



EVALUATION OF ENERGY+ PROCESS

WITHIN THE FRAMEWORK OF THE AID-EE PROJECT

Author

Nicola Labanca

August 16, 2006

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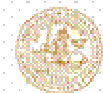
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Project executed within the framework of the Energy Intelligence for Europe programme, Contract number EIE-2003-114

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1 Characterisation of the instrument

Energy+ is a co-operative procurement process developed by energy agencies and research institutes from several European countries that co-operated in order to increase the market for super-efficient domestic cold appliances as from 1998.

The overall aim of this instrument was to contribute to a long-term, sustainable transformation of the European domestic appliance market by the use of aggregated purchasing power at European level. The instrument sought to facilitate the spreading of energy efficient fridge/freezers on the European market by aiming to develop and to make the best existing units available from more manufacturers throughout the European Union, and enlarge the market by making these models the choice of more customers.

The idea was to gather strong, influential purchasers from the whole European Union and together with them draw up specifications for a fridge/freezer with good energy and environmental qualities¹. By showing the manufacturers that there was a market for these products and what features the buyers were looking for, the manufacturers were supposed to be spurred to develop or make such units available on a larger scale².

Energy+ process does not correspond to the traditional idea of “procurement process” due to its several peculiarities that hopefully will appear clearer from the reading of various sections of this report.

Energy+ acted both at European and national level and its effectiveness can be explained by its capacity to exploit the interplay between these two levels.

On the one hand European character of energy+ allowed stimulating interest of cold appliances manufacturers for the initiative, as they address the whole European market and the regulation they have to comply with in relation to energy performance of their products is developed at European level. On the other hand aggregation of demand side, stimulation of its interest towards energy efficient cold appliances and verification of presence of these appliances in the various European countries could be achieved only acting at national level. For reasons above energy+ cannot be considered as an instrument to be implemented at national level only.

It has also to be pointed out that energy+ process, as applied to energy efficient cold appliances, differs from traditional procurement process because it forgoes the idea of creating a formal buyer group possibly addressing initial purchase orders to

¹ Such purchasers did not receive any direct economic incentive for their support to energy+ (see section 2.1 for more details on this point)

² It may be worth specifying that co-operative procurement differs from technological procurement insofar as it aims at increasing market share of already existing and commercialised products and does not directly address R&D of new products for which a considerable demand has been identified.

manufacturers involved (reasons for this are explained in the section dedicated to instrument evaluation).

1.1 Targets, including relation to end use sector and relation to national Kyoto target

Energy+ project targets were not explicitly set in terms of energy savings or avoided CO₂ emissions to be achieved.

Energy+ project team estimated that the procurement of high efficiency refrigerators directly induced by the first phase of implementation of the instrument (hereafter indicated as E+ phase) during 1999-2001 would have saved annually from 9.3 to 15.5 GWh of electricity in EU-15, that at the end of the successive phase (a.k.a. 2E+ phase) these savings would have reached 62 GWh in electricity end-uses in the EU-15 during a period of about 15 years (i.e. average cold appliance lifetime) and that at the end of the successive phase (a.k.a. 2E+ phase) these savings would have reached 62 GWh because of energy+ appliance sales in the period 2002-2004. Such savings could become as high as 1 TWh with a growing market share.

The action undertaken constituted a good mean for the European countries to work together towards the common green house gas (GHG) reduction commitments under the Kyoto Protocol, as in 1998 domestic refrigerators and freezers were supposed to be responsible for 6% of Europe's final electricity use and up to 2% of EU CO₂ emissions. 62 GWh saved annually thanks to energy+ were estimated to allow to avoid about 28 440 tones of CO₂ emitted. For more details on estimated energy saving and avoided CO₂ emission calculation see section 1.10.

1.2 Period the policy instrument was active

Energy+ was active from January 1, 1999 till October 31, 2004.

Such a process was implemented through two almost successive EC sponsored SAVE projects (hereafter indicated as E+ and 2E+ projects) and preceded by a one year feasibility study carried out under the SAVE programme (ref. 2) investigating the possibilities and the potential for such actions on a pan-European level.

From the end of E+ project³ (August 2001) until the official beginning of the 2E+ project⁴ (April 2002) there has been an 'intermediate period' during which participating organisations decided to financially support project co-ordinator so allowing maintaining all instruments in place.

³ Contract No XVII/4.1031/Z/98-273

⁴ Contract No: 4.1031/Z/01-033/2001

1.3 Actions, Specific technologies and/or energy efficiency measures

At the core of the project were technical and functional specifications that defined the criteria of the product type targeted. Manufacturers were invited to present products that would qualify to enter the energy+ lists by meeting a set of strict but simple mandatory specifications. The specifications did not prescribe any technical solution: manufacturers were free to present any solution as long as its performance and functions met the specifications.

Until the end of 2001, the project first phase – presented as a pilot project- focused on the most sold appliance across Europe: fridge-freezers with a capacity of 200/300 litres. Then, the specifications were extended to cover all categories of cold appliances as defined in the Labelling Directive 94/2/EC. The so called energy+ appliances were to:

- Have an energy efficiency index (EEI) equal to or below 42%⁵ (in accordance with Directive 94/2/EC and the EN 153 test procedure). Given the models on the list in March 2004, energy+ appliances were 25 to 64% more efficient than basic A-rated models.
- Have a maximum energy consumption of 280 kWh/year – to put a cap on the size of appliances being marketed under energy+.
- Be available on the European market by the relevant official energy+ list update publication deadline (twice a year).

As may be noticed, besides the cap of 42% applied to EEI of energy+ appliances an absolute limit of 280 kWh/year was established on appliances' energy consumption. The inclusion of this limit among energy+ specifications was introduced with the intent of contrasting manufacturer tendency to produce larger and larger models and of introducing a principle of sufficiency and not only of efficiency in energy consumption.

1.4 Target groups

Target groups

The following target groups participated in E+:

- White goods manufacturers;
- Retailers (regrouping large international retail chains as well as individual tailors, mail order companies and electric utilities);
- Direct buyers (holiday parks, hotel and catering industry, etc.);
- Institutional buyers (comprising housing companies, national housing associations, associations for student apartments, etc.);

⁵ The EEI is used to define the EU energy label categories, with 55% the maximum for an A-rated product.

- Supporters (including environmental organisations, energy agencies, consumer associations and other organisations who in their daily work could push for and inform about the qualified energy+ appliances).

In developing the range of domestic cold appliances in the procurement portfolio, 2E+ essentially addressed the same target groups. Specifically, 2E+ worked to strengthen the involvement of existing organisations whilst at the same time seeking to expand their number. E+ identified a number of “lever actors” not participating in the project that could be targeted in 2E+ and could benefit from an increase in sales of the high efficient appliances on which 2E+ focused, such as e.g. manufacturers of high efficiency compressors. As may be noticed energy+ was not built as a label targeting end-users and did not address consumers. Therefore the influence that this instrument had on these subjects has to be considered somehow indirect.

1.5 National contexts

Obviously the tempo and nature of market transformation induced was expected to be slightly different in the participating countries. E.g. in the countries where energy labels are still not common practice to the public the impact would have been different from other countries. The positioning of energy+ was also expected to be different in these countries. This is due to the national market situation (enthusiasm of local manufacturers, importers, retailers, supporters) national energy policies (energy prices, different energy sources, different energy policy instruments adopted), the energy situation, existing procurement schemes, rebates / subsidies, national communication about relevant topics (energy saving, energy efficiency, environmental issues) black-outs and many other aspects.

During the first phase of project implementation it was found that a few large manufacturing companies dominate the European market. They are present, in one way or the other, on most national markets. Well over 100 different brands (2001) were found in the 10 countries studied: appliances from the very same manufacturer are sold under different brands in different countries. This shows that, although cold appliances are fairly standardised units, strong national preferences prevail in regard to total volume, position of freezer vs refrigerator compartment (top or bottom) and volume of the freezer compartment, and above all branding and marketing. The brand and marketing strategy of different markets is consequently of high importance to the manufacturers, i.e. not every model can be sold in every country with any marketing argument and brand and in any price class. Even if most manufacturers would have been able to participate in an international procurement from a *production* point of view, only the major ones have the commer-

cial resources and the distribution network needed to widely deliver a winning or selected product throughout the European Union⁶.

1.6 International context

EU energy-efficiency policy had a strong impact on the market of cold appliances before 2000. Energy labelling began to be implemented in EU Member States in January 1995 and was fully implemented into legislation across the EU by May 1998. MEPS (Minimum Energy Performance Standards) were published in September 1996 and came into effect in September 1999. Although the overall impact on manufacturer sales or profitability of these measures is not discernible against major macro-economic effects such as general economic robustness and consumer confidence, labelling has clearly had a strong impact on product design, marketing and sales, achieved at some costs but also with important benefits.

