Evaluation of European Energy Behavioural Change Programmes[1]

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ABSTRACT

This paper is based on the findings of the BEHAVE Project (Evaluation of Energy Behavioural Change Programmes) which was supported by the European Commission under the EU Intelligent Energy – Europe (IEE) Programme.

The Project started with a review of behavioural theories and their applicability in the development and evaluation of energy-related behavioural change programmes, progressed to a case study analysis, and finished with a publication of guidelines for programme developers and policy makers.

In the case study analysis, information was collected on almost one hundred cases aiming at behavioural change in energy use from eleven European countries. More detailed information was collected on 41 cases which were subject to meta-analysis to identify success factors and weak points and to gather information on the current evaluation practices in such programmes.

The meta-analysis was carried out in five phases: context (pre-planning), planning, implementation, monitoring and evaluation. Planning and evaluation were recognised as two of the most critical phases.

Many of the programmes operated with quite formal plans but were typically not based on scientific theories or evidence. In many cases, there was lack of market segmentation; the goals were not targeted and the programmes tried to offer "everything to everybody". A multitude of ex-post evaluation methods for programme impacts were reported ranging from participant surveys, testing and comparison with control groups to top-down method evaluating the impact of several programmes focusing on the same target group. Process evaluation (25 cases) was slightly less common than impact evaluation (29 cases). Evaluation of the cost-effectiveness of the programmes was a rarity, most likely due to difficulties in quantitative impact evaluation.

1. Introduction

The BEHAVE Project - Evaluation of Energy Behavioural Change Programmes - was supported by the European Commission under the EU Intelligent Energy – Europe (IEE) Programme. The Project, implemented in 2006-2009, aimed to improve the impact of energy-related behavioural change programmes and projects in the household sector by learning from existing ones. The Project was coordinated by NL Agency (formerly SenterNovem) and carried out with project partners from Austria, Bulgaria, France, Finland, Greece, Norway, Spain, Sweden and the UK, as well as a number of sub-contractors.

The project approach consisted of three major steps: a review of behavioural theories and their applicability in the development and evaluation of energy-related behavioural change programmes; case study evaluations, and preparation of guidelines for programme developers and policy makers. In addition, various dissemination activities were conducted.

In the case study analysis, information was collected on almost one hundred cases aiming at behavioural change in energy use from eleven European countries. More detailed information was collected on 41 cases which were subject to meta-analysis to identify success factors and weak points and

[1] The paper is presented on behalf of the EnR (European Energy Network) Working Group on Energy Related Behaviour Change

to gather information on the current evaluation practices in such programmes. The cases were selected based on multiple criteria such as geographic distribution, coverage of various topics, target groups and instruments, as well as availability and quality of evaluation data. The reader should note that the cases presented in this report do not necessarily represent the average energy-related behavioural change programmes in Europe but favour those with better evaluation data.

The meta-analysis of the cases was carried out in five steps of the project planning and implementation cycle, namely 1) Context, 2) Planning, 3) Implementation, 4) Monitoring and 5) Evaluation. In addition to behavioural theories, a further viewpoint included in the case study analysis is the *social marketing concept*, which is the systematic application of marketing to achieve specific behavioural goals for a social good.

The hypothesis of the Project was that energy-related behavioural change programmes do not have the high impact that they could potentially have because, in general: (1) they have little basis in relevant theory, (2) concentrate mostly on motivational factors only, (3) follow a scattergun approach, (4) have rarely a prior diagnosis or evaluation and assessment of behaviour, and (5) do not often lead to ongoing activities. The findings were more positive but revealed room for improvement in all areas.

2. Theoretical Review

Radical changes in energy-related human behaviour are needed to implement even the modest policies for efficiency and use of renewable energy. These range from lifestyle and attitude to acceptance of transitions and innovations. Governments and non-governmental organisations (NGOs) undertake attempts to influence this behaviour of their citizens, using a variety of mechanisms, such as subsidies and taxes, direct feedback, mass-media campaigns, tailored advice through internet and (a little) education. Although the budgets for these activities are relatively small, it is still surprising that little use is made of solid scientific insights that could make these attempts so much more effective.

Energy-related behaviour consists generally of two types: investment behaviour and habitual behaviour. Investment behaviour occurs occasionally, typically involving the adoption of new technologies, or the purchase of new appliances. Habitual behaviour is routine behaviour such as switching off the lights when leaving a room. The behavioural change programmes evaluated aimed to influence both types of behaviour, sometimes in the same programme, though each type of behaviour is related to different variables, and needs different interventions.

A widely used model for investment behaviour is the theory of planned behaviour (Ajzen, 1985). This model assumes that consumers weigh their options in costs and benefits and pick the one that looks the best in a rational, mostly internal process. Policy interventions flowing from this model usually aim to ensure access of consumers to sufficient information so they can make informed choices. It is criticized because it does not take into account the complexity of human behaviour – particularly the emotional and social elements of this behaviour and the context.

Habitual behaviour is a form of automatic and routine behaviour. It is behaviour that people repeat, without weighing up the pros and cons. 90% of energy-related human behaviour is habitual. Characteristic of this type of behaviour is that it will not change, unless a change in the external circumstances occurs that can break the loop. The process is reflected in the model below.

