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NOTE

from:	General Secretariat of the Council
to:	Delegations
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Subject:	Proposal for a Directive of the European Parliament and of the Council on energy end-use efficiency and energy services

Delegations will find in Annex the new text of the draft Directive, amended in light of the meetings of the Working Party on Energy held on 8 and 15 March 2005.

All delegations and the Commission hold scrutiny reservations on the whole text.

MT: parliamentary scrutiny reservation.

New text (compared to previously examined text) is underlined, deletions are indicated by [].

draft

DIRECTIVE OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL

on energy end-use efficiency and energy services

THE EUROPEAN PARLIAMENT AND THE COUNCIL OF THE EUROPEAN UNION,

Having regard to the Treaty establishing the European Community, and in particular Article 175(1) thereof,

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HAVE ADOPTED THIS DIRECTIVE:

CHAPTER I

SUBJECT MATTER AND SCOPE

Article 1²

Purpose

The purpose of this Directive is to enhance the cost-effective improvement of energy end-use efficiency in the Member States by:

- providing the necessary indicative targets as well as mechanisms, incentives and institutional, financial and legal frameworks to remove existing market barriers and imperfections for the efficient end use of energy;³
- creating the conditions for the development of a market for energy services and for the delivery of other energy efficiency improvement measures to end users.

¹ Citations and recitals to be examined at a later stage.

² As usual Articles 1, 2 and 3 may have to be revisited in the light of changes made to operational provisions.

³ New recital 8bis: "The adoption by Member States of national targets to promote energy end-use efficiency provides effective synergy with that Community legislation that will, when applied, contribute to the achievement of these national targets."

Article 2 *Scope*

This Directive shall apply:

- as concerns providers of energy efficiency improvement measures:
 1. to all providers of energy efficiency improvement measures, including entities that distribute and sell energy to final customers .
 2. Member States may exclude small distributors and small retail energy sales companies from the application of Articles 6 and 13 of this Directive.
- as concerns customers:
 3. to all final customers except those installations in the industrial sector listed in Annex I of Directive 2003/87/EC^{4 5} and to means of transport used in aviation and maritime shipping;
 4. to the armed forces, to the extent that its application does not cause any conflict with the nature and primary aim of the activities of the armed forces.

Article 3 *Definitions*

For the purposes of this Directive, the following definitions shall apply:

- (a) "**Energy**": all forms of commercially available energy, including electricity, natural gas (including liquefied natural gas and liquefied petroleum gas), any fuel for heating and cooling including [] district heating and cooling, coal and lignite, peat, hydrogen, transport fuels (excluding aviation and foreign bunker fuels), and biomass as defined in Directive 2001/77/EC [].
- (b) "**Energy efficiency**": a ratio between an output of performance, service, goods, energy, etc., and an input of energy.
- (c) "**Energy efficiency improvement**": an increase in energy efficiency, due to technological, behavioural and/or economical changes []⁶.

⁴ OJ L 275, 25.10.2003, p. 32-46.

⁵ The reference to Directive 1996/61/EC was deleted because this draft Directive now includes biomass, and "biodegradable municipal waste" is exempted in Directive 1996/61/EC; furthermore, the Directive 1996/61/EC is likely to be amended frequently.

⁶ New recital: "When energy efficiency is achieved, due to technological, behavioural and/or economical changes, substantial negative environmental impact should be avoided, and social priorities should be respected."

- (d) **"Energy savings"**: an amount of saved energy determined by measuring and/or estimating consumption before and after implementation of one or more measures, whilst ensuring adjustment for external conditions that affect energy consumption.
- (e) **"Energy Service"**: the physical benefit, utility or good derived from a combination of energy and energy efficient technology, possibly including the operations, maintenance and control necessary to deliver the service (examples are indoor thermal comfort, lighting comfort, domestic hot water, refrigeration, product manufacturing, etc.), that normally leads to verifiable and measurable energy efficiency improvement.
- (f) **"Energy efficiency mechanisms"**: general instruments, such as regulated tariffs, energy taxes, subsidy schemes, funds, certification schemes etc., undertaken by governments or government bodies to create a supportive framework or incentives for market actors to provide and purchase energy services and other energy efficiency improvement measures.
- (g) **"Energy efficiency improvement programmes"**: activities such as energy audits, financial rebates for energy-efficient equipment, information campaigns, etc., that may be offered by governments, governmental bodies, national agencies, energy retail suppliers, distributors, energy service companies and other market players, [] that focus on groups of final customers and that normally lead to verifiable and measurable energy efficiency improvement.
- (h) **"Energy efficiency improvement measures"**: all actions, such as energy services, energy efficiency mechanisms and energy efficiency improvement programmes, initiated by any market player, including governments and authorities, that normally lead to verifiable and measurable energy efficiency improvement.
- (i) **"Energy service company" (ESCO)**: a company that delivers energy [] services and/or other energy efficiency improvement measures in a user's facility, and accepts some degree of financial risk in so doing. The payment for the services delivered is based (either wholly or in part) on the achievement of energy efficiency improvements and meeting the other agreed performance criteria.
- (j) **"Energy performance contracting (EPC)"**: a contractual arrangement between the beneficiary and the provider (normally an ESCO) of an energy efficiency improvement measure, where investments are paid for in relation to a contractually agreed level of energy efficiency improvement.
- (k) **"Third-party financing"**: a contractual arrangement that involves a third party – in addition to the energy supplier and the beneficiary of the energy efficiency improvement measure - that provides the capital for the measure and charges the beneficiary a fee equivalent to a part of the energy savings achieved as a result of the energy efficiency improvement measure.⁷ This third party may or may not be the ESCO.

