Evaluating Energy Efficiency Policies and Measures

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Abstract

Energy efficiency policies are gaining momentum throughout Europe by means of EU-wide directives and other national initiatives. Measures are developed to implement these policy instruments, but to what extend do they succeed?

There is a clear need for both ex-ante and ex-post evaluation of energy efficiency measures to ensure that plans are developed in a cost–effective measure and results are bringing more benefits than costs.

A number of factors have led to an increased need to monitor, analyse and evaluate quantitatively the impact of energy efficiency measures. Amongst these are:

- the need to monitor progress on achieving energy use and carbon emissions targets;
- across Europe, there is a move to assess the macro economic effects of proposed policy measures via regulatory impact assessments and cost benefit analyses;
- Ex ante evaluation is in line with the European Strategic Environmental Assessment (SEA) Directive which aims to ensure that the environmental consequence across the EU are assessed before any action is taken;
- there is a general view that supporting demand-side measures on an equal basis with supply-side measures is difficult within restructured, liberalised energy markets. Evaluation allows an equitable consideration of the best overall mix of measures to be made.

The proposed paper will look into current evaluation methods based on recent Energy Charter and IEA analysis, into how it works in practice, and will try to provide a review of the approaches that proved to be successful in evaluation of energy efficiency policies and measures internationally.

1 Introduction to Policy Evaluation

In any discussion on evaluation, there is a need to go back to basics. The energy efficiency community has been confronted with the need to evaluate and the development of evaluation techniques since the late 1970s and early 1980s. The question is why are we still discussing it? Why are governments and energy companies and energy service companies not evaluating more rigorously and more frequently?

In 1986, the IEA wrote: Most evaluations have tended to be rather superficial and issues such as the amount of energy savings achieved, the attribution of energy savings to particular measures, incrementality and cost-effectiveness are seldom fully addressed." Could that not also be written today for many European countries?

As long ago as 1999, the Energy Charter was pushing for evaluation to be better integrated into energy efficiency policy development. The following chart shows evaluation's prominence. The five major steps for developing an energy efficiency strategy include1:

- Policy Analysis
- Objectives and Target Setting
- Strategy Development and Action Plan
- Implementation
- On-going Monitoring and Evaluation

Fig 1: Developing an Energy Efficiency Strategy

a) The complexity of energy efficiency measures

Energy efficiency measures, described below, are by their nature quite complex, because they make certain assumptions about how consumers will react. Consumer behaviour has never been easy to pre-determine and it is impossible to know what there is about certain measures that either make consumers react – or not react.

As Paul Stern and Elliot Aronson wrote more than two decades ago for the National Research Council in the US, "All new government policies and programs are, in effect, experiments. To treat new policies as anything more than experimental is to set the public up for disappointment, for few policies turn out exactly as expected. Well-meaning efforts by government and industry to make things better often produce unexpected effects – and sometimes these effects are so undesirable that many people feel they would have been better off if no effort had been made."

[1] Developing an Energy Efficiency strategy, Energy Charter Secretariat, 2000

Well, much progress has been made since then in designing and executing energy efficiency measures and yet in many of the European economies in transition, we are still seeing relatively poorly developed, resourced and implemented measures. It is better in most EU-15 countries but it is not across the board. EU-wide evaluations in the past decade have shown some weaknesses there as well.

And the need to know more about how effective the measures put into place are is probably even more important today as energy efficiency measures are playing a greater and greater role in addressing global climate change and energy security.

PEEREA uses the following categories of instruments and measures in the review process:

1) Regulatory;
2) Information/Awareness;
3) Economic/Financial;
4) Education/Training
5) Voluntary Agreements; and
6) R&D.

An alternative categorisation, which includes sub-categories, is shown in Table 1. This taxonomy has been taken from the IEA DSM Handbook[2].

