Commission Energy 2030
Energy Efficiency

Fraunhofer Institute for Systems and Innovation Research FhG-ISI
Department of Mechanical Engineering
Dr. Wolfgang Eichhammer
Breslauer Str. 48
76139 Karlsruhe, Germany
Phone +49 721 6809 158
Fax +49 721 6809 272
wolfgang.eichhammer@isi.fraunhofer.de
date : 5 September 2006

Table of Contents

1 Main results from the 2003 Study « Gestion de la Demande d'Énergie » dans le Cadre des Efforts a accomplir par la Belgique pour réduire ses Émissions de Gaz a Effet de Serre

This section summarises the main results from the so-called "Fraunhofer Study on Energy Efficiency in Belgium"[1] which was carried out for the Belgium Ministry of Economic Affairs in 2003 by the Fraunhofer Institute for Systems and Innovation Research ISI (Germany) in co-operation with: The Environmental Change Institute ECI, University of Oxford (UK), ENERDATA, Grenoble (France), CEA (Netherlands), Studiecentrum Technologie, Energie en Milieu STEM, Antwerpen (Belgium), Ghent University (Belgium), Institut Wallon (Belgium).

Belgium has an ambitious climate change target of -7.5 % for all six greenhouse gases mentioned in the Kyoto Protocol (CO_2, CH_4, N_2O, HFCs, PFCs, SF_6) to reach by 2008-2012. The target is ambitious given the current rising trends in greenhouse gas emissions in the country, though it is average compared to a global EU target of -8 % for all greenhouse gases. The remaining 10 years up to 2012, however, leave little margin on action and an ambitious reduction of energy demand is necessary in combination with supply efficiency measures (both on fossil supply and renewables) and measures for non-CO_2 greenhouse gases.

In this context, the present study was commissioned by the Ministry for Economic Affairs with the aim to investigate in detail the role that energy efficiency at the demand side had been playing in Belgium energy policy so far and what elements of energy efficiency could be promoted to increase its role in the future, taking into account the particular federal structure of the Belgium state.

Energy efficiency is not an isolated element of energy policy but embedded in a general context of energy policy. This context is presented in the study both from a historic view and from a current perspective, which is characterised by

- the decision, not to continue the nuclear option in Belgium with a strong impact on CO_2 emissions though only after 2015. This increases the pressure to reduce energy demand;
- the liberalisation of electricity and gas markets, which on one hand threatens energy efficiency options for electric energy and Combined Heat and Power (CHP) technologies through low electricity prices, but which on the other hand might also present chances for efficiency options (and renewables) by breaking up market monopolies;
- the promotion of renewable energy in liberalised markets;

---

[1] "Beheer van de Energievraag" in het Raam van de door België te leveren Inspanningen om de Uitstoot van Broeikasgassen te verminderen - « Gestion de la Demande d'Énergie » dans le Cadre des Efforts a accomplir par la Belgique pour réduire ses Émissions de Gaz a Effet de Serre

- climate change and the preparation for the forthcoming EU-wide emission trading scheme for larger emitters. This opens the possibility to replace partially domestic measures for the reduction of greenhouse gases by measures undertaken elsewhere than in Belgium by making use of the so-called "Kyoto flexibility instruments".

In this wider context, the present study concentrated on the role that demand reduction might play for Belgium efforts to reduce greenhouse gases, and established:

- the **current state of energy efficiency** in Belgium through an indicator approach that describes the situation at the national and the regional level. For comparison, indicators for a larger number of other EU countries were put aside the Belgium indicators, in order to allow for a suitable comparison;
- the **current state of energy efficiency policy** by investigating successes and failures in the implementation of energy efficiency measures in Belgium, in particular through comparison with other EU countries. The quantitative impact of the most relevant measures was estimated, as far as the availability of evaluations or comparative analysis with other EU countries gave hints to it;
- the **overall quantitative contribution of current energy efficiency measures to the reduction of greenhouse gases**;
- the **potential for energy efficiency in Belgium** by a modelling approach that considered all demand sectors. The potential was established in two scenarios as compared to a reference development, one derived from a benchmarking approach with other EU countries, the second from a bottom-up evaluation of techno-economic potentials for different technologies. Inputs for the potential evaluation were given by a scenario workshop. This general modelling approach was complemented by zooming with separate models more in detail into two sectors where energy consumption is growing particularly rapidly: **electricity consumption for electric appliances** in the residential and service sectors, and there in particular **information and communication technologies**; (for details see Annex 1)
- the **gap between the modelling results and the current practice of energy efficiency** in Belgium;
- **elements for an energy efficiency programme for Belgium** that might close the gap. Such elements were in many cases again derived from the comparison with practices in other EU countries; (for details see Annex 3)
- **data gaps** that are hampering more detailed analysis of the energy demand sectors.

An important element in the course of the study was the interaction with external experts and stakeholders in a "Shared Analysis Approach" in order to better perceive their opinions. This was, first of all, used for the preparation of the modelling work, by discussing in four workshops intensively the possible future development of the various sectors (residential and commercial buildings, industry, transport) as well as the macro-economic development.

In another series of workshops in smaller groups, the perception of various stakeholder groups on future energy efficiency improvements was investigated. This occurred in six group interview sessions with various stakeholder groups. The face-to-face interviews were complemented by questionnaires sent to a variety of more stakeholders that could not be reached through the small workshops. (for details see Annex 2)

In the modelling exercise carried out in this work (for details see Annex 1) it has been shown that in a benchmarking approach (i.e. compared to what has already been achieved in surrounding EU countries), Belgium might reduce its energy consumption in 2020 by 5 % and its energy-related CO_2 emissions by 7.6 % as compared to 2001. Such a potential takes into account the obstacles that would impede economic energy efficiency potentials to be realised. If the latter could be realised, Belgium energy consumption could be reduced by 13 % by 2020 and its CO_2 emissions could fall by 18 % as compared to 2001.

Thus, the CO_2 reduction achievable in the Benchmarking Scenario would be approximately just enough to reach the Kyoto target for Belgium in 2012, by returning energy-related CO_2 emissions back to levels close to 100 Mt CO_2. This means that a climate policy aiming at the realisation of the energy efficiency potentials indicated by this scenario would not have to make massive use of flexibility instruments to reduce greenhouse gases but could rely to a large degree on domestic policies and measures.

The Economic Potential Scenario shows that the emissions could be cut down further considerably, opening up potentials for a possible second commitment period in the Kyoto process, and compensating to a certain degree for the expected increase in emissions due to the phase out of the nuclear power units starting in 2015.

Many of the instruments to achieve such a goal already exist. It is not necessary to reinvent the wheel with nice new concepts, although the comparison with a variety of European countries in this study has shown that it is always worth to have a look across the border to learn from other experiences. Thus, the Energy Efficiency Commitment, an obligation introduced in the UK for supply companies, appears particularly interesting for a discussion in Belgium given the apparent success of this instrument in that country. Nevertheless, often it might just be sufficient to get "old" instruments really working in Belgium.

Minimum Energy Performance Standards are the most striking examples, and their revitalisation, and their revitalisation, which started now with the planned introduction of stricter building codes accompanied with stricter roles for checking compliance in Flanders, is a first step in the right direction. Further enforcement is, however, necessary.

Voluntary agreements and Benchmarking Covenants have been introduced fairly recently to Belgium. Their success (both with respect to the target setting process and the monitoring of efforts) is therefore vital for the improvement of industrial energy efficiency.

Energy/CO_2 taxation, which was described in detail in the report could support other energy efficiency measures to realise their full potential.

In many cases, however, **insufficient and non-optimally allocated staff in the administration** hinders a good translation of these instruments into practice. Another large barrier for a better impact of such instruments are the **differences among the regional approaches,** for example in the fields of building codes and of agreements with industry for CO_2 reduction. Though a regional approach to energy efficiency is justified in many cases, there are efforts necessary from the regions, which have large competence in the field of energy efficiency, to harmonise efforts with the neighbours; otherwise it is unlikely that energy efficiency will develop satisfactorily for the whole country.

Often, the argument is advanced, that energy efficiency is expensive and reducing by more than a few percent the energy consumption will substantially harm the economy. Such an argument ignores that many studies and practical experiences have shown that there are "no regret potentials" of 20-25 % (International Panel for Climate Change IPCC) that can be realised at no net costs at all (though the necessary initial investments can be a substantial barrier). And the real benefit of improving energy efficiency will appear for European countries much more in the coming two decades that will experience certainly more than one crises around the oil, not to speak about the fact that slowly this resource will become more expensive while progressively running out.

