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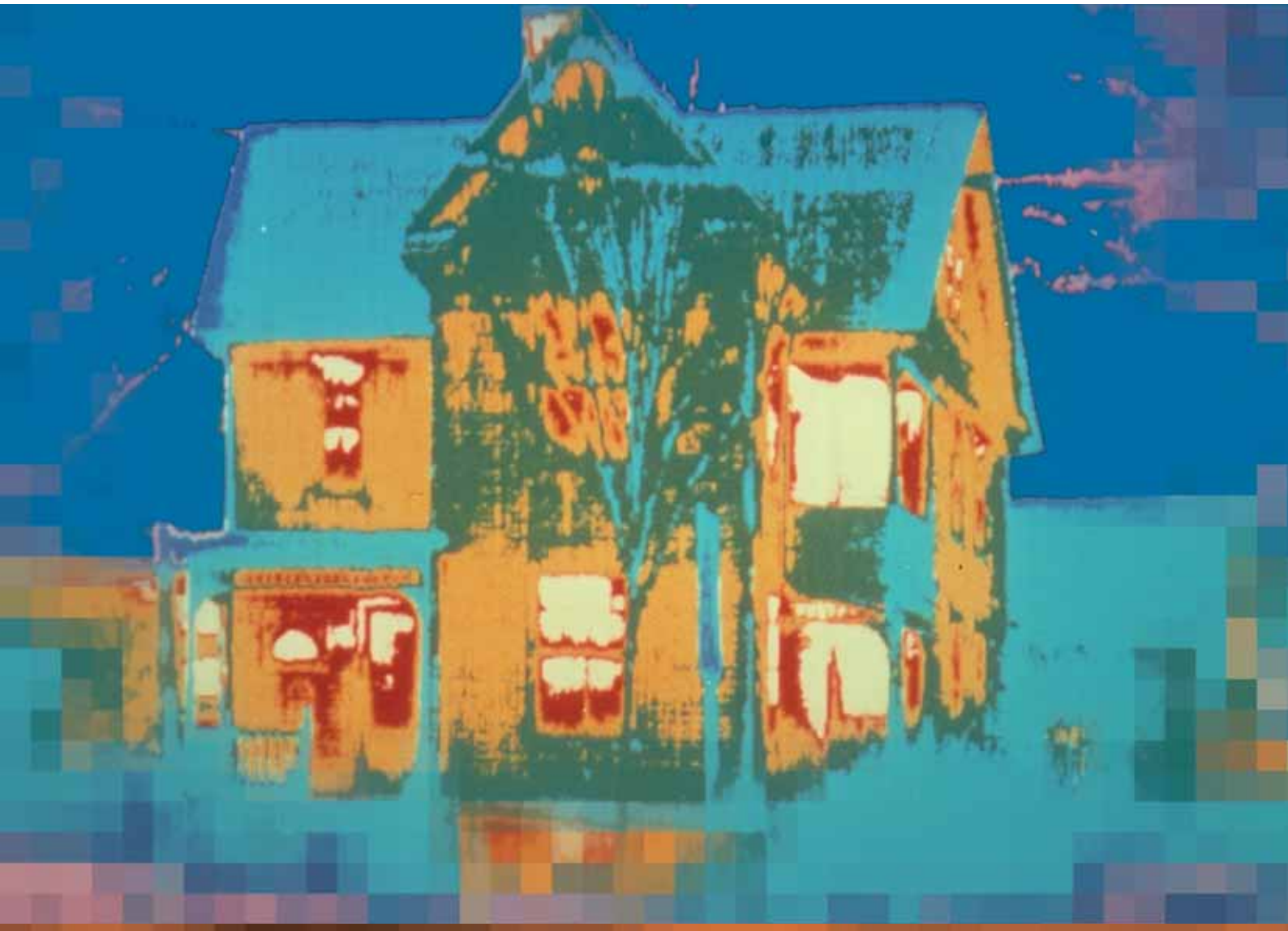

Energy

National Energy Efficiency Action Plan (EEAP) of the Federal Republic of Germany

in accordance with the EU Directive on “energy end-use efficiency and energy services” (2006/32/EC)

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Table of Contents

Energy efficiency as the focal point of national and international energy policy

Nowadays, the question of how to permanently increase energy efficiency occupies national and international discussion like almost no other energy policy topic. In recent times, many States have set themselves very ambitious energy savings targets. Between 2005 and 2010, China is intending to improve energy efficiency by 20 %. Numerous US States are discussing energy savings targets or have already introduced them. At its spring summit, the European Council decided to exploit the Community's energy saving potential, which is estimated at 20 %, by means of suitable measures inthe period up to 2020.

Germany, too, has set itself an exceedingly ambitious efficiency target. Energy productivity is to double by 2020 compared with the 1990 figure. Since more than half of this period has already elapsed, in plain English, this means that over the next 14 years, energy consumption per unit of gross domestic product (GDP) has to fall by 3.1 % year on year.

Within the European Union, France and Italy, among others, have, in addition to Germany, laid down challenging savings targets. For these countries, as is also the case with Germany, the obligation set out in the EU Directive on energy end-use efficiency and energy services applies, whereby 9 % of final energy must be saved by means of targeted measures over a nine-year period compared with a reference period.

Even if the goals of the Directive clearly fall short of the national targets mentioned, Germany and the other EU States are entering new territory at various points with the transposition of the Directive, and are confronted with considerable additional challenges, especially with regard to statistical and methodical considerations.

The National Energy Efficiency Action Plan summarises the results of the energy summit talks and various research studies which the Federal Ministry of Economic Affairs and Technology had commissioned on energy savings which had already been achieved and on current economic savings potential.

Against this backdrop, the plan submitted to Brussels takes into account the demand made by the Federal Ministry of Economics and Technology that all new energy saving measures must be subject to a careful cost-benefit analysis in order to minimise the burden on citizens and the economy.

Targets under the Directive

In accordance with the requirements of the EU Directive on energy end-use efficiency and energy services, Member States are to reduce energy consumption by a total of 9 % in comparison with a reference period [in Germany: the average over the years 2001-2005] over a nine-year period. In the calculation, Member States are at liberty to give greater weight to savings in the electricity sector. For Germany, this means a target value of 833 Petajoules [PJ] or 1080 PJ if a greater, i.e. primary energy-related, saving is assumed in the electricity sector.

To be able to assess the strategy and specific efforts of the individual Member States in relation to energy savings in time, the Directive stipulates that three national action plans [2007, 2011 and 2014] be drawn up which are increasingly specific in terms of statistics, and that an intermediate target be laid down for the year 2010. As regards the Federal Republic of Germany, this target value is 135 PJ, or 173 PJ, where greater weighting is given to saving electricity, i.e. approximately 61 % of the target value for 2016.

These targets shall primarily be achieved through the provision of energy services and energy efficiency measures by private industry, but also through measures initiated by the State. In this regard, consideration is also given to measures taken since 1991-1995 and which will continue to assist in saving energy in years to come. This applies, for instance, to buildings which have since been built in accordance with the more stringent provisions of the Heat Insulation Order in force at the time or the current Energy Saving Order and which will therefore also have a lower energy requirement in future.

This action plan lists those measures which are already in place. This list provides evidence of the fact that the previous energy savings policy has already been very successful. According to estimates, savings measures of this nature contribute approximately 45 % of the savings target, i.e. with a power coefficient

of 1, in the region of 375 PJ, and with a power coefficient of 2.5, in the region of 486 PJ.

Measures for achieving these targets

In addition to measures undertaken by the State, the Directive includes the contribution to savings made by providers of energy efficiency measures, energy distributors, distribution system operators and energy retailers, but also final customers/plants which have not hitherto been affected by the emissions trading system.

The aim of all the measures associated with the Directive is to improve energy end-use efficiency as well as develop and promote energy service markets. The following basic principles can be deduced from these measures as regards the structure and content of the action plan:

- Measures must be focused on (sub) sectors and energy end uses with a high, absolute, end-use energy savings potential which can be realised economically

- The structure and expansion of the range of services concerned with the efficient use of heat, energy and lighting for final customers

- The expansion and creation of markets and increasing the sale of energy-efficient products, techniques and processes

- Strengthening the marketing proposal, including financing of energy-efficient products, techniques and processes

- The provision of qualified information, target group-oriented consultation and audits, as well as the development and stipulation of standards and norms which support the abovementioned activities, simplify their broad application and motivate the actors

- The utilisation of synergy effects by networking the market actors with regard to the drawing up and implementation of measures

The Federal German Government will transpose the Directive on energy end-use efficiency and energy services in cooperation with the market actors.

Voluntary commitments on the part of the energy industry are preferred to regulatory measures if they have an adequate degree of liability within the meaning of the Directive and their observance is supervised and managed by means of monitoring. The activities undertaken by trade and industry in achieving verifiable energy savings are collated and assessed by the responsible agency (agencies) still to be appointed as per Article 4(1)(4). In the course of the first three-year period, the Federal German Government will evaluate the voluntary activities reported.

In this action plan, the Federal German Government is presenting an initial assessment of the contribution made by State measures in achieving targets. The detailed appraisal of the specific contributions made by individual measures in achieving targets takes into account the extensive provisions of the Directive in terms of statistically proofing of energy savings.

The following measures in particular are emphasised:

- A distinct tightening up of the energy requirements of buildings

- The consolidation and launch of different funding programmes in order to mobilise cost-effective efficiency potentials in the industrial, household, agriculture and forestry, trade, service and transport sectors

- Continuation of the CO2 Building Redevelopment Programme and extension of the circumstances in which funding is provided

- Increased investment in the energy efficiency of public buildings

- The procurement of energy-efficient products and services which form the basis of the Federal Government's procurement decisions

- The liberalisation of electricity metering is to be the precondition for the rapid circulation of smart metering

- Incentives to replace night-time electric storage heaters

- Energy saving contracting in the residential building sector

- Improving the energy consumption labelling of private cars

- Calling for the immediate stipulation of standards relating to equipment and products in the context of the transposition of the Eco-design Directive and the improvement in energy consumption labelling

- Embarking on a technology programme entitled "Climate protection and energy efficiency"

- Extending energy research in the sphere of improving energy efficiency in the building sector, in industry and in the trade, industrial and service sectors, among others

Special provisions of the Directive

In addition to the establishment, assessment and description of the future options available to the State as regards energy saving measures, the Directive places numerous additional requirements on Member States. The Federal German Government also gives its view on this in this action plan.

First of all, the Directive is calling for the concrete implementation of the statistical evaluation of the energy savings achieved in relation to the next two action plans. The Commission will appoint a committee with the aim of determining a calculation model for the savings actually achieved. In this regard, two different methods of calculation are combined, namely the Bottom-up method and the Top-down method. Bottom-up describes a method where the success of individual energy efficiency measures is calculated and assessed retrospectively.

In this case, it will depend on developing and applying statistical processes which satisfy the aim of the Directive in the least bureaucratic manner possible.

In addition, the EU Directive on energy end-use efficiency and energy services emphasises the exemplary role of the State as regards energy savings. All Member States must furnish proof of this role-model function by naming specific measures. Within the framework of this action plan, the Federal German Government is currently pointing predominantly to measures at a Federal level, but wishes to supplement this further with the numerous measures available in the Länder and local authority districts following consultations.

Finally, the Directive calls on Member States to ensure that "final customers for electricity, natural gas, district heating and/or cooling and domestic hot water are provided with competitively-priced individual meters which accurately reflect the final customer's actual energy consumptionand provide information on actual time of use." Even if these individual meters are available in Germany, taking into account technical opportunities currently available and the liberalisation of metering, the question nevertheless arises as to whether additional energy savings are possible through the targeted use of information and communication technologies in metering. The Federal Ministry of Economics and Technology, which is in charge in this respect, has started numerous initiatives in this regard.

Conclusion

In the first instance, this Energy Efficiency Action Plan is based on the 9 % savings target laid down in the EU Directive on energy end-use efficiency and energy services. In addition, it represents an important component in the opening up of even greater, economical energy savings potential. Through the scientific foundation, the demonstration of basic principles and the strict alignment with the principle of economic efficiency in assessing existing energy savings potential, the plan reflects the philosophy of German energy efficiency and energy savings policy. In this way, it represents an important building block and a marker for policy initiatives in this field in the years ahead.

1 Energy efficiency policy

Germany has already achieved a high level of energy efficiency. With a primary energy consumption of less than 7 gigajoules per € 1 000 of Gross Domestic Product (GDP), Germany is among the most productive industrialised countries in terms of energy consumption. Over time, specific energy consumption in Germany has clearly diminished. Less and less energy is required to produce one euro of GDP. The period 1990 - 2006 saw an average improvement in specific energy consumption (energy intensity) of 1.7 % per annum based on national data. In terms of an international comparison, Germany is therefore one of the leaders among the industrialised nations. Consequently, energy consumption and economic growth has been decoupled in Germany for years.

This reduction in specific energy consumption has made a not inconsiderable contribution to the fact that Germany was also able to achieve peak values in an international comparison regarding the reduction in CO_2 emissions. This innovative, energy-efficient and, consequently, cost-saving production method also made a decisive contribution to Germany being able to maintain its position as a champion exporter on world markets.

Nevertheless, it is important to also improve energy efficiency further on account of the fact that

- Energy efficiency constitutes a key competitive factor and, therefore, regional economic policy.
- Energy efficiency contributes to greater security of supply and increased availability of exhaustible energy sources.
- Energy efficiency is applied environmental policy and the most effective means, from the point of view of costs, of reducing greenhouse gas emissions.

Germany has therefore set itself an ambitious efficiency target. By 2020, energy productivity is to double compared with 1990. Consequently, energy efficiency also plays an important role in the key points for an integrated energy and climate programme adopted by the Federal Cabinet on 23 August 2007 which was drawn up following the national Energy Summit process. The key points take up the declarations given in the government statement on policy made by the Federal Ministry of the Environment on 26 April 2007, the outcomes of the three Energy Summits and the ambitious decisions taken by the European Council of Heads of State and Government in the spring of this year under the German Council presidency.

The following measures are emphasised in the sphere of energy efficiency:

- The liberalisation of electricity metering shall establish the precondition for the rapid dissemination of smart metering.
- Increased investment in the energy efficiency of public buildings.
- The development of technical guidelines for the procurement of environmentally friendly and in particular energy-efficient products and services to be used as a basis for procurement decisions taken by the Federal Government.
- Continuation of the CO2 building redevelopment programme and extension of the scope of funding.
- A distinct tightening up of the energy requirements for buildings.
- The long-term replacement of night-time electric storage heaters.
- Giving greater consideration to energy efficiency in the regulations on the billing of utility costs in the case of rented flats.
- Examining the potential for energy savings contracting in the residential building sector.
- Using CO_2 as the tax base for the motor vehicle tax in the case of new vehicles.
- Improving the energy consumption labelling of private cars.
- A greater spread and differentiation of toll charges for heavy goods vehicles according to classes of emissions, as well as greater inclusion of the

subordinate road network in agreement with the Federal Länder, where this is sensible from the point of view of transport and environmental policy.

- The consolidation and launch of various support programmes in order to mobilise the most cost-effective efficiency potentials in the industrial, household, agriculture and forestry, trade, service and transport sectors.

- Calling for immediate stipulation of standards relating to equipment and products in the context of the transposition of the Eco-design Directive and the improvement of energy consumption labelling.

- The further extension of combined heat and power generation by means of the amendment to the Act on combined heat and power generation.

- Emphasising the importance of modern energy management systems in industry.

- Launching a technology programme entitled "Climate protection and energy efficiency".

- A technology and efficiency programme for future propulsion technologies.

- Extending energy research in the sphere of raising energy efficiency in the building sector, in industry and in the trade and service sectors, among others.

- International projects concerning climate protection and energy efficiency (including the consistent implementation of the Clean Development Mechanism / Joint Implementation initiative and implementation of the energy efficiency export initiative).

This Energy Efficiency Action Plan under the Directive on energy end-use efficiency and energy services is not, however, intended to show how the economic energy efficiency potential can be exploited in its entirety or to portray all of Germany's energy efficiency measures in a detailed and exhaustive manner. In accordance with Article 14(2) of the Directive on energy end-use efficiency and energy services, its purpose is to describe how Germany will fulfil the obligations arising from the aforementioned directive, in particular those measures by means of which Germany is striving to achieve the final indicative energy savings target of 9 % which is required under the Directive.

It must be emphasised that the increase in energy efficiency is a task for society in general which cannot be tackled by the Federal German Government alone. On the contrary, continued contributions from citizens, business, the Länder and municipal authorities are also required and requested to this end.

2
Strategy for achieving the indicative energy savings target

2.1 Basic principles and framework conditions

Directive 2006/32/EC on energy end-use efficiency and energy services of 5 April 2006 stipulates a national indicative energy savings target for the period between the beginning of 2008 and the end of 2016 as an indicative energy end-use savings target. This figure is 9 % of the annual average consumption of all energy users within the scope of this Directive over the last five years prior to the implementation of this Directive for which official data are available. Energy services companies, energy distributors, distribution system operators and energy retailers, as well as final customers, are committed to energy saving measures. It is incumbent on the public sector to play an exemplary role. Those final customers in the form of installations/undertakings (see Chapter 3.1) involved in activities listed in Annex I to Directive 2003/87/EC establishing a scheme for greenhouse gas emission allowance trading within the Community are not covered by the Directive, nor are the armed forces in cases where application of the Directive on energy end-use efficiency and energy services conflicts with the nature and primary aim of the activities of the armed forces.

The indicative energy savings target must be attained by way of energy services and other energy efficiency improvement measures. In terms of measures, the Directive on energy end-use efficiency and energy services leaves it to the Member States to choose between various instruments to improve energy efficiency and promote energy service markets. EU States must inform the European Commission of their approach for transposing the Directive in three successive National Energy Efficiency Action Plans. With the help of a Committee of Experts, the European Commission will develop a harmonised bottom-up model for measuring and calculating energy savings by 1 January 2008.

The Federal German Government will transpose the Directive on energy end-use efficiency and energy services in cooperation with the market actors. Voluntary undertakings on the part of the energy industry are preferred to regulatory law measures if they have an adequate degree of commitment within the meaning of the Directive and their observance is supervised and managed by means of monitoring.

The purpose of all measures in the context of the Directive on energy end-use efficiency and energy services is to improve the efficiency of energy end-use by providing the necessary indicative targets, other measures and instruments as well as the development and promotion of energy services markets. From this, the following **basic principles** can be deduced in relation to the structure and content of the National Energy Efficiency Action Plan:

- Measures must be focused on (sub-) sectors and energy end-uses with a high absolute final energy savings potential which can be realised economically.

- The development and expansion of services for the efficient use of heat, energy and lighting for final customers.