Despite substantial improvements in cold appliance energy efficiency, stimulated by the energy labelling and MEPS Directives, in 2000 there were very considerable cost-effective energy savings potentials not yet realised. COLD II study (ref. 1) put in evidence that in 2000 appliances with EEI as low as 31% (44% better than the minimum A requirement fixed at EEI = 55%) already existed on the EU market, while EEI levels as low as 17-25% were quite conceivable considering potential medium – to long-term design options. Successive market evolution was characterised by a substantial improvement in the average EEI of cold appliances sold in the European market. The percentage of class A cold appliances sold became so high⁷ that the energy label with its A-G ranking criteria lost most of its usefulness and a revision of the EU label directive 94/2/EC was decided. In June 2003 the new directive came in place, introducing new A+ (30% ≤ EEI < 42%) and A++ (EEI < 30%) energy efficiency classes and at the same time redefining some parameters for the calculation of the energy efficiency index. This being the international context, energy+ assumed the role of facilitator and catalyser helping identify efficient cold products in the period immediately preceding the revision of the energy label thresholds⁸.

1.7 Market failures to overcome

Through energy+ a European market transformation action using demand purchasing power⁹ was undertaken. As already mentioned the potential for such actions was already investigated with a one-year study (ref. 2) constituting the basis on

⁶ It may be worth noticing that, despite this situation, Energy+ managed to actively involve manufacturers that were quite new and marginal in the European scenario (see the example of Arcelik described in section 3.7).

⁷ In 2003 most of cold appliances sold in the European market were class A and class B.

⁸ Notice that Energy+ specifications set the "42%" level for energy efficiency index which was then used as a reference for the labelling revision and became the threshold for the A+ energy class.

⁹ Interviewing a lot of operators on the demand side and asking them to sign the Energy+ declaration, the national E+ teams have sent a strong and unified signal to manufacturers: (simplifying) "all over Europe, retailers are devoting time to energy efficiency – an issue which is not at all part of their job – so this is the trend, and you should be part of it".

which energy+ was developed. The study focused on the process of procurement and identified two main variables, which greatly determine the best way to ensure a successful process at international level:

1. the similarities in product usage and the level of standardisation of the product; and
2. the international character of the market, i.e., the presence of international actors.

One of the main barriers to co-operative procurement at European level was identified in the lack of experience and therefore confidence in the process as such.

The fact that the European countries differ in terms of climate, culture (and therefore product usage), market structures and policy aspects, represented a challenge as well. *Energy+* pilot project was started up by using the first one of the three organisational forms recommended in the study for organising procurement activities¹⁰, i.e. *full EU-wide procurement*, on a highly international market with fairly standardised products. Refrigerator-freezers were found to meet the criteria necessary for such a procurement activity. They also represent a significant energy saving potential. Using pan-European procurement as a policy tool was also well in line with the political agenda at European level: it built upon the well established energy labelling system and plays an important role to help identify efficient cold products during the period between the introduction of minimum energy performance standards (September 1999) and the up-coming revision of the energy label thresholds. One of the main conclusion of the study was that *pan-European procurement help identify efficient cold products during the period between the introduction of minimum energy performance standards and the up-coming revision of the energy label thresholds.*

1.8 Organisations, which are responsible for implementation and execution

The participating countries in the first project (E+) were: Austria, Finland, France, Germany, Italy, The Netherlands, Norway, Portugal, Sweden and the UK. In the second project Belgium and Greece joined. Soon after the start also Sweden and

¹⁰ The SAVE study recommended three organisational forms of organising procurement activities:

- *Full EU wide procurement*, where a common procedure is developed and implemented at the EU level by a European process co-ordinator in co-operation with national co-ordinators. This scenario is suitable for international markets with more or less standardised products.

- *EU co-ordinated procurement*, where a common procedure is used concurrently on the individual national markets, is judged suitable for products with a low level of standardisation or large differences in usage, or on markets where the countries are very different in terms of policy and regulations.

- *Two-step procurement*, suitable for complex systems that can be broken into more or less standardised units. This scenario is a combination of the two above: a full EU wide procurement is carried out for the units or components, combined with EU co-ordinated national procedures for the entire systems.

Switzerland joined the project, via a separate construction with the project co-ordinator. The list of organisations participating in the process is reported below.

Austria – EVA, the Austrian Energy Agency; **Belgium** – VITO, Flemish Institute for Technological Research; **Finland** – Motiva, Energy Information Centre for Energy Efficiency and Renewable Energy Sources; **France** – ADEME, French Agency for the Environment and Energy Management; **Germany** – Wuppertal Institut with support from the State of North Rhin-Westphalia and UBA, the Federal Environment Agency; **Greece** – CRES, Centre for Renewable Energy Sources; **Italy** – Politecnico di Milano, with support of Ministero dell'Ambiente e della Tutela del Territorio, Direzione per la Salvaguardia Ambientale; **The Netherlands** – SenterNovem, the Netherlands Agency for Energy and the Environment; **Norway** – Norwegian Water Resources and Energy Directorate and NEE, Norwegian Energy Efficiency and Energy Management Inc; **Portugal** – ADENE, the Portuguese Energy Agency; **Sweden** – STEM, the Swedish National Energy Administration; **Switzerland** – SwissEnergy, represented by the Swiss Agency for Efficient Energy Use (S.A.F.E.); **United Kingdom** – ECI, the Environmental Change Institute of the University of Oxford with support from the DEFRA.

1.9 Available budget

Budget available for the first phase (E+) of implementation was 1,000,000 Euros of which 35% were provided by the European Commission. In the second phase (2E+) budget amounted to 753,250 Euros of which 31.39% were provided by the European Commission. Totally, 1,753,250 Euros were hence used in 6 years to address 10 countries (become 13 countries in the second project phase). This corresponds to about 30,000 Euros per country per year.

Table below roughly indicates first implementation phase budget allocation.

Activity	Budget allocated (Euros)	Budget share
Feasibility study	161,000	16.10%
Aggregation of potential buyers	301,000	30.10%
Compilation of technical specifications	133,000	13.30%
European Award Competition organization	90,500	9.05%
Evaluation and selection of winners	224,500	22.45%
Additional costs (national travels, publications, information, mailing)	90,000	9.00%
TOTAL	1,000,000	100%

1.10 Available information on initial expected effectiveness and cost-efficiency of the instrument

Rough estimates on expected energy+ effectiveness and cost-efficiency were made for each of the two phases of implementation with a different level of detail (ref. 3; ref. 4).

As far as E+ is concerned

A) Potential savings were estimated under the hypothesis of a minimum direct effect of shifting 1% of the 1996 European market (i.e. 62 000 units) from an average European model¹¹ (a C-rated one consuming 500 kWh per year) to a highly efficient class A model, which would have used no more than half of this C model's consumption, i.e. 250 kWh per year. Under this hypothesis the gain would have been a saving of **15.5 million kWh for one year**, equal to **1.43 million Euros for one year**, that is to say **18.5 million Euros over the life time of the appliance**.

Above minimum direct effects (i.e. 1% shift of market) were estimated also under the hypothesis of attracting consumers that would have bought B-rated models instead of the average category 7 appliance bought in 1996 as used above. The calculation showed, for a minimum objective of 1% shift on the market from these B models consuming 400 kWh per year, to highly efficient class A model consuming 250 kWh: a saving of **9.3 million kWh for one year**, equal to **861 000 Euros for one year**, that is to say **11.1 million Euros over the life time of the appliance**.

The contribution of indirect effects was also estimated, assuming that due to the entry on the market of new, higher efficiency class A models, the whole range of models and thus the whole market would have been pulled a little further to higher efficiency, thanks to changes implemented through the competition.

It was estimated that if an average saving of only 10 kWh per year per appliance would have been achieved, i.e. only 2% of improvement compared to the average fridge/freezer on the market, this would have yielded a saving of **62 million kWh/year and 74.4 million Euros over the life time of the appliance**.

B) An analysis of costs and benefits was also attempted.

From the point of view of the consumer, benefits can be analysed in terms of saved kWh across Europe: despite the fact that a conservative hypothesis was chosen, foreseen project benefits exceed its costs, be it the contribution of the European Commission or the contribution of the national institutional partners.

¹¹ Only fridge-freezers (category 7 of labelling directive 94/2/EC: 2 doors, 4 stars) were considered because they were the most sold cold appliances across Europe. This was as well the category that the successive project feasibility study indicated as the best category to be targeted by E+.

According to the three cases studies induced annual savings are 15.5 million kWh or 9.3 million kWh and 62 million kWh, which means 18.5 million Euros or 11.1 million Euros and 74.4 million Euros as induced savings benefit against 1.7 million Euros cost for the project.