Numerous examples to improve energy efficiency realised in Europe support the idea that energy efficiency can be improved by the figures given above without net costs. The perceived costs of energy efficiency today might appear small in the future as compared to the real costs in consequence of a hesitating demand policy. What is needed, is commitment of politicians of all colours, as well as awareness of the population of the risks at stake if nothing is done to mitigate climate change. In that sense, awareness of citizens of the impacts of their consumption patterns, especially in a long-term perspective of climate change mitigation requiring more drastic emission reduction targets, will be crucial.

The in-depth discussion of past experiences with energy efficiency in Belgium and the regions, as well as experiences from other European countries, leads us to propose a **TOP 20 list of measures for the improvement of energy efficiency in Belgium**, which might be able to realise a large fraction of the potentials established in this report. The list is meant as a **catalyzer for discussion** not as a final list. It can be considered that these measures might cover larger fractions of the potential identified. One or the other measure might need more careful in depth discussion. **However, it is unlikely that without a large number of these measures in the present or some modified form, energy efficiency could improve substantially in Belgium.** On purpose, the list was also not ranked, because it is felt that a comprehensive programme for energy efficiency must consider all or most of these options.

Belgium Energy Savings Policy Study : Top 20 Measures

Buildings

1. Implementation of Energy Performance Standards for buildings (new + renovation) which are well-controlled and harmonised across the regions. Such a measure might also target the phase-out of old heating and hot water boilers in existing buildings according to the example of the current Energy Performance Standard in Germany
2. A transparent and well-controlled Public Service Obligation for Power Grid Companies. Similar to the Energy Efficiency Commitment, this obligation should also target measures for <u>existing</u> buildings
3. Governing by example (federal, subsidised institutes such as schools and hospitals, regions, provinces & municipalities)
4. A rate structure for grid companies which gives them the incentive to invest in local energy efficiency and distributed generation when this is cheaper than investing in grid expansion.

Transport

5. Fuel taxation: harmonisation with neighbouring countries, account for *externalities*

6. Investment in freight rail and road/water/rail intermodality infrastructures funded through road tolls, especially for heavy vehicles
7. Taxation on vehicles according to CO_2 emissions specification

Industry

8. Sufficiently ambitious negotiated agreements/benchmarking covenants (above autonomous progress). Regional harmonisation between benchmarking covenants and negotiated agreements).
9. Preparation of the transition from agreements to the EU emission trading for companies participating in the trading scheme, which is obligatory from 2008. Clarification of relation between agreements and possible EU and national taxation schemes, in particular for companies NOT participating in the trading scheme (principle of equal treatment). Especially benchmarking agreements are not obsolete by emission trading as they can pave the way for the allocation of emissions. Second, if the cap is too large, there will be little demand and the effectiveness of such a scheme might only materialise after 2010 and the first Kyoto commitment period. Thus industry must, possibly up to 2010, reduce emissions rather through agreements than trading
10. Redesign existing energy efficiency subsidy schemes + auditing procedures, to enhance monitoring and auditing schemes by giving consistently feedback to companies in the form of benchmarks.

Electric Appliances

11. Strong role for information, rebates, procurement at national level (and regulation if EU does not wish to lead)
12. Information/Communication Technologies ICT : Differentiated measures according three operating modes : normal, standby and off-mode

Cross-Cutting

13. CHP: Package of measures (appropriate market + policy conditions, grid access, appropriate calculation procedures for quality CHP, independent advice..)
14. Energy/CO_2 taxation (with the exception of industrial branches engaged in sufficiently ambitious negotiated agreements/benchmarking covenants). Taxation must be seen as a complement to many other measures in this list in order to prevent rebound effects. It is also considered in this report that taxation can coexist with an emission trading scheme. Taxation levels could be derived from the consideration of budget coefficients

Admissible price increases at consumer level in potential scenarios

	Benchmark		*Economic potential*	
	2012	**2020**	**2012**	**2020**
Industry	9%	9%	11%	16%
Residential	15%	23%	22%	31%
Tertiary	6%	13%	19%	33%
Transport	11%	20%	12%	28%

15. A drastic change in budgets for R&,D towards Energy Efficiency (mainly for buildings and industry) + especially serious budgets for Demonstration Projects (building sector + industry).

16. Permanent, competent information desks (especially for professionals in the building sector (architects and engineers) and for industrial companies (including promoting of EU-initiatives such as Green Light, Motor Challenge, …)

17. Information and sensibilisation for households by a meshed network of advisory centres, possibly fully incorporated into the obligatory yearly RUE action plans of the electricity grid managers

18. Monitoring and Evaluation of policy measures (enough staff and resources for especially controlling the Verification Office for Benchmarking Agreements, the future Energy Performance Standards of Buildings, the Public Service Obligation, and the Energy Use of Public Authorities)

19. Much improved data collection (Detailed sectoral and even process yearly energy balances, especially for industry ; measured End-Use Consumption Data ; yearly Ownership Data of Appliances ; …)

20. Improved governance for energy efficiency : This measures was not investigated in this report, as it would need an investigation on its own, with an intensive interaction necessary between the different stakeholders involved at the regional and national level in energy efficiency. Nevertheless, it came up regularly in the discussions of the team that one of the first obstacles for energy efficiency is the largely non-coordinated split of responsibilities among the stakeholders. This issue also arose in the course of the final conference and it was therefore felt that such a measure should be included in the list. Specific recommendations with respect this issue are difficult to provide before a thorough investigation. However, as a trigger for discussion, it is suggested to create a public energy efficiency agency with one main institutional attachment and one site at the federal level, as well as three regional entities with an institutional link to the regions. The federal agency would have a role more in the conception and the steering of the federal energy efficiency policy, and the harmonisation of - or with - the regional policies in this domain, while the regional units would have the double role to participate in the regional policy conception and to put into practice both regional policies and the regional aspects of the federal policy. Strong interaction between national and regional entities is necessary. The difficulty being there that the regional and national entities might depend on authorities with a different political colour and conflicting views on the policies to implement. This problem

has to be solved in a new governance scheme for energy efficiency. Such an interaction could take the form that staff at the federal level might be mandated from the regional agencies, for example in the same way as staff is mandated to the International Energy Agency.

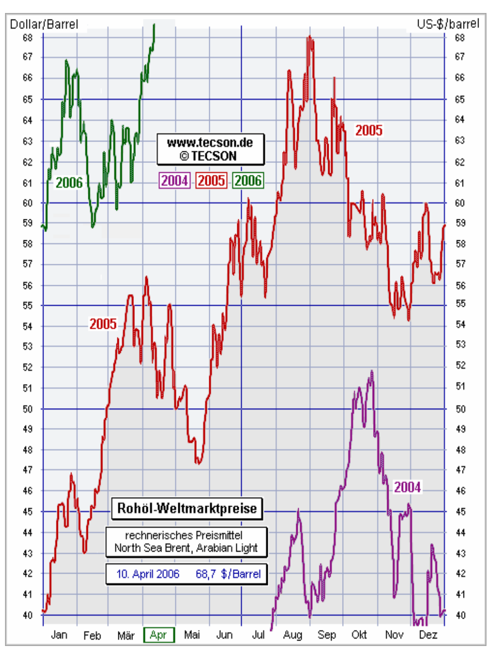
Not included in this list are measures concerning the lifecycle efficiency of material and products. Lifecycle efficiency of products can be considered the "second leg" to energy efficiency next to direct energy savings.

2 What has changed since 2003

During the last three years fundamental changes have occurred that conveys to energy efficiency improvements and energy conservation an even larger importance than it already had in view of mitigating climate change:

Energy Prices

The *oil price* has reached levels beyond 70 US$ per barrel which two years ago very few people believed possible. At the same time the prices for other energy carriers such as natural gas (but also for renewables such as wood pellets) have risen considerably. This development is due to various short and long-term factors and, although it is likely that there will again be periods when energy prices might fall for some time, it is clear that the extended period of cheap energy during the late eighties and the nineties is definitely revolved.