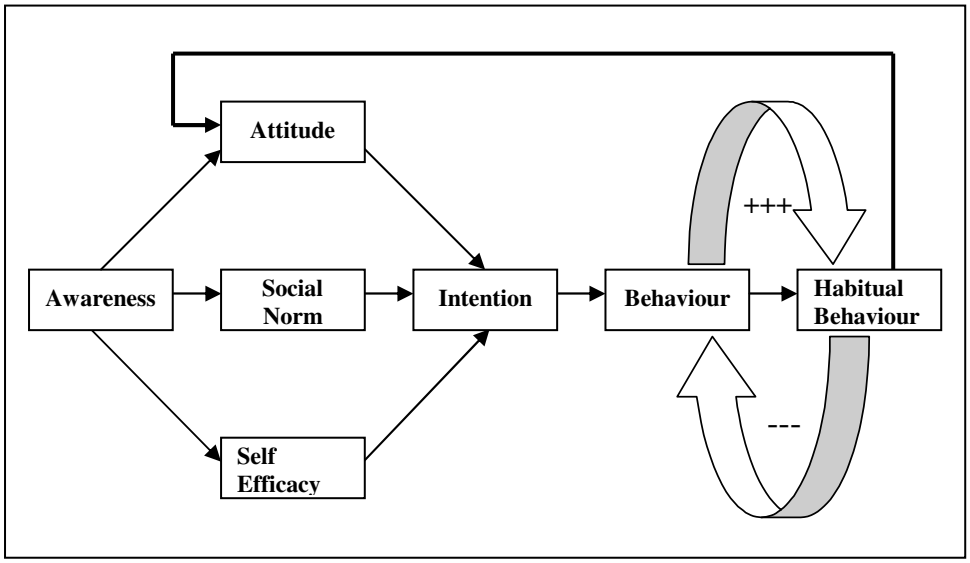

Figure 1. Habitual behaviour

Almost all energy-related behaviour is habitual behaviour: things people do automatically. To enforce a change in this behaviour, it is necessary to 'break the loop', to make visible changes in the context. Possible interventions to change this type of behaviour are de-conditioning (rewards or sanctions); changes in the situation to force renewed reasoning; or reduction of the human influence i.e. by making appliances automatic or 'fool-proof' (Heijs, 1999).

An effort to integrate these models in order to predict environmentally significant behaviour is made by Stern (2000) and his colleagues (Guagnano et al., 1995; Stern et al., 1999) to develop integrated 'Attitude-Behaviour Context' (ABC)

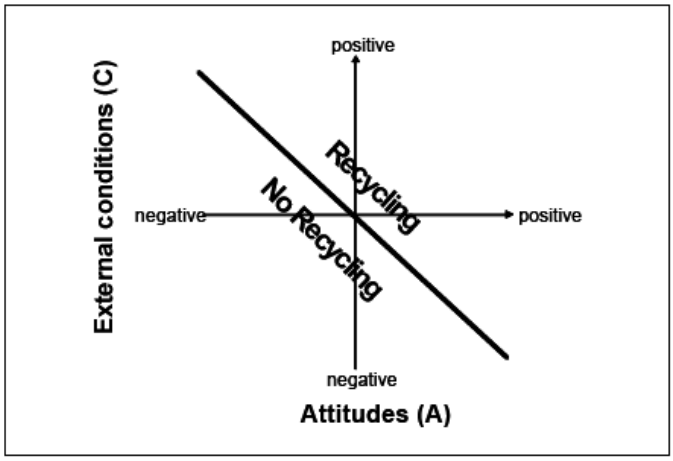

Figure 2. The Attitude-Behaviour-Context Model applied to recycling

The starting point for this approach is the assumption that behaviour is a function, both of the organism and its environment. Or, in the language of ABC, behaviour (B) is 'an interactive product of personal variables related to (A) attitudes and (C) contextual factors'. Variables related to attitudes are specific personal beliefs, (group) norms, social identity and values, as well as general 'pre-dispositions' to act in certain ways. Contextual factors can potentially include a wide variety of influences such as monetary incentives and costs, physical capabilities and constraints, institutional and legal factors, public policy support, interpersonal influences (e.g. social norms.) and in some cases broader dimensions of the social context, such as allegiance to or influence by environmental groups.

These models are useful for intervention aiming to change energy-related behaviour. One of the conclusions from the BEHAVE Project was that learning and exchange of knowledge on these and other relevant theories is essential to create more effective and efficient behaviour change programmes.

3. Case Study Analysis

3.1 Case Study Overview

All project partners provided cases for the meta-analysis: Spain 7, Finland 6, the Netherlands 5, Sweden 5, Austria 4, France 4, UK 4, Bulgaria 2, Norway 2 and Greece 1. In addition, one case was submitted by Germany. Effort was made to collect cases from new and forthcoming EU Member States but, with the exception of Bulgaria, suitable cases (focus on behavioural change, evaluation results available etc.) were not identified.