Table 1: Energy Efficiency Policies/Measures – Types and Subcategories

Type of Policy/Measure	Subcategories
1 Regulation	Building Codes and Enforcement
	Minimum Energy Standards for Appliances
2 Information	General Information
	Labelling
	Information Centres
	Energy Audits
	Education and Training
	Demonstration
	Governing by example
3 Economic	Subsidies
	Targeted taxes, Tax exemption, Tax credits
	Financing Guarantees
	Third party financing facilitation
	Reduced interest loans
	Bulk Purchasing
	Grants
	Technology Procurement
	Certificate trading systems
4 Voluntary Agreements	Industrial companies
	Energy production, transformation and distribution companies
	Commercial or institutional organisations
5 Combinations	

A comprehensive energy efficiency plan will use a combination of all the measures, although priorities need to be made since it is impossible to introduce them all at once, particularly when starting. The choice of instrument depends on a variety of factors, including:

- Cost and ease of delivery;
- "Strength" and "durability" of effectiveness in overcoming barriers and providing energy efficiency improvements in the short term and long term;
- Public, political and administrative acceptability; and
- Effectiveness in improving energy efficiency.

[2] IEA DSM Handbook http://dsm.iea.org/

b) Why Evaluation is Important

There are two basic reasons for conducting energy efficiency evaluations[3]:

1) rational management of the public budget;
2) cost-effectiveness of energy efficiency goals achievement.

In essence, we are seeking to understand whether energy efficiency policies should be supported by governments and, if so, what is the best set of policies which should be implemented.

Evaluations involve the collection of useful performance data that provides accountability for policy measures. The evaluation of policies, both at interim points and programme end, enable continuous improvements to be made to the policy measure or programme. Lessons learned from evaluations of past policies can be used to improve future programmes. Policy measures can be improved by the assessment of issues such as[4]:

- Where energy savings are being achieved - which measures, end-uses and customer segments are providing the greatest benefits;
- The cost at which the impacts are being achieved;
- Which customers, dealers, builders, manufacturers and other market trade allies participate and why;
- Which customers are not participating and why; and
- Which marketing methods are reaching the target audience

Going back to Stern and Aronson: "Rigorous evaluation methods should be part of the policy development process. That is, research done in an early stage of policy development can be used to modify a prospective policy to make it more effective or to make it more acceptable to the people it is meant to serve. In the jargon of evaluation researchers, the process is called "formative evaluation": evaluation of prototypes conducted for the purpose of formulating the policy or program. The alternative, "summative evaluation" is used to judge the success of a program after the fact and is not intended as a tool for redesign."

c) The history of evaluating energy efficiency measures

Evaluating energy efficiency measures on a regular basis really started in the United States, followed by Canada. In the United States, the Department of Energy was very rigorous in evaluating the effectiveness, for example, of its fuel economy labels on new cars for several years in a row in order to get the right information on and design of the label to effectively influence the purchaser. Also, legislation requiring utilities to achieve certain savings required those utilities to implement consumer-oriented measures and then evaluate them to ensure they were making expected savings.

When the IEA undertook the first international comparison of the effectiveness of energy efficiency measures in 1986[5], there were some results from Europe but they were generally not as comprehensive or as rigorous as American ones.

The IEA several times since the early 1990s took up the challenge to expand the knowledge base. The most recent effort was undertaken by the DSM implementing agreement under the IEA in October 2005.

The European Union has regularly encouraged its member states to undertake evaluations of their measures and this has often been part of obligations under certain directives.

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[3] World Energy Council (WEC): Energy Efficiency Polices and Indicators 2001, http://www.worldenergy.org/wec-geis/publications/reports/default/launches/eepi/eepi.asp

[4] Hagler Bailly Consulting, 1995, http://dsm.iea.org/NewDSM/Prog/Library/Upload/139/Evaluation-violette.doc

[5] IEA, *Energy Conservation in IEA Countries*, OECD, Paris, 1986.

The Energy Charter recently prepared a report on evaluation of energy efficiency policies and measures which will be published in 2007 (the report was prepared with the support of ERM, Peter Wooders being the main consultant). This report aims to:

- undertake an overview of the various practices of the PEEREA countries in evaluating their energy efficiency policies and measures;
- provide policymakers with useful information in their process of designing and choosing the energy efficiency measures in the various sectors of the economy;
- discuss the strengths and weaknesses of different approaches and methods;
- draw conclusions which identify the benefits of the most efficient evaluation approaches and discusses possible implementation of such evaluations in the economic and social context of various PEEREA countries.

