



# EUROPEAN UNION

THE EUROPEAN PARLIAMENT

THE COUNCIL

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**DIRECTIVE 2006/32/EC OF THE EUROPEAN PARLIAMENT  
AND OF THE COUNCIL  
ON ENERGY END-USE EFFICIENCY  
AND ENERGY SERVICES  
AND REPEALING COUNCIL DIRECTIVE 93/76/EEC**

**DIRECTIVE 2006/32/EC OF THE EUROPEAN PARLIAMENT  
AND OF THE COUNCIL**

**of 5 April 2006**

on energy end-use efficiency and energy services  
and repealing Council Directive 93/76/EEC  
(Text with EEA relevance)

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,

Having regard to the proposal from the Commission,

Having regard to the Opinion of the European Economic and Social Committee<sup>1</sup>,

Having regard to the Opinion of the Committee of the Regions<sup>2</sup>,

Acting in accordance with the procedure laid down in Article 251 of the Treaty<sup>3</sup>,

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<sup>1</sup> OJ C 120, 20.5.2005, p. 115.

<sup>2</sup> OJ C 318, 22.12.2004, p. 19.

<sup>3</sup> Opinion of the European Parliament of 7 June 2005 (not yet published in the Official Journal), Council Common Position of 23 September 2005 (OJ C 275 E, 8.11.2005, p. 19) and Position of the European Parliament of 13 December 2005(not yet published in the Official Journal). Council Decision of 14 March 2006.

Whereas:

- (1) In the European Community there is a need for improved energy end-use efficiency, managed demand for energy and promotion of the production of renewable energy, as there is relatively limited scope for any other influence on energy supply and distribution conditions in the short to medium term, either through the building of new capacity or through the improvement of transmission and distribution. This Directive thus contributes to improved security of supply.
- (2) Improved energy end-use efficiency will also contribute to the reduction of primary energy consumption, to the mitigation of CO<sub>2</sub> and other greenhouse gas emissions and thereby to the prevention of dangerous climate change. These emissions continue to increase, making it more and more difficult to meet the Kyoto commitments. Human activities attributed to the energy sector cause as much as 78 % of the Community greenhouse gas emissions. The Sixth Community Environment Action Programme, laid down by Decision No 1600/2002/EC of the European Parliament and of the Council<sup>1</sup>, envisages that further reductions are required to achieve the United Nations Framework Convention on Climate Change long-term objective of stabilising greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system. Therefore, concrete policies and measures are necessary.

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<sup>1</sup> OJ L 242, 10.9.2002, p. 1.

- (3) Improved energy end-use efficiency will make it possible to exploit potential cost-effective energy savings in an economically efficient way. Energy efficiency improvement measures could realise these energy savings and thus help the European Community reduce its dependence on energy imports. Furthermore, a move towards more energy-efficient technologies can boost the European Community's innovativeness and competitiveness as underlined in the Lisbon strategy.
- (4) The Communication from the Commission on the implementation of the first phase of the European Climate Change Programme listed a directive on energy demand management as one of the priority climate change measures to be taken at Community level.
- (5) This Directive is consistent with Directive 2003/54/EC of the European Parliament and of the Council of 26 June 2003 concerning common rules for the internal market in electricity<sup>1</sup> and with Directive 2003/55/EC of the European Parliament and of the Council of 26 June 2003 concerning common rules for the internal market in natural gas<sup>2</sup>, which provide for the possibility of using energy efficiency and demand-side management as alternatives to new supply and for environmental protection, allowing Member State authorities, inter alia, to tender for new capacity or to opt for energy efficiency and demand-side measures, including systems for white certificates.

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<sup>1</sup> OJ L 176, 15.7.2003, p. 37. Directive as amended by Council Directive 2004/85/EC (OJ L 236, 7.7.2004, p. 10).

<sup>2</sup> OJ L 176, 15.7.2003, p. 57.

- (6) This Directive is without prejudice to Article 3 of Directive 2003/54/EC, which requires that Member States ensure that all household customers and, where Member States deem it appropriate, small enterprises, enjoy universal service, that is the right to be supplied with electricity of a specified quality within their territory at reasonable, easily and clearly comparable, and transparent prices.
- (7) The aim of this Directive is not only to continue to promote the supply side of energy services, but also to create stronger incentives for the demand side. The public sector in each Member State should thus set a good example regarding investments, maintenance and other expenditure on energy-using equipment, energy services and other energy efficiency improvement measures. Therefore, the public sector should be encouraged to integrate energy efficiency improvement considerations into its investments, depreciation allowances and operating budgets. Furthermore, the public sector should endeavour to use energy efficiency criteria in tendering procedures for public procurement, a practice allowed under Directive 2004/17/EC of the European Parliament and of the Council of 31 March 2004 coordinating the procurement procedures of entities operating in the water, energy, transport and postal services sectors<sup>1</sup>, and Directive 2004/18/EC of the European Parliament and of the Council of 31 March 2004 on the coordination of procedures for the award of public works contracts, public supply contracts and public service contracts<sup>2</sup>, the principle of which was confirmed by the judgment of 17 September 2002 of the Court of Justice in Case C-513/99<sup>3</sup>. In view of the fact that administrative structures vary widely between Member States, the different types of measures which the public sector may take should be taken at the appropriate national, regional and/or local level.

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<sup>1</sup> OJ L 134, 30.4.2004, p. 1. Directive as last amended by Commission Regulation (EC) No 2083/2005 (OJ L 333, 20.12.2005, p. 28).

<sup>2</sup> OJ L 134, 30.4.2004, p. 114. Directive as last amended by Regulation (EC) No 2083/2005.

<sup>3</sup> C-513/99: *Concordia Bus Finland Oy Ab, formerly Stagecoach Finland Oy Ab v Helsingin kaupunki and HKL-Bussiliikenne* (2002 ECR I-7213).