From the environmental point of view, benefits can be analysed in terms of avoided CO₂ emissions. Using Eurostast (1990) figures, the project was expected to allow to avoid 7 110 tones of CO₂ for the first hypothesis, 4 266 tones of CO₂ for the second hypothesis and 28 440 tones of CO₂ if indirect effects were considered.

As far as 2E+ is concerned

Same starting data as E+ were employed for the evaluation, with the exception of the average per unit consumption estimated at 400 KWh (as a result of minimum standards introduction) and the average consumption of highly efficient fridge/freezers estimated at 200 KWh. Assuming that these highly efficient appliances could be promoted to 5% of the market, the annual savings were estimated in 62 GWh (310,000 appliances x 200 kWh). Savings would have reached about 1 TWh when energy+ fridge/freezers would have spread throughout the whole stock of appliances. Considering small today A+ and A++ appliance market shares, assumptions on achievable energy+ appliance market share were not as conservative as they might seem.

1.11 Side effects

Energy+ basically being a market transformation programme, it can be argued that spill over effects were considered very important for the success of programme. Nevertheless, the envisaged introduction of A+ and A++ classes in the energy label makes very difficult to evaluate spill over effects as well as free riding due to those manufacturers that would have produced cold appliances complying with energy+ specifications even without energy+ process implementation because of new energy efficiency class introduction. No evaluations about these effects do exist.

2 Policy theory

Different implementation phases of the policy instrument analysed are defined in work plans of E+ and 2E+ projects (ref. 3; ref. 4) and are summarised in the overall picture below reporting also related success and failure factors, indicators individuated and relationships with other energy policy instruments. Subjects directly responsible for the instrument implementation were the energy+ co-ordination team (made of 3 persons) and national energy+ teams (made of 1-2 persons belonging to the already mentioned organisations). Also target groups addressed (white goods manufacturers, retail organisations, housing associations, environmental NGOs, energy agencies, consumer organisations, etc.) played an active role promoting energy+ cold appliances and benefiting of the international showcase that the action offered.

It has to be stressed that it is almost impossible to define exact sequence of phases of the *energy+* project (or in general of any procurement activity). The whole process requires a great deal of flexibility and openness to adjust to new inputs and experiences during the course of the project. For instance, the feasibility study was not only an activity that served to verify a given, planned procedure¹²; it also played a role in starting to build up important relations with market actors who would eventually come to participate in the project's buyer group, so serving as an initial step of the market transformation activity for the project.

Similarly to the feasibility study, it is also difficult to draw clear division lines between the phases of building up a group of potential buyers and developing the technical requirements. Potential buyer group's views on the requirements were actively solicited, and the requirements were amended several times based on input from potential buyer representatives, technical experts and the project team's views before they were finalised.

2.1 Cause-impact relations

The following actions resulted to be the key elements for the implementation of the instrument (ref. 7). Such actions constitute the cause-impact chain reported in figure 1 below together with indicators, main instrument success and failure factors and interactions with other policy instruments individuated¹³.

¹² On this point, see e.g. the decision taken during the feasibility study of abandoning the work programme objective of creating a buyer group able to submit to manufacturers initial purchase orders for energy+ appliances (see indicator n.1).

¹³ A detailed description of indicators, success and failure factors and interactions with other policy instruments individuated can be found in chapter 3, section 4.2 and section 2.2 respectively.

On the market actors' side

- Potential buyers are contacted by energy+ national teams and are asked to elaborate a common demand for the product in question (given the possible existence of specific preferences for each buyer) and in the ideal case address an initial order to the manufacturers that will eventually meet their demands. Once an international buyer group is formed, buyers jointly define the features of the product they wish to purchase. This work is performed by the buyer group, led by the project coordinator assisted by the rest of the team members and independent technical experts within the fields treated in the specifications. It is of the utmost importance that the buyers are strong and influential enough to encourage the manufacturers to take up the challenge and develop their products or production lines in the desired direction.
- Manufacturers are contacted at their headquarters by the energy+ co-ordination team and at their national branches.
- Participating manufacturers declare in which countries they are prepared to offer the product for sale. Each individual product is submitted to the energy+ co-ordination team which centralises and checks the data before publishing it on energy+ lists of products.
- National energy+ teams verify the presence of appliances in their country. Adjustments are made in the product list through a dialogue between manufacturers' European HQ, national branches, energy+ central and national teams.
- Energy+ randomly tests registered products in order to confirm that they do conform to the specification and their product declaration.
- In each participating country, buyers and other representatives of target groups are approached by the national energy+ representatives, who disseminate information and provide overall support. Commitment to the project is indicated by a signed declaration¹⁴. No money is required by the energy+ project from participants at any stage.

Energy+ co-ordination group activities

The role of the central team is crucial, as they carry out the co-ordination work with the manufacturers' headquarters and are responsible for the publication of the bi-annual list of energy+ products disseminated among target groups, the maintenance of the on-line appliance data base published on project website, the organisation of the European Energy+ Awards competitions . Much of the publicity material and

¹⁴ The Energy+ team prepared three types of "Energy+ declarations": one for retailers, one for large buyers and one for supporters. By signing these declarations which were not very binding, these operators indicated their interest in energy efficiency and their will to pay a specific attention to this criteria and the Energy+ project in their daily work, i.e. constructing a range of products for their shops, bulk buying appliances, speaking to the general public). As a result of signing this "declaration", they received a "certificate" signed by a national representative and by an officer from the European Commission that they could use for their own recognition (public, internal, etc.).

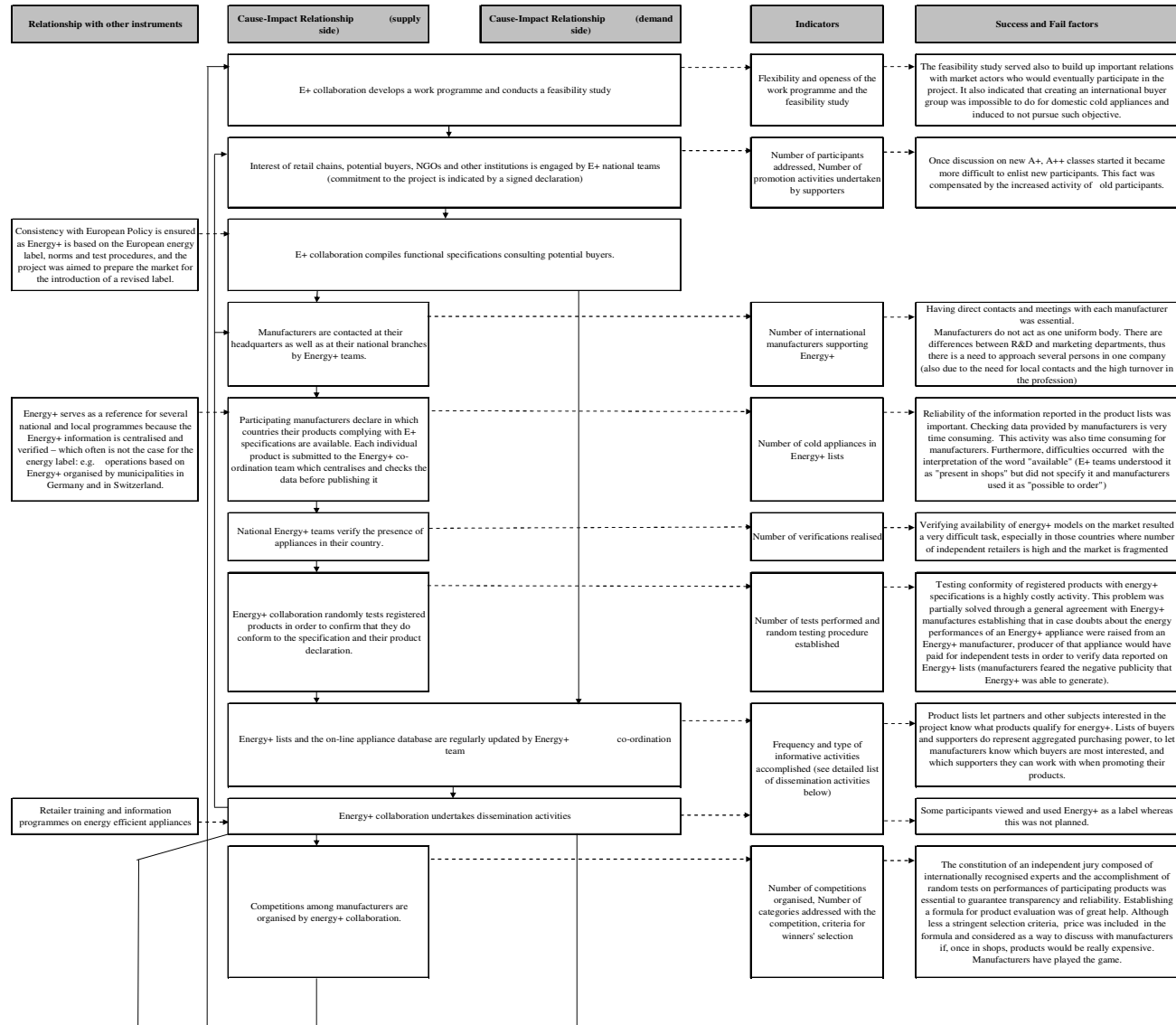
the organisation of the competitions is provided centrally. The national teams provide input for all these tasks, comment on the documents proposed by the coordination team, translate all the material, organise dissemination in their own country, including supporting the participants. The energy+ teams are effectively acting as a facilitator between offer and demand of energy efficient cold appliances through providing information. Trade activities remain a part of the traditional, confidential negotiations between buyer and seller.