Evaluation of policies and not just specific measures is also important. The Energy Charter Secretariat has undertaken peer reviews of the energy efficiency policies and measures of 15 of its participating countries. These reviews consider energy efficiency within the context of overall energy policy within the country but do an in-depth analysis of the effectiveness of the energy efficiency approach, including the institutions involved. Recommendations are then made to the country under review and these recommendations are approved by the highest decision body of the Energy Charter. In subsequent years, the reviewed country reports back on progress made in addressing the recommendations.

2 A Review of Evaluation Techniques

Evaluation implies techniques and indicators. The European Commission's Logical-Framework ([6]) ('Logical-Framework') has become the de facto standard used by the European Commission and many national Governments for project design and evaluation in many areas of activity. It is used both in advance ("ex ante") of a decision to proceed with a policy or project and, once the policy or project has been implemented (i.e. "ex post"), as an assessment of the policy's performance against the stated objectives. The Logical-Framework approach considers:

- efficiency - whether the policy is a good use of resources (eg, whether consumers would have made the investments without a grant) - efficiency is often measured through cost-benefit analysis techniques;
- effectiveness - whether the policy achieves its immediate goals - such as a certain number of households insulating their roofs;
- impact - whether the policy achieves its specific objective - such as reducing energy consumption in participating households by 20%;
- sustainability - whether the benefits of the policy will be sustained when the subsidies or grants end or tax policies revert to normal.

A narrow definition of an 'effective' policy in a Logical-Framework approach would be one which achieves its narrow, immediate targets (e.g. number of households accepting grants for roof insulation).

Key Methodologies and Techniques Utilised

A large number of methodologies and techniques are available to evaluate policies and measures. Which are chosen depends on a number of factors, including the type of policy/measure, the ambition level of the evaluation and prior experience. A review if now presented of the key techniques, noting their strengths and weaknesses and referring to some of the many sources of extra information available.

6 Manual, Project Cycle Management: Integrated Approach and Logical Framework; Evaluation Unit Methods and Instruments for Project Cycle Management; February 1993.

Evaluations Before (ex ante) and After (ex post) Implementation
The majority of evaluations to date have been ex post, but ex ante are increasingly being employed.

Ex ante analysis allows policymakers to estimate the costs and benefits of a range of policy intervention options before implementation, and thus before significant money and time are invested. The impact of a policy scenario is measured against a reference scenario, in which energy-demand trend is based on demographic and social drivers and the impact of energy saving measures implemented before the start year of the simulation.

Ex post analyses enable policy makers to learn from past choices to improve the design of future policies. For example, computer models are developed to simulate ('backcast') the effects of proposed policies to ensure they are cost-effective in meeting their objectives. Surveys are conducted to gauge the effectiveness of information and awareness programmes so that future programmes can be better targeted.

Qualitative and Quantitative Analysis
Qualitative analysis assesses factors such as the awareness of information campaigns; quantitative analysis factors such as fuel efficiency. In most evaluations, a mixture of qualitative and quantitative analysis is used to assess the impact of a policy/measure.

Qualitative analysis forms a part of almost all evaluations in all countries, whether they are simple or complex and what policy/measure they assess. Qualitative analysis involving the discussion of the level of implementation or any problems arising during implementation is a useful part of any policy evaluation. For example, the impact of an information programme may be affected by surveys of the target group. Analysis may include the uncertainty of the level of impact a particular policy or programme has on energy efficiency; in many cases a change in energy efficiency is a result of a range of factors (e.g. energy price, demographic and social). The assessment of the level of implementation will depend on the objectives of the policy. For an information programme, this may be assessed by the level of awareness and knowledge within a random sample of the public; the assessment of an energy audit may look at the level of enforcement and compliance of the measures and technologies recommended during the audit.