- (8) There is a large variety of ways in which the public sector can fulfil its exemplary role: besides the applicable measures listed in Annex III and VI, the public sector may, for example, initiate energy-efficiency pilot projects, stimulate energy-efficient behaviour of employees etc. In order to achieve the desired multiplier effect, a number of such actions should be communicated in an effective way to individual citizens and/or to companies, whilst emphasising the cost benefits.
- (9) The liberalisation of the retail markets for final customers for electricity, natural gas, coal and lignite, heating, and in some cases even district heating and cooling, has almost exclusively led to improved efficiency and lower costs on the energy generation, transformation and distribution side. This liberalisation has not led to significant competition in products and services which could have resulted in improved energy efficiency on the demand side.
- (10) In its Resolution of 7 December 1998 on energy efficiency in the European Community<sup>1</sup>, the Council endorsed a target for the Community as a whole to improve energy intensity of final consumption by an additional one percentage point per annum up to the year 2010.
- (11) Member States should therefore adopt national indicative targets to promote energy end-use efficiency and to ensure the continued growth and viability of the market for energy services, and thus contribute to the implementation of the Lisbon strategy. The adoption of national indicative targets to promote energy end-use efficiency provides effective synergy with other Community legislation that will, when applied, contribute to the achievement of those national targets.

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<sup>1</sup> OJ C 394, 17.12.1998, p. 1.

- (12) This Directive requires action to be undertaken by the Member States, with the fulfilment of its objectives depending on the effects that such action has on the final consumers of energy. The end result of Member States' action is dependent on many external factors which influence the behaviour of consumers as regards their energy use and their willingness to implement energy saving methods and use energy saving devices. Therefore, even though Member States commit themselves to making efforts to achieve the target figure of 9%, the national energy savings target is indicative in nature and entails no legally enforceable obligation for Member States to achieve it.
- (13) In aiming to achieve their national indicative target, Member States may set themselves a target higher than 9%.
- (14) The improvement of energy efficiency will benefit from an exchange of information, experience and best practice at all levels, including, in particular, the public sector. Therefore, Member States should list measures undertaken in the context of this Directive, and review their effect as far as possible, in energy efficiency action plans.
- (15) When striving for energy efficiency on the basis of technological, behavioural and/or economic changes, substantial negative environmental impact should be avoided, and social priorities should be respected.

- (16) The funding of supply and the costs of the demand side have an important role to play in energy services. The creation of funds to subsidise the implementation of energy efficiency programmes and other energy efficiency improvement measures and to promote the development of a market for energy services can constitute an appropriate tool for the provision of non-discriminatory start-up funding in such a market.
- (17) Improved energy end-use efficiency can be achieved by increasing the availability of and demand for energy services or by other energy efficiency improvement measures.
- (18) In order to realise the energy savings potential in certain market segments where energy audits are generally not sold commercially, such as households, Member States should ensure the availability of energy audits.
- (19) The Council Conclusions of 5 December 2000 list the promotion of energy services through the development of a Community strategy as a priority area for action to improve energy efficiency.
- (20) Energy distributors, distribution system operators and retail energy sales companies can improve energy efficiency in the Community if the energy services they market include efficient end-use, such as indoor thermal comfort, domestic hot water, refrigeration, product manufacturing, illumination and motive power. Profit maximisation for energy distributors, distribution system operators and retail energy sales companies thus becomes more closely related to selling energy services to as many customers as possible than to selling as much energy as possible to each customer. Member States should endeavour to avoid any distortion of competition in this area, in order to guarantee a level playing field between all energy service providers; they can, however, delegate this task to the national regulator.



- (21) Taking full account of the national organisation of market actors in the energy sector and in order to favour the implementation of energy services and of the measures to improve energy efficiency provided for in this Directive, Member States should have the option of making it compulsory for energy distributors, distribution system operators or retail energy sales companies or, where appropriate, for two or all of these market actors, to provide such services and to participate in such measures.
- (22) The use of third-party financing arrangements is an innovative practice that should be stimulated. In these, the beneficiary avoids investment costs by using part of the financial value of energy savings that result from the third party's investment to repay the third party's investment and interest costs.
- (23) With a view to making tariffs and other regulations for net-bound energy more conducive to efficient energy end-use, unjustifiable volume-driving incentives should be removed.
- (24) The promotion of the market for energy services can be achieved by a variety of means, including non-financial ones.
- (25) The energy services, energy efficiency improvement programmes and other energy efficiency improvement measures put into effect to reach the energy savings target may be supported and/or implemented through voluntary agreements between stakeholders and public sector bodies appointed by the Member States.
- (26) The voluntary agreements which are covered by this Directive should be transparent and contain, where applicable, information on at least the following issues: quantified and staged objectives, monitoring and reporting.

- (27) The motor fuel and transport sectors have an important role to play regarding energy efficiency and energy savings.
- (28) In defining energy efficiency improvement measures, account should be taken of efficiency gains obtained through the widespread use of cost-effective technological innovations, for instance electronic metering. In the context of this Directive, competitively priced individual meters include accurate calorimeters.
- (29) In order to enable final consumers to make better-informed decisions as regards their individual energy consumption, they should be provided with a reasonable amount of information thereon and with other relevant information, such as information on available energy efficiency improvement measures, comparative final consumer profiles or objective technical specifications for energy-using equipment, which may include "Factor Four" or similar equipment. It is recalled that some such valuable information should already be made available to final customers under Article 3(6) of Directive 2003/54/EC. In addition, consumers should be actively encouraged to check their own meter readings regularly.
- (30) All types of information relating to energy-efficiency should be widely disseminated in an appropriate form, including through billing, to relevant target audiences. This can include information on financial and legal frameworks, communication and promotion campaigns, and the widespread exchange of best practice at all levels.
- (31) With the adoption of this Directive, all substantive provisions of Council Directive 93/76/EEC of 13 September 1993 to limit carbon dioxide emissions by improving energy efficiency (SAVE)<sup>1</sup> are covered by other Community legislation and therefore Directive 93/76/EEC should be repealed.

