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Demand Side Management
Technologies and Programmes

TASK 1

INDEEP
Analysis Report 2004

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The following countries supported the INDEEP database:

Belgium
Denmark
France
Japan
Norway
Republic of Korea
The Netherlands
Spain
Sweden
USA

This report is prepared by

Evert van der Laar
Harry Vreuls (Operating Agent)

You can contact the Operating Agent
- by mail: P.O.box 17, NL 6130 AA Sittard, The Netherlands
- by phone: + 31-46-4202258 and by fax +31-46-4528260
- by e-mail: h.vreuls@senternovem.nl

This report is available at http://dsm.iea.org

This report is an update of "INDEEP Analysis Report 2000", produced by Caper Kofod, Energy Piano, Denmark

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Summary and conclusions

The INDEEP database started in 1994 and is an international tool for:

- inspiring the design and planning of new DSM and energy efficiency activities;
- comparing the user's own programmes with similar types of programmes and evaluations;
- providing access to contacts concerning different types of DSM, thus creating a network.

By July 2004[1] the database contained 229 quality-controlled programmes from 14 countries. However, evaluations have only been completed for 63% of the programmes, so not all data is available for all programmes.

The primary objective for almost all the programmes (94%) is energy efficiency. Some 57% are targeted towards residential customers, 32% towards commercial customers, 26% towards industrial customers, and only 7% towards agricultural customers.

Electricity consumption is affected by 90% of the programmes, and utility companies implemented around 84% of the programmes.

Rebates and cash awards are marketing incentives used in 52% of the programmes. Most programmes use more than one method of marketing. The three main methods (personal contact, direct mail and advertising) are each used in around 50% of the programmes. This makes it difficult to determine which strategy gives the highest participation rate because different programmes and programme types are successful with different combinations of marketing methods and incentives.

A quarter of the programmes are classified as 'market transformation' programmes. This report includes an analysis of this programme type for introducing new products and increasing the adoption of these products. This programme type typically seems to be combined with other programme types, such as general information campaigns and site-specific information.

Another special topic analysed in this report looks at successful programmes by participation rate. Ten programmes with some of the highest participation rates, good or acceptable cost-saving ratios, without being pilot/demonstration programmes, are described in detail. These programmes originate from eight countries and present very different types of energy efficiency activities.

[1] A same analysis was conducted on the database and reported in "INDEEP Analysis Report 2000"

1 Introduction

INDEEP is an energy efficiency database developed as a separate Task under the IEA DSM (Demand-Side Management) Agreement[2]. The INDEEP database is a tool for:

- designing or planning new DSM programmes, including both utility and non-utility energy efficiency services and programmes;
- evaluating existing programmes by comparing similar programmes throughout the world that are included in the database.

This analysis report is the second in a series published by the IEA INDEEP expert group containing information about their work. The following analysis is based on the INDEEP data as available in August 2000.

Chapter 2 shows that data is included from 14 countries, and that only data which has passed a quality control, has been included.

Chapter 3 categorises the programmes and includes the reasons for selecting them. The status of the programmes and evaluations are then described, followed by the technologies and techniques used.

The marketing techniques and participation are presented in Chapter 4.

Chapter 5 describes how the programmes have been evaluated along with their results, in the form of energy savings, programme costs, and cost effectiveness.

However, a more in-depth analysis is conducted on market transformation programmes (see Chapter 6). The analysis looks at programme types combined with market transformation, promoted technologies, marketing techniques, evaluation methods and cost effectiveness.

Finally, Chapter 7 provides an overview of 10 programmes in the INDEEP database with some of the best participation rates, as well as being cost effective, to show the characteristics of successful DSM programmes. The first analysis report “International Programme Experience in providing Energy Efficiency Services Comparing Cost Effectiveness” published in 1998 included a list of the top-10 programmes with the lowest total resources cost (TRC).

[2] more information ad http://dsm.iea.org

2 Participating countries and data quality control

2.1 Data from 14 countries

The INDEEP database currently (May 2004) consists of 229 DSM programmes implemented in 14 countries that use a broad range of energy-saving technologies. The number and percentage of programmes from each country are shown in figure 1. Most programmes (20%) come from the Netherlands, followed closely by Spain (19 %) and Denmark (18 %) both submitting 18%, and USA at 16%.

Data has been gathered, using a standard form (see Appendix B) on approximately 235 programmes. However, due to lack of essential data for some programmes, only 229 are included in this analysis (see Section 2.1 concerning quality control).

Number of programmes per country

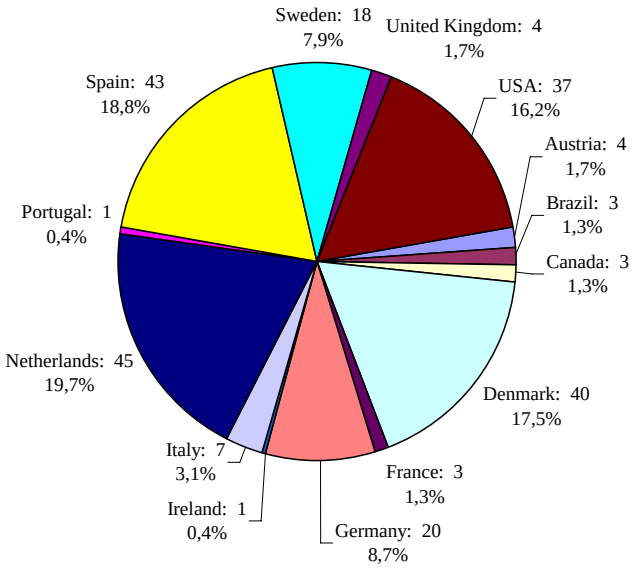

Figure 1. Number of programmes per country.

Most programmes in the database have been implemented by:

- utility companies (84%);
- central governments (7%);
- regional governments and energy service companies (3%);

Energy efficiency is the primary objective in nearly all programmes.

2.2 Data quality control

The quality of the INDEEP programme data is directly related to the value of the database as a design or evaluation tool for current and future DSM programmes. In the summer of 1997 the INDEEP experts attempted to ensure the quality of the available information by forming a quality control group.

This new quality control group consisted of certain INDEEP data that is compulsory for all programmes in the database, i.e.:

- summary;
- programme status;
- evaluation status;
- implementing agent;
- energy sources affected;
- technologies;
- reasons for selecting the DSM activity.

All these criteria for basic information have been met. Figure 2 present the available data for other important fields.

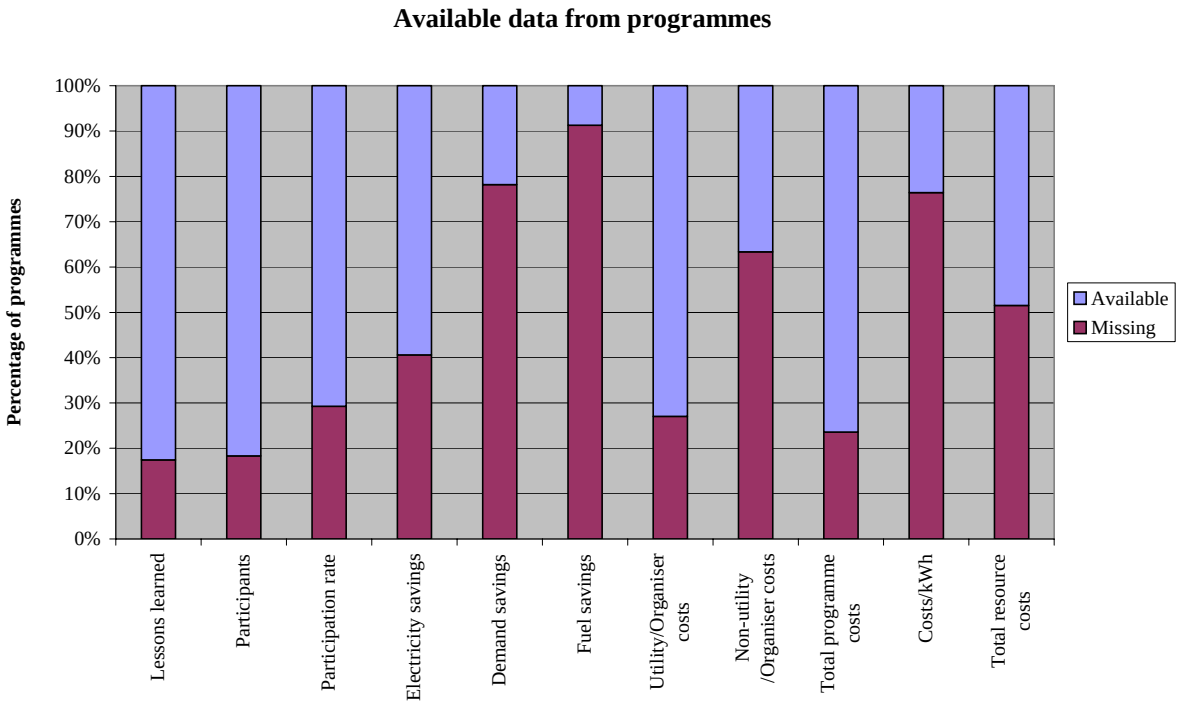

Figure 2. Available data for programmes included in the analysis.

A number of programmes submitted to the INDEEP experts were not included in the database due to the lack of information about the programmes.

At the time of writing the first analysis, 61% of the programmes had completed their evaluations. However, in 2000, the data has been improved and updated by the INDEEP expert group and since then the contact persons are requested to update the information. The database as a whole has achieved a high level of quality due to the content and availability of the information on the programmes in the database.

Besides the quality control data Figure 2 also includes an overview of available data for the most important types of information: savings, costs, participation, energy efficiency measurement and lessons learned. Unfortunately, not all data is available for every programme. Around 40% have electricity savings data; around 25% have total programme cost data; and around 20% of the programmes have some participation data.

The missing data makes it difficult to analyse and compare all the programmes or aspects of the database. For 78% of the programmes it is possible to calculate the simple cost/saving ratio, while only around 51% of the programmes have enough data to calculate the total resource cost (TRC), which is the best measure of presenting and comparing the cost-effectiveness of the programmes.

3 General overview of INDEEP programmes

3.1 Different types of DSM activities

INDEEP programmes are categorised into different types of DSM activities. An individual programme may be placed in as many programme types as applicable. Figure 3 shows how INDEEP programmes fall into programme type categories. On average, a programme is classified as two programme types.

Most programmes are of the following types:

- general information programmes (131 programmes);
- site-specific information (91 programmes);
- installation of conservation measure programmes (77 programmes).

Since the last analysis, published in 2000, site-specific information programmes have increased from 86 to 91, and market transformation programmes have risen from 58 to 59.

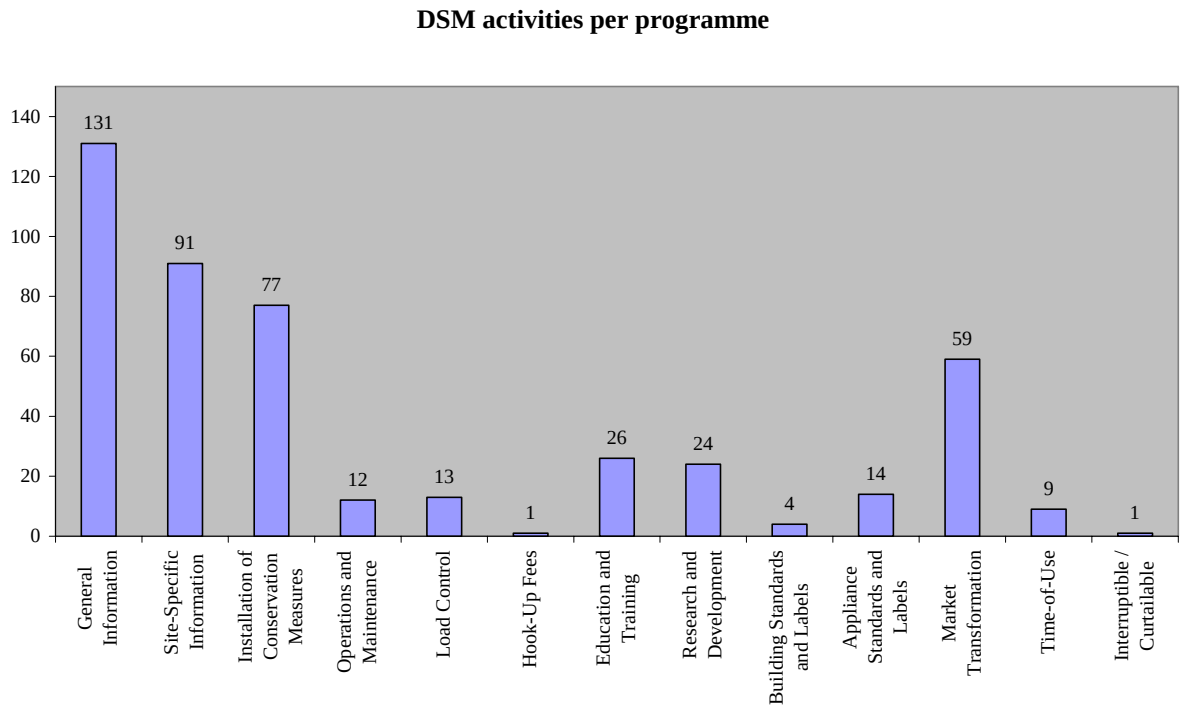

Figure 3. Number of programmes in each programme type.

3.2 Reasons for selecting DSM activity

Each programme in the INDEEP database can include up to five reasons (out of 16 options) why its implementing agents chose to enact that particular DSM programme. These reasons are split into four separate categories: regulatory, economic, environmental, and marketing of the implementing organisation. Figure 4 shows how many programmes are cited in each category.

A frequent reason (62 programmes) for implementing a DSM programme is 'regulatory incentives'. Selecting the particular DSM activity for economic reasons (i.e. economic development, cost of service) was the least likely option. Environmental reasons were frequent, with 79 DSM programmes being implemented to reduce global warming and 56 to aid the reduction of local emissions. Marketing reasons were the most popular. One-third of the programmes in the database (74) were implemented as energy-saving programmes to augment the public image, and 64 to improve the quality of service.

In general, public image, quality service and environmental concerns were given as the main reasons why agents, such as governments and utilities, implement DSM programmes.