- The expansion and creation of markets and increasing the sale of energyefficient products, techniques and processes.

- Strengthening the marketing facilities, including financing services for energyefficient products, techniques and processes.

- The provision of qualified information, target group-oriented consultation and audits, as well as the development and stipulation of standards and norms which support the abovementioned activities, simplify their broad application and motivate the actors.

- The utilisation of synergy effects by networking the market actors with regard to the drawing up and implementation of measures.

This Energy Efficiency Action Plan contains projections and alternative considerations of the Federal German Government whose instruments and measures could help achieve the indicative savings objective stipulated by the Directive. In this regard, particular consideration must be given to the following **framework conditions**:

Legal regulation provisos: the proposals based on predominantly economic and technical premises include the possible application of economic, administrative and also legal instruments depending on economic efficiency and market conditions.

Since the establishment and further development of legal instruments is left to the respective legislator or regulatory body, and any adaptation of the German legal framework in line with the requirements of the Directive which may be required is only to be carried out at a later date as per the Directive, the legal measures proposed in the Energy Efficiency Action Plan are subject to this proviso.

Financial proviso: all the programmes, measures and instruments proposed in the Energy Efficiency Action Plan which presuppose financial expenditure by public authorities are subject to such financing being provided.

Options and alternatives as regards instruments: the energy saving measures described in the Energy Efficiency Action Plan constitute guidelines to which the future transposition of the Directive in Germany is to be adapted, in observance of the principles of technical and economic suitability and minimising administrative expenditure. Against this background, the Federal German Government considers it appropriate to classify the anticipated quantitative energy saving effects of policies and measures mentioned in the Energy Efficiency Action Plan in bands (with a minimum and maximum estimate) and to specify alternatives as regards instruments for certain areas which may well overlap in terms of their effects.

In this connection, it must be assumed that not all the instruments and measures listed will prove to be fully implementable and that some instruments will not provide the full energy savings initially expected of them. As a precaution, to take these restrictions into account, the overall volume of energy savings envisaged in the Energy Efficiency Action Plan is classified higher than would be necessary when using static data and when implementing each separate measure in full.

2.2 Technical and economical energy savings potential

In terms of achieving objectives in a cost-efficient manner, State initiatives and activities aimed at reducing final energy consumption will concentrate on those areas where economically viable potential energy savings are not exploited as yet or have not been exploited in their entirety. Market obstacles including a lack of capital, investment risks or, frequently, simply a lack of information, make it considerably more difficult to fully exploit these savings . Likewise, direct incentives do not always exhibit the intended effect on account of overly high transaction costs.

To determine the existing economic potential at current prices, the Federal German Government has had a study[1] drawn up Prognos AG, Basel, and its cooperation partners, and will systematically develop the potential identified in it in collaboration with trade and industry. The key elements of this study are summarised briefly below.

1 Research project 18/2006 of the Federal Ministry of Economics and Technology entitled “Energy Savings and energy efficiency in light of current price developments”, drawn up by Prognos AG, Basel and Berlin, in cooperation with Progtrans AG, Basel (covering the transport and traffic sector) and basics AG, Zürich (covering the manufacturing sector).

Procedure and method

As regards the systematic identification of potential energy savings, differentiations in final energy consumption are required over and above the statistics which are available officially. This includes a distinction between relevant consumer groups (households, branches of industry, public services, motorised private transport, etc.) and areas of application (buildings, equipment, drive system, etc). To this end, the final energy consumption was subjected to a fine subdivision by sector, and an energy consumption matrix was drawn up in each case, with a horizontal differentiation according to consumer group and a vertical differentiation according to relevant areaof application.

Since the project is primarily directed at exploiting energy end-use efficiency and potential savings, efficiency potential in central production (generally power-station technologies) was excluded from the investigation. This also applies to the generation and distribution of district heating as well as large-scale centralised and small-scale decentralised combined heat and power generation. However, it should be pointed out that small-scale and micro-scale combined heat and power generation in particular is being used more and more in households, trade, industry and services.

Technical potential

Against the background of the specific requirements of the Directive on energy end-use efficiency and energy services which have to be transposed directly, as regards the definition of the technical potential, the current state of the art on the market was taken into consideration. The state of the art in the context of this study is the level of development of progressive products, processes, facilities or modes of operation which make the practical suitability of a measure aimed at limiting energy end-use appear, by and large, secure and economical/ near-economical. Standard repair cycles were taken into consideration when designing the measures.

Within the meaning of the Directive, possible savings were determined statically over the period 2008-2016 in comparison with a reference year (2002), i.e. without updating the quantity structures or market developments.

The technical potential across all sectors is 1463 PJ [petajoules] (15.5 % of the final energy consumption taken as a basis (9412 PJ)).

Economic potential

Economic potential within the meaning of the study means that quantity of energy to be saved (in units of consumption in absolute terms and as a percentage in relative terms) which can be portrayed in economic terms in relation to the technical potential, i.e. for a defined duration of the measure and at a defined interest rate, has specifically lower costs per consumption unit saved than the standard market price to be paid by the respective consumer per unit of consumption.

The economic potential determined in this way across all sectors is 1246 PJ, i.e. 13.2 % of the final energy consumption taken as a basis (9412 PJ).
The contributions from the individual sectors are made up as follows:

- Private households: 354 PJ (corresponding to 12.5 % of the final consumption taken as a basis)
- Trade, industry and services: 146 PJ (10.7 %) [2]
- Manufacturing: 352 PJ (13.9 %)
- Transport and traffic: 394 PJ (14.7 %)

Final energy consumption in the public service sector (included in the abovementioned figure for the trade, industry and service sector), is 222 PJ. Of this figure, 39 PJ (17.5 %) can be exploited economically.

2 Energy consumption in the building trade and small-scale industrial undertakings is usually listed under the trade, industry and service sector. In this investigation, however, for methodical reasons the relevant measures and energy saving potential are grouped under manufacturing.

The study was able to deduce the following findings from this interim result:

a) With regard to the target value set out in the Directive on energy end-use efficiency and energy services, adequate potential is available which can be exploited economically during the 2008-2016 implementation period.

b) The contribution from each of the individual sectors is of a comparable order of magnitude, i.e. between 10 and 15 % of the respective final energy consumption.

c) The cost effectiveness of energy saving measures is an important, but not the sole decisive, factor in realising potential energy savings.

d) The majority (85 %) of the technical potential is already economically exploitable today and this was also largely the case 5, 10 and in some cases 20 years ago. In the classical sense, this constitutes market failure due to a multiple-obstacle structure.

Obstacles

The obstacle structures were identified and appraised in relation to the individual measures. All circumstances which prevent or impede the realisation of (otherwise) economical potential energy savings are described as obstacles in this regard. These obstacles may be informational, legal, financial, organisational, motivational and/or of another nature. In addition to other obstacles, the following were identified as being particularly relevant:

- **Private households:** In addition to a lack of information, which also concerns the optimum operation of installations and equipment from the point of view of energy, the landlord/tenant dilemma with (depending on the market situation) a limited ability to split the costs incurred in modernisation investment plays a special role.
- **Trade, industry and services:** The obstacle structure is comparable with that of the private household sector, but is intensified in part by a further differentiation of responsibilities (user/investor dilemma) and the relatively low importance of energy costs in an undertakings' overall costs.
- **Manufacturing:** Here too, energy costs do not carry any particular weight in terms of overall costs in the majority of undertakings. Moreover, energy saving investment is in competition with potential investment in core business and is therefore subject to a comparatively high anticipated return.
- **Transport and traffic:** Problems of acceptance and a lack of information on the benefit (savings effects) of measures constitute relatively significant obstacles since measures aimed at controlling behaviour are frequently subjectively felt to constitute confinement and restriction.

The study was able to deduce the following findings from the analysis of the obstacles:

a) A heterogeneous obstacle structure exists which clearly differs between the individual sectors.

b) In accordance with the heterogeneous obstacle structure, the choice of instruments should be differentiated by sector.

The measures described in Chapter 4.2, on whose quantitative savings effects the German Energy Agency (dena) has presented estimates at the request of the Federal Ministry of Economics and Technology, are, essentially, within the framework of the economic potential estimated by Prognos AG.

2.3 Procedure for exploiting the economic potential

There is no easy answer to the problem of providing sustainable support for energy saving and efficiency. A balanced mix of instruments which takes the heterogeneous situation into account and which is tailored to the respective areas of activity is the most suitable solution. From an economic-policy point of view, it is important that additional administrative expense and direct State intervention be limited as far as possible. As has been shown by many examples from the area of German industry in particular, the most effective measures relating to energy saving and efficiency are those which successfully find a market for themselves on account of their price-cost ratio.

Within the framework of transposing the Directive, special attention is directed at measures in the public sector which must fulfil an exemplary role in this connection.

Alongside the increase in energy efficiency as regards conversion and transmission, in order to achieve this aim, it is even more the case that sweeping measures in favour of economical and efficient dealings with energy in the case of final customers in industry, the public sector and the trade and service sector, as well as in the case of private consumers, are necessary.

In this regard, the initiatives of the Federal German Government concerned with greater energy efficiency on the demand side and, consequently, on achieving the national indicative energy savings target, concentrate on the following key areas and priority instruments and measures:

1. Accelerated development of the extensive potential energy savings in the building sector, especially involving existing residential buildings:

- Particularly energy-efficient techniques for heating and insulating buildings have matured and are available ready for use, but are not used to a sufficient extent. A considerable improvement in energy end-use efficiency in the building sector is therefore possible in accordance with the state of the art. Consequently, the aim of the action strategy is a broad market penetration of existing solutions designed to raise energy efficiency.

- The speed of innovation in the case of new builds and redevelopment is currently too low and must be increased. As regards building redevelopments, only a part of the economically exploitable savings potential is utilised. The proportion of energy-related redevelopments in terms of building renovations must be substantially increased and the quality of energy-related redevelopment measures optimised (raising the rate and quality of energy-related redevelopment).

2. Support for measures designed to increase energy efficiency in the trade, industry, services, agricultural and industrial sectors, in particular, in small- and medium-sized enterprises (SMEs):

- Overcoming existing shortfalls in information, especially through individual energy advice, standardisation and the broad application of energy audits, as well as by integrating the theme of energy efficiency in qualifications, training and further education.

- Overcoming existing financial obstacles when exploiting potential energy savings through financial support for investment in measures where proof of energy efficiency is furnished.

- Target-group oriented marketing for announcing funding programmes as a supporting element.

3. Increased exploitation of the extensive, economic energy efficiency potential in the public sector, especially through measures involving public buildings and in government procurement. To this end, the following measures are implemented or developed further:

- Increased exchange of experiences relating to model projects between the Federal Government, the Länder and the municipalities.

- The continuation and development of the application of contracting procedures on Federal Government properties.

- The provision and maintenance of selection tables, specifications, guidelines, sample modules for the selection of, tendering for and contracting of energy-efficient products, as well as for the awarding of contracts incorporating energy-efficient criteria.

- The development and establishment of standardised methods, benchmarks and quality criteria concerning best practices with regard to energy efficiency in municipalities.

- Continuation of the programme concerned with the energy-related redevelopment of Federal buildings and the initiation of corresponding funding programmes in the Länder and municipalities.

- To ensure the economical and energy-efficient operation of Federal Government properties, by means of the operational monitoring of the technical installations, the application and observance of the principles governing management shall be reviewed and user advice guaranteed.

4. Promoting the technical development of vehicles, with the main emphasis on the energy-related optimisation of conventional drives in private cars and heavy goods vehicles, and supporting greater market penetration by energy-efficient vehicles and components including low rolling-resistance tyres and oils. To achieve this, regulatory policy instruments and information and motivational measures are combined:

- The inclusion of CO_2 emissions in the assessment basis for road tax.

- Improving consumer information in the case of private cars and heavy goods vehicles (adapting the German Order on energy consumption labelling) by means of a more transparent structure and differentiated labelling.

- Information and motivational measures aimed at increasing the demand for low rolling-resistance tyres and oils and the greater dissemination of a fuel saving driving technique.

- Improving the network of cycle paths.

Measures and initiatives which are developed and implemented purposefully by undertakings which are engaged on the market as energy traders and vehicle manufacturers with a view to transposing the Directive on energy end-use efficiency and energy services are particularly important in the transport sector.

5. (Further) developments in terms of informing and motivating final customers on energy efficiency on the demand side and improving training and further education for actors and multipliers.

The market-oriented measures constitute a basis for both successful wide-ranging implementation and for a permanent impact associated with all instruments and measures as proposed in the National Energy Efficiency Action Plan for increasing end energy efficiency.

As emphasised above, this Energy Efficiency Action Plan cannot claim to show how the existing economic energy efficiency potential can be fully exploited or to portray Germany's energy efficiency measures in a detailed manner. In accordance with Article 14 of the Directive on energy end-use efficiency and energy services, such measures are listed here which are conceivable in order to achieve the energy efficiency objectives required by the Directive, as well as measures designed to fulfil the exemplary role of the public sector and those concerned with the prescribed provision of information for final customers and providing them with advice.

3 Determining the national indicative energy savings target

3.1 Determining the average end-use inland energy consumption

The availability of data

The "5 year period" prior to the entry into force of the Directive on energy end-use efficiency and energy services, in respect of which official data is available, is the period 2001–2005. However, the data available hitherto is only provisional on account of the exceptional features of Germany's energy statistics, meaning that the calculations of the indicative energy savings target within the framework of this action plan which are based on this data may only be provisional in nature.

The final inland energy consumption for the period 2001–2005 is presented in table form according to final energy sources (cf. Table 3-1).[3]

Emissions trading clause

The Directive on energy end-use efficiency and energy services is not in competition with the emissions trading system but incorporates those areas not covered by the Emissions Trading Directive. Accordingly, as per Article 2 letter b, the Directive does not apply to those installations/undertakings[4] involved in greenhouse gas emission allowance trading within the Community.

However, given that the aggregate final energy consumption of all installations covered by emissions trading cannot be determined at least just yet at justifiable cost, this derogation cannot be currently taken into consideration in calculating the quantitative energy saving objective. No quantity of energy which is allocated to emission trading within the meaning of the derogation shall therefore be deducted from the average annual final energy consumption as an initial value of the quantitative energy saving objective. In the run-up to preparing the second Energy Efficiency Action Plan, the Federal German Government will check whether and, if necessary, how this data loophole can be closed at justifiable cost when calculating the indicative savings target, as well as when estimating the quantities of energy savedwhich have already been achieved.

The issue to be clarified in the context of transposing the Directive into national legislation and administrative provisions as to whether certain undertakings to be included in the circle of final customers are affected by any legal obligations remains unaffected.

Final energy consumption by the armed forces

According to Article 2c of the Directive on energy end-use efficiency and energy services, also included in the area of application of the Directive are 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 and with the exception of material used exclusively for military purposes". As regards this area to be exempted, concrete figures are available to the Federal German Government. It will therefore be taken into account when calculating the savings objective.

3.2 Conversion factors

For the purposes of comparing energy savings and for converting different final energy sources into comparable units, Annex II of the Directive on energy end-use efficiency and energy services defines conversion factors. Electric current constitutes a special case, as regards the conversion of which, Member States may use a factor as per Article 4(1) and Annex II which has a value of 1 or 2.5 or any figure in-between.

In the following action plan, the quantitative saving values are calculated on the basis of the power coefficients 1 and 2.5.

3.3 National indicative energy savings target for 2016 and the 2010 interim target

Pursuant to Article 4(1) and Annex I to the Directive, the national indicative energy savings target to be used in the Energy Efficiency Action Plan amounts to 9 % of the final energy consumption for the five-year base period. Consequently, as regards a calculation based on a power coefficient of 1, the provisional indicative energy savings target for the Federal Republic of Germany totals 833 PJ. When using the power coefficient 2.5, the provisional indicative energy savings target would be 1080 PJ.

3 Source: Zahlen und Fakten. Energiedaten. Nationale und internationale Entwicklung. [Figures and facts. Energy data. National and international development]. Drawn up by the Federal Ministry of Economic Affairs and Technology, Department III A 2. As at: 13 December 2006.

4 A precise definition is still awaited from the Committee as per Article 16 of the Directive on energy end-use efficiency and energy services. For possible variants in terms of demarcations, refer to the definition of "undertaking" in Chapter 8.2.

The distribution of this savings objective between energy sources and sectors or branches will be left to the Member State. The Federal German Government is striving to align this distribution, in principle, with the respective availability of technical and, based on this, potential economic savings as regards energy end-use, as described in Chapter 2.2.

This potential was identified within the framework of the already mentioned scientific study conducted by Prognos AG[9]. The Federal German Government is holding talks on the basis of this study with the market actors regarding the systematic exploitationof the potential by the economy. The outcome of these talks will be taken into consideration in the context of the legal transposition of the Directive (cf. also Chapter 4.3).

According to Article 4(2) of the Directive on energy end-use efficiency and energy services, the Member State shall set an intermediate target for the third year of the period of application of the Directive, in other words, for the end of 2010.

The intermediate target is determined in the first approach by means of the linear interpolation of the value for 2010 from the estimated achievable final

3.1 Distribution of EU Structural Funds in Germany

Base period	Mineral coal	Brown coal	Fuel[5]	Heavy fuel oil	Light fuel oil	Gas[6]	Electric current	District heating	Other[7]	Final energy consumption total
2001 – 2005 Unit	**[PJ]**	**[PJ]**	**[PJ]**	**[PJ]**	**[PJ]**	**[PJ]**	**[PJ]**	**[PJ]**	**[PJ]**	**[PJ]**
Average annual final energy consumption overthe 5-year period	**395**	**80**	**2,675**	**95**	**1,131**	**2,522**	**1,829**	**290**	**267**	**9,284**
Of which:										
Final energy consumption by the armed forces which does not come under the area of application of the Directive on energy end-use efficiency and energy services			**23**							**23**
Final energy consumption of those undertakings and installations participating in emissions trading which does not come under the area of application of the Directive on energy end-use efficiency and energy services[8]	**No data**	**No data**	**No data**	**No data**	**No data**	**No data**	**No data**	**No data**	**No data**	**No data**
Total final energy consumption to be taken into consideration as per the Directive on energy end-use efficiency and energy services	**395**	**80**	**2,652**	**95**	**1,131**	**2,522**	**1,829**	**290**	**267**	**9,261**

Table 3-1: Average final energy consumption [PJ] for the base period 2001–2005 according to energy carriers

5 Fuels and other mineral oil products.

6 Liquefied petroleum gas, refinery gas, coke oven gas, blast furnace gas and natural gas.

7 Firewood, fuel peat, sewage sludge and rubbish.

8 Final energy consumption for the "5-year period" of those undertakings included in emissions trading. No data currently available, therefore set at 0.