The cases featured various topics and target groups. Climate change campaigns and energy efficiency campaigns addressed the general public or all households, covered numerous topics and used multiple instruments. Energy efficient building programmes targeted either the construction of new buildings or renovation of old ones on a large scale. Household energy use was also addressed by programmes with narrower scope (e.g. changes in the heating system and/or energy use by household appliances or lighting). School programmes, local energy agencies (advice centres), labelling and renewable energy programmes had more focused target groups or a more limited number of instruments. In addition, non-energy programmes were included featuring three eco-driving programmes and one health/safety programme.

The cases contained both well-known successful approaches and innovative new ones using new concepts and communication channels. Project participants made an effort to provide information on campaigns which they considered to provide good learning opportunities for others or to be quite or very successful due to their design or results achieved. Using less successful cases might have offered further learning opportunities.

Most programmes were nationwide. Spain presented three regional programmes and the UK and Austria reported one local programme each. A certain level of localism can be found in cases presenting local energy advice centres however, the centres have a wide coverage of the country. One programme, the Nordic Swan Label - featuring an eco-label for various products - covered all the Nordic Countries. Some programmes either copied or otherwise implemented in several European countries were the Norwegian Rainmakers TV campaign for children and the Swedish Don’t Drink and Drive Campaign.

A quantitative case study analysis was carried out for an overview of the case characteristics.

Regarding target groups, it was common to address the public at large, but also more focused target groups, such as school children, were mentioned (see Table 1).

National governments played a major role in financing of the programmes. Other frequently mentioned financers were the energy agencies and utilities (see Table 2). In over half of the cases, a national, regional or local energy agency either implemented the programme or participated in its implementation (see Table 2). Other frequently mentioned implementing organisations were national governments, utilities and regional and local governments, as well as professional associations

Table 1 Target groups

Target groups addressed	Number of case studies	Percentage of case studies
Consumers/citizens	28	68%
Households	24	59%
Youngsters	8	20%
Elderly	4	10%
School children	12	29%
Low income groups	3	7%
Employees	3	7%
Others (e.g. media)	10	24%
Intermediary parties	6	15%

Table 2 Financers and implementing organisations

	Financers	Implementing organisation
	Percentage of case studies[1]	Percentage of case studies[1]
National governments	73%	27%
Energy agencies	24%	56%
Utilities	17%	22%
Professional associations	10%	15%
Local and regional governments	9%	15%
NGOs	2%	12%
Others (e.g. non-energy companies, universities and the European Commission)	24%	29%

[1] The sum is larger than 100% because many cases had multiple financers and implementing organisations

The average budget of the cases concentrating mainly on behavioural change was €3.8 million. Advice centre programmes, programmes involving subsidies and long climate change and energy efficiency campaigns tend to have relatively large budgets clearly exceeding the average. Four programmes had budgets lower than €100 000. Two of them were one-off campaigns and two repeated campaigns for which only the budgets of one year were reported. The budget was mentioned as a major issue in several case studies but several options were followed to overcome the problems. For example, significant part of the work was carried out by various stakeholders that operated as partners or the programme financing covered only coordination and marketing as in the case of the Finnish energy efficiency week where the participants bear most of the cost.

Short one-off campaigns are not effective in inducing behavioural change. The average duration of the programmes was 2 years and 11 months. The programmes with shortest duration were energy awareness weeks targeting school children and other target groups; however, the programmes are also among the "oldest" ones having been implemented annually since 1996 and 1997, respectively. The duration of five other programmes was less than six months. The longest running programme was the UK Energy Efficiency Advice Centres which started in 1993. Some of the climate change and energy efficiency campaigns were also among the longer-running programmes. The long-running programmes

typically featured a considerable amount of monitoring and evaluation that was used to ensure the continuity of financing.

In terms of communication channels, traditional channels still dominate: booklets and brochures were distributed in 78% of the cases and in 68% of the cases information was disseminated by articles in newspapers and magazines. Personal advice and training were both provided in about half of the cases. New channels, such as infotainment[2], were used in one third of the cases and digital channels in three cases. Regulatory instruments (laws and regulations, permits and covenants) were used in seven case studies and economic instruments (subsidies, tax instruments and financing) in ten case studies.

3.2 Programme Context

Each national behavioural change programme is planned in a context which is affected by national circumstances as well as national and international policies. The context is a significant factor in choosing which kinds of behavioural programmes are designed and implemented in a given country.

Context factors, such as demography, socio-economic variables and geography are among the main variables used in market segmentation and, hence, important in planning.

The key questions in contextual analysis are:

- Which elements are relevant in a country?
- What is their current impact on energy behaviour?
- What needs to be changed to achieve the programme goal?

Various elements of the context can be identified. The following list covers most of them but the list is not exhaustive:

- Aligning programme objectives with energy and climate policy objectives, energy and environmental strategies, action plans and communication programmes.
- Regulatory framework may need to be supplemented by information campaigns. Sometimes non-energy regulation can be a facilitator for behavioural change programmes.
- Good timing (seizing the moment) can help in success (start of the heating season, organising events at the time of other large-scale activities/interest or avoiding simultaneous activities etc.).
- Energy prices: certain projects may work well in the time of high energy prices while other strategies may be needed if energy prices are low.
- Political structures and institutional setting (federal/non-federal country, implementing organisations, financing organisations, NGOs, public-private relationship) as well as market structures (manufacturers, vendors, multipliers) have an impact on what kind of programmes can be implemented and can be effective in a given country or location. The same applies to climate, natural resources, demography and social context, cultural features and gender issues.
- Energy use by consumers/target groups (energy mix with break-down to different end-uses, use patterns, building stock, and appliance stock) must be well known because it has an impact on the key messages.
- Security of supply concerns can be a major motivational factor for energy efficiency improvements.