⁷ New recital: "By having recourse to third party financing the beneficiary avoids investment costs himself, using part of the financial value from the energy savings to repay the third party's investment and interest costs."

- (l) **"Energy audits"**: a systematic procedure that obtains adequate knowledge of the existing energy consumption profile of a building site, industrial operation, private or public services, etc., that identifies and quantifies cost-effective energy savings opportunities, and reports the findings.
- (m) **"Financial instruments for energy savings"**: all financial instruments such as funds, subsidies, tax rebates, loans, third-party financing, energy performance contracting, guarantee of savings contracts, energy outsourcing and other related contracts that are made available to the market place by public or private bodies in order to lower partly or cover totally the initial project cost for implementing energy efficiency improvement measures.
- (n) **"Final customer"**: customer that purchases energy for his own use.
- (o) **"Energy distributor"**: the natural or legal person responsible for transporting energy, with a view to its delivery to final customers and to distribution stations that sell energy to final customers.
- (p) **"Retail energy sales company"**: the natural or legal person that sells energy to final customers.
- (q) **"Small distributors and small retail energy sales companies"**: the natural or legal person that distributes or sells energy to final customers, distributing or selling less than the equivalent of 100 GWh net-bound energy or, in the case of non-net-bound energy, serving less than 1000 customers per year.
- (r) **"White certificates"**: certificates issued by independent certifying bodies confirming the claims of market actors for savings of energy, as a consequence of energy efficiency measures.

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CHAPTER II

ENERGY SAVINGS TARGETS

Article 4 *General target*

1. Member States shall adopt and make every effort necessary to meet a six-year indicative target resulting from cumulative annual energy savings attributable to energy services and other energy efficiency improvement measures. When adopting their national indicative target Member States may ensure that the costs of the measures adopted to achieve this target do not exceed their benefits.

2. The national indicative target shall be subdivided into two three - year targets of energy savings that are at least equal to 3% of the [] average annual amount of energy previously distributed and/or sold to final customers.
3. This fixed absolute amount of energy savings shall be calculated in accordance with the methodology set out in Annex I. [] For purposes of comparison of energy savings and for conversion to a comparable unit, the conversion factors provided for in Annex II shall apply unless the use of other conversion factors can be justified. Examples of eligible energy efficiency improvement measures are given in Annex III. A general framework for measurement and verification of energy savings is given in Annex IV.
4. The [] savings, according to the targets mentioned in paragraph (2), will be measurable in the first three calendar years after the date referred to in Article 18(1) and then applied to and measured in the following three years []. The cumulative savings will thus increase by the successive application of the [] target of the following three-year period [] for a maximum of 6 years.
5. Member States shall assign to one or more new or existing independent [] authorities or agencies, approved by the competent authority, the overall control and responsibility for overseeing the framework for reaching the target mentioned in paragraph (2); these bodies shall thereafter verify the savings as a result of energy services and other energy efficiency improvement measures, and reporting the results.
6. After having reviewed and reported on this target the first time, the Commission will examine whether it is appropriate to come forward with a proposal for a Directive to develop further the market approach in energy efficiency improvement by means of “white certificates”.

Article 5

Procurement of energy end-use efficiency by the public sector

1. Member States shall ensure that the public sector fulfils an exemplary role in meeting or surpassing the indicative national targets. To this end, they shall impose one or more mandatory requirements chosen from the list given in paragraph 3 hereafter, pertaining to the procurement of energy services and other energy efficiency improvement measures. On the basis of annual statistics, Member States shall continue to impose additional mandatory requirements from this list until the Member State is deemed to be able to meet the two three-year targets. []⁸
2. Member States shall assign to a new or existing organisation or organisations the administrative, management and implementing responsibility for achieving the goal set out in paragraph (1). These may be the same independent public sector authorities or agencies as described in Article 4(5).

⁸ New recital: “The mandatory requirements imposed by Member States on the public sector will enable or require the public sector to integrate energy efficiency improvement considerations into their investments, depreciation allowances and operating budgets.”