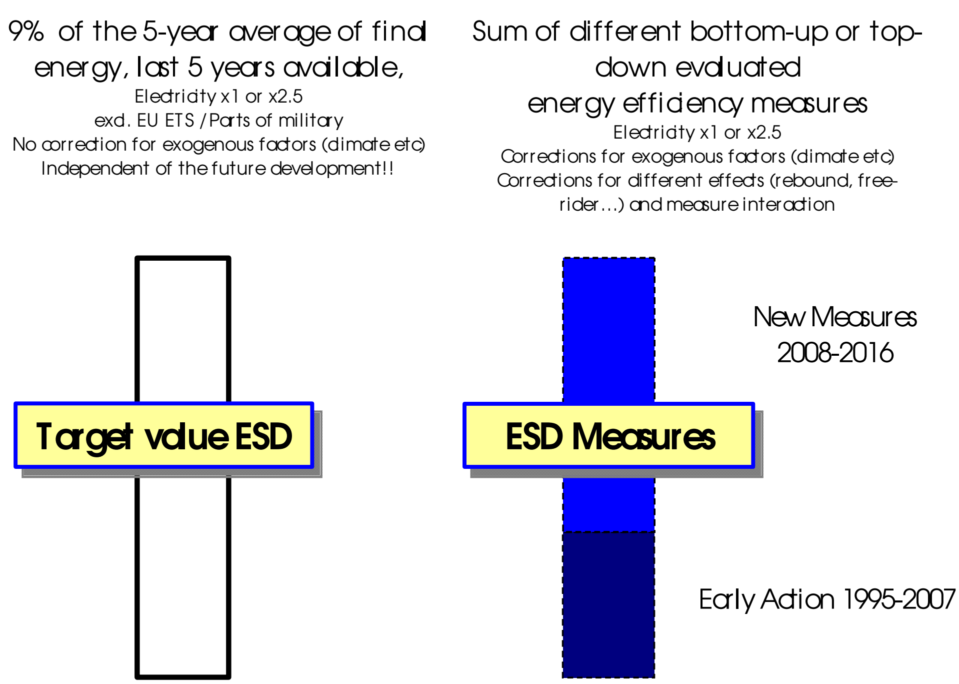


European Emission Trading Scheme (EU ETS)

The *European Emission Trading Scheme (EU ETS)* has partially (together with the higher prices for fossil fuels) induced an increase in the electricity prices due to the fact that energy suppliers tend to integrate the price of allowances into their electricity prices. In Germany for example the medium voltage price for industrial companies increased by 60 % since 2002, making electricity saving more attractive.

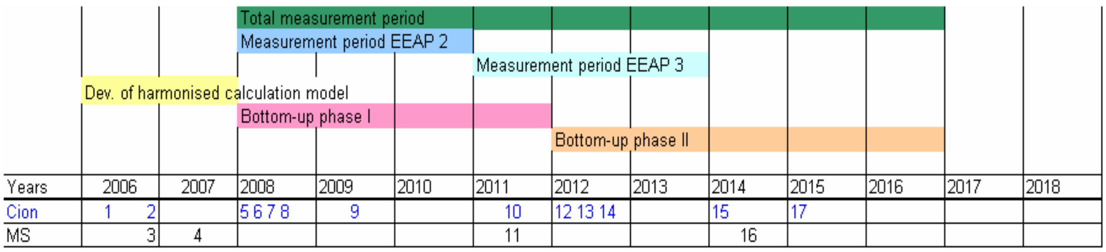
European Directive for Energy Efficiency and Energy Services (EU ESD)

On the policy side, the most important event was that the *Directive 2006/32/ec of the European Parliament and of the Council of 5 April 2006 on Energy End-use Efficiency and Energy Services* (EE&ES Directive) was published on 27 April 2006 (Official Journal EU L114, p64-85) and entered into force on 17 May. This Directive creates an institutional frame for energy efficiency improvements in all sectors and for energy services at the European level. In this frame it requires an indicative target of 9% improvement of energy efficiency in 9 years and evaluation methodology to measure the savings achieved. In the follow-up of the Directive the European Commission intends to bring forward a European action plan for energy efficiency. In this frame, the EU Member States are required to realise through national Energy Efficiency Action Plans (EEAPs) the economic potentials for the improvement of energy efficiency. The first of these EEAPs must already be submitted by 30 June 2007. The Commission needs to finalise the assessment of the Member State Action Plans by 1 January 2008.

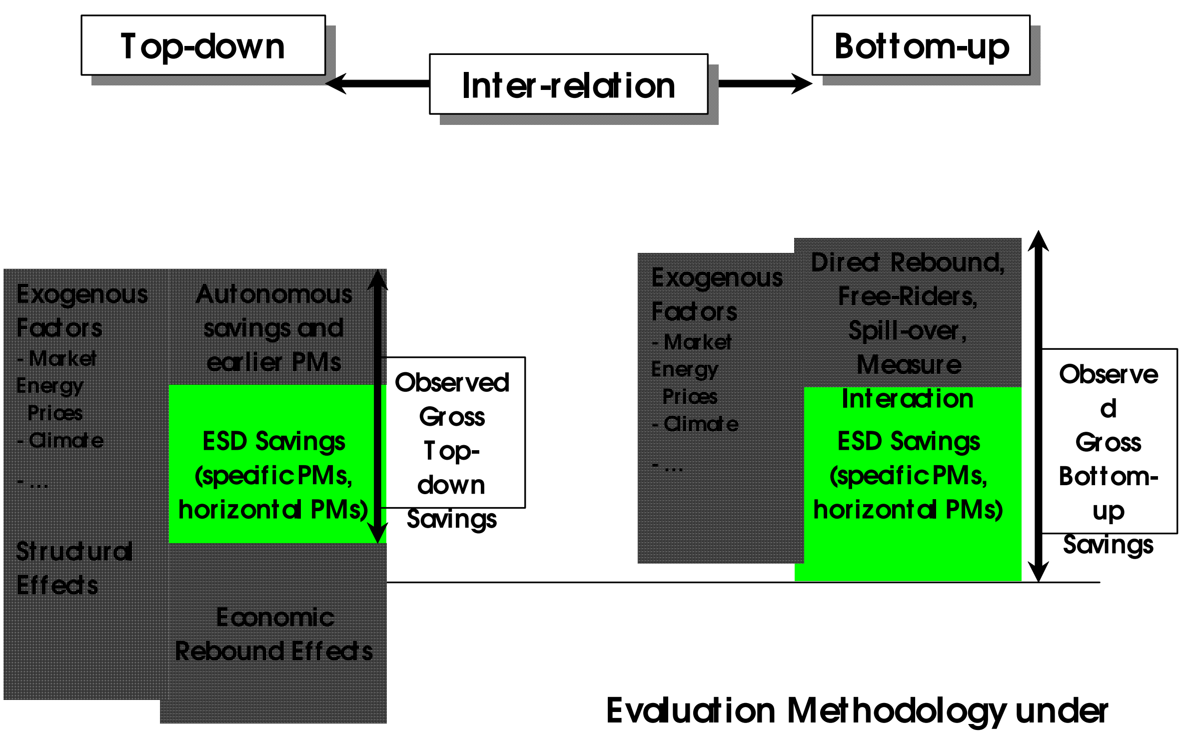


Target value of the ESD and energy efficiency measures

Time Frame EU EE Directive



1. Entry into force of the Directive	Entry date: May 2006
2. Commission to replace list of harmonised lifetimes (Annex IV, point 5)	Deadline: Nov 2006 (6 months after entry into force)
3. Member States may submit calculation methods for energy savings (Article 14(1))	**Deadline: Nov 2006 (6 months after entry into force**
4. Member States to submit EEAP 1, incl. overall and intermediate target in GWh (Art. 14 (2	**Deadline: 30 June 2007**
5. Commission report on EEAP 1 + opinion on intermediate target (Article 14(5))	Deadline: 1 January 2008
6. Commission to refine and complement as required points 2 to 6 of Annex IV (Article 15(2))	Deadline: 1 January 2008
7. Commission report on cost benefit analysis (Article 14(3))	Deadline: May 2008 (2 years after entry into force)
8. Commission report on setting indicators and benchmarks (Article 15(4))	Deadline: 30 June 2008
9. Commission guidelines on measuring and estimating energy savings effects (Annex I (3)):	No deadline set (after 2008 but before 2011)
10. Commission report on the progress on setting indicators and benchmarks (Article 15(4))	Deadline: May 2011 (5 years after entry into force)
11. Member States to submit EEAP 2 (Article 14(2))	**Deadline: 30 June 2011**
12. Commission report on EEAP 2 (Article 14(5))	Deadline: 1 January 2012
13 Commission to raise the percentage of harmonised bottom-up calculations (Article 15(3)	**Deadline: 1 January 2012**
14. Commission report on white certificates (Article 4(4))	Deadline: Medio 2012 (After reviewing EEAP 2)
15. Commission proposal for a new or an amended Directive (Article 14(5))	Deadline: Early 2014 (After reviewing EEAP 2)
16. Member States to submit EEAP 3 (Article 14(2))	**Deadline: 30 June 2014**
17. Commission report on EEAP 3 (Article 14(5))	Deadline: 1 January 2015

