



EVALUATION OF RUE OBLIGATIONS OF ELECTRICITY DISTRIBUTION GRID MANAGERS IN FLANDERS

WITHIN THE FRAMEWORK OF THE AID-EE PROJECT

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1 Characterization of the instrument

In order to encourage the efficient use of electricity in a liberalised market, the Flemish region of the Kingdom of Belgium imposes RUE (Rational Use of Energy) public service obligations on its electricity distribution grid operators and electricity suppliers. Such obligations were initially¹ introduced at the Belgian federal level with the scope of reducing autonomous demand growth by 8 TWh in the period 1995-2005. Flanders Region converted generic energy saving objectives, imposed on Belgian electricity grid companies and electricity suppliers as from 1995, into specific and mandatory saving targets to be achieved by its electricity grid companies through the Flemish decree of 17.07.2000 and decision of 29.03.2002. This regulation takes account of the full liberalization of the Flemish electricity and gas markets and of the regionalization in the Belgian management of the energy sector. The three principal reasons that induced the Flemish Government to introduce it were: limited control by the Flemish Government of the existing initiatives on energy efficiency; no clear energy saving target associated with these initiatives; and limited evaluation carried out of these initiatives.

The present evaluation report will not address the “conventional” phase of the instrument between 1995 and 2002 and will focus only on the Flemish “legal” phase of its application initiated in 2002. Main Flemish governmental institutes in charge for instrument enforcement, monitoring and control are VREG, the Flemish regulatory authority of electricity and gas markets and ANRE, the (Flemish) Department of Natural Resources and Energy².

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

As of January 1st, 2003 in the calendar year n each (electricity distribution) grid manager has to realize an annual *primary* energy saving whose amount corresponds to a given fraction of the energy supplied during the year $n-2$ and varies with the type of end users served as summarized in the table below.

¹ Later on this context faded away and the goal of the instrument was adapted

² VEA (Flemish Energy Agency) replaces ANRE as of 01.04.2006

Annual saving target at high-voltage ³ end-users (% of energy supplied in year <i>n-2</i>)	Annual saving target at low-voltage ⁴ end-users (% of energy supplied in year <i>n-2</i>)	To be achieved in
1%	1%	2003
1%	2%	2004
1%	2.1%	2005
1%	2.2%	2006
1%	2.2%	2007
1%	1%	as of 2008

“Primary” energy savings are calculated multiplying the saved end use of electricity with a factor of 2.5 and multiplying the saved end use of all other energy carriers with a factor of 1.

In case of high-voltage end-users the Minister can, based on a motivated request by the grid manager, allow a reduction on the total kWh upon which the result obligation is calculated if since the year *n-2* the energy use of end users connected to the grid of the grid manager decreased with more than 5 % as a consequence of a disconnection from the grid of one or more high-voltage end users.

For grid managers whose electricity deliveries to households is less than 10 % of their total electricity deliveries to **low-voltage end users**, annual saving obligation at these end users is constantly at 1%.

Absolute amounts of energy to be saved in the first instrument implementation period are summarised below⁵:

Reference year	Low voltage end – users (PJ of primary energy/year)	High voltage end-users (PJ of primary energy/year)	Total (PJ of primary energy/year)
2003	0.55	0.82	1.37
2004	1.14	0.85	1.98
2005	1.26	0.82	2.08

If in a given year the realised primary energy saving is higher than the result obligation, the surplus can be carried over to the following year to satisfy the result obligation for the particular target group involved.

³ (nominal > 1000 volts)

⁴ (nominal ≤ 1000 volts)

⁵ Source: Collys A., ANRE (presentation - European Parliament, 3 March 2005)

Although information on the numerical relation of above mentioned saving targets with Belgian Kyoto targets is not available, Kyoto is one of the main reasons why the instrument is still in place and further sharpened since 1995. It is today acknowledged that negotiations at the EU level about the burden sharing of the -8% committed by the EU in Kyoto resulted in a too high target of -7.5% for Belgium. Given the high nuclear share in power generation and some other characteristics, it is shown that Belgium will mitigate at the highest marginal cost next to the Netherlands and although the energy use is still too high and growing for meeting the Kyoto targets, such targets motivated the establishment of energy saving obligations on electricity grid companies.

1.2 Period the policy instrument was active

The Decision of 29 March 2002, amended by the decision of 26 September 2003, governs the RUE obligations of the electricity distribution grid managers in Flanders; obligations are set on an annual basis as of 2003 onwards. 2002-2005 represents the first instrument implementation period, at the end of which the Ministry of Economic Affairs is supposed to deliver a report on results achieved in terms of net impact, effectiveness, cost-efficiency, etc.

1.3 Actions, Specific technologies and/or energy efficiency measures

According to the Decision of 29.03.2002 each action undertaken must include:

- a sensitizing and informing part (*indirect* action) drawing attention to the action and giving the target group the necessary information regarding the saving possibilities⁶,
- a stimulating part (*direct* action) whereby each target group is financially supported to execute the action.

Furthermore grid managers have to offer all the end users connected to their grid and in all of their client offices the following RUE-activities:

- dissemination of information brochures as supplied by the Flemish authority to the grid managers;
- individual RUE advice to low-voltage end users;

To this end grid managers have to place at the disposal of low-voltage end users a RUE-advisor in their client offices during office hours. This advisor also acts as a central spokesman for both the Flemish authority and the end users.

⁶ Indirect actions cannot be accounted for the achievement of the electricity grid companies energy saving target.

Broadly speaking, intervention instruments adopted consist in:

- a) General information to customers about the programme and its advantages (brochures, internet, etc.)
- b) Audits / Energy management: individual energy audits for households, energy audits and energy book keeping for municipalities, quick and detailed energy audits for industry and tertiary sector, energy book keeping for the tertiary sector
- c) Rebates for different technologies (see list below)
- d) Financial help for investments of municipalities into energy efficiency measures

Energy end-uses typically addressed in the *domestic* sector are:

- Low-flow shower heads
- Efficient lighting (CFLs)
- Thermal insulation (roofs, windows)
- Condensing boilers / Low-temperature boilers

As far as *non-domestic* sector is concerned measures typically implemented relate to:

- Different kinds of energy audits
- Relighting (retrofit of lighting systems)
- Frequency converter / Variable speed drives
- Thermal insulation (roofs)
- Condensing boilers / Air heaters

In 2004 the obligation imposed to grid energy managers to send households domiciled on January 1st at an address where there is a connection to their distribution grid a “coupon” that during two years could be freely exchanged for a CFL, an “energy saving shower head”, an “energy meter”. Such initiative, limited to CFL only, will have to be repeated⁷ by grid managers in 2006 and will target households domiciled on 1st January 2005 at an address where there is a connection to their distribution grid. This time number of coupons sent will equal the number of household members minus one.

The primary energy savings resulting from these particular actions are taken into account for a maximum of 0.015 kWh per kWh supplied (i.e. 1.5%) in determining the fulfilment of the obligation for 2004 and 2005.

In 2003 the top six actions in terms of number of premiums (financial support) given to households were: 1) CFLs, 2) energy saving showerheads, 3) condensing boilers, 4) high efficiency boilers, 5) “superwindows”; and 6) roof insulation.

In 2004 most popular RUE actions were the replacement of single glazing with energy efficient glazing (6000 premiums), the installation of condensing boilers (6000 premiums) and the placement of roof insulation (2.650 premiums). A total of

⁷ Grid managers whose electricity deliveries to households is less than 10 % of their total electricity deliveries to **low-voltage end users** are not under this obligation.

1.079.964 CFLs, 84.521 energy saving showerheads and 1.230 energy meters were distributed (“energy coupon” action obligation)⁸.

Results for 2005 are not available yet.

Decision of 29 March 2002 imposes obligations on electricity suppliers as well.

