INDEEP evaluation of 220 Energy Efficiency programmes from 14 countries

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1. SYNOPSIS

The INDEEP database is a tool for designing or planning new energy efficiency programmes, evaluation of existing programmes by drawing comparisons between similar programmes in the database, and finally getting access to contacts concerning different types of DSM and actual DSM programmes, creating a network.

By September 2000 the INDEEP database holds 220 programmes of quality from fourteen countries. The programmes are spread over a wide variety of types; the majority is characterised as general information, site-specific advice and installation of conservation measures. In general the programmes are also implemented for a wide range of reasons. The energy as well as the demand savings falls into a wide range and the degree of savings is depending on the type of programme, the technology used and its characteristics. The majority of programmes have total resource costs under 0.06 Euro/kWh. Most lessons learned by the programme management are on how to improve the programme and what the success factors were.

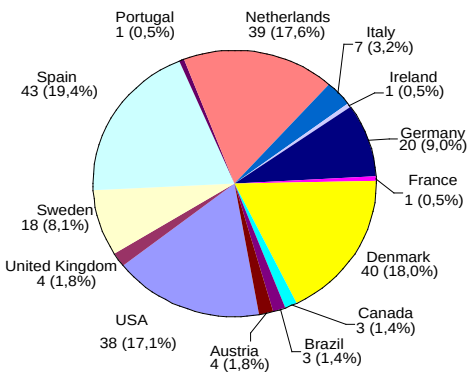
2. INTRODUCTION

The International Database on Energy Efficiency Programmes (INDEEP) is one of the Tasks in the IEA Demand-Side Management (DSM) Agreement. INDEEP has been designed to make information available on electric and gas utility demand-side management or energy efficiency services programmes. It also contains information from programmes carried out by governmental agencies, energy service companies, and others. This presentation summaries the content of the INDEEP database by September 2000. An analysis of content of the INDEEP databases is reported in details in two analysis studies respectively in 1997 and in 2000. The data collection process, the development of the database available at the Internet and the search options in the database are described in another report (see the bibliography in the end of this presentation). For the next two years the data collection process will continue and year 2002 a new analysis is foreseen.

3. COUNTRIES AND PROGRAMME TYPES

By September 2000, the INDEEP Database contains 220 Energy Efficiency programmes implemented in 14 countries. Figure 1 shows the largest number 19% of programmes comes from Spain followed closely by Denmark and the Netherlands both with 18% and by USA with 17%.

Figure 1. Number of programmes per country



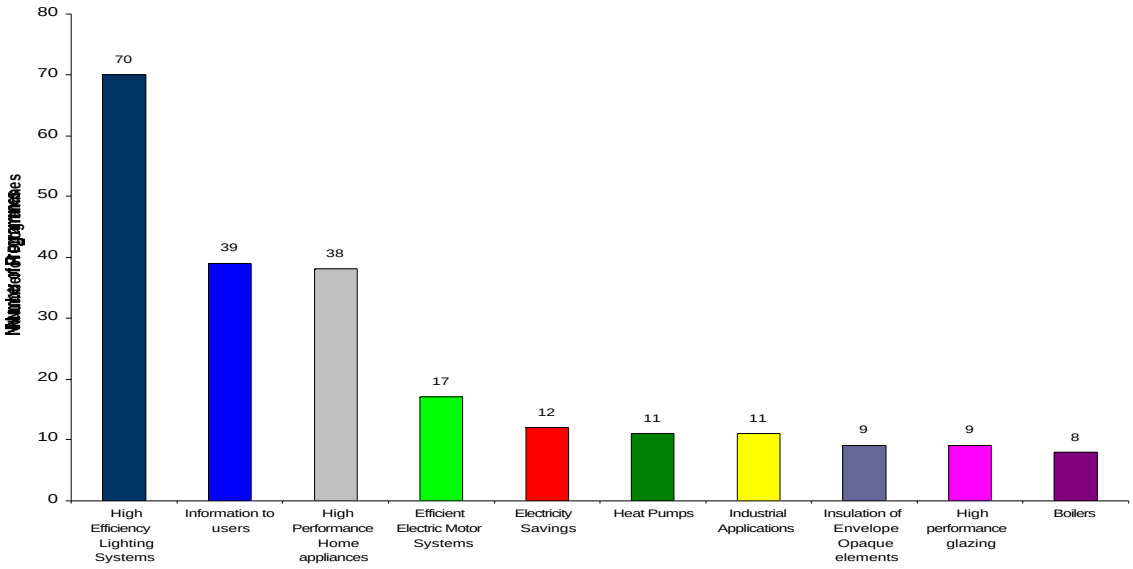
An INDEEP programme may be categorised by several programme types. In average a programme is placed in two programme types. The major programme types are:

- **124 general information programmes** including promotion of energy efficient household appliances, bonus for decreasing consumption, use of CFLs, use of more efficient heating systems, use of low flow showerheads, tailor made advice and energy management.
- **86 site-specific information programmes** including visit by an info-bus, shift of heating system, long-term agreements, dedicated energy audits, efficient lighting for commercial customers, automatics and efficient motors.
- **74 installation of conservation measure programmes** including CFL installation, activity of energy teams, installation of solar heating and/or heat pumps, voluntary agreements and performance contracting.
- **58 market transformation programmes** including use of solar water systems, introduction of appliances with low stand-by consumption, use of efficient laundry equipment including lower water consumption, technology procurement programmes and use of occupancy sensors for efficient lighting.

Other programme types used in INDEEP programmes are operation and maintenance, education and training, research and development, building standards and labelling, appliance standards and labelling load control and time-of-use tariffs.

A single programme may be characterised by use of up to seven technology codes also including immaterial techniques. 61% of the programmes use only one single technology. Figure 2 shows the most common technologies used in INDEEP programmes.

Figure 2. Number of programmes by technological codes



4. REASONS FOR IMPLEMENTING PROGRAMMES

A frequent reason (63 programmes) for implementing the Energy Efficiency (EE) programmes is regulatory incentives. Selecting the particular programme for economic reasons (i.e. economic development, cost of service) was the least likely. Environmental reasons were frequent, with 71 programmes implementing the EE programme as a reduction of global warming option and 56 programmes in order to aid the reduction of local emissions. 74 programmes were implemented as energy saving programmes in order to augment public image and 64 programmes in order to improve quality of service. In general, image/service and environmental concerns are the main reasons that agents such as governments and utilities implement EE or DSM programmes.

The number of programmes that achieved or exceeded their goals is 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 need for better marketing and dissemination of information about the programme and the need for improved co-operation between participating parties.

5. MARKET TRANSFORMATION PROGRAMMES

58 INDEEP programmes (26%) are of the type Market transformation. More than half of the programmes comes from Denmark and Sweden 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.

The lessons learned given programme by programme in the INDEEP database state that monetary incentives, free installation of equipment/materials, or rebates together with aggressive marketing techniques increase the participation and the energy savings in market transformation DSM programmes. Using all these means are rather expensive, so programmes geared towards cost effectiveness concentrate on educating targeted customers and non-customers on energy-efficiency with limited monetary incentives.