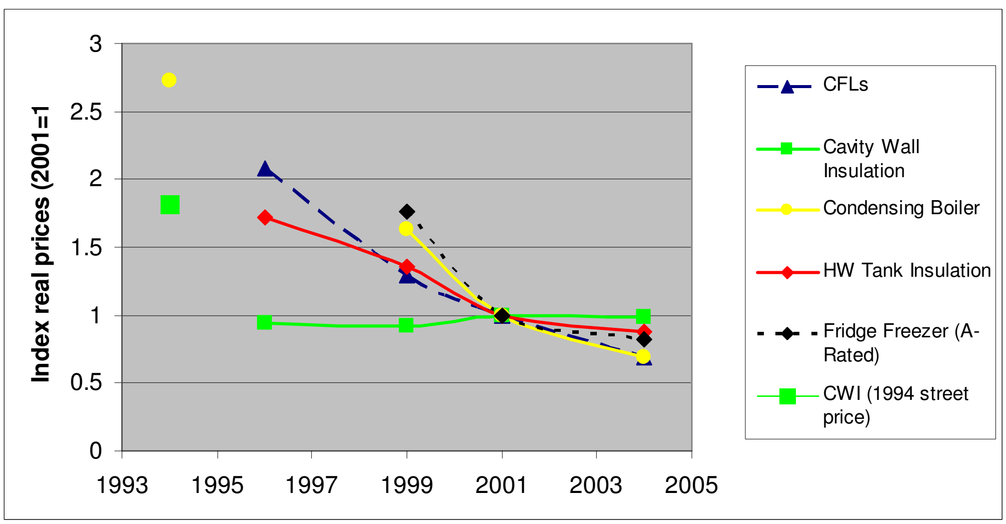


Evaluation Methodology under the EU ESD linking Bottom-up and Top-down Evaluations

Knowledge about costs of energy efficiency measures

The technical potentials for energy efficiency are enormous in all sectors. Much more important is, however, a realistic estimate at which costs these potentials can be realised beyond those potentials that are realised in an autonomous way anyhow. The current high energy prices can strongly enhance the uptake of energy efficient technologies and procedures. In addition, it is also important to describe the innovation effects of such technologies, and the scale effects that occur when energy efficiency technologies are used in a broad manner. A-Appliances had originally costs e.g. 100 Euro higher than standard D-Appliance. Today B-Appliance are more expensive than A-Appliance due to the larger volumes of A-Appliances. For the Energy Efficiency Commitment and its predecessors in the UK for example it was observed that technologies such as condensing boilers, high-efficiency lamps, A-class refrigerators etc. underwent a cost reduction by up to a factor of 2-3 (Lees, 2006). All in all, these examples show that costs of energy efficiency measures tend to be overestimated if considered in a static manner.

Price development (in real prices) of energy saving technologies during the active period of different energy efficiency programmes in the UK



Source: Lees (2006)

Belgium Involvement in Clean Development Mechanism CDM/ Joint Implementation JI

According to Point Carbon, Belgium has engaged in the following way in the Kyoto project-based flexibility instruments CDM/JI:

- Belgium is preparing to step into the JI/CDM market as part of its strategy to reach its Kyoto target of reducing greenhouse gas emissions by 7.5 per cent from 1990 to 2008-

12. In May the federal government will launch its first tender to attract emission reducing projects, with a 2005 budget of €10 million.

- With today's CER market price, the budget could be estimated to generate in excess of one million tonnes of reductions through the tender.
- Belgium has yet to establish a Designated National Authority (DNA) for Kyoto projects. Projects must be approved by the DNAs of both the host country and the investor country for CERs to be transferred to an investor country's national registry. A legal agreement needs to be worked out and signed between the country's regions and the federal government before the DNA is formally established. This is expected to happen towards the end of this year. All parties involved agree, however, that the National Climate Commission will become the DNA.
- The regions of Wallonia and Flanders have their own JI and CDM strategies supplementing the federal initiative. Wallonia is purchasing credits through the World Bank, so the lack of a DNA has no consequence.
- In addition the regional government of Brussels-Capital is currently setting up a €1.5 million fund that will invest in a sinks project in the Republic of Congo. The project is in its early phase, but has been estimated to generate 44,000 tCO2e emissions reductions annually during the first commitment period.

Burden-Sharing-Target: -7.5 % of 146.8 Mt = 135.8 Mt CO2e/year in 2008-2012. Distribution on regions:

Brussels: + 3.475 % (4.13 Mt CO2e/year)

Flanders: -5.2 % (50.23 Mt CO2e/year)

Wallon: - 7.5 % (83.37 Mt CO2e/year)

National gap of 12.28 Mt CO2 in 2008-2012 to be covered by CDM/JI. Emissions in 2002 (all GhG): +2.2 % to 150 Mt CO2e. Distance to target: 14.2 Mt CO2e

Regions might also make use of CDM/JI.

As a matter of fact, depending on the carbon price, Belgium might spend 100 million Euro on CDM/JI !

3 Previous and present projections for energy-related CO_2 -emissions

The following table makes a comparison between previous CO_2 -emissions from 2003 and the present PRIMES baseline prepared for the Commission 2030:

- The first two parts of the table compare more in detail the PRIMES projections from 2003 in the frame of the European Commission projections and the projection from 2006. CO_2 emissions end up at a level in 2030 in the new projection which is

6 Mt lower in the new projections. It can be supposed that new assumptions on energy prices account for much of the difference. However, final energy demand seems only marginally lower by about 1%.

- The lower part of the table presents a comparison of energy-related CO_2 emissions as an Index from the PRIMES 2003 and the PRIMES 2006 studies, from the different MED-PRO scenarios from 2003 and from the Inventories from Belgium (the strong increase of CO_2 emissions in 2030 in the PRIMES projections is the result of the assumed nuclear phase-out). The Inventories are lower than the projections indicating even some stabilisation of the CO_2 –emissions since 1997. It can be supposed that the 2005 and 2006 inventories will also show some impact of the current high energy prices. The 2006 projections should be discussed in the light of these indications of lower growth in CO_2 emissions. The spread of the MED-Pro scenarios which reflect the potentials for energy efficiency show that there is a large possibility for the Belgium consumers to react to high energy prices.

BELGIUM: Baseline Scenario 2003 (Energy Transport 2030)

Summary Balance Sheet[1]

	1990	1995	2000	2005	2010	2015	2020	2025	2030	'95-'00	'00-'10	'10-'20	'20-'30
										Annual % Change			
Gross Inland Consumption (ktoe)	**47178,74**	**50331,04**	**57040,37**	**59073,46**	**61027,33**	**61871,13**	**62148,20**	**61742,06**	**60614,92**	2,53	0,68	0,18	-0,25
Final Energy Demand (ktoe)	**31240,63**	**34406,79**	**36908,39**	**38125,97**	**39195,14**	**39871,21**	**40583,41**	**41024,88**	**41569,76**	1,41	0,60	0,35	0,24
Electricity	4985,73	5884,69	6667,16	6972,64	7542,02	7835,84	8261,44	8537,33	8852,08	2,53	1,24	0,92	0,69
by sector													
Industry	11830,07	12027,80	13621,32	14130,42	14628,36	14736,83	14670,14	14498,56	14318,37	2,52	0,72	0,03	-0,24
Tertiary	3369,02	4602,47	4156,27	4170,87	4407,75	4646,97	5001,41	5461,04	6100,38	-2,02	0,59	1,27	2,01
Households	8337,62	9296,10	9468,52	9493,25	9467,07	9451,31	9289,96	9080,65	8868,53	0,37	0,00	-0,19	-0,46
Transports	7703,92	8480,42	9662,28	10331,43	10691,96	11036,09	11621,90	11984,64	12282,48	2,64	1,02	0,84	0,55
CO_2 Emissions (Mtn CO_2)	**106,30**	**112,45**	**115,88**	**113,64**	**112,23**	**113,12**	**120,06**	**131,08**	**145,88**	0,60	-0,32	0,68	1,97

