Comments on the conclusions of the Commission ENERGY 2030 "How to deal with Belgium's Energy Challenges towards 2030?" (Draft)

Dr. Wolfgang Eichhammer, Deputy Head of the Department Energy Policy and Energy Systems, Fraunhofer Institute for Systems and Innovation Research (ISI), Karlsruhe Germany

Non-permanent Member of the Commission 2030, Expert for Energy Demand

Introduction

The Commission Energy 2030 has been set up to give a broad scientific foundation to the continued debate on future directions of the Belgium energy system beyond Kyoto.

My comments are to emphasise some of my views expressed during the work of the Commission 2030 and which could not necessarily be taken up in the report and its conclusions in the same clarity and broadness as written down here, although a variety of them have in some way been reflected in the conclusions. Therefore, I would like to associate these separate remarks to the report conclusions in view of a possible broader debate after publication of the report. An energy system is necessarily complex and a variety of developments are subject to uncertainties which give in consequence rise to different views and weighting of issues.

I would like to thank the Ministry of Mr. Verwilghen for the occasion to express my views on energy efficiency policies in the frame of the Commission 2030 work, Professor D'Haeseleer and his team for the excellent work performed in very short time, and other Commission Members as well as the Federal Planning Bureau for lively discussions and contributions to the work of the Commission.

Comments

(1) I fully **acknowledge the strong emphasis put by the report on the future improvement of energy efficiency in Belgium** and support the recommendations provided. Belgium is lacking behind other European countries in matters of energy efficiency for a variety of reasons[1,2] including a heterogeneous ap-

[1] see the report headed by Fraunhofer ISI "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 for the Ministry of Economic Affairs, Belgium, May 2003

[2] see the Energy Efficiency Indicators for Belgium as compared to other EU countries in the frame of the EU Odyssee-MURE project (www.odyssee-indicators.org)

proach among the regions. Belgium needs to strengthen its energy policy in that respect as well as the institutional capacity to carry on a stronger policy for energy efficiency in the future. On the energy efficiency policy side, the most important event this year was that the Energy Efficiency and Energy Services Directive entered into force at the EU level[3]. This Directive creates an institutional frame for energy efficiency improvements in all sectors and for energy services at the European level. The Directive requires an indicative target of 9% improvement of energy efficiency in 9 years and the development of evaluation methodologies to measure the savings achieved. In the follow-up of the Directive the European Commission has brought 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 (NEEAPs) the economic potentials for the improvement of energy efficiency. In this frame we see a chance for Belgium to promote energy efficiency at the national level in a strong manner.

The following are issues where I weight the facts gathered in the report in a different manner than the present conclusions:

(2) Looking to the transport sector and to the tertiary sector but also to other energy consumption than electricity I find that **the conclusions put a very strong if not too strong a weight on the role of the electricity generation sector in the reduction of greenhouse gases**. However, roughly 75 % of all Greenhouse Gas Emissions in Belgium are linked to the final demand sectors transport, residential and tertiary buildings, and industry. This is certainly also a consequence of the low weight of the energy sector due to the present use of nuclear energy as illustrated in the report but it points nevertheless to the fact that the CO_2-emissions from these other sectors need to be strongly reduced in view of the time up to 2030 but also beyond up to 2050. This process takes time and needs to be initialised soon.

(3) I have some doubts about the message from the projections and the analysis **that the transport sector cannot or only to a small degree reduce energy consumption because it is insensitive to price signals**. This considerably underestimates the role of standard setting and an adequate CO_2-taxation of transport fuels and of car ownership. Naturally, if the relatively large transport sector emissions are taken out from the considerations (nearly 25% of the present CO_2-emissions), the other sector have to take a much higher burden.

[3] 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.

Some analysis provided in the frame of the Commission 2030 on this issue[4] discusses the price insensitivity of the transport sector and the corresponding difficulties with standards. The argument relies essentially on the point that manufacturers are going to increase the price of efficient cars as compared to less efficient cars. This, however, will only occur in an initial phase when the market penetration is small. Talks with German car manufacturers have shown that once the market has taken up a sufficiently large number of units, the pressure from the market is large enough so that the additional cost are compensated by more efficient production modes and volume effects (air conditioning in cars has by the way also experienced this). At the end the user receives more services, including more energy services, for the same price. Nevertheless, I acknowledge that the conclusions of the report take up the transport sector as an important field for action. However, the instruments needed to improve energy efficiency for the transport sector need to be further worked out.