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<sup>1</sup> OJ L 237, 22.9.1993, p. 28.

- (32) Since the objectives of this Directive, namely to promote energy end-use efficiency and to develop a market for energy services, cannot be sufficiently achieved by the Member States and can be better achieved at Community level, the Community may adopt measures, in accordance with the principle of subsidiarity as set out in Article 5 of the Treaty. In accordance with the principle of proportionality, as set out in that Article, this Directive does not go beyond what is necessary in order to achieve those objectives.
- (33) The measures necessary for the implementation of this Directive should be adopted in accordance with Council Decision 1999/468/EC of 28 June 1999 laying down the procedures for the exercise of implementing powers conferred on the Commission<sup>1</sup>,

HAVE ADOPTED THIS DIRECTIVE:

## CHAPTER I

### SUBJECT MATTER AND SCOPE

#### *Article 1*

#### *Purpose*

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

- (a) providing the necessary indicative targets as well as mechanisms, incentives and institutional, financial and legal frameworks to remove existing market barriers and imperfections that impede the efficient end use of energy;

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<sup>1</sup> OJ L 184, 17.7.1999, p. 23.

- (b) creating the conditions for the development and promotion of a market for energy services and for the delivery of other energy efficiency improvement measures to final consumers.

## *Article 2*

### *Scope*

This Directive shall apply to:

- (a) providers of energy efficiency improvement measures, energy distributors, distribution system operators and retail energy sales companies. However, Member States may exclude small distributors, small distribution system operators and small retail energy sales companies from the application of Articles 6 and 13;
- (b) final customers. However, this Directive shall not apply to those undertakings involved in categories of activities listed in Annex I to Directive 2003/87/EC of the European Parliament and of the Council of 13 October 2003 establishing a scheme for greenhouse gas emission allowance trading within the Community<sup>1</sup>;
- (c) the armed forces, only to the extent that its application does not cause any conflict with the nature and primary aim of the activities of the armed forces and with the exception of material used exclusively for military purposes.

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<sup>1</sup> OJ L 275, 25.10.2003, p. 32. Directive as amended by Directive 2004/101/EC (OJ L 338, 13.11.2004, p. 18).

*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), liquefied petroleum gas, any fuel for heating and cooling (including district heating and cooling), coal and lignite, peat, transport fuels (excluding aviation and maritime bunker fuels) and biomass as defined in Directive 2001/77/EC of the European Parliament and of the Council of 27 September 2001 on the promotion of electricity produced from renewable energy sources in the internal electricity market<sup>1</sup>;
- (b) "energy efficiency": a ratio between an output of performance, service, goods or energy, and an input of energy;
- (c) "energy efficiency improvement": an increase in energy end-use efficiency as a result of technological, behavioural and/or economic changes;
- (d) "energy savings": an amount of saved energy determined by measuring and/or estimating consumption before and after implementation of one or more energy efficiency improvement measures, whilst ensuring normalisation for external conditions that affect energy consumption;

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<sup>1</sup> OJ L 283, 27.10.2001, p. 33. Directive as amended by the 2003 Act of Accession.

- (e) "energy service": the physical benefit, utility or good derived from a combination of energy with energy efficient technology and/or with action, which may include the operations, maintenance and control necessary to deliver the service, which is delivered on the basis of a contract and in normal circumstances has proven to lead to verifiable and measurable or estimable energy efficiency improvement and/or primary energy savings;
- (f) "energy efficiency mechanisms": general instruments used 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 that focus on groups of final customers and that normally lead to verifiable and measurable or estimable energy efficiency improvement;
- (h) "energy efficiency improvement measures": all actions that normally lead to verifiable and measurable or estimable energy efficiency improvement;
- (i) "energy service company" (ESCO): a natural or legal person that delivers energy services and/or other energy efficiency improvement measures in a user's facility or premises, 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 on the meeting of the other agreed performance criteria;
- (j) "energy performance contracting": a contractual arrangement between the beneficiary and the provider (normally an ESCO) of an energy efficiency improvement measure, where investments in that measure are paid for in relation to a contractually agreed level of energy efficiency improvement;

- (k) "third-party financing": a contractual arrangement involving a third party – in addition to the energy supplier and the beneficiary of the energy efficiency improvement measure – that provides the capital for that 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. That third party may or may not be an ESCO;
- (l) "energy audit": a systematic procedure to obtain adequate knowledge of the existing energy consumption profile of a building or group of buildings, of an industrial operation and/or installation or of a private or public service, identify and quantify cost-effective energy savings opportunities, and report 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 energy savings contracts, energy outsourcing and other related contracts that are made available to the market place by public or private bodies in order to cover partly or totally the initial project cost for implementing energy efficiency improvement measures;
- (n) "final customer": a natural or legal person that purchases energy for his own end use;
- (o) "energy distributor": a 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. This definition excludes electricity and natural gas distribution system operators, covered in point (p);

- (p) "distribution system operator": a natural or legal person responsible for operating, ensuring the maintenance of and, if necessary, developing the distribution system of electricity or natural gas in a given area and, where applicable, its interconnections with other systems, and for ensuring the long term ability of the system to meet reasonable demands for the distribution of electricity or natural gas;
- (q) "retail energy sales company": a natural or legal person that sells energy to final customers;
- (r) "small distributor, small distribution system operator and small retail energy sales company": a natural or legal person that distributes or sells energy to final customers, and that distributes or sells less than the equivalent of 75 GWh energy per year or employs fewer than 10 persons or whose annual turnover and/or annual balance sheet total does not exceed EUR 2 000 000;
- (s) "white certificates": certificates issued by independent certifying bodies confirming the energy savings claims of market actors as a consequence of energy efficiency improvement measures.