On each invoice or on an accompanying document referring to this invoice they have to show the annual electricity end use during the preceding three years in a comprehensive manner⁹. Invoices or related documents must show the origin of the electricity supplied as well¹⁰.

The origin of the electricity has to be specified as follows:

- electricity produced with renewables;
- electricity produced in ‘qualitative’ cogeneration units;
- electricity produced with fossil fuels;
- electricity produced in nuclear power plants;
- electricity of which the origin is unknown¹¹.

The VREG checks if the information given by the supplier is reliable. The supplier reports to the VREG annually before 1st February of the current year on the data of the preceding calendar year. The VREG makes a summary report and places this at the disposal of ANRE.

⁸ **Couder, J., Verbruggen A.**, 2006, *RUE obligations of electricity distribution grid managers in Flanders*, University of Antwerp, draft version

⁹ If the supplier does not have at his disposal the data mentioned, he requests those data from the grid manager. Subject to no written protest of the end user, the grid manager provides the supplier the necessary information at the simple request of the supplier.

¹⁰ The supplier uses as a basis for this the direct or indirect agreements with the electricity producers that cover his deliveries of the preceding calendar year. The origin of the electricity is determined on the basis of the whole production park of a producer to which the agreement relates. For electricity obtained through import or exchange on a power exchange, the supplier can use the aggregated data supplied by the importer or the power exchange concerned.

¹¹ The category “of which the origin is unknown” is only allowed for a fraction smaller than 5 % or if the supplier can motivate that the origin of the electricity cannot be ascertained. The supplier asks permission for this to the VREG.

1.4 Target groups

Basically target groups are constituted by the actors under the obligation imposed through the Decision 29.03.2002 (i.e. electricity grid companies, a.k.a. distribution system operators – DSOs, and energy suppliers) and the groups targeted with the actions undertaken by DSOs to comply with the obligation. Such groups consist in:

1. Private customers (mainly households), including the special group of protected customers¹²,
2. companies,
3. (local) public authorities (municipalities),
4. non-commercial organisations (schools, hospitals),
5. external organisations¹³.

Protected customers, municipalities and external organisations are indicated in the Decision as those target groups to whom electricity grid companies should pay special attention¹⁴.

1.5 National context

The Kingdom of Belgium is a Federal State composed of three Regions: Flanders, Wallonia and Brussels-Capital.

As far as electricity distribution and supply are concerned, the regulatory competences of the regions and the federal state are as follows:

- *Federal state*: electricity and natural gas tariffs, the high-voltage electricity grid with a voltage level higher than 70 kilovolt (kV), nuclear energy and large energy production and storage facilities, with the exception of the production of electricity from renewable energy sources (RES) and of combined heat and power (CHP) systems;
- *Regions*: the distribution (or local transport) of electricity via the low-voltage electricity grid with a voltage level of less than or equal to 70 kilovolt (kV), the distribution of natural gas, the production of electricity from renewable energy sources (RES)¹⁵ and combined heat and power (CHP) systems, rational use of energy (RUE) and social public service obligations (PSO).

¹² Protected customers are those who fall into a specific income category and who are in a debt management or collective debt mediation programme with their energy suppliers.

¹³ The meaning of 'external organisations' is very unclear. It probably means that the DSO should cooperate with other organisations.

¹⁴ The Decision does not provide further specifications on how such alleged "special attention" should be demonstrated.

¹⁵ except for offshore wind farms in the Belgian territory of the North Sea.

The Belgian transportation (or transmission) grid (> 70 kV) is managed by Elia, the *federal* transmission system operator (TSO). The distribution grids (\leq 70 kV) in Flanders are managed by *regional* DSOs, appointed for a period of 12 years by the the Flemish regulator VREG.

Historically, electricity distribution and supply were carried out by municipalities, most of which regrouped themselves into so-called *intermunicipalities*. ‘Mixed’ *intermunicipalities*, as opposed to ‘pure’ public *intermunicipalities*, have the private producer Electrabel as a partner. Most DSOs in Flanders are a continuation of the former *intermunicipalities*, whereas – to comply with the unbundling requirements – their supply activities have been transferred to two new companies: Electrabel Customer Solutions (a subsidiary of Electrabel) for the mixed part and Luminus for the pure part. The high-voltage grid manager Elia is also a DSO in Flanders, because – for historical reasons¹⁶ – Elia manages the 26 kV to 70 kV power grid in Flanders.

In 2004 “pure” DSOs distributed only 3.01 out of the about 38.2 TWh of electricity consumed in Flanders¹⁷.

1.6 International context

It can be easily argued that the liberalisation process had a big impact on the history of the instrument and influenced the design of its “legal” phase initiated in 2002. As already mentioned Kyoto commitments are the main drivers of Belgian climate policy and one of the main causes of energy saving obligation enforcement in Flanders.

1.7 Market failures to overcome

Although the instrument was not put in place to overcome specific market failures, given the programmes and results, one can derive that the failures addressed were:

- Lack of information, understanding, knowledge, interest of the end-user groups targeted
- For the local public authorities: shortage of know-how and shortage of investment funds
- Scarce return in investments on some energy saving measures with high technical saving potential.
-

¹⁶ Some parts of the network equal to or less than 70 kV are technically indivisible from the transmission (> 70 kV) network.

¹⁷ Actually one of the pure DSOs (namely PBE) also operates in the Walloon region, so the amount of electricity distributed in Flanders is even lower.

1.8 Organisations, which are responsible for implementation and execution

Belgian and Flemish institutes involved in the implementation and execution of the instrument are:

- **ANRE:** (Flemish) Department of Natural Resources and Energy. The Flemish decision of 16 April 2004 transforms ANRE into an ‘Independent Internal Agency’ called the “**Flemish Energy Agency**” (VEA). This agency is under the authority of the minister and governed primarily by a policy agreement.
- **CREG:** Commission for Electricity and Gas Regulation. CREG, established in 2001, is the *federal* body for regulating the electricity and natural gas markets in Belgium.
- **VREG:** Flemish Authority for the Regulation of the Electricity and Gas markets. VREG, created on 1 December 2001, is the *Flemish* regulator.
- **Elia:** Belgium’s electricity transmission system operator (TSO).
- **SERV:** Flanders Social and Economic Council
- **MiNa Council:** Flanders Nature and Environmental Council

Energy saving actions are promoted by DSOs, distinguished in “pure” and “mixed” DSOs.

Inter-regies represents the “pure” DSOs (i.e. without private producer Electrabel as a partner), namely *in Flanders* 3 so-called ‘regies’ (2 municipalities AGEM-Merksplas and ETIZ-Izegem¹⁸ and the Antwerp Port Authority), and 4 pure *inter-municipalities*, namely Interelectra (44 municipalities), IVEG (9 municipalities), PBE (20 municipalities in the Flemish region and 4 in the Walloon region) and WVEM (14 municipalities).

”Mixed” DSOs are seven: Imea, Iveka, Iverlek, Gaselwest, Intergem, Imewo, Si-belgas.

1.9 Available budget

Information on budget needed by Flemish institutions to administer the system is not available. It can, however, be estimated that they are quite moderate, since ANRE/VEA needs only around the equivalent of 1.5 full-time staff plus some expenditure for consultants, and VREG and CREG probably need less resources¹⁹.

From 2002 onwards the grid managers have to submit annually before the 1st of June a draft RUE action plan for the following year to ANRE including an estimate

¹⁸ No longer a DSO in 2006.

¹⁹ Source: A. Collis (ANRE) interview realised by Stefan Thomas (Wuppertal Institute) on November 22nd, 2005.

of budget needed. Actions implementation costs are passed on to end consumers through energy tariffs that are set annually on the basis of such estimates²⁰.

In 2003 24.8 million euro was budgeted for the RUE action plans, but only 11.77 million euro was actually spent²¹, of which 4 million euro on households (domestic clients, including ‘protected customers’); 4.7 million euros on other target groups (non-domestic clients); and 3 million euro on sensitization, information campaigns and monitoring. In 2004 30.18 million euro was budgeted but DSOs spent only about 18.3 million euro. In 2005 amount budgeted was 24.46 million euro²².