Quantitative analysis ranges from the simple application of one or more indicators to full Market Transformation or Cost Benefit Analysis (see below for details on these two techniques). Although indicators can be applied to both quantitative and qualitative analyses, it is within quantitative analysis that they find the majority of their applications. There is a wide and useful literature on indicators. In summary:

- indicators range from those at high levels of aggregation (e.g. the whole economy or a sector within it) to indicators that describe a single technology within a specified, potentially small application;
- two types of ratios ('energy intensities') are commonly used at a high level of aggregation: economic ratios divide energy consumption by indicators of economic activity (e.g. Gross Domestic Product); techno-economic ratios divide energy consumption to an indicator of activity in measured in physical terms (e.g. tonnes of steel produced) and are generally applied at a sector or sub-sector level;
- energy efficiency depends not only on the efficiency of technologies but also on other factors such as the economic structure, energy prices and energy mix of a country. The impacts of changes in economic structure can be separated out using well-established indicators: the resulting changes in energy efficiency are then due to improvements in technology efficiency;
- specific sets of indicators have been developed to understand the specificities of activity sectors (industry, residential, commercial, transport);
- the efficient use of energy is central to all three aspects of sustainable development. The United Nations Commission on Sustainable Development (CSD) uses a set of Energy Indicators for Sustainable Development7 which encompass the social, environmental and economic aspects of energy use;
- energy efficiency policies and measures, particularly those that aim to increase the thermal efficiency of buildings, may have a wide range of social and health impacts – increased thermal comfort may reduce poverty, mortality, morbidity and increase the productivity or residents. Many evaluations ignore these secondary impacts, concentrating solely on reductions in energy use;

[7] http:///www-pub.iaea.org/MTCD/publications/PDF/Pub12222_web.pdf

- indicators can be developed to assess the impacts on a whole range of pollutants (particulates, oxides of sulphur and nitrogen, etc.). The majority of evaluations include carbon dioxide only.

Quantitative indicators add vigour to any analysis but may be misleading in isolation. For example the number of A rated appliances sold may be a good indicator of the success of an appliance labelling scheme but a survey may suggest that the sales (although increased) could have risen far higher due to some flaw in the labels or implementation of the policy.

Backcasting

The ex post analysis (backcasting) of policies and measures allows policy makers to learn from past choices to improve the design of future policies.

The impact of one or a combination of policies/programmes over a region may be analysed. Both top down analysis and bottom up analysis can be carried out and the different values compared. Top down analysis measuring the macro effects of a package of measures over a certain timescale in a region may not separate the effect of social factors that increase energy demand from the effect of the policy measures under analysis and may underestimate the impact of the policy measures.

Bottom up analysis using in-depth ex post evaluation of measures may give a more accurate picture of the impact of the policy measure under analysis, but it is more data intensive and there may be difficulties in collecting coherent data.

The backcasting simulation method compares the modelled energy savings due to the policies and measures enforced within a period to the actual energy savings data from that period. The difference between the anticipated energy savings and the actual energy savings give an indication of impacts beyond those associated with the policy. For example the energy savings due to higher building energy standards may not be realised due to increased thermal comfort or weather patterns. A comparison of the difference between the modelled energy savings and the actual energy savings may give policy makers a greater understanding of the effect of these factors on energy demand.

Backcasting allows an identification of gaps in any knowledge or data that is required to effectively assess policies and measures. It provides a robust, scientific evaluation approach which is structured and transparent. However the method is subject to several uncertainties for example the assumptions behind the reference scenario are subjective and many measures are too recent to give long-term trends to evaluate.

Market Transformation

The term ‘market transformation’ is used to describe the substantial increase in energy efficient appliances, buildings, vehicles and other technology in the market place. Market transformation programmes are used by Government to help technologies overcome market barriers and become widely adopted. The penetration of new technologies generally follows an “S-curve” where penetration starts slowly, peaks in the middle years and then declines as saturation is approached. Market transformation aims to speed up the slow penetration in the initial years, moving penetration to the peak period where it is generally self-sustaining without the need for policy support.

Market specific analysis tends to be top-down and looks at market indicators such as sales of energy efficient appliances or changes in manufacturer products lines. Market based analysis can be useful to analyse national energy efficiency programmes that may incorporate a range of energy efficiency policy measures.