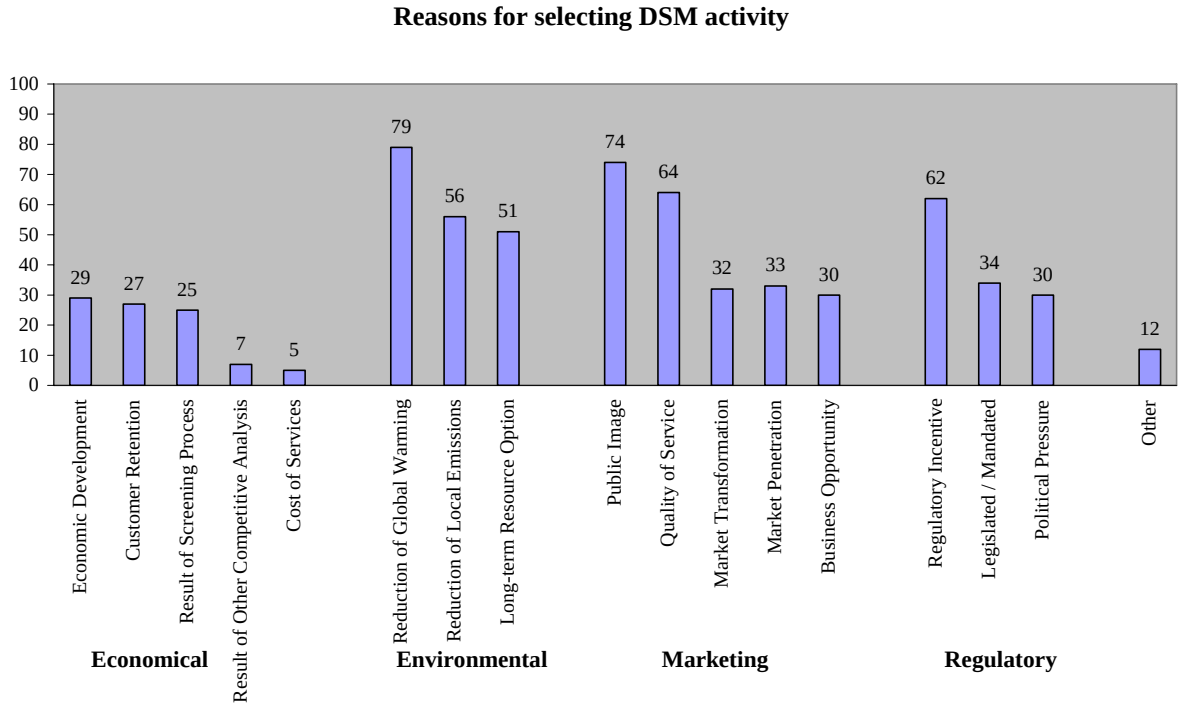

Figure 4. Reasons for selecting DSM activities.

3.3 Programme status

The continuation status is available for all 229 programmes. Figure 5 shows that 52% of the programmes in the database are currently still being implemented, while 48% have been terminated.

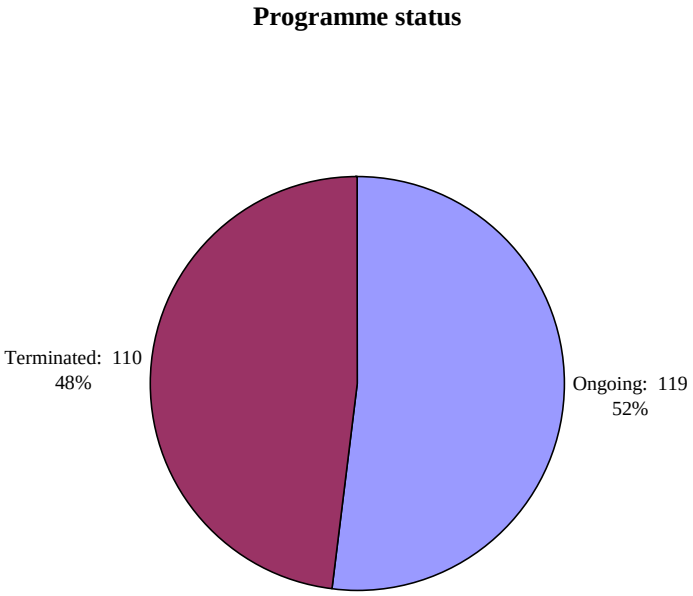

Figure 5. Continuation status.

Figure 6 shows that 63% have completed an evaluation of the programme, while 30% are ongoing, and 7% are planning to perform an evaluation.

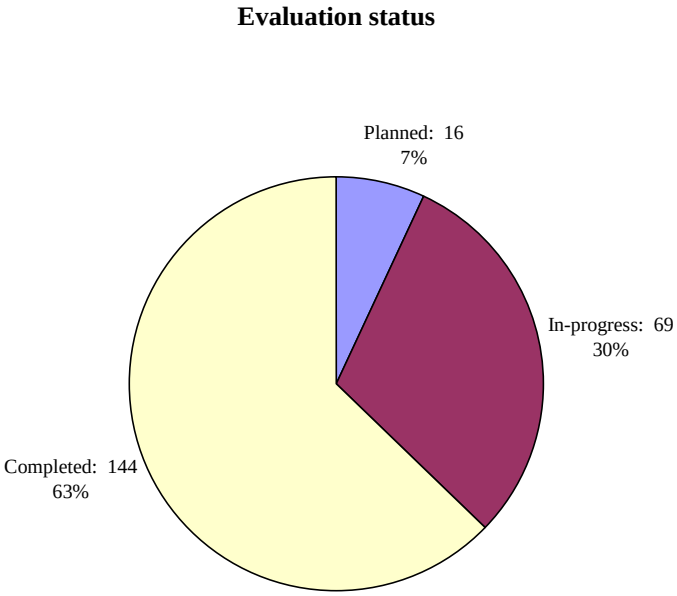

Figure 6. Evaluation status.

3.4 Energy source

The INDEEP programmes may affect four different types of energy sources: electricity, gas, fuel oil, or district heating. Table 1 shows the number of programmes that apply to one or more energy source, with 72% (164) of the programmes affecting only one energy source. This percentage was 83% in 1997 and 77 % in 2000, which shows a slight tendency to include more than one energy source in the programmes.

Number of energy sources affected	Number of programmes
0	8
1	164
2	31
3	7
4	19

Table 1. Number of energy sources affected.

Table 2 shows the number of programmes that affect each type of energy source. The main energy source within the database is electricity, which is affected by 90% (205) of the programmes. Some 29% (66) of the programmes affect gas, 11% (25) affect fuel oil, and 12% (27) have district heating as an energy source.

Type of energy source affected	Number of programmes
Electricity	205
Gas	66
Fuel oil	25
District heating	27

Table 2. Types of energy sources.

3.5 Combining incentives, marketing and technologies in the programmes

Many of the programmes used more than one marketing method, marketing incentive, and technology. These variables identify the programme and directly affect programme results such as customer participation, energy savings, and cost. Consequently, mixing variables makes it very difficult to attribute programme success or failure to one single factor.

3.6 Technology

The programmes in INDEEP are characterised by energy efficiency technology codes including real technologies, energy conversion systems, apparatus, as well as immaterial techniques (see list in Appendix A). A single programme can be characterised by up to seven different types of energy technologies. The database contains over 80 different energy-saving technologies.

All programmes in the database include technology data. Table 3 shows the number of programmes using one or more energy-saving technologies: 64% (146) of the INDEEP programmes that have this information available use a single energy-saving technology, while 36% (83) use a combination of technologies.

Number of technologies used	Number of programmes
1	146
2	29
3	14
4	11
5	11
6	9
7	9

Table 3. Number of programmes using several technologies.

Figure 7 shows the most common technologies used.

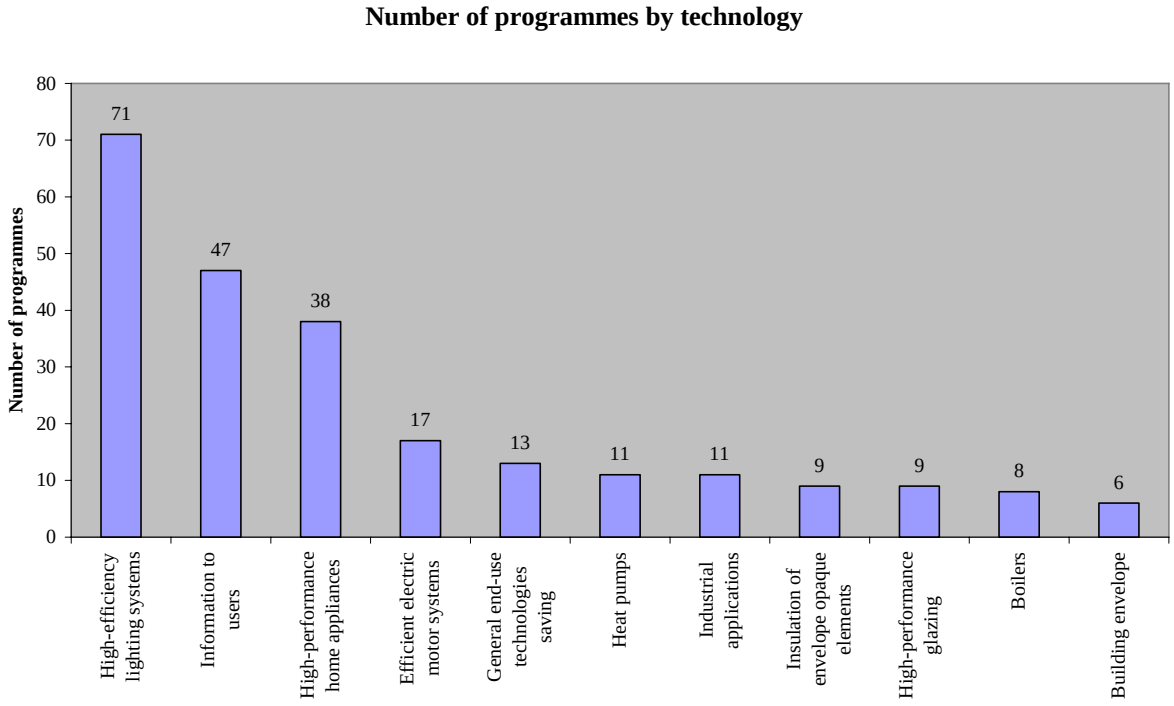

Figure 7. Number of programmes categorised according to the most common technology.

Table 4 shows the total number of programmes for the main categories as well as the subcategories.

Tech. nr.	Name of technology	Number of programmes in main category	Number of programmes in subcategories
10	**Building envelope**	32 (14%)	6 (3%)
11	Insulation of envelope opaque elements		9 (4%)
14	High-performance glazing		9 (4%)
16	Energy gathering components		1 (0%)
17	Reduction of air in- & exfiltration flows		6 (3%)
18	External building shadings		1 (0%)
20	**Thermodynamic cycles**	17 (7%)	3 (1%)
21	Heat pumps		11 (5%)
22	Chillers		1 (0%)
23	CHP technologies		2 (1%)
30	**Heat recovery systems**	4 (2%)	3 (1%)
34	Heat recovery from industrial uses		1 (0%)
40	**Thermal generators & distrib. systems**	18 (8%)	3 (1%)
41	Furnaces		2 (1%)
42	Boilers		8 (3%)
44	Advanced heat emission devices		1 (0%)
45	Pipes and ducts		4 (2%)
50	**Storage techniques**	8 (3%)	5 (2%)
51	Sensible thermal storage		2 (1%)
53	Ice storage		1 (0%)
60	**Solar techniques**	11 (5%)	2 (1%)
61	Passive solar heating		1 (0%)
63	Active solar heating		6 (3%)
65	PV applications		2 (1%)
70	**HVAC control & regulation**	16 (7%)	5 (2%)
71	Component control devices		6 (3%)
73	Building energy management systems		5 (2%)
80	**General end-use technologies saving**	150 (66%)	13 (6%)
81	High-efficiency lighting systems		71 (31%)
82	High-performance home appliances		38 (17%)
83	Adv. office appliances		3 (1%)
84	New electrical load management		5 (2%)
85	Advanced electric systems		3 (1%)
86	Efficient electric motor systems		17 (7%)
98	**Industrial applications**	13 (6%)	11 (5%)
99	Miscellaneous		2 (1%)
100	**Mix of all technologies**	3 (1%)	3 (1%)
>100	**Immaterial techniques**	120 (52%)	60 (26%)
101	Information to users		47 (21%)
102	Tariff rates		4 (2%)
103	Certification and labelling		5 (2%)
104	Managerial measures		4 (2%)

Table 4. Number of programmes using the various technologies.

Some 66% (150) of the programmes produce electricity savings by using better "end-use technolo-gies". The largest subcategories within this main category are: high-efficiency lighting systems (71 programmes) and high-performance home appliances (38 programmes).

Although the main technology category focuses on different kinds of electricity savings, other technology categories may also generate electricity savings, e.g. different kinds of insulation technologies in the building envelope group will save electricity if electricity is used for heating.

Some 52% (120) of the programmes use immaterial techniques, the most popular being “Information to the users”.

4 Targeting, marketing and participation

4.1 Customer targeting

Figure 8 shows the types of customers targeted by the programmes in the database. Of course a single programme may target more than one type of customer. According to the total shown in Figure 8, 57% of the programmes are targeted towards residential customers, 32% towards commercial customers, 26% towards industrial customers, and only 7% towards agricultural customers.

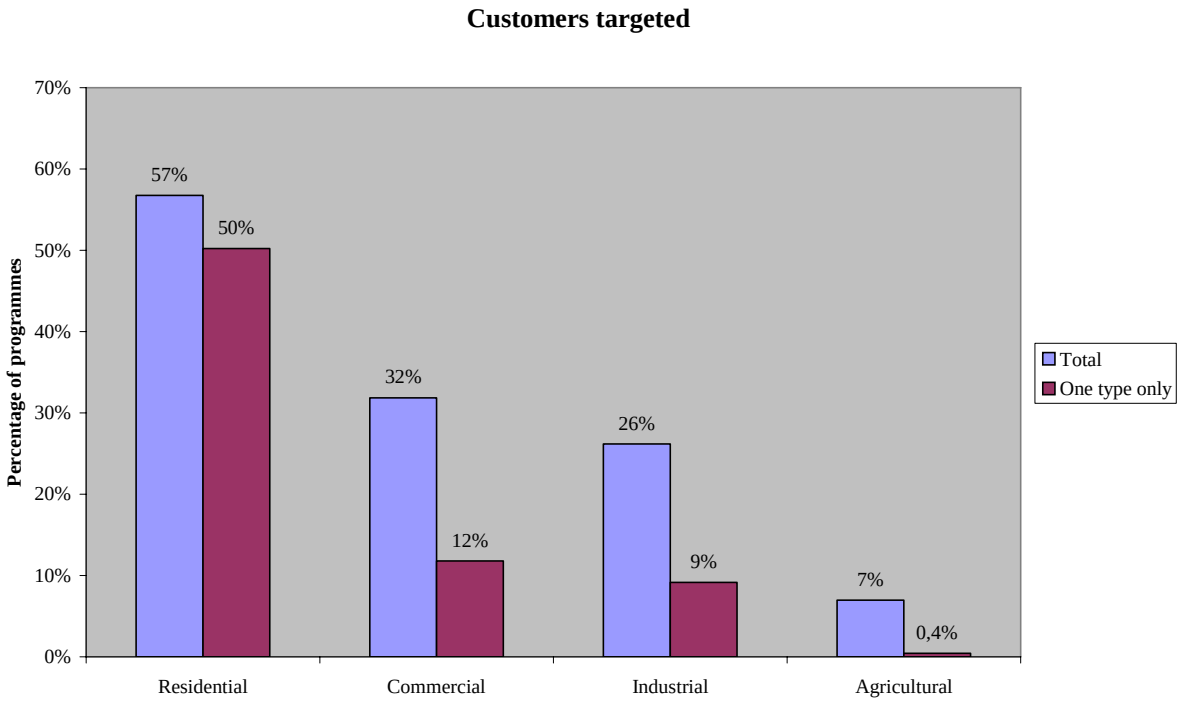

Figure 8. Customers targeted.

The "one type only" bars in Figure 8 refer to programmes that target a single type of customer, e.g. 50% of the INDEEP programmes target only residential customers, while 12% target only commercial, 9% target only industrial customers, and 0,4% of the programmes target just agricultural customers. From the differences in the two bars, it is clear that many of the programmes that apply to residential customers do not target other customer groups, while commercial and industrial customer programmes are applicable to more than one customer group.

4.2 Marketing techniques

Table 5 shows the amount of mixing involved in the marketing incentives. Marketing incentives (i.e. rebates, financing, etc.) are used in 82% (187) of the INDEEP programmes. For 59% (136) of those programmes, only one incentive is used to promote the programme. Only a few programmes combine the different types of incentives.