## CHAPTER II

### ENERGY SAVINGS TARGETS

#### *Article 4*

##### *General target*

1. Member States shall adopt and aim to achieve an overall national indicative energy savings target of 9% for the ninth year of application of this Directive, to be reached by way of energy services and other energy efficiency improvement measures. Member States shall take cost-effective, practicable and reasonable measures designed to contribute towards achieving this target.

This national indicative energy savings target shall be set and calculated in accordance with the provisions and methodology set out in Annex I. For purposes of comparison of energy savings and for conversion to a comparable unit, the conversion factors set out 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 the measurement and verification of energy savings is given in Annex IV. The national energy savings in relation to the national indicative energy savings target shall be measured as from 1 January 2008.

2. For the purpose of the first Energy Efficiency Action Plan (EEAP) to be submitted in accordance with Article 14, each Member State shall establish an intermediate national indicative energy savings target for the third year of application of this Directive, and provide an overview of its strategy for the achievement of the intermediate and overall targets. This intermediate target shall be realistic and consistent with the overall national indicative energy savings target referred to in paragraph 1.

The Commission shall give an opinion on whether the intermediate national indicative target appears realistic and consistent with the overall target.

3. Each Member State shall draw up programmes and measures to improve energy efficiency.
4. Member States shall assign to one or more new or existing authorities or agencies the overall control and responsibility for overseeing the framework set up in relation to the target mentioned in paragraph 1. These bodies shall thereafter verify the energy savings as a result of energy services and other energy efficiency improvement measures, including existing national energy efficiency improvement measures, and report the results.
5. After having reviewed and reported on the first three years of application of this Directive, the Commission shall examine whether it is appropriate to come forward with a proposal for a directive to further develop the market approach in energy efficiency improvement by means of white certificates.

## *Article 5*

### *Energy end-use efficiency in the public sector*

1. Member States shall ensure that the public sector fulfils an exemplary role in the context of this Directive. To this end, they shall communicate effectively the exemplary role and actions of the public sector to citizens and/or companies, as appropriate.

Member States shall ensure that energy efficiency improvement measures are taken by the public sector, focussing on cost-effective measures which generate the largest energy savings in the shortest span of time. Such measures shall be taken at the appropriate national, regional and/or local level, and may consist of legislative initiatives and/or voluntary agreements, as referred to in Article 6(2)(b), or other schemes with an equivalent effect. Without prejudice to national and Community public procurement legislation:

- at least two measures shall be used from the list set out in Annex VI;
- Member States shall facilitate this process by publishing guidelines on energy efficiency and energy savings as a possible assessment criterion in competitive tendering for public contracts.

Member States shall facilitate and enable the exchange of best practices between public sector bodies, for example on energy-efficient public procurement practices, both at the national and international level; to this end, the organisation referred to in paragraph 2 shall cooperate with the Commission with regard to the exchange of best practice as referred to in Article 7(3).

2. Member States shall assign to a new or existing organisation or organisations the administrative, management and implementing responsibility for the integration of energy efficiency improvement requirements as set out in paragraph 1. These may be the same authorities or agencies as those referred to in Article 4(4).

### CHAPTER III

#### PROMOTION OF ENERGY END-USE EFFICIENCY AND ENERGY SERVICES

##### *Article 6*

##### *Energy distributors, distribution system operators and retail energy sales companies*

1. Member States shall ensure that energy distributors, distribution system operators and/or retail energy sales companies:
  - (a) provide on request, but not more than once a year, aggregated statistical information on their final customers to the authorities or agencies referred to in Article 4(4) or to another designated body, provided that the latter in turn transmits to the former the information received. This information must be sufficient to properly design and implement energy efficiency improvement programmes, and to promote and monitor energy services and other energy efficiency improvement measures. It may include historical information and must include current information on end-user consumption, including, where applicable, load profiles, customer segmentation and geographical location of customers, while preserving the integrity and confidentiality of information that is either of private character or commercially sensitive, in compliance with applicable Community legislation;

- (b) refrain from any activities that might impede the demand for and delivery of energy services and other energy efficiency improvement measures, or hinder the development of markets for energy services and other energy efficiency improvement measures. The Member State concerned shall take the necessary measures to bring such activities to an end where they occur.

2. 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; or
  - (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 market-oriented schemes, such as white certificates, with an effect equivalent to one or more of the requirements referred 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 effect, 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.

- 3. Member States shall ensure that there are sufficient incentives, equal competition and level playing fields for market actors other than energy distributors, distribution system operators and retail energy sales companies, such as ESCOs, installers, energy advisors and energy consultants, to independently offer and implement the energy services, energy audits and energy efficiency improvement measures described in paragraph 2(a)(i) and (ii).
- 4. Under paragraphs 2 and 3, Member States may place responsibilities on distribution system operators only if this is consistent with the requirements relating to the unbundling of accounts laid down in Article 19(3) of Directive 2003/54/EC and in Article 17(3) of Directive 2003/55/EC.

5. The implementation of this Article shall be without prejudice to derogations or exemptions granted under Directives 2003/54/EC and 2003/55/EC.

#### *Article 7*

##### *Availability of information*

1. Member States shall ensure that information on energy efficiency mechanisms and financial and legal frameworks adopted with the aim of reaching the national indicative energy savings target is transparent and widely disseminated to the relevant market actors.
2. Member States shall ensure that greater efforts are made to promote energy end-use efficiency. They shall establish appropriate conditions and incentives for market operators to provide more information and advice to final customers on energy end-use efficiency.
3. The Commission shall ensure that information on best energy-saving practices in Member States is exchanged and widely disseminated.

#### *Article 8*

##### *Availability of qualification, accreditation and certification schemes*

With a view to achieving a high level of technical competence, objectivity and reliability, Member States shall ensure, where they deem it necessary, the availability of appropriate qualification, accreditation and/or certification schemes for providers of energy services, energy audits and energy efficiency improvement measures as referred to in Article 6(2)(a) (i) and (ii).