BELGIUM: Baseline Scenario 2006 **SUMMARY ENERGY BALANCE AND INDICATORS (A)**

ktoe	1990	1995	2000	2005	2010	2015	2020	2025	2030	'90-'00	'00-'10	'10-'20	'20-'30
										Annual % Change			
Gross Inland Consumption	**47256,82**	**50458,59**	**57167,89**	**59213,17**	**60353,87**	**59525,78**	**58279,74**	**56795,64**	**55428,72**	**1,92**	**0,54**	**-0,35**	**-0,50**
Final Energy Demand	**31354,53**	**34575,83**	**37054,57**	**38640,14**	**39967,73**	**40741,81**	**41197,19**	**41082,33**	**40930,36**	**1,68**	**0,76**	**0,30**	**-0,06**
Electricity	4985,73	5884,69	6667,15	7186,61	7822,29	8213,20	8597,33	8861,09	9052,19	2,95	1,61	0,95	0,52
by sector													
Industry(1)	11943,88	12196,89	13768,61	13765,25	13993,16	14152,83	14101,60	13955,36	13850,99	1,43	0,16	0,08	-0,18
Residential	8336,68	9294,75	9465,29	9962,95	10310,90	10446,41	10313,72	10145,01	10008,23	1,28	0,86	0,00	-0,30
Tertiary	3370,04	4603,75	4158,38	4467,92	4847,50	5141,60	5446,11	5601,14	5763,38	2,12	1,55	1,17	0,57
Transport	7703,93	8480,43	9662,28	10444,03	10816,18	11000,97	11335,75	11380,82	11307,75	2,29	1,13	0,47	-0,02
CO2 Emissions (Mt of CO2)	**105,86**	**112,01**	**114,68**	**115,60**	**115,87**	**115,81**	**117,00**	**127,71**	**139,92**	**0,80**	**0,10**	**0,10**	**1,81**

CO2 Emissions (Index)	**1990**	**1995**	**2000**	**2005**	**2010**	**2015**	**2020**	**2025**	**2030**
Inventories 2004 (CO2 Emissions without LUCF)	100,0	103,8	104,1	(106,6)*					
Primes 2003	100,0	105,8	109,0	106,9	105,6	106,4	112,9	123,3	137,2
Primes 2006	100,0	105,8	108,3	109,2	109,5	109,4	110,5	120,6	132,2
Med-PRO Reference (2003)	100,0				108,3		115,5		
Med-PRO Benchmarking Scenario (2003)	100,0				91,9		92,3		
Med-PRO Economic Potential Scenario (2003)	100,0				85,6		81,3		

* 2004

	1990	**1991**	**1992**	**1993**	**1994**	**1995**	**1996**	**1997**	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**
Inventories 2004 (CO2 Emissions without LUCF)	100,0	102,7	101,4	100,1	103,1	103,8	107,3	102,7	107,4	103,2	104,1	104,2	103,6	106,6	106,6

4 The way forward

The previous section has shown that the main conclusions from the 2003 Study on Energy Efficiency in Belgium are not only still valid but have been given considerable more weight in the light of the recent developments. The way forward to improve energy efficiency summarises therefore in the following main recommendations:

- Commission 2030 might depart from TOP-20 List established in the Energy Efficiency Report and enrich it with possible new elements due to changes in recent energy efficiency measures.
- Revise the list in exchange with stakeholder contacts. Although the original list has been already discussed extensively in stakeholder events, it is necessary to further continue this exchange given the fact that energy efficiency needs a large consensus in society.
- Develop the TOP-20 list further in the light of the EU Energy Efficiency Action Plan which has to be delivered by Belgium until June 2007. This provides a timely frame to update the work from 2003

Annex 1:
The potential for energy efficiency in Belgium

The potential for energy efficiency improvement in Belgium was modelled by making use of three different models, focussing on different areas:

- In a general modelling approach covering all demand sectors by making use of the demand model MED-PRO run at ENERDATA
- A zoom into electric appliances by making use of a stock model for appliances run at ECI
- A further zoom into information and communication technologies (ICT) which are currently the fastest growing category of appliances.

General modelling approach

One particular task of the project is to estimate the potentials for energy efficiency improvement in Belgium in 2012 (dead-line for Kyoto commitments) and 2020. For this purpose, next to the exploitation of existing studies, a modelling exercise was carried out with the MED-PRO demand model from ENERDATA.

The overall methodology to evaluate the potential for energy efficiency and CO_2 mitigation lies upon the comparison of three future situations as to energy demand and CO_2 emissions, as simulated by the model:

- a baseline evolution (the **Reference Energy Scenario** - RES),
- **Benchmarking Scenario (BMS):** The potential savings are established starting from this reference value (which can further evolve in time by autonomous changes). In the benchmarking approach the potential savings are derived from the comparison with other countries. This way of constructing a scenario was chosen because it is a very pragmatic view of what the actual potential is , i.e. in the real economic world, with real decision makers and actual behaviours, and barriers but with different policies across Europe as regard energy efficiency. That would give certainly a very realistic economic potential up to 2020.
- **Economic Potential Scenario (EPS):** In a second place economic potentials for energy efficiency in Belgium were derived by making use of demand reduction potentials that have in established in numerous studies within Belgium and in other countries, as far as applicable to the Belgium context (on the basis of the existing literature and expertise of the consortium). This is, in a certain manner, also a kind of benchmarking approach as it is based on the comparison with best practice, but more in an ideal world, i.e. neglecting the existence of different barriers (economic, social and behavioural). Realising the potentials estimated in the second way in the time frame of 2020, would require certainly a very dedicated energy efficiency policy over the next 15-20 years. This scenario has net zero costs to the economy on a lifecycle basis (not taking into account barriers, i.e. transaction costs for the removal of barriers), though is requires in certain cases investment costs, which in itself can constitute a barrier, if not enough capital is available.

A scenario workshop has been organised with various experts in order to get first clear indications and guidelines, if not a consensus, on what is precisely meant by the baseline evolutions up to 2012 and 2020 (the reference scenario), from economic and technical viewpoints. Besides, this workshop also intended to get agreement on policies and measures to be considered in the evaluation of the potentials, with indications on their implementation characteristics.

Scenario Assumptions

The reference scenario was defined in close relation to the work carried out for the 3rd National Communication, at least on the same package of socio-economic assumptions.

Nevertheless, two difficulties remained:

- medium term detailed macro-economic forecasts (2001-2007) used in the 3rd National Communication (NC) have been revised since then, with some drastic changes;
- a specific extrapolation of these forecasts up to 2012 has been made at the occasion of the 3rd NC, but not beyond; more aggregated macro-economic forecast up to 2020 has been elaborated by the BfP, but for other purposes.

In order to allow comparison with the previous works carried out in relation to the Climate Change policies (in particular the 3rd NC), it has been decided to use directly the detailed macro-economic forecasts of the 3rd NC, and to extrapolate them up to 2020 using the other macro-economic forecast of the BfP.

The demographic assumptions (population and number of households) are directly taken from the report of the BfP "Perspectives énergétiques 2000- 2020: scénarios exploratoires pour la Belgique", which are based on a previous study "Perspectives de la population 1995-2050".

In order to remain consistent with the macro-economic and demographic assumptions, some of their most important sectoral consequences have been reviewed with sectoral specialists, and not directly taken from previous studies:

- physical output of energy intensive industries: steel, ammonia and petrochemicals;
- construction of new dwellings and tertiary buildings, renovation;
- transport demand and traffics.

The general principles adopted to quantify the sectoral assumptions are mostly of economic nature: competition (industries, transport), cost effectiveness (construction versus renovation, new equipment).

All existing policies and measures taken at this date (end 2001) are included into the reference and energy efficiency potentials (Benchmarking and Economic Potential Scenario) are evaluated in relation to additional measures or reinforcement of existing ones. Therefore, the technical trends considered in the reference are those expected from existing measures, as evaluated in the 3rd NC.

Energy efficiency potentials are to be assessed in relation to policies and measures necessary to reach Kyoto commitments 2008-2012. But it was recognised that evaluating ex-ante the expected impacts of in-door policy measures is rather hazardous, for different reasons: interaction between policy measures, sensitivity to context elements, and also the difficulty to capture complex behavioural responses to such measures. It was therefore agreed that, up to 2012 and beyond (2020), the assessment of the potentials would be made first on the basis of a benchmarking analysis of differences with European best practices, with an attempt, at a later stage, to identify necessary policies and measures to fulfil these potentials.

In a second stage, economic potentials were evaluated, that are more ambitious with respect to energy efficiency improvement but still can be considered on a life cycle basis.

Main results

The main results for the three scenarios are summarised in the following tables and figures. **Final energy demand** in 2020, as compared to 2001, would:

- increase by 16 % in the reference scenario
- be reduced by about 5 % in the benchmarking scenario;
- be reduced by 12 % in the economic potential scenario.
- Energy savings in 2020 with respect to the reference scenario would be 18 % in the benchmarking scenario, and 25 % in the economic potential scenario.