Number of marketing incentives used	Number of programmes	Percentage of programmes
0	42	18%
1	136	59%
2	44	19%
3	7	3%

Table 5. Marketing incentive mixing.

Figure 9 shows the most widely used marketing incentive to be rebates and cash rewards.

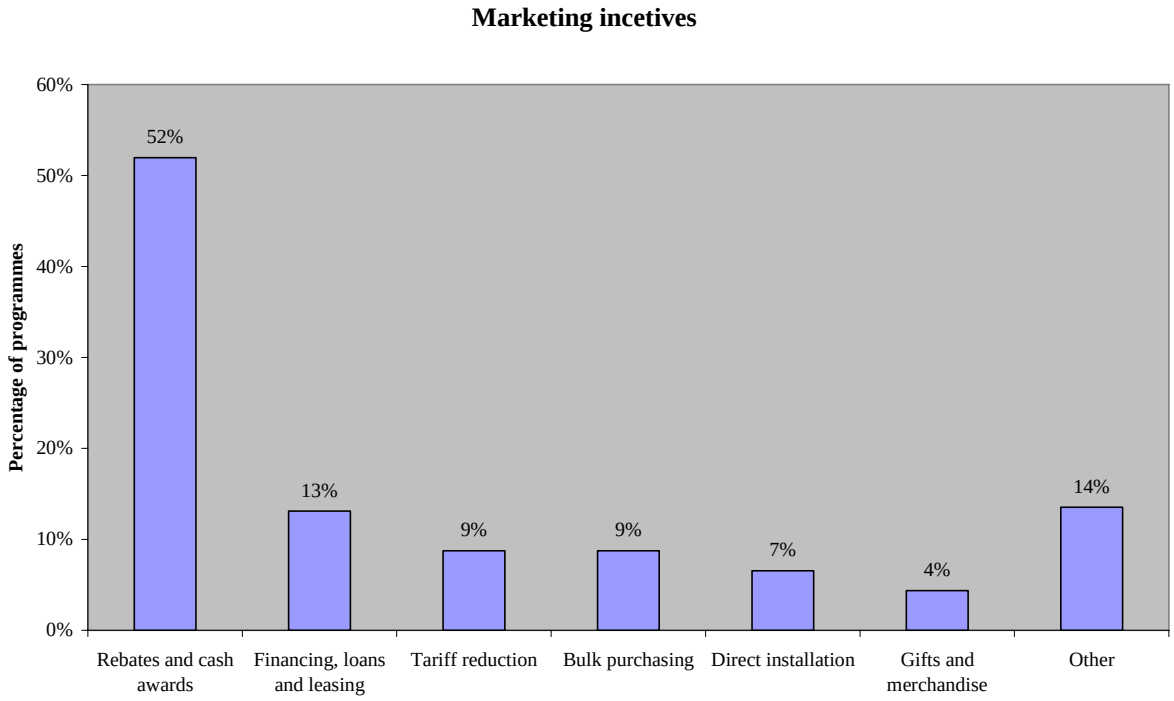

Figure 9. Percentage of programmes vrs. marketing incentives.

Table 6 shows that marketing methods (i.e. direct mail, advertising, etc.) are used in 93% (214) of the INDEEP programmes, and the degree to which they are used is greater than for marketing incentives. Programmes are very likely (69%, 159) to use two or more marketing methods. In the 'lessons learned' and 'summary' sections of the database, many stated that aggressive and broad marketing campaigns using a variety of methods are necessary in order to obtain a high participation rate.

Number of marketing methods used	Number of programmes	Percentage of programmes
0	15	7%
1	55	24%
2	92	40%
3	40	17%
4	23	10%
5	4	2%

Table 6. Marketing method mixing.

Figure 10 shows the overall percentage of programmes using the various marketing methods. Several marketing methods are often used together, so that increased participation cannot always be attributed to a single method. No single marketing method stands out above the rest.

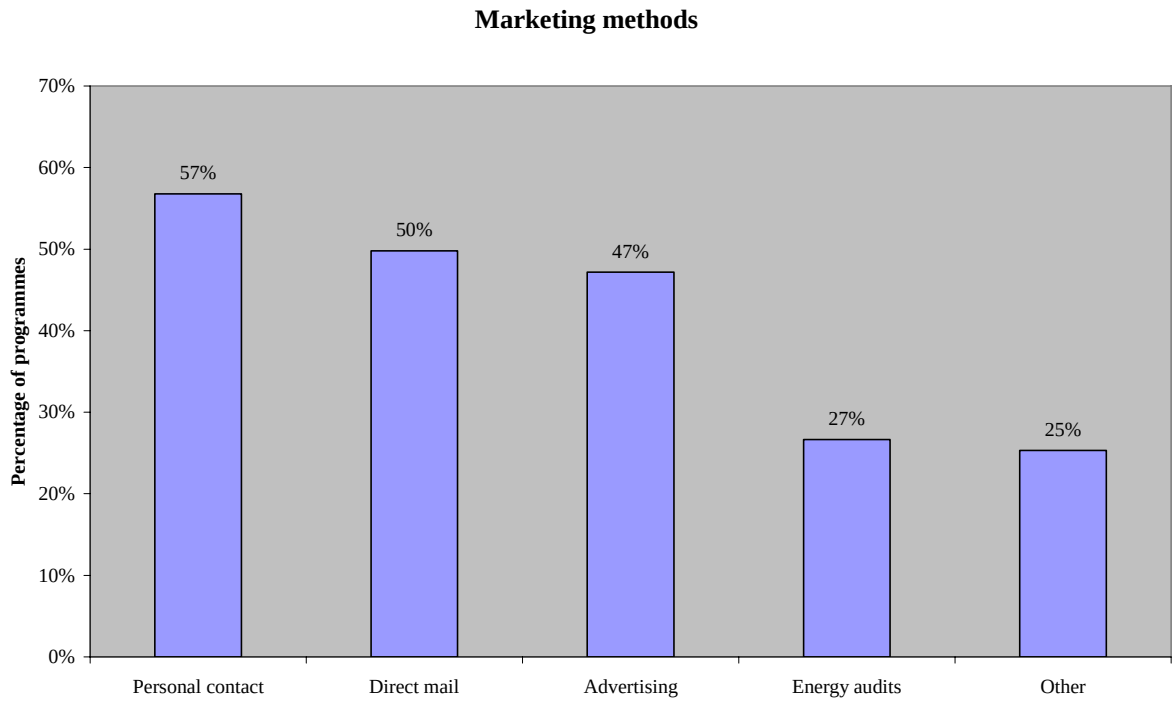

Figure 10. Percentage of programmes vs. marketing methods.

4.3 Participation

Participation information varies widely throughout the database and depends on the number of eligible customers. It is difficult to determine which strategy attracts most participants because different programmes and programme types are successful with different marketing methods and incentives, although several techniques are mentioned more than once throughout the database as instrumental in achieving a high degree of customer participation.

Several programmes find that involving the customers in designing and implementing the programme, as well as being partners, gives good participation results.

The US programme "Energy $avings Plan" allows vendors, contractors, utility customers, and industrial customers to help plan, design, and participate in the ongoing evaluation of the programme and annual modifications. The programme achieved a participation rate of 50%.

A utility in the Netherlands implemented a programme to try to influence energy behaviour with the assistance of neighbourhood associations. The customers in the neighbourhood took part in meetings with the utility to discuss the energy situation in the area. This programme entitled "Neighbourhood Energy Approach" achieved a participation rate of 50%. Involving customers in the design and implementation of the programmes is effective, but is usually only feasible for programmes with a small group of eligible customers.

Other INDEEP programmes believed very aggressive marketing to be the key to greater participation. The Netherlands programme "Go Easy Campaign, Metercard" achieved a participation rate of 50% to promote self-metering by customers, by organising a mass-media campaign during the first week of the programme. The campaign greatly increased knowledge of and participation in the programme.

The Italian programme "Lampadina Blu", with 50,000 participants in a CFL (compact fluorescent lamp) dissemination programme not including any rebates, found that a broad advertising campaign involving vendors was the key to success.

Rebates and cash rewards seem to be a good way of inducing participation, but it is not a guarantee. Around 35% of the programmes in the database use rebates or cash rewards as their only marketing incentive. These programmes have participation rates ranging from less than 1% to 100% of all eligible customers. The programmes with the highest participation rates found that a combination of a rebate and a good marketing campaign worked best in attracting customers. One German programme achieved one of the highest participation rates of all German CFL programmes by offering direct installation of a CFL, or one free coupon for a CFL, for each household, and supporting this by a convincing marketing campaign.

In the UK, with funds raised from a levy on gas consumers, a GBP 200 cash rebate was offered to owner-occupied households if a gas-condensing boiler was purchased. The programme attracted twice as many applicants as expected due to the large rebate and the successful advertising campaign.

Overall, there is no single strategy that attracts the most participants. Each programme is unique and has a different technique for marketing, but combinations of marketing methods and incentives seem to work well.

5 Evaluation, savings, costs and effectiveness

5.1 Evaluation method

An important aspect of the INDEEP database is the reliability of the energy savings data. This can partially be determined by the data used to calculate the savings.

Table 7 shows the combination of different types of evaluation methods used to calculate energy savings. Some 30% (66) of the programmes with evaluation method information use only one method to determine the savings, while the remaining programmes use two or more methods to calculate the savings produced by the DSM programme.

Number of evaluation methods	Number of programmes
0	74
1	66
2	36
3	22
4	12
5	7
6	3
7	0

Table 7. Number of evaluation methods used for calculating energy savings.

Around 35% (76) of the programmes have no evaluation method specified, presumably because the evaluation is still ongoing (31%) or planned (7%), as shown in Figure 6.

Figure 11 shows how many programmes used the various types of evaluation. The most common way to calculate savings (38%, 83 programmes) is to use engineering data. This is usually the easiest way to obtain energy saving data, but may also be the least reliable since the saving is projected from calculations and not from measuring the results.

Only 38% of these programmes use engineering data as their only method for determining energy savings; the rest use engineering data as a secondary check with another evaluation method (measured data).

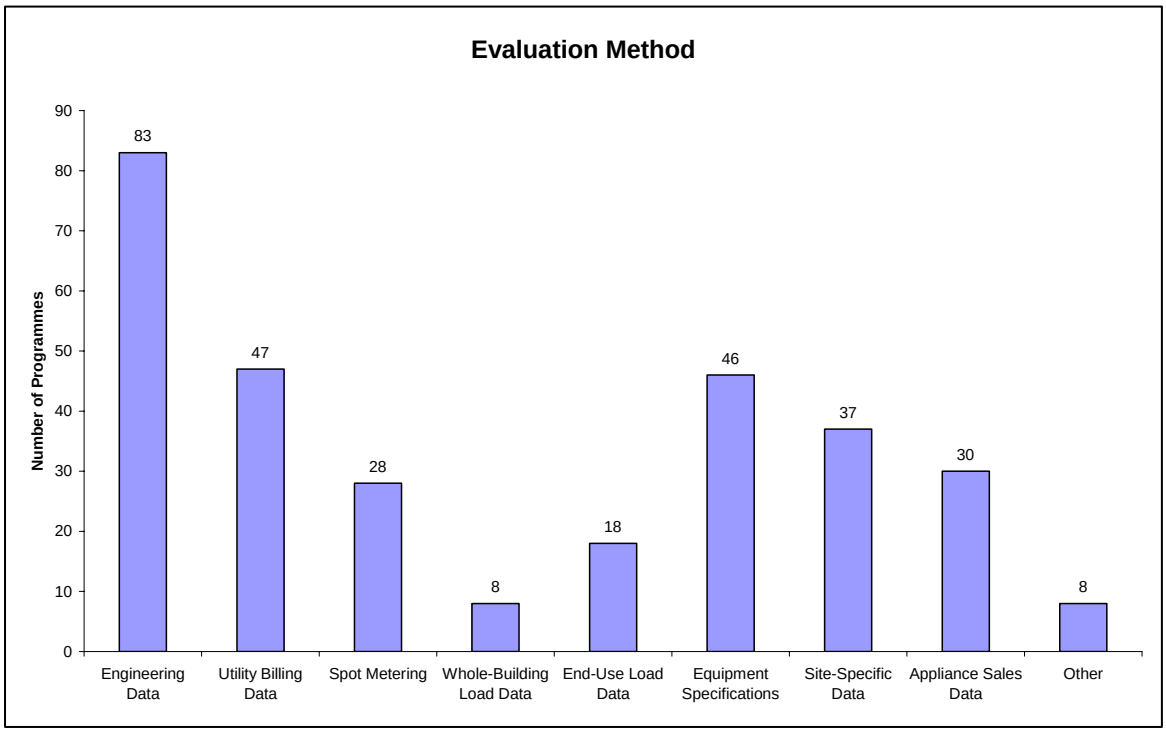

Figure 11. Evaluation method.

The programme evaluations often use several other sources of measured data, such as spot metering (13%, 28 programmes), site-specific data (17%, 37 programmes), equipment specifications (21%, 46 programmes), and utility billing data (21%, 47 programmes) in their calculations.

5.2 Energy savings

Three different types of energy savings created by the INDEEP programmes may be entered into the database: electricity, power demand, and fuel savings. A programme may have one or more types of savings.

As mentioned in Section 3.4, the main energy source affected in INDEEP is electricity, with 89% (195 programmes) affected.

Some 75% of the programmes in the database achieved electricity savings, with 64% giving annual electricity savings data, and 36% producing cumulative savings. The programme savings range from 5 MWh to 3,535,000 MWh. Figure 12 shows the number of programmes that fall into each savings range for annual and cumulative data. The electricity savings achieved depend largely on the characteristics and size of the particular DSM programme.

Figures 12 and 13 show there are more programmes with cumulative savings data in two categories than with annual data, which may be explained by the fact that evaluation is not carried out annually in some programmes.

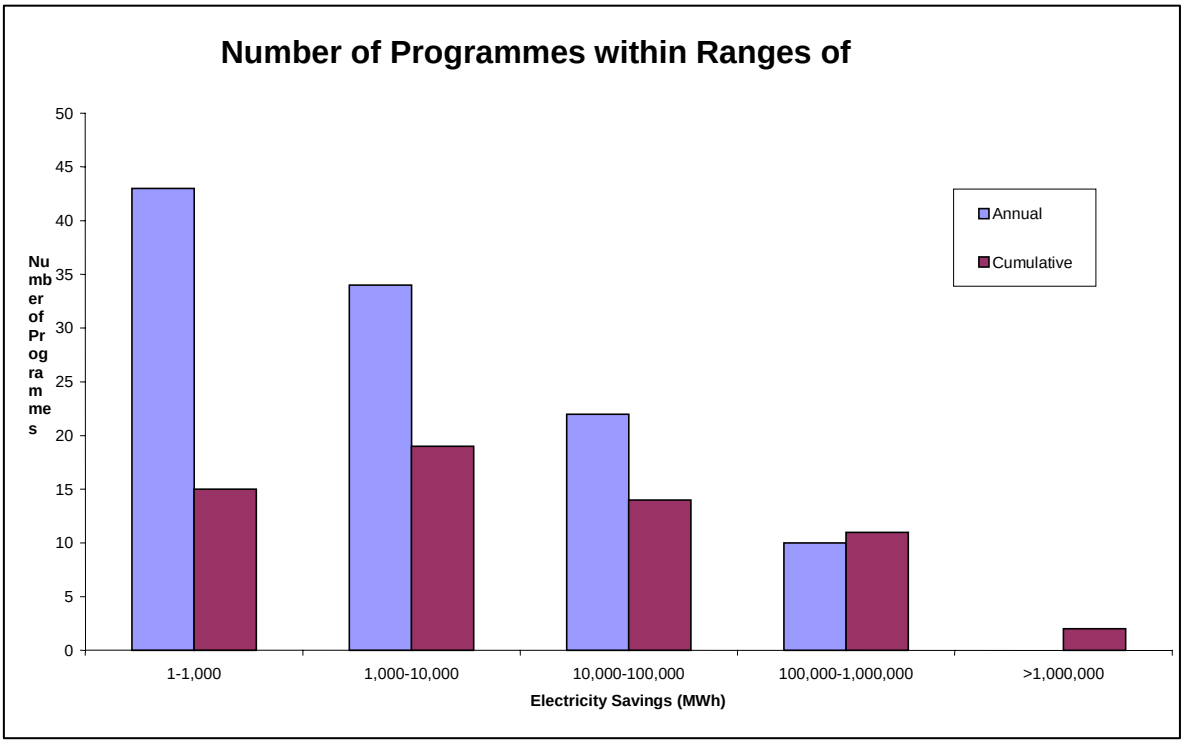

Figure 12. Number of programmes vs. annual and cumulative electricity savings.

