaluation; include difficulties encountered; and provide recommendations for program improvement)

_____
_____
_____
_____
_____
_____
_____

Go Back and Complete Program Summary on Page 1

INSTRUCTIONS FOR COMPLETING THE INDEEP DATA COLLECTION INSTRUMENT

This data collection instrument (DCI) is designed to facilitate the collection of information on utility and government DSM programs. These instructions provide guidelines for completion of the DCI. The person(s) completing the DCI should regard the instructions as a reference that should only be consulted when there is a question regarding the completion of a particular data request.

The shaded portions of the DCI are to be filled in by the INDEEP country expert.

DCI Page 1

Primary Program Implementing Agent
This is the organization performing the actual program implementation/delivery - e.g., utility company, government agency (central, regional or local), local community organization, or an energy service company. A municipal government should be coded as "local government." There may be a combined effort in program implementation. **Check all applicable implementing agents.**

Energy Service Company (ESCo)
An Energy Service Company is a firm that specializes in providing DSM conservation services. Typically, this firm enters into contractual agreements with utility companies to assist in planning, implementation/delivery, and monitoring and evaluating DSM programs.

Other
Please provide a brief explanation.

Contact
Enter the name, address, telephone number, FAX number, and electronic mail (email) address for the person to be contacted for additional information.

Implementing Agent Name
Enter the full name of the primary program implementing agent (in English).

Program Name
Enter the full name of the DSM program (in English).

Project ID Number
If you have given the program an internal code, please complete, so that it is easier to communicate and avoid misunderstanding.

Program Summary
Describe the program in a few sentences, using the section headings of the DCI. Provide program highlights that capture the essence of the program: e.g., its market delivery system, program impacts, uniqueness of program, expectations versus results, etc.

DCI Page 2

Program Start and End Dates

Enter the month and year for start and end dates of the **overall program**. For ongoing programs, check **ongoing**; for programs that have ended, check **terminated** and specify the program end date.

Program Status

"Program status" refers to the life-cycle stage of the program. Programs may be in one of three stages in their life cycle. These stages are defined below. **Check one only.**

Pilot
Pilot Programs are designed to test or build the capability to deliver full-scale programs.

Full-Scale
Full-Scale Programs are available to all customers in an eligible market at the **national** level or for a particular **region.**

Phase Out
A Phase Out Program is in its last year of operation; the evaluation of the program may continue after a program has ended.

Evaluation Status

Check one only.

Completed
A program evaluation has ended and that at least one evaluation report is available.

In-progress
A program evaluation has started and is ongoing.

Planned
A program evaluation is being planned and is likely to be implemented. Specify the approximate date when the evaluation will start.

Energy Objectives

Check one or more of the three objectives that apply to the DSM program.

Energy Efficiency
Programs promoting more efficient use of energy.

Load Optimization
Load optimization programs include *load shifting* (promoting the movement of electricity use from one time period to another, usually from the on-peak to the off-peak period for a single day), *valley filling* (promoting increased off-peak electricity consumption, without necessarily reducing on-peak demands), *peak clipping* (promoting reduced electricity demand (kW) at times of peak daily demand (typically, at system peak)), and *load building* (promoting increased electricity consumption, generally without regard to the timing of this usage).

Fuel Switching
Programs promoting the conversion (switching) of one source of energy (e.g., gas) to another source of energy (e.g., electricity).

Program Goals

Most programs have goals that shape the program. Where appropriate, describe the goals in terms of number of participants, energy savings, demand savings, fuel savings, appliance sales, or other category. Specify the units.

Reasons for Selecting This DSM Activity

Sixteen potential reasons for implementing this DSM activity are listed on the DCI. **Check at least one and no more than 5** key reasons that apply to the DSM activity.

Regulatory Incentive
A regulatory body (e.g., a public utilities commission) has offered incentives to the primary program implementing agent (see pg. 1) for promoting DSM programs. The incentives may be financial or non-financial, and the primary program implementing agent has the option of taking advantage of these incentives.

Legislated/ Mandated
A regulatory/legislative body has required that the primary program implementing agent implement DSM programs.

Political Pressure
Pressure by the general public, interest groups, political parties, and others made it necessary for the primary program implementing agent to implement this DSM activity.

Public Image
Implemented for enhancing the public image of the primary program implementing agent (i.e., for good public relations).