## *Article 9*

### *Financial instruments for energy savings*

1. Member States shall repeal or amend national legislation and regulations, other than those of a clearly fiscal nature, that unnecessarily or disproportionately impede or restrict the use of financial instruments for energy savings in the market for energy services or other energy efficiency improvement measures.
2. Member States shall make model contracts for those financial instruments available 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 authority or agency referred to in Article 4(4).

## *Article 10*

### *Energy efficient tariffs and other regulations for net-bound energy*

1. Member States shall ensure the removal of those incentives in transmission and distribution tariffs that unnecessarily increase the volume of distributed or transmitted energy. In this respect, in accordance with Article 3(2) of Directive 2003/54/EC and with Article 3(2) of Directive 2003/55/EC, Member States may impose public service obligations relating to energy efficiency on undertakings operating in the electricity and gas sectors respectively.



2. Member States may permit components of schemes and tariff structures with a social aim, provided that any disruptive effects on the transmission and distribution system are kept to the minimum necessary and are not disproportionate to the social aim.

### *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 subsidise 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. Such 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, energy distributors, distribution system operators, retail energy sales companies and installers. Member States may decide to open the funds to all final customers. Tendering or equivalent methods which ensure complete transparency shall be carried out in full compliance with applicable public procurement regulations. Member States shall ensure that such funds complement, and do not compete with, commercially-financed energy efficiency improvement measures.

*Article 12*  
*Energy audits*

1. Member States shall ensure the availability of efficient, high-quality energy audit schemes which are designed to identify potential energy efficiency improvement measures and which are carried out in an independent manner, to all final consumers, including smaller domestic, commercial and small and medium-sized industrial customers.
2. Market segments that have higher transaction costs and non-complex facilities may be reached by other measures such as questionnaires and computer programmes made available on the Internet and/or sent to customers by mail. Member States shall ensure the availability of energy audits for market segments where they are not sold commercially, taking into account Article 11(1).
3. Certification in accordance with Article 7 of Directive 2002/91/EC of the European Parliament and of the Council of 16 December 2002 on the energy performance of buildings<sup>1</sup> shall be regarded as equivalent to an energy audit meeting the requirements set out in paragraphs 1 and 2 of this Article and as equivalent to an energy audit as referred to in Annex VI(e) to this Directive. Furthermore, audits resulting from schemes based on voluntary agreements between organisations of stakeholders and an appointed body, supervised and followed up by the Member State concerned in accordance with Article 6(2)(b) of this Directive, shall likewise be considered as having fulfilled the requirements set out in paragraphs 1 and 2 of this Article.

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<sup>1</sup> OJ L 1, 4.1.2003, p. 65.

*Article 13*  
*Metering and informative billing*  
*of energy consumption*

1. Member States shall ensure that, in so far as it is technically possible, financially reasonable and proportionate in relation to the potential energy savings, final customers for electricity, natural gas, district heating and/or cooling and domestic hot water are provided with competitively priced individual meters that accurately reflect the final customer's actual energy consumption and that provide information on actual time of use.

When an existing meter is replaced, such competitively priced individual meters shall always be provided, unless this is technically impossible or not cost-effective in relation to the estimated potential savings in the long term. When a new connection is made in a new building or a building undergoes major renovations, as set out in Directive 2002/91/EC, such competitively priced individual meters shall always be provided.

2. Member States shall ensure that, where appropriate, billing performed by energy distributors, distribution system operators and retail energy sales companies is based on actual energy consumption, and is presented in clear and understandable terms. Appropriate information shall be made available with the bill to provide final customers with a comprehensive account of current energy costs. Billing on the basis of actual consumption shall be performed frequently enough to enable customers to regulate their own energy consumption.

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, distribution system operators 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 of energy;
  - (b) comparisons of the final customer's current energy consumption with consumption for the same period in the previous year, preferably in graphic form;
  - (c) wherever possible and useful, comparisons with an average normalised or benchmarked user of energy in the same user category;
  - (d) contact information for consumers' organisations, energy agencies or similar bodies, including website addresses, from which information may be obtained on available energy efficiency improvement measures, comparative end-user profiles and/or objective technical specifications for energy-using equipment.

## CHAPTER IV

### FINAL PROVISIONS

#### *Article 14*

##### *Reports*

1. Member States that already use, for whatever purpose, calculation methods for measuring energy savings similar to those described in Annex IV at the time of the entry into force of this Directive may submit information at the appropriate level of detail to the Commission. Such submissions shall take place as soon as possible, preferably not later than .....\* . This information will enable the Commission to take due account of existing practices.
2. Member States shall submit to the Commission the following EEAPs:
  - a first EEAP not later than 30 June 2007;
  - a second EEAP not later than 30 June 2011;
  - a third EEAP not later than 30 June 2014.

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\* Six months after the date of entry into force of this Directive.

All EEAPs shall describe the energy efficiency improvement measures planned to reach the targets set out in Article 4(1) and (2), as well as to comply with the provisions on the exemplary role of the public sector and provision of information and advice to final customers set out in Articles 5(1) and 7(2) respectively.

The second and third EEAPs shall:

- include a thorough analysis and evaluation of the preceding EEAP;
- include the final results with regard to the fulfilment of the energy savings targets set out in Article 4(1) and (2);
- include plans for - and information on the anticipated effects of - additional measures which address any existing or expected shortfall vis-a-vis the target;
- in accordance with Article 15(4), use and gradually increase the use of harmonised efficiency indicators and benchmarks, both for the evaluation of past measures and estimated effects of planned future measures;
- be based on available data, supplemented with estimates.

3. Not later than ...<sup>\*</sup>, the Commission shall publish a cost/benefit impact assessment examining the linkages between EU standards, regulations, policies and measures on end-use energy efficiency.

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\* Two years after the date of entry into force of this Directive.