9 Research project 18/2006 of the Federal Ministry of Economics and Technology entitled "Energy Savings and energy efficiency in light of current price developments", drawn up by Prognos AG.

energy savings value up to 2016 for each instrument presented in Chapter 4.2. As regards those options in terms of instruments and measures which are newly introduced or which are to be substantially developed further, the value for final energy savings which can be achieved by 2010 was estimated below the linearly interpolated value in order to take account of below-average final energy savings during the initiation phase or until such time as these instruments are developed further. According to this method, the intermediate target for 2010 is 510 PJ or 61 % of the national indicative energy savings target. Were the factor 2.5 to be used, the intermediate target would be 659 PJ.

To calculate the indicative energy savings target and the intermediate target, a different methodology was applied. The indicative energy savings target results from the average final energy consumption for the base period 2001-2005, while the intermediate target was estimated using the bottom-up approach based on the achievable final energy savings of the options available in terms of measures.
Table 3-2 offers an overview.

Calculation of intermediate values	PJ (current 1)	PJ (current 2.5)
National indicative energy savings target (9 % objective)	**833**	**1080**
Intermediate target, final energy savings by means of new instruments and options available in terms of measures up to 2010	**135**	**173**
Intermediate target, final energy saving including the estimate of energy saving quantities already achieved according to Annex I number 3 of the Directive on energy end-use efficiency and energy services	**510**	**659**

Table 3-2: National indicative energy savings target 2016 and the intermediate final energy savings target up to 2010

10 Federal Ministry of Economics and Technology study 36/2006 entitled "Statistical and methodical issues in connection with the proposal for a Directive from the European Commission on energy end-use efficiency and energy services" of the Fraunhofer Institute for Systems and Innovation Research.

11 Federal Ministry of Economics and Technology study entitled "Quantitative structuring and assessment of the German early actions within the meaning of Annex I number 3 of the Directive on energy end-use efficiency and energy services". This study is expected to be completed by June 2008.

3.4 Energy savings already achieved pursuant to Annex I number 3 of the Directive

According to Annex I number 3 of the Directive, it is permitted if, as regards the quantitative billing of the final quantities of energy savings achieved, such energy savings are included on the basis of measures which were already initiated back in 1995 (where justified, back in 1991) and which have a lasting effect. Hereafter, these measures carried out prematurely are designated "early actions".

Over the period referred to, Germany has taken extensive energy saving measures. However, as regards the arithmetically determined volume of these early actions within the meaning of the Directive on energy end-use efficiency and energy services, only rough estimates are available with a consequently larger range of variation. This is not only attributable to the fact that there are various instruments and measures where quantitative evaluations can only be supported, in principle, with rough estimated values. This lack of precision is also the result of the fact that the Directive does not contain any statements on the principal parameters which may influence the scope of the early actions (e.g. possible discounting of the service life, rebound effects, 'bandwagon effects', autonomous technical progress or overlapping measures) and the competent committee as per Article 16 of the Directive on energy end-use efficiency and energy services has still not provided any results in this regard.

In this Energy Efficiency Action Plan, a proportion of early actions of 45 % of the savings objective is assumed. With a power coefficient of 1, this corresponds to approximately 375 PJ and approximately 486 PJ with a power coefficient of 2.5. The basis for this is an initial assessment in the study compiled by the Fraunhofer Institute for Systems and Innovation Research on the orders of the Federal Ministry of Economic Affairs and Technology which was completed in 2006.[10]

Regarding the specific and detailed assessment of these energy saving quantities which have already been achieved, the Federal Ministry of Economics and Technology has commissioned a further scientific study[11], the results of which will find their way into the second Energy Efficiency Action Plan. The result of this study shall also contribute to the concretisation of future evaluation processes concerned with the assessment of final energy saving measures.

4 National Energy Efficiency Action Plan measures

The explanation of the measures given in the Energy Efficiency Action Plan is based on the structure of the "List of examples of eligible energy efficiency improvement measures" as per Annex III of the Directive on energy end-use efficiency and energy services.

4.1 Measures which are already available in the period under consideration in the Directive

In the period under consideration in the Directive, i.e. since 1995 or 1991, a broad range of measures (early actions) has been having an effect on reducing final energy consumption, these measures being carried out by the government at State, Land or municipal level, as well as by private industry. The following table in the context of this action plan therefore only represents an initial overview of the various measures undertaken.

These are measures which also produced energy saving effects during the period of validity of the Directive – without these, Germany's final energy consumption in 2016 would turn out to be understandably higher.

Private households

No.	Instrument	Description	Status	Type*	Anticipated results / comments
PHH 1	Energy Saving Order (including the Order on heat insulation and the Order on heating installations incorporated therein)	Limiting energy consumption by new buildings and redevelopment requirements in the case of existing buildings. a. Order on heat insulation (amended version of 1 January 1995). Minimum requirements pertaining to heat insulation in the case of new structures and during the renovation of existing buildings b. Order on heating installations (amended version of 4 May 1988). Lays down requirements pertaining to both new space heating installations and water heating installations as per technical regulations and standards and to the control equipment for central heating systems and obligations incumbent upon operators.	Energy Saving Order of 1 February 2002. a. and b. incorporated in the Energy Saving Order of 1 February 2002	O	Integrated approach to building physics and efficient housing technology which save energy a. Reducing the energy requirement of new and existing buildings b. Increased efficiency of heating installations as a result of reduced operating and heat transfer losses. Preference given to low temperature boilers and heat condensing boilers
PHH 2	Order on the billing of heating costs	Regulates the dividing up of heating and hot water costs between occupants of multiple dwelling units which have central heating, including a right of reduction for the user in the event of inadequate division	In force since 1981, in the version dated 20 January 1989.	O	Incentives to control the consumption of heat and hot water
PHH 3	On-site energy advice in buildings	Advice given at the property by qualified individuals, including specific proposals on energy-saving measures (heat insulation, heating installations) and the possible use of renewable energy sources, including an evaluation of the economic efficiency of all of the measures put forward. The grant amount depends on the size of the building	On-going since 1991	Fö/I	Reducing energy consumption in existing buildings Considerable potential to save energy and CO_2 (~ 25 %)
PHH 4	Kreditanstalt für Wiederaufbau – KfW – [Credit institute for reconstruction's] CO_2 building redevelopment programme	Long-term, low-interest loans for extensive redevelopment measures aimed at reducing CO_2 and saving energy in old residential buildings. An additional redemption subsidy is granted in the event of the level applicable to new builds as per the Energy Saving Order being attained.	Since February 2001	Fö	Reducing energy consumption in existing buildings. Reducing CO_2 output by 1.3 million tonnes between 2005 and 2010. This corresponds to a quarter of the CO_2 reduction which is aspired to in relation to the private household sector in the national climate protection programme

* Refer to Chapter 8.3 for an explanation of the abbreviations.

Private households (continuation)

No.	Instrument	Description	Status	Type*	Anticipated results / comments
PHH 5	KfW's CO_2 reduction programme	Long-term, low-interest loans for individual energy saving measures in the case of existing residential buildings (heat insulation, renewal of heating technology, window replacement, etc.). Use of renewable energy sources in the case of new residential buildings as well. Building or purchase of energy saving houses with an energy consumption of less than 60 kWh/m² a funded by the Kreditanstalt für Wiederaufbau	1996 to the end of 2004 (concluded)	Fö	Reducing energy consumption in existing buildings Reducing CO_2 output by 1.8 million tonnes between 1996 and 2004
PHH 6	KfW's living space modernisation programme (2003)	Financing by means of longterm, interest subsidised loans for various measures concerned with the modernisation and redevelopment of dwellings	2003 to the end of 2004 (concluded)	Fö	Reducing energy consumption in existing dwellings Reducing CO_2 output by around 0.4 million tonnes
PHH 7	KfW's programme concerned with the modernisation of living space	Financing by means of longterm, low-interest loans for various measures concerned with the modernisation and redevelopment of dwellings. Special interest subsidy for energy-related redevelopment measures (Eco plus measures: heat insulation and heating modernisation based on renewable energy sources)	On-going since 1 January 2005	Fö	Reducing energy consumption in existing dwellings Reducing CO_2 output by 0.36 million tonnes between 2005 and 2010. This corresponds to approximately 7 % of the CO_2 reduction which is aspired to in relation to the private household sector in the national climate protection programme
PHH 8	KfW's ecological building programme	Long-term, low-interest loans for the new building of KfW energy saving houses with an energy consumption of less than 60 or 40 kWh/m_2 a, passive houses and the installation of heating technology based on renewable energy sources in the case of new builds	On-going since 1 January 2005	Fö	Reducing energy consumption by means of new builds. By 30 November 2005, funding was made available for the new building of 6,800 KfW energy saving houses with an energy consumption of less than 60 kWh/m² a and 2,700 energy
PHH 9	Eco allowances within the framework of the owneroccupied housing allowance	Allowance for energy saving measures including solar heating systems, reverse cycle heating systems and heat recovery in buildings. Additional subsidies for new low energy houses	Finished at the end of 2002	Fö	Reducing energy consumption under current standards in the case of new residential buildings

* Refer to Chapter 8.3 for an explanation of the abbreviations.

No.	Instrument	Description	Status	Type*	Anticipated results / comments
PHH 10	Order on energy consumption labelling	The labelling of household appliances stipulated by the EU Directives was amended by means of the Act of 30 January 2002 and the subsequent Order on energy consumption labelling was fully transposed into German law. This applies to washing machines, tumble dryers, fridges/ freezers, dishwashers, lamps, air conditioning equipment and electric ovens. Also, the Order on maximum energy consumption of 6 December 2002. Participation by manufacturers and traders in the European "Energy+" project	On-going	O	Reducing specific energy consumption in the case of household appliances
PHH 11	Market incentive programme favouring renewable energies	Promoting the use of renewable energies, especially on the heating market (solar collectors). Started on 1 September 1999. Subsidy relating to water heating or combined water heating and space heating	On-going	Fö	Reduced usage of conventional energy sources where low temperatures are required. Replacing oil, gas and electricity with renewable energy sources
PHH 12	The "Solarwärme Plus" initiative	The "Solarwärme Plus" initiative is aimed at fitters and final customers. Funded by solar firms, Ruhrgas, the Association of heating and sanitation [Verband Heizung Sanitär] and the Ministry of the Environment. Implemented by the German Energy Agency	Running since 2002	I	Increased use of solar heating systems
PHH 13	The "Energy efficiency initiative"	Campaign designed to clarify and provide information on the use of electricity in households, especially by retails shops, regarding standby consumption, white appliances and lighting. Jointly borne by the electricity industry and the German Energy Agency with financial support from the Federal Ministry of Economics and Technology and (from 2002 to 2004) the German Environment Foundation	Running since 2002	I	High potential for energy savings, e.g. an estimated 75 % in the case of lighting. Stand-by operation accounts for around 5 % of energy consumption
PHH 14	Climate protection scheme	Far-reaching campaign directed at private consumers with practical hints on saving energy and background information on aspects of climate change. Implemented by the German Energy Agency	2002–2004	I	Supporting the national climate protection programme by raising general awareness of the programme

* Refer to Chapter 8.3 for an explanation of the abbreviations.

Private households (continuation)

No.	Instrument	Description	Status	Type*	Anticipated results / comments
PHH 15	Energy hotline and internet information platform	Call centre for information on economical use of energy in the electricity and building sectors, cogeneration and renewable energies, as well as funding programmes and reference to qualified experts, supported by an extensive website. Implemented by the German Energy Agency	Running since 2001	I	Support measure for financing programmes, primarily in the housing sector
PHH 16	Energy saving advice offered by the Federal Association of Consumers	Individual and supplierindependent advice given to private consumers on energy saving in households and in buildings, financed by the Federal Ministry of Economics and Technology	On-going	I	Annual savings of 1-2 Terawatt hours as a result of energysaving investment in the building sector and modified consumer behaviour
PHH 17	PR and advertising campaigns conducted by Federal Ministries and the German Energy Agency on energy efficiency and climate protection in the building sector	Among other things, various brochures on new energyefficient buildings and heating installations, published by the German Energy Agency and the Federal Ministry of Transport, Building and Urban Affairs	On-going	I	Dissemination of information for consumers
PHH 18	"zukunft haus" [the future of housing] campaign	Campaign aimed at providing clarification and information on energy-efficient renovation and building modernisation; is directed at owners, engineers and planning experts. Carried out by the German Energy Agency in collaboration with the Federal Ministry of Transport, Building and Urban Affairs and the private sector	On-going	I	Provision of additional information for efficient building modernisation
PHH 19	Stocks of low-energy houses	Funded by the Federal Ministry of Transport, Building and Urban Affairs within the framework of the CO_2 building redevelopment programme, the German Energy Agency (dena) is using a pilot project involving more than 140 buildings to test energy-related redevelopments to a new building standard (as per the Energy Saving Order) or better, partly using highly innovative passive house components and supported by German industry.	On-going	I/Fö	

* Refer to Chapter 8.3 for an explanation of the abbreviations.

Trade, industry and services (tertiary sector), including the public sector

No.	Instrument	Description	Status	Type*	Anticipated results / comments
GHD 20	Contracting / project financing by third parties	The Federal German Government has introduced project financing by third parties in order to implement energy saving and energy efficiency measures in the case of Federal Government properties. Previously, several Federal Länder, including Hesse, Baden-Württemberg and Berlin, had already implemented projects of this nature. Other Länder, such as Bavaria, Brandenburg, North Rhine-Westphalia, Rhineland- Palatinate and Thuringia are considering similar projects	On-going	Fö	Utilising energy saving potential in the public and private sectors by means of external financial and technical support
GHD 21	50/50 projects	To promote energy saving in schools, several Länder have implemented special incentive programmes. By far the most popular are so-called 50/50 projects. All costs saved as a result of energy saving measures are equally divided up between the corresponding school and the school authority	On-going	Fö	Proposed participation of schools and teachers in energy saving
GHD 22	Energy saving guidelines	The Federal German Government and the German Länder (or their energy agencies) have published a series of energy saving guidelines for various areas of application, including administrative buildings, hospitals, sports centres, manufacturers and technologies (heating, lighting, electricity use, etc.). Generally, these may be requested from the relevant ministries in the Länder or downloaded from the Internet	On-going	I	Dissemination of technical know-how among public and private actors
GHD 23	Stimulus programmes	Several energy agencies (Länder, municipalities, etc.) have published so-called stimulus programmes in order to facilitate the training of specialists, such as energy managers in industry, architects, factory operators, municipal officials and the like	On-going	A	Expanding the know-how of specialists regarding energysaving design, construction and operation

* Refer to Chapter 8.3 for an explanation of the abbreviations.

Trade, industry and services (tertiary sector), including the public sector (continuation)

No.	Instrument	Description	Status	Type*	Anticipated results / comments
GHD 24	Energy manager	A growing number of municipalities are either employing their own specialised energy managers for energy accounting purposes, operation and for monitoring all aspects associated with energy use in the public sector, or utilising the know-how of energy agencies	On-going	I	Determining and exploiting energy saving potential in the public sector
GHD 25	Federal Ministry buildings	Reducing energy-related CO2 emissions by 30 % up to 2008-2012 (reference year: 1990) in the case of all buildings which are the responsibility of the Federal German Government. The Federal Ministry of the Environment will reduce CO_2 emissions by 30 % by 2005	On-going	SV	Energy savings at a government level (including the purchase of green electricity). Pilot model for other administrations
GHD 26	Guidelines concerned with sustainable building on Federal Government properties	Guidelines concerned with sustainable building on Federal Government properties, including additional requirements pertaining to the energyrelated standard for new builds, rebuilds and extensions	Published in 2001	I	Fulfilling the obligation on the part of the Federal ministries to reduce CO_2 emissions on Federal Government properties. Supplementing the voluntary agreement on the part of the Federal Ministries
GHD 27	Advice given by the German Energy Agency on contracting projects on Federal Government properties in the case of 38 properties	Advice on contracting projects in the case of 38 Federal Government properties	Running since 2002	I	Promoting the introduction of energy services on Federal Government properties for the purpose of reducing energy consumption
GHD 28	Programme concerned with the energy-related redevelopment of Federal buildings	The programme cofinances structural and plant-related measures in existing Federal buildings. In terms of operating buildings, these measures lead to energy savings and reductions in CO_2 output and are clearly above the minimum requirements set out in the Energy Saving Order	Running since 2006	Fö	Saving energy, reducing energy costs and CO_2 emissions
GHD 29	Operational monitoring of technical installations on Federal Government properties	By means of the operational monitoring of technical installations, the application and observance of the principles relating to management are examined and technical advice for consumers guaranteed	On-going	I	Ensuring the economical and energy-efficient operation of Federal Government properties, reducing energy consumption and CO_2 emissions

* Refer to Chapter 8.3 for an explanation of the abbreviations.

Industry

No.	Instrument	Description	Status	Type*	Anticipated results / comments
IND 30	Energy Management Act	Energy Management Act of 24 April 1998, as amended by the version dated 12 July 2005. Act on the supply of gas and electricity. Provisions concerning economical and efficient dealings with energy	In force	O	Liberalisation of the electricity and gas markets, cost-effective energy production
IND 31	Voluntary agreement	1995 - first voluntary agreement signed by 14 sectors of industry aimed at increasing energy savings and reducing CO_2. These sectors account for two thirds of industrial energy consumption. The results are assessed and monitored by an independent research institution	Updated	SV	Aim: a reduction in specific CO_2 emissions and specific energy consumption by up to 20 % between 1987 and 2005
IND 32	"Declaration on the prevention of global warming"	In March 1996, German industry updated the voluntary agreement within the framework of their "Declaration on the prevention of global warming". This agreement now covers more than 70 % of industrial energy consumption and 99 % of public electricity generation	Updated	SV	Aim: a reduction in specific CO_2 emissions by 20 % between 1990 and 2005. The CO_2 reduction target was attained by most sectors of industry in 2000 (most recent monitoring report)
IND 33	Voluntary agreement on climate protection	A further update to the Voluntary agreement on climate protection was adopted in November 2000. It contains the commitment to promote the development of combined heat and power appliances (followed by obligations incumbent upon individual branches of industry)	In force	SV	Compared with the 1990 reduction in specific CO_2 emissions, by 28 % up to 2005. Compared with the 1990 reduction in all greenhouse gas emissions cited in the Kyoto protocol, by 35 % up to 2012
IND 34	Supplementing the Voluntary agreement on climate protection	Supplementing the agreement of November 2000 by the "Agreement concluded between the government of the Federal Republic of Germany and the German economy on reducing CO2 emissions and promoting cogeneration"	In force	SV	A reduction in emissions by the energy industry totalling up to 45 million tonnes of CO_2 per year by the year 2010 CO_2 reduction targets which were adopted in the Act on combined heat and power generation
IND 35	Act on combined heat and power generation	Dated 19 March 2002. Act concerned with preserving, modernising and developing cogeneration	In force	O	Reduction in CO_2 emissions of 10 million tonnes by 2005 and 23 million tonnes by 2010 Safeguarding the current crop of combined heat and power appliances and increased utilisation of cogeneration

* Refer to Chapter 8.3 for an explanation of the abbreviations.