Energy-related CO_2 emissions in 2020 (2010), as compared to 2001, would:

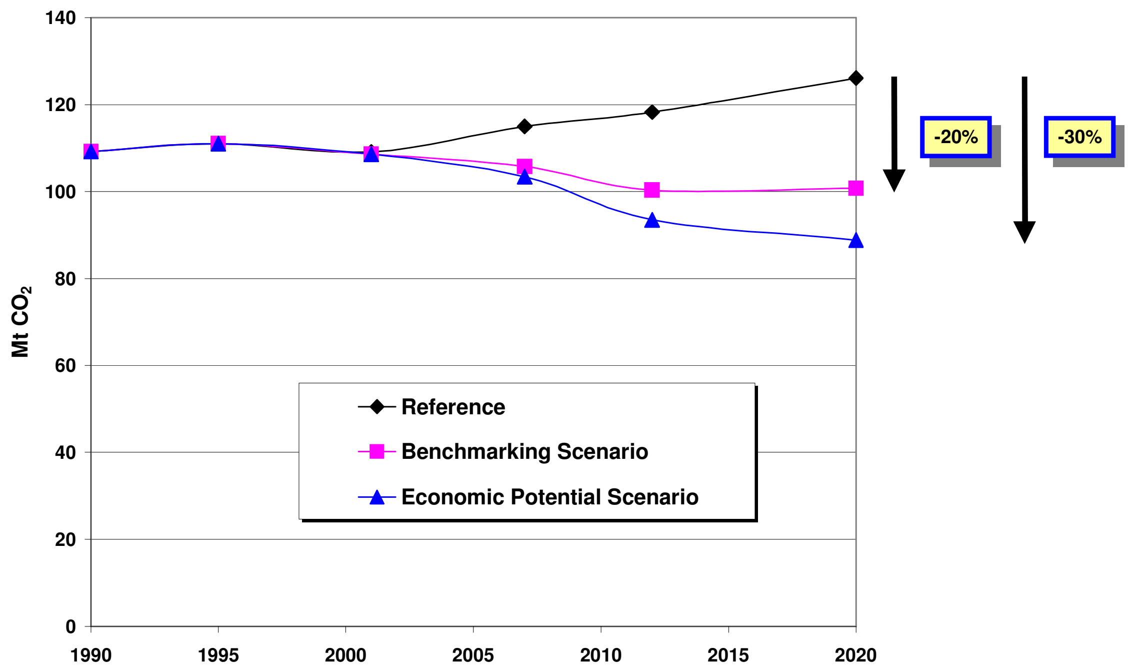
- increase by 15.6 % (8.4 %) in the reference scenario
- be reduced by about 7.6 % (7.2 %) in the benchmarking scenario;
- be reduced by 18 % (14 %) in the economic potential scenario.
- CO_2 reduction in 2020 with respect to the reference scenario would be 20 % in the benchmarking scenario, and 30 % in the economic potential scenario.

Thus, the CO_2 reduction achievable in the benchmarking scenario would be approximately just enough to reach the Kyoto target for Belgium in 2012, by returning energy-related CO_2 emissions back to levels close to 100 Mt CO_2, while the economic potential scenario shows that the emissions could be cut down further considerably, opening up potentials for a possible second commitment period in the Kyoto process, and compensating to a certain degree for the expected increase in emissions due to the phase out of the nuclear power units starting in 2015. Comparison with the 3rd National Communication of Belgium reveals some differences (see Table A1-1), which can be explained by the following two differences in procedure:

- Differences in scenario assumptions, in particular at the sectoral level (transport sector)
- Differences in the definition of scenarios (the "with measure" scenario in the Communication contains a limited set of demand reduction measures)
- One other major difference is the contributions of different sectors to the energy efficiency reduction in the with additional measures scenario: while in the 3rd Communication, the industrial sector is contributing by far the largest to the additional reduction, the potentials, as evaluated here, require substantial reduction from all sectors.

The potential savings in the Benchmarking Scenario and the Economic Potential Scenario according to the different end uses are presented in Figure A1-2 and Figure A1-3. While for the Benchmarking Scenario Savings of the order of 8 Mtoe (4.8 Mtoe) have to be realised a time horizon of 2020 (2012), in the Economic Potential Scenario up to 11.5 Mtoe (6.6 Mtoe) have to be achieved in the same time span. The savings to be achieved, in particular for the Benchmarking Scenario up to 2012 of 4.8 Mtoe must be compared with the roughly 1 Mt of CO_2 savings achieved in the nineties in Belgium (equivalent to approximately 0.35 Mtoe of savings in final energy). Thus the effort to improve energy efficiency must be considerably larger than in the previous decade. This does not seem out of scope give the comparatively high level of energy consumption in Belgium on a European scale. Nevertheless, in means that without a strong energy efficiency policy such changes are not likely to arise in an autonomous way.

Figure A1-1: Development of energy-related CO2 emissions in the three scenarios



Energy-related CO_2 Emissions	2012/1990	2020/1990	2012/2001	2020/2001
Reference	8,3%	15,5%	8,4%	15,6%
Benchmarking Scenario	-8,1%	-7,7%	-7,6%	-7,2%
Economic Potential Scenario	-14,4%	-18,7%	-13,9%	-18,2%

Table A1-1: Comparison with results of the 3rd National Communication of Belgium

	With measures	With additional measures
3rd National communication (Table 5.7)	2010/1995	2010/1995
Energy transformation sector	-4,5%	-22,7%
Manufacturing and construction	0,0%	-17,1%
Transport sector	32,0%	28,9%
Residential and Services	10,1%	2,9%
Energy-related CO2 emissions (Mt CO2)	**7,8%**	**-4,2%**

	Reference	BMS	EPS
Own scenario work	2012/1995	2012/1995	2012/1995
Energy transformation sector	-2,5%	-17,8%	-27,1%
Manufacturing and construction	1,5%	-16,6%	-21,8%
Transport sector	18,3%	4,3%	4,2%
Residential and Services	13,2%	-3,1%	-11,4%
Energy-related CO2 emissions (Mt CO2)	**6,5%**	**-9,6%**	**-15,8%**

Figure A1-2: Energy Savings Benchmarking Scenario (BMS compared to reference)