[2] Infotainment is information-based media content or programming that also includes entertainment content in an effort to enhance popularity with audiences and consumers (Wikipedia).

- Barriers to energy efficiency need to be analysed to formulate effective programmes packaging communication instruments with other policy instruments.
- Availability of resources for programme design and implementation sets boundaries for the types of campaigns which can be implemented.

Case study design usually included certain amount of contextual analysis. This could be seen from the case study reports both explicitly and implicitly. Among the most frequently mentioned contextual elements were national and international policies, the institutional setting, market structures, demographic and socio-economic variables and patterns of energy use. Few cultural considerations were reported. The frequency of reporting certain elements, however, should not be seen as an indication of their importance for programme design. Instead, their importance and applicability varies country by country and is also time-related.

Context was sometimes seen as an impediment to providing interesting opportunities for implementing certain types of programmes. For example, national programmes requiring regional support can be difficult to implement in a federal country whereas national programmes implemented through various national organisations can be easier to carry out. This was demonstrated by an Austrian case study which mentioned the federal structure as being an important consideration in programme design. A Spanish case involved the collection of fried oil from households, a project which, on the other hand, can only be implemented in a country where vegetable oil is used in large quantities in the national cuisine. On the other, the case introduced a very innovative approach.

Aligning programme objectives with energy and climate policy objectives

A decision to invest in changing citizens' energy-related behaviour starts at the policy making level. A government develops long-term priorities and goals for energy conservation and energy efficiency. Getting energy conservation policies and strategies right is the first essential step towards achieving the behaviour changes needed. Care in moving from policies to the specification of proposed programmes is the next important step. It is perhaps here that the biggest mistakes are made. Unfortunately, political pressures often lead to the need for taking quick, visible actions.

The cases frequently combined energy and climate policy objectives. A case on promotion of wooden pellets was closely linked with the Swedish energy policy objective to transform the energy system towards a sustainable system based on alternatives to oil and electricity. Several countries mentioned that they had a prevailing energy efficiency programme or that they implemented a large-scale energy efficiency or climate change communication programme. Behavioural change was often a key element in them.

Regulatory framework

In some cases programmes were implemented to reinforce the impact of energy efficiency legislation. Examples were Spanish programmes related to energy labelling where salesmen of white goods (major household appliances) received energy efficiency training for white goods and financial support was given for the renewal of white goods. In the UK, the Energy Saving Trust's Advice Programme was part of the infrastructure to support and reinforce the government's regulatory framework Energy Efficiency Commitment, which is an obligation on energy suppliers to deliver energy efficiency savings. It may also be possible to implement programmes making use of laws and regulations having little direct connection with energy efficiency. For example, Austria implemented an advisory programme built on the mandatory requirements of annual chimney sweeping (Climate Herald) whereby chimney sweepers disseminated energy efficiency information. The regulatory framework can also become an impediment to the effective implementation of behavioural change programmes. Bulgaria reported programme implementation as being difficult due to missing parts in national legislation and

regulation regarding, e.g., urban planning, building proprietor's property status, energy services contracting and implementation, and financial incentives for both contractual parties.

Institutional and market structures

The institutional setting defines the key players in programme implementation. Most programmes were implemented by national or local energy efficiency agencies or the like. However, depending on the institutional setting and local circumstances, other organisations (consumer associations, NGOs and professional associations), as well as energy companies and private companies had implemented behavioural change programmes. Although a programme may be initiated by a national energy agency, several intermediary organisations may be involved. For example, the Netherlands and Sweden emphasised the effectiveness of using intermediaries in their case studies.

Practically all countries emphasised the use of existing institutions and infrastructures in programme design and implementation. However, in some cases new solutions needed to be developed. For example, the UK reported a long-term large-scale programme whereby a new energy advisory infrastructure was set up. Also Austria and France reported the construction of well-developed and distributed energy advice infrastructures that provided various information services to the consumers.

Programmes that promote new technologies (or just technologies in general) often call for addressing the whole chain from manufacturers to vendors and final consumers. In several case studies the importance of addressing both consumers and multipliers, such as planners and installers, was emphasised, e.g., the Austrian cases promoting heat pumps or solar heating and the Swedish case promoting wood pellet heating.

Timing

The timing of the activities was important. The focus of public debate, unexpected environmental or natural events, changes in energy prices and EU-wide initiatives can all be either drivers for national campaigns or can strengthen or weaken their impact. For example, the Finnish Climate Change Communication Programme had synergy with the EU-wide public information campaign on climate change in 2006-2007.