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

No information on initial expected effectiveness (as defined in the context of AID-EE project) is available, other than that the energy saving targets should be met. Under Flemish RUE obligations energy saving targets for the year n are calculated on the basis of the amount of energy supplied in the year $n-2$ and only energy efficiency (EE) measures implemented in year n and energy savings generated by these measures in year n can be accounted for the achievement of the saving target. Initial expected effectiveness could have been estimated 1) considering the overall energy saving target for the period 2002-2005 resulting from the sum of the single ex-ante estimated annual saving targets and 2) estimating the obliged actors level of compliance (as % of the saving target achievable). Nevertheless such estimate would have taken into account only savings generated during one year by EE measures implemented in the period 2002-2005.

In order to evaluate the net impact of the policy instrument, energy savings generated by implemented EE measures during their whole life-time (or at least during the period between their implementation date and 2005) should be taken into account.

No information is available on expected cost-efficiency for the society, government, other organisations and end-users. The only data available related to expected instrument effectiveness and cost-efficiency are the annual grid managers estimated budget for the fulfilment of the obligation and the annual saving targets to be achieved (see section 1.1 and section 1.9).

²⁰ Final end-use energy prices are commonly split into three components: 1) transmission and distribution network charges 2) taxes, levies and surcharges (regulated); and 3) the market-based price of energy (subject to competition). In Belgium electricity grid tariffs for components 1) and 2) are a *federal* competence and component 2) include a regional surcharge destined to finance promotion of RUE in Flanders.

²¹ Of which 6,83 million euros on low-voltage and 4,94 million euros on high-voltage clients. It is unclear to what extent the surplus was taken into account in drawing up the new distribution grid tariffs.

²² Source: A. Collys (ANRE) interview realised by Stefan Thomas (Wuppertal Institute) on November 22nd, 2005

1.11 Side effects

Important instrument side effects are free-ridership, spill-over and rebound effects. Methodologies proposed by obliged actors to evaluate energy savings achieved do not take such effects into account. Increased market penetration and cost reduction of energy efficient solutions and employment effects would deserve attention and consideration as well. No specific evaluations of these effects have been performed. Another noteworthy side effect is the reduction on the absolute target on RES (obligation on renewable energy supply is expressed as percentage of total energy produced. Energy savings affect amount of energy produced therefore reducing absolute RES obligation).

2 Policy theory

Instrument policy theory reported in the present chapter was designed on the basis of the text of 29.03.2002 decision of the Flemish Government concerning the public service obligations for the promotion of Rational Use of Energy (amended by the decision of 26.09.2003) and information and comments provided by stakeholders contacted.

2.1 Cause-impact relations, indicators and success and failure factors

In this paragraph policymakers' assumptions on how the instrument will function are described, cause-impact relations of the instrument are determined and per cause-impact relation indicators are defined. These are used in chapter 3 to monitor the effect of the various steps in the process (cause-impact chain). In chapter 3 per indicator success and failure factors are indicated as well.

Cause-impact relations for the instrument can be described as follows:

1. Flemish decree of 17/07/2000 and decision of 29/03/02 set mandatory saving targets for electricity grid companies and obligations for electricity suppliers.

Indicator(s) selected to monitor the effect of this step:

Indicator 1: Energy saving targets setting and energy market actors put under obligation.

2. Electricity suppliers must indicate on each invoice consumers' details of historic consumption comparisons and the sources of the electricity supplied.
3. Suppliers report to the VREG annually (by February 1st) on the data of the preceding calendar year. The VREG checks if the information is reliable and makes a summary report placing it at the disposal of ANRE. Such piece of information is included in the annual evaluation report on EE measures implemented and grid managers compliance with the obligation produced by ANRE by October 1st (see point 9 below).

Indicator(s) selected to monitor the effect of this step:

Indicator 2: Monitoring of energy consumption

4. Every year (by June 1st) electricity grid companies provide ANRE with the plan of indirect (through information) and direct (through financial support) EE programmes for the following year.

This draft RUE-action plan contains – for each action – the following information:

- a) a description of the action (addressing both *direct* and *indirect* component),
- b) the target group;
- c) the budget;
- d) the expected primary energy saving and calculation method;
- e) the data that will be kept for reporting purposes

Indicator(s) selected to monitor the effect of this step:

Indicator 3: Preferred actions, budget estimates and methodologies proposed for savings calculation.

5. Within 60 days ANRE approves²³ the plan and the methodologies proposed to determine achievable primary energy savings²⁴. ANRE takes into consideration that:

1°: only direct, measurable consequences of actions of which the causal relationship with the RUE actions of the grid managers can be demonstrated, can be taken into account;

2°: the savings as a result of sensitizing and information campaigns can under no circumstances be taken into account;

3°: as opposed to 1°, savings can be taken into account for carrying out energy audits, implementing energy accounting systems and implementing energy management systems. In the succeeding years ANRE will verify and correct the savings that have been accounted for based on data on the

²³ Actually, if ANRE does not communicate a decision about the draft RUE action plan received within 60 days, such plan can be considered automatically approved; Otherwise:

- ANRE can ask additional data from the grid manager. The grid manager delivers the missing information within 45 calendar days after receiving this request. The approval term is in that case suspended until the requested information has been received by ANRE;
- If the grid manager does not agree with the decision of ANRE he can inform the minister of his objections within 10 working days after notification by ANRE. If the grid manager has not formulated objections after that term, the decision of ANRE is considered final;
- The minister, within twenty days after hearing the objections, takes a final decision on the draft RUE action plan. In that case the calculation method laid down by the minister is applied. If the minister does not decide within twenty days, the draft RUE action plan is approved.

²⁴ **The approved calculation methods are not made public by ANRE.**

real savings resulting from these actions, as soon as those data become available;

4°: energy savings as a result of energy services already carried out on a commercial basis cannot be taken into account;

5°: actions completely paid for by the beneficiary (of those actions) cannot be taken into account

Indicator(s) selected to monitor the effect of this step:

Indicator 4: Effectiveness of the approval procedure

6. Costs caused by the programmes to be implemented at one customer group are included in the network tariffs for that customer group.

Indicator(s) selected to monitor the effect of this step:

Indicator 5: Amount of obligation costs charged to end-users.

7. Electricity grid operators provide end users connected to their grid with:
 - a) General information about the programme (brochures, internet, etc.)
 - b) Audits/Energy management;
 - c) Rebates for different technologies;
 - d) Financial help for investments of municipalities into EE measures.

Indicator(s) selected to monitor the effect of this step:

Indicator 6: DSOs action implementation plans

8. Target groups (private customers including special group of low-income households, companies, public authorities, schools, hospitals, non-commercial organisations) enter the programmes.

Indicator(s) selected to monitor the effect of this step:

Indicator 7: Programmes accessibility and target groups participation

9. From 2004 onwards each grid manager annually submits before the 1st of May to ANRE a RUE report concerning the execution of the RUE action plan of the preceding year²⁵.

The RUE report contains at least a separate chapter on the cost-effectiveness of the executed actions and the results of those actions.

²⁵ As of 2002 each grid manager annually places at the disposal of ANRE before the 1st of May also the global amount of electricity drawn off the grid during the preceding calendar year of all the electricity end users connected to his grid. These data are split per sector, at a minimum between high-voltage and low-voltage end users.

In case of doubt concerning the accuracy of the report, ANRE can request all information and data, either from the grid manager or from the VREG.

Indicator(s) selected to monitor the effect of this step:

Indicator 8: Number of checks on data provided

10. As of 2002 ANRE annually submits before 1st October a global evaluation report of the preceding year to the VREG. This report contains information on:
- the compliance with the result and action obligations;
 - the cost-effectiveness of the actions;
 - the target group policies;
 - the timely submitting of RUE action plans and reports;
 - the compulsory RUE-activities.