Industry (continuation)

No.	Instrument	Description	Status	Type*	Anticipated results / comments
IND 36	Order on small- and medium-sized firing installations	Order on small- and mediumsized firing installations (1st Federal Pollution Control Order) dated 14 March 1997, updated on 27 July 2001. Limits the emissions of air pollutants in the case of small-scale firing installations.[12] In addition, this Order sets out the requirement pertaining to waste gas losses in the case of new gas-operated heating systems. Waste gas losses in the case of existing plants must be driven down to these values following a transitional period.	In force	O	Reduced heat losses as a result of continuous servicing and checks and replacing obsolete systems
IND 37	KfW's environmental programme	Supplements the abovementioned voluntary agreements by means of lowinterest loans to SMEs for investment in energy saving measures. Makes capital available for investment in conservation measures. It is operated by the Kreditanstalt für Wiederaufbau and may be used as a supplement to the ERP Environmental Protection and Energy Saving Programme. Up to 100 % of the investment costs relating to energy saving measures may be financed by combining loans at reduced rates of interest from the ERP Environmental Protection and Energy Saving Programme and KfW's environmental programme	On-going	Fö	Incentives for energy saving investment in the case of SMEs
IND 38	ERP Environmental Protection and Energy Saving Programme	Promotes, inter alia, energysaving measures, efficient dealings with energy and the use of renewable energy sources by awarding lowinterest loans to undertakings	On-going	Fö	Incentives for energy saving investment in the case of undertakings
IND 39	Programme promoting demonstration projects from the Federal Ministry of the Environment	Promotes the first large-scale implementation of new techniques or processes involving energy conservation in Germany	On-going	Fö	Incentives for pilot energy saving investment in the case of undertakings
IND 40	Demand-side management projects	German electricity utilities support a range of demandside management projects. These projects primarily focus on advising consumers on energy-saving measures	On-going	I	Informing final consumers of electricity and gas on energysaving installations and energysaving behaviour

12 Heat output less than 1 MW with solid fuels, less than 5 MW with liquid fuels and less than 10 MW with gaseous fuels.

* Refer to Chapter 8.3 for an explanation of the abbreviations.

No.	Instrument	Description	Status	Type*	Anticipated results / comments
IND 41	German Energy Agency compressed air campaign	Information campaign on energy and the cost-effective provision of compressed air in the industrial and service sectors. Implemented by the German Energy Agency, the Association of machine manufacturers and the Fraunhofer Institute.	Ran until the end of 2004	I	Potential technical savings of 48 % and potential economic savings of 30-35 %
IND 42	German Energy Agency compressed air campaign	Information and advice campaign on efficient electricity usage in trade and industry, especially SMEs. Implemented by the German Energy Agency with various partner institutions (German Engineering Federation, Dt. Kupferinstitut, vehicle and pump manufacturers)	Follow-up to the "Compressed air" project which finished at the end of 2004. Running in conjunction with the "Energy Efficiency Initiative" umbrella campaign funded by the German Energy Agency: 2005–2008	I	Considerable technical and economic savings potential throughout the entire electrical main engine system, including pumps, ventilators, etc.

* Refer to Chapter 8.3 for an explanation of the abbreviations.

Transport[13]

No.	Instrument	Description	Status	Type*	Anticipated results / comments
V 43	Road Tax Act	Reduced road tax rates for a limited time for private cars with particularly low CO_2 emissions since 1997	In force	F	Incentive to buy private cars which have low exhaust gas emissions and which consume less fuel
V 44	Voluntary agreement	In a voluntary agreement concluded between the German Government and the motor vehicle industry, the latter entered into a voluntary agreement to reduce fuel consumption in the case of newly licensed cars manufactured in Germany between 1990 and 2005 by 25 %. Additionally: Further development of the pledge by the European Automobile Manufacturers Association	On-going	SV	– 4 to 7 million tonnes of CO_2 anticipated for 2005 (compared to 1990)
V 45	Act on the introduction of tolls for heavy commercial vehicles using certain stretches of Federal motorways	Dated 12 April 2002. Introduction of the new toll system based on stretches of road and exhaust gas emissions since 1 January 2005	In force	O/F	Changing the means of transport, switching from road to rail - 1 million tonnes of CO_2 anticipated for 2008/2012
V 46	Regular exhaust gas checks	Compulsory since 1993 for all types of motor vehicle	In force	O	Lower energy consumption and reduced exhaust gases
V 47	The Municipal Transport Financing Act and the Act on regionalisation	The Municipal Transport Financing Act and the Act on regionalisation contain provisions on financial assistance for investment which is directed at improving traffic and passenger transport in regions, towns and municipalities	In force	O/F	Change in behaviour in favour of local public transport
V 48	Future investment programme	The Federal German Government decided to invest an additional € 3.1 billion in railway infrastructure within the framework of the Future investment programme in order to reduce greenhouse gas emissions and energy consumption in the transport sector	In force	F	Achieving greater acceptance on the part of potential passengers as a result of improved comfort and better connections
V 49	The Federal German Government's fuel strategy	The Federal German Government's fuel strategy: ► substituting biofuels for conventional fuels ► innovative drive technologies and increased efficiency	On-going	F	Promoting alternative fuels. 5 million tonnes anticipated in 2008-2012

[13] The following section only deals with the main measures in the transport sector. Refer to Chapter 2.2.3 (Transport) of the National Climate Protection Programme 2005 for a more detailed overview.

* Refer to Chapter 8.3 for an explanation of the abbreviations.

No.	Instrument	Description	Status	Type*	Anticipated results / comments
V 50	Consolidating the "Neues Fahren" [New driving techniques] campaign	In collaboration with the automobile industry and motor vehicle and environmental associations, the Federal German Government will further continue with the abovementioned campaign in relation to fuel-saving driving techniques. The requirements pertaining to energy-efficient driving techniques as contained in the driving school syllabuses were raised	On-going	A	Lowering fuel consumption through modified driving behaviour. 3 million tonnes anticipated in 2008-2012
V 51	Order on energy consumption labelling in relation to private cars	Pursuant to EU Directive 1999/94/EC, standard labelling of the fuel consumption and the CO_2 emissions of new private cars exhibited in showrooms	In force	O/I	Further reduction in the demand for fuel in the transport sector as a result of buying new vehicles with specifically low consumption (Shell: average consumption of 3.7 l/km may be achieved by 2020) Publishing information on consumption and CO_2 emissions of all new vehicles on the German market on an annual basis
V 52	Fiscal consideration of work-related travel expenses	Commuting allowance irrespective of the mode of transport (as of 1 January 2007, excluding the deduction of travel expenses as expenses incurred in acquiring or maintaining income; only the hardship provision for longdistance commuters and a special regulation for disabled persons)	In force (as of 1 January 2007, still only applicable to long-distance commuters travelling in excess of 20 km	F	Reducing the number of journeys

* Refer to Chapter 8.3 for an explanation of the abbreviations.

Cross-sectoral

No.	Instrument	Description	Status	Type*	Anticipated results / comments
SÜ 53	Energy Saving Act	Dated 22 July 1976. Most recent amendment - 1 September 2005. Act concerned with energy saving and energy efficiency in buildings	In force	O	Framework Act on energy saving
SÜ 54	Energy Saving Order – excluding private households	Dated 21 November 2001. Most recent amendment - 2006. Combines requirements pertaining to the heat insulation of buildings with provisions concerning heating installations and introduces new maximum values relating to the annual primary energy requirement in case of heating. Demands the replacement of older boilers and the issuing of an "energy certificate" for new buildings	In force since 1 February 2002	O	Reducing the energy requirement (heating, air conditioning equipment, hot water) in the case of new buildings by 25-30 % In the region of 2 million boilers installed prior to October 78 must be replaced Maximum annual heating energy requirement in the case of new buildings: approx. 70 kWh/m² (formerly 100 kWh/m²)
SÜ 55	Energy requirement certificate for new buildings	As per Section 13 of the Energy Saving Order. Administrative provision concerned with proving the energy requirement of buildings	In force	O	Implementation of an energy certificate in the case of new buildings for property developers and owners
SÜ 56	Ecotax	Energy taxation within the framework of ecological tax reform: ▸ raising taxes on mineral oils and gases ▸ imposing an electricity tax ▸ exempting cogeneration fuels from tax ▸ fiscal equality of gas and steam turbine power stations ▸ exempting biofuels from tax (since 2007, this has largely been replaced by a biofuel quota) ▸ relief for gases in circulation	5th phase in force since 1 January 2003	F	Raises energy prices and renders energy saving measures economically productive. Reduces labour costs by using social security revenue (lowering pension scheme contributions) and environmental programmes 20 million tonne reduction in CO_2 anticipated between 1990 and 2003, which will rise to 24 million tonnes by 2010
SÜ 57	Fees Order for architects and engineers	The 5th amendment (in force since 1 January 1996) in the version dated 1 January 2002 makes provision for incentives for designers on a fee-paying basis to promote the efficient use of energy in buildings	In force	O	Incentives for designers to choose the most efficient instead of the most expensive technical solution
SÜ 58	The "Environmental sign" (Blue Angel)	Introduced in 1977 for the purpose of labelling energy-saving and environmentally-friendly products. Similar to the European ecolabel.	On-going	I	Marketing incentive for manufacturers to use verifiable and recognised standards

* Refer to Chapter 8.3 for an explanation of the abbreviations.

No.	Instrument	Description	Status	Type*	Anticipated results / comments
SÜ 59	Energy label for information and consumer electronics	Membership of the European Group for Energy Efficient Appliances (GEEA) for the voluntary labelling of such appliances (www.energielabel.de)	On-going	I	Potential savings of up to 50 %
SÜ 60	Funding programmes in the German Länder	Various funding programmes in the German Länder support the efficient use of energy. The Federal Ministry of Economics and Technology maintains an Internet database of national and European funding programmes	On-going	Fö/I	Incentives for investors to overcome financial barriers, in several cases, making it easier to bring innovative technologies on to the market
SÜ 61	Investigating efficient energy dealings	National financing programmes of the Ministry of the Economy and the Ministry of Research. Energy-related application research in the building sector initiated by the Federal Ministry of Transport, Building and Urban Affairs and the research grant entitled "Zukunft Bau" [the future of building] from the Federal Ministry of Transport, Building and Urban Affairs	On-going	For	Supporting the development of new energy-saving technologies
SÜ 62	Energy Agencies	Set up at a national (the German Energy Agency), Land and local level. Several of these are cofinanced in part by the EU Commission's SAVE programme	Running since the late 1980s	I	Supporting energy planning, carrying out public awareness campaigns, advising private investors and SMEs, drawing up training programmes, etc.
SÜ 63	Energy Star	Promoting the "Energy Star" as a voluntary mark for office equipment based on an EU agreement	On-going	I	Reducing the energy consumed by office equipment
SÜ 64	5th energy research programme of the Federal German Government entitled "Innovation and new energy technologies"	Promoting research and development in the energy sector (power station technologies, renewable energies, energy-optimised building design, biomass). The focus is on "energy efficiency" and "renewable energies"	In force since January 2006	For	New approaches and technological improvements in energy production andenergy use helped to achieve a quicker breakthrough in terms of improved cooperation between the economy, science and politics in the research and development of innovative energy technologies
SÜ 65	Programme entitled "The climate is seeking protection"	Campaign aimed at private consumers through interactive, virtual consultancy (energy-related building redevelopment, including, for instance, heating pump/fridge checks). Transposition of Article 6 of the Framework Climate Convention to provide information and motivation on countermeasures relating to climate change), carried out by co2online	2004–	I	Contribution to achieving the climate protection targets in the household, trade, industry and service sectors

* Refer to Chapter 8.3 for an explanation of the abbreviations.

4.2 Additional, State induced measures and those to be extended for achieving the indicative energy savings target

Where energy savings as per the Directive on energy end-use efficiency and energy services can already be calculated precisely, the corresponding points were included in the following list of measures.

With some of the measures mentioned below, these hitherto involve options in terms of actions whose precise implementation in coordinated packages of measures is checked systematically. Here, generally speaking, priority is also given to private industry initiatives (see Chapter 4.3) over government activities and the basic principles and framework conditions demonstrated in Chapter 1.

By specifying target value margins for the individual measures and minimum and maximum values in the overall view of sector target values, the projection is taken into account. The result each time is a target corridor.

4.2.1 Overview of instruments and measures

	Indicative savings target				Intermediate target			
Sector description	**Final energy saving 2016 [PJ] (Power coefficient: 1)**		**Final energy saving 2016 [PJ] (Power coefficient: 2.5)**		**Final energy saving 2010 [PJ] (Power coefficient: 1)**		**Final energy saving 2010 [PJ] (Power coefficient: 2.5)**	
	min.	**max.**	**min.**	**max.**	**min.**	**max.**	**min.**	**max.**
Private households (residential sector)	198	335	243	452	53	93	69	125
Trade, industry and services								
Trade, industry and services – public sector	7	9	15	19	2	3	5	7
Trade, industry and services – general	37	55	61	96	7	11	13	22
Industry	45	64	81	118	10	15	21	31
Transport sector	159	231	159	231	46	67	46	67
Cross-sectoral (measures)	54	66	60	75	16	22	18	25
Cross-sectoral (measures)	57	70	63	79	17	24	19	27
Total for all sectors	**503**	**764**	**622**	**995**	**135**	**213**	**173**	**279**
Early Actions	375	375	486	486	375	375	486	486
Total (sectors + Early Actions)	**878**	**1,139**	**1,108**	**1,481**	**510**	**588**	**659**	**765**
Target value comparison		**833**		**1,080**		**510**		**659**

Table 4-1: Table concerned with the contribution of the individual sectors to the Directive on energy end-use efficiency and energy services - achieving targets; values rounded off.

Private households					Anticipated final energy savings as a result of the measures (min. [PJ] – max. [PJ] 2016)				Intermediate target - final energy savings as a result of the measures (min. [PJ] – max. [PJ] 2010)				
					Power coefficient 1		Power coefficient 2.5		Power coefficient 1		Power coefficient 2.5		
No.	Instrument	Measures	Status	Type	Total	of which electricity	Total	of which electricity	Total	of which electricity	Total	of which electricity	Evaluation
1	CO_2 building redevelopment programme	a) Promoting the redevelopment of heating in existing residential buildings. The amount of funding depends on the standard of redevelopment b) Special funding for replacing direct electrical central heating systems with fossil fuel heating systems, reverse cycle heating systems and other regenerative energies	Implemented, further development New / planned	Fö	120–160	20–40	150–240	50–100	30–45	5–10	27.5–60	12.5–25	Bottom up
2	KfW funding programme concerned with ecological building	Promoting the new energy-efficient building of passive houses and energy saving houses with an energy consumption of less than 60 or 40 kWh/m² a	Developed further	Fö	5–15	0	5–15	0	1–3	0	1–3	0	Bottom up
3	Programme for introducing new, highly-efficient household appliances to the market	Initiation and implementation of a market launch programme for the acquisition of top energy-efficient household appliances	New / planned	Fö	10–15	10–15	25–38	25–38	2–4	2–4	5–10	5–10	Bottom up
4	European Top Runner Strategy	a) Differentiating energy consumption labelling for energyoperated products (Order on the labelling of household appliances with an indication of the consumption of energy and other vital resources) b) Best appliance labelling (e.g. EU Energy Star Programme concerned with office equipment c) Minimum energy efficiency standards for energy-operated products, especially as regards lighting and standby consumption d) Electricity consumption data for products, appliances and installations	New / planned	O	8–15	8–15	20–37.5	20–37.5	2–4	2–4	5 – 10	5–10	Top down

4.2.2 Private households (continuation)

Private households					Anticipated final energy savings as a result of the measures (min. [PJ] – max. [PJ] 2016)				Intermediate target - final energy savings as a result of the measures (min. [PJ] – max. [PJ] 2010)				
					Power coefficient 1		Power coefficient 2.5		Power coefficient 1		Power coefficient 2.5		
No.	Instrument	Measures	Status	Type	Total	of which electricity	Total	of which electricity	Total	of which electricity	Total	of which electricity	Evaluation
5	On-site energy advice in buildings	Qualified individual advice at the property with specific proposals on energy-saving measures	Implemented, further development	Fö	25–50	3 –5	29.5–57.5	7.5–12.5	8–17	1–2	9.5–20	2.5–5	Bottom up
6	Energy advice for private consumers from the Federation of German Consumer Organisations	Individual and supplier-independent advice given to private consumers on saving energy in households and in buildings	Implemented, continuation and further development	Fö	30–60	2–3	33–64.5	5 – 7.5	10–20	0.7–1.0	11.1–21.5	1.8–2.5	Bottom up
7	Continuation of the energy efficiency initiative of the German Energy Agency	a) Integrated and effective public relations communications measures (information, advice, motivation), including the construction and ongoing further development of a central information platform with access to all information, standards and aids for the efficient use of electricity in the continual and actionoriented addressing of multipliers and final customers b) Improving the amount of information available on the efficient use of electricity c) Motivation to implement energy efficiency measures (buying and utilisation behaviour) d) Consistent networking of the market actors and the qualification of multipliers	Further development	I									
	Total				**198–335**	**43–78**	**243–452**	**107.5–195**	**53–93**	**10.7–21**	**69.1–124,5**	**26.8–52.5**	

Public sector Trade, industry and services: Public sector					Anticipated final energy savings as a result of the measures (min. [PJ] – max. [PJ] 2016)				Intermediate target - final energy savings as a result of the measures (min. [PJ] – max. [PJ] 2010)				
					Power coefficient 1		Power coefficient 2.5		Power coefficient 1		Power coefficient 2.5		
No.	Instrument	Measures	Status	Type	Total	of which electricity	Total	of which electricity	Total	of which electricity	Total	of which electricity	Evaluation
8	The redevelopment of buildings in the public sector	a) The use of funds from the CO_2 building redevelopment programme in the redevelopment of public buildings (buildings in Länder, municipalities, etc.) b) Continuation of the programme on the energy-related redevelopment of Federal buildings c) Operational monitoring of technical installations on Federal Government properties. Measures: Implementation of an active management policy with the aim of obtaining potential savings in the region of 10 % by means of low-investment measures	Implemented, further development	Fö									Bottom up
9	Contracting on Federal Government properties	(Further) development of the on-going project with the aim of substantially strengthening the utilisation of the energy efficiency potential available on Federal Government properties	Implemented	Fö	2–4	1–2	3.5–7	2.5–5	0.5–1	0.2–0.4	0.8–1.6	0.5–1	Bottom up
10	Modernising outdoor lighting facilities	a) Modernising street lighting from the point of view of energy consumption	New / planned	Fö/I	3	3	7.5	7.5	1	1	2.5	2.5	Bottom up
		b) Modernising traffic lights from the point of view of energy consumption			1.3	1.3	3.25	3.25	0.4	0.4	1	1	
11	Mission E	Energy efficiency campaign by the German armed forces	Implemented, further development	I	0.5–1	0.2–0.3	0.8–1.5	0.5–0.8	0.5–1	0.2–0.3	0.8–1.5	0.5–0.8	
	Total				**6.8–9.3**	**5.5–6.6**	**15.1–19.3**	**13.8–17.6**	**2.4–3.4**	**1.8–2.1**	**5.1–6.6**	**4.5–5.3**	