Social context

In terms of the development of energy-related behavioural change programmes, relevant factors in the social context were, among others, age, gender, languages used, ethnicity, class, household types, education levels and ability to pay. These are also factors in market segmentation, and they can either enhance or impede access to assets, services, and public goods. The case studies did not portray large differences in the social context or social diversity between or inside the countries. Rather, judging solely on the basis of the case studies, the countries and social issues faced by them appeared surprisingly similar, but differences exist. For example, there are different language groups in some countries (e.g. Finland) but this was not reflected in the case studies. In some countries (e.g. France, Germany, Spain, Sweden and UK) there are large immigrant populations which were not mentioned. The reasons for not capturing these factors in the case studies could be the formulation of the detailed template which did not emphasise social considerations or that they had been neglected in programme design.

In countries with lower but growing GDP, energy consumption is growing rapidly in the household sector. People are buying more appliances because the markets are far from saturated. From an energy efficiency point of view, this can create equally an opportunity or a threat depending on how it is addressed. Effective information campaigns, such those presented in the Spanish and French case studies, can help to ensure that the appliances purchased are efficient. However, behavioural change programmes may not always be adequate and various incentives may be required. The socio-economic status of

consumers (ability to pay) can either impede or enhance their possibilities to invest in energy efficiency. Those with higher income have better opportunities to invest in equipment, which may have a high investment cost but feature lower life-cycle cost or energy consumption. Those with lower income could probably gain more from better energy efficiency but may not be able to make the initial investments. For example, in the UK, fuel poverty among the elderly is an issue. In such situations, combining information instruments with economic ones is necessary. Some examples of combining subsidies with information campaigns were presented in, e.g. the Spanish and Norwegian case studies.

Appliances can be used to further demonstrate social context. For example, who in families makes the purchase decisions about appliances (white goods, small appliances, information technology and electronics) and who uses them? The elderly often have older and less efficient appliances. Can specific strategies be formulated to address this target group? These are questions to be addressed in contextual analysis and in the programme planning phase, but to do it effectively, the programme designer needs to know the social context.

Energy prices

Energy prices can motivate behavioural change. In Norway, rising energy prices put pressure on politicians to act. As a result, a support and information programme for electricity saving technologies was introduced.

Energy use by consumers/target groups

Information on energy end-uses by consumers and lack of information thereof can both be factors which affect behavioural programme design. In the context of increasing energy intensity per capita, Spain introduced several large-scale behavioural programmes based on detailed studies on energy use in households. Good background studies on energy mix, its break-down to different end-uses, appliance stock and end-use patterns can help in making informed decisions about campaigns.

The characteristics of the building stock and the construction market dictate where the largest energy efficiency potential exists and what types of behavioural change programmes targeting the building sector are feasible. Austria and Bulgaria reported that there was a large building stock which requires renovation (Austrian Climate Herald Programme and Bulgarian National Programme for Renovation of Residential Buildings). This probably applies to many other countries as well and can be a major driver in pursuing behavioural change programmes concentrating on existing building stock. In Finland, many home-owners build their own houses. They were targeted by a campaign promoting low-energy single-family houses.

Barriers to energy efficiency

Households have significant energy efficiency potential. Many strive for better energy efficiency by paying attention to the heating systems and their regulation, choosing energy-efficient appliances and lighting and using them prudently. However, it is a well known fact that the market does not fully deliver cost-effective savings autonomously. The barriers explaining the gap need to be identified, and behavioural change programmes can be designed to address the barriers. Due to the diverse nature of the barriers, a portfolio of policies is considered most effective, e.g., using also regulatory measures and financial instruments in addition to behavioural change programmes - or vice versa.

In case studies, barriers were not explicitly called ‘barriers’. However, many case descriptions suggested that considerable effort had been put on analysing barriers. In Norway, in the case study Electricity Savings in Households, imperfect information on heating system improvements was addressed by a behavioural change campaign featuring subsidies to address problems in access to capital. However, the programme did not address the barrier related to credibility and trust as less serious

equipment suppliers tried to skim the market which could possibly be addressed by quality control. In Spain, two separate campaigns were launched to remove less efficient appliances from the markets. Imperfect information was being addressed by training salesmen regarding the energy efficiency of white goods and access to capital was enhanced by a subsidy programme in Madrid.

3.3 Programme Planning

The key questions in the preparation of a behavioural change programme are:

- What will be done?
- When will it be done?
- Who is responsible for doing it?
- How much will it cost?
- How long will it take?
- What will it deliver?

Effective programmes typically operate following a strategic plan and involve the following steps:

- setting the programme goals in line with policy goals;
- analysing the determinants of desired behavioural change;
- market segmentation and choice of target groups;
- choice of instruments;
- planning the organisation and management;
- risk analysis and back-up plan;
- programme testing and pilot campaigning;
- planning the resources, and;
- planning the monitoring and evaluation.

Most programmes were initiated by programme managers and a few by the government; however, this was not very clear from the materials. A couple of programmes were initiated by other stakeholders such as the parliament or international organisations.

Many programmes operated with formal plans. For example, in the UK, all the case programmes operated on carefully structured plans that always considered monitoring and evaluation. In a couple of cases, planning was restrained by time constraints, because of political pressure to quickly establish an ad hoc programme or for other reasons.