2.2 Interaction with other policies

Energy+ was based on the European energy label, norms and test procedures. This fact facilitated participation of manufacturers to the action proposed because meeting energy+ specifications did not require measurement or verification activities different from the ones already to be accomplished to comply with EU legislation. At the same time energy+ stimulated manufacturers to put on the market more energy efficient cold appliances and prepared the market to the introduction of the revised label with new A+ and A++ energy efficiency classes.

Energy+ could serve as a reference for several national and local programmes on energy efficiency (e.g. a Dutch rebate programme and operations organised by municipalities in Germany and in Switzerland) because appliances more energy efficient than basic class A models were addressed and information was centralised and verified (which is not the case for the energy label). Thanks to initiatives like these also consumers could be directly involved and informed about energy+ products and retailers were stimulated to participate more actively to the action.

Finally, energy+ communication support could be employed for retailer training and information programmes on energy efficient appliances.



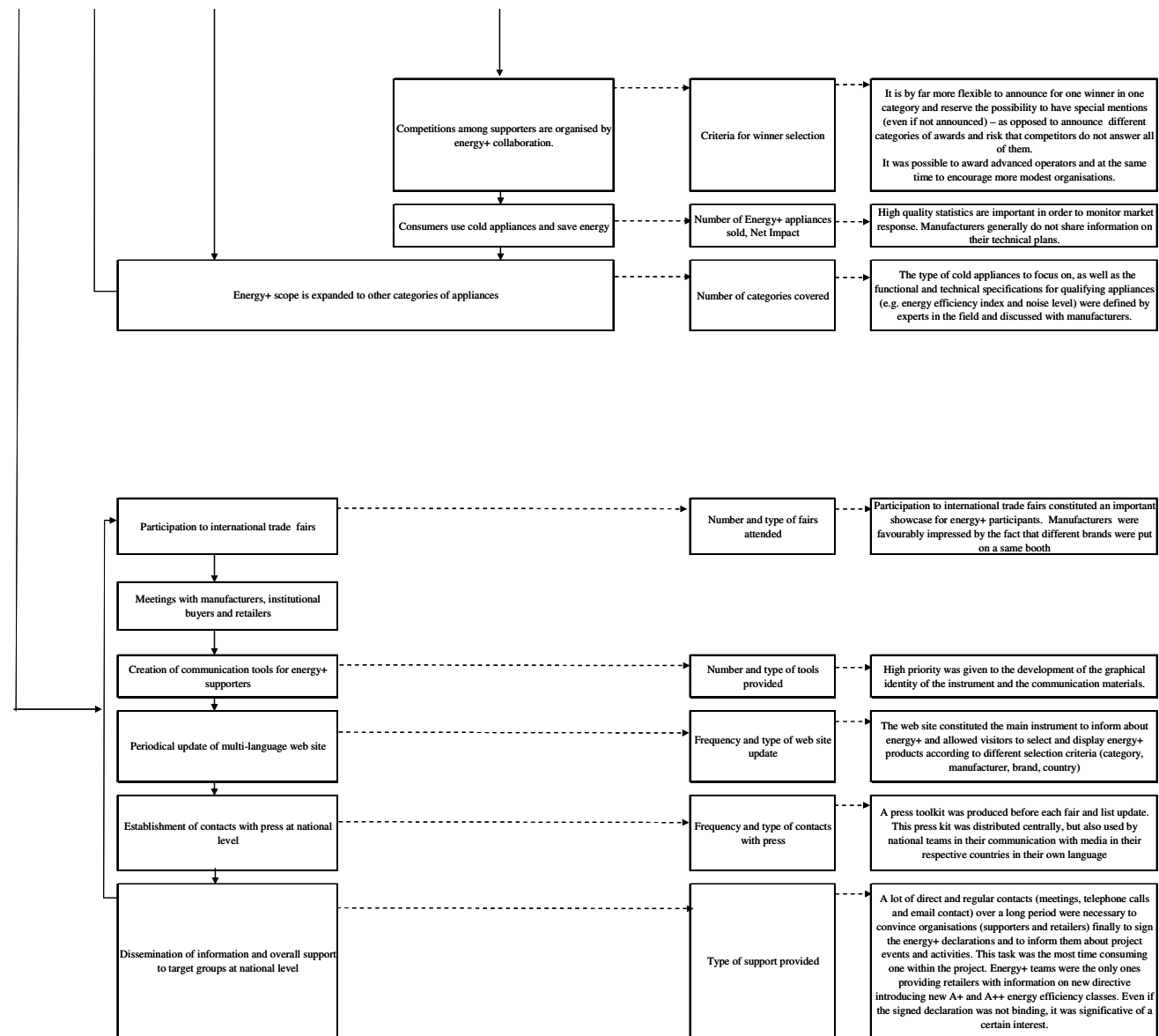


Figure 1 Overall picture of assumed functioning of the instrument: cause-impact relations, indicators, success and failure factors and interactions with other instrument

3 Evaluation

Sections of this chapter present the outcome of each defined indicator.

3.1 Indicator 1 - Flexibility and openness of the initial work programme and the feasibility study

As already mentioned the whole *energy+* process requires a great deal of flexibility and openness to adjust to new inputs and experiences during the course of the project. The feasibility study conducted during project initial phase did not serve only to verify initial planned procedure but played a role in starting to build up important relations with market actors who would eventually come to participate in the project's buyer group. During the feasibility study, important experience was achieved and used as input when the technical requirements for the products were developed. Thus, the feasibility study itself also served as an initial step of the market transformation activity for the project.

Furthermore, the feasibility study indicated the impossibility of co-ordinating an international buyer group of the size and kind targeted by *energy+*, in the sense of co-ordinating orders and purchasing, and forced to revise initial project work programme envisaging that buyers involved in *energy+* process would have possibly elaborated a common demand for some *energy+* products and then addressed an initial order to the manufacturers that could meet their demand.

Reasons inducing the abandon of this work programme objective typically pursued by "traditional" procurement processes not focusing on domestic cold appliances are briefly summarised hereunder.

Retailers generally have yearly agreements with specific manufacturers. The price they pay to their supplier is often not set until the number of appliances sold (of all kinds, not only refrigerators-freezers) is known. Bargaining practices between supplier and retailer imply that the price for a cold appliance can be influenced by the number of washing machines of the same brand sold. The relations between retailer and supplier are often long-term and new brands will only be included in the range if they are expected to be fairly easy to sell. Therefore, retailers do not include the products conforming to the *energy+* specifications in their range if the brand in question is not in line with their business strategy or does not fit the national context. Retailers are for these reasons not able to place any firm orders and can not commit themselves to buy a certain number of units of a product, no matter how energy efficient and of good quality the unit may be.

Moreover, organising a bulk purchase would potentially conflict with European competition legislation. These market characteristics prohibited the setting up of a

buyer group in the traditional sense (i.e., a number of institutional buyers who jointly develop specifications and operate as a single buying entity for contracts).

The above conclusions do not mean that international procurement activities with tight and co-ordinated buyer groups are impossible for all type of products, but the conclusion seems to be valid for consumer-oriented, mass-produced goods where brands are important, as it's case for European domestic cold appliances¹⁵.

To meet these challenges and at the same time maintain the market transformation effect on a European scale, the project was instead designed to push for the “best of the best” products and to stimulate the “vanguard” demand-side actors to act in favour of highly efficient products, while letting the commercial interactions take place outside the scope of the *energy+* project.

3.2 Indicator 2 - Number of international manufacturers supporting energy+

Table below shows variation with time of number of international manufacturers that inscribed their products in energy+ lists.