Tertiary sector - general Trade, industry and services - general					Anticipated final energy savings as a result of the measures (min. [PJ] – max. [PJ] 2016)				Intermediate target - final energy savings as a result of the measures (min. [PJ] – max. [PJ] 2010)				
					Power coefficient 1		Power coefficient 2.5		Power coefficient 1		Power coefficient 2.5		
No.	Instrument	Measures	Status	Type	Total	of which electricity	Total	of which electricity	Total	of which electricity	Total	of which electricity	Evaluation
12	Special fund concerned with energy efficiency in SMEs in the trade, industry and service sectors	a) Advising on potential energy savings b) Financial support in the form of investment for exploiting the hidden potential by means of low-interest loans	New / planned	Fö	29–40	8–12	41–58	20–30	4.8–7.2	2–3	7.8–11.7	5–7.5	Bottom up
13	European Top Runner Strategy	a) Differentiating energy consumption labelling for energyoperated products b) Best appliance labelling (e.g. EU Energy Star Programme concerned with office equipment) c) Minimum energy efficiency standards for energy-operated products, especially as regards lighting and standby consumption d) Electricity consumption data for products, appliances and installations	New / planned	O	8–15	8–15	20–37.5	20–37.5	2–4	2–4	5–10	5–10	Top down
14	Contracting and cogeneration campaign	Implementation of a campaign to establish contracting as an energy-efficient service and to consolidate the use of combined heat and power appliances	New / planned	I									
15	Continuation of the energy efficiency initiative of the German Energy Agency		Further development	I									
	Total (rounded off)				**37–55**	**16–27**	**61–95.5**	**40–67.5**	**7–11**	**4–7**	**13–22**	**10–17.5**	

Industry					Anticipated final energy savings as a result of the measures (min. [PJ] – max. [PJ] 2016)				Intermediate target - final energy savings as a result of the measures (min. [PJ] – max. [PJ] 2010)				
					Power coefficient 1		Power coefficient 2.5		Power coefficient 1		Power coefficient 2.5		
No.	Instrument	Measures	Status	Type	Total	of which electricity	Total	of which electricity	Total	of which electricity	Total	of which electricity	Evaluation
16	Contracting in relation to compressed air	Standardisation and extension of contracting models for the provision of compressed air by specialist suppliers	Further development	S	5–8	5–8	12.5–20	12.5–20	1.5–2.5	1.5–2.5	3.8–6.25	3.8–6.25	Bottom up
17	Contracting in relation to lighting	Standardisation and extension of contracting models for lighting by specialist suppliers	Further development	S	2–3	2–3	5–7.5	5–7.5	0.6–0.75	0.6–0.75	1.5–2.3	1.5–2.3	Bottom up
18	Contracting in relation to heating, ventilation and air conditioning	Standardisation and extension of contracting models for heating, ventilation and air conditioning by specialist suppliers	Further development	S	3–5	3–5	7.5–12.5	7.5–12.5	1–1.5	1–1.5	2.5–3.75	2.5–3.75	Bottom up
19	Special fund concerned with energy efficiency in SMEs in the industrial sector	a) Advising on potential energy savings b) Financial support in the form of investment for exploiting the hidden potential by means of low-interest loans	New / planned	Fö	29–40	8–12	41–58	20–30	4.8–7.2	2–3	7.8–10.7	5–7.5	Bottom up
20	European Top Runner Strategy	a) Differentiating energy consumption labelling for energyoperated products b) Best appliance labelling (e.g. EU Energy Star Programme concerned with office equipment c) Minimum energy efficiency standards for energy-operated products (eco-design), especially as regards lighting and standby consumption	New / planned	O	6–8	6–8	15–20	15–20	2–3	2–3	5–7.5	5–7.5	Top down

Industry					Anticipated final energy savings as a result of the measures (min. [PJ] – max. [PJ] 2016)				Intermediate target - final energy savings as a result of the measures (min. [PJ] – max. [PJ] 2010)				
					Power coefficient 1		Power coefficient 2.5		Power coefficient 1		Power coefficient 2.5		
No.	Instrument	Measures	Status	Type	Total	of which electricity	Total	of which electricity	Total	of which electricity	Total	of which electricity	Evaluation
21	Contracting and cogeneration campaign	Implementation of a campaign to establish contracting as an energy-efficient service and to consolidate the use of combined heat and power appliances	New / planned	I									
22	Continuation of the energy efficiency initiative of the German Energy Agency	Central information platform with access to all information, standards and aids for the efficient application of energy with a view to continually informing multipliers and final customers	Further development	I									
	Total (rounded off)				**45–64**	**24–36**	**81–118**	**60–90**	**10–15**	**7–11**	**21–30.5**	**18–27**	

Transport					Anticipated final energy savings as a result of the measures (min. [PJ] – max. [PJ] 2016)				Intermediate target - final energy savings as a result of the measures (min. [PJ] – max. [PJ] 2010)				
					Power coefficient 1		Power coefficient 2.5		Power coefficient 1		Power coefficient 2.5		
No.	Instrument	Measures	Status	Type	Total	of which electricity	Total	of which electricity	Total	of which electricity	Total	of which electricity	Evaluation
23	Promoting mobility, communication and city logistics	a) Coordinating the supply and demand of private, public and industrial mobility b) Transferring mobility to efficient carriers c) Improving mobility communication, especially as regards operational mobility management	Implemented, continuation and further development	Fö	4 –6	0	4 –6	0	1–2	0	1–2	0	Bottom up
24	Accelerating technical development	Funding programme for optimising conventional drives and fuels of and for private cars and heavy goods vehicles	Further development	Fö	100–120	0	100–120	0	30–40	0	30–40	0	Bottom up
25	Campaign entitled “Energy efficiency and mobility”	a) Greater implementation and notification of training for car drivers in relation to fuel-saving driving techniques	New / planned	I	20–65	0	20–65	0	5–10	0	5–10	0	Bottom up
		b) Accelerated information and motivational measures for increasing the demand for low rolling-resistance tyres and oils	New / planned	I									
26	Improving the infrastructure for using bicycles	Funding programme for the development, maintenance and new construction of cycle paths and networks, the provision of opportunities to hire vehicles and parking areas	Weiterentwickelt	Fö	35–40	0	35–40	0	10–15	0	10–15	0	Top down
27	Adjusting road tax	Including CO2 emissions in the basis of assessment	New / planned	F									
	Total				**159–231**		**159–231**		**46–67**		**46–67**		

14 At all levels, the Federal German Government is actively supporting the competition-neutral inclusion of air traffic in the European emissions trading scheme, as well as the realisation of the Single European Sky. The aim of these measures is to reduce fuel consumption and limit the impact of air traffic on the environment. By means of the freight traffic and logistics master plan, the transport of freight and logistics is to be further improved in Germany, resulting in an increase in the energy efficiency of the transport system.

Cross-sectoral (measures)					Anticipated final energy savings as a result of the measures (min. [PJ] – max. [PJ] 2016)				Intermediate target - final energy savings as a result of the measures (min. [PJ] – max. [PJ] 2010)				
					Power coefficient 1		Power coefficient 2.5		Power coefficient 1		Power coefficient 2.5		
No.	Instrument	Measures	Status	Type	Total	of which electricity	Total	of which electricity	Total	of which electricity	Total	of which electricity	Evaluation
28	Tightening up the Energy Saving Order	Tightening up the level of requirements and extending the obligations concerned with retrofitting, as well as strengthening implementation	Implemented, continuation and further development	O	50–60	0	50–60	0	15–20	0	15–20	0	Bottom up
29	Energy certificate in respect of the building stock	Phased introduction of an energy certificate in the case of letting or selling, including recommendations for modernisation	New as of 1 July 2008	O									
30	"E-Energy" and "Smart Metering" technological competition	Testing and demonstrating integrated concepts for ICT-based energy systems, in particular, the application of Smart Metering technology with a view to reducing energy consumption	New / planned	S	4–6	4–6	10–15	10–15	1–2	1–2	2.5–5	2.5–5	Bottom up
31	Improving and expanding training and further education	a) Systematic integration of energy efficiency know-how in college/ university and vocational training	Further development	A									
		b) The development of training modules on the subjects of energy efficiency in relation to training and further education											
		c) Extending further education offers											
		d) Supplementing with broadly acting marketing campaigns and training and further education measures											

Cross-sectoral (measures)					Anticipated final energy savings as a result of the measures (min. [PJ] – max. [PJ] 2016)				Intermediate target - final energy savings as a result of the measures (min. [PJ] – max. [PJ] 2010)				
					Power coefficient 1		Power coefficient 2.5		Power coefficient 1		Power coefficient 2.5		
No.	Instrument	Measures	Status	Type	Total	of which electricity	Total	of which electricity	Total	of which electricity	Total	of which electricity	Evaluation
32	Extending energy research in the area of raising energy efficiency	The Federal Ministry of Economics and Technology is laying down new points of emphasis in energy research in the area of energyoptimised building: a) “Energy-efficient school” (energyrelated redevelopment of school buildings. The aim is the 3-litre school up to the Plus Energy school) b) “Energy-efficient town” (raising energy efficiency in towns and municipalities by integrating and networking new energy technologies in the supply engineering and building services engineering sectors) c) Continuation of the energy-related application research in the building sector initiated by the Federal Ministry of Transport, Building and Urban Affairs	New / planned	For	2.5–3.5	0	2.5–3.5	0	1–1.5	0	1–1.5	0	Bottom up
	Total				**56.5–69.5**	**4–6**	**62.5–78.5**	**10–15**	**17–23.5**	**1–2**	**18.5–26.5**	**2.5–5**	

4.3 Additional measures by industry

According to Article 6(2) of the Directive on energy end-use efficiency and energy services, Member States

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).

The Federal German Government emphasises the fundamental ideas of the Directive in terms of establishing viable energy service markets and anticipates that trade and industry will make a substantial contribution to achieving the national indicative energy savings target. Talks between the Federal Ministry of Economics and Technology and those branches of industry and associations covered by the Directive have shown that numerous approaches exist within trade and industry for transposing Article 6 of the Directive on energy end-use efficiency and energy services.

The Federal German Government is anticipating specific contributions on the part of trade and industry to increase final energy savings in the following areas in particular:

- Providing final consumers of networked energies, especially electricity, with intelligent meters within the meaning of Article 13 of the Directive.

- Specific offers of advice from suppliers of final energy sources in the heating market to final consumers.

- Information available at every petrol station for car drivers regarding fuel- saving measures (for instance, by means of consumer campaigns, reference to corresponding offers of advice and Internet databases on receipts, etc.).

The Federal German Government makes reference to the fact that all measures carried out within the meaning of the Directive must be subject to an indepen-dent evaluation and will accordingly ensure that they count towards the national indicative energy savings target.

The activities undertaken by trade and industry in achieving verifiable energy savings are collated and assessed by the responsible agency (agencies) still to be appointed as per Article 4(1)(4). In the course of the first three-year period, the Federal German Government will evaluate the voluntary activities announced.

Should it come to light in the context of evaluating the measures that additional legislative requirements are needed in order to transpose the requirements set out in Article 6(2) of the Directive on energy end-use efficiency and energy services, these will be taken by the Federal German Government. In this regard, the German Government will also consider the results of the audit conducted by the Commission as per Article 4(2)(5) (further development of the market concept of energy efficiency improvement by means of white certificates).

5 Evaluating the National Energy Efficiency Action Plan measures

For the purpose of measuring whether targets are achieved, the Directive on energy end-use efficiency and energy services authorises Top-down and Bottom-up evaluation methods. These may be classified as follows according to their degree of detail.[15]

1. The most detailed approach consists of a **separate Bottom-up data collection and analysis relating to energy savings**, in which connection the collection of data can be based on both measurements and expert assessments with and without inspection. The advantage of this method is that many inherent, exogenous factors are ignored and consequently, in theory, a greater degree of accuracy can be achieved. In practice, above all, determination of the base line for measuring final energy savings plays an important role in the accuracy of the programme. Here too, especially in the case of smaller savings, simplifications must be effected during the assessment for each measure. The disadvantage of this measure is the possible high costs associated with such a system (the European Parliament is proposing an upper limit of 2 % of the costs of the measures). To limit costs, the data should be collected on a random basis.

2. A **combined Top-down/Bottom-up approach** which separates all exogenous factors statistically or on the basis of models. The advantage of this method is improved meaningfulness at comparatively low additional costs. The disadvantage is that acceptance of the data and the methodology has to be guaranteed first. One variant of this approach is to permit varying sharpness of the dispersal in a flexible manner depending on the sector and data situation.

3. A **refined Top-down approach** is directed at separating as many exogenous factors as possible. To this end, secondary statistics and statistical checks are used. The advantage of this method is improved meaningfulness at comparatively low additional costs. The disadvantage is that acceptance of the data and the methodology has to be guaranteed first.

4. A **simple Top-down approach** to the measurement using indicators which is essentially based on official primary statistics which are available and therefore has the highest level of aggregation. The advantage of this approach is that no additional data has to be collected and that the data is officially accepted. The disadvantage is the poor separability of exogenous factors.

The indicative volume of savings shall be achieved by targeted measures of those actors obligated by the Directive. Annex IV of the Directive describes the fact that the final energy savings achieved through these measures are to be proven in a "harmonised calculation model which uses a combination of top-down and bottom-up calculation methods". However, this method is not yet currently available since the Committee appointed to this end as per Article 16 has not hitherto come up with any guideline or recommendation.

It follows from further provisions in Annex IV that in future, where possible, it is to be proven on a larger scale by means of Bottom-up methods in what respect, and to what extent, the respective measure had resulted in the final energy savings in question. With subsequent monitoring on the transposition of the Directive, this proof as per Annex IV number 1.1 is to include measures which relate to 20 to 30 % of the final inland energy consumption. This proportion shall be increased subsequently.

These statistical and methodical considerations do not have any direct impact for the time being on the first Energy Efficiency Action Plan and its savings target. With a view to preparing a future evaluation, a check will be carried out in relation to every instrument described in Chapter 4 and the associated measures and comments provided each time as to which method may be used to determine the final energy saving achieved (refer to the descriptions regarding evaluation on the sheets of measures in chapter 8.1).

15 Federal Ministry of Economics and Technology research project 36/2005 entitled "Statistical and methodical issues in connection with the proposal for a Directive from the European Commission on energy end-use efficiency and energy services" of the Fraunhofer Institute for Systems and Innovation Research, Karlsruhe 2006.

6
Specific measures according to the Directive

6.1 Energy end-use efficiency in the public sector (Article 5 of the Directive on energy end-use efficiency and energy services)

As per Article 5(1), Member States shall ensure "that the public sector fulfils an exemplary role in the context of this Directive". To this end, at least two measures are to be chosen from the list given in Annex VI to the Directive.

6.1.1 Energy end-use efficiency in the public sector - general

It is incumbent on the public sector to play an exemplary role in the promotion of energy efficiency. The Federal German Government is therefore obliged, for instance, to reduce the output of CO_2 emissions in its area of responsibility by 30 % by 2008–2012, compared with 1990 levels. This shall largely be achieved by improving energy efficiency.

The basis for improving energy efficiency in the building sector is the Energy Saving Order. Moreover, by means of its "120 million programme concerned with the energy-related redevelopment of Federal buildings", the Federal German Government has created the financial conditions to be able to implement energy saving measures over and above the standard laid down in the Energy Saving Order. Contracting is also applied for the third-party financing of such measures (measure (a) of Annex VI to the Directive on energy end-use efficiency and energy services). The aim of the pilot project entitled "Contracting on Federal Government properties" is, to optimise as many suitable Federal Government properties as possible from the point of view of energy by means of external service providers, to exploit the existing potential for energy savings, to reduce CO_2 emissions and to lower costs.

Technical realisation and coordination is handled by the German Energy Agency (dena) with the aim of carrying out contracting relating to energy saving and/or the supply of energy on as many Federal Government properties as possible. In this way, the Federal Government fulfils its exemplary role vis-à-vis the Länder and municipalities. So far, tenders have been, or are being, invited in relation to around 40 properties (average energy saving in the region of 30 %). The project is proceeding well having overcome some initial obstacles. Among other things, improved framework conditions for combined heat and power appliances and for using renewable energies have contributed to this. Within the framework of the 120 million programme concerned with the energy-related redevelopment of Federal Government properties, resources are also used for contracting measures.

With the implementation of the 120 million programme and the "Contracting" pilot project, the Federal German Government is also providing examples of possible solutions for other administrative bodies. This is very important because the Länder and, in particular, the municipalities, possess considerable Government realties and, consequently, also considerable potential to save energy.

When awarding government contracts, it is also the intention of the Federal German Government, inter alia, in the context of its Hi-Tech strategy, to use the potential for innovation afforded by public procurement (measures c and d of Annex VI to the Directive on energy end-use efficiency and energy service). This innovation potential also includes the procurement of energy-efficient products and services which is designed to ensure sustainable utilisation which also preserves resources. Current law governing the awarding of contracts does not prevent such procurement and offers corresponding instruments. In its paper focusing on the key issues surrounding an integrated energy and climate protection programme, the German Federal Government decided to develop technical guidelines for considering energy efficiency in the case of procurement by the Federal Government which are used as a basis when the Federal German Government is making decisions on procurement (observing the life cycle cost principle).

Guides, qualified recommendations and detailed information also assist in the aim of improving energy efficiency on the part of public services. Since the beginning of 2006, a database has been made available on the Internet by the German Energy Efficiency Agency (dena) which carries the title "Office Top Ten" (www.office-topten.de). This database provides information and possibilities for comparison for officials in charge of procurement who are seeking particularly energy-efficient office equipment. Reference is also

made to the "Information service for environmentally-friendly procurement" (www.beschaffung-info.de) of the Federal Office responsible for environmental protection.

In addition to the measures already in place which are designed to improve energy efficiency in the public sector, reference is made to the additional measures in Chapter 4.2.