As with the electricity savings, the demand savings fall into a wide range and the degree of savings is particular to the programme and its characteristics.

Annual demand savings are reported in 22% (49) of the INDEEP programmes, and cumulative demand savings are reported for 16 programmes. Figure 13 shows the number of programmes in the database with demand savings in six different ranges.

Around 39% of the programmes with annual data calculated demand savings between 0.1 MW and 1.0 MW, but one programme recorded annual savings of over 1,000 MW.

Most of the cumulative demand savings recorded are greater than 1.0 MW over several years, and two programmes ("LCP (least cost planning) Pilot Study" from Portugal and the "Condensing Boiler Programme" from the UK), recorded demand savings in excess of 1,000 MW over several years.

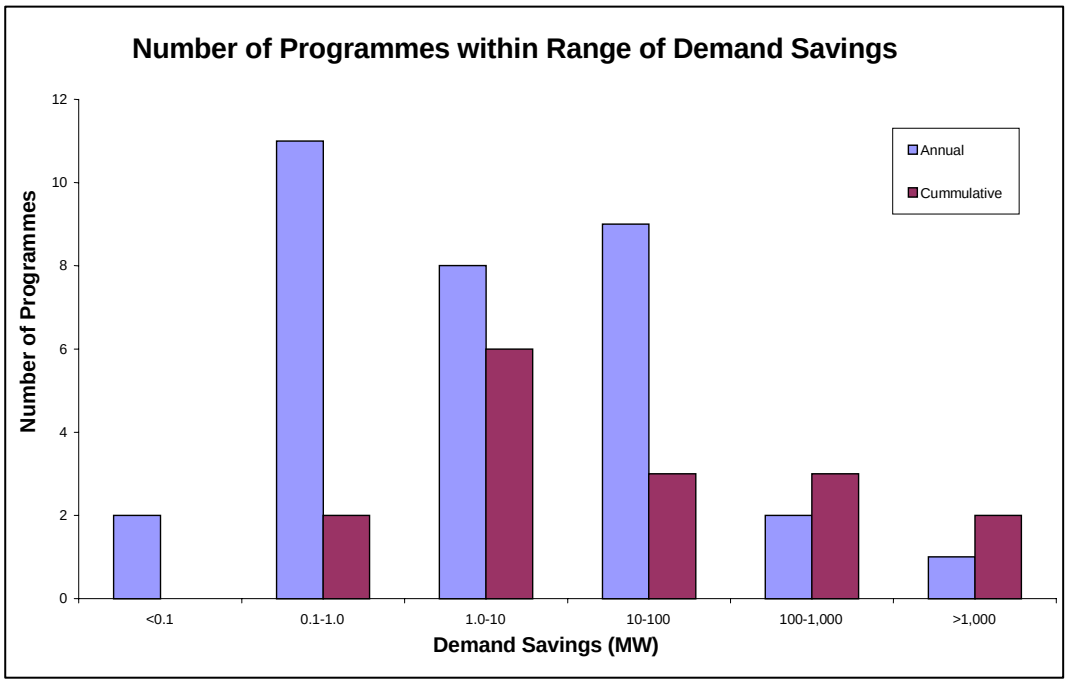

Figure 13. Number of programmes vs. annual and cumulative demand savings.

Only 23 (10%) of the programmes in the database have fuel savings data. Again, there is a wide range of recorded savings, which shows that fuel savings depend largely on the specific goals, characteristics, and implementers of the programmes. Fifteen programmes have annual fuel savings data and eight programmes have cumulative data as shown in Figure 14. Naturally, the cumulative programmes have a higher percentage of programmes with larger savings.

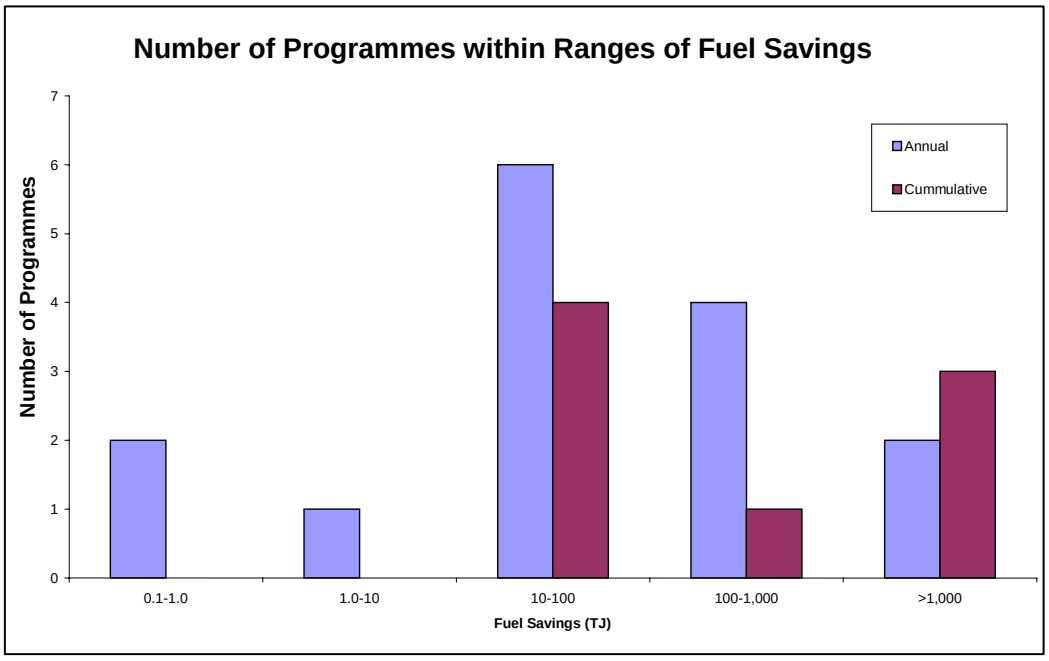

Figure 14. Number of programmes vs. annual and cumulative fuel savings.

5.3 Programme costs

The possible range for any type of energy savings is clearly very extensive due to the wide variety of INDEEP programmes. The same trends can be found in the total programme costs.

The total programme costs are made up of utility/organiser costs and non-utility organiser costs. The database can also show the percentage of incentive versus non-incentive costs needed to implement the DSM programmes. These costs are shown in euros (exchange rate date 1/1/2000). The costs are not transferred to one specific year but are spread out over the period 1993-1999.

Figure 15 shows the broad range of total programme costs required to implement the INDEEP programmes: 94% of the programmes have cost data available, including 60% with annual cost data and 40% with cumulative cost data. As shown below, most programmes cost between 100,000 and 1 million euro to run for a single year, but can cost as little as 10,000 euro or as much as 100 million euro, depending on the size and characteristics of the programme.

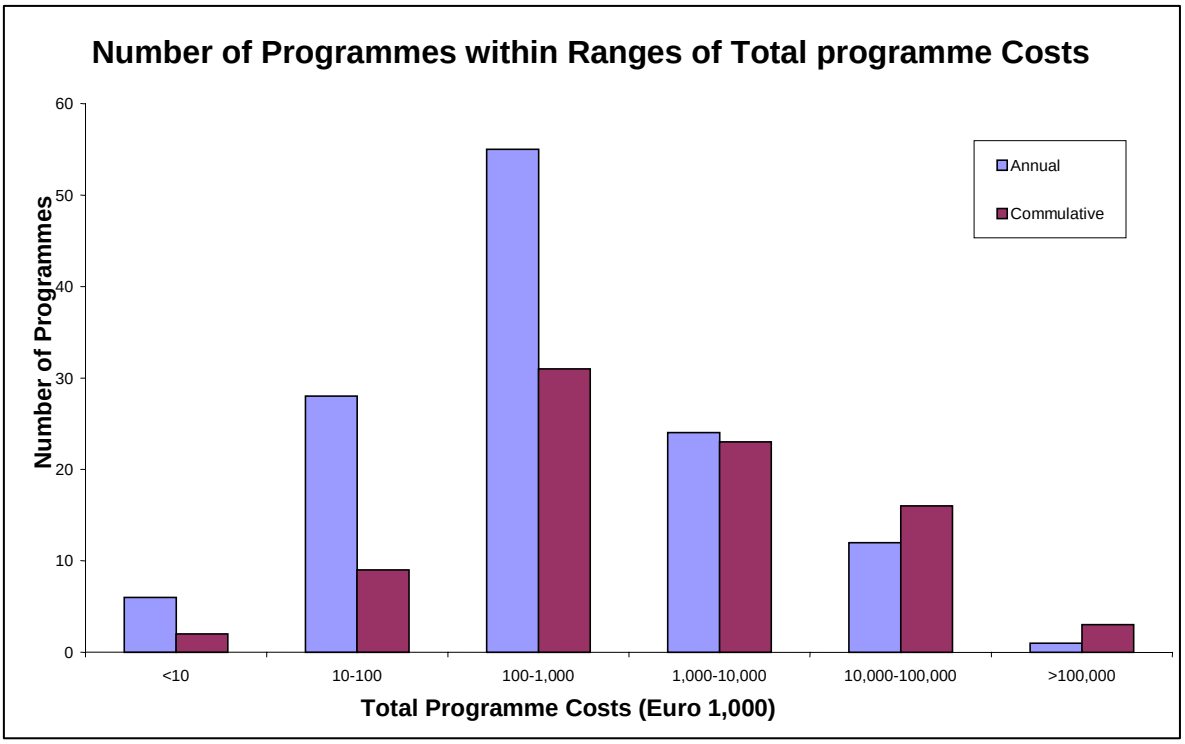

Figure 15. Number of programmes vs. total programme costs.

5.4 Cost effectiveness

The cost effectiveness of the INDEEP programmes is calculated in two ways. The first is the total resource cost (TRC). There are currently 64 (of the 220 programmes in the database) that can be compared using the TRC method. The cost effectiveness is measured in euro/kWh and compares the cost of the DSM programme to the energy savings being produced. The lower the TRC, the more cost-effective the programme. The total programme cost is spread out equally over the lifetime of the energy savings using a 5% annual interest rate. This calculated annual payment is then divided by the annual energy savings in kWh. The TRC for the INDEEP programmes ranges from 0 to 0.54 euro/kWh.

Figure 16 shows the programmes that fall within the specified resource cost ranges. Most programmes have TRCs of less than 0.06 euro/kWh, which shows good cost effectiveness. Figure 16 shows a distinctive split between programmes with fairly low TRCs and those with higher TRCs. Thirteen INDEEP programmes have TRCs greater than 0.1, which indicates a very poor cost effectiveness.

Many programmes in INDEEP produce a wealth of energy savings using very little money, but the reverse is also true. Much depends on the type of programme being implemented and the way in which the marketing is carried out.

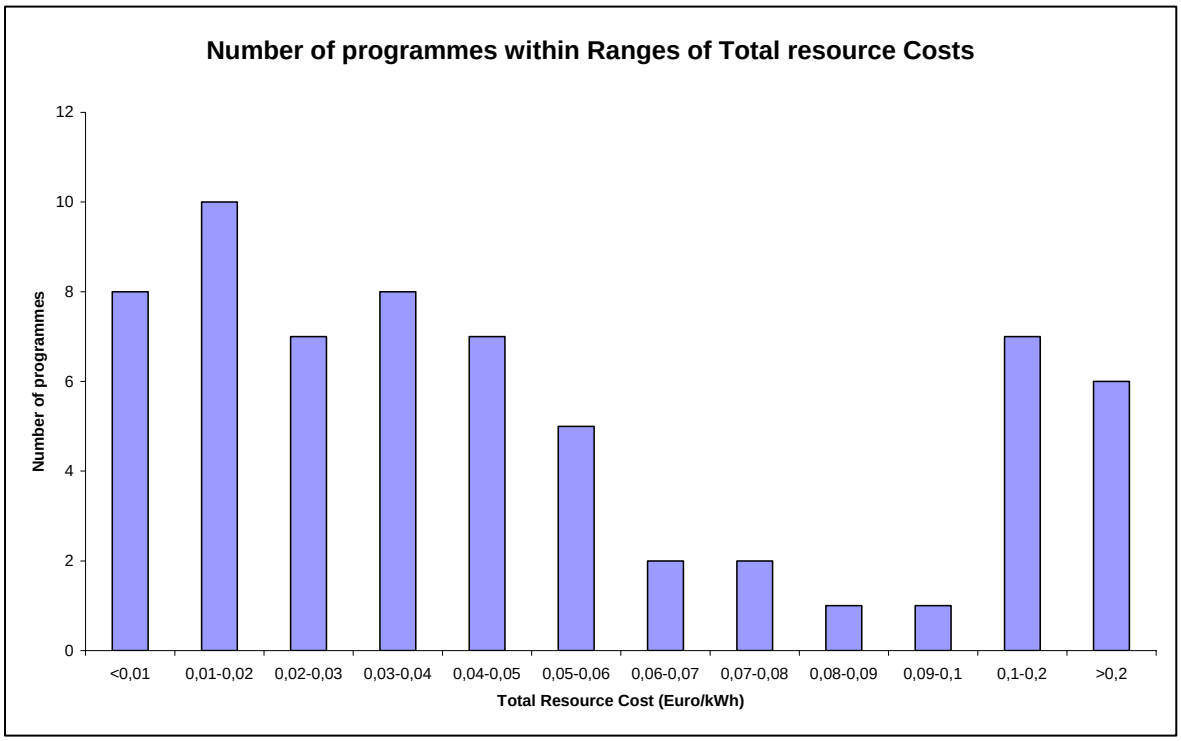

Figure 16. Number of programmes vs. total resource costs.

The other measure of cost effectiveness included in INDEEP is a simple cost-saving ratio. This calculation is first carried out on cumulative data and, if this is not available, then annual

data is used. The simple cost-saving ratio is measured in euro/kWh and simply divides the total programme cost by the energy savings. The lower the ratio, the more cost-effective the programme. This calculation is used to compare more of the programmes in the database because only 29% of the programmes have data allowing TRC calculation.

Some 122 of the INDEEP programmes (55%) have data for calculating the simple cost-saving ratio shown in Figure 17. The same trends persist in this type of comparison as in the TRC calculations. Many of the programmes (51), have cost-saving ratios of less than 0.1 euro/kWh, while only a few (16) have ratios greater than 1.0. Many programmes (55) fall somewhere in-between.