(4) If the model projections by the Primes model in the frame are right (see some comments on this below) **buildings in the tertiary sector** show a comparatively strong increase of fuel use for heating. That points, if considered realistic,, to the large role of thermal building regulation and its enforcement for the tertiary sector, as well as to measures to save energy in existing tertiary sector buildings. **Biofuels in the transport sector** are also an important "non-electric issue" for energy policy.

(5) **Air traffic** is a further "non-electric" field for increasing worry and not enough emphasised in the report due to its strong growth. In addition, emissions from this sector are to a large degree not taken into account in the international inventories but contribute to the greenhouse gas effect. The Belgium field of action is limited in this area but Belgium could support European measures that tackle the air traffic such as the inclusion of air traffic in the European Emission Trading Scheme or the taxation of kerosene if proposed at a European level.

(6) **Energy efficiency in electricity uses** also presents a considerable scope to reduce the pressure on the electric system: enhancement of the labelling schemes for electric household appliances, EU-wide coordinated stand-by policies for information/communication appliances, promotion schemes in the industrial sector for efficient electric cross-cutting technologies such as electric motors, pumps, compressors, ventilators etc. present also substantial scope for

4 Energy and environment developments in the transport sector, Contribution for ENERGY 2030, 2nd version, Prof. Stef Proost)

reduction. In Germany the Fraunhofer Institute ISI was able to show in its "Efficient Compressed Air Campaign" (http://www.druckluft-effizient.de) including more than hundred companies and compressed air suppliers that a 30% reduction of electricity for compressed air uses was possible in economic terms.

(7) The **cost of energy efficiency and energy saving options and their representation in presently used models**, including Primes (which is not a technology-detailed model), is an issue of much debate. Practical experience has shown that the models considerably overestimate such costs because in particular they do not present properly **innovation effects induced by the new technologies**. They also do not take into account that **policy measures can be designed to overcome barriers and to lower transaction costs[5]** which are in some way reflected in the models in terms of high expectations on the rate of return. At each time, when energy efficiency has been tackled IN PRACTICE, it has been found that the associated costs were lower than expected and the co-benefits (including non-energy benefits) larger than initially thought. These field experiences should also be taken into account next to the theoretical experience of the models: see for example the cost reductions for energy efficient technologies achieved in the UK energy efficient commitments[6], in the EU labelling schemes for electric appliances (an A-class device costs not more today than a D-class device ten years ago and in the very near future the prices for A++ devices will be at the same level as the A devices of today) or in the national building regulations (which over the past years have led to a strong decrease in the initial costs to insulate buildings)[7].

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5 see for example Jochem E., Gruber E. (2005), Local learning networks - an Effective Instrument to Reduce Transaction Costs for Decisions to Invest in Efficient Motor Systems, eemods, Conference Proceedings, ID 23062

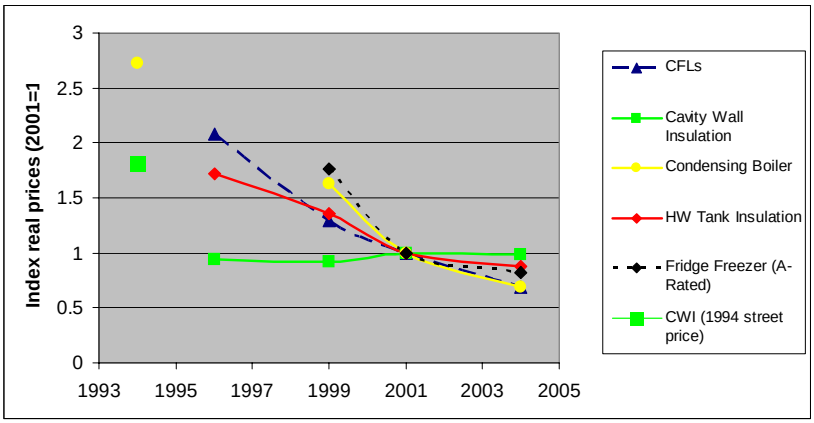
6 Eion Lees Energy (2006). Evaluation of the Energy Efficiency Commitment 2002-05. Report to Defra.
http://www.defra.gov.uk/Environment/energy/eec/pdf/eec-evaluation.pdf