3. Without prejudice to the national and Community public procurement legislation, Member States shall ensure that the public sector shall apply requirements from the following list in order to meet the goal set out in paragraph (1):
 - (a) requirements for the use of financial instruments for energy savings, including energy performance contracting, that stipulate the delivery of measurable and pre-determined energy savings (including whenever public administrations have outsourced responsibilities);
 - (b) requirements to purchase equipment and vehicles from lists of energy-efficient product specifications of each category of equipment and vehicles, using, where applicable, minimised life cycle cost analysis or comparable methods to ensure cost-effectiveness;
 - (c) requirements to purchase equipment that has low standby power consuming mode using, where applicable, minimised life cycle cost analysis or comparable methods to ensure cost-effectiveness;
 - (d) requirements to replace or retrofit existing equipment and vehicles with the equipment listed in (b) and (c) of this paragraph;
 - (e) requirements to use energy audits and implement the resulting recommendations.

CHAPTER III

PROMOTION OF ENERGY END-USE EFFICIENCY AND ENERGY SERVICES

Article 6

Energy distributors and retail energy sales companies

1. Member States shall ensure that energy distributors and/or retail energy sales companies selling [] energy:
 - (a) provide aggregated statistical information on their final customers necessary for the appointed authorities or agencies designated in Article 4(5) to properly design and implement energy efficiency improvement programmes, and to promote and monitor energy services and other energy efficiency improvement measures. This information may include historical information and shall include current information on end-user consumption, load profiles, customer segmentation, and geographical location of customers, where applicable, while preserving the integrity and confidentiality of information that is either of private character or commercially sensitive, in conformity with applicable Community legislation;

- (b) refrain from any activities that might impede the delivery of or hinder the development of markets for energy services and other energy efficiency improvement measures. The Member State shall take necessary measures to bring such activities to an end where they occur.
2. The Member States shall choose one or more of the following requirements that have to be respected by the companies listed in paragraph (1) of this Article, directly and/or indirectly through other providers of energy services or energy efficiency improvement measures:
- (a) ensure the offer to their final customers and the promotion of competitively priced energy services; or
- (b) ensure the offer to their final customers and the promotion of competitively priced and independent energy audits and/or other energy efficiency improvement measures with clearly measurable and verifiable effects, in accordance with and with the support of Article 9(2) and 12 of this Directive; or
- (c) contribute to the funds and funding mechanisms referred to in Article 11 of this Directive the financial resources that as a minimum correspond to the estimated costs of offering the activities in paragraph 2(a) or (b), with the level to be agreed with the relevant public sector authorities or agencies designated in Article 4(5) [].
3. The Member State shall guarantee that there exist sufficient incentives, equal competition and level playing fields for other companies than those listed in Article 6(1), - e.g. ESCOs, energy equipment installers, energy advisors and energy consultants - to independently offer and implement the energy services, energy audits and other energy efficiency improvement measures described in Article 6(2) (b).
4. Under Article 6(2) and 6(3), Member States may place responsibilities on [] distributors or network operators only if this respects the requirements relating to the unbundling of accounts in Directives 2003/54/EC (Article 19(3)) and 2003/55/EC (Article 17(3)).

Article 7
Implementation of savings

Member States shall ensure that information on energy efficiency mechanisms and financial and legal frameworks used in reaching the Member State target [] is transparent and widely disseminated to the relevant market players.

Article 8

Qualification, certification and/or accreditation of providers of energy services, energy audits and other energy efficiency improvement measures.

With a view to achieving a high level of technical competence, objectivity, and reliability, Member States shall ensure the availability of appropriate qualification, accreditation and/or certification schemes for market players delivering [] energy audits and energy efficiency improvement measures described in Article 6(2) (b).

Proof of qualification, certification and/or accreditation for this purpose delivered by Member States authorities shall, if required by another Member State, be mutually recognized, provided that these schemes for qualification, certification and/or accreditation respect a set of minimum requirements and criteria regarding equivalence, substance, capacity and reliability of market players. These requirements and criteria shall be established by the Committee referred to in Article 16 during the period of [18 months] following the entry into force of the Directive.

Article 9

Financial instruments for energy savings

1. Member States shall remove or amend national legislation and regulations, other than those of a clearly fiscal nature, that impede or restrict the use of financial instruments for energy savings in the market for energy services or other energy efficiency measures.
2. Member States shall make available model contracts for these financial instruments to existing and potential purchasers of energy services and other energy efficiency improvement measures in the public and private sectors. These may be issued by the same authority or agency as described in Article 4(5).

Article 10

Energy efficient tariffs and other regulations for net-bound energy

Member States shall ensure:

- (a) the removal of [] incentives to increase the volume of transmitted energy sales embedded in tariff regulation schemes in monopoly segments of the distribution of net-bound energy. Components of schemes and tariff structures with a social aim, and with minimal disruptive effects, may be allowed.