Result of Screening Process
A formal screening process (e.g., using computer cost-effectiveness tests) was used to select the DSM activity - e.g., a program may be selected because its benefit-cost ratio was greater than one.

Result of Other Competitive Analysis
A bidding process or some other form of competitive analysis was used to select the DSM activity - e.g., a program may be selected because the winner of a DSM bid included this program in its menu of program offerings.

Economic Development
Implemented for developing a stronger economy - e.g., creating more employment in the region.

Business Opportunity
Implemented for developing a new business for the primary program implementing agent.

Long-term Resource Option
Implemented for providing a resource for the future.

Market Penetration
Implemented for increasing the penetration of one or more energy efficiency measures and practices in the marketplace.

Quality of Service
Implemented for increasing the quality of service offered to the utility's customers or the government's taxpayers.

Customer Retention
Implemented for retaining customers for the utility - e.g., offering low billing rates so customers will stay with the utility.

Cost of Service
Implemented for reducing the cost of service to the utility (e.g., less generating capacity needed to build).

Reduction of Global Warming
Implemented for improving the quality of the global environment as it relates to global warming (e.g., CO_2).

Reduction of Local Emissions
Implemented for improving the quality of the local environment (e.g., air quality and water quality).

Market Transformation
Implemented for influencing the attitudes and behavior of individuals and organizations, so that investments in energy efficiency persist even after the program is changed or eliminated.

Other
If another reason is important and is not listed, please specify.

Eligible Markets
The Eligible Market is any set of customers or participating units that qualify for a program based on the program's eligibility requirements. **Check all that apply**. Eligible Market definitions can be classified into two main categories:

New Construction
New Construction refers to buildings and facilities (or additions) constructed during the current year; it may also include major renovations of existing facilities and building envelope components (although there is no strict definition, "major renovations" occur when large amounts of floor area are affected).

Replacement/Retrofit
Replacement/retrofit buildings are structures that are in use as of the beginning of the current year. Replacement is the installation of new equipment or building envelope components for worn out equipment at the end of its useful life. Retrofit is the substitution of new equipment for existing equipment prior to its normal retirement age accompanied by the removal and disposal of the old equipment.

Energy Source Affected
Indicate type of energy source that the DSM program affects: e.g., electricity, gas, fuel oil, and district heating.

Program Types

Check all applicable types.

General Information
Programs that inform customers about DSM options through advertising media such as brochures, bill stuffers, television, and radio ads.

Site-Specific Information
Programs that provide guidance on energy efficiency and load management options tailored to a particular customer's facility. They often involve an on-site inspection of the facility to identify potential cost-effective DSM actions. An energy audit and design assistance are examples of site-specific information programs.

Installation of Conservation Measures
Programs where the utility, contractor, or customer installs energy efficiency DSM measures in the facilities of participating customers (with or without incentives).

Operations and Maintenance
Programs that include regular maintenance of particular measure(s), along with training and education of O&M personnel, maintenance manuals, and periodic re-testing to measure actual performance.

Load Control
Programs that promote shifts in electricity consumption from one time period to another (usually from on-peak periods to off-peak periods during a single day) or clipping peak usage.

Hook-Up Fees
Programs that are usually performance-based with a sliding scale; the fees decline as the energy efficiency of the home increases, and increase as it decreases.

Education and Training
Programs that attempt to educate and train the general population or key target groups (e.g., builders and architects) through workshops, seminars, and special courses.

Research and Development
Development of new technologies as well as the demonstration and technology transfer of these research projects.

Building Standards and Labels
Standards that typically require minimum energy efficiency levels for new construction and, sometimes, when making improvements to existing stocks. Typical actors involved in building standards are local, state, and federal government. In some cases, labels may be provided by utilities or government which show the energy efficiency of the building.

Appliance Standards and Labels
Standards that typically require minimum energy efficiency levels for new appliances . In some cases, labels may be provided by utilities or government which show the energy efficiency of the appliance.

Market Transformation
Programs that try to influence the attitudes and behavior of individuals and organizations, so that investments in energy efficiency persist even after the program is changed or eliminated

Alternative Rates
Programs that offer special rate designs or structures for customers in return for participation in programs designed to change load shape, especially peak load.

Time-of-Use
Programs that feature rates differentiated by time-of-the-day and/or season of the year.