Indicator(s) selected to monitor the effect of this step:

Indicator 9: Degree of compliance with the overall obligation

11. If savings achieved exceeds the obligation, VREG allows electricity grid companies to use extra savings to comply with the obligation of following year. Electricity grid companies not achieving their target must pay a penalty (10 Eurocent/Kwh of primary energy not saved²⁶).

Indicator(s) selected to monitor the effect of this step:

Indicator 10: Setting the amount of penalties

12. At the end of first implementation period (2005) the Ministry of Economic Affairs delivers a report on results achieved (net impact, effectiveness, cost-efficiency, etc.) and defines objective for next implementation period.

2.2 Interaction with other policies

Interactions of RUE obligations with other policy instruments probably represent a not sufficiently considered issue in Flanders, as in the past there often was some mismatch or some overlap among the energy policy instruments set-up by various authorities. Because since a few years every policy level is committed to the climate change issue and has developed some expertise, there is a tendency to implement the full range of available instruments. The federal government was/is active on the international scene (e.g. at the COPs and in IPCC) and has taken about maximum use of its fiscal authority to promote e.g. renewable energy and energy efficiency investments by tax payers. Also it has introduced additional excise taxes on car fuels, and there lives quite some intention of tax reforms to reduce taxes on

²⁶ Obviously penalties cannot be incorporated in the tariffs.

income and labour and to raise taxes on energy use. This comes on top of the instruments that the regions have set in, such as direct subsidies for efficiency investments, certificates for green power and for CHP, the covenant with large industrial energy users²⁷, the implementation of the EU ETS going on, etc. In general the matching between the instruments is improving, and because their deployment now is broad the shortfall in some is often filled by another instrument. Nevertheless more attention should probably be paid to the fact that some interactions could generate windfall profits and alter the proper functioning of market based instruments, like the EU-ETS and green certificates.

²⁷ A covenant (in Flanders) is an agreement signed between the regional authorities and an industry federation or a company with a goal of reducing energy consumption. In Flanders, a benchmarking agreement may be concluded by any company which consumes more than 0,5 PJ of primary energy per site per year. An audit covenant is reserved for companies that consume between 0,1 and 0,5 PJ per site per year as from 1 January 2006. Companies stipulating such covenants benefit of a reduction on the federal contribution (i.e. a levy on electricity consumption used to finance the cost of regulating and supervising the electricity market and various federal public service obligations) paid through electricity tariffs by all customers connected to the distribution grid or to the transmission grid.

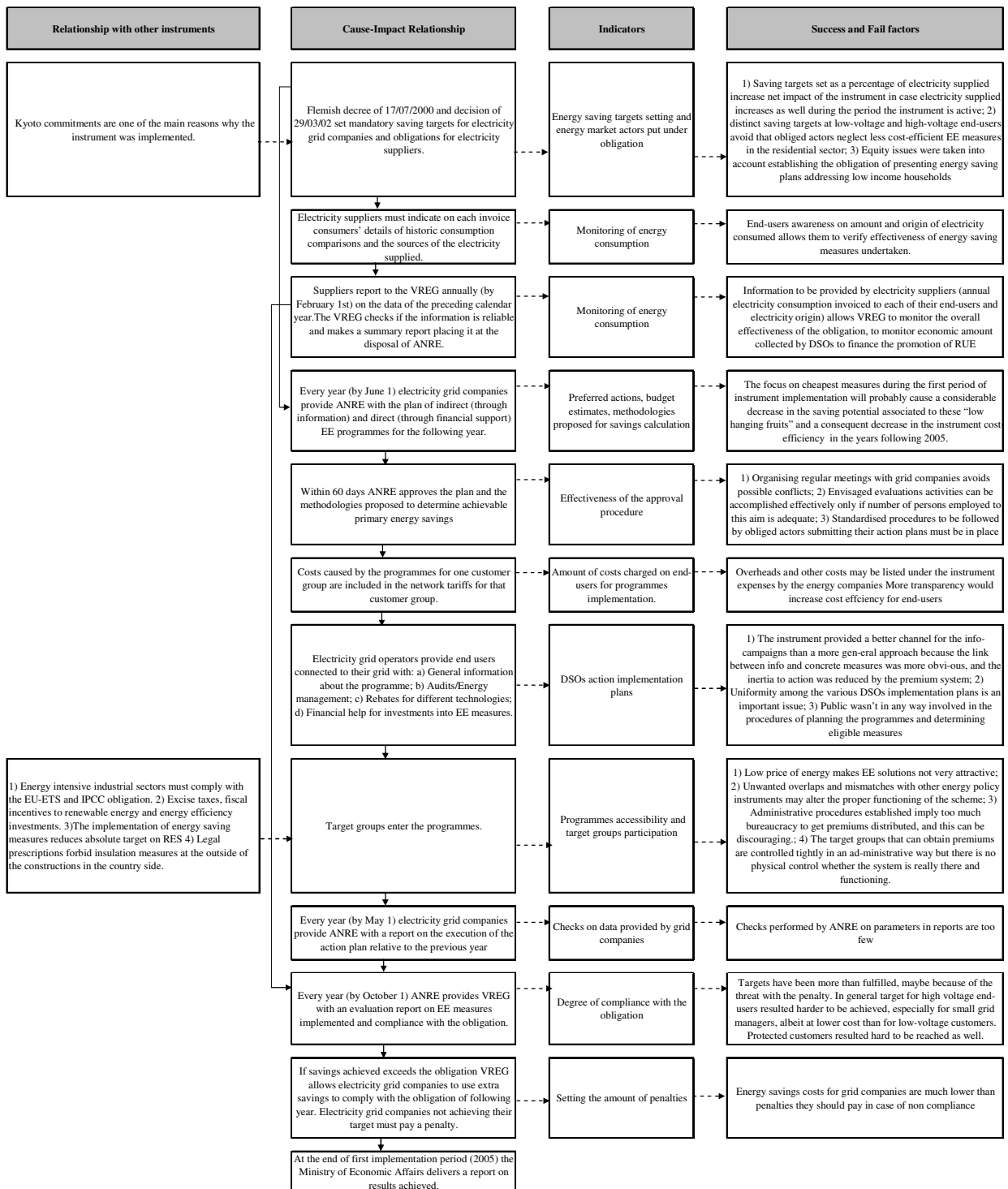


Figure 1 Overall picture of assumed functioning of the instrument: cause-impact relations, indicators, success and failure factors and interactions with other instruments

3 Evaluation

The outcome of each indicator is presented in this chapter

3.1 Indicator 1: Energy saving targets setting, energy market actors put under obligation.

The choice of setting energy saving targets as a percentage of electricity supplied increases net impact of the instrument in case electricity supplied increases as well during the period the instrument is active.

Establishing distinct saving targets at low-voltage and high-voltage end-users avoids that obliged actors neglect less cost-efficient EE measures in the residential sector and decide to realise energy savings mainly in the non residential sectors where EE measures are typically cheaper.

Equity issues were taken into account establishing the obligation of presenting energy saving plans addressing low income households and offering higher premiums to this target group.

The specific obligation of freely distributing CFLs, energy saving shower heads and energy meters to households (see section 1.3) surely facilitated the delivering of the hundreds of thousands units requested by domestic clients. Indeed managing the same administrative procedures established to get premiums for other energy saving measures would have surely resulted very problematic. Nevertheless, calculation of the energy savings to be associated to such cheap and highly requested measures should take into account inefficiencies in the distribution process (e.g. breakage during transportation, end-users disinformation, etc.).

Energy saving targets were put only on electricity network because oil market is fully liberalised while gas market is not, and it would have resulted very difficult to put targets on gas and not on oil because of the competition of these two fuels in some sectors (e.g. buildings heating).