This removal may be done by the introduction of transmission and distribution tariff structures that take into account, for example, in addition to reflecting the actual and expected costs of maintenance and offsets, the number of customers served and the suitability of the relationship between the fixed and variable cost components. This may also be done, for example, through the use of price caps or by any other measures that can be deemed to have the same effect;

- (b) cost recovery may be allowed for costs incurred in fulfilling audit requirements pursuant to Article 6 (2) (b) by incorporating these costs into distribution tariffs in a transparent, verifiable way, but only in those market segments described in Article 12(2).

Article 11
Funds and funding Mechanisms

1. Without prejudice to Articles 87 and 88 of the Treaty, Member States may establish a fund or funds to subsidize the delivery of energy efficiency improvement programmes and other energy efficiency improvement measures and to promote the development of a market for [] energy efficiency improvement measures. These measures shall include the promotion of energy auditing, financial instruments for energy savings and, where appropriate, improved metering and informative billing. The funds shall also target end-use sectors with higher transaction costs and higher risks.
2. If established, the funds may provide for grants, loans, financial guarantees and/or other types of financing that guarantee results.
3. The funds shall be open to all providers of [] energy efficiency improvement measures, such as ESCOs, independent energy advisors and installers, and to all end-use consumers . Tendering or equivalent methods which ensure complete transparency shall also be carried out in full compliance with current public procurement regulations, ensuring also that the funds complement and do not compete with, commercially-financed energy efficiency improvement measures.

Article 12
Energy audits

1. Member States shall ensure to all final customers the availability of independent, high quality energy audit schemes designed to identify potential energy efficiency improvement measures.
2. Energy audits shall also be made available for smaller domestic, commercial and small and medium-sized industrial premises and undertakings with comparatively high transaction costs. The segments of the market that have higher transaction costs and non-complex facilities may be reached by other measures such as questionnaires and computer programmes made available on Internet and/or [] sent to customers by mail. For market segments where energy audits are not offered and sold commercially [], Member States shall ensure their availability as described in Article 10(b) and /or Article 11(1).
3. Premises and undertakings audited in fulfilment of the certification requirement set forth in Article 7 of Directive 2002/91/EC on the energy performance of buildings shall be considered as having fulfilled the requirements set forth in Article 12(1) and 12(2) above. Furthermore, audits resulting from schemes based on voluntary agreements between organisations of stakeholders and a body appointed, supervised and followed up by the Member State shall likewise be considered as having fulfilled the requirements set forth in Article 12(1) and 12(2).

Article 13
Metering and informative billing of energy consumption

1. Member States shall ensure that:

final customers or end users of electricity, gas, district heating and/or cooling are provided with competitively priced individual meters that accurately reflect the customer's or user's actual energy consumption and that provide information on actual time of use, in so far as this is technically possible, financially reasonable and proportionate in relation to the potential savings.

2. Member States shall ensure that:

where appropriate, billing performed by energy distributors and retail energy sales companies is based on actual consumption, presented in clear and understandable terms and is carried out frequently enough to enable customers to regulate their own energy consumption. Information on distribution charges, energy volume charges and other associated charges shall be made available with their bill to provide the consumer with a comprehensive account of current energy costs.

3. Member States shall ensure that:

where appropriate, the following information is made available to final customers in clear and understandable terms by energy distributors or retail energy sales companies in or with their bills, contracts, transactions, and/or receipts at distribution stations:

- (a) current actual prices and actual consumption;
- (b) comparisons of the consumer's current energy consumption with consumption for the same period in the previous year, in preferably graphical [] form;
- (c) whenever this is possible and provides an added value, comparisons with an average normalised or benchmarked user of energy of the same category;
- []
- (d) contact information, including website addresses, where information on available energy efficiency improvement measures, as well as technical specifications for energy-using equipment, may be obtained.

CHAPTER IV
FINAL PROVISIONS

Article 14
Reports

1. Not later than 3 years after the date referred to in Article 18(1), Member States shall submit to the Commission an interim report on the overall administration and implementation of the Directive. The report shall include information on the measures taken or planned. A final report showing progress in the period of six years after the date referred to in Article 18(1) shall be submitted to the Commission not later than 8 years after that date. The interim report shall include i.a. the estimated progress to date with respect to the annual energy savings target, as set out in Article 4 (2) and the aim set out in Article 5 (1). The final report shall include definitive results covering fulfilment of the target for the entire six-year period.
2. On the basis of the Member States' interim and final reports the Commission shall assess to what extent Member States have made progress towards achieving their national targets. The Commission shall publish a report with its conclusions on the first interim reports, not later than 4 years after the date referred to in Article 18(1). Not later than one year after receipt of the final reports from Member States, the Commission shall publish its conclusions in a final report. These reports shall be accompanied, as appropriate and where necessary, by proposals to the European Parliament and to the Council for additional measures including a possible prolongation of the targets and other provisions set out in this Directive.