4. The EEAPs shall be assessed in accordance with the procedure referred to in Article 16(2):
  - the first EEAPs shall be reviewed before 1 January 2008;
  - the second EEAPs shall be reviewed before 1 January 2012;
  - the third EEAPs shall be reviewed before 1 January 2015.
  
5. On the basis of the EEAPs, the Commission shall assess the extent to which Member States have made progress towards achieving their national indicative energy savings targets. The Commission shall publish reports with its conclusions:
  - on the first EEAPs before 1 January 2008;
  - on the second EEAPs before 1 January 2012;
  - on the third EEAPs before 1 January 2015.

These reports shall include information on related action at Community level, including legislation currently in force and future legislation. The reports shall take into account the benchmarking system referred to in Article 15(4), identify best practices and identify cases where Member States and/or the Commission are not making enough progress, and may contain recommendations.

The second report shall be followed, as appropriate and where necessary, by proposals to the European Parliament and to the Council for additional measures including a possible extension of the period of application of targets. If the report concludes that insufficient progress has been made towards achieving the national indicative targets, these proposals shall address the level and nature of the targets.

*Article 15*

*Review and adaptation of the framework*

1. The values and calculation methods referred to in Annexes II, III, IV and V shall be adapted to technical progress in accordance with the procedure referred to in Article 16(2).
2. Before 1 January 2008, the Commission, in accordance with the procedure referred to in Article 16(2), shall further refine and complement as required points 2 to 6 of Annex IV, whilst respecting the general framework set out in Annex IV.
3. Before 1 January 2012, the Commission, in accordance with the procedure referred to in Article 16(2), shall raise the percentage of harmonised bottom-up calculations used in the harmonised calculation model referred to in point 1 of Annex IV, without prejudice to those Member State schemes that already use a higher percentage. The new harmonised calculation model with a significantly higher percentage of bottom-up calculations shall first be used as from 1 January 2012.



Wherever practicable and possible, the measurement of total savings over the total period of application of the Directive shall use this harmonised calculation model, without prejudice to those Member State schemes that use a higher percentage of bottom-up calculations.

4. Not later than 30 June 2008, the Commission, in accordance with the procedure set out in Article 16(2), shall develop a set of harmonised energy efficiency indicators and benchmarks based upon them, taking into account available data or data that can be collected in a cost-effective manner for each Member State. For the development of these harmonised energy efficiency indicators and benchmarks the Commission shall use as a reference guide the indicative list set out in Annex V. Member States shall gradually integrate these indicators and benchmarks into the statistical data included in their EEAPs as referred to in Article 14, and use them as one of the tools at their disposal to decide on future priority areas in the EEAPs.

Not later than ...<sup>\*</sup>, the Commission shall present to the European Parliament and the Council a report on the progress in setting indicators and benchmarks.

#### *Article 16*

#### *Committee*

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

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\* Five years after the date of entry into force of this Directive.

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*

##### *Repeal*

Directive 93/76/EEC is hereby repealed.

#### *Article 18*

##### *Transposition*

1. Member States shall bring into force the laws, regulations and administrative provisions necessary to comply with this Directive not later than ...<sup>\*</sup>, with the exception of the provisions of Article 14(1), (2) and (4), for which the date of transposition shall be, at the latest ...<sup>\*\*</sup>. They shall forthwith inform the Commission thereof.

When Member States adopt these measures, they shall contain a reference to this Directive or shall be accompanied by such reference on the occasion of their official publication. The methods of making such reference shall be laid down by Member States.

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

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\* Two years after the date of entry into force of this Directive.

\*\* The date of entry into force of 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 Strasbourg,

*For the European Parliament*  
*The President*

*For the Council*  
*The President*

## ANNEX I

### Methodology for calculating the national indicative energy savings target

The methodology used for calculating the national indicative energy savings target set out in Article 4 shall be the following:

1. Member States shall use the annual final inland energy consumption of all energy users within the scope of this Directive for the most recent five-year period previous to the implementation of this Directive for which official data are available, to calculate an annual average amount of consumption. This final energy consumption shall be the amount of energy distributed or sold to final customers during the five-year period, not adjusted for degree days, structural changes or production changes.

On the basis of this annual average amount of consumption, the national indicative energy savings target shall be calculated once and the resulting absolute amount of energy to be saved applied for the total duration of this Directive.

The national indicative energy savings target shall:

- (a) consist of 9% of the annual average amount of consumption referred to above;
- (b) be measured after the ninth year of application of this Directive;
- (c) be the result of cumulative annual energy savings achieved throughout the nine-year application period of this Directive;

(d) be reached by way of energy services and other energy efficiency improvement measures.

This methodology for measuring energy savings ensures that the total energy savings prescribed by this Directive are a fixed amount, and thus independent of future GDP growth and of any future increase in energy consumption.

2. The national indicative energy savings target shall be expressed in absolute terms in GWh, or equivalent, calculated in accordance with 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 and that have a lasting effect may be taken into account in the calculation of the annual energy savings. In certain cases, where circumstances can justify it, measures initiated before 1995 but not earlier than 1991 may be taken into account. Measures of a technological nature should either have been updated to take account of technological progress, or be assessed in relation to the benchmark for such measures. The Commission shall provide guidelines on how the effect of all such energy efficiency improving measures should be measured or estimated, based, wherever possible, on existing Community legislation, such as Directive 2004/8/EC of the European Parliament and of the Council of 11 February 2004 on the promotion of cogeneration based on a useful heat demand in the internal energy market<sup>1</sup> and Directive 2002/91/EC.

In all cases, the resulting energy savings must still be verifiable and measurable or estimable, in accordance with the general framework in Annex IV.

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<sup>1</sup> OJ L 52, 21.2.2004, p. 50.