6.1.2 End-use energy savings on the part of the Federal Armed Forces

The Federal Armed Forces consume large amounts of energy. In 2005, final energy consumption for operating the in excess of 1,600 Federal Armed Forces' properties nationwide, i.e. several thousand buildings, was in the region of 1.3 billion kWh of electrical energy and approximately 4.7 billion kWh of heat energy. The costs of operating Federal Armed Forces property are definitively determined by the resources consumed (heat, electricity, water and waste water). The Federal Armed Forces are striving to reduce the resources consumed in every military district by 5 % annually, relative to the target value of the preceding year, over the period from 1 January 2007 to 31 December 2010.

The military district administrations have determined target values for 2007 in relation to electricity [kWh/a], heat [MWh/a] and water [m3/a]. For the further period 2008–2010, the annual target value shall be formed from the target values for energy and water from last year.

Provision is made for the following measures to achieve these aims:

1. Planning and organisational measures

- Accelerated implementation of the decision on deployment as well as the occasional or also partial shutdown//decommissioning of buildings and structural works (e.g. on account of deployment abroad or exercises). In this regard, the current utilisation of the land (target infrastructure / actual infrastructure) shall also be reviewed in order to identify the potential for reducing operating costs.

- The existing apparatus of the Technical Operating Service (including garages, breakdown trucks and the like) and of the terrain management authority ['Geländebetreuung'] shall be adapted in line with the proven reduced requirement for carrying out tasks.

- The needs of a property (or of a building in the case of large consumers, factory buildings, etc.) in terms of electricity, heat and water for ensuring that the departments can fulfil their orders and tasks shall be reviewed in observance of current regulations. The hours when these resources are supplied for operating purposes shall be aligned with the hours when these resources are actually required by users to carry out their tasks. This especially applies to ventilation systems and air conditioning equipment, as well as lighting equipment and large-scale consumers. If required, technical aids (building automation, timer switches, motion detectors, etc.) shall be used.

- The actual sealing areas for surface water shall be inspected with the areas estimated in the fee rulings of the municipal authorities (also refer to the local government byelaws).

- Larger energy consumers and their optimisation potential shall be identified within the framework of energy control. Measures aimed at improving energy efficiency shall be introduced subsequently.

2. Technical measures

- The consumption of resources can be reduced in a sustainable manner, particularly as a result of the renewal of operating installations or individual components thereof, within the framework of the CO_2 building redevelopment programme.

- The management of technical installations shall be optimised. In particular, "hydraulic equalisation" shall be carried out or guaranteed in the case of heat supply installations such that this is also documented with corresponding building activities.

- The installation of consumption meters for monitoring and recording the amount of resources consumed.

3. User behaviour

- Making soldiers and civilians sensitive to user behaviour by means of energy representatives.

- In the context of the mission[E] energy saving campaign, by means of saving energy tips, employees are urged to handle resources (electricity, heat, water) in an efficient manner.

- The employment of electrical loads shall be checked and reduced as required. In the case of electrical appliances, attention shall be paid to the fact that these appliances have an energy label (where possible, energy efficiency class A).

- In addition, reference is made to the catalogue of measures relating to the "2004 energy campaign" which lists additional, detailed energy saving measures (energy checklist).

4. Mission[E] energy saving campaign

By means of the mission[E] (Energie [energy], Effizienz [efficiency], Einsparung [savings], Emission [emissions] and Engagement [involvement]) energy saving campaign, in cooperation with North Rhine-Westphalia's Energy Agency, energy consumption by the Federal Armed Forces is to be reduced simply by soldiers and civilian employees behaving in a more energy conscious manner. Various programmes, materials and on-line proposals are designed to help achieve this goal.

In addition, action weeks are taking place at separate locations where electricity consumption is measured in buildings and is to be reduced by making users aware of this issue. An example of this is the programme which ran from 15–19 January 2007 at the Ermekeil barracks in Bonn (the headquarters of the Federal Armed Forces Administration) where staff reduced their electricity consumption by 9 % inside a week.

6.1.3 Choosing measures from Annex VI to the Directive as per Article 5(1)

A final choice on the measures to be found in Annex VI to the Directive as per Article 5(1) is made following talks with the Federal Länder in order to clarify any contributions made at Land and local authority level.

6.2 Availability of information (Article 7 of the Directive on energy end-use efficiency and energy services)

According to Article 7(1) of the Directive on energy end-use efficiency and energy services, 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".

Article 7(2) of the same Directive, stipulates that (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."

The Federal German Government shall ensure that in implementing the measures mentioned in Chapter 4.2, the requirements laid down in Article 7(1) and (2) are taken into account.

6.3 Metering and billing of energy consumption (Article 13 of the Directive on energy end-use efficiency and energy services)

Requirements as per the Directive and the starting position

Pursuant to Article 13(1) of the Directive, 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."

These individual meters are available in Germany. At present, as far as final customers are concerned, conventional electromagnetic meters (Ferraris meters) are used almost exclusively. These are generally used to determine annual consumption but may be read by consumers at any time. No provision is made at present for a realtime load measurement (generally at intervals of a quarter of a second but also at one minute intervals where necessary) in accordance with the Electricity System Access Order for customers whose annual consumption is below 100,000 kWh (private households and smaller businesses). Standard load profiles are applied here.

Against the backdrop of technical possibilities which are currently available, the question nevertheless arises as to whether additional energy savings are possible on both the demand and production sides as a result of the targeted use of information and communication technologies in metering ("Smart Metering", Advanced Meter Management and Advanced Meter Reading). In addition to remote meter reading services, this may also facilitate other energy saving opportunities such as remote lock-on, load limitation and a tariff register (time-dependent tariffs). As regards customers with whom special agreements have been concluded who consume in excess of 100,000 kWh, these techniques have already largely been implemented.

According to a study[16] commissioned by the Federal Ministry of Economics and Technology, a majority of German energy providers are already concerning themselves with the theme of Smart Metering. According to a survey conducted in September 2006, 24 % of energy providers are examining Advanced Meter Management / Advanced Meter Reading systems within the framework of pilot projects and 19 % are planning to do so in the near future. A further 35 % are involved with this topic and are following the market.

In this connection, it must be emphasised that initial attempts are already under way to introduce digital metering in Germany. However, numerous issues still remain as regards these attempts which are making an overall economic assessment of the benefits and costs associated with the digitisation of metering difficult.

Benefits in the form of final energy savings

When estimating the beneficial elements, a distinction must be drawn between savings in terms of power and labour (energy end-use).

Power: Improved load management includes the potential to avoid further investment in power stations and networks, including in particular with regard to the future improved use of electricity from (fluctuating) renewable energy sources such as wind and solar energy. This may also include improved daytime use - e.g. in the case of load shedding during peak times and a load tie-in during base periods (in particular, process heat in the area of household appliances or building cooling). An economic assessment is complex and would have to be done separately (potentially avoided installed power in production and transport). In principle, however, the attempt itself seems interesting in view of the increasing future integration of the fluctuating power supply (renewable) and loads (e.g. air conditioning).

End-use Energy (work): Load management in the narrower sense does not impact on the demand for final energy since, generally speaking, the time when the electricity is consumed is simply moved. The actual final energy saving potential should lie in improved consumer information. An effective savings effect only arises when the consumer takes appropriate consumption reducing measures as a result of the additional information. When using load management to avoid the speed regulation of renewable energies, specifically wind energy, a savings potential may be exploited indirectly in network bottleneck situations.

16 Wik Consult/Fraunhofer ISI/ISE, Potenziale der Informations- und Kommunikations-Technologien zur Optimierung der Energieversorgung und des Energieverbrauchs [Potential afforded by information and communication technologies with a view to optimising energy supply and consumption] (eEnergy), 2006.
http://www.bmwi.de/BMWi/Navigation/Service/publikationen,did=184714.html

Against this backdrop, an assessment of possible final energy savings through the extensive introduction of digital meters entails numerous uncertainties.

Costs

With a fictitious price of around € 100 / meter and an estimated 49 million metering points, in the region of € 5 billion would have to be invested in metering infrastructure alone in order to introduce digital meters across the country. In addition to this there are the costs incurred in relation to the communications infrastructure and the expansion of the IT systems which are required. Consequently, as a rule, the offering of meters to final customers ought only to turn out profitable from a certain threshold reference value above the energy costs which have been saved.

In addition to the abovementioned cost/benefit considerations, care should be taken, above all, that the Advanced Meter Management and Advanced Meter Reading systems are installed in a manner which is consistent with the law. According to currently available technical standards, the reading of a meter does not pose any problem, in principle. However, solutions of this nature should be offered across the board (for all customers), if necessary, using different (competing) systems, with a high degree of legal certainty.

In this regard, the following additional demands are laid down:

- Data protection.
- The interoperability between different meter systems.
- Proper conveyance (digitisation) of the metering data.
- The technically faultless transmission of the data.
- The commercially correct retranslation of the data into accounting systems.
- A high degree of system and individual component reliability.
- A guarantee that system failure at an individual metering point does not entail total data loss (back-up function).
- Guaranteeing redundancy in the event of system failure and data loss (e.g. in this case, the option of reading the meter manually).
- A low susceptibility to tampering and vandalism.

On account of the numerous points which still require clarification, the cost/benefit assessment, along with the final assessment of the possible energy efficiency potential arising from the introduction of the Advanced Meter Management systems in Germany, have not yet been definitively cleared up. In the opinion of the Federal German Government, the targeted association of information and communication technologies with the optimisation of energy supply and demand also offers considerable potential which should be researched and exploited in a targeted manner.

A further requirement for research and development: E-Energy technological competition

The Federal Ministry of Economics and Technology embarked on the technological competition entitled "E-Energy: a future energy system based on information and communication technologies" on 30 April 2007.[17] This competition is designed to promote the development and testing of integrated concepts regarding the composition of approximately 3 to 5 E-Energy model regions. It involves research and development projects which, in a regional innovation cluster, exploit the modernising potential of advanced information and communication technologies and the applications and services within the energy supply chain as a whole, from production to consumption via transport and distribution, which are based on this. Through this, a volume of financing in the region of € 100 million is to be mobilised, of which the Federal Ministry of Economics and Technology shall contribute up to € 40 million in subsidies for a period of up to four years.

A general aim of the funding measure is to improve global competitiveness and system competence within the information and communication technology industries and the energy industry, as well as within integrated sciences in Germany, so that the burden on the economy as a whole and private households is reduced as a result of final energy savings and the clearly higher level of efficiency within the electricity market, while the attractiveness of the location rises. In addition, E-Energy is to promote digital convergence with energy technology (in particular, with the building of equipment and general plant construction, measurement and control engineering and technology) and the creation of new information and communication technology services with convincing examples of solutions in selected model regions. In this way, bandwagon effects, new business ideas and follow-up investment are to be stimulated and new fields of activity and markets opened up at home and abroad. In addition, the development of innovation in other networked supply areas will also be able to benefit from the results and experiences obtained within the framework of the E-Energy funding measure.

The focal points of the E-Energy programme in terms of content are the seamless introduction of electronic business and legal transactions and the continuous integration and utilisation of digital technologies to optimise the electricity supply as a whole. Innovative information and communication technology-based technologies, services and business models which promise a particularly significant degree of sustainability and a broad impact, and which therefore generate a high level of public interest, are sought.

The Federal German Government estimates that this research and development project results in energy savings of 4–6 PJ (assessment involving a power coefficient of 1) or 10–15 PJ (assessment involving a power coefficient of 2.5), without allowing for multiplier effects (see Chapter 4.2).

Liberalisation of metering

As regards the swift dissemination of new technologies in the area of liberalised electricity metering for the real-time measurement of consumption as a prerequisite for saving energy, by means of the following measures, the Federal German Government will create the preconditions whereby these technologies are increasingly applied in industry in particular:

- The complete opening up of this area to competition by supplementing energy industry law (the Energy Industry Act and statutory order)

- The establishment in energy industry law of the necessary principles whereby intelligent electronic meters may also be introduced in favour of a broader offer of load-variable tariffs, for the time being, in relation to trade and industry customers, but also in relation to household customers at a later date, provided these principles can be applied in an economically sensible manner. As regards implementation, a transitional period of six years is envisaged, accompanied by a process whereby the outcome of liberalisation is monitored.

17 http://www.e-energie.info/

7
Legal transposition and submission of the second Energy Efficiency Action Plan

The Federal German Government is endeavouring to transpose the Directive into national law by 17 May 2008 within the deadline stipulated. A prerequisite for this, however, is clarification by the committee according to Article 16 of the Directive on energy end-use efficiency and energy services of those points in the Directive which remain open and which are still unclear.

The second National Energy Efficiency Action Plan will be presented to the Commission by 30 June 2011 at the latest.

8 Annex

8.1 Explanatory notes on the additional, State-induced measures

8.1.1 Private households

Private households			
1	CO_2-building rehabilitation programme	Implemented, further development	Funding

a) Promoting heating renovation in existing residential buildings. The amount of funding depends on the level of redevelopment
b) Funding the replacement of night-time electric storage heaters.

This instrument assists in the aim of raising the rate and quality of redevelopment in existing buildings, in accelerating the introduction to the market of innovative energy standards, and in the support and preparation associated with the tightening up of minimum standards under regulatory law. To achieve this, grants must be made available for the redevelopment of residential buildings. This instrument shall be accompanied by information, motivational, training and further education measures (refer to the section entitled "Cross-sectoral measures and instruments").

Anticipated final energy savings as a result of the measures (min. [PJ] – max. [PJ])

Indicative energy savings target for 2016				Intermediate target for 2010			
Power coefficient 1		Power coefficient 2.5		Power coefficient 1		Power coefficient 2.5	
Total	of which electricity	Total	of which electricity	Total	of which electricity	Total	of which electricity
120–160	20–40	150–240	50–100	30–45	5–10	27.5– 60	12.5– 25

Characteristics regarding the calculation or assessment of final energy savings: Over the preceding year, the rate of redevelopment of existing buildings in Germany was, on average, 1.3 % per annum, with the trend downwards. Assuming standard life cycles for buildings and heating installations, a redevelopment rate of 2.6 % per annum is required which is to be achieved by the further development of the CO_2 building redevelopment programme by 2016 through a continual increase in the annual rate of redevelopment. As a marginal condition, an increase in living space by 2016 in the region of 7 % compared with 2005 was assumed.

Evaluation: Bottom up
Analysis based on the monthly and annual statistics compiled by KfW (measures and energy-related standards) Analysis and accompanying scientific research of exemplary, highly-efficient redevelopment projects (e.g. the model project entitled "Stocks of low energy houses")

Private households			
2	Promoting energy-efficient new buildings	New / planned	Funding

Further development of the KfW funding programme concerned with the "ecological building" of passive houses and energy saving houses with an energy consumption of less than 60 or 40 kWh/m² a (residential buildings with a primary energy requirement for room heating and water heating of a maximum of 60 or 40 kWh/m² a).

Increased provision of funds for promoting the new building of passive houses and energy saving houses with an energy consumption of less than 60 or 40 kWh/m² a. Supporting the measure by marketing campaigns and training and further education measures.

Anticipated final energy savings as a result of the measures (min. [PJ] – max. [PJ])

Indicative energy savings target for 2016				Intermediate target for 2010			
Power coefficient 1		Power coefficient 2.5		Power coefficient 1		Power coefficient 2.5	
Total	of which electricity	Total	of which electricity	Total	of which electricity	Total	of which electricity
5–15	0	5–15	0	1–3	0	1–3	0

Characteristics regarding the calculation or assessment of final energy savings: On the basis of the predicted increase in living space in Germany, an increase in the proportion of space constructed in accordance with the passive housing standard from 0.4 % in 2006 to approximately 40 % in 2016 and, as regards energy saving houses, from 4.5 % in 2006 to approximately 18 % in 2016, is assumed.

Evaluation: Bottom up
1. Analysis of the KfW statistics
2. Determining the difference between new buildings which are funded and the minimum standard for new builds under the Energy Saving Order
3. Calculating the total final energy savings across all funded projects

8.1.1 Private households (continuation)

Private households			
3	**Programme for introducing new, highly-efficient household appliances to the market**	**New / planned**	**Funding**
Initiierung und Umsetzung eines Markteinführungsprogramms für den Erwerb von Top-Energieeffizienz-Haushaltsgeräten			

Funding appliances which are particularly energy efficient with lifespans of 5 years (funding "top runner" appliances).
The programme may be effective in a supporting role with regard to a preferred replacement of inefficient household appliances with appliances which correspond to the state of the art in terms of energy efficiency.
When replacing old appliances: combining funding with the guaranteed return of old appliances (obligation to furnish proof).
Application and management of the programme in collaboration with the retail trade and their banks, including the specialised retail trade (e.g. the kitchen and furniture trades).
Supporting this measure with training measures for the retail trade along with offers of information and advice at the point of sale.

Anticipated final energy savings as a result of the measures (min. [PJ] – max. [PJ])

Indicative energy savings target for 2016				**Intermediate target for 2010**			
Power coefficient 1		**Power coefficient 2.5**		**Power coefficient 1**		**Power coefficient 2.5**	
Total	**of which electricity**	**Total**	**of which electricity**	**Total**	**of which electricity**	**Total**	**of which electricity**
10–15	10–15	25–38	25–38	2–4	2–4	5–10	5–10

Characteristics regarding the calculation or assessment of final energy savings:
Starting with the most energy-efficient appliances currently available in the abovementioned categories, their lifespans, and extrapolating the tendency to increase the level of equipment ownership, based on estimates regarding the individual categories of appliances, a total final energy saving across the categories of appliances under consideration of 40 – 50 PJ by 2016 is deemed to be achievable. The contribution made by the loan financing programme in this regard is assumed to be 25–30 %.

Evaluation: Bottom up
Recording the number, type and average final energy consumption of the appliances being funded;
determining the difference in relation to the average final energy consumption of those appliances in this category.

Private households			
4	**European Top Runner Strategy**	**New / planned**	**Regulatory law**

Objective-oriented and dynamic arrangement of a set of regulatory policy instruments at a European level within the framework of EU internal market regulations

The European Top Runner Strategy proposes an approach designed to increase the development and market penetration of products with high levels of energy efficiency and, at the same time, to define certain minimum energy efficiency standards, especially in the areas of lighting, large household appliances and standby consumption, as a prerequisite for entry to the market (combined, dynamic push and pull strategy).
To achieve this, the coordinated stipulation and dynamic updating of the energy efficiency criteria and threshold values is required, taking into account the complementary application of differentiating and best appliance labelling (energy consumption labelling, Energy Star) and minimum energy efficiency standards (the Eco-design Directive) which shall be updated in a dynamic manner in accordance with technical progress and market development.
The Top Runner Strategy is to be implemented with reference to the criteria of relevance under the EU Eco-design Directive for energy-operated products.
The impact of the European Top Runner Strategy shall be supported by intensive information and motivational measures for final consumers and the retail trade.