Article 15
Review and adaptation of the framework

1. The values and calculation methods referred to in Annexes II, III and IV shall be adapted to technical progress in accordance with the procedure referred to in Article 16(2).
2. During the period of [18 months] following the entry into force of the Directive, points 2 - 6 of Annex IV shall be further refined and complemented as required, in accordance with the procedure referred to in Article 16(2), and whilst respecting the guidelines set out in Annex IV.1.
3. Following the period referred to in paragraph 2 and until [three years] following the entry into force of the Directive, the Committee referred to in Article 16 shall work towards a possible increase of the percentage of bottom-up calculations contained in the harmonised calculation model.

4. As from [three years following the entry into force of the Directive], the Committee referred to in Article 16 may decide to raise the minimum percentage of harmonised bottom-up calculations used in the harmonised calculation model as prescribed by Annex IV.1, from [30%] to a maximum of [50%], without prejudice to Member State schemes that already have a higher percentage. In doing so, the Committee shall take the following factors into account and motivate its decision accordingly:
- experience with the harmonised calculation model during its first years of application;
 - expected potential increase in accuracy as a result of replacing a part of the top-down calculations with bottom-up calculations;
 - estimated potential added cost and/or administrative burden.

If the Committee thus decides to increase the minimum percentage of harmonised bottom-up calculations, the new harmonised calculation model shall first be used as from [four years following the entry into force of the Directive].

*Article 16
Committee*

1. The Commission shall be assisted by a Committee.
2. Where reference is made to this paragraph, Article 5 and 7 of Decision 1999/468/EC shall apply, having regard to the provisions of Article 8 thereof.

The period laid down in Article 5(6) of Decision 1999/468/EC shall be set at three months.
3. The Committee shall adopt its Rules of procedure.

*Article 17
Repeals*

Council Directive 93/76/EEC shall be repealed with effect from the date of entry into force indicated in Article 19.

Article 18
Transposition

1. Member States shall bring into force the laws, regulations and administrative provisions necessary to comply with this Directive on [⁹] at the latest. They shall forthwith communicate to the Commission the text of those provisions and a correlation table between those provisions and this Directive.

When Member States adopt those provisions, they shall contain a reference to this Directive or be accompanied by such a reference on the occasion of their official publication. Member States shall determine how such reference is to be made.

2. Member States shall communicate to the Commission the texts of the main provisions of national law which they adopt in the field governed by this Directive.

Article 19
Entry into force

This Directive shall enter into force on the twentieth day following that of its publication in the *Official Journal of the European Union*.

Article 20
Addressees

This Directive is addressed to the Member States.

Done at Brussels, [...]

For the European Parliament
The President
[...]

For the Council
The President
[...]

⁹ 24 months after the date of entry into force

ANNEX I

Methodology for calculating targets for end-use efficiency

The methodology used for calculating the national indicative targets set out in Articles 4 and 5 shall be the following:

1. Member States shall use the annual final inland energy consumption for sectors covered by the Directive for the most recent six year period, previous to the implementation of this Directive for which official data are available, to calculate an annual average amount of consumption. This energy consumption shall be the amount of energy distributed or sold to final customers during the six-year period, not adjusted for degree days, structural changes or for production changes. On the basis of this absolute amount of final energy consumption, the national energy savings target will be calculated once and the resulting absolute amount of energy applied for the total duration of this Directive. The methodology for measuring energy savings ensures that the total energy saving prescribed by the Directive, a fixed amount, is independent of future GDP growth.
2. The national indicative energy savings target shall thus be calculated on the basis of average energy consumption of the six-year period and expressed in absolute terms in GWh, or equivalent, using the conversion factors in Annex II.
3. Energy savings in a particular year following the entry into force of this Directive that result from energy efficiency improvement measures initiated in a previous year not earlier than 1995 may be taken into account in the calculation of the annual savings. In exceptional cases, where circumstances can justify it, measures initiated not earlier than 1991 may be taken into account. In all cases, the resulting energy savings should still be measurable and verifiable, in accordance with the general framework in Annex IV of this Directive.