7 Jakob M., Madlener R. (2004). Riding Down the Experience Curve for Energy-Efficient Building Envelopes: The Swiss Case for 1970-2020, International Journal of Energy Technology and Policy (Special Issue on "Experience Curves"), 2(1-2): 153-178.
http://www.cepe.ch/download/staff/reinhard/IJETP_vol2_no1_2_jakob_madlener.pdf

Jakob, M. (2004). Marginal costs, cost Dynamics and Co-Benefits of Energy Efficiency Investments in the Residential Buildings Sector. Energy Policy, Invited contribution to Special Issue on the eceee 2003 Summer Study "Time to turn down energy demand"
http://www.cepe.ch/download/staff/martin/EnergyPolicy_JEP1609_ArticleInPress.pdf

Jakob M., Jochem E., Christen K. (2002). Grenzkosten bei forcierten Energieeffizienzmassnahmen bei Wohngebäuden, CEPE und HBT, ETH Zürich, Studie im Auftrag des Forschungsprogramms EWG des Bundesamts für Energie (BFE), September 2002.
http://www.cepe.ch/research/projects/grenzkosten/Grenzkosten_Schlussbericht_Teil1.pdf

Development of energy efficiency technology costs in the UK under the Energy Efficiency Commitment and its predecessors :



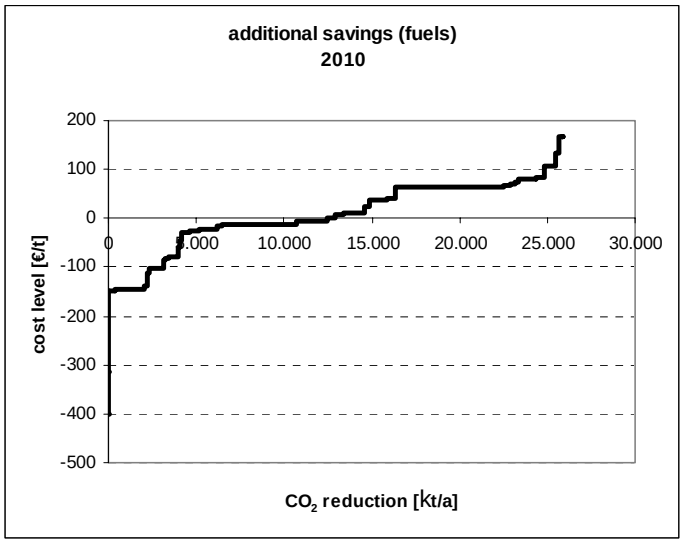
The industrial sector also presents considerable potential for the reduction of energy and of CO_2-emissions at costs which appear substantially lower than the costs evaluated by the Primes model. Below is a technologically detailed evaluation of CO_2-savings from energy efficiency measures in the industrial sector of the European industry (emissions from fuel consumption only; time horizon only 2010 hence considerably shorter than 2030; discount rate for investments of 15% and moderate fuel prices corresponding to around 40$ per barrel; only additional savings, i. e. excluding autonomous savings) which shows that most of the options have costs below 100 Euro per tonne of CO_2. Other investigations on industrial cross-cutting technologies show even lower cost levels. For the latter we estimate based on a detailed techno-economic evaluation taking into account field experiences in Germany an economic saving potential by 2015 of around 15% of German industrial electricity consumption corresponding to 32 TWh or 18 Mt CO_2. A variety of further options in the industrial sector in Germany are at costs well below 100 Euro/t CO_2. This potential can be taped by well-designed energy efficiency campaigns

Other reports such as the recently published Stern-Report[8] also point to considerably lower costs for the reduction of CO_2-emissions from the demand side.

http://www.cepe.ch/research/projects/grenzkosten/Grenzkosten_Schlussbericht_Teil2.pdf
http://www.cepe.ch/research/projects/grenzkosten/Grenzkosten_Schlussbericht_Teil3.pdf

[8]Stern Review: The Economics of Climate Change, http://www.hm-treasury.gov.uk/independent_reviews/stern_review_economics_climate_change/sternreview_index.cfm