Interruptible/Curtailable
Programs that provide incentives in the form of bill credits or special (reduced) rate structures. In exchange for the incentive, the customer agrees to reduce electrical loads upon request from the utility. The utility's request is usually made during critical periods when the system demand approaches the utility's generating capacity. For interruptible programs, the power company is able to remotely switch off the equipment. For curtailable programs, the customer voluntarily reduces power consumption, as laid down in an agreement.

Other
Please provide a brief explanation.

DCI Page 3

Customers Targeted By Program

Refers to groups (or subgroups) of customers with similar characteristics, such as income, building type, or economic activity which is the focus of the program. Major sectors include Residential, Commercial, Industrial, and Agricultural. Each DSM program will target at least one sectors. For commercial, industrial, and agricultural sectors, specify 6-digit NACE codes (consult with country experts on selection of codes). **Check all that apply.**

For the multi-family houses/apartments group, four options are possible: central heating, individuals electric space heating, individual non-electric space heating, and district heating.

Non-customers Targeted By Program

Refers to key groups that participate in the program as intermediaries for the customers targeted by the program: e.g., building owners, retailers, wholesalers, appliance manufacturers, builders, realtors and developers, architects and engineers, building managers and administrators, building and equipment operators, and energy service companies. **Check all that apply.**

Technologies

Specify all Technologies that apply to the DSM program and **use the codes that are listed at the end of the instructions.** Use the **Other** category only if necessary. For each technology, indicate an estimated simple payback time in years.

Payback Time

The period of time required for the energy savings to equal the cost of the conservation action; e.g., if a compact fluorescent exit light costs $6 and saves $3 per year, the payback is 2 years.

Marketing Incentives

Type of Incentives

Any award used to encourage customer participation in a DSM program and adoption of recommended measures is an incentive. Below are definitions of incentive types:

Rebates and Cash Awards

Cash payments in the form of a check awarded for participation in a DSM program.

Financing/Loans/Leasing

Utility DSM program incentives where the financing cost associated with a financial instrument or loan is paid for, in part or in whole, by the utility. The utility may also provide favorable terms for leasing equipment.

Direct Installation

Programs that offer equipment and installation at no cost to the customer (i.e., out-of-pocket investment on the part of the customer is not required).

Billing Rate Discounts
Reduced billing rates offered to a customer in order to encourage participation in a DSM program.

Bulk Purchasing
Bulk Purchasing occurs when a utility purchases a large quantity of merchandise (e.g., refrigerators) and sells them at a wholesale cost plus a slight markup (usually lower than retail cost).

Gifts
Incentives in the form of merchandise are awarded to a customer, utility, or trade ally for participation in a DSM program.

Other
Please provide a brief explanation.

Marketing Methods
The list identifies methods commonly used to contact, educate, or solicit customer participation in a DSM program. **Check all applicable methods.**

Direct Mail
Direct Mail is used when the primary program implementing agent sends mail (including brochures and bill inserts) directly to the target group.

Advertising
Includes radio, television, and newspaper advertising of the program.

Energy Audits
An inspection of a house, building, or industrial process by an expert who makes recommendations for ways the customer can reduce energy use.

Personal Contact
Personal Contact is used when the primary program implementing agent directly contacts individuals of a target group, face-to-face or by telephone.

Other
Please provide a brief explanation.

Participation Summary

Most Recent Year and Cumulative Participation
Enter the calendar year for which the most recent year costs apply and enter in the column header. Enter the start and end years in the column header for which the cumulative costs apply.

Number of Participants
Enter the number of participants that have participated in the program, where participants may be customers, households, facilities, or firms. The units chosen should be the same unit type as those used to specify the number of expected participants (see page 2 of DCI) and eligible customers (see below).

Number of Eligible Customers

Enter the number of eligible customers, where eligibility refers to criteria that a customer must meet in order to participate in a DSM program.

Participation Rate (% of Eligible Customers)

The Participation Rate is defined as the *ratio* (expressed as a percent) of the number of *participants* in a program to the total number of *eligible customers* for the program. The following equation specifies the participation rate:

Participation Rate = (Participants/Eligible Customers*100)

DCI Page 4

Program Impacts

Cost Information

Report all costs in your country's monetary units and enter the calendar year for which the costs apply.

Most Recent Year and Cumulative Program Costs, Savings, and Sales

Enter the calendar year for which the most recent year costs, savings, and sales apply and enter in the column header. Enter the start and end years in the column header for which the cumulative costs, savings, and sales apply.