ANNEX II

Primary energy content of selected fuels for end use - conversion table ¹⁰

Energy commodity	kJ (NCV)	kgoe (NCV)	kWh (NCV)
1 kg coke	28500	0.676	7.917
1 kg hard coal	17200 - 30700	0.411 - 0.733	4.778 - 8.528
1 kg brown coal briquettes	20000	0.478	5.556
1 kg black lignite	10500 - 21000	0.251 - 0.502	2.917 - 5.833
1 kg brown coal	5600 - 10500	0.134 - 0.251	1.556 - 2.917
1 kg oil shale	8000 - 9 000	0.191 - 0.215	2.222 - 2.500
1 kg peat	7800 -13800	0.186 - 0.330	2.167 - 3.833
1 kg residual fuel oil (heavy oil)	40000	0.955	11.111
1 kg light fuel oil	42300	1.010	11.750
1 kg motor spirit (petrol)	44000	1.051	12.222
1 kg paraffin	40000	0.955	11.111
1 kg LPG	46000	1.099	12.778
1 kg natural gas ¹¹	47200	1.126	13.10
1 kg LNG	45190	1.079	12.553
1 kg wood (25% humidity) ¹²	13800	0.330	3.833
1 kg pellets/wood bricks	16800	0.401	4.667
1 kg waste	7400 - 10700	0.177 - 0.256	2.056 - 2.972
<i>1 MJ derived heat</i>	<i>1000</i>	<i>0.024</i>	<i>0.278</i>
<i>1 kWh electrical energy</i>	<i>3600</i>	<i>0.086</i>	<i>1¹³</i>

¹⁰ Member States may apply different conversion factors if these can be justified.

¹¹ 93.0% methane.

¹² Member States may apply other values depending on the type of wood most used in the Member State.

¹³ For savings in kWh electricity Member States may apply a default co-efficient of 2.5 reflecting the estimated 40% average EU generation efficiency during the target period. Member States may apply a different co-efficient provided they can justify it.

Source: Eurostat.

ANNEX III

Examples of eligible energy efficiency improvement measures

This annex provides examples of where energy efficiency improvement programmes and other energy efficiency improvement measures may be developed and implemented.

To be taken into account, these [] energy efficiency improvement measures must result in savings that can be clearly measured and verified according to the guidelines in Annex IV of this Directive, and where impacts on savings are not already counted in other specific measures. The following lists are not exhaustive but are intended to provide guidance.

1. Examples of eligible energy efficiency improvement measures:

Residential and tertiary sectors

- a) heating and cooling (e.g. new efficient boilers, installation/efficient update of district heating/cooling systems, etc.);
- b) insulation and ventilation (e.g. wall cavity and roof insulation, double/triple glazing of windows, etc.);
- c) hot water (e.g. installation of new devices, direct and efficient use in space heating, washing machines, etc.);
- d) lighting (e.g. new efficient bulbs and ballasts, digital control systems, etc.);
- e) cooking and refrigeration (e.g. new efficient devices, heat recovery systems, etc.);
- f) other equipment and appliances (e.g. new efficient devices, time control for optimised energy use, stand-by loss control, etc.);

Industry sector

- g) product manufacturing processes (e.g. more efficient use of compressed air, condensate and switches and valves, use of automatic and integrated systems, efficient stand-by modes, etc.);
- h) motors and drives (e.g. increase in the use of electronic controls, variable speed drives, integrated application programming, frequency conversion, etc.);
- i) fans, variable speed drives and ventilation (e.g. new devices/systems, use of natural ventilation, etc.);
- j) demand response management (e.g. load management, peak shaving control systems, etc.);

Transport sector

- k) mode of travel used, e.g.
 - subsidised financing of buying/leasing energy-efficient vehicles;

- incentives for transport fleet drivers to reduce fuel use per kilometre driven;
 - energy efficiency add-ons for vehicles, e.g. streamlining for trucks and cars, fuel computers, tyre pressure monitors;
 - eco-driving courses with measurable follow-up activities;
 - energy efficiency audits on vehicles, e.g. tyres, emissions, roof racks, etc.;
 - third-party financing projects involving transport fleet companies with the aim of reducing the amount of energy used;
- l) modal shifts of travel, measures that provide, e.g.
- car free home/office obliging, implementation of mobility guarantees for residents/workers, e.g. bicycle, public transport pass, easy access to hire cars, etc.;
 - car free delivery days of children to schools and kindergartens;
 - de-investment: car users renounce car ownership and in return receive reduced-cost alternative mobility, e.g. bicycle, public transport pass, easy access to hire cars, etc.;
 - parking spaces in connection with public transport stops (park and ride systems).

2. Examples of eligible horizontal energy efficiency improvement measures

[]

- regulations, taxes etc. that have the effect of [] reducing energy end-use consumption;
- standards and norms that aim primarily at improving the energy efficiency of products and services, including buildings;
- focused information campaigns that promote energy efficiency improvement and energy efficiency improvement measures;
- energy labelling schemes;
- metering and informative billing;
- training and education that lead to application of energy-efficient technology and/or techniques;
- achievements in modal shift, through measures, including legislation, which effectuate a transfer of more energy-consuming modes of transport to less energy-consuming ones, per passenger-km or tonne-km..