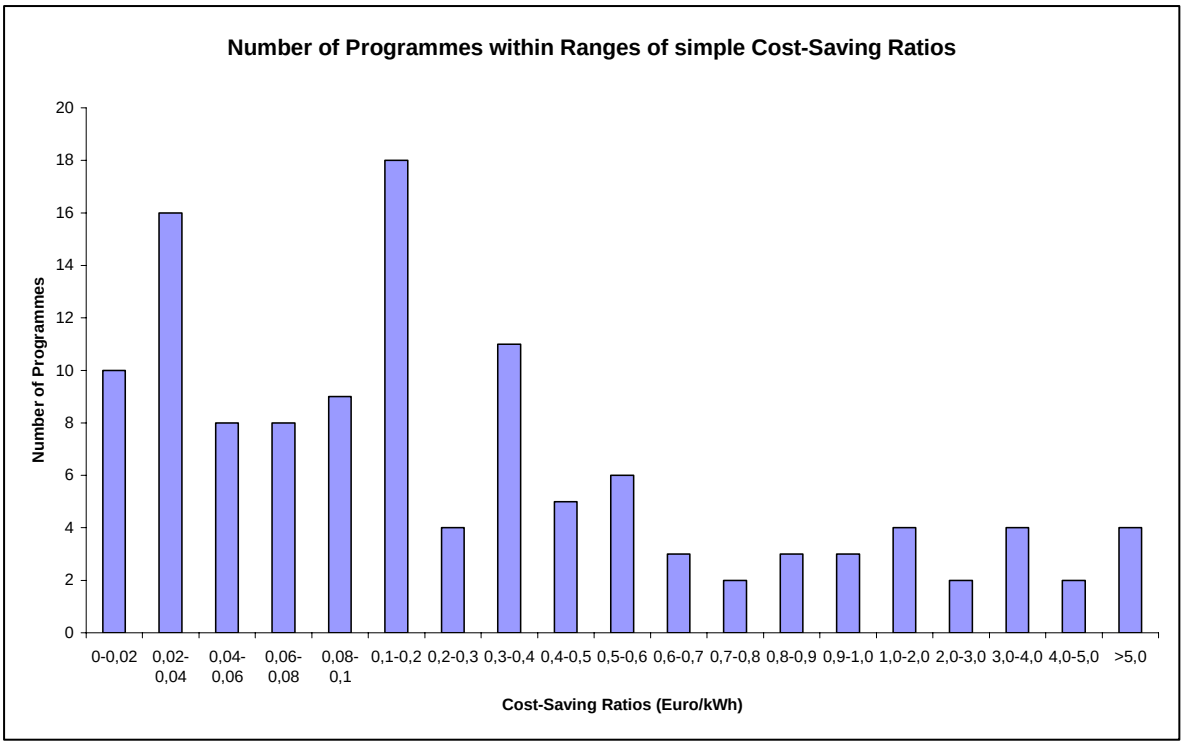

Figure 17. Number of programmes vs. simple cost-saving ratio.

Total resource cost and simple cost-saving ratios are useful for estimating the degree of cost-effectiveness, but one should be aware that many DSM programmes are highly individual or unique, and these calculations are not always capable of capturing all the facts. Energy prices are also different for each programme, which naturally affects the value of the savings.

6 Market transformation programmes

6.1 Market transformation in combination with other programme types

The term ‘market transformation’ has come to be used for market-oriented energy efficiency programmes that aim to change the structure and function of the market. The objective of market transformation programmes is to *introduce* new products and services and to *increase* the adoption of new products and services as well as existing but under-utilised products and services.[3]

Contrary to traditional energy efficiency programmes focusing only on end-users of energy, market transformation programmes include several market players such as manufacturers, trade allies, and end-users. Moreover, the focus is on a permanent market shift towards more energy-efficient products and services, while traditional energy efficiency programmes often focus just on end-user participation.

A transformation programme often includes a combination of measures, such as research and development, demonstration, technology procurement, information, labelling, incentives, energy standards, etc. that stimulate the introduction and adoption of energy-efficient products and services.

Some 58 INDEEP programmes (26%) can be classified as market transformation programmes. Over half originate from Denmark and Sweden, as shown in Figure 18.

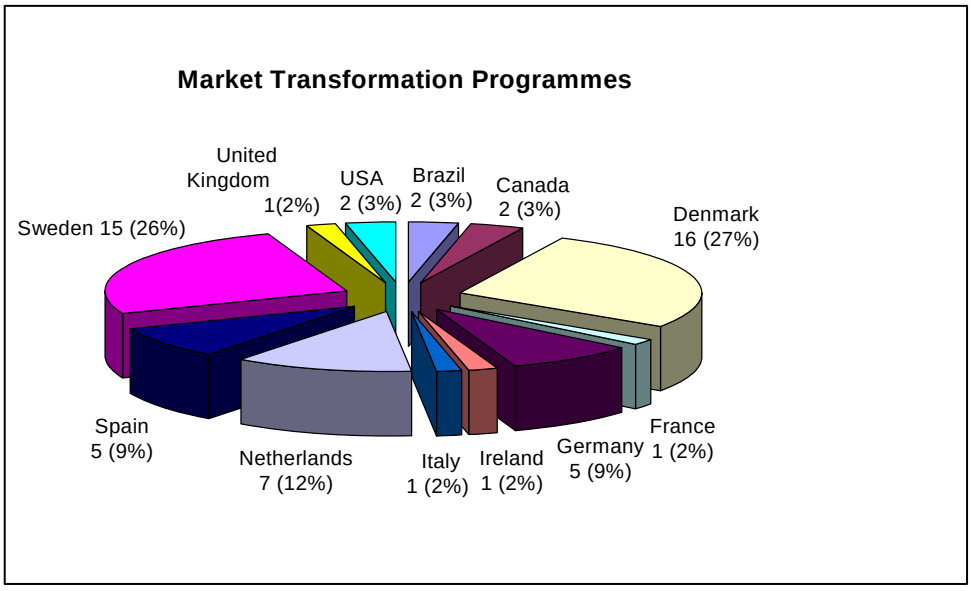

Figure 18. Countries with INDEEP market transformation programmes.

[3] Lena Neij, *Dynamics of Energy Systems - Methods of analysing technology change*, Doctoral thesis, Department of Environmental and Energy Systems Studies, Lund University, 1999.

The fact that transformation programmes often include a combination of measures is illustrated as, on average, these programmes also promote two other types of programmes. Figure 19 shows that some programmes are a combination of up to six programme types.

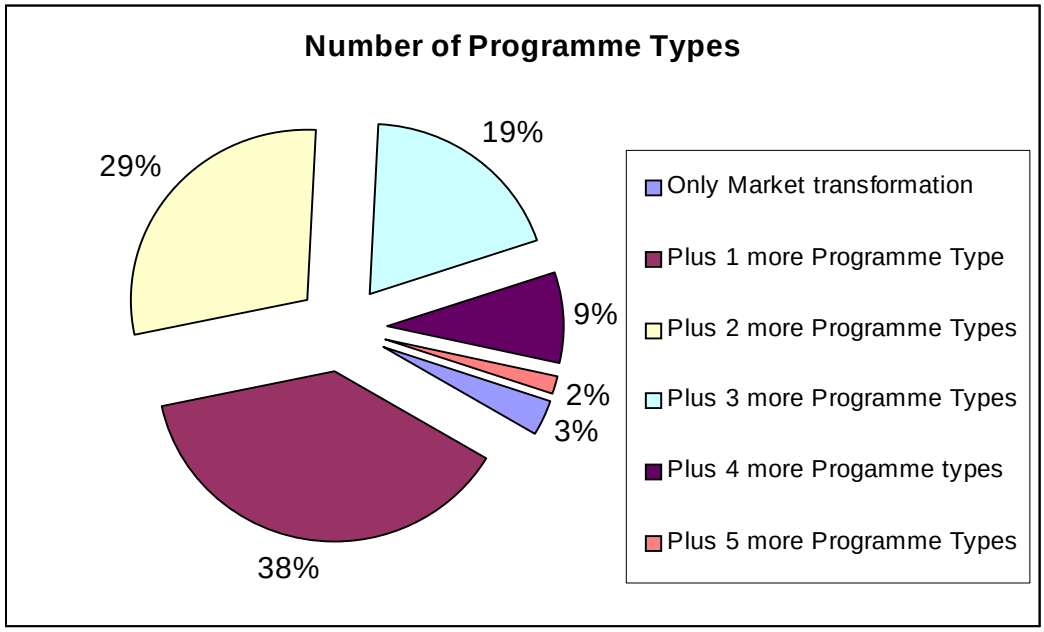

Figure 19. Number of programme types including market transformation programmes.

Figure 20 shows the programme types combined with market transformation.

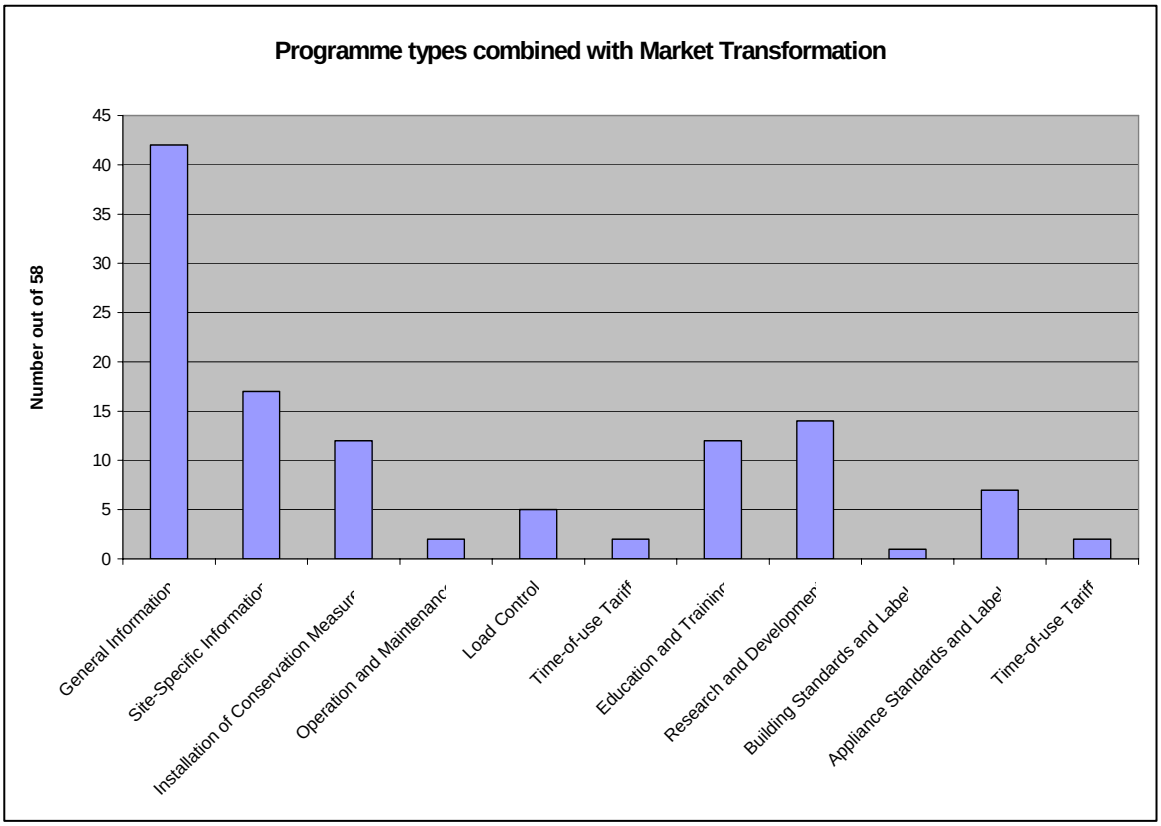

Figure 20. Other programme types combined with market transformation.

The complexity of this programme type is also illustrated by the fact that only 24 of the 58 programmes state market transformation as one of the main reasons for selection.

6.2 Technologies promoted

Figure 21 shows that many of the market transformation programmes use a combination of different types of technologies very similar to the combination for all programmes, shown earlier in Figure 7.

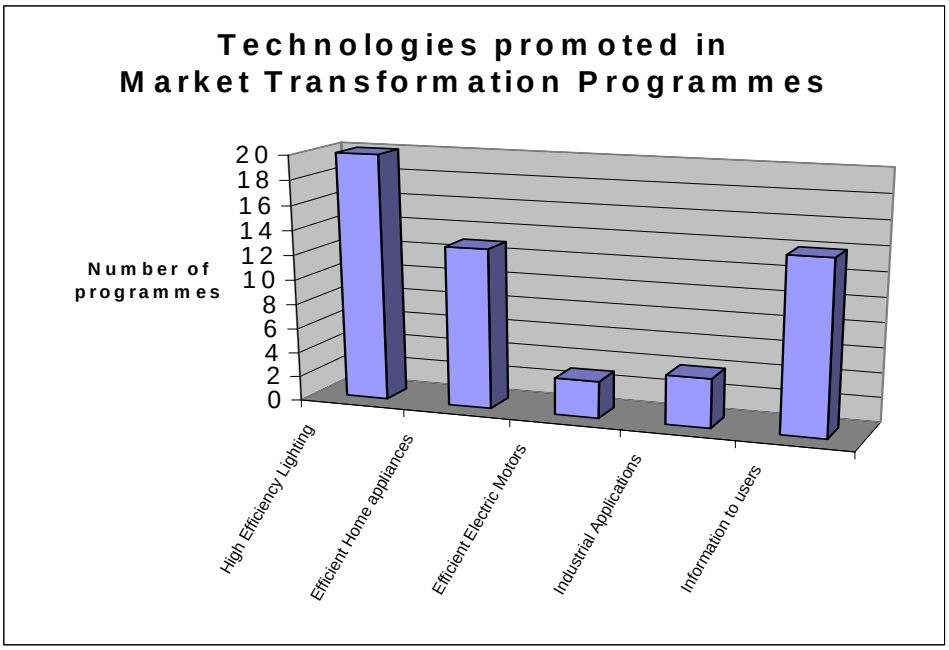

Figure 21. Specific types of technologies used in market transformation programmes.

6.3 Customers targeted

According to Figure 22, most market transformation programmes target residential (no specific subcategory, but mainly all) customers, followed by commercial and industrial customers, with only three programmes targeting agricultural customers.

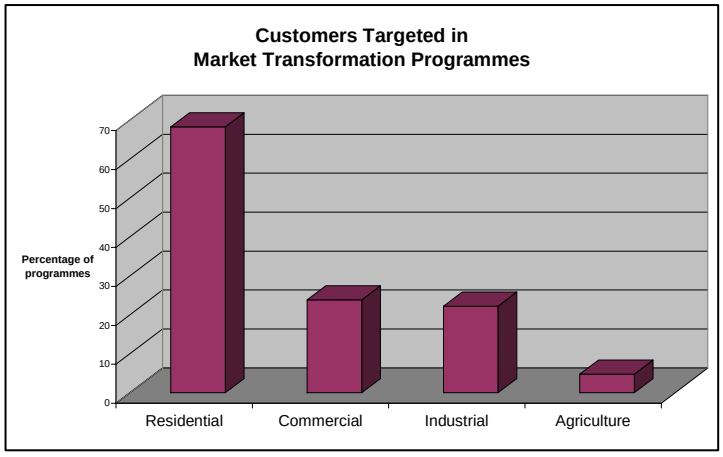

Figure 22. Types of customers in market transformation programmes.

6.4 Marketing techniques

The amount of mixing involved in the marketing techniques for market transformation programmes is shown below. Marketing incentives (Table 8) are used in 74% (43) of the 58 programmes. In 45% (26) of those, only one incentive is used to promote the programme.

Number of marketing incentives used	Number of programmes
0	15
1	26
2	16
3	1

Table 8. Marketing incentive mix for market transformation programmes.