Total Utility/Organizer Costs
All utility/organizer expenses associated with a DSM program: e.g., rebates, labor costs (such as the time of utility staff, field representatives, and contractors) as well as program support costs which are directly associated with individual customers participating in the program; such costs include advertising and program promotion.

Total Non-Utility/Organizer Costs
All program expenses paid by customers, trade allies, and other organizations that are not reimbursed by the utility/organizer.

Total Program Costs
The sum of the utility/organizer costs and non-utility/organizer costs associated with a DSM program.

Incentive Costs (%)
Indicate the percentage of total program costs that are monetary inducements in the form of a rebate or payment. Incentives costs could include reimbursement of installation and/or equipment costs as well as other costs such as cash rebates to customers and incentives to trade allies. Incentive cost % plus non-incentive cost % should equal 100%.

Non-Incentive Costs (%)
Indicate the percentage of total program costs that are non-incentive (administrative) costs. These include labor costs (such as the time of utility staff, field representatives, and contractors) as well as program support costs which are directly associated with individual customers participating in the program. Such costs include advertising and program promotion. Incentive cost % plus non-incentive cost % should equal 100%.

Electricity Savings
Electricity Savings should be entered in megawatt-hours. A megawatt-hour is equal to 1,000 kilowatt-hours or 1,000,000 watt-hours and is abbreviated MWh.

System Peak Demand Savings
System Peak Demand Savings should be entered in megawatts. A megawatt is equal to 1000 kilowatts or 1,000,000 watts and is abbreviated MW. The changes in the demand

for electricity resulting from the program occur at the same time the utility experiences its system peak demand (often referred to as diversified coincident peak demand).

Fuel Savings
Fuel Savings should be entered in terajoules. A terajoule is equal to 10^{12} joules.

Appliance Sales
Appliance Sales should be entered in number of units sold. Specify the appliance in the second column using the codes on page 3 of the DCI.

Data Used to Calculate Savings
This section requests information regarding the types of energy data used for the calculations of energy and load impacts. **Check all that apply.**

Engineering Data
Estimates using engineering principles with assumptions about equipment and system performance characteristics and operation profiles of measures installed through the programs.

Utility Bills
Ideally, utility bills are obtained for a year before and a year after participation, Annual electricity and gas use is typically adjusted for weather and other relevant factors, and the differences between pre- and post-participation use in kWh/year or therms/year are computed.

Spot Metering
Generally, electricity and gas use is monitored before and after participation for short times (e.g., a few days). Other relevant factors (e.g., operating hours for equipment and heating degree days) are measured for a longer time (e.g., up to a year).

Whole-building Load Data
Electrical use of a facility is monitored to record kW demands and kWh before and after participation.

End-Use Load data
Specific circuits or equipment affected by new systems are monitored to record kW demand and kWh before and after participation.

Equipment Specifications
Performance of new equipment is calculated based on information obtained directly from the manufacturer. (In those cases where there is a handbook of equipment specs in the hands of engineers, "engineering data" should be checked instead.)

Site Specific Data
Energy and load effects are calculated based on information obtained by a program representative during an audit of, or other type of visit to, the facility.

Appliance Sales Data
Data on appliance sales generally come from manufacturers or retailers. Sometimes special surveys are conducted to obtain more precise data.

Other

Indicate other data sources used for estimating or measuring the energy impacts of DSM programs.

Life-Cycle Program Costs

Average Measure Lifetime
This is the average lifetime of all of the measures installed in the program. Where possible, the average should be weighted by energy savings (weighted average).

Discount Rate
The real societal and utility discount rates should be reported; these rates exclude the rate of inflation.

Lessons Learned

Enter any lessons learned in this section. Lessons learned may pertain to the current program year or to the entire life of the program. Where available, discuss difficulties encountered in program design, financing, implementation, and evaluation; recommendations for program improvement; and key elements for program success.