ANNEX IV

General framework for Measurement and Verification of Energy Savings

1.1 Measuring Energy savings

General

In measuring the realised energy savings as set out in Articles 4 and 5 with a view to capture the overall improvement in energy efficiency and to ascertain the impact of individual measures, a harmonised calculation model which uses a combination of top-down and bottom-up calculation methods shall be used to measure the annual improvements in energy efficiency for the reports in Article 14.

In developing the harmonised calculation model in accordance with article 15.2, the Committee shall aim to use, to the extent possible, data which is already routinely provided by Eurostat and/or the national statistical agencies.

Top-down calculations

A top-down calculation method means that the amount of energy savings is calculated using the national or more aggregated sectoral levels of savings as the starting point. Adjustments of the annual data are then made for extraneous factors such as degree days, structural changes, product mix, etc. to derive a measure that gives a fair indication of total energy efficiency improvement, as describes in 1.2 below. This method does not provide exact measurements at a detailed level nor does it show cause and effect relationships between measures and their resulting savings. However, it is usually simpler and less costly and is often referred to as “energy efficiency indicators” because it gives an indication of developments.

In developing the top-down calculation method used in this harmonised calculation model, the Committee shall base its work, to the extent possible, on existing methodologies such as the ODEX model¹⁴.

Bottom-up calculations

At least [30%] of the annual final inland energy consumption for sectors falling within the scope of the Directive shall be covered by using a harmonised bottom-up model. In developing this harmonised bottom-up model in accordance with article 15.2, the Committee shall aim to use standardised methods which entail a minimum of administrative burden and cost, notably by using measurement methods referred to in 2.1 and 2.2 of this Annex, and by focusing on those sectors where the harmonised bottom-up model can be most cost-efficiently applied.

Member States that wish to do so, may use further bottom-up measurements in addition to the minimum [30%] prescribed by the harmonised bottom-up model after the agreement of the Committee has been obtained on the basis of a description of the methodology presented by the Member State concerned.

¹⁴ SAVE - financed through the ODYSSEE Project. European Commission 2005.

A bottom-up calculation method means that energy savings obtained through the implementation of a specific energy efficiency improvement measure are measured in kilowatt-hours (kWh), in Joules (J) or in kilogram oil equivalent (kgoe) and added together with energy savings results from other specific energy efficiency measures. The assigned public authorities or agencies set out in Article 4(5) will ensure that double counting of energy savings, which results from a combination of energy efficiency improvement measures (including mechanisms), are avoided. For the bottom-up calculation method, data and methods referred to in points 2.1 and 2.2 may be used.

[]

If bottom-up calculations are not available for certain sectors, top-down indicators or mixtures of top-down and bottom-up calculations may be used in the reports to the Commission, subject to the agreement of the Committee referred to in Article 16. Some top-down calculations will be necessary to measure the impact of measures implemented after 1995 (and in certain cases 1991) but still having impacts.

1.2 How Energy Savings Measurements should be normalised

Energy savings shall be determined by estimating before and comparing to the use after the implementation of the measure, while ensuring adjustment and normalisation for extrinsic conditions commonly affecting energy use. Conditions commonly affecting energy use may also differ over time. Such conditions may be the likely impact of one or several plausible factors (not exhaustive):

- weather conditions, such as degree-days;
- occupancy levels;
- opening hours for non-domestic buildings;
- installed equipment intensity (plant throughput); product mix;
- using schedule for installation and vehicles;
- relationship with other units.

2. Data and Methods that may be used (Measurability)

Several methods for collecting data to measure and/or estimate energy savings exist. At the time of the evaluation of an energy service or energy efficiency improvement measure, it will often be impossible to rely only on measurements. A distinction is therefore made between methods measuring energy savings and methods estimating energy savings, where the latter is the more common practice.

2.1 Data and Methods based on Measurements

Bills from Distribution Companies or Retailers

Metered energy bills may form the basis for measurement for a representative period before the introduction of the energy efficiency improvement measure. These may then be compared to metered bills for the period after the introduction and use of the measure, also for a representative period of time. The findings should be compared to a control group (non participation group) if possible or, alternatively, normalised as described in [] 1.2 of this Annex.

Energy Sales Data

The consumption of different types of energy (e.g. [] electricity, gas, heating oil, etc.) may be measured by comparing the sales data from the retailer or distributor obtained before the introduction of the energy efficiency improvement measures with the sales data from the time after the measure. A control group may be used or the data normalised.

Equipment and Appliance Sales Data

Performance of equipment and appliances may be calculated on the basis of information obtained directly from the manufacturer. Data on equipment and appliance sales can generally be obtained from the retailers. Special surveys and measurements may also be carried out. The accessible data can be checked against sales figures to determine the size of savings. When using this method, adjustment should be made for changes in the use of the equipment or appliance.