	<i>Manufacturers</i>
January 1999	0
Feb 2000	1
March 2001	4
Dec 2001	5
March 2002	8
Dec 2002	12
March 2003	13
October 2003	19
March 2004	21

These manufacturers were AB Electrolux, Amica, Antonio Merloni, Arcelik, Bosch-Siemens, Candy, Foron, Gorenje, Haier, IAR Siltal, Liebherr, Merloni, Miele, Migros, Neckermann, Otto, Quelle, Snaige, Vestfrost, V-Zug and Whirlpool. Among these names all the most important producers of cold appliances commercialising their products in the European Union can be easily recognised.

Data on European market share of energy+ appliances are not available. A rough estimate can be derived from sales of A+ and A++ cold appliances. Excepting the 280 KWh/year cap put on Eneyg+ appliances' maximum annual energy consumption, all A+ and A++ appliances sold by above manufacturers can indeed be considered energy+ appliances.

A rough indication of EU 15 sales of A+, A++ appliances according to available Gfk data is 2.5% in the year 2003.

¹⁵ In case of domestic cold appliances it seems feasible, however, to have institutional buyers involved in the buyer group and have them co-ordinate their work in a decentralised fashion, as happened in Sweden.

3.3 Indicator 3 - Number of cold appliances in energy+ lists

	<i>Brands</i>	<i>Models</i>
March 1999		2
Feb 2000		2+7
March 2001	8	16
Dec 2001		23
March 2002	18	78
Dec 2002	24	188
March 2003	33	438
October 2003	39	597
March 2004	49	866

The table above illustrates the variation with time of the number of energy+ models put on the market by manufacturers supporting the action. Information on number of brands represented is also reported when available. Values obtained are by far better than most optimistic forecasts. Considering that studies conducted at European level have shown that sales tend to follow supply figures, it can be roughly assumed (ref. 6) that variations above correspond to sales figures of high range models (i.e. not the bulk of appliances sold but appliances with a very high added value mainly deriving from their higher energy performances). An important question is whether the energy+ project managed to speed up the market introduction and commercialisation of more energy efficient models compared to those already on the market. This question is difficult to answer, since manufacturers generally do not share information on their technical plans. There are methods that could be used to establish whether market introduction of a given product was speeded up due to a number of activities (for instance learning curve analysis methods) but these methods also require high-quality statistics and can only be utilised after some time has passed. Individual pieces of evidence do suggest, however, that the energy+ project has been important for the companies.

3.4 Indicator 4 -Number of verifications of the presence of appliances in the sales points and catalogues

Verifying availability of energy+ models on the market resulted a very difficult task, especially in those countries (like Italy) where number of independent retailers is high and the market is highly fragmented. In general verifications performed were very few and were often limited to some interviews with retailers supporting the action. Results indicated that retailers were usually not aware of the level of presence of energy+ appliances in their shops, although subjects interviewed af-

firmed that energy+ appliances could easily be provided to those consumers explicitly requiring them. The relations between retailer and supplier are often long-term and new brands are included in the range only if they are expected to be fairly easy to sell, if they are in line with their business strategy and they fit the national context. Various initiatives undertaken in different European countries shows that the activation of local programmes on energy efficiency addressing cold appliances are the best incentive for retailers to rapidly increase the presence of energy+ appliances in their sales points.

3.5 Indicator 5 – Tests of registered products to confirm conformity with specifications

Testing conformity of registered products with energy+ specifications is a highly costly activity that could be realised at the expense of project budget only during the E+ phase. In 2000, 5-6 energy+ models were indeed bought by the collaboration and tested by the test institute TNO in the Netherlands. Results revealed that energy performances of these models were even better than those declared by manufacturers on energy+ lists. Nevertheless, a general rule agreed by energy+ manufacturers on declared appliance energy performances was surely more effective than number of tests performed in guaranteeing manufacturer declaration truthfulness. Such agreement established that in case doubts about the energy performances of a given energy+ appliance were raised by an energy+ manufacturer, producer of that appliance would have paid for independent tests in order to verify data reported on energy+ lists (this case never happened probably because manufacturers feared the negative publicity that energy+ was able to generate).

3.6 Indicator 6 – Frequency and type of informative activities accomplished

The most important deliverables produced for information purposes are the lists of *energy+* products together with the lists of buyers and supporters. The products are the tangible results of responses from manufacturers, but the lists of buyers and supporters should also be seen as an impressive result in itself: they represent a large network of institutions that are committed to the continued promotion of energy efficient products that did not exist before the project started. The primary function of the product lists is of course to let partners and others interested in the project know what products qualify for *energy+*. Conversely, the lists of buyers and supporters do represent aggregated purchasing power, to let manufacturers know which buyers are most interested, and which supporters they can work with when promoting their products. As such they point out paths for potential *energy+* manufacturers and validate the relevance of the specifications. For some of the participants in the buyer group, being on the list was also part of a strategy to promote themselves as a “green” company. The lists were seen as a credible tool for this purpose, thanks to the reliability of the information reported, deriving from the at-

tention paid by the co-ordination team in the check of the data provided by energy+ participants. This checking activity turned out to be very time consuming as number of products and participants increased.

In order to support the promotion of the lists (to get more products included, in order to generate more supporters and partners, in order to get more products included, etc.) a number of auxiliary materials were produced. All materials produced were based on a strict graphical identity of the project, the development of the graphical identity and the communication materials being given high priority and budget.

The following materials were produced:

- A multilingual website (six languages)
- A number of brochures (presenting the project, teasing about the competitions)
- Leaflets to accompany the list (in some occasions)
- Posters
- *Energy+* bulletin (in several languages, produced by the national teams based on a central template)
- A CD-ROM with graphical instructions, electronic versions of logos, selling tips¹⁶ and an *energy+* toolkit to help with promotion materials
- *Energy+* stationary adapted to each national team
- A press toolkit was produced before each fair and list update. This press kit was distributed centrally, but also used by national teams in their communication with media in their respective countries in their own language.

Energy+ website was a particularly important communication tool. Besides project description, project participants and international events, *energy+* website hosted an online searchable product database, allowing visitors to select and display *energy+* products according to different selection criteria (category, manufacturer, brand, country). Products' online database could be easily updated by manufacturers who could insert information relative to their new *energy+* products (this information had to be validated by the co-ordination team before its publication). National teams could enter directly the web pages in their own language and follow the changes made in the English pages. Furthermore they could easily adopt their language (country) pages dedicated to national *energy+* events.

In each participating country a lot of direct and regular contacts (meetings, telephone calls and e-mail contacts) over a long period were necessary to convince organisations (supporters and retailers) to sign the *energy+* declarations. The method

¹⁶ Selling tips were particularly appreciated by retailers and made the CD successful (arguments for selling staff, numbers on how to estimate savings according to the average appliances and electricity prices in each country were reported).

of the project – a process of building the bridge between manufacturers and the buyers – was easily understood and widely welcomed.

Energy+ was presented by national teams during several public events including workshop and conferences on energy efficiency, TV and radio programmes, etc. International trade fairs often represented the best location for the promotion of the initiative, the lists update publication and the organisation of competitions among energy+ manufacturers and supporters (Confortec in Paris, February 2000, Domotechnica in Cologne, March 2001, HomeTech in Berlin, March 2002, HomeTech in Cologne, February 2004).

High professional profile of information activities undertaken reassured participating manufacturers about the real existence of a demand on the market for very energy efficient models.

3.7 Indicator 7 – Competitions among energy+ manufacturers

To stimulate R&D, energy+ co-ordination team organised two **European Energy+ Award Competitions** (presenting the most efficient appliances available on the European market – not prototypes). In 2001, the two most energy-efficient fridge-freezers proposed on the European market were rewarded from AB Electrolux and Whirlpool (EEI of 33% and 35% respectively, i.e. consuming about one third of the necessary energy for comparable appliances). In 2004, Energy+ Awards were for five different categories of cold appliances. AB Electrolux models were rewarded in four of the five categories considered (EEI of these models being within 27% and 30%) and Arcelik received a special mention for presenting the “Most Efficient Energy+ Model” in the category of two door fridge-freezers (EEI of 19,8 %).

Competitions of manufacturers were based on the mandatory specifications, together with optional requirements of importance to the buyers. The mandatory specifications and the optional requirements together may best be described as set of specifications aimed at guiding the manufacturers in the development of products. These optional requirements included even better energy efficiency (than the mandatory specifications), refrigerants and foaming agents with low environmental impact, low noise, clear (external) temperature displays, reasonable price, and user friendliness. A formula based on the relative importance of the various optional requirements was developed to guide manufacturers in developing their submissions, and to help evaluate the entries.