## ANNEX II

Energy content of selected fuels for end use – conversion table <sup>1</sup>

Energy commodity	kJ (NCV)	kgoe (NCV)	kWh (NCV)
1 kg coke	28 500	0,676	7,917
1 kg hard coal	17 200 - 30 700	0,411 - 0,733	4,778 - 8,528
1 kg brown coal briquettes	20 000	0,478	5,556
1 kg black lignite	10 500 - 21 000	0,251 - 0,502	2,917 - 5,833
1 kg brown coal	5 600 - 10 500	0,134 - 0,251	1,556 - 2,917
1 kg oil shale	8 000 - 9 000	0,191 - 0,215	2,222 - 2,500
1 kg peat	7 800 - 13 800	0,186 - 0,330	2,167 - 3,833
1 kg peat briquettes	16 000 - 16 800	0,382 - 0,401	4,444 - 4,667
1 kg residual fuel oil (heavy oil)	40 000	0,955	11,111
1 kg light fuel oil	42 300	1,010	11,750
1 kg motor spirit (petrol)	44 000	1,051	12,222
1 kg paraffin	40 000	0,955	11,111

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<sup>1</sup> Member States may apply different conversion factors if these can be justified.

1 kg liquefied petroleum gas	46 000	1,099	12,778
1 kg natural gas <sup>1</sup>	47 200	1,126	13,10
1 kg liquefied natural gas	45 190	1,079	12,553
1 kg wood (25% humidity) <sup>2</sup>	13 800	0,330	3,833
1 kg pellets/wood bricks	16 800	0,401	4,667
1 kg waste	7 400 - 10 700	0,177 - 0,256	2,056 - 2,972
1 MJ derived heat	1 000	0,024	0,278
1 kWh electrical energy	3 600	0,086	1 <sup>3</sup>

Source: Eurostat.

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<sup>1</sup> 93% methane.

<sup>2</sup> Member States may apply other values depending on the type of wood most used in the respective Member State.

<sup>3</sup> 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.

## ANNEX III

### Indicative list of examples of eligible energy efficiency improvement measures

This Annex provides examples of areas in which energy efficiency improvement programmes and other energy efficiency improvement measures may be developed and implemented in the context of Article 4.

To be taken into account, these energy efficiency improvement measures must result in energy savings that can be clearly measured and verified or estimated in accordance with the guidelines in Annex IV, and their impacts on energy savings must not already be counted in other specific measures. The following lists are not exhaustive but are intended to provide guidance.

Examples of eligible energy efficiency improvement measures:

#### Residential and tertiary sectors

- (a) heating and cooling (e.g. heat pumps, new, efficient boilers, installation/efficient update of district heating/cooling systems);
- (b) insulation and ventilation (e.g. wall cavity and roof insulation, double/triple glazing of windows, passive heating and cooling);
- (c) hot water (e.g. installation of new devices, direct and efficient use in space heating, washing machines);



- (d) lighting (e.g. new, efficient bulbs and ballasts, digital control systems, use of motion detectors for lighting systems in commercial buildings);
- (e) cooking and refrigeration (e.g. new, efficient devices, heat recovery systems);
- (f) other equipment and appliances (e.g. combined heat and power appliances, new, efficient devices, time control for optimised energy use, stand-by loss reduction, installation of capacitors to reduce reactive power, transformers with low losses);
- (g) domestic generation of renewable energy sources, whereby the amount of purchased energy is reduced (e.g. solar thermal applications, domestic hot water, solar-assisted space heating and cooling);

#### Industry sector

- (h) 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);
- (i) motors and drives (e.g. increase in the use of electronic controls, variable speed drives, integrated application programming, frequency conversion, electrical motor with high efficiency);
- (j) fans, variable speed drives and ventilation (e.g. new devices/systems, use of natural ventilation);
- (k) demand response management (e.g. load management, peak shaving control systems);
- (l) high-efficiency cogeneration (e.g. combined heat and power appliances);

## Transport sector

- (m) mode of travel used (e.g. promotion of energy-efficient vehicles, energy-efficient use of vehicles including tyre pressure adjustment schemes, energy efficiency devices and add-on devices for vehicles, fuel additives which improve energy efficiency, high-lubricity oils and low-resistance tyres);
- (n) modal shifts of travel (e.g. car free home/office transportation arrangements, car sharing, modal shifts from more energy-consuming modes of transport to less energy-consuming ones, per passenger-km or tonne-km);
- (o) car-free days;

## Cross-sectoral measures

- (p) standards and norms that aim primarily at improving the energy efficiency of products and services, including buildings;
- (q) energy labelling schemes;
- (r) metering, intelligent metering systems such as individual metering instruments managed by remote, and informative billing;
- (s) training and education that lead to application of energy-efficient technology and/or techniques;

## Horizontal measures

- (t) regulations, taxes etc. that have the effect of reducing energy end-use consumption;
- (u) focused information campaigns that promote energy efficiency improvement and energy efficiency improvement measures.

## ANNEX IV

### General framework for measurement and verification of energy savings

1. Energy savings measurements and calculations and their normalisation
- 1.1. Measuring energy savings

#### General

In measuring the realised energy savings as set out in Article 4 with a view to capturing the overall improvement in energy efficiency and to ascertaining 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 EEAPs referred to 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 are 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 larger-scale aggregated sectoral levels of energy 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 described in point 1.2. This method does not provide exact measurements at a detailed level nor does it show cause and effect relationships between measures and their resulting energy 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 model<sup>1</sup>.

## Bottom-up calculations

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 to energy savings results from other specific energy efficiency improvement measures. The authorities or agencies referred to in Article 4(4) will ensure that double counting of energy savings, which results from a combination of energy efficiency improvement measures (including mechanisms), is avoided. For the bottom-up calculation method, data and methods referred to in points 2.1 and 2.2 may be used.

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<sup>1</sup> ODYSSEE-MURE Project, SAVE Programme. Commission 2005.