Choosing electricity grid companies (representatives of the public sector) instead of electricity supply companies as obliged actors partly avoids the problem of conflicting goals (saving and selling energy) rising when obliged actors are supply companies. For grid managers, the "loss of profit" by transporting less energy is compensated by the CREG in recalculating the tariffs for the development of cost drivers. Furthermore, the grid companies are in the hands of local authorities and hence more easy to oblige to contribute to societal objectives. On the other hand, even though suppliers mainly see EE policies as means to bind customers to the company, supply companies could exploit their higher competences in the sectors ad-

dressed and better relationships with end-users to make the instrument more effective.

3.2 Indicator 2: Monitoring of energy consumption.

Detailed information to be provided by electricity suppliers (annual electricity consumption invoiced to each of their end-users and electricity origin) allows VREG to monitor the overall effectiveness of the obligation, to monitor economic amount collected by DSOs to finance the promotion of RUE (see step 6 of the instrument policy theory) and facilitates end-users (reading information about annual amount and origin of electricity consumed on their electricity bills) in verifying if energy saving measures implemented actually reach expected performances. Instrument transparency is surely enhanced by this activity. Information on frequency and outcomes of checks performed by VREG on the reliability of information provided by suppliers are not available.

3.3 Indicator 3: Preferred actions, budget estimates and methodologies proposed for savings calculation.

The table below gives an indication of actions typically undertaken by obliged actors.

Action
'Superwindows' to replace single glazing
Condensing boiler (domestic)
High-efficiency boiler (domestic)
Roof insulation
Wall insulation
Relighting
Heatpump
Thermal solar energy (domestic)
Ventilation with heat recuperation
Energy accounting
Energy audits
Frequency converter
Air heaters
Radiation heaters
Energy efficient motors
Non-domestic condensation techniques
Non-domestic thermal solar energy
Photovoltaic (PV)

Source: Annual reports of the mixed DSOs.

Although Decision of 29 March 2002 makes a distinction between low and high voltage customers, in practice the network companies offer programmes distinguishing between residential and non-residential customers.

Below most relevant actions undertaken in 2003 in the residential and not residential sectors were ranked according to number of premiums delivered, total energy savings achieved, cost-effectiveness (ratio between premiums value and energy savings achieved)²⁸.

²⁸ Presentation of A. Collys (ANRE) at the European Parliament – March 3rd, 2005

Residential:

TOP +6 premiums	TOP +6 energy saving	TOP +6 cost effectiveness²⁹
Energy saving light bulbs	Energy saving shower-head	Energy saving shower-head
Energy saving shower-head	Energy saving light bulbs	Tube insulation
Condensing boilers	Condensing boilers	Radiator foil
High eff. Boilers	High eff. boilers	Roof insulation
Super insulating glazing	Roof insulation	Energy saving light bulbs
Roof insulation	Super insulating glazing	High eff. Boilers

Not- Residential:

TOP +5 premiums	TOP +5 energy saving	TOP +5 cost effectiveness
Freq. Convertors	Freq. convertors	Thorough Audit
Energy bookkeeping	Thorough Audit	Quick scan
Condensing Technology	Relighting	Freq. Convertors
Heat pumps	Condensing technology	Roof insulation
Relighting	Roof insulation	HR motors

First column of the table referring to the residential sector indicates that in 2003 households implemented mostly less costly energy saving measures, while second column shows that such measures were also those mostly contributing to the

²⁹ It may appear surprising that radiator foil and energy saving shower heads are more cost effective in primary energy terms than energy saving light bulbs, high efficiency boilers and roof insulation in the residential sector. This may be because of the extent of the subsidy that the energy distributor has to contribute (e.g. they were required to 100% subsidise energy saving showerheads and energy saving light bulbs) or it may be because the energy saving values are incorrect in the presentation by ANRE from which the present table is derived (the energy saving from low flow showerheads reported, i.e. 1,311 kWh/year primary, looks surprisingly high for oil and gas heated hot water systems).

achievement of the energy saving target established for obliged actors³⁰. Information available indicates that this happened also in 2004 and it is not unlikely that such trend persisted also in 2005 and 2006 (see “CFL coupon” action obligation). The focus on cheapest measures during the first period of instrument implementation will probably cause a considerable decrease in the saving potential associated to these “low hanging fruits” and a consequent increase in the instrument cost-efficiency (as defined in the context of AID-EE project) in the years following 2007³¹.

Criteria adopted by obliged actors for budget formulation must be carefully verified (costs declared by obliged actors are charged to end-users through energy tariffs!). Energy companies can claim some overhead and costs not directly linked to the obligation as costs for indirect actions implementation. While these costs are necessary for the implementation and success of the instrument, they reduce the cost-effectiveness of the instrument.

Concerning methodologies for the calculation of energy savings achieved, grid managers typically propose a pure ex-ante approach (no on-field measurements). In case of complex measures (like VSDs or audits in the non residential sector) savings generated through subsidised investments are calculated on the basis of pre-defined specific formulae depending on variables whose value is estimated on-field (e.g. number of hours of VSDs use, etc.). As ANRE does not make public approved calculation methods, it is not possible to be more specific on this point. Transaction costs due to monitoring and verification of energy savings can be quite high (both for the obliged actors and the ANRE having to approve the methodology proposed). Elaborated (i.e. costly) methodologies can be accepted only in case of measures with high saving potential (the higher the savings achievable, the lower the influence of these costs on cost-efficiency).

3.4 Indicator 4: Effectiveness of the approval procedure

Requirements on obliged actors are quite strict. Not allowing to include energy savings resulting from indirect actions in the calculation methods proposed and establishing that each action undertaken must have a direct and an indirect component avoids problems typically occurring when savings generated by information or sen-

³⁰ The Flemish Ministry reported that in 2003 nearly all premiums for CFLs and energy saving showerheads went to the protected clients. Premiums addressing these energy saving solutions were basically the only premiums received by protected customers and allowed to save 75% of the energy totally saved in 2003 in the domestic sector (see section 3.12 on this point).

³¹ Considering that already in 2003 75% of savings achieved in the domestic sectors were realised thanks to CFLs and energy saving shower heads and taking into account the push on CFLs in the period 2004-2007, it is indeed reasonable to assume that additionality of such measures will be considerably lowered as from 2007.

sitizing campaigns have to be quantified. In this way effects of “indirect” actions are only quantified insofar as they favour an effective and successful implementation of the direct and concrete actions they are combined to.

Organising regular meetings (as ANRE does) with grid companies avoids possible conflicts and makes the instrument more efficient.

Information on the selectivity of the approval process is not available.

Envisaged evaluations activities can be accomplished effectively in 60 days only if number of persons employed by ANRE to this aim is adequate³². Considering that some actions are proposed many times it is likely that learning processes (both on the regulator and the obliged actors side) considerably lower initial workload (and associated transaction costs³³) needed to provide and evaluate documents related to such repeated actions. This may happen only if standardised procedures to be followed by obliged actors submitting their action plans are in place. Standardisation is particularly important for energy savings monitoring and verification methodologies proposed by grid companies in order to assure equitable evaluations in case different grid companies propose same EE measures.

3.5 Indicator 5: Amount of obligation costs charged to end-users

Amount of obligation costs charged to end-users are fixed yearly on the basis of estimated budget needed by DSOs to implement energy saving actions (both estimated costs for *direct* and *indirect* actions are included). The calculation mechanism is not completely clear. In particular it is not clear how differences between costs actually incurred and estimated budget for actions implemented in a given year are taken into account in drawing up distribution tariffs in the following year.

Information on energy consumption provided by energy suppliers (see step 3 of the instrument policy theory) and economic amount charged to end users per transported MWh, should constitute the basis for VREG to monitor amount collected by DSOs to finance the promotion of RUE and compare it with DSOs cost statements. Nevertheless, the very complex structure of electricity end-use prices in Flanders makes this job very difficult.