The exact process and method of setting programme goals was unclear in the case study materials. Usually, some background information on the context was given, but the link between energy and climate policy goals and programme goals was not visible.

The programme goals themselves were usually clearly defined, though in a qualitative rather than quantitative way. However, clear objectives are not sufficient. They should also be challenging, achievable, targeted and measurable. In many cases, the goals were not targeted. Instead, many programmes tried to offer “everything to everybody”. It was not unusual that programmes included almost all possible target groups and covered almost all possible topics. This does not allow tailored communication according to each target group’s needs unless the programme budgets are huge - which they seldom are.

However, focused cases existed as well. Because most of the programme goals were not measurable, it is difficult to evaluate if they were challenging, yet achievable. Despite the lack of measurable targets, quantitative evaluations of results were made in some cases. The lack of measurability can be a hindrance for acquiring programme financing when other types of programmes “compete” over the same funds.

Market segmentation and choice of the target groups was closely related to the definition of the programme goal. Some cases, particularly those using television as the main communication instrument, and those targeting school children and youngsters, featured careful market segmentation that was used in choosing the target groups. An example was the Dutch project "Energy survival" which targeted school children between the ages of 8/10-12 years, the 'tweens'. Other case studies clearly defined market segments, such as larger houses using electric heating or people commuting in a certain region. However, many cases addressed either the whole population or all households. In some of the cases targeting the whole population, more focused sub-projects were implemented.

The programme design was usually not based on scientific theories or evidence and, therefore, references to planning models were not made. However, exceptions could be found, e.g., in the Netherlands and in UK. In general, programme design seemed to rely more on the experience accumulated by the programme managers and implementing organisations. Based on this practical experience, careful planning was carried out.

In many cases, a limited variety of policy instruments was used. Because of the project objectives, all cases were to contain at least one type of communicative instrument. Although regulatory and economic instruments as well as structural provisions were also used, they were used in a limited number of cases.

Most of the cases did not provide information on how the communicative channels were chosen after the choice of the target groups. However, it could be seen from the cases that quite often the channels had been subject to careful consideration. Examples include the use of intermediaries well-known by the target groups, carefully planned TV programmes, and school packages for children, or providing the public with carefully designed climate change calculators to facilitate learning-by-doing.

3.4 Programme Implementation

Programme implementation basically means acting upon the programme plan/strategic plan. However, certain parts of the implementation phase are more critical than others. Particularly, the launch of a new programme is a critical phase where effective monitoring and, if necessary, prompt reaction may be needed.

Effective implementation requires two types of skills: implementation and diagnostic skills. Implementation skills mean essentially project management skills. Diagnostic skills are needed to recognise whether the programme fulfils expectations or not. If it does not, is it the result of poor planning or poor implementation? If it was about poor implementation, what went wrong? Collection of monitoring data is important for empowering the diagnostic process with possibilities to react to problems in a timely and correct manner. Should problems emerge, a back-up plan can prove useful.

Cooperation with and motivation of partners and other stakeholders is of utmost importance in the implementation phase. Motivation of the partners was sometimes difficult. For example, the Austrian case study "Climate heralds" stated that the motivation of information-disseminating chimney sweepers was essential for the successful management of the campaign. However, there were large regional differences in the motivation of professionals which hindered the campaign implementation.

Although cooperation of a wide base of stakeholders is usually considered positively, unclear roles may cause troubles, and decision-making should not be split among too many members. The Swedish case report on wood pellet heating stated: "The joint steering group had some difficulties in organising its work and coordinating the programme activities, and the communication gave unclear signals about who was doing what, and who was responsible for the campaign."

3.5 Programme Monitoring

Monitoring serves two objectives in programme implementation. First, it provides feedback to programme management to allow effective control. Monitoring can be used to provide the programme management information on the success of the programme to allow correct and prompt action if necessary to ensure that programme goals are achieved. Also the needs of the target group (e.g., the consumers or other end-users) can be monitored by asking them questions about how they perceive the programme. This is typically done by conducting a feedback survey where programme-related questions are posed. The surveys are based on telephone calls, postal questionnaires or web-based elements. An effective tool in helping to achieve the programme goals is to establish performance indicators which can be monitored during programme implementation. The Spanish case "Energy Efficiency Domestic Index" emphasised that one of the success factors of the campaign was daily monitoring in the launch phase. This allowed them to detect flaws quickly and to respond accordingly.

Second, monitoring provides performance data for the ex-post evaluation of the programmes. Any comparative study is impossible to realise if there is no data available on the situation at the beginning of the programme (baseline data). Thus, it becomes impossible to find out the direction of the change at a later stage. In many cases, it may be impossible to collect the data needed for evaluation after the programme has been implemented, but it might have been possible or even simple if it had been planned from the outset.