TECHNOLOGIES

CODE	
10	**Building Envelope**
11	New insulation materials
12	Opaque elements
13	Dynamic insulation
14	Energy gathering components
15	Low emissivity finishes for internal surfaces
16	Transparent insulation/glazing
20	**Thermodynamic Cycles**
21	Heat pumps
21.1	Electrically driven
21.2	Combustion eng. driven
21.3	Chemical
21.4	Absorption
22	Chillers
22.1	Absorption
22.2	Thermal compression
23	CHP technologies
23.1	Small modular systems
23.2	Diesel c. medium size
23.3	Gas turbine
23.4	Counterpress. plant
30	**Heat Recovery Systems**
31	Dehumidifiers
32	Heat exchangers
33	Heat recovery from appliances
40	**Thermal Generators and Distribution Systems**
41	Furnaces
42	Boilers
43	Emulsifiers
44	Thermosyphons
50	**Storage Techniques**
51	Sensible thermal storage
52	Latent thermal storage
53	Ice storage
54	Aquifer storage
60	**Solar Heating and Cooling Techniques**
61	Passive heating techniques
61.1	Sunspaces
61.2	Direct gains
61.3	Indirect gains
61.4	Daylighting
62	Passive cooling techniques
62.1	Evaporative cooling
62.2	Natural ventilation

CODE	
63	Active solar heating techniques
63.1	Flat collectors
63.2	Vacuum tube collectors
63.3	Concentrating collectors
63.4	Air collectors
70	**Control and Regulation**
71	Control devices for components
72	Metering devices
73	Building energy management systems
80	**Electricity Savings**
81	High efficiency lighting systems
81.1	Compact fluorescents
81.2	Electronic ballasts
81.3	High efficiency magnetic ballasts
81.4	Reflector systems
81.5	Efficient fluorescent lamps
81.6	High intensity discharge
82	High performance appliances
82.1	Refrigerators and freezers
82.2	Water heaters
82.3	Motors
83	Advanced electric systems
84	New load management systems
90	**Other Technologies**
91	Industrial
92	Fuel switching
93	Specify:

APPENDIX C

Workshop Agenda

List of Workshop Participants

IEA-Implementing Agreement for Cooperation on Technologies and Programs for Demand-Side Management.

Task 1: International Data Base on Energy Efficiency Programs. Second workshop.

Agenda

Chairman: Mr.César Gaya Goya (Director ADAE)

Thursday, February 8.

9:00 am-9:40 am	Opening Remarks and Welcome-Mrs.Carmen Rodriguez Spanish ExCo Delegate (REE) "IEA Policy on Energy Efficiency"-Mr. Tim McIntosh (IEA). "IEA Implementing Agreement , Task 1 and Workshop Objetives"-Mr. Edward Vine (LBNL, USA).
9:40 am-10:15 am	"Legislation on DSM and IRP"- Mr Finn Josefsen (DEA, Denmark).
10:15 am-10:45 am	*Break.*
10:45 am-11:30 am	"An Overview of the INDEEP Project."-Mr. Edward Vine, Annex 1 Operating Agent (Lawrence Berkeley Laboratory, USA).
11:30 am-12:30 pm	Preliminary Analysis Presentation
12:30 pm-2:00 pm	*Lunch.*
2:00 pm-3:00 pm	Discussion on the Analysis
3:00 pm-4:00 pm	Discussion on the Future of INDEEP Project
4:00 pm-4:30 pm	*Break.*
4:30 pm-5:30 pm	Summary Presentations of Small Group Discussions to All Participants.

Friday, February 9.

9:00 am-10:00 am	"DSM in Spain". Legislative Introduction-Mr. Jaime Suárez (MINER). -Grupo Endesa. -Hidrocantábrico. -Unión Fenosa. -Iberdrola.
10:00 am-11:00 am	"Lessons Learned from First Day"-Mr. Edward Vine.
11:00 am-11:30 am	*Break.*
11:30 am-12:15 am	Plenary Discussion, "Future Directions for INDEEP".
12:15 pm-1:00 pm	Presentation of SAVE II Program Proposals-Mr. Flavio Conti (European Commission DG XVII).
1:30 pm	*Lunch.*

RED ELÉCTRICA

Task 1: International Data Base Demand-Side Management Technologies and Programmes.

II Workshop. Madrid, Spain. 8-9 February 1996.