Transparency on the costs recovering mechanism is fundamental in order to accurately assess instrument cost-efficiency and to be aware of who is paying what.

³² ANRE employs 3 persons (1.5 full time persons equivalent) possibly supported by external consultants to accomplish such activities within the 60 days period mentioned. Source: A. Collis (ANRE) interview realised by Stefan Thomas (Wuppertal Institute) on November 22nd, 2005

³³ We use the definition of transaction costs given by Matthews (1986, p.906), who defines them as “the costs of arranging a contract *ex ante* and monitoring and enforcing it *ex post*, as opposed to production costs”.

3.6 Indicator 6: DSOs action implementation plans

The instrument provided a better channel for the info-campaigns than a more general approach because the link between info and concrete measures was more obvious, and the inertia to action was reduced by the premium system. In case of CFLs and energy saving shower heads it was noticed that their distribution to end-users without previous end-users information could be highly inefficient.

Uniformity among the various DSOs implementation plans is an important issue. Although a list of actions is posted as reference, companies have quite some freedom to pick from the list and to add other EE measures. As a consequence the policy implemented may be different by municipality and when e.g. a household wants to enter the programme it has to find out what type of menu is applicable in the place it lives. More uniformity in the actions undertaken in various municipalities would not only facilitate end-users participation but would also create a level playing field (conditions to get the premium may nowadays differ for the same measure). It is also noteworthy that the public wasn't in any way involved in the procedures of planning the programmes and determining eligible measures.

3.7 Indicator 7: Programmes accessibility and target groups participation

Low price of energy makes EE solutions not yet very attractive and some times end-users participation in the programmes was not as hoped. In general only households and industries with some interest (financial or by conviction) were actively participating. In case of public authorities it was the desire to look better than neighbouring authorities, the possibility of exploiting funding and expertise on EE measures that made them very active in some regions. Administrative procedures established imply too much bureaucracy to get premiums distributed, and this can be discouraging.

The table below indicates number of premium distributed in 2003 among domestic clients (protected clients are excluded), protected clients and non-household clients³⁴.

Target group	Number of premiums distributed
Domestic clients	13,629
Protected clients	371,032
Non-household clients	2,828
Total	387,489

³⁴ Source: Collys A., ANRE (presentation - European Parliament, 3 March 2005)

Note that protected clients received only premiums related to CFLs and energy saving shower heads, whilst other target groups (i.e. domestic and so called non-household clients) received premiums addressing technologies different from CFLS and energy saving shower heads.

As far as controls on the actual implementation of EE measures are concerned, the target groups that can obtain premiums are controlled tightly in an administrative way (certificated documents from certificated companies, e.g. bills, must be submitted), but there is no physical control whether the system is really there and functioning.

3.8 Indicator 8: Number of checks on data provided in the reports

ANRE is responsible for the verification of data annually provided by grid managers in their reports and for checks aiming at verifying that claimed measures have actually been implemented by end-users. In principle level of detail of information that grid managers are requested to provide allows ANRE to keep under control all the phases of the actions implementation process. So far, the number of checks actually performed (both on the grid companies and the end-user side) has been low³⁵.

3.9 Indicator 9: Degree of compliance with the overall obligation

All grid managers reached their target in 2003, except one for the high voltage, with less budget than planned. Grid managers achieved their saving target in 2004 as well. No information is available for 2005. In general target for high voltage end-users resulted harder to be achieved, especially for small grid managers. Protected customers resulted hard to be reached as well. Still, in 2003 and 2004, the total savings exceeded the total target by far, both for high and low voltage customers, so there has been the possibility of a large carry forward to 2005 and or 2006.

3.10 Indicator 10: Setting the amount of penalties

Electricity grid companies not achieving their target must pay a penalty of 10 Euro-cent for each KWh of primary energy not saved³⁶ (i.e. 27.78 Euro/GJprim). This amount results much higher than required grid companies rate of investment on en-

³⁵ Source: A. Collys (ANRE) interview realised by Stefan Thomas (Wuppertal Institute) on November 22nd, 2005

³⁶ Obviously penalties cannot be incorporated in the tariffs.

energy saving actions (see section dedicated to instrument cost efficiency) and as such stimulates obliged actors to actively support energy efficiency.

3.11 Indicator 11: Net impact

Table below reports amount of savings achieved in the first instrument implementation period.

Reference year	LV end-users (PJ of primary energy/year)	HV end-users (PJ of primary energy/year)	Total (PJ of primary energy/year)
2003 ³⁷	1.21	1.53	2.75
2004	Info not available	Info not available	2.88 ³⁸
2005	Info not available	Info not available	Info not available

Above savings are calculated without taking free rider, spill over, rebound, and possible further dynamic effects into account.

Savings achieved in a given year are calculated taking into account only EE measures implemented in that year and energy savings generated by these measures in that year. Information on how base line was set for the calculation of savings generated by the EE measures implemented is not available. Data available didn't allow to estimate final energy saved in the years considered and uncertainties affecting calculation of primary energy savings reported above.

The share of electricity use affected by instrument can be estimated considering that in the first years after 2000 annual electricity consumption in Flanders was around 140 PJprim.

3.12 Indicator 12: Effectiveness

Instrument effectiveness can be deduced comparing targets set and savings achieved reported in the table below. It shows that the total savings exceeded the total target by far.

³⁷ Source: Collis A., ANRE (presentation - European Parliament, 3 March 2005)

³⁸ Of these 2,88 PJ, 1,05 PJ have to be attributed to the "energy coupon" action obligation. Source: Couder, J., Verbruggen A., 2006, *RUE obligations of electricity distribution grid managers in Flanders*, University of Antwerp, draft version

Targets set and savings achieved (PJ of primary energy/year)

Reference year	LV end-users		HV end-users		Total	
	Target	Savings achieved	Target	Savings achieved	Target	Savings achieved
2003	0.55	1.21	0.82	1.53	1.37	2.75
2004	1.14	Info not available	0.85	Info not available	1.98	2.88
2005	1.26	Info not available	0.82	Info not available	2.08	Info not available

As already mentioned the calculation of savings achieved does not include dynamic side effects like free-ridership, rebound effects, etc. It is worth noticing that 75% of savings achieved at domestic clients (i.e. 0.82 out of 1.10 PJprim saved at these clients) in 2003 were realised through CFLs and energy saving showerheads installed by protected customers thanks to premiums distributed.

3.13 Indicator 13: Cost efficiency

Considering that amounts budgeted by grid companies to comply with RUE obligations are entirely charged on end-users, grid companies met their obligation at zero costs. Saving measures are implemented at the expenses of the end-users (and hence of the society) that pay for the implementation of these measures, finance RUE obligations through electricity bills and receive premiums distributed by grid companies.

3.13.1 Society

Data available do not allow to calculate instrument cost efficiency for the society as defined in the context of AID-EE project for several reasons.

- information on additional investments (additional compared to the reference situation) of reduction measures is not available
- information available do not allow to calculate cost savings on energy (information on life-time of measures implemented and long-range marginal system cost of electricity in the different sectors addressed is missing)
- data available do not permit to calculate net energy savings generated by measures during their whole life time.

A very rough estimation can be attempted for 2003 if it is assumed that overall investments of grid companies for this year corresponds to the total additional investments for the implemented energy saving measures.

Under such hypothesis cost efficiency for the society results 1.77 Euro/(GJprim/year)³⁹.

It is interesting to calculate the ratio between the amount spent by grid companies to comply with RUE obligations (and charged on end-users) and annual savings achieved.

Refer- ence year	Investments (million Euro)	Savings achieved (PJprim/year)	Invest./savings (Euro/(GJprim/year))
2003	11.77	2.75	4.28
2004	18.3	2.88	6.35
2005	24.46(budgeted)	2.08 (targeted)	11.76 ⁴⁰

Ratio between total investments and total savings achieved for the whole instrument first implementation period (2003-2005) can be calculated from data above and equals 7.07 Euro/(GJprim/year).