Performance indicators with target levels can be established to help in monitoring. The term 'performance indicator' was rarely explicitly mentioned in the case studies, but it was clear from the programme descriptions that they had been used. However, what remains more unclear is, have any target levels been established for the performance indicators. Typical performance indicators measure the number of materials distributed, web-site visitors, event participants, TV campaign viewers, numbers of installation, etc. Others may relate to user opinions and satisfaction. It was very common in the case examples to follow indicators related to participation or media impact. A more variable list of indicators was listed in the Spanish case Economic Support for the Renewal of White Goods in the Community of Madrid: "The proper development of the Plan was monitored by checking that the discounts were applied correctly by the retail establishments, that the customers were informed that these were due to the type of domestic appliance they were purchasing, that they were supplied with proper information, and that that they were given the informative brochures, and that the salesmen had the required training. The increase in the proportion of class A domestic appliances was also confirmed."

3.6 Programme Evaluation

Two types of programme evaluation were identified. Process evaluation is a systematic assessment of the programme for the purpose of improving its design, its delivery, and the usefulness of the quality of services delivered to the consumer. Impact evaluation examines the effect/outcome of a programme (e.g., changes of behaviour, energy savings and CO_2 emission reduction).

The full separation of process and impact evaluation can be quite difficult and might not always be feasible or desirable. Process evaluation supplements impact evaluation by exploring why savings were achieved. It may include examination of the adequacy of the data needed for subsequent impact evaluations. Another link is the consumer surveys that can simultaneously collect input on programme performance including satisfaction and potential free riders. Integrating data collection efforts may result in more cost-effective evaluation (Violette 1995).

There were cases where monitoring and performance evaluation were executed with careful planning and where also the information obtained was made use of. For example, all the UK cases logically followed the same methodological pattern from the very goals of the programme to monitoring and the ex-post analysis of the campaign. Each campaign, however, modified the theoretical framework for its own specific purpose.

In long-lasting or permanent programmes, formal evaluations during implementation were reported. For example, the operation and performance of French energy information centres was evaluated frequently. The German Campaign Energy Efficiency in Private Households was subject to frequent third-party evaluations during implementation, first twice a year and from 2005 once a year. Also the Swedish Climate Campaign, although lasted only for three years, was evaluated during implementation.

Third-party programme evaluations normally contain both process and impact evaluation. The main benefit of independent evaluation is an unbiased view. Self-evaluation - no matter how objective or self-critical the evaluator tries to be - cannot reach the level of objectivity that an independent evaluation can. The downside of an independent evaluation is, naturally, its higher cost. Examples of both self-evaluation and independent evaluation were presented in the cases. A combination of the two was used in the Finnish "Climate change communications programme" where the evaluation was first conducted as a self-evaluation by the programme's steering group, and an independent evaluation was conducted at the end of the programme.

An example of a third party evaluation was the Norwegian case study "Electricity savings in households". The objective of the programme was to reduce electricity use by promotion and subsidising of air-to-air heat pumps, pellet stoves and steering systems for electric panel heaters. An independent ex-post evaluation was performed using mail surveys to households, telephone interviews with technology suppliers, and meter reading information. The evaluation consisted of the following elements:

a) Enova's management of the programme:
   - documentation of the programme;
   - communication with households and interest organisations;
   - technology criteria;
   - rejections and defaulted grants.
b) Effects among the households:
   - description of participating households;
   - household satisfaction with the investment;
   - energy savings and investment profitability.
c) Effects in the market:
   - development in technology markets;
   - development in the electricity market;
   - social effects and profitability.

In 25 cases out of 41, it was reported that no process evaluation had been carried out. However, in some of these cases, collected information included certain elements of process evaluation. It is possible that the programme manager was not familiar with the concept of "process evaluation" or did not recognise that the evaluation carried out fell into this category of evaluation.

In total, impact evaluation was carried out in 29 cases out of 41. Both qualitative and quantitative impact evaluations could be found in the cases, but, not surprisingly, qualitative evaluation was more common. Yet, in many programmes, evaluation was used to quantify energy savings and/or avoided CO_2 emissions.

Most of the cases applied evaluations with consumer-specific information. However, examples of evaluations using market information (market-tracking) could be found. Typical examples of the latter were programmes aiming at training salesmen or promoting certain technologies.

One example of the evaluation of behavioural change and energy savings was in the Dutch case "Measurement is knowing". In the programme, households were provided with a digital plug-in metering device to measure the energy consumption of their appliances. The evaluation was carried out by internet-based questionnaires. On average, six appliances were measured, and 66% of the participating households reported having taken action to reduce their energy consumption, 45% reduced stand-by

power consumption, and 30% replaced old light bulbs with more efficient ones. Other behavioural changes included reducing the use of a tumbler dryer and replacing old white goods by more efficient ones. In the evaluation, the energy savings were estimated at 250 kWh per household.

An example of an impact evaluation of energy efficiency advisory services was in the UK. The objective of the Energy Efficiency Advice Centres (EEAC) managed by the Energy Saving Trust (EST) is to help consumers save energy through efficiency measures and thereby reduce their carbon emissions. The two main types of advice provided by the EEACs are verbal advice and a home energy check (HEC). A record of customers is kept in a database where contact information of callers as well as advice given are recorded. Carbon savings were assessed through quantitative customer surveys (computer aided telephone interviews). The survey was followed by an attribution process whereby the effect of an intervention is assigned to a particular cause or activity. In the case of the EEAC evaluation, it was determined if energy saving actions claimed were due to EEAC advice. Information for the attribution was collected by a question in the survey. A reduction was made to account for a proportion of customers who stated that they had used more than one EST consumer advice channel. Quantitative energy and carbon saving estimates were made, and lifetime cost-effectiveness of the programme was assessed.