Cost reduction costs for additional energy saving measures for direct CO_2 emissions from the industrial sector of the EU :

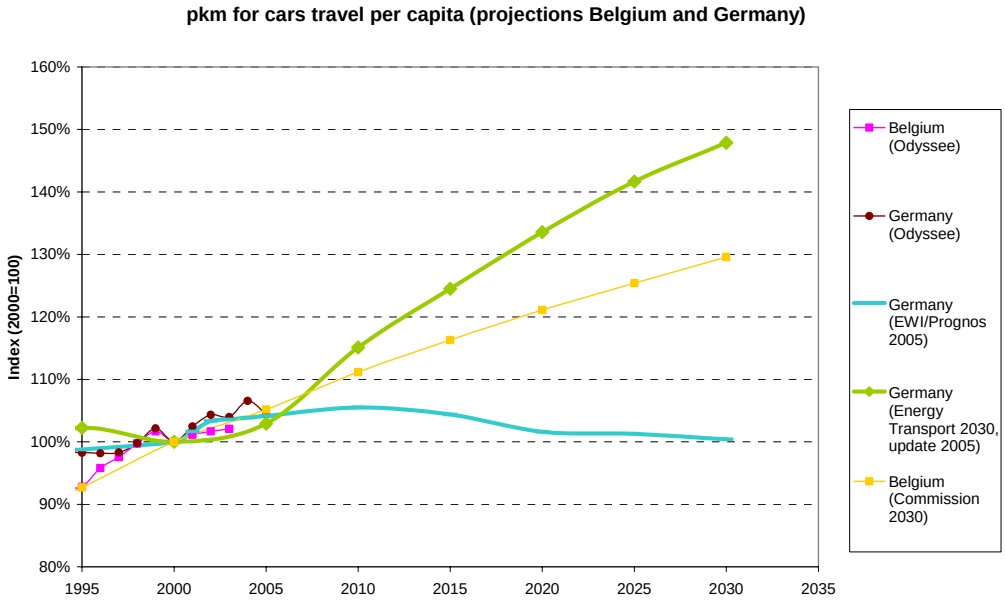


Note: Emissions from fuel consumption only; time horizon only 2010 hence considerably shorter than 2030; discount rate for investments of 15% and moderate fuel prices corresponding to around 40$ per barrel; only additional savings, i. e. excluding autonomous savings

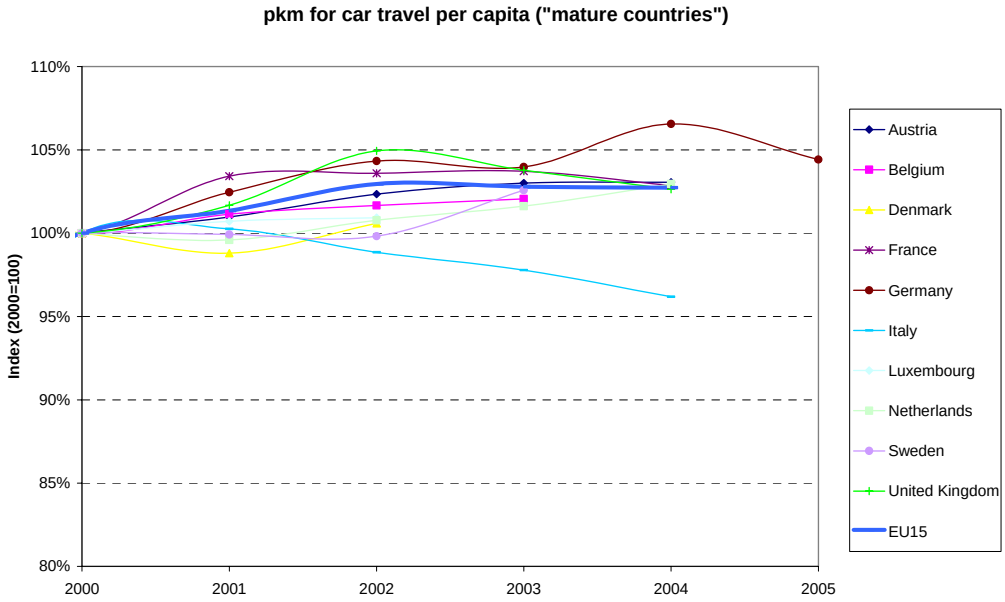
(8) Some of the pressure that is projected with the Primes model for CO_2-emissions is due to the assumptions that enter the model, in particular for the transport sector (e.g. expectations on the growth of mobility) or for the tertiary sector (expectations on the demand for heating of tertiary sector buildings). I have discussed this issue, and possible saturation effects in these parameters in various emails in comparison to Germany[9]) and other countries. The impact of these assumptions on the CO_2-emissions from the transport sector and the tertiary sector is considerable. I advocate therefore a more critical view on **uncertainties in the modelling exercise**, which in my view is in these two sectors at the high end of possible developments rather than corresponding to a reference scenario. These parameters should be critically followed up in the next years to clarify their development and possible saturation effects.