Figure 23 shows the percentage of market transformation programmes using different types of marketing incentives. Clearly, most programmes (52%) use rebates and cash rewards to stimulate participation in their programmes. This is an effective, but costly method.

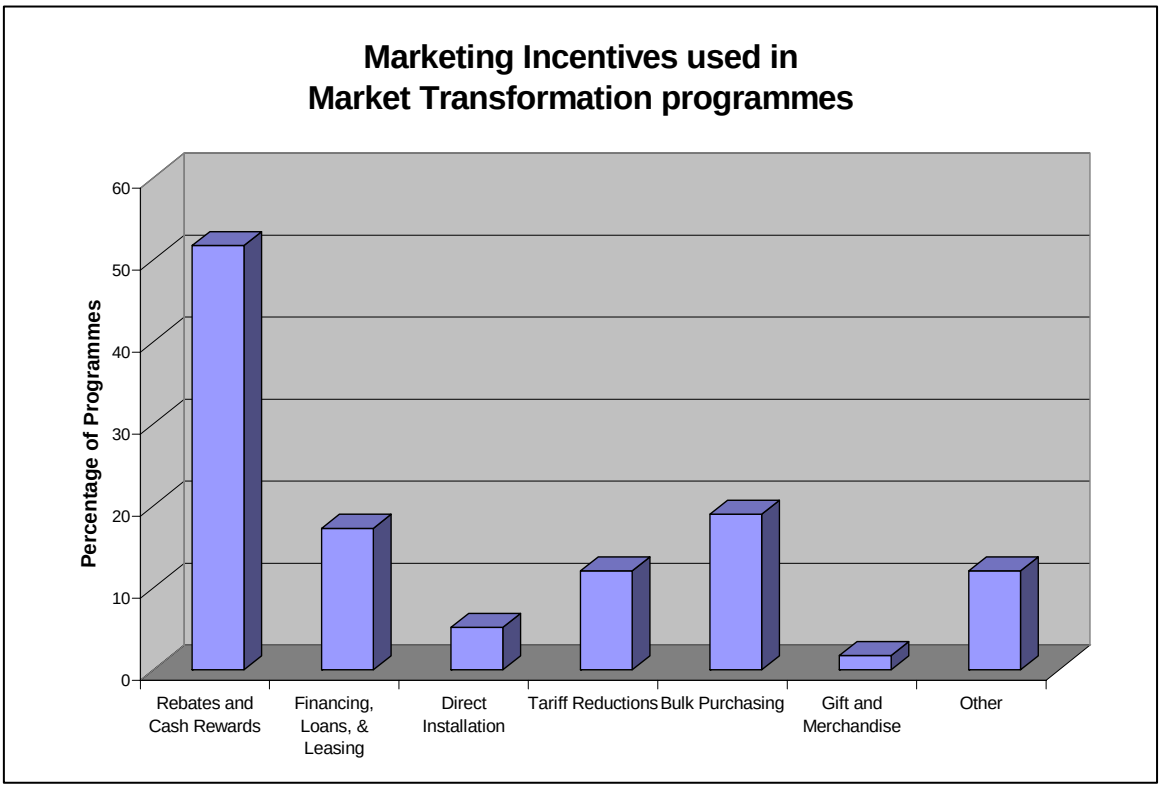

Figure 23. Percentage of market transformation programmes by marketing incentives.

Compared to the programmes in Figure 9, bulk purchasing is shown here as double, and direct installation represents only half.

Marketing methods are used in 95% (55) of the market transformation programmes, and 76% (42) of those use two or more methods to induce participation, as shown in Table 9.

Number of marketing methods used	Number of programmes
0	3
1	13
2	25
3	13
4	4

Table 9. Marketing method mix for market transformation programmes.

Figure 24 shows personal contact as the most popular method, followed by advertising and direct mail.

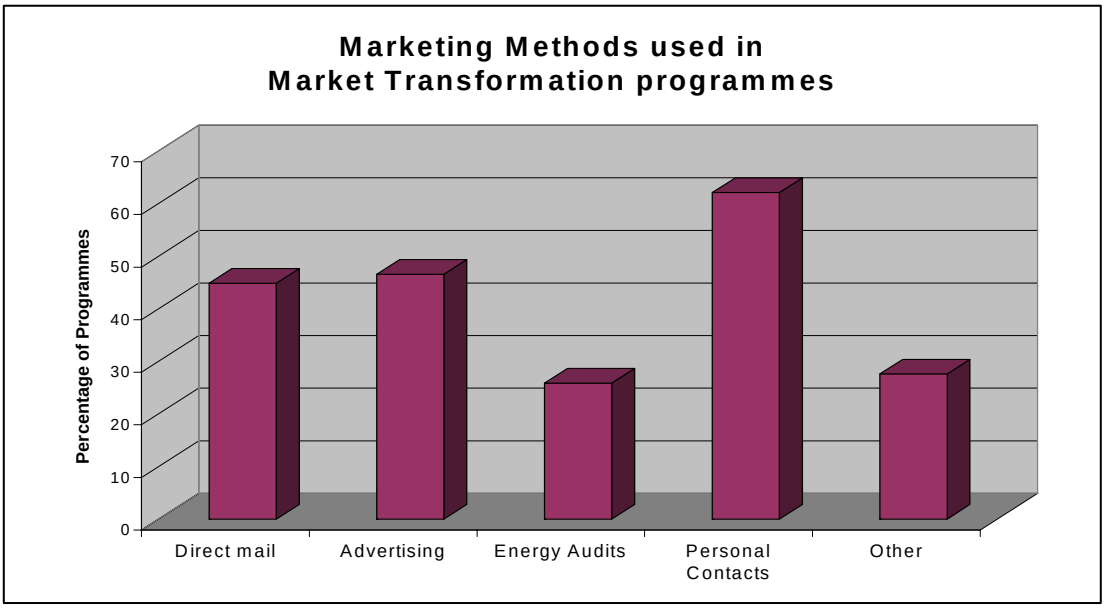

Figure 24. Percentage of market transformation programmes by marketing methods.

6.5 Evaluation methods

Around 40% of the programmes have been evaluated, while 50% are ongoing and 10% are planned.

The evaluation methods used by the market transformation programmes are shown below. Table 10 shows that 28% do not use any method, 19% use one method, and 53% ensure more reliable savings data by using more than one evaluation method to calculate the savings.

Number of evaluation methods	Number of programmes
0	16

1	11
2	13
3	10
4	6
5	1
6	1

Table 10. Number of evaluation methods used in market transformation programmes.

The most prevalent ways to calculate savings is by using engineering data and equipment specification. Figure 25 shows a good range of all methods.

Overall, from the information given in the 'lessons learned' category of the INDEEP database, giving monetary incentives, free installation of equipment/materials, or rebates, together with aggressive marketing techniques, seems to increase the participation rate, and therefore increases the energy savings in market transformation DSM programmes. However, this is very expensive, so programmes geared towards cost effectiveness concentrate on educating targeted customers and other groups on energy efficiency and limiting monetary incentives.

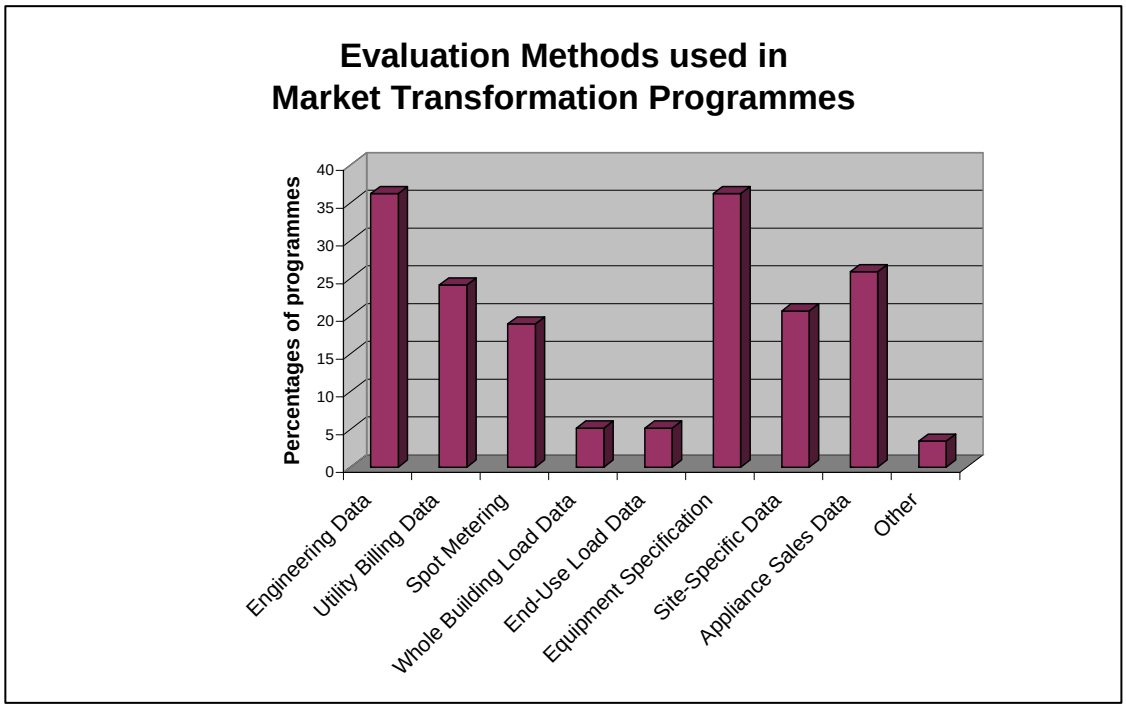

Figure 25. Number of market transformation programmes per evaluation method.

6.6 Cost effectiveness of market transformation programmes

Only 15 of the 58 market transformation programmes have gathered enough data to calculate the total resource costs, while 34 include enough data to calculate the simple cost-saving ratio.

Figure 26 shows the distribution of the cost-saving ratio for these 34 programmes, along with the similar distribution for the 122 programmes in INDEEP without this information (also shown in Figure 17).

Figure 26 shows that the market transformation programmes include more 'very good' as well as 'very poor' cost/saving ratio programmes.

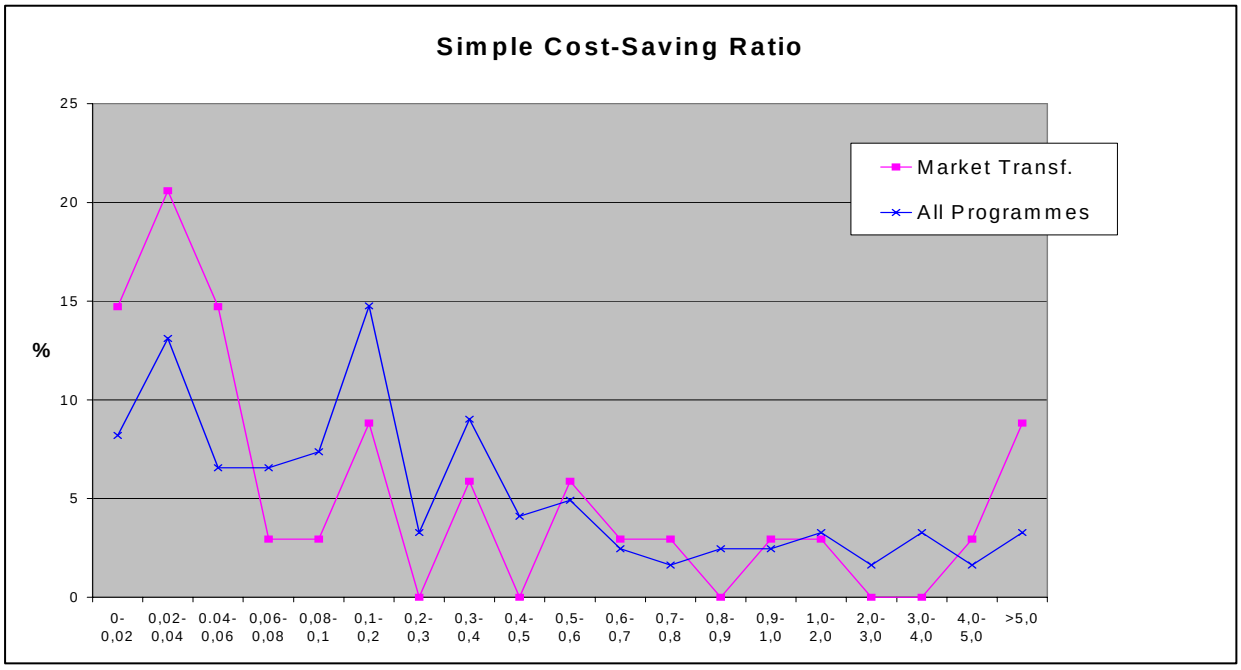

Figure 26. Simple cost-saving ratio for market transformation and all programmes.

7 Successful programmes by participation rate

The characteristics of individual programmes within the INDEEP database have been examined as well as the trends for entire programme types, technology groups, marketing techniques or the entire database. When looking to improve, evaluate, or create DSM programmes, it is important to look at other successful programmes. The success of a programme can be measured in many ways, e.g. cost effectiveness, total energy savings, achievement of the goals or a high participation rate and thus a penetration of energy efficiency activities.

The first INDEEP analysis report in 1997 included a top-10 list of the most cost-effective programmes in the database. However, the database has expanded by 36% from 1997 to 2000. There is therefore little point in producing the same kind of top-10, because many of the top-runners will be the same programmes, so this time the experts have produced a top-10 list of successful programmes by participation rate.

7.1 Goals versus results

The INDEEP survey concerns five types of goals that the implementing agent wishes to achieve through the DSM programme. The participation goals are the most numerous. Both participation goals and results are compared on a logarithmic scale in Figure 27.

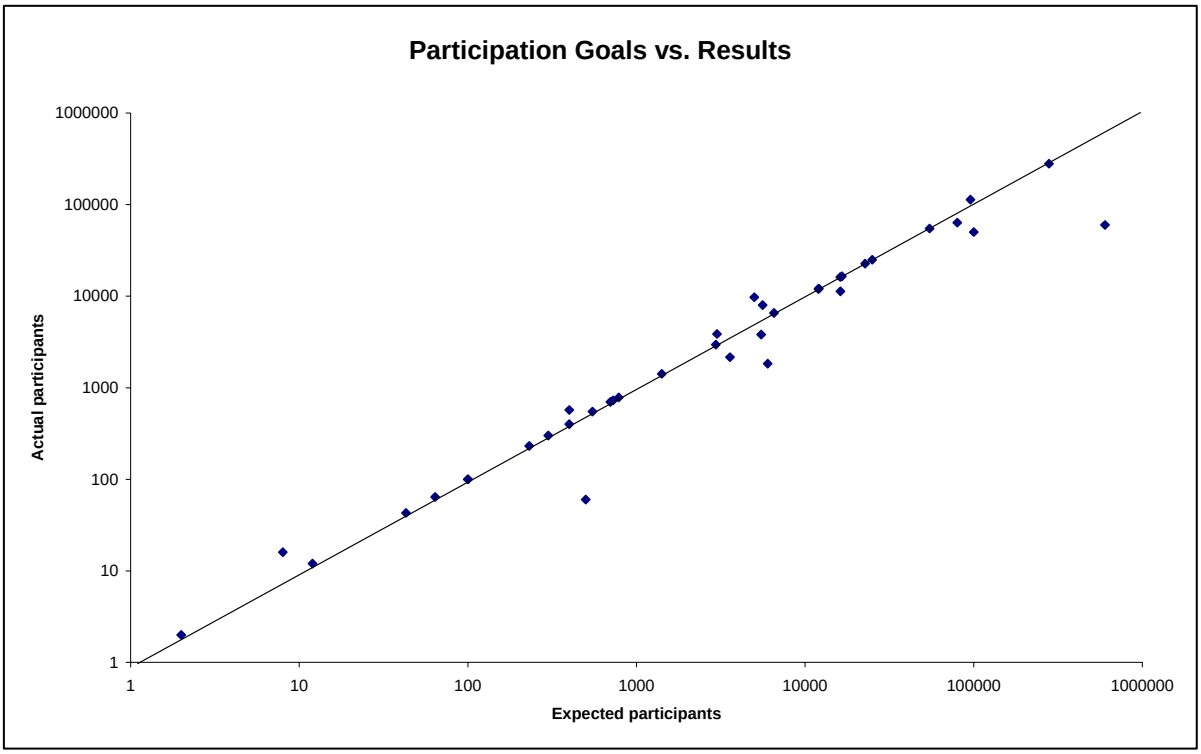

Figure 27. Participation goals vs. results.