AIR.03 7.FEB.96

Group	Name	Organisation	Country
2	Mr.. Casper Kofod	DEFU	Denmark.
✓1	Mr. Flemming Nielsen	NESA	Denmark.
2	Mr. Per Danielsen	NVE	Denmark.
3	Mr. Finn Josefsen	Danish Energy Agency	Denmark.
3	Mr. Joerg Haug	Stuttgart University	Germany
3	Mr. Flavio Conti	EUROPEAN COMMISSION	Italy.
✓1	Mr. Noia	ACEA	Italy.
2	Mr. Cracas	ACEA	Italy.
✓1	Mr. Hiroshi Asano	CRIEPI	Japan.
3	Mrs. Victoria Wiltshire	European Association For Conservation of Energy	United Kingdom
2	Mr. Frèrejean	N.V ENECO	Netherlands
3	Mr. Harry Vreuls	NOVEM SITTARD	Netherlands
1	Mr. César Gaya Goya	ADAE	Spain
2	Mr. Ignacio Ruiz Cortina	FECSA	Spain.
3	Mr. Juan Comas	FECSA	Spain.
✓1	Mr. José Manuel Rivero	H. CANTABRICO	Spain.
2	Mr. Alfonso Barba	IBERDROLA	Spain
3	Mr. Juan Aurrecoechea	IBERDROLA	Spain
✓1	Mr. José Ignacio Damigo	Sevillana de Electricidad	Spain.
2	Mr. Salvador Fernández	UNION FENOSA	Spain.
3	Mr. Jesús Martín Giraldo	UNION FENOSA	Spain.
1	Mrs.Concepción Rodríguez	UNESA	Spain.
2	Mr. Gonzalo Paradinas	UNESA	Spain
	2 Mr. Félix Mártinez	REE	Spain
3	Mrs. Carmen Rodríguez	REE	Spain
1	Mr. Jaime Suarez	MINER	Spain
✓1	Mr. Edward Vine	Lawrence Berkeley Laboratory.	USA
3	Mr. Tim McIntosh	International Energy Agency.	

APPENDIX D

Market Research Questionnaire

Market Research Questionnaire, INDEEP Workshop (Madrid, Feb. 8-9, 1996)

1) What aspects of DSM are you involved in or are most relevant to your job activities?

(Please check your top four)

- ☐ (a) Resource planning
- ☐ (b) Program design
- ☐ (c) Program management and implementation
- ☐ (d) Program monitoring and tracking
- ☐ (e) Customer services
- ☐ (f) Rebate processing
- ☐ (g) Impact evaluation
- ☐ (h) Process evaluation
- ☐ (i) Marketing planning and research
- ☐ (j) Regulatory reporting/filings
- ☐ (k) Economic/financial analysis (e.g., cost recovery/incentives)
- ☐ (l) Forecasting
- ☐ (m) Other (please specify:_____)

2) How important are each of the following types of DSM information in assisting you to address the DSM challenges of your job? How satisfied are you with the existing information sources?

	IMPORTANCE (Rate on a scale of 1 to 5, 1 = not important; 5 = very important) (Please circle the appropriate rating)	**SATISFIED?** (Please circle Yes or No)
A. Names of contacts - program managers and program evaluators	1 2 3 4 5	Yes or No
B. Program goals	1 2 3 4 5	Yes or No
C. Reasons for implementing a DSM program	1 2 3 4 5	Yes or No
D. Customers and other groups targeted by program	1 2 3 4 5	Yes or No
E. Technologies promoted by program	1 2 3 4 5	Yes or No
F. DSM marketing incentives and methods	1 2 3 4 5	Yes or No
G. DSM program participation rates	1 2 3 4 5	Yes or No
H. Cost of DSM programs	1 2 3 4 5	Yes or No
I. Energy and demand savings from DSM programs		
J. Data used in calculating energy savings (e.g., utility billing data, end use data, engineering calculations)	1 2 3 4 5	Yes or No
K. Cost-effectiveness of DSM programs	1 2 3 4 5	Yes or No
L. Lessons learned about DSM programs	1 2 3 4 5	Yes or No

(PLEASE TURN OVER)

3) In what format do you prefer to receive information on energy efficiency programs?

(Please check no more than three)

- ☐ (a) One-page summaries of programs
- ☐ (b) Ten-page analyses of programs
- ☐ (c) Large, detailed reports
- ☐ (d) Computerized database - on diskette
- ☐ (e) Computerized database - via Internet
- ☐ (f) Consultation with national expert(s)

4) Country:_____)

5) Organization

(Please check one)

- ☐ (1) Utility
- ☐ (2) Government
- ☐ (3) Consultant
- ☐ (4) Other (please specify:_____)

COMMENTS: (Please mention any additional ideas, thoughts, or recommendations)

Thank you for your valuable time and input. Please return this survey during the workshop.