[9] The Primes model projects used at the EU level for Germany has also considerably higher values for these particular assumptions than the national German projections: e.g. mobility for cars is expected in Primes to increase by 45% in Germany by 2030 while the national EWI/Prognos projection assume essentially a stabilisation.

Comparison of assumptions on car travel per capita



Source: Commission 2030, EWI-Prognos, DG TrEn, Odyssee Database



Source: Odyssee Database

(9) I agree that Belgium must make strong domestic efforts to reduce greenhouse gas emissions in particular in the field of domestic energy efficiency but the **role of Kyoto flexibility instruments** and the possibility to "lower the bill" through this mechanism is not discussed in depth in the report. Such type of measures can initiated energy efficiency measures in developing countries with a consid-

erable larger potential than Belgium (but also measures in other fields of action to reduce Greenhouse Gas Emissions). The short calculation discussion in section 9.4.3 of the report (which could be supplemented with a macro-economic model in which flexible mechanisms are allowed) and in the conclusions shows nevertheless, how important the consideration of these mechanisms is as a part of the overall greenhouse gas reduction package in Belgium. Belgium has started in that view with CDM measure in order to gain knowledge and should enhance further the experience. **Non-CO_2-greenhouse gases**, although they represent a smaller fraction of less than 15% to greenhouse gases, could nevertheless also make further contribution to the reduction of greenhouse gases. These gases have not been investigated in detail in the report for further reduction options.

(10) The report and its conclusions make interesting suggestions based on a Dutch example to link the future development of the energy supply system with the financial promotion of sustainable development through the establishment of a sustainability fund financed half by supply companies and half by the government. The counterpart is a prolonged use of nuclear energy. In the Netherlands financing is to be provided for energy savings, clean fossil fuels (including carbon sequestration) and renewable energy such as biomass. Such an approach has some novelty but also some caveats. First of all it must be emphasised that the European Directive for Energy Efficiency and Energy Services requires from the Member States and the energy distributors in Article 6 anyhow substantial efforts to promote energy efficiency and energy services[10]. Care must therefore

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10 Under Article 6 of the EU Directive for Energy Efficiency and Energy Services Member States shall:

(a) choose one or more of the following requirements to be complied with by energy distributors, distribution system operators and/or retail energy sales companies, directly and/or indirectly through other providers of energy services or energy efficiency improvement measures:

(i) ensure the offer to their final customers, and the promotion, of competitively priced energy services;

(ii) ensure the availability to their final customers, and the promotion, of competitively-priced energy audits conducted in an independent manner and/ or energy efficiency improvement measures, in accordance with Article 9(2) and Article 12; or

(iii) contribute to the funds and funding mechanisms referred to in Article 11. The level of such contributions shall as a minimum correspond to the estimated costs of offering any of the activities referred to in this paragraph and shall be agreed with the authorities or agencies referred to in Article 4(4); and/or

(b) ensure that voluntary agreements and/or other marketoriented schemes, schemes, such as white certificates, with an effect equivalent to one or more of the requirements referred

be taken in such an agreement that it is an additional effort as compared to the requirements of the Directive and not just double selling of efforts (the same holds also true for the government contribution). Second, a priority must be established among technologies eligible under such funding that promote sustainable development: The larger share of such a fund should be devoted to the improvement of energy efficiency and renewables and not to clean coal because clean coal can only be a transitional technology and because it is yet another supply technology.