An independent jury composed of internationally recognised experts in the fields of energy efficiency, technological aspects and consumer issues was appointed for each of the two European Awards Competitions in order to evaluate and select the winners. The award ceremonies took place at Domotechnica and Hometech international trade fairs both held in Cologne respectively on March 2001 and on February 2004.

3.8 Indicator 8 - Competitions among energy+ supporters

In 2004, Energy+ Awards were assigned also to organisations on the demand side (that had signed the energy+ declaration) for their most creative promotional campaign. The aim of this part of the European Energy+ Award Competition has been to stimulate creative activities around the theme of energy efficiency and energy+ appliances as well as to create synergies between the most active participants and manufacturers, thus raising market shares of very efficient products.

Migros (a Swiss retail chain) and EWZ (utility for the city of Zurich) shared the award for energy+ participants for “the most effective retailers campaign” and “the most comprehensive promotion campaign” respectively.

The jury for this part of the competition has been the energy+ collaboration, due to its hands-on experience with communication and marketing. The selection of winner(s) has been based on the information provided by the candidates. In order to participate in this Award competition, minimum information was required, that has been compiled with the support of the correspondent national energy+ team.

The process has been simpler than in the appliance award competition. All entries were discussed and put into categories like: retailer, NGO, consumer organisations. A voting by the energy+ team has determined the winner. The jury has, based on the presented material, chosen to rank the entries by their quality, looking at the following aspects: originality, clear targets, effects on the market, scale of activity, repeatability and relevance for energy+.

In general the impressive number of press representatives attending the award ceremonies organised and the coming of the CEOs is an indicator of how seriously energy+ was perceived.

3.9 Indicator 9 - Number of participants addressed and promotion activities undertaken

Variation with time of number of participants addressed (grouped by retailers, institutional buyers and supporters) is showed in the table below. Number of outlets and dwellings represented is also reported.

	<i>Retailers</i>	<i>Number of Outlets</i>	<i>Institutional Buyers</i>	<i>Dwellings</i>	<i>Supporters</i>	<i>Participants TOTAL</i>
January 1999						0
February 2000						90
March 2001	49	15.000	17	1.409.000	40	106
December 2001						106

March 2002	49	15.000	17	1.409.000	43	109
December 2002	49	15.000	17	1.409.000	44	110
March 2003	53	15.000	17	1.409.000	44	114
October 2003	57	15.500	17	1.409.000	44	118
March 2004	57	15.500	17	1.409.000	44	118

As may be noticed numbers of participants did not increase significantly during the 2E+ phase starting on April 2002. With 2E+ national teams interviewed many new retailers, direct buyers and institutional buyers. In spite of the attempts made by national teams, 2E+ didn't manage to increase significantly the list of participants in the process¹⁷, excepting the category of white goods manufacturers whose number increased conspicuously with time (see indicator n. 2).

Several examples of promotion initiatives undertaken by energy+ participants could be mentioned. Noticeable is the case of a large Swiss institutional owner of flats, the city of Zurich, furnishing their rental units with standard equipment, who decided to give first priority to energy+ criteria in bulk buys and at the same time banish any appliance below class A. In France, supporter Hespul successfully organised small-scale bulk buys for visitors of local fairs. In the Netherlands and Germany (Aachen) energy+ criteria were adopted in rebate schemes.

3.10 Indicator 10 - Number of energy+ appliances sold and Net Impact.

In general net impact of market transformation programmes, typically made of several soft measures, is hard to be estimated. In the case of energy+ a quantitative assessment of the effects of energy+ in terms of induced sales of energy efficient cold appliances in the European market and saved kWh is even harder. The already mentioned difficulties of collecting enough statistical sales data, the problem of distinguishing the effect of energy+ from that of the legislative measures¹⁸ introducing new A+ and A++ energy efficiency classes and many other possible and not evaluated side effects (e.g. free riding manufacturers, etc.) indeed hamper detailed evaluations.

According to a very rough estimation published in the final report of energy+ project (ref. 6) about 0.5 millions of energy+ appliances were sold in 2004 determining 100 GWh (0.36 PJ) of energy savings. Using Eurostast (1990) figures 0.36 PJ of saved energy corresponds to about 45870 tones of CO2 emissions avoided. Nevertheless, considering assumptions made for the calculation¹⁹, it seems reasonable to

¹⁷ One reason for this is probably to be found in the discussion for the revision of cold appliances' energy label ended with the introduction of new A+ and A++ classes in the summer of 2003.

¹⁸ Due to anticipation from manufacturers these legislative measures probably influenced the market before they got officially published in the summer of 2003.

¹⁹ 20 million units of sold cold appliances are estimated for 2004 on the basis of a linear extrapolation from sales in 1994 and 1999 as evaluated in Cold II study (ref. 1). Average consumption of sold appliances for that year is estimated in 400 kWh/year, while average consumption of energy+ appliances is assumed to be around 200

consider these amounts of savings as a rough estimation of the sum of autonomous energy efficiency improvements (that would have been realised also without energy+) and the net impact of energy+ in 2004, which probably corresponds to less than a percentage point of the amount calculated. Once life time of cold appliances and the whole period of policy instrument implementation are taken into account this percentage point has to be multiplied by a factor 20 ÷ 40 and the overall net impact of energy+ turns out to be of the order of a hundred of GWh. Data available do not allow to be more precise.

3.11 Indicator 11 – Number of cold appliances categories covered

With the 2E+ phase energy+ expanded its scopes and addressed all the 10 categories specified in the European Energy Labelling Directive 2003/66/EC with the agreement of manufacturers²⁰. In order to simplify the presentation of energy+ lists, appliances were sorted according to the following 8 categories:

- Table top²¹ (max height 85 cm) refrigerators
- Refrigerators
- Table top refrigerator-freezers
- 1-door refrigerator-freezers
- 2-door refrigerator-freezers
- Table top freezers
- Upright freezers
- Chest freezers

The table below shows how, from the very beginning of 2E+, energy+ lists managed to cover all the 8 categories addressed.

	<i>Types of Appliances</i>	<i>Models</i>
March 1999		2
Feb 2000		2+7
March 2001	2	16
Dec 2001		23
March 2002	5	78
Dec 2002	8	188
March 2003	8	438

kWh/year. Under the hypothesis that percentage of sold energy+ appliances in 2004 coincides with percentage of sales of A+ and A++ appliances indicated by GfK for the preceding year (i.e. 2.5%), total savings of 100 GWh/year results from *200 kWh savings x 2,5% x 20 million*.

²⁰ Actually manufacturers were the ones asking for this expansion

²¹ Cold appliances are defined as “table top” if they can either fit under the counter when top is removed or stand alone as an extra working surface in the kitchen.

October 2003	8	597
March 2004	8	866

3.12 Effectiveness

Energy+ (especially during its second implementation phase) aimed at increasing the market share of existing high efficiency products, at assisting manufacturers to prepare for label revision as well as at stimulating continuous improvement of the most efficient products. As such its targets were not explicitly set in terms of potential energy savings it could assure. Although reduction of energy consumption of European cold appliances was its primary objective, such reduction was seen as the ultimate consequence of a series of actions allowing the achievement of long-term and stable market transformation in the sense of energy efficiency. Among these, dialogue maintained with manufacturers for several years and retailer as well as large buyer training and information are worthy to be mentioned. Available ex-ante estimates of potential energy savings that can be associated to this action do not distinguish between the effects of energy+ and the effects of energy label revision, entirely attributing to energy+ the credit for all appliances meeting its specifications introduced in the European market. These estimations attribute to energy+ an energy saving potential of 62 GWh/year (0.22 PJ/year) to be compared with a net impact effectively realised roughly evaluated in less than 1 GWh/year (0.0036 PJ/year). Although this comparison seems to penalise energy+, it must be stressed that effectiveness of this instrument has to be sought in the long-term and indirect effects of market transformation rather than in the number of efficient cold appliances it allowed to introduce during its implementation. Unfortunately no estimations on these effects are available.

3.13 Cost efficiency

3.13.1 Society

In order to estimate instrument cost-efficiency for the society in the countries participating in the procurement process

- additional (compared to the reference situation) investments for energy+ appliance buyers,
- cost savings on energy due to energy+ appliance purchase calculated using national shadow energy prices (i.e. national prices without levies and taxes) and
- net energy savings due to energy+ process implementation

should be known. Although rough estimates on aggregated net energy savings achieved through instrument implementation can be attempted (see section 3.8 on this point), lack of statistical information about energy+ appliance prices (needed to calculate buyer additional investments) and achieved energy savings per

participating country make not possible to calculate instrument cost-efficiency for the society.

3.13.2 Government

The assumption made in the present calculation is that overall budget employed by the organisations responsible for the implementation of energy+ at European level can be assimilated to the total expenditure of a government implementing an energy policy instrument at national level.