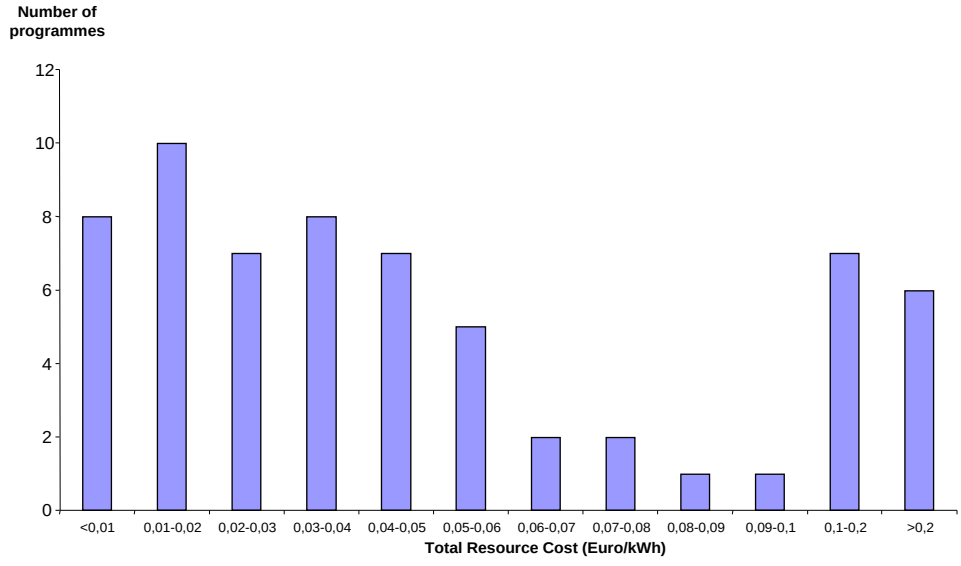
6. ENERGY SAVINGS RANGES WIDELY

INDEEP includes influence on electricity, power demand, and fuel savings. 89% of the programmes in INDEEP affect the use of electricity with savings in the most cases. The electricity savings range from 5 to 3,535,000 MWh. Demand savings are reported in 30% of the INDEEP programmes and range from 0.1 to 1,000 MW. Two programmes "LCP Pilot Study" from Portugal and the "Condensing Boiler Programme" from the UK, recorded very large demand savings in excess of 1,000 MW over several years.

7. COST EFFECTIVENESS

The cost effectiveness of the INDEEP programmes is calculated in two ways. The first and best method is calculation of the TRC (Total Resource Cost). The method requires data on different kind of investment and lifetime of the technology and includes 64 of the 220 programmes. The total programme cost is spread out equally over the lifetime of the energy savings using a 5% annual interest rate. It then divides this calculated annual payment by the annual energy savings in kWh. The cost effectiveness is calculated in Euro/kWh (cost/energy savings) where the programmes with lowest TRC are the most cost effective. The majority of programmes have a TRC below 0.06 Euro/kWh, which indicate good cost effectiveness. Figure 3 shows a distinctive break between programmes with fairly low TRC and higher TRC. Thirteen INDEEP-programmes have TRC greater than 0.1, which indicate a very poor cost effectiveness. The cost effectiveness depends very much on the type of programme that is being implemented and how the marketing is carried out.

Figure 3. Programmes within ranges of total resources costs



The other method used for calculation of cost effectiveness is the simple cost-saving ratio. This method includes 122 of the INDEEP programmes (55%). The same trends persist as with calculation of the TRC.
An example of findings in a successful programme ESP-42 are the Spanish utility Grupo ENDESA was promoting engines electronic speed regulation by new motors replacing old motors in the area Pymes. Targeting sales of 82793 motors, the result was sales of 83688 motors giving a participation rate of 101%. The electricity savings were 108150 MWh/year and the cost-saving ratio 0,0316 Euro/kWh was good.
Lessons learned were,

- High performance engines/motors are expensive and thus the benefits have to be promoted.
- If the offer and installation period had been longer the sales would have been increased for 100 kW motors.
- The successful programme is ready for expansion.

8. GETTING ACCESS TO INDEEP

The user of INDEEP may examine the characteristics of individual programmes within the INDEEP database as well as the trends of entire programme types, technology groups, marketing techniques, or the entire database.
In the case of improving, evaluating, or creating DSM programmes, it is important to look at other existing programmes that have been successful. The success of a programme can be measured in many different ways such as cost effectiveness, total energy savings, achievement of the goals or a high participation rate, and thus a penetration of energy efficiency activities.

It is possible to get access to INDEEP at the IEA DSM website at the address *http://dsm.iea.org/* by seeking under annex 1. A limited access is open for everyone while a full access to use of the database and all development during 6 years requires that the country sign an INDEEP membership contract including a payment of 5,000 $/year. The payment will be used for maintenance of INDEEP, updating programmes, collecting new programmes and an analysis of the content by year 2002.

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