It must be noticed that ratios calculated are all much lower than the fine of 10 Eurocent/KWhp (i.e. 27.78 Euro/GJprim) to be paid by grid companies in case of non compliance with the obligation.

Finally, it can be noteworthy to analyze the below breakdown of 11.77 million Euros totally spent by DSOs in 2003.

2003 DSOs expenditures

	Investments (million Euro)	Savings achieved (PJprim/year)	Investments/savings (Euro/GJprim/year)
Premiums domestic clients	4.06	1.11	3.64
Premiums non-household clients	4.76	1.65	2.87
Sensitization and information	2.98		

The fourth column of the table above indicates that premiums distributed among non-households clients resulted more effective⁴¹ than those assigned to domestic clients for the achievement of energy saving targets⁴².

³⁹ Cost efficiency for the society has been estimated as the difference between grid company investments and depreciated cost savings on energy (due to implemented measures) over the total amount of energy savings realised. Cost savings on energy have been calculated assuming an electricity market based price of 6.2297 Eurocent/KWh for low voltage end-users and of 3.0902 Eurocent/kWh for high voltage end users (source: CREG). Such amounts include electricity production costs only (i.e. transmission, distribution, tax, levy and surcharge electricity price components are excluded).

⁴⁰ Considering that in 2003 and 2004 the budget was nearly twice as big as the actual expenditure, the investment per savings for 2005 may not turn out to be as high as indicated here if the same trend as in the preceding years is kept.

3.13.2 Government

Information on costs due to the administration of the system are not available. It can, however, be estimated that they are quite moderate, since ANRE/VEA needs only around the equivalent of 1.5 full-time staff plus some expenditure for consultants, and VREG and CREG probably need less resources⁴³.

3.13.3 Other organisations

As already mentioned, being amounts budgeted by grid companies to comply with RUE obligations entirely charged on end-users, it can be assumed that grid companies met their obligation at zero or even negative costs.

Considering that electricity grid tariffs are set annually at federal level on the basis of the estimated costs, plus a reasonable profit margin to ensure a return on invested capital (and in accordance with guidelines published by CREG) it can be assumed that reduction on amount of electricity distributed due to compliance with RUE obligations doesn't reduce grid companies profit margin.

Moreover grid companies are mostly representatives of the public sector that benefits of energy saving measures undertaken through the reduction induced by these on its energy bills.

3.13.4 End-user

Data available do not allow to calculate cost-efficiency for the end-users basically for the same reasons expressed in 3.13.1

⁴¹ Notice that only savings generated in 2003 by measures implemented are taken into account in the calculations.

⁴² Notice that this remains true also if higher premiums that grid companies were obliged to offer to protected (domestic) costumers are not considered. Source: **Collys, A.**, 2005, *The Flanders (BE) regional utility obligations*, Presentation at the European Parliament, ANRE.

⁴³ Source: A. Collis interview 22 November 2005

4 Conclusions

4.1 Net impact, effectiveness and cost efficiency

Information on achieved savings is available only for 2003 and 2004. Savings achieved were 2.75 PJprim in 2003 and 2.88 PJprim in 2004.

Such amounts are calculated without taking free rider, spill over, rebound, and possible further dynamic effects into account.

Savings achieved in a given year are evaluated taking into account only EE measures implemented in that year and energy savings generated by these measures in that year. Information on how base line was set for the calculation of savings generated by the EE measures implemented is not available. Data available didn't allow to estimate final energy saved in the years considered and uncertainties affecting calculation of primary energy savings reported above.

The share of electricity use affected by the instrument is about 2%⁴⁴.

Instrument effectiveness can be deduced from the comparison of targets set and savings achieved in the period 2003-2005 reported in the table below.

Targets set and savings achieved (PJ of primary energy/year)

Reference year	Target	Savings achieved
2003	1.37	2.75
2004	1.98	2.88
2005	2.08	Info not available

As far as instrument cost-efficiency is concerned, considering that amounts budgeted by grid companies to comply with RUE obligations are entirely charged on end-users, grid companies met their obligation at zero or even negative costs. Saving measures are implemented at the expenses of the end-users (and hence of the society) that pay for the implementation of these measures, finance RUE obligations through electricity bills and receive premiums distributed by grid companies.

⁴⁴ Such share was estimated considering that in the first years after 2000 annual electricity consumption in Flanders was around 140 PJprim.

Furthermore, there are no losses from reduced electricity transport for the grid companies because of decoupling of profits and volume of kWh distributed.

It is interesting to calculate the ratio between the amount spent by grid companies to comply with RUE obligations (and charged on end-users) and annual savings achieved (see table below).

Reference year	Invest./annual savings (Euro/(GJprim/year))
2003	4.28
2004	6.35
2005	11.76 (estimated) ⁴⁵

It must be noticed that ratios calculated are all much lower than the fine of 10 Eurocent/KWhp (i.e. 27.78 Euro/GJprim) to be paid by grid companies in case of non compliance with the obligation.

Data available indicate that at least in 2003 premiums distributed among non-households clients resulted more effective than those assigned to domestic clients for the achievement of energy saving targets.

A very rough estimation of cost efficiency for the society can be attempted for 2003 if it is assumed that overall investments of grid companies for this year corresponds to the total additional investments for the implemented energy saving measures.

Under such hypothesis cost efficiency for the society results 1.77 Euro/(GJprim/year).

4.2 Success factors

Main success factors individuated for the various steps of instrument implementations are summarised below.

- The choice of setting energy saving targets as a percentage of electricity supplied increases net impact of the instrument in case electricity supplied increases as well during the period the instrument is active.
- Establishing distinct saving targets at low-voltage and high-voltage end-users avoids that obliged actors neglect less cost-efficient EE measures in the residential sector and decide to realise energy savings mainly in the non residential sectors where EE measures are typically cheaper.

⁴⁵ Estimate is made on the basis of budgeted euros for 2005. Considering that in 2003 and 2004 the budget was nearly twice as big as the actual expenditure, the investment per savings for 2005 may not turn out to be as high as indicated here if the same trend as in the preceding years is kept.

- Equity issues were taken into account establishing the obligation of presenting energy saving plans addressing low income households and offering higher premiums to this target group.
- Level of detail of information to be provided by electricity suppliers allows VREG to monitor the overall effectiveness of the obligation, to monitor economic amount collected by DSOs to finance the promotion of RUE and facilitates end-users in verifying if energy saving measures implemented actually reach expected performances.
- Organising regular meetings with grid companies avoids possible conflicts between the regulator and the obliged actors and makes the instrument more efficient.
- The instrument provided a better channel for the info-campaigns than a more general approach because the link between info and concrete measures was more obvious, and the inertia to action was reduced by the premium system.
- Level set for penalties stimulated grid managers to actively support energy efficiency.

4.1 Fail factors

Main possible fail factors individuated for the various instrument implementation steps are listed below.

- The focus on cheapest measures during the first period of instrument implementation will probably cause a considerable decrease in the saving potential associated to these “low hanging fruits” and a consequent increase of the costs for the achievement of saving targets established for the years following 2007.
- Energy companies can claim some overhead and costs not directly linked to the obligation as costs for indirect actions implementation. While these costs are necessary for the implementation and success of the instrument, they reduce the cost-effectiveness of the instrument.
- Envisaged actions evaluation activities can be accomplished effectively by ANRE in the 60 days established only if number of qualified persons employed to this aim is adequate.
- Calculation method establishing how claimed grid companies budget is passed to end-users through electricity distribution tariffs is not completely clear. In particular it is not clear how differences between costs actually incurred and estimated budget for actions implemented in a given year are taken into account in drawing up distribution tariffs in the following year.
- Transparency on the costs recovering mechanism is fundamental in order to accurately assess instrument cost-efficiency and to be aware of who is paying what.
- More uniformity in the actions undertaken in various municipalities would not only facilitate end-users participation but would also create a level playing field (conditions to get the premium may nowadays differ for the same measure).