However, this figure should be used carefully because many of the responses were given after the programme had been implemented and/or evaluated. In other words, the goals given for a number of programmes could be influenced by the results.

The programmes that achieved or exceeded their goals amount to over twice the number that failed to meet them. Some programmes that did not meet their goals did very poorly. The problems are reported to be the need for better marketing and information dissemination about the programme, and the need for improved cooperation between participating parties.

7.2 Ten successful programmes with a high participation rate

Some 132 INDEEP programmes (59%) include either an annual or cumulated participation rate. Figure 28 shows the participation rate for all these programmes sorted according to expansion rate.

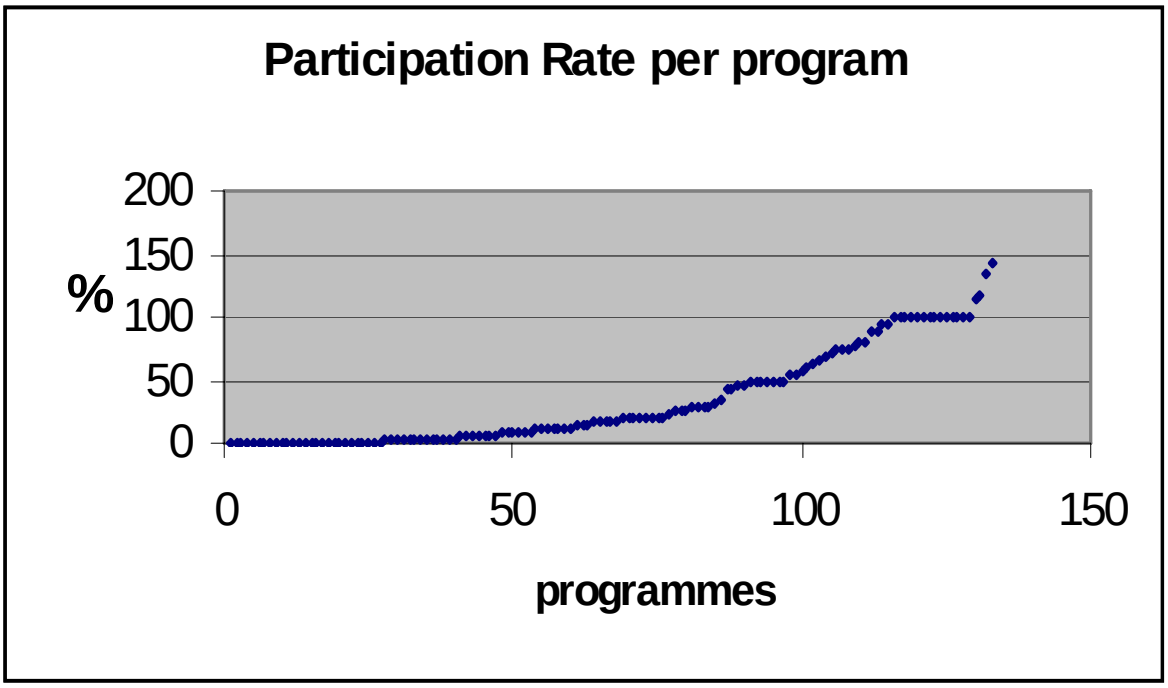

Figure 28. Participation rate per programme sorted according to growth rate.

Twenty-one programmes had a participation rate ranging from 90 to 143%, with 17 now at 100% or above.

Table 11 includes some of the most successful programmes by participation rate. The following criteria were used to select the 10 programmes:

- high participation rate;
- good (or at least acceptable) cost effectiveness;
- not a pilot or demonstration project;
- not a project missing cost or saving data, or with a poor description.

As indicated in Table 11, all 10 programmes (except one) were evaluated based on measured data and not just engineering (estimated) data. Four programmes were evaluated based on two or more types of data, which indicate good evaluation quality.

Programme name	DCI #	Country	Cumulative participation rate in %	Cumulative participation in number	Cost/saving ratio in euro/kWh	Evaluation data *)
Using CFLs in the residential sector, DOMOLUZ	ESP-08	Spain	118	113,000	0.1407	Sa
Promoting motors with electronic speed regulation	ESP-42	Spain	101	83688	0.0316	Sa
Electricity bills with more information	DK-04	Denmark	100	1,132,000	0.0289	(Bi)
Energy consulting, public sector, > 100 MWh/year	DK-31	Denmark	100	726	0.0160	Sp, Si
Aluminium smelter conservation/modernisation	USA-32	USA	90	9	0.0733	En
Process improvements	CAN-01	Canada	88	517	0.0869	En, Bi, Sp, Sa
Procurement of electric water boilers for a residential area	S-09	Sweden	60	270	0.0640	Sa
KesS efficient appliance sales	DE-03	Germany	56	1,000,000	0.1695	Sa
Go Easy Campaign, Metercard	NL-04	The Netherlands	50	170,000	0.0007	En, (Bi)
Assessment of consumer response to DSM measures	IR-01	Ireland	50	3870	0.1676	Bi, Si

*) En = Engineering Sp = Spot metering Si = Site-specific Ot = Other
Bi = Billing Eq = Equipment specified Sa = Appliance sales

Table 11. INDEEP programmes with a high participation rate.

The 10 programmes are described below in more detail.

7.2.1 Using CFLs in the residential sector (ESP-08)

In cooperation with several other parties the Spanish utility Iberdrola implemented the DOMOLUZ programme for introducing CFLs (compact fluorescent lamps) into the residential sector.

Around 113,000 homes participated. This was more than the defined eligible participants (95,600 homes), giving a participation rate of 118%.

CFL sales in the programme totalled 315,000, giving an average use of 2.8 CFL/home. The cost-saving ratio of 0.1407 euro/kWh is acceptable.

Iberdrola reports that one of the key factors in the programme's success is the participation of different interested groups (consultants, appliance manufacturers, suppliers, etc.). The

company also reports that it is necessary to achieve a consensus on financing and programme costs.

Experience gained from implementing DOMOLUZ by the utilities Cia. Sevillana de Electricidad, Union Electrica Fenosa, SA, and FECSA can also be seen in ESP-05, ESP-14 and ESP-23. These three INDEEP programmes include only experience from the first year of the programme (1995) and this is why they have low participation rates.

7.2.2 Promoting motors with electronic speed regulation (ESP-42)

The Spanish utility Grupo ENDESA is promoting motors with electronic speed regulation in their distribution area (Pymes).

Targeting sales totalled 82,793 motors, but actual sales amounted to 83,688 units, giving a participation rate of 101%.

The electricity savings totalled 108,150 MWh/year and the cost-saving ratio of 0,0316 euro/kWh is good.

Lessons learned included:

- high-performance motors are expensive, and benefits have to be promoted;
- the offer and installation period should have been longer, as this would have resulted in efficiency for more 100 kW machines;
- the programme may now be expanded.

7.2.3 Electricity bills with more information (DK-04)

The western part of Denmark implemented a programme that gave information on meter reading and billing, which included graphics.

This included all 1,132,000 homes in the area, thus a participation rate of 100%. The cost-saving ratio of 0.0289 euro/kWh is fine, based on an estimated 2% savings.

The agent reported that programme success is dependent on behavioural changes, which are very difficult to measure, but the initiative may be seen as a quality of service programme.

7.2.4 Energy consulting, public sector, > 100 MWh/year (DK-31)

The Copenhagen KE utility offers free energy consulting for public sector institutions with an energy consumption of more than 100 MWh/year. Energy savings of 7% are expected, spread over approximately 5 years. The objective is to include all public institutions.

The energy consultancy includes analysing the energy consumption and producing a savings catalogue. Energy savings and costs cover the entire lifespan of the DSM activity, "re-purchasing" and follow up, which means that the energy savings and costs (in INDEEP) that exist after the expiry of the campaign will be included in the cumulative values.

The activity includes a high degree of energy management information and training.

The programme is effective with a fine cost-saving ratio of 0.0160 euro/kWh and gradually the participation rate will be 100%, including all 726 institutions.

7.2.5 Aluminium smelter conservation/modernisation (USA-32)

USA-32 was implemented by Bonneville Power Administration (BPA) as a full-scale regional programme and provided incentives to Pacific Northwest aluminium smelters, encouraging them to invest in electric energy efficiency improvements. The incentive is offered to aluminium smelters only.

The smelters are paid 0.005 USD/kWh saved over a 10-year period, based on the differences between a baseline kWh per pound electrical usage and current kWh per pound electrical usage.

Information about the technologies installed is proprietary. Smelters do not allow utility staff to enter their facilities, so the smelters report their results to BPA.

All the smelters were involved in the planning and design of the programme. Nine out of 10 smelters in this region participated, giving a participation rate of 90%.

The programme was very cost effective with a cost-saving ratio of 0.0733 euro/kWh, with electricity savings of over 1 million MWh.

7.2.6 Process improvements (CAN-01)

The Canadian utility BC Hydro developed this programme to allow customers and utility staff to explore specialised industrial energy savings opportunities, that complement prescriptive rebate programmes.

Retrofit projects that meet the programme's eligibility criteria are offered just enough incentive to motivate customer implementation. Customer service representatives describe programmes during routine visits.

When customers have innovative energy-saving ideas, the programme provides both engineering support and financial incentives. Projects with savings of less than 200 MWh/year and buy-down payback of two years receive up to a maximum of 0.10 Canadian dollars for first-year kWh savings. Projects with investments greater than 50,000 Canadian dollars negotiate a minimum amount necessary to implement the programme, with a maximum of 0.05 Canadian dollars/kWh for first-year savings.

The programme has been very successful and cost effective both at the utility level and from a total resource cost perspective. Participants are generally energy-intensive industries and are therefore more interested in improving energy efficiency than the average industrial company. Some 517 out of 590 industries participated, giving a participation rate of 88%.

The cost-saving ratio is fine, with a value of 0.0869 euro/kWh.

The key to the success of these energy forums is that industrial associations, not the utilities, have been leading the forums and selecting energy-related topics of interest to particular industries.

7.2.7 Procurement of electric water boilers for a residential area (S-09)

The Swedish utility Nacka Energi AB implemented this programme, which was initiated by the housing association in the area, and the bulk purchase led to reduced costs, from 12,000 to 7,000 Swedish krona per house.

Some 270 of the 439 eligible participants participated, giving a participation rate of 60%.

The cost-saving ratio of 0.0640 euro/kWh is fine, with a total saving of 470 MWh.

Lessons learned include:

- the conditions for all houses targeted must be similar, to achieve low contractor costs;
- no-one wants to pay for organiser administration;
- private residential customers want to know the exact cost before they make a final decision.

7.2.8 KesS efficient appliance sales (DE-03)

The large German utility RWE Energie implemented this programme to promote the use of energy-efficient appliances in the home. These appliances included refrigerators, freezers, dishwashers, and washing machines.

RWE paid an incentive of 50 euro to each customer buying an energy-efficient appliance with an RWE label.

Participants included 1 million of the 1.8 million eligible, resulting in a participation rate of 56%.

Energy savings totalled 453,000 MWh, with an acceptable cost-saving ratio of 0.1695 euro/kWh.

RWE report the following lessons learned:

- marketing is very important (this was the true goal);
- the incentive should be variable, depending on the energy-saving potential.

7.2.9 Go Easy Campaign, Metercard (NL-4)

The Dutch NL-4 (Go Easy Campaign, Metercard), programme was designed to promote self-metering by residential customers.

During the first week of the programme the utility organised a mass-media campaign consisting of direct mailings and advertisements to inform potential participants about the programme. Customers who returned the reply card sent out by the utility were then sent a series of meter cards to be completed, giving the customer's energy consumption.

Monitoring and targeting can reduce overall energy consumption by influencing customer behaviour. Therefore, the utility published the degree-days in local newspapers every week, so customers could calculate their target energy use and then monitor the actual energy use.

The programme began in October 1993 at a regional level and, after the evaluation was completed, the programme has continued.

The utility used no marketing incentives to maintain participation, but found that introducing a 'game element' into the campaign helped to retain customer interest.

The programme is reported to have used only engineering data in the evaluation, but the INDEEP experts are hopeful that some billing data was also used. In 1994 some 170,000 households, 50% of all eligible customers, participated in the programme. These participants produced electricity savings of 270,000 MWh and fuel savings of 823 TJ for the total programme cost to the utility of only 180,000 euro. With large savings and low costs, this programme has an excellent low TRC of 0.0007 euro/kWh and an outstanding low cost-saving ratio of 0.0006 euro/kWh.

7.2.10 Assessing consumer response to DSM measures (IR-01)

The utility ESB implemented this programme by targeting two areas:

1) Ashburn, with predominantly domestic loads (55%)
2) Middleton, with a predominantly commercial load.

An advertising campaign was launched, including several promotional offers, and market research was conducted.

The response to these offers was excellent. As a result of the DSM measures taken, load increase has fallen to target level. Average daily peaks have dropped and customers' bills were reduced by 51%. Subscription upgrading was deferred for three years.

Participation included 3,870 customers out of 7,826, giving a participation rate of 50%. The cost-saving ratio was acceptable, at 0.1676 euro/kWh.

Lessons learned included:

- advertising has a very short-term effect, which was disappointing;
- a few industrial customers represent a very easy way to make substantial gains. This is more effective than targeting domestic consumers;
- monetary incentives attract a high level of interest;
- free installation of products is a good way to realise gains immediately;
- having gained entry to customers, it is easier to look for further savings opportunities.