Estimated cumulative energy savings that can be attributed to energy+ amount to about 100 GWh (0.36 PJ). By taking the default values of 4 % interest rate and a 10 year depreciation period for the energy efficiency measures, the depreciated overall budget employed for energy+ implementation results of EUR 1.18 million. The ratio between costs and energy savings is then around 1.2 €cent/kWh (3.3 €/GJ). This estimation is surely affected by large uncertainties.

3.13.3 End-user

Missing data impeding cost-efficiency estimates for end-users of the countries participating in the procurement process are mostly the same mentioned for cost-efficiency for the society.

3.14 Relationships with national instruments and differences in the penetrations of energy+ appliances in the countries involved in the process

Energy+ technical specifications being based on European energy label, the instrument proved more effective in those participating European countries where the level of compliance with the European directive on energy label is higher. Energy+ process stakeholders (retailers, manufacturers, institutional buyers, energy policy makers, etc.) of these countries were indeed more aware of instrument additional value and resulted more committed in its promotion. Nevertheless, in countries (like Germany) where manufacturers, retailers and the population were receptive to the theme of energy efficiency (and more broadly the environment) energy+ impact was large notwithstanding the energy label not having been a lot present in shops for a long time.

Obviously national electricity prices influenced energy+ impact as well. In northern European countries where electricity price is traditionally low (e.g. Norway) and where electricity is used for a wide range of purposes (e.g. heating) stakeholders' interest in energy+ resulted modest.

In Greece manufacturers and retailers did not appear very interested in energy+ because of an alleged Greek consumer lack of interest towards energy efficiency due to difficulties in evaluating energy saving economic benefits against energy effi-

cient appliance relatively higher sale price. Despite of this situation some (relatively few) energy+ models were introduced on the market in the last phases of instrument implementation.

French energy+ team managed to engage the interest of several cold appliances manufactures and, although France is not considered as a “mature” market from the energy efficiency and environmental points of view, number of energy+ appliances made available on the market resulted quite high with respect to the other countries involved in the process.

Same thing happened in Italy where many of the cold appliance manufacturers commercialising their products in the European Union have their headquarters.

National incentive campaigns and rebate programmes for the promotion of energy efficient cold appliances proved very effective in stimulating the introduction of energy+ appliance on national markets. Noticeable the Dutch premium scheme started in 2000, the rebate program for A+ appliances of the Stadtwerke Aachen in Germany and the Belgian premium scheme started on April 1996 and still continuing. Another noteworthy case of synergic interaction with national instruments for the promotion of energy efficiency is the Swiss www.topten.ch. On this still very active web-site best refrigerators and freezers meeting energy+ specification were presented on 9 specific lists (for different categories of cold appliances). In these lists, all important information for consumers such as a photo, prices, energy costs, energy efficiency, size, link to the producer are shown. Topten has a large impact on consumers (about 500'000 visitors with 20 Mio hits in 2004) and on institutional buyers and, although initially the appliance industry reacted in a hostile way to it, the market is now reacting positively to its introduction. Such initiative is being reproduced in several European countries.

4 Conclusions

4.1 Net impact, effectiveness and cost efficiency

Targets of energy+ were not explicitly set in terms of potential energy savings it could deliver. Although reduction of energy consumption of European cold appliances was its primary objective, such reduction was seen as the ultimate consequence of a series of actions allowing the achievement of long-term and stable market transformation in the sense of energy efficiency. For these reasons also data available for the evaluation of net impact, effectiveness and cost efficiency are very scarce. Isolating the effect of energy+ from autonomous improvements of energy efficiency and the introduction of new A+ and A++ energy efficiency classes is very difficult (energy+ was put in place also to assist manufacturers in their preparation to label revision).

Overall net impact has been evaluated in about a hundred of GWh, considering as due to energy+ only 1% of savings roughly estimated for 2004 in the final report of energy+ project (in the report savings assured by energy+ are identified with savings caused by the introduction in the European market of class A+ and A++ cold appliances).

Effectiveness is difficult to be deduced as well. The only ex-ante rough estimation available attribute to energy+ potential energy savings of about 62 GWh/year to be compared with about 1 GWh/year probably achieved.

Cost efficiency of 1.2 €cent/kWh was calculated for the implementing organisations on the basis of a depreciated overall budget employed of EUR 1.18 million and an estimated overall net impact of about 100 GWh.

Uncertainties of these estimations are surely very large and do not take into account long-term effects.

4.2 Success and failure factors

Success and failure factors for the various steps of instrument implementation are here summarised.

1. Co-ordination of an international buyer group of the size and kind targeted by energy+ (in the sense of co-ordinating orders and purchasing for consumer-oriented and mass-produced goods where brands are important) resulted impossible²².
2. Having frequent direct contacts and meetings with each manufacturer was essential. Manufacturers do not act as one uniform body. There are differences

²² See section 3.1

between R&D and marketing departments, thus there is a need to approach several persons in one company. Contact high frequency also depend on the necessity of local contacts at national level and the high turnover in the profession.

3. It was also essential to meet manufacturers both in the headquarters and at national level because the two levels influence each other (e.g. AEG Germany was reluctant to participate in energy+ until Electrolux Europe took position, and, vice versa, BHS central did not want to participate until they had positive feed back from several of their national branches).
4. Reliability of the information reported in the product lists was important. Checking data provided by manufacturers is very time consuming. This activity is also time consuming for manufacturers. Furthermore, difficulties occurred with the interpretation of the word "available" when referred to energy+ appliances (E+ teams understood it as "present in shops" but did not specify it and manufacturers used it as "possible to order").
5. Verifying availability of energy+ models on the market resulted a very difficult task, especially in those countries where number of independent retailers is high and the market is fragmented.
6. Testing conformity of registered products with energy+ specifications is a highly costly activity. Announcing the rule of random testing with a detailed procedure was important. Furthermore, energy+ manufacturers agreed that in case doubts about the energy performances of an energy+ appliance were raised from an energy+ manufacturer, producer of that appliance would have paid for independent tests in order to verify data reported on energy+ lists, this fact indicating that manufacturers feared the negative publicity that energy+ was able to generate.
7. The constitution of an independent jury composed of internationally recognised experts and the accomplishment of random tests on performances of participating products was essential to guarantee transparency and reliability of European competitions. Establishing a formula for product evaluation was of great help. Although less a stringent selection criteria, price was included in the formula and considered as a way to discuss with manufacturers if, once in shops, products would be really expensive. Manufacturers have played the game.
8. As far as competitions on the demand side are concerned, it proved more flexible to announce for one winner in one category and reserve the possibility to have special mentions (even if not announced) – as opposed to announce different categories of awards and risk that competitors do not answer all of them. Furthermore, it was possible to award advanced operators and at the same time to encourage more modest organisations.
9. Once discussion on new A+, A++ classes started it became more difficult to enlist new participants. This fact was compensated by the increased activity of old participants.
10. High quality statistics are important in order to monitor market response. Manufacturers generally do not share information on their technical plans.

11. The type of cold appliances to focus on, as well as the functional and technical specifications for qualifying appliances (e.g. energy efficiency index and noise level) were defined by experts in the field and discussed with manufacturers.
12. Participation in international trade fairs constituted an important showcase for energy+ participants. Manufacturers were favourably impressed by the fact that different brands were put on a same booth
13. High priority was given to the development of the graphical identity of the instrument and the communication materials.
14. The web site constituted the main instrument to inform about energy+ and allowed visitors to select and display energy+ products according to different selection criteria (category, manufacturer, brand, country).
15. A press toolkit was produced before each fair and list update. This press kit was distributed centrally, but also used by national teams in their communication with media in their respective countries in their own language.
16. Publication of energy+ lists was fundamental. Product lists let partners and others interested in the project know what products qualify for energy+. Lists of buyers and supporters do represent aggregated purchasing power, to let manufacturers know which buyers are most interested, and which supporters they can work with when promoting their products.
17. Some participants viewed and used energy+ as a label, whereas this was not planned.
18. A lot of direct and regular contacts (meetings, telephone calls and e-mail contacts) over a long period were necessary to convince organisations (supporters and retailers) finally to sign the energy+ declarations and to inform them about project events and activities. This task was the most time consuming one within the project. Even if the signed declaration was not binding, it was significative of a certain interest. Energy+ teams were the only ones providing retailers with information on new directive introducing new A+ and A++ energy efficiency classes.
19. Energy+ has contributed to homogenise the communication on very efficient appliances. Before the project started, manufacturers were beginning to communicate on "Super A", Super A+" or "A+" models without any information regarding the efficiency. Energy+ managed to obtain retailer support because it was the only programme applying the same criteria to all brands (42%).
20. Energy+ managed to convince marketing department within manufacturers to put on the market energy efficient models existing in the R&D department but not yet marketed..