Consumer specific analysis tends to be bottom-up and makes use of data collected at the end-user level. This data is then used to estimate the savings resulting from the policy measure or programme various analytical techniques (statistical, engineering or combination or integration techniques).

Market and consumer analysis have various advantages and disadvantages compared to each other.

- Market specific analysis requires less time and money but tends to estimate the potential energy savings resulting from a scheme and not the actual energy savings. For example the sales of energy efficient light bulbs will not give an accurate indication of the resulting energy savings; the true savings will depend on

behavioural factors such as whether the efficient light bulbs were all installed. Manufacturers' claims of the energy use of efficient technology may not be accurate in actual field conditions;

- Consumer based analysis may be able to assess energy savings more accurately by assessing the actual behaviour of participants. In addition, collecting actual in-field data provide information that may be very important for improving the programme and achieving the anticipated energy savings. Consumer based analysis tends to involve the collection of data from a sample of programme targets or participants. Care should be taken to ensure that the sample is adequately large and representative of the overall target group.

Cost Benefit Analysis

Most cost benefit analyses of energy efficiency programmes look at the cost of the programme and the resulting energy/CO2 and financial savings. The amount of money invested per unit of energy saved can be compared to the consumer unit price of energy to see if demand management costs less than supply management.

Although rare, cost benefit analyses of energy efficiency programmes may try to estimate the total net social benefit by considering multiple factors such as environmental impact (e.g. reduction of SOx, NOx, PM, VOCs and CO), and social/health impacts (decreased mortality and morbidity). Economic analysis may not be limited to financial savings but may look at wider impacts such as job creation and multiplier effects.

The cost benefit of a policy or programme can be expressed as the:

- Net Present Value, NPV (benefits minus costs, defined in terms of money of today); or
- Benefit to Cost ratio (=present benefit/present cost).

However this quantitative approach may be difficult to apply where the values of certain programme impacts are hard to establish. The following problems typically arise in cost benefit analyses:

- Boundaries – it may be hard to establish which costs and benefits should be included in the analysis;
- Data – there may be a lack of reliable data for some of the impacts;
- Illusory precision – allocating a value to unquantified impacts can suggest more confidence in the accuracy of its value than warranted;
- Proper representation of important impacts – quantifiable impacts may be given more weight in the calculation than unquantified impacts that may be just if not more important.

Cost benefit analysis usually focuses on monetised impact; however there are other impacts that are vital to decision-making.

Accounting for Indirect Impacts

Policies can have indirect impacts on other areas, or be indirectly influenced by these other areas. Table 2 gives examples for six effects, over three economic activities.

Table 2: Indirect Impacts on/from Energy Efficiency Policies

Issue	Transportation	Buildings - appliances	Industry
Rebound effect	- Improving fuel economy increases mileage- Power purchase increase turn to long distance travel	Better insulations leads to higher temperatures	Better efficiency could lead to higher production volumes
Spill-over	- Bus systems spread the world - SUV model applied in developing Countries (Chinese cars bigger than US)	Appliances are retailed on a global market (almost...)	Technology transfers, cross participations, joint ventures...
Split Incentive	Car user is not its purchaser (case in Belgium e.g.)	Landlord-Tenant issue	Subsidies or ETS money flow to the wrong people
Free rider	Subsidy for old cars scrapping	Existing replacement market also benefits the grants	Effect of voluntary agreements?
Absence of options	No alternative infrastructures. City planning (distances, density…)	Refurbishment not always possible (because architecture...)	
Unavailability of information	- Sub-optimal modal choice - Car fuel efficiency - Congestion "traps"	- Unawareness of opportunities- Inconsistent retrofitting levels	Use of irrelevant economic indicators

Free-rider and Spill-Over Effects

The free-rider effect is the proportion of energy efficiency improvements made by participants during an energy efficiency programme that would have been made in absence of the programme.

The spill-over effect refers to energy efficiency improvements that occurred due to the influence of a programme but were not directly supported through the programme (technically or financially).

The two effects are often combined as a net-to-gross ratio. Net programme impact is typically 60-85% of measured gross programme impact. In effect, the increase in programme impact due to the spill-over effect is more than offset by the decrease in impact from free riders.