In general, evaluation of cost-effectiveness of the programmes was a rarity. This is somewhat surprising given the importance of cost-effectiveness in justifying financing decisions. The likely explanation is the difficulty of quantitative evaluation of the impact of behavioural change programmes.

Typically, not much effort was put in the cases on analysing the free riders[3], spill over[4] or the multiplier effect[5]. However, in some cases - particularly those aiming at promoting certain technologies - the multipliers were considered to be important in programme implementation or they might have been one of the primary target groups, e.g. in the Austrian programmes promoting heat pumps and solar heating whereby training courses were organised for installers. In the Dutch EcoDriving campaign, spillover effect was estimated. In cases promoting certain technologies, free riders were considered as a potential problem because awareness raising was combined with the provision of subsidies (e.g. the Electricity Savings in Households campaign in Norway and in car devices in the Dutch EcoDriving campaign).

4. Conclusions

Public awareness, information and benefit campaigns constitute an important element to support energy efficiency and to promote energy efficiency policies and programmes. Changes in consumer behaviour can lead to significant energy savings; various studies have suggested savings potentials as high as up to approximately 20%. Improvement of energy efficiency and related market transformation require informed consumers and awareness among all segments of society as well as tailored information, education and training for selected stakeholders.

The hypothesis of the Project was that energy-related behavioural change programmes do not have the high impact that they could potentially have because, in general: (1) they have little basis in relevant theory, (2) concentrate mostly on motivational factors only, (3) follow a scattergun approach, (4) have rarely a prior diagnosis or evaluation and assessment of behaviour, and (5) do not often lead to ongoing activities.

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[3] Free riders are those who consume more than their fair share of a public resource, or shoulder less than a fair share of the costs of its production (Wikipedia). The free-rider effect regards end-users who make use of facilities or support, provided for by energy efficiency programmes, policies, or energy services, but would have implemented energy-saving actions anyway.

[4] Spill over effects are externalities of economic activity or processes upon those who are not directly involved in it. (Wikipedia). Spill over effect occurs when consumers undertake additional, but unaided, energy efficiency actions based on positive experience with the programme.

[5] By the multiplier effect the market will implement a measure automatically without any further involvement from the authorities or agencies.

The findings were more positive but revealed room for improvement in all areas. Particularly, there is need to increase the focus of the programmes (e.g., by market segmentation and target marketing), to aim at long-term approaches and measurement and evaluation, and to increase programme planners' knowledge on theoretical background. Some campaigns tried to offer "everything to everybody". Instead, one should start with the behaviour that has the greatest impact and is easiest to change. To do this, the changeability of the behaviour has to be determined by, e.g., using market research and evaluation results of previous campaigns.

The effectiveness (and cost-effectiveness) of behavioural change programmes will be greatly increased if adequate time and consideration is given to identifying the approaches, instruments and programmes most likely to yield the desired outcomes. The findings of the BEHAVE Project emphasised the following considerations:

(a). Take time to prepare action (programme design, resourcing and implementation): Jumping into immediate and visible action may account for the bulk of the mistakes made in developing a behavioural change programme. Careful consideration of what changes are expected and how they may be brought about always pays off.

(b). Seek synergies through collaboration between departments: Before embarking on an entirely new programme focusing on behavioural aspects of energy conservation, policy makers and implementers alike should identify what other parallel programmes exist or are being developed in related areas. The most obvious ones are behavioural programmes concerned with aspects of environmental management, including those that aim to increase awareness and induce behavioural change in relation to climate change. More cost-effective approaches may be found through integrating programmes which are complementary to one another – or that may be perceived to be complementary or overlapping by the public.

(c). Seek synergies with private and civil sector activities: Programmes are often more effective when these are supported by a wide range of parties, from governments to the better results for all at lower costs.

(d). Identify what has been done previously that has been effective, in comparable fields (not energy alone): All too often, behavioural change programmes are developed as though it is the first time they have been conceived. In reality, there is by now a great deal of accumulated experience in such programmes, as the case studies examined in the BEHAVE Project illustrate. Furthermore, there is a vast body of experience in other fields, such as public health, drug control, citizenship and the environment.

(e). Involve appropriate expertise across a range of disciplines: Many so-called behavioural change programmes are handed over to public relations and advertising consultants. Yet much of what can be incorporated into such programmes derives from research and experiences in areas such as social psychology, sociology, economics, and in public and commercial marketing. A basic tenet of what is now called social marketing is that multi-disciplinary approaches to behaviour change are more effective than those that derive from one discipline only. Those who are involved in moving from policy to the specification of programmes for action should consult as widely as possible across disciplines.

(f). Highlight the importance of specific behavioural goals, target market(s) and timeframes: It is important to establish clear behavioural goals and target markets, as a part of programme design. Detailed goals, however, cannot adequately be set in high-level policy. Therefore, policy makers should insist on the development of specific goals to be realised by behavioural changes, and on adequate market segmentation, as part of the programme development and implementation process.

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