Anticipated final energy savings as a result of the measures (min. [PJ] – max. [PJ])

Indicative energy savings target for 2016				**Intermediate target for 2010**			
Power coefficient 1		**Power coefficient 2.5**		**Power coefficient 1**		**Power coefficient 2.5**	
Total	**of which electricity**	**Total**	**of which electricity**	**Total**	**of which electricity**	**Total**	**of which electricity**
8–15	8–15	20–37.5	20–37.5	2–4	2–4	5–10	5–10

Characteristics regarding the calculation or assessment of final energy savings:
Starting with the most energy-efficient appliances currently available in the abovementioned categories, their lifespans, and extrapolating the tendency to increase the level of equipment ownership, based on estimates regarding the individual categories of appliances, a total final energy saving across the categories of appliances under consideration of 40 – 50 PJ by 2016 is deemed to be achievable. The contribution made by the Top Runner Strategy in this regard is assumed to be 20–30 %.

Evaluation: Top down

8.1.1 Private households (continuation)

Private households			
5	**On-site energy advice**	**Implemented / further development**	**Funding**
Funding energy savings advice on site			

The "On-site energy savings advice" funding programme is implemented by the Federal Office of Economics and Export Control on the orders of the Federal Ministry of Economics and Technology. By making a financial contribution to the costs, the owners of residential buildings can be given detailed advice on the energy-related condition of their building. To this end, proposals or packages of measures concerned with heat insulation and the heating installation from the point of view of energy, and their economical nature, are presented in a detailed consultancy report following a preceding assessment of the structure by an engineer or energy building consultant (HWK) specially qualified in this area. The measures proposed are explained to the house owner in detail and the anticipated energy savings estimated. As a result of this supplier-independent advice, the building owner is given support in achieving the greatest possible energy savings. In excess of 96 % of the advice takes place in 1 and 2-bedroom family houses.

Anticipated final energy savings as a result of the measures (min. [PJ] – max. [PJ])

Indicative energy savings target for 2016				**Intermediate target for 2010**			
Power coefficient 1		**Power coefficient 2.5**		**Power coefficient 1**		**Power coefficient 2.5**	
Total	**of which electricity**	**Total**	**of which electricity**	**Total**	**of which electricity**	**Total**	**of which electricity**
25–50	3–5	29.5–57.5	7.5–12.5	8–17	1–2	9.5–20	2.5–5

Characteristics regarding the calculation or assessment of final energy savings:
With reference to a survey from 2002 of 2,500 people who had received advice, the Federal Ministry of Economics and Technology states that the additional investment for measures concerned with the energy-related redevelopment of buildings which was initiated as a result of on-site advice is roughly the same as that which was determined at the Energy Advice Stand at the consumer advice centre.

Evaluation: Bottom up
Random survey of people who have received advice regarding the measures implemented as a result of the energy advice promoted
Calculating the resulting energy savings
Estimating the total final energy savings across all the advice promoted (projection)

Private households			
6	**Energy advice for private consumers by the Federation of German Consumer Organisations**	**Implemented, continuation and further development**	**Funding**
Funding energy saving advice given at consumer centres for private consumers			
Following prior arrangement of the date, energy advice is carried out by qualified experts (predominantly engineers) in consumer advice centres and municipal areas. This advice is organised by the Federation of German Consumer Organisations.			

Anticipated final energy savings as a result of the measures (min. [PJ] – max. [PJ])							
Indicative energy savings target for 2016				**Intermediate target for 2010**			
Power coefficient 1		**Power coefficient 2.5**		**Power coefficient 1**		**Power coefficient 2.5**	
Total	**of which electricity**	**Total**	**of which electricity**	**Total**	**of which electricity**	**Total**	**of which electricity**
30–60	2–3	33–64.5	5–7.5	10–20	0.7–1.0	11.1–21.5	1.8–2.5

Characteristics regarding the calculation or assessment of final energy savings:
The outcome of a project evaluation conducted by the Institut für Energie- und Umweltforschung Heidelberg GmbH which took place in December 2005 relating to the year 2004 was that the energy efficiency measures initiated as a result of this advice resulted in final energy savings of 4 to 7 PJ.

Evaluation: Bottom up
Document analysis: assessment of annual reports by the Federation of German Consumer Organisations regarding the fixed point energy advice programme and the data from questionnaires organised by energy consultants. Important characteristics and the topics covered during each advice session are recorded on the questionnaires in a standardised manner
Interviews: interviews with representatives from consumer advice centres in the Länder covering questions concerned with organisation, public relations work, cooperation and opportunities to improve the energy advice project
Survey of people who have received advice on the measures implemented as a result of the energy advice promoted
Calculating the resulting energy savings
Estimating the total final energy savings across all the advice promoted

Private households			
7	**Continuation of the energy efficiency initiative of the German Energy Agency (dena)**	**Further development**	**Information**
Integrated and effective public relations communications measures (information, advice, motivation), including the construction and on-going further development of a central information platform with access to all information, standards and aids for the efficient use of electricity in the continual and action-oriented addressing of multipliers and final customers. Improving the amount of information available on the efficient use of electricity. Motivation to implement energy efficiency measures (buying and utilisation behaviour). Consistent networking of the market actors and the qualification of multipliers.			
The drawing up and distribution of information and training materials for multipliers Conceiving and implementing seminars and information events Developing a consultancy network (consumer advice centres, the retail trade, the electrical trade) Information on differentiating and best appliance labelling Initiating voluntary agreements on the part of the retail trade for the purpose of optimising the product offer at the point of sale Press and media relations Providing information, advice and motivation are necessary prerequisites for being able to apply several other instruments successfully, and are therefore inseparably linked to this. It is therefore not useful to quantify final energy savings as a result of information, advice and motivation. The corresponding amounts are included in the quantifications of the respective instruments			

8.1.2 Public sector

Trade, industry and services (tertiary sector) – Public sector			
8	**The redevelopment of buildings in the public sector**	**Implemented, continuation and further development**	**Funding/information**
a) The use of funds from the CO_2 building redevelopment programme in the renovation of public buildings (buildings in Länder and municipalities, etc.). b) Continuation of the programme on the energy-related redevelopment of Federal buildings. c) Operational monitoring of technical installations on Federal Government properties.			
Re a) Investment pact concluded between the Federal Government, the Länder and the municipalities on the energy-related redevelopment of the social infrastructure (schools, day-care centres) Re b) The programme concerned with the energy-related redevelopment of Federal Government properties was developed on the basis of the arrangement in the 2005 coalition agreement. Over a fouryear period, € 120 million is to be spent each year, making a total of € 480 million. The recommendation contained in the EU Commission's Energy Efficiency Action Plan to strengthen the exemplary role of the public sector is hereby implemented. Furthermore, the programme assists in preserving the value of buildings and contributes to the consolidation of building activity. The programme has been running since 2006. The total final energy savings achieved as a result of the programme can be quantified on the basis of an evaluation of the first two years that the programme has been running, which shall be judged as early actions. The first two biannual reports concerned with the evaluation of the programme were presented by May 2007 Re c) Implementation of active energy management with the aim of obtaining potential savings in the region of 10 % as a result of low investment measures. By means of the operational monitoring of the technical installations, the application and observance of the principles governing management shall be reviewed and user advice guaranteed. Monitoring is carried out based on a list of measures related to the property, the result being reported to the department annually, and forming the basis for corresponding decisions or measures.			

Trade, industry and services (tertiary sector) – Public sector			
9	**Contracting on Federal Government properties**	**Implemented, continuation and further development**	**Funding**
(Further) development of the on-going project whose aim is to substantially strengthen the utilisation of the available economic energy efficiency potential on Federal Government properties			
The aim of the project entitled "Energy efficiency contracting on Federal Government properties", which is part of the Federal German Government's national strategy aimed at sustainable development, is to optimise as many suitable Federal Government properties as possible from the point of view of energy by means of contracting projects and thereby reduce costs, as well as contribute to fulfilling the self commitment on the part of the Federal German Government to reduce CO_2 emissions.			

Anticipated final energy savings as a result of the measures (min. [PJ] – max. [PJ])

Indicative energy savings target for 2016				Intermediate target for 2010			
Power coefficient 1		Power coefficient 2.5		Power coefficient 1		Power coefficient 2.5	
Total	of which electricity	Total	of which electricity	Total	of which electricity	Total	of which electricity
2–4	1–2	3.5–7	2.5–5	0.5–1	0.2–0.4	0.8–1.6	0.5–1

Characteristics regarding the calculation or assessment of final energy savings:
The Federal German Government owns in the region of 4,500 properties whose energy consumption was just under 36 PJ in 2005. Approximately 1,900 of the properties with energy costs totalling € 230 million are suitable according to a potential study into energy contracting and could be optimised from the point of view of energy by 2016 by integrating final energy service undertakings. In this way, final energy consumption on Federal Government properties in the area of operations of the Federal German Government may be reduced by around 10 % per annum.

Evaluation: Bottom up
Alongside its voluntary agreement to reduce CO_2 by 30 % over the period 2008–2012 compared with 1990, in its own area of operations, the Federal German Government is monitoring CO_2 emissions which are calculated on the basis of values for final energy consumption. Within the framework of this monitoring, final energy savings which were obtained through contracting measures can consequently be quantified.

Trade, industry and services (tertiary sector) – Public sector			
10	**Modernising outdoor lighting facilities**	**New / planned**	**Funding**

a) Modernising street lighting from the point of view of energy consumption
b) Modernising traffic lights from the point of view of energy consumption

Re a) A reduction in the requirement for electricity on the part of street lighting by optimising the lamp type, illuminants and fluorescent lamp ballast, and by optimising circuitry / controls as required.
Re b) Most existing traffic lights are fitted with 230 V lamps. By refitting them with LED lamps, energy consumption may be reduced by around 70 %.

Anticipated final energy savings as a result of the measures (min. [PJ] – max. [PJ])

Indicative energy savings target for 2016				Intermediate target for 2010			
Power coefficient 1		Power coefficient 2.5		Power coefficient 1		Power coefficient 2.5	
Total	of which electricity	Total	of which electricity	Total	of which electricity	Total	of which electricity
a) 3	3	7.5	7.5	1	1	2.5	2.5
b) 1.3	1.3	3.25	3.25	0.4	0.4	1	1

Characteristics regarding the calculation or assessment of final energy savings:
a) Actual consumption – street lighting: 12 PJ/annum; technical potential: 25 % (static compared with 2002).
b) Actual consumption – traffic lights: 1.8 PJ/annum; technical potential: ca. 70 % (static)

Evaluation: Bottom up
Logging the refitted street lighting and traffic lights
Determining the final energy consumption before and after redevelopment / refitting
Totalling in relation to all projects

Trade, industry and services (tertiary sector) – Public sector			
11	**Mission E**	**Implemented, continuation and further development**	**Information**

Energy efficiency campaign by the Federal Armed Forces

The aim of the campaign is to reduce consumption across the country of heat, electricity and water in every sector of the armed forces over the period 2007–2010 by a total of 5 % annually, relative to the target value from the previous year, by means of organisational and structural measures, as well as through modified user behaviour. The varied information offers - campaigns, materials and on-line offers - of that part of the campaign (Mission E) which is geared to influencing user behaviour are designed to inform and motivate soldiers and civilian employees to save final energy. These include interactive saving tips which are available on the Federal Armed Forces' intranet, a complete portal of topics, including up-to-date news on energy saving, and a brochure on saving energy without sacrificing comfort.

Anticipated final energy savings as a result of the measures (min. [PJ] – max. [PJ])

Indicative energy savings target for 2016				Intermediate target for 2010			
Power coefficient 1		Power coefficient 2.5		Power coefficient 1		Power coefficient 2.5	
Total	of which electricity	Total	of which electricity	Total	of which electricity	Total	of which electricity
0.5–1	0.2–0.3	0.8–1.5	0.5–0.8	0.5–1	0.2–0.3	0.8–1.5	0.5–0.8

Characteristics regarding the calculation or assessment of final energy savings:
The energy consumption in operating the in excess of 1,600 Federal Armed Forces' properties (several thousand buildings) was in the region of 4.7 PJ of electrical energy and approximately 16.9 PJ of heat energy in 2005. The aim of "Mission E" is to save at least 1 % of this final energy consumption each year.

Evaluation: Top Down
Determining the final energy consumption of the Federal Armed Forces and in the area of application of the Directive on energy end-use efficiency and energy services

8.1.3 Trade, industry and services – general

Trade, industry and services (tertiary sector) – general			
12	**Special fund concerned with energy efficiency in SMEs in the trade, industry and service sectors**	**New / planned**	**Funding**
a) Advising on potential energy savings b) Financial support in the form of investment for exploiting the hidden potential by means of lowinterest loans			
Advice on energy savings in SMEs in the trade, industry and service sectors is to be carried out within the framework of the funding programme. Investment in exploiting the energy end-use savings potential identified in the audits may be funded by means of low-interest loans.			

Anticipated final energy savings as a result of the measures (min. [PJ] – max. [PJ])							
Indicative energy savings target for 2016				**Intermediate target for 2010**			
Power coefficient 1		**Power coefficient 2.5**		**Power coefficient 1**		**Power coefficient 2.5**	
Total	**of which electricity**	**Total**	**of which electricity**	**Total**	**of which electricity**	**Total**	**of which electricity**
29–40	8–12	41–58	20–30	4.8–7.2	2–3	7.8–11.7	5–7.5

Characteristics regarding the calculation or assessment of final energy savings:
a) The number of SMEs in the trade, industry and service sectors in D (source: Federal Office of Statistics)

10 - 49 employees		50 - 250 employees in SMEs (EU definition) : 10 - 250 employees
232,000	46,000	278,000

b) The proportion of SMEs in the trade, industry and service sectors in respect of which energy audits are to be funded (estimate from the German Energy Agency)

10 - 49 employees		50 - 250 employees in SMEs (EU definition): 10 - 250 employees
5 %	20 %	20,800

Evaluation: Bottom up
Determining the final energy savings achieved which can be attributed to investment funding and non investment-related measures (duty to report on the part of those parties receiving funds)

Trade, industry and services (tertiary sector) – general			
13	**European Top Runner Strategy**	**New / planned**	**Regulatory law**

Objective-oriented and dynamic arrangement of the set of regulatory policy instruments at a European level within the framework of EU internal market regulations

The European Top Runner Strategy proposes an approach designed to increase the development and market penetration of products with high levels of energy efficiency and, at the same time, to define certain minimum energy efficiency standards, especially in the areas of lighting and standby consumption, as a prerequisite for entry to the market (combined, dynamic push and pull strategy).
To achieve this, the coordinated stipulation and dynamic updating of the energy efficiency criteria and threshold values is required, taking into account the complementary application of differentiating or best appliance labelling (energy consumption labelling, Energy Star) and minimum energy efficiency standards (the Eco-design Directive) which shall be updated in a dynamic manner in accordance with technical progress and market developments.
The Top Runner Strategy should be implemented with reference to the criteria of relevance under the EU Eco-design Directive for energy-operated products.
The impact of the European Top Runner Strategy shall be supported by information and motivational measures.

Anticipated final energy savings as a result of the measures (min. [PJ] – max. [PJ])

Indicative energy savings target for 2016				**Intermediate target for 2010**			
Power coefficient 1		**Power coefficient 2.5**		**Power coefficient 1**		**Power coefficient 2.5**	
Total	**of which electricity**	**Total**	**of which electricity**	**Total**	**of which electricity**	**Total**	**of which electricity**
8–15	8–15	20–37.5	20–37.5	2–4	2–4	5–10	5–10

Characteristics regarding the calculation or assessment of final energy savings:
Starting with the most energy-efficient appliances currently available in the categories relevant to the trade, industry and service sector, in particular, office equipment and lighting, their lifespans, and extrapolating the tendency to increase the level of equipment ownership, based on estimates regarding the individual categories of appliances, a total final energy saving across the categories of appliances under consideration of 15 - 20 PJ by 2016 is deemed to be achievable. The contribution made by the Top Runner Strategy in this regard is assumed to be 50-75 %.

Evaluation: Top down

Trade, industry and services (tertiary sector) – general			
14	**Contracting and cogeneration campaign**	**New / planned**	**Information**

Implementation of a campaign to establish contracting as an energy efficiency service and to consolidate the use of combined heat and power appliances in the trade, industry and service sector.

By means of the campaign, policy makers in the trade, industry and service sector are to be provided with detailed information on contracting and cogeneration via an internet platform, publications and regional information events. For the purpose of simplification and standardisation, handbooks are to be provided containing model contracts.

8.1.3 Trade, industry and services general

Trade, industry and services (tertiary sector) – general			
15	**Continuation of the energy efficiency initiative of the German Energy Agency**	**Further development**	**Information**
Integrated and effective public relations communications measures (information, advice, motivation), including the construction and on-going further development of a central information platform with access to all information, standards and aids for the efficient use of electricity for the purpose of informing multipliers and final customers on a continuous basis. Improving the amount of information available on the efficient use of electricity. Motivation to implement energy efficiency measures. Networking multipliers and final consumers (trade, industry and services).			
Information and training materials for multipliers Seminars and information events Developing a consultancy network between associations, planners, energy suppliers, Chambers of Commerce and Industry Initiatives involving direct networking between final customers, e.g. management circles Establishing “Energietisch” forums as pilot local energy efficiency networks Information on differentiating and best appliance labelling Best practice communication Press and media relations Providing information, advice and motivation are necessary prerequisites for being able to apply several other instruments designed to improve energy efficiency in the trade, industry and service sector. The quantification of final energy savings as a result of information, advice and motivation does not therefore serve any purpose.			

8.1.4 Industrial sector

Industrial sector			
16	**Contracting in relation to compressed air**	**Further development**	**Standard**

Standardisation and extension of contracting models for the provision of compressed air by specialist suppliers

Compressed air technology has developed into a widespread cross-application technology. Care and know-how are required when using and dealing with compressed air in operational situations. While observing safety aspects is routine, it is frequently the case that insufficient consideration is given to optimising energy potential and that this is not therefore exploited, even though compressed air, in terms of its energy content, is a very valuable resource.
As regards efficient energy end-use, contracting models are effective financing and operating models which represent a market-oriented approach for exploiting potential energy efficiency and which have already been applied successfully in relation to compressed air installations. The undertaking which wishes to use compressed air concludes an agreement with a contractor according to which the latter plans, finances, constructs, operates and maintains the compressed air installation. The contractor also assumes the reserve holding. The undertaking which uses compressed air still only pays for the compressed air which has been made available and which it has received. As a specialised undertaking with the corresponding know-how, the contractor can build and operate the installation in an optimal cost-effective and energy-efficient manner.
The standardisation and further circulation of contracting models make an important contribution to the development of markets for energy services. The process shall be accompanied by intensive information and motivational measures.