Rebound Effect

This effect refers to the increase in the demand for energy services as the cost of the service decreases due to technical improvements in energy efficiency. Consumers change their behaviour due the lower cost of the service e.g. raise thermostat levels; cool their buildings more in the summer; buy more appliances and/or operate them more frequently; or drive their vehicles more, resulting in lower net energy conservation despite the improvements in technical energy efficiency8.

Studies to estimate the rebound effect of space heating in Europe estimated it to be between 20-30%. Estimates of the rebound effect in Europe vary with energy service and range between 0 and 50%. A study of the rebound effect of increased efficiency from retrofit household efficiency improvements found that around 30% of the potential energy savings were taken as increased comfort in low-income households. However the rebound effect tends to decrease over time due to the saturation effect.9

Data evaluation techniques

The proper analysis of data collected, and the design of its collection, requires the careful application of statistics. Further information is not presented here, but a major reference[10] provides more detail in four principal areas:

[8] IEA, 2005, The experience with energy efficiency policies and programmes in IEA countries – learning from the critics, http://www.iea.org/textbase/papers/2005/efficiency_policies.pdf

[9] Ibid

[10] SRC International et al, 2001, http://www.wupperinst.org/energieeffizienz/pdf/Ex-post-Evaluation-DSM.pdf

- Statistical methods;
- Engineering methods;
- Hydrid (combo of the two) methods;
- Sampling methods.

3 Highlights from PEEREA Countries on Evaluation Experience

Evaluations are made either by countries or by International Organisations, such as the IEA, the World Energy Council, ODYSEE – MURE, etc. Most of the evaluations are ex-post.

Some examples of national approaches to evaluation include:

Netherlands

The general approach for the evaluation of energy efficiency measures in the Netherlands is related to the way policy measures are transferred into well defined programmes. Evaluations of programmes are carried out every 4 years, generally by external consultants. The results of evaluations are used to monitor programmes and also as input for the policy process. Both ex-ante and ex-post evaluations are used.

When developing policy papers, the Dutch Government uses internal evaluation, supported by scenario studies carried out by research institutes and government agencies. Data collection is generally performed by Statistics Netherlands (CBS).

Policies are monitored within the framework of both the "general protocol for energy conservation" and the Dutch climate change policy.

Guidance on the internal evaluation of programmes was issued by the Ministry of Economic Affairs in 1994.

The Dutch Ministry of Finance has recently developed a new format for its policy measure reporting. This sets out targets, how they will be reached and the associated costs. This has prompted the revision of the Guidelines given by the Ministry of Economic Affairs in 1994. The Ministry of Housing, Spatial Planning and Environment introduced a Manual for evaluating Climate Change Policies in 2003 that is also relevant to energy policy measures.

Denmark

All Danish energy savings activities are typically evaluated, normally using external/independent consultants. Electricity network companies and increasingly, natural gas and district heat network companies, are obliged to map consumption and evaluate their energy saving activities.

Seven evaluations performed by Danish electricity network companies covered both regulation (Energy labelling of small buildings and Energy management scheme for large building), and information programmes (free-of-charge electricity audits, project 'Red Hot', the 'A' campaign 1999, promotion campaign for efficient ventilation and voluntary agreements for industry).

The evaluations are fairly robust with most assessing impact, costs, and CO2 abatement costs. Both ex-ante and ex-post evaluations are carried out. Long lasting programmes are usually assessed mid way to ensure that the project is on target to meet its objectives cost effectively.

Weaknesses of the evaluations include:

- lack of transparency of calculated figures;
- unclear or missing assumptions;
- lack of a consideration of baseline development;
- lack of measurement of energy impact.

France

Evaluations in France are carried out by a large number of organisations over a wide range of policies and measures, making the drawing of a full picture of which evaluations are being conducted difficult to draw. Work is sub-contracted through competitive tender to a range of consulting, academic, statistics and public sector bodies. In some cases there are clear distinctions between the implementing and evaluating organisations; in others these are blurred or non-existent. It is the view of certain commentators that the lack of capacity-building devoted to the evaluation of public policies in general and of energy efficiency in particular is a weakness of France's evaluation programme.