4.3 Monitoring and verification

Data employed in the previous sections to attempt to determine impact, effectiveness and cost-efficiency of the instrument only relate to number of A+, A++ cold appliances sold in the EU and economic amount spent by agencies responsible for instrument implementation.

Energy+ appliance sales data are needed in order to properly estimate above mentioned parameters.

Deducing number of energy+ models sold from sales of A+ and A++ appliances is not an easy task. Even though most of these appliances are probably energy+ appliances (in the sense that they comply with energy+ specifications including the 280 KWh/year cap on energy consumption), only a market analysis could allow to establish how many of such appliances are included in energy+ lists and were sold in the countries where energy+ process was implemented. Besides this information,

- fraction of these appliances sold because of energy+ process (and not because of other reasons),
- annual energy consumption and life-time of this fraction,
- average energy consumption and life-time of cold appliances sold and not belonging to this fraction²³
- rebound, spill over and other long term instrument dynamic side effects (surely important for an instrument aiming at transforming the market of cold appliances)

should be assessed in order to estimate instrument net impact²⁴. Instrument effectiveness as defined in the context of AID-EE project could be calculated if saving targets for the instrument would have been explicitly set, and this was not the case, as already explained in section 4.1.

Further information needed to estimate instrument cost efficiency (for end-users and the society) are additional cost of energy+ appliances with respect to the market average and electricity price, calculated according to guidelines produced by AID-EE collaboration.

Considering the huge geographical area addressed and difficulties related to gathering data on price and sales of domestic appliances, it is easy to argue that costs for the estimation of instrument net impact, effectiveness and cost-efficiency are not negligible if compared with the very limited budget employed by implementing agencies.

²³ This if it is assumed that consumers buying energy+ appliances would have bought a new cold appliances even if the programme would not have been in place and that the only effect of energy+ programme is the shifting of the preference of consumers from the average solution available on the market to the energy+ solution. Under such hypothesis the possibility that a certain percentage of energy+ model buyers would not have substituted their cold appliance if energy+ process would not have been in place is not envisaged (for this percentage of consumers average consumption of cold appliances installed at households and not average consumption of not energy+ appliances sold should be considered as base line).

²⁴ Needless to say that such estimate should address at least the whole period during which the instrument was active.

4.4 Learning experiences

In the text below, a list of lessons learned is presented.

Targeting the right product and market

1. *Chose a product that has enough interest in many European countries to gain demand side strength.*
2. *Be sure the market is international, at least on the supply side. A few cold appliances manufacturers dominate the European market and are present in more or less all countries. There are few strictly national manufacturers.*
3. *Prefer a unit type product that presents a sufficient energy saving potential. Domestic refrigerators and freezers were the largest single source of electricity consumption in households after electric space and water heating when energy+ process was implemented²⁵.*
4. *Pre-check that procurement is a suitable “tool” for the product and the market in question. The one-year study that preceded energy+ produced a questionnaire for this purpose. Applying the pre check in energy+ led to an adapted process for goods that are not purchased directly by end-users.*
5. *Ensure consistency with the European and national policy frameworks.*

Instrument implementation

6. *Good timing is important, attention should be given to: the agendas of different actors from different countries, time for manufacturers to prepare participation, time when retailers decide upon their yearly or biyearly product range, difference in time perception between public and private participants, suitable time and event to announce the results, i.e. participating organisations and availability of products on the market, etc.*
7. *Budget and schedule flexibility, in order to adapt to market actor responses. This is true for procurement projects in general, but is even more important when it comes to international scale actions.*
8. *Communication and marketing, regarding the project itself as well as the products, are central elements of this kind of projects, especially when it involves retailers. Nevertheless it is important to control as much as possible what they are going to do with project communication support*
9. *Sufficiently detailed statistical data from manufacturers are fundamental for monitoring and evaluation of net impact, effectiveness, and cost efficiency of the instrument.*
10. *Planning what would happen in case of complaints from some participant helps in making manufacturers aware about the need to respect the rules (see rules established on declared appliance energy performances). A general*

²⁵ It seems brown goods (especially after the introduction of plasma TV) now may exceed domestic cold appliance energy consumption.

recommendation for projects involving manufacturers and retailers is to try to plan as much as possible rules to avoid any type of complaint or risk of discredit

What to do when launching another pan-European project?

11. *It might be easier to target a product type where the buyers are the final users i.e. are direct or institutional buyers.* This would reduce a lot of problems encountered during the energy+ project like the difficulties linked with branding and retailers specifically targeting products with a high sales price giving them the possibility to put a high mark up, something that to some extent goes against the project aim. The problem with long term relations between retailers and manufacturers would also be attenuated. However, the methodology and the "instrument" would surely be different – and has not been yet tested at international scale.
12. *The duration of the project is crucial. Market operators need to be reassured that a long-term financing has been secured.*
13. *If a mass produced product is chosen it is necessary to carefully analyse the marketing strategies of the various participants in the various countries.* For refrigerator/freezers, for marketing reasons not all products can be sold in all countries under any marketing argument and to any price.
14. *Keep track of non-official and “off the record” fundamentals on the manufacturers side:* marketing announces sometimes conflict with real production issues, they happen to boycott international events and tend to privilege direct and often non-formal contacts with their partners.
15. *Focus on the key actors specific interests (everybody has to gain something from the process), and respect all participants specific situations and working methods.* Retailers' job is not to convince consumers that an energy efficient appliance saves money and the environment, but to sell refrigerator/freezers. In order to involve retailers it is necessary to show that by participating in this specific project, they will sell appliances, which are very energy efficient. This might be used as good marketing; in some countries, the retail organisations were happy to use the project since it offered a unique selling point. Some manufacturer sources indicate that the award was as important as the buyer group.
16. *Promoting a principle of sufficiency and not only of efficiency of addressed products is important.* An absolute limit of 280 kWh/year in the energy consumption was included among energy+ specifications with the intent of contrasting tendency of manufacturers to produce larger and larger models²⁶.
17. Energy+ has managed to create a competition on the energy efficiency criteria thanks to an "inclusive" process:

²⁶ Actually, it is not so automatic that introducing a cap on energy+ appliance energy consumption allows promoting sufficiency, as this cap could only impede large cold appliances to benefit from aggressively improved energy efficiency.

- the most advanced manufacturers competed to be at the "top of the list" (manufacturers were eager to know if they were the best or not on energy+ lists in order to plan for press releases and communication activities)
- the less advanced manufacturers competed to participate and get on the list (the most striking example being Arcelik, interested in the project from the beginning but unable to join, then ready for the 42% level but not for the 280 kWh/year cap and finally winner of the competition for the most popular category).

References - documents

1. **ADEME-PW consulting, GfK marketing services**, 1999: *Monitoring of energy efficiency trends for refrigerators, freezers, washing machines, washer-dryers and household lamps sold in the EU.*
2. **Swedish National Energy Administration (STEM)**, 1998: *report ER 15*
3. **Energy+ collaboration**, 1998: *Project proposal for SAVE project contract No XVII/4.1031/Z/98-273*
4. **Energy+ collaboration**, 2001: *Project proposal for SAVE project contract No: 4.1031/Z/01-033/2001*
5. **Energy+ collaboration**, 2001: *Final report for SAVE project contract No XVII/4.1031/Z/98-273*
6. **Energy+ collaboration**, 2005: *Final report for SAVE project contract No: 4.1031/Z/01-033/2001*
7. **B. Boardman, S. Attali, N. Labanca**, 2005: *Energy+ process: a good practice for energy efficiency.* Proceedings of “National Conference on Italian Energy Policy”, Bologna.

References – interview

1. The following representatives of energy+ participants were interviewed by the Italian energy+ team at the end of 2004. Their answers contributed to the evaluations presented in the final report of energy+ that constitutes one of the main source of information employed for the present analysis.

Type of supporter	Name of the company	Contact person	Function	Address
Manufacturer	Electrolux	Giorgio Benvenuti	Product Manger Cold	Corso Lino Zanussi, 26 33080 Porcia (PN) – Italy
Manufacturer	Antonio Merloni	Alessandro Remigi	Responsible of the Technical Office Cold	Località Colle di Gaifana, Nocera Umbra (PG) – Italy
Manufacturer	Haier	Sandro Lovati	Product Manager Cold	Via De Cristoforis, 12 21100 – Varese - Italy
ONG	Unione Nazionale Consumatori	Vincenzo Dona	President and general director	Via Caio Duilio 13 00192 Roma – Italy
Retailer	MediaWorld	Paolo Grigioni	Responsible of the Commercial Office	Via E. Fermi 4 Curno, Bergamo – Italy