End-Use Load Data

Energy use of a building or facility can be fully monitored to record energy demand before and after the introduction of an energy efficiency improvement measure. Important relevant factors (e.g. production process, special equipment, heating installations, etc.) may be metered more closely. []

2.2 Data and Methods based on Estimates

Simple Engineering Estimated Data: Non-inspection

Simple engineering estimated data calculation without on-site inspection is the most common method for obtaining data for measuring deemed savings. Data may be estimated using engineering principles, without using on-site data, but with assumptions based on equipment specifications, performance characteristics, operation profiles of measures installed, etc., with stipulations based on statistics.

Enhanced Engineering Estimated Data: Inspection

Energy data may be calculated on the basis of information obtained by an external expert during an audit of, or other type of visit to, one or several targeted sites. On this basis, more sophisticated algorithms/simulation models could be developed and be applied to a larger population of sites (e.g. buildings, facilities, vehicles, etc.). This type of measurement can often be used to complement and calibrate simple engineering estimated data.

3. How to Deal with Uncertainty

All the methods listed in Chapter 2 of this Annex may contain some degree of uncertainty. Uncertainty may derive from:¹⁵

- instrumentation errors: these typically occur because of errors in specifications given by the product manufacturer;
- modelling errors: these typically refer to errors in the model used to estimate parameters for the data collected;
- sampling error: this typically refers to errors resulting from the fact that a sample of units was observed rather than the entire set of units under study.

Uncertainty may also derive from planned and unplanned assumptions; these are typically associated with estimates, stipulations and/or the use of engineering data. The occurrence of errors is also related to the chosen system of data collection that is outlined in 2.1 and 2.2 of this Annex. A further specification of uncertainty is advised.

Member States may choose to use the system of quantified uncertainty when reporting on the targets set out in this Directive. Quantified uncertainty shall then be expressed in a statistically meaningful way, declaring both accuracy and confidence level. For example, ‘the quantifiable error is found with 90% confidence to be $\pm 20\%$ ’.

If the method of quantified uncertainty is used, Member States are also taking account that the acceptable level of uncertainty required in savings calculations is a function of the level of savings and the cost-effectiveness of decreasing uncertainty.

4. Harmonised lifetimes of energy efficiency improvement measures in bottom-up calculations

Some energy efficiency improvement measures last for decades while other measures last for a shorter period of time. The list below gives some examples of the average lifetime of energy efficiency measures:

Loft insulation professional - private	30 years
Cavity wall insulation - private	40 years
Glazing E to C rated (in m ²)	20 years

¹⁵ A model for establishing a level of quantifiable uncertainty based on these three errors is given in Appendix B in the International Performance Measurement & Verification Protocol (IPMVP).

Boilers B to A rated	15 years
Heating controls - upgrade with boiler replacement	15 years
CFLs - retail	16 years

Source: Energy Efficiency Commitment 2005 - 2008, UK

To ensure that all Member States apply the same lifetimes for similar measures, these lifetimes will be harmonised on a European level. The Commission, assisted by the Committee created in Article 16, shall therefore replace the above list with an agreed preliminary list with the average lifetime of different energy efficiency improvement measures [] not later than six months after the [] date referred to in Article 19.

5. How to deal with multiplier effects of energy savings and how to avoid double counting in mixed top-down and bottom-up calculation methods

The implementation of one energy efficiency improvement measure, e.g. hot water tank and pipe insulation in a building, or other measure with equivalent effect, may give future multiplier effects in the market, meaning that the market will implement a measure automatically without any further involvement from the energy authorities or agencies set out in Article 4 (5) or any private based energy services provider. A measure with multiplier potential would in most cases be more cost-effective than measures that need to be repeated on a regular basis. Member States shall estimate the energy savings potential of such measures including their multiplier effects and verify the total effects in an ex-post evaluation using indicators when appropriate.

[] Potential energy savings resulting after the target period shall not be taken into account when Member States are reporting on the overall target set out in Article 4 of this Directive. Measures that promote long-term market effects should in any case be encouraged and measures that already have resulted in multiplier energy savings effects should be taken into account when reporting on the targets set out in Article 4, provided they can be measured and verified using the guidance given in this Annex.

6. How to Verify the Energy Savings

If deemed cost-effective and necessary, the energy savings obtained through a specific energy service [] or other energy efficiency improvement measure shall be verified by a third party. This may be done by independent consultants, ESCOs or other market players. The appropriate Member State authorities or agencies referred to in Article 4 (5) may provide further instructions on this matter.

Sources: A European Ex-post Evaluation Guidebook for DSM and EE Service Programmes; IEA, INDEEP database; IPMVP, Volume 1 (Version March 2002). **Sources:** A European Ex-post Evaluation Guidebook for DSM and EE Service Programmes;

IEA, INDEEP database; IPMVP, Volume 1 (Version March 2002).