Name (Optional):

APPENDIX E

DSM Information Brief

DSM INFORMATION BRIEFS
Key Findings from an Analysis Performed for the U.S. Department of Energy

May 1995

INTERNATIONAL DSM & DSM PROGRAM EVALUATION

A recently published report on the status of demand-side management (DSM) programs in selected European countries has found that these programs often represent cost-effective resources when compared to the cost of new generating capacity. *International DSM and DSM Program Evaluation: An INDEEP Assessment* analyzes DSM programs in Austria, Denmark, the Netherlands, Spain, and Sweden; assesses the availability of data and information on these programs; and presents case studies on thirteen European DSM programs. The findings from these analyses represent a joint international effort to compile and analyze measured results of energy efficiency programs in a consistent fashion.

The report is a project of the International Database on Energy Efficiency Programs (INDEEP), sponsored by the International Energy Agency (IEA) Demand-Side Management Implementing Agreement. The agreement is an international collaboration of 14 IEA member countries, plus Korea and the European Union, working to clarify and promote opportunities for DSM. Through the support of DOE, INDEEP is designed to make available information on electric and gas utility DSM programs, as well as DSM programs carried out by government agencies, energy service companies, and others. Initially, the INDEEP database will include programs implemented by the five countries noted above, plus Korea, the United States, and the Commission of the European Union.

PROGRAMS AND TECHNOLOGIES

In most European countries, DSM programs are carried out by utilities and government agencies. Utilities have promoted DSM for many years, primarily through time-of-use rates. Now, utility DSM programs include not only such rates, but also information campaigns, research and development, energy audits, direct payments or rebates, and appliance labeling. Despite broadened DSM program offerings, utility companies continue to focus on load management (reductions in energy demand - kW), rather than energy efficiency (reductions in energy use - kWh).

Most DSM programs underway in Europe target lighting and electric water and space heating in the residential sector. Commercial sector applications are mainly for lighting, heating, and air conditioning. In the industrial sector, DSM programs impact lighting, cogeneration, heating, ventilation, and air conditioning (HVAC), interruptible loads, and efficient motors. Some DSM programs include fuel conversion, from all-electric or oil-heat to district heating or natural gas.

IMPLEMENTATION METHODS

Implementation methods are often key to the success of a DSM program. For the programs described in this report, a variety of methods have been used by sponsoring organizations to create interest and to ensure participation in DSM programs. They include:

- brochures
- direct contacts by the utility
- direct mail
- newspaper advertising
- radio/TV advertising
- shows/exhibits
- seminars/workshops

Other methods have included direct contacts by trade allies, tests and demonstrations, general advertising, newsletters, and telemarketing.

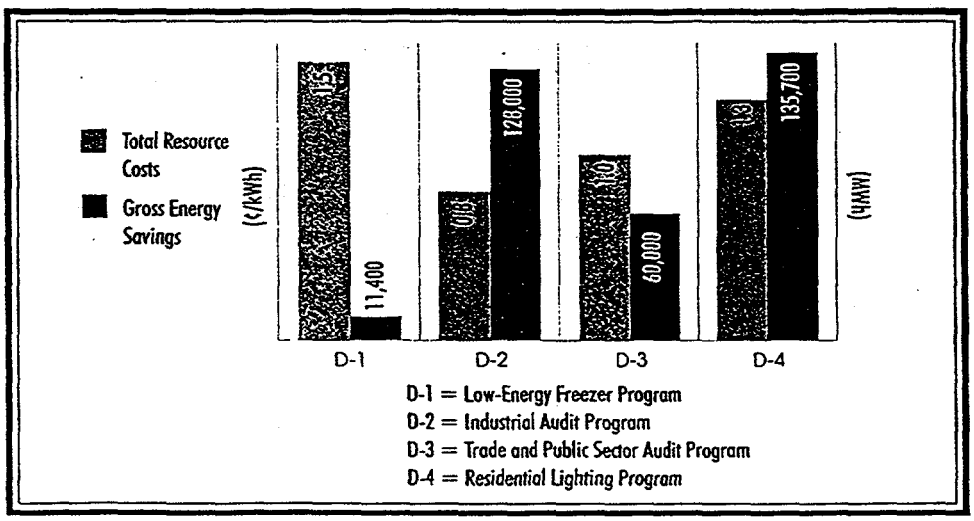

Figure 1. Levelized Total Resource Costs (¢/kWh) and Gross Energy Savings (MWh)
DSM Program Case Studies in Denmark

COST EFFECTIVENESS

The cost-effectiveness of the 13 European DSM programs reviewed in this assessment varied significantly. From a total resource cost perspective, including participant costs, these programs cost an average of 1.8¢/kWh (ranging from 0.01¢/kWh to 9.7¢/kWh). In some cases, the programs were very cost effective, compared to the avoided cost of new supply.