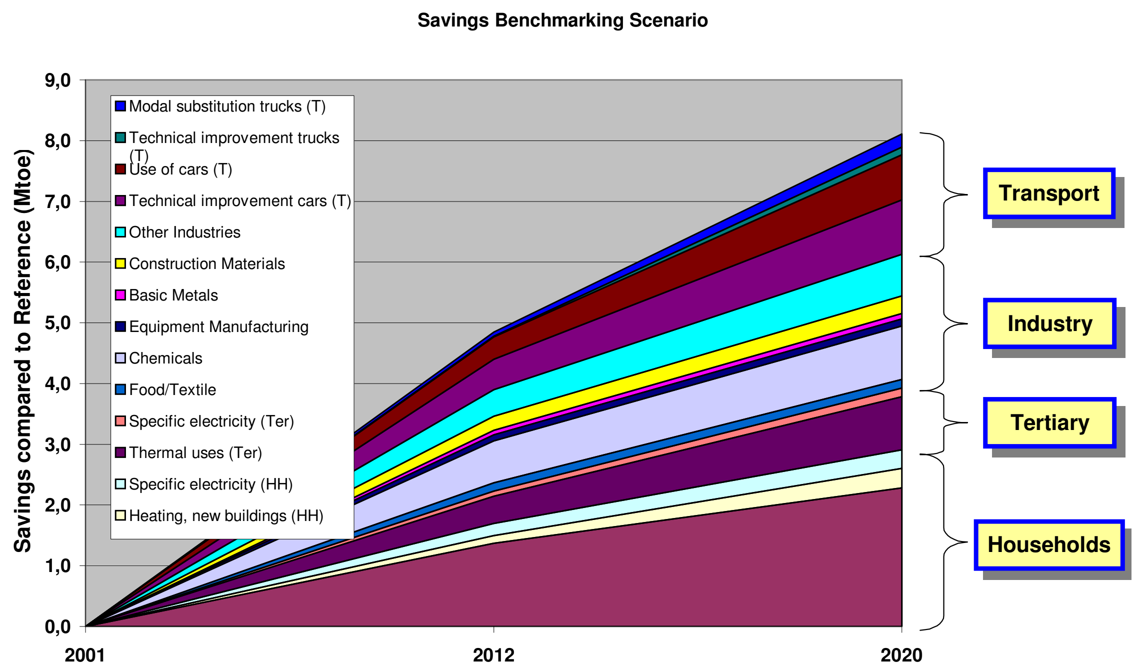
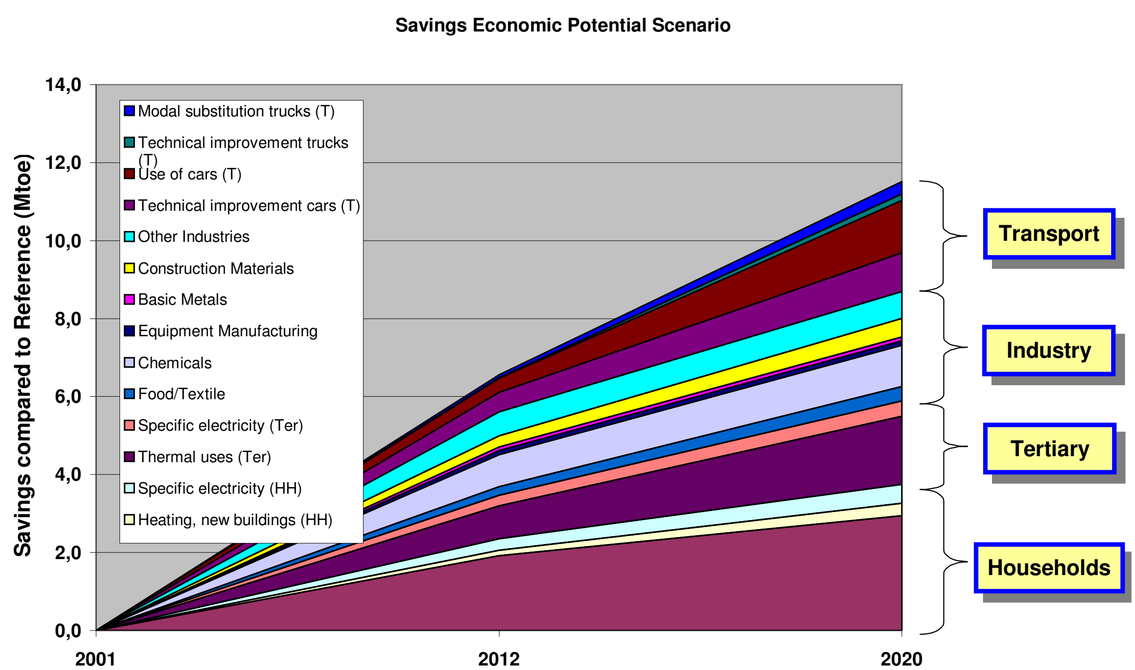


Figure A1-3: Energy Savings Economic Potential Scenario (EPS compared to reference)



Annex 2:
Stakeholder views on energy efficiency improvement in Belgium

In order for any policy program to succeed, it is important that the target group and other relevant stakeholders understand, accept or even endorse

- the necessity and the goals of the policy,
- the approach and the instruments of the policy;
- the actions (behaviour, investments, co-operation) that are expected from them, either as target group or as an intermediary.

For the policy makers this means that their policy plan and the deployment of the accompanying instruments must be purposeful, fair and transparent. This won't be easy to reach for all policies, especially not for climate policy. Climate policy is aimed at abstract, hard to reach, long term, global effects. Individual contributions will have no significant effect on the overall goal of reducing the greenhouse effect. Only long lasting and massive action will do.

Therefore a climate policy might suffer from people underestimating or denying the problem it seeks to address. Furthermore, because of the large consequences of some measures they are asked to take, people will oppose policy instruments, distrust the motives of politicians or will try to back out of the appeal that is made on them.

Early insight in the beliefs, mistrusts and expectations of target groups and other stakeholders is therefor of the utmost importance for a acceptable and accepted climate policy. The same goes of course for an Energy Demand Management (EDM) policy as an important part of the Belgium climate policy.

In order to gain this kind of insight in stakeholder beliefs and opinions three types of activities were carried out under the general heading of "stakeholder interaction" in this project:

- The first interaction activity was the representation of several relevant governmental bodies within the accompanying committee of the project, in particular from the regional level.
- The second activity was a qualitative survey amongst stakeholders within the main sectors of Belgian society which might be affected by (new) EDM policy.
- The last interaction activity is the conference hold at the end of the project. This conference had three major goals. First of all it gave the stakeholders information on the project. Secondly it fed back information on how the proposed EDM-program will be received by the stakeholders; which aspects still come across any opposition and which aspects need further explanation or changes. And thirdly, by strengthening of understanding and by creating a sense of urgency, the workshop aimed to induce commitment amongst representatives of the target groups and other stakeholders.

The second activity occurred in six group interview sessions, with representatives of the following sector / groups:

- Industry
- Small and Medium sized Enterprises (SME) and the service sector
- The residential (buildings) sector (housing corporations, real estate developers)
- "Intermediaries" for energy efficiency (architects, (retro-)fitters, building contractors)
- The transport sector
- Consumers, environmental groups and NGO's

Main findings from this interaction activities were the following:

- Among interviewees there is a general acceptance of the need to save energy and to reach Kyoto targets which Belgium agreed on. Other reasons for energy saving are also mentioned (and sometimes valued even more important): a future independent power supply for Belgium and a moral obligation to developing countries to use substantially less energy within industrialised countries, like Belgium.
- There are no doubts on the existence of large & feasible saving potentials –
- except for industry & the transport sector.
- As strong need for the enforcement of existing regulations.
- A strong need for consistency & harmonisation, within Belgium but also on a European level.
- Basis education on environmental effects of energy uses is needed for the general public.
- In the building sector an integrated approach seems necessary: integration of energy efficiency in the building process, education and training of architects, stronger control of existing regulations, find new solutions for the improvement of energy efficiency of the existing building stock.
- Transport is a problematic sector. Although efficiency is getting better over time, volume grows even faster and total energy demand grows. Structural changes seem hard to reach (especially on short notice). Behavioural changes seem unlikely too since the economic and social importance of mobility. Change should come from a large range of linked measures and policy instruments.
- Spatial planning is often mentioned as important tool to curb down future energy demand, both in transport as in energy use for heating through compact building.
- There still is a large energy saving potential in the service sector and amongst SME. Measures will be hard to reach here since knowledge and awareness is low. An integrated approach with knowledge transfer, subsidies, hands-on help and stimulation of intermediaries could set things into motion in this sector.

Annex 3:
Overview of potentials and energy efficiency programme elements for the demand sectors in Belgium

Overview of potentials and energy efficiency programme elements for the residential sector

Belgium EDM - Evaluation of main targets for energy savings potentials

Households

Mtoe/year	Benchmark 2012	Benchmark 2020	Economic potential 2012	Economic potential 2020	Major barriers	Benchmarking Scenario: Main measures (packages of measures) to realise potentials	Fraction of potential realised *	Economic Potential Scenario: Main measures (packages of measures) to realise potentials	Fraction of potential realised *
						- Incorporation of Energy Performance Advice into the existing system of grants and premiums			
Heating	1,50	2,60	2,05	3,26					
Existing buildings	1,37	2,29	1,92	2,95	- Public: insuff. information	***Improvement of existing buildings***			
					financial constrainst; own	- Public service obligation grid managers	+++	- Further enhancement of all measures on existing buildings	+++
					user dilemma	- EPS impact on heating boilers (condensing boilers)	+++		
						- Permanent, competent information desks	+		
						- Incorporation of Energy Performance Advice into the existing syste	++		
						- Financial incentives/tax releave			
New buildings	0,13	0,32	0,14	0,32	- Building professionals:	***Improvement of new buildings***	+++		
					inertia; insuff. information	- Effective implementation of EPS (including strict	+++	- Implementation of stricter EPS (E90 or E80); regular revision	+++
					- Public: insuff. information	standards (E135, E100) and controls)			
					financial constraint; paper	- Education of building professionals	+		
					hassle; compliance not				
					enforced				
Specific electricity	0,20	0,31	0,30	0,48					
Total	**1,70**	**2,91**	**2,35**	**3,74**					

*** Estimate of fraction of potential realised by measure/package of measure**
(large fraction: +++ / substantial amounts: ++ / small fraction: +)

Overview of potentials and energy efficiency programme elements for the tertiary sector