APPENDIX A: INDEEP Technologies code

Code	Number		TECHNOLOGIES
10			**Building Envelope**
	11		Insulation of Envelope Opaque
			elements
		11,1	Insulation of External Walls (Exterior)
		11,2	Insulation of External Walls (Interior)
		11,3	Insulation of External Walls (Cavity)
		11,4	Roof /Attic Insulation
		11,5	Basement Insulation
	12		Dynamic Insulation
		12,1	Ventilated Curtain wall
		12,2	Ventilated Chamber built-in PV blinds
	13		Transparent Insulation
	14		High performance glazing
		14,1	Double Glazing U>=2.7 Wm2K
		14,2	Double Glazing 2.7>U>=1.8 Wm2K
		14,3	Glazing U<1.8 Wm2K
		14,4	Electrochromic Glazing
	15		Low emissivity finishes for internal s
			urfaces
	16		Energy gathering components
	17		Reduction of air in- & exfiltration flows
		17,1	Fenestration weatherstripping
		17,2	Fast acting, self-repairing doors
		17,3	Energy efficient Factory doors
	18		External Building Shadings
		18,1	Fixed Solar Shadings
		18,2	Movable Solar Shadings (smart control)
		18,3	Movable Solar Shadings (manually)
		18,4	Vegetation & Trees for shading
			purposes
	19		Double skin cladding
20			**Thermodynamic Technologies**
	21		Heat Pumps
		21,1	Electrically driven
		21,2	Combustion eng.driven
		21,3	Chemical HP
		21,4	Absorption HP
	22		Chillers
		22,1	Absorption
		22,3	Thermal Compression
	23		CHP Technologies
		23,1	Small modular systems
		23,2	Diesel cycle Medium size
		23,3	Gas Turbine CHP
		23,4	Counterpressure plant

Code	Number		TECHNOLOGIES
30			**Heat Recovery Systems**
	31		Dehumidifiers
	32		Heat Exchangers
	33		Heat Recovery from appliances
	34		Heat Recovery from industrial uses
40			**Thermal generators &**
			distribution systems
	41		Furnaces
		41,1	Fluidised Bed
	42		Boilers
		42,1	High Efficiency Boilers
		42,2	Gas condensing Boilers
		42,3	Boiler Cascade
		42,4	Separate HW summer heater
		42,5	Heat Radiant Pipes
	43		Advanced Burners
		43,1	Emulsifiers
		43,2	Low NOx burners
		43,3	New nozzle for derating the
			plant capacity
		43,4	Replacement of burner for different
			fuel used
	44		Adv. Heat Emission Devices
		44,1	Underfloor Low Temp. Heating
		44,2	Wall/Ceiling embedded heating
		44,3	High Performance Radiators
	45		Pipes and Ducts
		45,1	Insulation & sealing
		45,2	Flow Restrictors
		45,3	Reduction of Flow resistance
		45,4	Balancing
		45,5	Reduction of the ventilation rate
		45,6	Energy Efficient Air filters
		45,7	Showerhead restrictors
	46		Efficient Air Handling Units
50			**Storage techniques**
	51		Sensible Thermal Storage
		51,1	HW Tank-lagging jackets
	52		Latent Thermal Storage
	53		Ice Storage
	54		Aquifer Storage

Code	Number		TECHNOLOGIES
60			**Solar Techniques**
	61		Passive Solar Heating
		61,1	Sunspaces
		61,2	Direct Gains
		61,3	Indirect gains
		61,4	Others
	62		Passive cooling
		62,1	Evaporative cooling
		62,2	Natural Ventilation conversion
		62,3	Window Smart Ventilation Control
		62,4	Night Cooling
	63		Active Solar Heating
		63,1	Flat collectors
		63,2	Vacuum tube collectors
		63,3	Concentrating collectors
		63,4	Air collectors
		63,5	Others
	64		Daylighting
		64,1	Light shelves
		64,2	Skylights
		64,3	Reflective louvers
		64,4	Prismatic /holographic films
		64,5	Light Pipes
	65		PV applications
		65,1	PV building integrated-grid connected
			system
		65,2	PV building integrated-stand-alone syst.
		65,3	PV isolated grid connected system
		65,4	PV & Thermal Hybrid integrated panels
70			**HVAC Control & Regulation**
	71		Components control devices
		71,1	Thermostats on radiators
		71,2	Regulator valves for controlling temp &
			waterflows
		71,3	Switch from CAV to VAV
		71,4	PI/PID control instead of on/off or
			prop. control
		71,5	Different set values for Heating & Cooling
		71,6	Change to individual zone control
		71,7	Remote control of set values for thermostats
		71,8	Optimised Start & Stop of fans
		71,9	Optimum start/stop of night cooling
		71,10	Economizer control of air recirculation damper
		71,11	Automatic summer/winter compensation
		71,12	Revised schedule for operation of circulators
	72		Metering devices
		72,1	Individual Heat Metering
		72,2	Individual HW Metering
	73		Building Energy Management Systems
		73,1	Timers and programmers on HVAC components
		73,2	Electr. Control of Electr. Heated house
80			**End Use Technologies**
	81		High Efficiency Lighting Systems
		81,1	Low Energy Lamps
		81,2	Electronic Ballast

Code	Number		TECHNOLOGIES
		81,3	High efficiency magnetic ballast
		81,4	Reflector Systems
		81,5	Efficient Fluorescent Lamps
		81,6	High Intensity discharge lamps
		81,7	Lighting Device Controls
		81,8	Occupancy Sensor Control
		81,9	Halogen lamps
		81,10	Efficient Incandescent lamps
	82		High Performance Home appiances.
		82,1	Fridge/Freezers
		82,2	Cloth Washing machines
		82,3	Dish Washing machines
		82,4	Clothes Dryer
		82,5	El. Water Heaters improv./switch to gas
		82,6	Electric Ovens & Cookers
		82,7	Color TV
		82,8	Hi-Fi and Video recorders
		82,9	Kitchen Extraction Hood
	83		Adv. Office Appliances
		83,1	Photocopiers
		83,2	Printers
		83,3	Computers and Workstations
		83,4	Telefax machines
	84		New electrical load management
		84,1	Power Factor Compensation
		84,2	Power Quality Improvement
		84,3	Load Shift to low tariff
		84,4	Power Limiters
	85		Advanced Electric systems
		85,1	Power Factor Correction
	86		Efficient Electric Motor Systems
		86,1	Energy Efficient Motors
		86,2	Permanent Magnet Motors
		86,3	Adjustable Speed Drives
		86,4	Cable Sizing
	87		New efficient mobility devices
		87,1	Advanced Internal mobility devices
		87,2	Advanced External mobility devices
90			**Other Technologies**
	91		Fuel Cells
	92		Wind generators
	93		Biomass energy
	94		Biogas energy
		94,1	Biogas exploiting landfills
		94,2	Biogas from digestors
	95		Small Hydro
	96		Integrated Renewable Energies
	97		Thermodynamic changes
	98		Industrial Applications
		98,1	Compressed Air
		98,2	Liquid Gas expansion
		98,3	Advanced Electrolysis
	99		Miscellanea
		99,1	Geothermal energy for thermal uses
100			**All technologies**

Code	Number	IMMATERIAL TECHNIQUES
101		**Information to users**
	101,1	Consumers general information by media (TV, newspapers)
	101,2	Teaching users about savings techniques
	101,3	Billing with informative graphics etc. on the bill
	101,4	Energy Manager formation and training
	101,5	Free Audit on site with ECO identification & suggestion
102		**Tariff Rates**
	102,1	Daily Time of Use Rates
	102,2	Seasonal Time of Use Rates
	102,3	Interruptible Rates
103		**Certification and Labelling**
	103,1	Energy Certification of building energy consumption
	103,2	Appliance Labelling
	103,3	Heating System Performance Labelling
	103,4	Cooling System Performance Labelling
104		**Managerial Measures**
	104,1	Implementation of En. Manager position in public administr.
	104,2	Implementation of En. Manager position in ind. companies
	104,3	Ext. Planned Maintenance Service
	104,4	Switch to Heat Service supply company

APPENDIX B: INDEEP Data Collection Form

INDEEP 4 page DCI

DCI Number	**Country**	**Primary Programme Implementing Agent** Electric or Gas Utility Central Government Regional Government Local Government Local Organisation ESCo (Energy Service Company) Other (specify)
Name of INDEEP Expert		
First Data Submittal [ ] Date of submittal	Data Update [ ] Date of update	

Original Contact Information	**Actual Contact Information**
Name:	Name:
Company:	Company:
Address:	Address:
City/Town:	City/Town:
Zip Code:	Zip Code:
Phone:	Phone:
Fax:	Fax:
Email:	Email:
Date:	Date:

Programme Name:	
Project ID	Programme Implementing Agent
Programme Summary	

Programme Start Date	Ongoing
End Date	Terminated

Programme Status	**Evaluation Status**
Pilot (Demonstration)	Completed
Full Scale at National Level	In-progress
Full Scale Regional level	Planned
Phase out	
	Programme Goals
Energy Objectives	Number of participants
Energy Efficiency	Energy savings
Load Optimisation	Demand savings
Fuel Switching	Fuel savings
	Appliance #1 sales
	Appliance #2 sales
	Other (specify)

Reasons for Selecting this DSM Activity (Choose 1-5 reasons)	**Eligible Markets**
Regulatory Incentive	New Construction
Legislated / Mandated	Replacement/Retrofit
Political Pressure	
Public Image	
Result of Screening Process	
Result of Other Competitive Analysis	
Economic Development	
Business Opportunity	**Energy Source Affected**
Long-term Resource Option	
Market Penetration	Electricity
Quality of Service	Gas
Customer Retention	Fuel Oil
Cost of Service	District Heating
Reduction of Global Warming	
Reduction of Local Emissions	
Market Transformation	
Other (specify)	

Programme Type	**Alternative rates**
General Information (Brochures, etc.)	Time-of-Use
Site-Specific Information (Audits, etc.)	Interruptible/Curtailable
Installation of Conservation Measures	Other (specify)
Operations and Maintenance	
Load Control	
Hook-up Fees	
Education/Training	
Research and Development	
Building Standards and Labels	
Appliance Standards and Labels	
Market Transformation	
Other (specify)	

Customers Targeted by Programme Residential	**Non-customers Targeted by Programme**
All 1-2 Family Houses With Electric Space Heating 1-2 Family Houses Non Electric Space Heating Multifamily Houses/Apartments Central Heating Multifamily Houses/Apartments Indiv. Elec. Space Heating Multifamily Houses/Apartments Indiv. Non-Electric Heating Multifamily Houses/Apartments District Heating Other (specify)	Building Owners Retailers Wholesalers Appliance manufacturers Builders Realtors and developers Architects and engineers Bldg. mgrs. and administrators Bldg. and equipment operators Energy service companies Leasors and renters Other (specify)

Commercial [ ]	All Others (specify 6-digit NACE code(s))
Industry [ ]	All Others (specify 6-digit NACE code(s))
Agricultural [ ]	All Others (specify 6-digit NACE code(s))

Technologies	
Technology Code (see DCI Instructions)	Payback time in years

Marketing instruments	**Marketing methods**
Rebates and Cash Awards Financing, Loans, and Leasing Direct Installation Tariff reduction Bulk Purchasing Gifts and Merchandise Other (specify)	Direct mail Advertising Energy Audits Personal Contact Other (specify)

Participation Summary			
		Cumulative	Units
Participants			
Eligible Customers			
Participation Rate			

Programme Costs, Energy Savings, and Appliance Sales			
		Most Recent Year	Cumulative
Costs in Euro	Total Utility/Organiser Costs Total Non-Utility/Organiser Costs Total Programme Costs Incentive Costs (%) Non-Incentive Costs (%)		
Energy Savings	Electricity savings (MWh) System peak demand savings Fuel savings (TeraJoule)		
Appliance Sales (# units)	#1 Specify units #2 Specify units		

Data used to calculate savings	**Life-Cycle Programme Costs**
Engineering data Utility billing data Spot metering Whole-buildings load data End Use load data Equipment specifications Site-specific data Appliance sales data Other (specify)	Average measure lifetime: Real societal discount rate: Real utility discount rate:

Lessons Learned

APPENDIX C: Overview of the International Energy Agency (IEA) and the IEA Demand-Side Management Programme

The International Energy Agency

The International Energy Agency (IEA), established in 1974, is an intergovernmental body committed to advancing security of energy supply, economic growth, and environmental sustainability. The policy goals of the IEA include:

- diversity, efficiency, and flexibility within the energy sector,
- the ability to respond promptly and flexibly to energy emergencies,
- environmentally-sustainable provision and use of energy
- development and use of more environmentally-acceptable energy sources,
- improved energy-efficiency,
- research, development and market deployment of new and improved energy technologies, and
- undistorted energy prices
- free and open trade
- cooperation among all energy market participants.

To achieve those goals, the IEA carries out a comprehensive program of energy cooperation and serves as an energy forum for its 26 member counties.

Based in Paris, the IEA is an autonomous entity linked with the Organization for Economic Cooperation and Development (OECD). The main decision-making body is the Governing Board, composed of senior energy officials from each Member Country. A Secretariat, with a staff of energy experts drawn from Member countries and headed by an Executive Director, supports the work of the Governing Board and subordinate bodies.

As part of its program, the IEA provides a framework for more than 40 international collaborative energy research, development and demonstration projects, known as Implementing Agreements, of which the DSM Programme is one. These operate under the IEA's Energy Technolgy Collaboration Programme which is guided by the Committee on Energy Research and Technology (CERT). In addition, five Working Parties (in Energy Efficiency, End Use, Fossil Fuels, Renewable Energy and Fusion Power) monitor the various collaborative energy agreements, identify new areas for cooperation and advise the CERT on policy matters.

IEA Demand Side Management Programme

The Demand-Side Management (DSM) Programme, which was initiated in 1993, deals with a variety of strategies to reduce energy demand. The following 17 member countries and the European Commission have been working to identify and promote opportunities for DSM:

Australia	Italy
Austria	Japan
Belgium	Korea The Netherlands
Canada	Norway
Denmark	Spain
Finland	Sweden
France	United States
Greece	United Kingdom

Programme Vision: In order to create more reliable and more sustainable energy systems and markets, demand side measures should be the first considered and actively incorporated into energy policies and business strategies.

Programme Mission: To deliver to our stakeholders useful information and effective guidance for crafting and implementing DSM policies and measures, as well as technologies and applications that facilitate energy system operations or needed market transformations.

The Programme's work is organised into two clusters:

- The load shape cluster, and
- The load level cluster.

The 'load shape" cluster includes Tasks that seek to impact the shape of the load curve over very short (minutes-hours-day) to longer (days-week-season) time periods. The "load level" cluster includes Tasks that seek to shift the load curve to lower demand levels or shift loads from one energy system to another.

A total of 15 projects or "Tasks" have been initiated since the beginning of the DSM Programme. The overall program is monitored by an Executive Committee consisting of representatives from each contracting party to the Implementing Agreement. The leadership and management of the individual Tasks are the responsibility of Operating Agents. These Tasks and their respective Operating Agents are:

Task 1 International Database on Demand-Side Management &
Evaluation Guidebook on the Impact of DSM and EE for Kyoto's GHG Targets
Harry Vreuls, NOVEM, the Netherlands

Task 2 Communications Technologies for Demand-Side Management - *Completed*
Richard Formby, EA Technology, United Kingdom

Task 3 Cooperative Procurement of Innovative Technologies for Demand-Side Management – *Completed*
Dr. Hans Westling, Promandat AB, Sweden

Task 4 Development of Improved Methods for Integrating Demand-Side Management into Resource Planning - *Completed*
Grayson Heffner, EPRI, United States

Task 5 Techniques for Implementation of Demand-Side Management Technology in the Marketplace - *Completed*
Juan Comas, FECSA, Spain

Task 6 DSM and Energy Efficiency in Changing Electricity Business Environments – *Completed*
David Crossley, Energy Futures, Australia Pty. Ltd., Australia

Task 7 International Collaboration on Market Transformation
Verney Ryan, BRE, United Kingdom

Task 8 Demand-Side Bidding in a Competitive Electricity Market - *Completed*
Linda Hull, EA Technology Ltd, United Kingdom

Task 9 The Role of Municipalities in a Liberalised System
Martin Cahn, Energie Cites, France

Task 10 Performance Contracting

Dr. Hans Westling, Promandat AB, Sweden

Task 11 Time of Use Pricing and Energy Use for Demand Management Delivery
Richard Formby, EA Technology Ltd, United Kingdom

Task 12 Energy Standards
Frank Pool, New Zealand

Task 13 Demand Response Resources
Ross Malme, Retx, United States

Task 14 White Certificates
Antonio Capozza, CESI, Italy

Task 15 Network Driven DSM
David Crossley, Energy Futures Australia Pty Ltd, Australia

For additional information, see the DSM website: http://dsm.iea.org