Most evaluations in France have been ex post and have been carried out at an aggregate level via indicators. The changes in the indicators are due to several factors: autonomous technical progress, changes in energy prices and the role of other programmes.

Only a few ex post evaluations of individual programmes exist in France. In general, they have been developed in the middle of the programme activity or at the end and not at the same time as the development of the programme.[11]

Indicators have been used in France since the mid-eighties to measure the overall energy efficiency progress resulting from many different factors. Recent indicators try to monitor the market penetration of efficient equipment and technologies that are promoted through specific programmes but it can be difficult to separate the impact due to the programme with other factors. Calculations of CO2 emissions have been undertaken in all evaluations since the mid nineties, either in the indicators or in the in depth ex post evaluations.

Evaluations of energy efficiency measures and programmes are carried out in four principal ways in France:

- 1. One-off in depth ex post evaluations of specific measures
- 2. Yearly evaluation that aims at providing an overview of the general trends in energy efficiency in the country
- 3. Yearly monitoring is done internally by ADEME to follow the impact of all the measures undertaken by ADEME
- 4. Ex ante evaluations that estimate, through modelling and/or expert assessment, the future impact of existing and/or new measures

IEA (International Energy Agency)

The IEA has recently produced a report on experiences with energy efficiency policies within their member countries and a handbook of evaluation methods of energy efficiency policy measures and Demand Side Management programmes (DSM). The handbook uses a series of case studies of different policy measure types in IEA different countries to establish a common methodology for the evaluation of energy efficiency policy measure and DSM programmes.

Country reports on six of the PEEREA countries (The Netherlands, Belgium, Denmark, France, Italy, and Sweden) are given in the second part of the IEA DSM Handbook. In each country report all energy efficiency policy measure evaluation studies are collected and analysed to assess:

1. the level of energy efficiency policy measure evaluation effort within each country;
2. evaluation techniques used for different policy measure types

The level of evaluation effort of the 42 case studies in the IEA DSM handbook (categorised into the three levels :Level A (Comprehensive); Level B (targeted evaluations) Level C (programme review evaluations.

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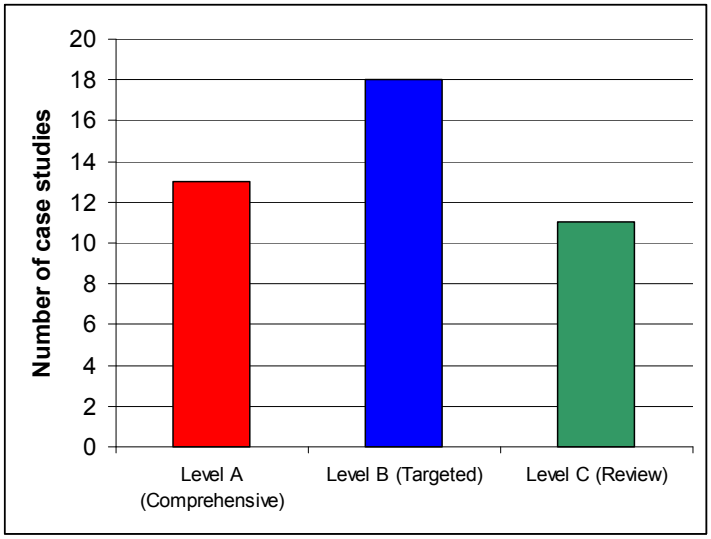
http://dsm.iea.org/NewDSM/Work/Tasks/1/EvalGuideBook/Evaluation%20guidebook%20volume%202%20France%20oct%2005.pdf

Fig 2: Evaluation effort level of the 42 case studies in the IEA DSM handbook



ODYSSEE and MURE

ODYSSEE, a database of energy-efficiency indicators established in 1993, is a joint project between ADEME, the Intelligent Energy Europe (IEE) programme of the European Commission/DGTREN and energy efficiency agencies in the EU-15 and Norway. The project was set up through a joint collaboration between ADEME, the SAVE programme of the General Directorate of the European Commission in charge of energy and all energy efficiency agencies in the EU-15 and Norway (or their representatives)[12]. The project is co-ordinated by ADEME with the technical support of ENERDATA and Fraunhofer. The data are updated regularly by the network of national teams.