These energy and cost savings could only be estimated, due in part to the sponsoring utilities' limited experience in evaluating DSM (especially energy efficiency) programs. Also, limited participation levels and differences among program goals and objectives hindered evaluation opportunities. In a few cases, program costs were also unavailable. European utilities relied on engineering data and engineering analysis as well as on site data for estimating energy savings. Billing data were rarely used to statistically analyze actual changes in consumption.

Total resource costs and energy savings of four DSM programs initiated in Denmark are illustrated in Figure 1.

PARTICIPATION

Cumulative participation rates in the 13 DSM programs ranged from less than 1% to 63%. On average, these programs have higher penetration rates than those in the United States, which are typically less than 15% (with many in the 5-10% range). The relatively higher degree of success in participation may reflect the extensive amount of marketing of the programs and higher energy prices in Europe.

NON-ENERGY BENEFITS

European utilities consider non-energy benefits, such as environmental quality, business productivity, quality of service, and public image, to be important when selecting, implementing, and evaluating DSM programs. European consumers also consider non-energy benefits, such as increased comfort and quality of life, to be important in deciding to participate in DSM programs.

As electricity markets change from tightly regulated monopolies to more openly competitive businesses, utilities will be re-examining the role of demand-side management and energy efficiency as resource options. Non-energy benefits may gain in importance, due to the commitments of many European governments to the United Nations Framework Convention on Climate Change for reducing or stabilizing carbon dioxide emissions.

CONCLUSIONS

The current level of energy efficiency programs, in contrast to load management programs, in most European countries is low compared to the Untied States, and the future is uncertain given potential structural changes in the utility industry. However, energy efficiency programs, which have proven to be cost-effective, may increase in light of international commitments to environmental quality. Given a future of stable or increased DSM activity, the need for program evaluation will become more important. Collaborative program evaluations, such as that sponsored by the INDEEP project, will be increasingly valuable. And in a more competitive future, program evaluation will be critical for assessing utility profitability and customer services and for improving organizational efficiency and efficacy.

FOR MORE INFORMATION

The full report, *International DSM and DSM Program Evaluation: An INDEEP Assessment* (LBL Report # 36647), by E. Vine of the Lawrence Berkeley Laboratory (LBL), is available by calling LBL at (510) 486-4266.

ABOUT DSM INFORMATION BRIEFS

DSM Information Briefs are periodically published by the Demand-Side Management/ Integrated Resource Planning Programs at the U.S. Department of Energy and are intended to provide a brief overview of key findings from analyses of DSM resources that have been sponsored by the U.S. Department of Energy.

Copies can be obtained by contacting Diane Pirkey of the U.S. Department of Energy at (202) 586-9839 or by contacting Laurie Holman of Energetics, Incorporated at (202) 479-2748.

Implementing Agreement on Demand-Side Management Technologies and Programmes - 1994 Annual Report, Anne Bengtson, Editor, Swedish National Board for Industrial and Technical Development (NUTEK), Department of Energy Efficiency, January 1995

The IEA Demand-Side Management Programme is an international collaboration with 14 IEA member countries, plus Korea and the European Union, working to clarify and promote opportunities for DSM. Through cooperative activities, participants collaborate to help DSM technologies reach their full market potential.

As of December 1994, 15 countries plus the European Union, have signed the Implementing Agreement on Demand-Side Management Technologies and Programmes. The programme currently has five tasks, which include:

Task 1: International data base on demand-side management technologies and programmes
Task 2: Communications technologies for demand-side management
Task 3: Cooperative procurement of innovative technologies for demand-side management
Task 4: Development of improved methods for integrating demand-side options into resource planning
Task 5: Investigations of techniques for implementation of demand-side management technology in the marketplace

For further information, or to obtain copies of the Implementing Agreement, contact:

Diane Pirkey
U.S. Department of Energy
(202) 586-9839

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