Belgium EDM - Evaluation of main targets for energy savings potentials

Tertiary sector

Mtoe/year	Benchmark 2012	Benchmark 2020	Economic potential 2012	Economic potential 2020	Major barriers	Benchmarking Scenario: Main measures (packages of measures) to realise potentials	Fraction of potential realised *	Economic Potential Scenario: Main measures (packages of measures) to realise potentials	Fraction of potential realised *
Thermal uses	0,44	0,88	0,85	1,75	- Building professionals: inertia; insuff. information - Owners: insuff. information financial constraint; paper hassle; compliance not enforced	***Measures specific (S) and non-specific (NS) for tertiary***			
						- Building performance standards (new + renovation) (S)	+++	- Energy/CO2 taxes	++
						- Governing by example (federal, regions, provines & municipalities)	++	- Enhanced building performance standards (new + renovation) (S)	+++
						- Monitoring and Evaluation of policy measures (NS)	+		
						- Professional information dissemantion for professionals (S)	++		
						- Demonstration projects (NS)	+		
						- Public Service Obligation for Power Grid Companies (NS)	++		
						Measures not specific:			
						- Much improved data collection (NS)	+		
Specific electricity	0,09	0,14	0,26	0,39	- high life cycle energy consumption - lack of knowledge of consumers	***Electric appliances***			
						- Continued support for EU policy (appropriate level for traded goods in single market)	++	- coherent market transformation policy for electric appliances, and ICT in particular	+++
						- Strong role for information, rebates, procurement at national level (and regulation if EU does not wish to lead)	+++		
						- Co-ordinate with other Member States, and through EU	+		
						- ICT: Differentiated measures according three operating modes: normal, standby and off-mode.	+++		
Total	**0,53**	**1,02**	**1,11**	**2,15**					

*** Qualitative estimate of fraction of potential realised by measure/package of measure**
(large fraction: +++ / substantial amounts: ++ / small fraction: +)

Overview of potentials and energy efficiency programme elements for the transport sector

Belgium EDM - Evaluation of main targets for energy savings potentials

Road transport	Benchmark		Economic potential		Major barriers	Benchmarking Scenario Main measures (packages of measures) to realise potentials	Fraction of potential realised *	Economic Potential Scenario Main measures (packages of measures) to realise potentials	Fraction of potential realised *
Mtoe/year	**2012**	**2020**	**2012**	**2020**					
Cars	0,87	1,64	0,87	2,35					
specific consumpt.	0,50	0,90	0,50	1,00	- average size Belgian cars	***Benefiting fully ACEA agreement for reduced spec. Consump.***			
					- development of air cond.	- fuel taxation: harmonisation with neighbouring countries, account	+++	- Enforced ACEA agreement (120 g/km) for reducing the specific	+++
						- taxation on vehicles according to CO_2 emissions specification	+++	consumption of cars; inclusion of air conditioners	
						- raising awareness (energy consumption labels etc)	+++	- fuel taxation: account for externalities	+++
use of cars	0,37	0,74	0,37	1,34	- availability of alternatives	***Reducing use of cars without reducing mobility / travel comfort***			
					- attachment of people to	- road pricing according to use of public space and externalities	++	- further investment in TGVs and fast urban/sub-urban PT	+++
					car	- fuel taxation (accounting for externalities)	++		
					- speed and time-use	- investment in TGVs and fast urban/sub-urban PT infrastructures /	+++		
						- good information system on PT	+		
						- "Company" cars	++		
TRUCKS	0,07	0,34	0,08	0,48					
specific consumpt.	0,01	0,13	0,01	0,16	- unsufficient attention to	***Measures tackling spec. consump. of light / heavy duty vehicles***			
					energy cons. in freight	- Inclusion of light duty vehicles into ACEA agreements	+++	- Enforced inclusion of light duty vehicles into ACEA agreements	+++
					- low fuel prices	- Benefiting of technical progress foreseen in other countries for	++	- Benefiting of more ambitious technical progress in heavy duty	++
						heavy duty vehicles	++	vehicles under discussion today	
						- fuel taxation (accounting for externalities)			
modal substitution	0,06	0,22	0,06	0,31	- just in time logistics	***Balancing freight traffic towards more energy/environm. friendly modes***			
					- costs versus speed	- road pricing according to use of public space and externalities	+++		
					- reliability of transport	- fuel taxation (accounting for externalities)	++		
					and logistic solutions	- investment in freight rail and road/water/rail intermodality infrastruc	+++	- further investment in infrastructures	+++
Total (excl. transit)	**0,98**	**2,05**	**0,99**	**2,90**		- harmonisation of the social status of drivers accross EU-25	++		

*** Qualitative estimate of fraction of potential realised by measure/package of measure**
(large fraction: +++ / substantial amounts: ++ / small fraction: +)

Overview of potentials and energy efficiency programme elements for the industrial sector and CHP

Belgium EDM - Evaluation of main targets for energy savings potentials

Industry, electricity, per branch

TWh/year	Benchmark 2012	Benchmark 2020	Economic potential 2012	Economic potential 2020
food/textile	0,8	0,9	1,6	3,3
chemicals	1,3	1,8	1,7	2,7
equipment	0,6	1,0	0,6	1,0
metallic	0,3	0,4	0,3	0,4
building	0,4	0,4	0,4	0,8
others	0,4	0,6	0,5	0,6
Total	**3,8**	**5,1**	**5,2**	**8,7**

Industry, fossil fuels, per branch

Mtoe/year	Benchmark 2012	Benchmark 2020	Economic potential 2012	Economic potential 2020
food/textile	0,06	0,06	0,08	0,09
chemicals	0,59	0,72	0,68	0,82
equipment	0,04	0,03	0,05	0,03
metallic	0,05	0,06	0,06	0,06
building	0,20	0,25	0,26	0,41
others	0,40	0,64	0,57	0,64
Total	**1,34**	**1,76**	**1,70**	**2,06**

Major barriers

- "business as usual" realisation of agreements and covenants
- asymmetric information
- neglectance of non-core production equipment
- exhaustance of energy efficiency potential

Benchmarking Scenario Main measures (packages of measures) to realise potentials	Fraction of potential realised *
- "Good European practice" as a guideline for target setting of negotiated agreements/ benchmarking agreements	+++
- Strict monitoring of results /knowledge of processes (enough staff for negotiations/ benchmarks)	+++
- Redesign existing EE subsidy schemes + auditing procedures, to enhance monitoring and auditing schemes by giving consistently feedback to companies	++
- Promote national and regional activities derived from forthcoming EU initiatives on cross-cutting technologies such as the Motor Challenge and lighting (Green-Light), or benefit from other national initiatives such as the compressed air initiative in Germany	++
- R&D support for industrial EE	+
- energy/CO2 taxation for companies not participating in effective agreements	++

Economic Potential Scenario Main measures (packages of measures) to realise potentials	Fraction of potential realised *
- 10% world-best companies as a guideline for target setting of negotiated agreements/ benchmarking agreements	+++
- Strict monitoring of results /knowledge of processes (enough staff for negotiations/ benchmarks)	+++
- Redesign existing EE subsidy schemes + auditing procedures, to enhance monitoring and auditing schemes by giving consistently feedback to companies	+++
- Promote national and regional activities derived from forthcoming EU initiatives on cross-cutting technologies such as the Motor Challenge and lighting (Green-Light), or benefit from other national initiatives such as the compressed air initiative in Germany	++
- R&D support for industrial EE according to a consistent White Book for Energy Efficiency R&D to be established	+++

Belgium EDM - Evaluation of main targets for energy savings potentials

CHP

MW	Benchmark 2012	Benchmark 2020	Economic potential 2012	Economic potential 2020
(2000: 1538 MW)	2200	3100	>2500	>3500

Major barriers

- Technical performance not under control
- Profitability of CHP mostl… dependent on electricity pricing (feed-in and back-…
- Wrong CHP quality norm

Benchmarking Scenario Main measures (packages of measures) to realise potentials	Fraction of potential realised *
- Apply correct fomulas for splitting combined from condensing activity in CHP	+++
- Reject 'quality norm' and apply correct rule for measuring CHP performance	+++
- Design the certificate systems well so they do not derail or block …	+++
- Co-ordinate and improve independent promotion and advice to CH… CHP investors.	+++

Economic Potential Scenario Main measures (packages of measures) to realise potentials	Fraction of potential realised *
- Realise appropriate market + policy conditions for CHP potential development	+++
- Make CHP 'the rule' and condensing power the exception	+++
- 'Fair terms of trade with the power grid	+++
- Open and low transaction cost access to (emerging) power marke…	+++
- Assign network cost savings of distributed gen. to distributed gen…	+++

*** Qualitative estimate of fraction of potential realised by measure/package of measure**
(large fraction: +++ / substantial amounts: ++ / small fraction: +)