Before 1 January 2008, the Commission shall develop a harmonised bottom-up model. This model shall cover a level between 20 and 30% of the annual final inland energy consumption for sectors falling within the scope of this Directive, subject to due consideration of the factors referred to in points (a), (b) and (c) below.

Until 1 January 2012, the Commission shall continue to develop this harmonised bottom-up model, which shall cover a significantly higher level of the annual final inland energy consumption for sectors falling within the scope of this Directive, subject to due consideration of the factors referred to in points (a), (b) and (c) below.

In the development of the harmonised bottom-up model, the Commission shall take the following factors into account and justify its decision accordingly:

- (a) experience with the harmonised calculation model during its first years of application;
- (b) expected potential increase in accuracy as a result of a larger share of bottom-up calculations;
- (c) estimated potential added cost and/or administrative burden.

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 the measurement methods referred to in points 2.1 and 2.2 and by focusing on those sectors where the harmonised bottom-up model can be most cost efficiently applied.

Member States that so wish may use further bottom-up measurements in addition to the part prescribed by the harmonised bottom-up model subject to the agreement of the Commission, in accordance with the procedure referred to in Article 16(2), on the basis of a description of the methodology presented by the Member State concerned.

If bottom-up calculations are not available for certain sectors, top-down indicators or mixtures of top-down and bottom-up calculations shall be used in the reports to the Commission, subject to the agreement of the Commission, in accordance with the procedure referred to in Article 16(2). In particular, when assessing requests to this effect within the context of the first EEAP described in Article 14(2), the Commission shall demonstrate the appropriate flexibility. Some top-down calculations will be necessary to measure the impact of measures implemented after 1995 (and in certain cases as early as 1991) that continue to have impact.

1.2. How energy savings measurements should be normalised

Energy savings shall be determined by measuring and/or estimating consumption, before and after the implementation of the measure, while ensuring adjustment and normalisation for external 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, such as:

- (a) weather conditions, such as degree days;

- (b) occupancy levels;
- (c) opening hours for non-domestic buildings;
- (d) installed equipment intensity (plant throughput); product mix;
- (e) plant throughput, level of production, volume or added value, including changes in GDP level;
- (f) using schedule for installation and vehicles;
- (g) 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 point 1.2.

### Energy sales data

The consumption of different types of energy (e.g. electricity, gas, heating oil) 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 energy 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) 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 energy 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 and statistics etc.

#### 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). 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 point 2 may entail some degree of uncertainty. Uncertainty may derive from<sup>1</sup>:

- (a) instrumentation errors: these typically occur because of errors in specifications given by the product manufacturer;
- (b) modelling errors: these typically refer to errors in the model used to estimate parameters for the data collected;
- (c) sampling errors: these typically refer 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 points 2.1 and 2.2. A further specification of uncertainty is advised.

Member States may choose to use the method 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  $\pm 20\%$ ".

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<sup>1</sup> 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).

If the method of quantified uncertainty is used, Member States are also to take into account that the acceptable level of uncertainty required in energy 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 improvement measures:

Loft insulation of private dwellings	30 years
Cavity wall insulation of private dwellings	40 years
Glazing E to C rated (in m <sup>2</sup> )	20 years
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 established under Article 16, shall therefore replace the above list with an agreed preliminary list of the average lifetime of different energy efficiency improvement measures not later than ...\* .

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 another measure with equivalent effect, may have future multiplier effects in the market, meaning that the market will implement a measure automatically without any further involvement from the authorities or agencies referred to in Article 4(4) or any private-sector 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.

With regard to the evaluation of horizontal measures, energy efficiency indicators may be used, provided that the way in which they would have developed without the horizontal measures can be determined. However, it must be possible to rule out, as far as possible, double counting with savings achieved through targeted energy efficiency programmes, energy services and other policy instruments. This applies particularly to energy or CO<sub>2</sub> taxes and information campaigns.

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\* Six months after the date of entry into force of this Directive.

Corrections shall be made for double counting of energy savings. The use of matrices that enable the summation of impacts of measures is encouraged.

Potential energy savings resulting after the target period shall not be taken into account when Member States report on the overall target set out in Article 4. Measures that promote long-term market effects should in any case be encouraged and measures that have already 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 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 actors. The appropriate Member State authorities or agencies referred to in Article 4(4) 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).

## ANNEX V

Indicative list of energy conversion markets and sub-markets for which benchmarks can be worked out:

1. The market for household appliances/information technology and lighting:
  - 1.1 Kitchen appliances (white goods);
  - 1.2 Entertainment/information technology;
  - 1.3 Lighting.
2. The market for domestic heating technology:
  - 2.1 Heating;
  - 2.2 Hot-water provision;
  - 2.3 Air conditioning;
  - 2.4 Ventilation;
  - 2.5 Heat insulation;
  - 2.6 Windows.
3. The market for industrial ovens.
4. The market for motorised power in industry.

5. The market for public-sector institutions:
  - 5.1 Schools/public administration;
  - 5.2 Hospitals;
  - 5.3 Swimming pools;
  - 5.4 Street lighting.
6. The market for transport services.



## ANNEX VI

### List of eligible energy efficient public procurement measures

Without prejudice to the national and Community public procurement legislation, Member States shall ensure that the public sector applies at least two requirements from the following list in the context of the exemplary role of the public sector as referred to in Article 5:

- (a) requirements concerning 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 based on lists of energy-efficient product specifications of different categories of equipment and vehicles to be drawn up by the authorities or agencies referred to in Article 4(4), using, where applicable, minimised life-cycle cost analysis or comparable methods to ensure cost-effectiveness;
- (c) requirements to purchase equipment that has efficient energy consumption in all modes, including in standby 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 points (b) and (c);
- (e) requirements to use energy audits and implement the resulting cost-effective recommendations;

- (f) requirements to purchase or rent energy-efficient buildings or parts thereof, or requirements to replace or retrofit purchased or rented buildings or parts thereof in order to render them more energy-efficient.
-