MURE was designed and developed by a team of European experts, led and co-ordinated by ISIS (Istituto di Studi per l'Informatica e i Sistemi - Rome) and by FhG-ISI (Fraunhofer Institute for Systems and Innovation Research - Karlsruhe). The MURE team further includes ENERDATA (F) and previously INESTENE (F) and March Consulting Group (UK). A permanent network of correspondents established in all other Member States guarantees the continuous updating of the database.

Users of the MURE database can select over 850 measures for each of the four demand sectors (household, industry, services and transport) for one (or more) or the EU-15 countries and Norway. Each measure is summarised, with information including the legal framework of the measure, year of enforcement, measure type and players involved.

The MURE website also contains a simulation tool which allows users to assess the savings resulting from a policy or package of policies compared to a reference scenario. In the reference scenario energy demand is driven by factors such as the number of households, electricity demand growth and energy efficiency measures already implemented.

The MURE simulation tool can be used for both ex post and ex ante evaluations. Ex post simulations generate theoretical energy saving data from a period that can then be compared to actual data to give an indication of the real energy drivers present. Ex ante simulations allow forecasting of the long term impact of both current and proposed energy efficiency policies.

[12] EVA in Austria, Econotec in Belgium, DEA in Denmark, Motiva in Finland, FhG-ISI in Germany, CRES in Greece, Sustainable Energy Ireland, ENEA in Italy, ECN in the Netherlands, IFE in Norway, ADENE in Portugal, IDAE in Spain, STEM in Sweden and AEAT in United Kingdom.

4 Where Now? Lessons Learned and How to Move Forward

This paper has described two types of efforts: national (or measure-specific) and international. Evaluations are happening but not frequently or comprehensively enough. Why is that, given the prominence and priority they have received for more than two decades? And how important are going to be evaluations from now on?

Some key recommendations in regard of initiating and conducting evaluation are provided by the World Energy Council, following their evaluations of the EC's SAVE programme[13] continues to be valid:

- Good evaluations are essential to improve programme activities and information from evaluations should be used actively;
- Care should be taken when forming the objectives of an evaluation as they determine the credibility and costs of the evaluation;
- The evaluation should be planned as early as possible in relation to programme activities. Planning evaluations early, even before the programme starts, can reduce the amount of work required and more reliable data can be collected at lower cost;
- Good communication between the parties involved and affected by the evaluation should be established. All parties should be aware of the possible consequences of the evaluation and care should be taken in the presentation of the evaluation results to ensure that they are immediately useful to the intended users.

But where do you go from here? Especially in Europe, given the new Directives that came into force in the area of energy efficiency (e.g. the CHP Directive, the Buildings Directive, the Energy Services Directive) as well as the Action Plan, it becomes essential to be able to know what to expect from various envisaged policies and also to be able to follow developments and to be able to react if expected results and realities are far from each other.

In light of the above considerations evaluations should be more and more developed as an instrument of planning and of monitoring. We may not afford to wait for the end of a multi-annual programme in order to undertake evaluations and to change future policies. Early reactions and adjustments can save money and secure reaching longer term targets. Therefore the development of indicators and of evaluation methodologies should go hand in hand. But one should not replace ex-post evaluations with monitoring based on key indicators either. It is all about creating a system of evaluations which, integrated in the policy cycle presented in the Introduction of this paper, to secure that:

- Realistic targets and plans are established; neither to demanding to discourage action nor to lax to allow no action
- Results of ex-ante evaluation of policies and measures should be seen as guiding, and not binding
- Indicators for supporting monitoring and evaluation effectiveness are developed in the beginning of the implementation stage
- Flexibility in the implementation of various policies and measures is allowed, if intermediate evaluations bring evidence of the need to change
- Results of ex-post evaluations are considered in the development of new similar types of policies and measures

[13] SRC International et al, 2001, http://www.wupperinst.org/energieeffizienz/pdf/Ex-post-Evaluation-DSM.pdf