(11) Making a **choice of the future supply mix** [11] is in my view a matter of the national Belgium debate, balancing various risks associated with each option and pondering all the different elements. For this reason I have advocated a broader presentation of the possible supply choices in the report as currently, similar to other countries including Germany where the nuclear phase out is also debated under climate considerations. For the sake of the public debate I recommend in particular also discussing the possibility to increase the use of gas in the power sector and in combined heat and power schemes, even if it is necessary to discuss the issues of energy prices and of supply security which are particularly sensitive issues for gas. Germany has made use of this possibility in their scenarios (EWI/Prognos). In view of the risk of energy demand reduction technologies mentioned in the report conclusions not fulfilling the expectations, it is important in that respect that the risks associated to each technology are discussed in a balanced way including the risks for the fossil supply (price risks, security of supply risks, externalities) and the nuclear technology (supply security, which is also an issue for the nuclear option, proliferation/vulnerability of the technology, waste disposal, investment risks in liberalized electricity markets, technological lock-in, and public opinion). It is also important to point to the opportunities in view of exporting energy efficient technologies[12].

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to in point (a) exist or are set up. Voluntary agreements shall be assessed, supervised and followed up by the Member State in order to ensure that they have in practice an effect equivalent to one or more of the requirements referred to in point (a).To that end, the voluntary agreements shall have clear and unambiguous objectives, and monitoring and reporting requirements linked to procedures that can lead to revised and/or additional measures when the objectives are not achieved or are not likely to be achieved. With a view to ensuring transparency, the voluntary agreements shall be made available to the public and published prior to application to the extent that applicable confidentiality provisions allow, and contain an invitation for stakeholders to comment.

11 after having performed energy efficiency improvements on the demand side to the best that economics allows, possibly including a notion of externalities, and after having opened the way to renewables in an adequate manner

12 see for example NIW/FRaunhofer ISI: Wirtschaftsfaktor Umweltschutz – Leistungsfähigkeit der deutschen Umwelt- und Klimaschutzwirtschaft im internationalen Vergleich, Text 16 06,

Overall I believe for the reasons provided above that despite the strong emphasis that energy efficiency is already given in the conclusions and in the report, the potential in economic terms is still larger than the scenarios in the report are presenting currently. Our previous work in Belgium based on a detailed technological investigation has shown that reductions in final energy demand of 17% as compared to the baseline are possible in 2020 in economic terms, even considering barriers. These conclusions were taken at energy price levels which are considerably lower than the levels observed today. In 2030, even taking more stringent assumptions on barriers, such a reduction appears as feasible at considerably lower cost than the very high reduction costs projected by the (imperfect) models used in the present exercise. I would in addition advocate considering as an option enhanced energy efficiency going to some degree beyond the energy efficiency technologies which are presently economic in view of a certain amount of externalities and future energy price increases.

ISSN 1862-4804, Umweltbundesamt Berlin, Dessau, Mai 2006 (This report also considers energy efficient demand technologies)

Final Demand and Reduction Costs

Final Energy: Change from Baseline

	Commission 2030 ("-15%")				Commission 2030 ("-30%")			
%	Bpk15 (2030)	Bpk15n (2030)	Bpk15s (2030)	Bpk15ns (2030)	Bpk30 (2030)	Bpk30n (2030)	Bpk30s (2030)	Bpk30ns (2030)
Final energy demand / tot	-7,6	-2,6	-19,3	-5,3	-14,2	-9,1	-31,9	-17,3
Electricity	-0,5	9,9	-0,6	12,4	4,5	14,6	-5,1	15,9
Carbon value (in €/t CO2)	123	60	524	105	320	186	2150	490
Carbon value (in $/bbl) - approx.	47	23	202	40	123	71	827	188

Target Energy Service Directive 2016?

Target = 9% in 9 years to be achieved by energy efficiency measures

Fraunhofer Study

	Energy Service Directive (2016)	"Energy Service Directive continued" (2030)	Benchmarking Scenario (2020)	Economic Potential Scenario (2020)
Final energy demand / tot	-9%	-23%	-17,9	-24,5
Electricity			-12	-20,7
Carbon value (in €/t CO2)			0	Transaction Costs
Carbon value (in $/bbl) - approx.				