- It is also noteworthy that the public wasn't in any way involved in the procedures of planning the programmes and determining eligible measures.
- There are unwanted overlaps of RUE obligations with other instruments such as benchmarking covenant, tax deductions, etc.
- Low price of energy makes EE solutions not yet very attractive and sometimes end-users participation in the programmes was not as good as expected.
- As far as controls on the actual implementation of EE measures are concerned, the target groups that can obtain premiums are controlled tightly in an administrative way (certificated documents from certificated companies, e.g. bills, must be submitted), but there is no physical control whether the system is really there and functioning.
- The approved calculation methods of energy savings are not made public by ANRE.
- In principle detailed information that grid managers are requested to provide allows ANRE to keep under control all the phases of the actions implementation process. The number of checks actually performed (both on the grid companies and the end-user side) has been low so far.
- In general, targets for high voltage end users resulted harder to be achieved, especially for small grid managers, albeit at a lower cost than the target for low-voltage end users. Protected customers resulted hard to be reached as well. Still, in 2003 and 2004, the total savings exceeded the total target by far, both for high and low voltage customers, so there has been the possibility of a large carry forward to 2005 and or 2006.

4.4 Monitoring and evaluation

The fact that the approved calculation methods of energy savings are not made public by ANRE makes it difficult to indicate uncertainties related to these methods and to evaluate their possible pros and cons. Both ANRE and the grid managers typically prefer a pure ex-ante approach (no on-field measurements). In case of complex measures (like VSDs or audits in the non residential sector) savings generated through subsidised investments are calculated on the basis of pre-defined specific formulae depending on variables whose value is estimated on-field (e.g. number of hours of VSDs use, etc.)⁴⁶.

Information on how base line was set for the calculation of savings generated by the EE measures implemented in the three years considered is not available,

The fact that achieved savings are calculated without taking free rider, spill over, rebound, and possible further dynamic effects into account, increases the uncertainty of the evaluation performed.

One general remark that can be referred to the specific instrument analysed is that

⁴⁶ Source: A. Collys (ANRE) interview realised by Stefan Thomas (Wuppertal Institute) on November 22nd, 2005

transaction costs due to monitoring and verification of energy savings can be quite high (both for the obliged actors and the ANRE having to approve the methodology proposed). The employment of standardised evaluation procedures has to be recommended in general, but proves particularly effective in reducing transaction costs of those actions that grid companies propose many times. Furthermore standardisation is particularly important for energy savings monitoring and verification methodologies in order to assure equitable evaluations in case different grid companies propose same EE measures.

Elaborated (i.e. costly) methodologies can be accepted only in case of measures with high saving potential (the higher the savings achievable the lower the influence of these costs on cost-efficiency).

For the specific case of distribution of CFLs, energy saving shower heads, energy meters the calculation approach of the energy savings to be associated to such measures should be carefully evaluated because of the possible inefficiencies in the distribution process (e.g. breakage during transportation, end-users disinformation, etc.).

As far as calculation of instrument cost-efficiency (for the end-user and the society) is concerned the most important missing information for a proper calculation of this parameter are the additional investment costs of the EE measures (additional compared to the reference situation). Such information relies on statistical evaluations based on sales data that retailers do not usually want to make public, is difficult to be gathered and needs of continuous update (especially if the instrument is in place for many years). Annual cost reductions due to energy savings are less difficult to be evaluated once data on energy savings achieved are available.

Gathering data for the calculation of government cost-efficiency should be relatively easy and cheap.

The awaited report from the Ministry of Economic Affairs on results achieved during first implementation period (2003-2005) will probably fill some of these gaps.

4.5 Learning experiences from other EU countries

Besides learning experiences constituted by success and fail factors reported in the preceding sections, it is possible to point out some further interesting indications based on the comparison of RUE obligations in Flanders with similar instrument implemented in other EU countries (e.g. energy efficiency obligations in Italy, EEC in Great Britain, white certificate system in course of implementation in France).

Probably Italy has implemented the energy saving obligation system that more closely resembles to the one implemented in Flanders, as energy saving targets are imposed on energy (gas and electricity) grid companies (i.e. public actors) like in Flanders and energy saving investment costs are recovered by obliged actors through energy tariffs like in Flanders.

The common choice of energy grid companies as obliged actors⁴⁷ represents an interesting but somehow controversial approach. As already mentioned choosing electricity grid companies (representatives of the public sector) instead of electricity supply companies as obliged actors partly avoids the problem of conflicting goals (saving and selling energy) rising when obliged actors are supply companies. For grid managers, the "loss of profit" by transporting less energy is compensated by the CREG in recalculating the tariffs for the development of cost drivers. Furthermore, the grid companies are in the hands of local authorities and hence more easy to oblige to contribute to societal objectives. On the other hand, even though suppliers mainly see EE policies as means to bind customers to the company, supply companies could exploit their higher competences in the sectors addressed and better relationships with end-users to make the instrument more effective.

A second point deserving attention is the cost recovery mechanism adopted in the two countries. In Italy the cost recovery mechanism is linked to the amount of savings achieved (energy grid companies can recover 100 Euro/toe of primary energy saved) while in Flanders it seems that grid companies entirely recover expenditures for the implementation of their actions plan. Under this point of view, the Italian cost recovery mechanism probably stimulates the activity of grid companies (Italian grid companies could even make profits in case of very cost-effective EE measures) more than the Flemish one and appears simpler to be administered (no need for cost statements. The focus is on energy savings achieved).

Third point: the Italian energy saving evaluation approach seems more standardised. For a series of predetermined energy savings measures, the Italian regulatory authority provided technical forms in which the amount of energy saved is defined ex-ante for each measure implemented or can be rather easily calculated on the basis of a limited number of parameters (e.g. number of working hours). Such standardised approach sensibly reduces workload (both on the regulator and the obliged actor side) to produce and evaluate information attesting energy saving achieved. The fact that the approved calculation methods of energy savings are not made public by ANRE does not allow to establish if a similar approach is in place in Flanders. However, it appears that it is used for many of the measures implemented by the Flemish grid companies.

Finally, based also on the experience matured in several EU countries, it is possible to give some general indications about the interactions of end-use energy saving obligations on energy suppliers/distributors (as RUE obligations in Flanders or the ones previously mentioned in place in Italy, GB and France) with other energy policy instruments.

- End-use energy saving obligations on energy suppliers/distributors and energy taxes are – in principle – complementary for the State budget (energy savings reduce energy tax revenues but public subsidies may be reduced as well and indirect taxes associated to reallocated expenditures may increase).

⁴⁷ Notice that in GB and France subjects under obligation are retail energy suppliers

- Subsidy schemes and tax deductions have to be adapted to avoid overlaps with the obligations where not necessary (e.g. subsidies for energy audits may improve the functioning of the obligation system. Since obliged actors tend to promote competitive or almost competitive technologies, subsidies and tax deductions should be employed to promote new emerging technologies?)
- Performance standards do not conflict with such obligations (although comprehensive performance standards, as building performance standards, do not combine well with energy saving measures referring to single building components, as such comprehensive standards make it more difficult to calculate the reference baseline for single building components)
- Voluntary agreements can function in the context of such obligations (where VAs involve subsidies and tax deductions, adaptations have to be made)
- In any case, there is no problem in allowing that one action – e.g., by an industry company subject to a voluntary agreement, with assistance from an energy company subject to an obligation to save energy – can count towards the fulfilment of the inherent targets of *both* instruments, as long as double-counting the effects for national energy policy targets is avoided by an appropriate monitoring mechanism.
- As far as energy tariffs are concerned: the regulator should ensure that costs are charged to customers in such a way that energy efficiency is economically attractive for consumers (fix monthly charge vs percentage of the pre-tax energy price ?)

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