Anticipated final energy savings as a result of the measures (min. [PJ] – max. [PJ])

Indicative energy savings target for 2016				**Intermediate target for 2010**			
Power coefficient 1		**Power coefficient 2.5**		**Power coefficient 1**		**Power coefficient 2.5**	
Total	**of which electricity**	**Total**	**of which electricity**	**Total**	**of which electricity**	**Total**	**of which electricity**
5–8	5–8	12.5–20	12.5–20	1.5–2.5	1.5–2.5	3.8–6.25	3.8–6.25

Characteristics regarding the calculation or assessment of final energy savings:
The total energy consumption of compressed air installations in Germany > 10 kW is in the region of 50 PJ (source: www.druckluft-energieeffizienz.de). The average energy end-use savings potential of these installations was estimated at 33 % by the Fraunhofer Institute for System Analysis and Innovation Research. Assuming that 30-50 % of this potential may be exploited by contracting, a final energy saving of 5 - 8 PJ will result by the year 2016.

Evaluation: Bottom up
Survey on contracting in the case of compressive air applications and determining average final energy savings, deducing total final energy savings through compressive air contracting.

8.1.4 Industrial sector (continuation)

Industrial sector			
17	Contracting in relation to lighting	Further development	Standard

Standardisation and extension of contracting models for lighting by specialist suppliers

As regards efficient energy end-use, contracting models are effective financing and operating models which represent a market-oriented approach for exploiting potential energy efficiency and which have already been applied successfully in relation to lighting installations.
The standardisation and further circulation of contracting models make an important contribution to the development of markets for energy services. The process shall be accompanied by wide-reaching information and motivational measures.

Anticipated final energy savings as a result of the measures (min. [PJ] – max. [PJ])

Indicative energy savings target for 2016				Intermediate target for 2010			
Power coefficient 1		Power coefficient 2.5		Power coefficient 1		Power coefficient 2.5	
Total	of which electricity	Total	of which electricity	Total	of which electricity	Total	of which electricity
2–3	2–3	5–7.5	5–7.5	0.6–0.75	0.6–0.75	1.5–2.3	1.5–2.3

Characteristics regarding the calculation or assessment of final energy savings:
In its study entitled "Energy Savings and energy efficiency in light of current price developments. Determining potential, as commissioned by the Federal Ministry of Economics and Technology" (2007), Prognos AG determined the economic energy end-use savings potential for lighting in the industrial sector to be 20 PJ by 2016. It is assumed that 10-15 % of this potential can be exploited through contracting.

Evaluation: Bottom up
Survey on contracting in the case of lighting in the industrial sector and determining average final energy savings; deducing total final energy savings through lighting contracting.

Industrial sector			
18	Contracting in relation to heating, ventilation and air conditioning	Further development	Standard

Standardisation and extension of contracting models for heating, ventilation and air conditioning by specialist suppliers

As regards efficient energy end-use, contracting models are effective financing and operating models which represent a market-oriented approach for exploiting potential energy efficiency and which have already been applied successfully in relation to heating, ventilation and air conditioning installations.
The standardisation and further circulation of contracting models make an important contribution to the development of markets for energy services. The process shall be accompanied by intensive information and motivational measures.

Anticipated final energy savings as a result of the measures (min. [PJ] – max. [PJ])

Indicative energy savings target for 2016				Intermediate target for 2010			
Power coefficient 1		Power coefficient 2.5		Power coefficient 1		Power coefficient 2.5	
Total	of which electricity	Total	of which electricity	Total	of which electricity	Total	of which electricity
3–5	3–5	7.5–12.5	7.5–12.5	1–1.5	1–1.5	2.5–3.75	2.5–3.75

Characteristics regarding the calculation or assessment of final energy savings:
In its study entitled "Energy Savings and energy efficiency in light of current price developments. Determining potential, as commissioned by the Federal Ministry of Economics and Technology", Prognos AG determined the economic energy end-use savings potential as regards space heating in the industrial sector to be 67 PJ by 2016. It was assumed that 3 - 5 PJ could be saved through contracting in relation to heating, ventilation and air conditioning.

Evaluation: Bottom up
Survey on contracting in the case of heating, ventilation and air conditioning in the industrial sector and determining average final energy savings; deducing total final energy savings through contracting in relation to heating, ventilation and air conditioning.

Industrial sector			
19	**Special fund concerned with energy efficiency in SMEs in the industrial sector**	**New / planned**	**Funding**

a) Advising on potential energy savings
b) Financial support in the form of investment for exploiting the hidden potential by means of lowinterest loans

Advice on energy savings in SMEs in the industrial sector is to be carried out within the framework of the funding programme. Investment in exploiting the energy end-use savings potential identified in the audits may be funded by means of low-interest loans.

Anticipated final energy savings as a result of the measures (min. [PJ] – max. [PJ])

Indicative energy savings target for 2016				**Intermediate target for 2010**			
Power coefficient 1		**Power coefficient 2.5**		**Power coefficient 1**		**Power coefficient 2.5**	
Total	**of which electricity**	**Total**	**of which electricity**	**Total**	**of which electricity**	**Total**	**of which electricity**
29–40	8–12	41–58	20–30	4.8–7.2	2–3	7.8–11.7	5–7.5

Characteristics regarding the calculation or assessment of final energy savings:
a) The number of SMEs in the industrial sector in D (source: Federal Office of Statistics)

10 – 49 employees		50 – 250 employees in SMEs (EU definition) : 10 – 250 employees
50,000	17,000	67,000

b) The proportion of SMEs in respect of which energy audits are to be funded (estimate from the German Energy Agency)

10 – 49 employees		50 – 250 employees in SMEs (EU definition): 10 – 250 employees
20 %	50 %	18,500

Evaluation: Bottom up
Determining the final energy savings achieved which can be attributed to investment funding and non investment-related measures (duty to report on the part of those parties receiving funds).

8.1.4 Industrial sector (continuation)

Industrial sector			
20	**European Top Runner Strategy**	**New / planned**	**Regulatory law**
Objective-oriented and dynamic arrangement of the set of regulatory policy instruments at a European level within the framework of EU internal market regulations			

The European Top Runner Strategy proposes an approach designed to strengthen the development and market penetration of products with high levels of energy efficiency and, at the same time, to define certain minimum energy efficiency standards, especially in the areas of lighting and standby consumption, as a prerequisite for entry to the market (combined, dynamic push and pull strategy).
To achieve this, the coordinated stipulation and dynamic updating of the energy efficiency criteria and threshold values is required, taking into account the complementary application of differentiating or best appliance labelling (energy consumption labelling, Energy Star) and minimum energy efficiency standards (the Eco-design Directive) which shall be updated in a dynamic manner in accordance with technical progress and market developments.
The Top Runner Strategy should be implemented with reference to the criteria of relevance under the EU Eco-design Directive for energy-operated products.
The impact of the European Top Runner Strategy shall be supported by intensive information and motivational measures.

Anticipated final energy savings as a result of the measures (min. [PJ] – max. [PJ])

Indicative energy savings target for 2016				**Intermediate target for 2010**			
Power coefficient 1		**Power coefficient 2.5**		**Power coefficient 1**		**Power coefficient 2.5**	
Total	**of which electricity**	**Total**	**of which electricity**	**Total**	**of which electricity**	**Total**	**of which electricity**
6–8	6–8	15–20	15–20	2–3	2–3	5–7.5	5–7.5

Characteristics regarding the calculation or assessment of final energy savings:
Starting with the most energy-efficient appliances and components currently available in the categories relevant to the industrial sector, in particular, office equipment, lighting, electric motors, pumps, etc., their lifespans, and extrapolating the tendency to increase the level of equipment ownership, based on estimates regarding the individual categories of appliances, a total final energy saving across the categories of appliances under consideration of 25 - 35 PJ by 2016 is deemed to be achievable.
It is estimated that around 75 % of this potential is exploited by special funds for SMEs in the industrial sector (cf. instrument number 24) and by contracting models (cf. instrument numbers 21 - 23) and around 25 % by the European Top Runner Strategy.

Evaluation: Top down

Industrial sector			
21	**Contracting and cogeneration campaign**	**New / planned**	**Information**
Implementation of a campaign to establish contracting as an energy efficiency service and to consolidate the use of combined heat and power appliances in industry			

Through the campaign, policy makers in the industrial sector are to be provided with detailed information on contracting and cogeneration via an internet platform, publications and regional information events. For the purpose of simplifying and standardising invitations to tender, modified tender guidelines are to be provided containing model contracts and tender specifications. This campaign is a necessary accompanying measure in order to be able to implement instrument numbers 18, 19 and 20 successfully and is therefore inseparably linked to these instruments. The final energy savings which can be achieved are included in the data relating to the aforementioned instruments. A separate quantification of the final energy savings achieved as a result of the campaign does not serve any purpose.

Industrial sector			
22	**Continuation of the energy efficiency initiative of the German Energy Agency (dena)**	**Further development**	**Information**
Integrated and effective public relations communications measures (information, advice, motivation), including the construction and on-going further development of a central information platform with access to all information, standards and aids for the efficient use of electricity for the purpose of informing multipliers and final customers on a continuous basis. Improving the amount of information available regarding energy efficiency in the case of power applications. Increasing the motivation to use energy efficiently (procurement/investment/utilisation/organisation). Improving the qualifications of multipliers (planners, plant builders, etc.) with regard to energy efficiency. Key technical issues in terms of content: Cross-application technologies (electrical drives, compressed air, pumps, ventilators, refrigeration technology, hoisting and conveying engineering, hydraulics, lighting and air conditioning). Sector-specific approaches.			
Continually providing multipliers and final customers with information through public relations work, via the Internet, a hotline, brochures, the trade press, association information, events, fairs and exhibitions The provision of information and training materials for multipliers, e.g. design handbooks for crossapplication technologies Holding, funding and marketing seminars and information events Establishing and developing consultancy networks between associations, planners and consultants, energy suppliers, Chambers of Commerce and Industry Initiatives involving direct networking between final customers, e.g. management circles Establishing “Energietisch” forums as pilot local energy efficiency networks Innovation competitions for energy efficiency technologies Best practice communication Information on differentiating and best appliance labelling in the context of the European Top Runner Strategy Providing information, advice and motivation are necessary prerequisites for being able to apply the other instruments designed to improve energy efficiency in the industrial sector. The quantification of final energy savings as a result of information, advice and motivation does not therefore serve any purpose.			

8.1.5 Transport sector

Transport sector			
23	**Promoting mobility, communication and city logistics**	**Implemented, continuation and further development**	**Funding, regulatory law**

a) Coordinating the supply and demand of private, public and industrial mobility
b) Transferring mobility to the more efficient modes of transport each time
c) Improving mobility communication, especially as regards operational mobility management, the legal obligations incumbent upon large enterprises with more than 500 employees for implementing mobility management

The basis for optimising mobility communication and city logistics is an exact inventory of the demand for mobility and the supply thereof. It may be implemented, for instance, by the following measures on a purely voluntary basis.
The establishment of facilities for bicycle riders (bicycle stands, showers, etc.)
The establishment of integrated tariffs, e.g. for public transport, public regional traffic; if necessary, also the integration of service offers including a bicycle repair service, sales service, etc.
Integrated, comfortable and attractive information services (internet portal and contacts)
Carpooling exchanges (on-line)
Station park and ride schemes

Anticipated final energy savings as a result of the measures (min. [PJ] – max. [PJ])

Indicative energy savings target for 2016				**Intermediate target for 2010**			
Power coefficient 1		**Power coefficient 2.5**		**Power coefficient 1**		**Power coefficient 2.5**	
Total	**of which electricity**	**Total**	**of which electricity**	**Total**	**of which electricity**	**Total**	**of which electricity**
4–6	0	4–6	0	1–2	0	1–2	0

Characteristics regarding the calculation or assessment of final energy savings:
Switzerland's experiences with operational mobility management: savings of 2,700 GJ/annum for each company participating (source: Energie Schweiz: Mobilitätsmanagement in Unternehmen [Energy Switzerland: mobility management in undertakings], Bern, 2004)
Austria's experiences: savings of 6,500 GJ/annum for each company participating (source: results from the programme entitled "Mobilitätsmanagement in Betrieben [mobility management in enterprises] from the "Active climate" campaign, Vienna, 2006)
Penetration: continual increase up to 2014; after 2014, a level of compliance of around 85 % by means of the legal obligation incumbent upon large enterprises with more than 500 employees (approx. 4,000 enterprises) regarding operational mobility management

Evaluation: Bottom up
Re a) and b) Evaluation of city logistics: of delivery transportation through participating enterprises/municipalities
Parameters: consignment per trip, number of journeys, distance of each journey, number of vehicles
Re c) Investigation of modal share before and after the introduction of mobility management for each enterprise
(parameters: parking use permits – private cars and bicycles, public transport cards)

Transport sector			
24	**Accelerating technical development**	**Further development**	**Standard**

Optimising conventional drives and fuels of and for private cars and heavy goods vehicles by stipulating maximum binding values in relation to the average CO_2 emissions figure

Raising the efficiency of combustion engines through structural improvements
Using new fuel mixtures

Anticipated final energy savings as a result of the measures (min. [PJ] – max. [PJ])

Indicative energy savings target for 2016				**Intermediate target for 2010**			
Power coefficient 1		**Power coefficient 2.5**		**Power coefficient 1**		**Power coefficient 2.5**	
Total	**of which electricity**	**Total**	**of which electricity**	**Total**	**of which electricity**	**Total**	**of which electricity**
100–120	0	100–120	0	30–40	0	30–40	0

Characteristics regarding the calculation or assessment of final energy savings:
Limiting CO_2 emissions by laying down a target value for average CO_2 emissions from the fleet of new European vehicles in the context of EU law which is planned in this regard.

Evaluation: Bottom up
Determining fuel consumption as per the driving cycle; deducing the total final energy savings achieved

Transport sector			
25	**Campaign entitled "Energy efficiency and mobility"**	**New / planned**	**Information**

Campaign for the tapping of energy efficiency potential through influencing motorists' behaviour

a) Greater implementation and notification of training for car drivers in relation to fuel-saving driving techniques: according to calculations made by the Federal Environment Agency and the Swiss Ecodrive programme, an average fuel saving of 10 % is assumed for private car drivers who participate in training aimed at saving petrol. This shall be supported by a campaign which motivates final customers to participate in such training and extends the amount of such training on offer.
b) Accelerated information and motivational measures for increasing the demand for low rollingresistance tyres and oils: in the context of the campaign, the use of rolling resistance-optimised tyres and low rolling-resistance oils is to be advertised. While low rolling-resistance oils are already being increasingly used nowadays, low rolling-resistance tyres have still failed to acquire any significant market share.

Anticipated final energy savings as a result of the measures (min. [PJ] - max. [PJ])

Indicative energy savings target for 2016				**Intermediate target for 2010**			
Power coefficient 1		**Power coefficient 2.5**		**Power coefficient 1**		**Power coefficient 2.5**	
Total	**of which electricity**	**Total**	**of which electricity**	**Total**	**of which electricity**	**Total**	**of which electricity**
20–65	0	20–65	0	5–10	0	5–10	0

Characteristics regarding the calculation or assessment of final energy savings:
Re a) Using the calculations carried out by the Federal Environment Agency (out of town - 12 %, in town - 6 %, saving per driver) and the experiences within the framework of the Swiss Ecodrive programme (an average saving of 11 %) as a starting point, an average fuel saving of 10 % is assumed for every car driver who participates in a training programme aimed at saving petrol.
Re b) As regards the use of low rolling-resistance oils, an increase in market penetration of the stock of private cars as a whole from the current figure of around 7 % to 35 % is assumed in 2016. As regards the use of low rolling-resistance tyres, where the proportion of all private cars using them is currently close to 0, it is estimated that market penetration will increase to 15 % by 2016. Moreover, the average fuel saving of today's tyres with optimum rolling resistance of 4% per vehicle will increase to 5-6 % by 2016 (source: Michelin and the German Association of the Automotive Industry).

Evaluation: Bottom up
Re a) Recording the number of participants in driver training (including beginner drivers who receive efficiency training), the average reduction in consumption as a result of participating in training, a level of compliance and its development for every training participant (sample survey)
Re b) Analysis of statistics concerned with the sale of low rolling-resistance tyres and oils

8.1.5 Transport sector (continuation)

Transport sector			
26	**Improving the infrastructure for using bicycles**	**Further development**	**Funding**

Funding programme for the development, maintenance and new construction of cycle paths and networks, the provision of opportunities to hire vehicles and parking areas.

As a result of funding measures concerned with extensive improvements to the bicycle infrastructure, people who drive cars are to be motivated to make more use of bicycles, especially those car drivers who make short trips.

Anticipated final energy savings as a result of the measures (min. [PJ] – max. [PJ])

Indicative energy savings target for 2016				Intermediate target for 2010			
Power coefficient 1		Power coefficient 2.5		Power coefficient 1		Power coefficient 2.5	
Total	of which electricity	Total	of which electricity	Total	of which electricity	Total	of which electricity
35–40	0	35–40	0	10–15	0	10–15	0

Characteristics regarding the calculation or assessment of final energy savings:
In its study entitled "Energy Savings and energy efficiency in light of current price developments. Determining potential, as commissioned by the Federal Ministry of Economics and Technology", Prognos AG determined that 3 % of all vehicle mileage could be replaced by bicycle use if improvements to the bicycle infrastructure were implemented successfully.

Evaluation: Top down

Transport sector			
27	**Adjusting motor vehicle tax**	**New / planned**	**Fiscal**

Including CO_2 emissions in the basis of assessment

While retaining the differentiation as per exhaust emission standards, an adjustment to the motor vehicle tax which is neutral from the point of view of revenue is effected by including CO_2 emissions in the basis of assessment. In this way, economical vehicles may be relieved of the fiscal burden.

Planned measures:

- The revenue-neutral adjustment to the road tax will take place in relation to all new vehicles at the next available opportunity.
- End-of-life vehicles will continue to be taxed according to engine size and hazardous substance emissions. As a result of moderate increases in tax rates in relation to old stock, beginning with vehicles in the Euro 2 exhaust emission standard, it is to be ensured that new vehicles are not made worse off as regards taxation and that latitude is offered in terms of financial incentives for acquiring new vehicles.
- Every gram of CO_2 is taxed at the same rate and the different mineral oil tax rates which apply to petrol and diesel are equalised as was the case previously.

8.1.6 Cross-sectoral measures

Cross-sectoral (measures)			
28	**Energy Saving Order**	**Implemented, continuation and further development**	**Regulatory law**

Accelerating technical innovation and energy-efficient construction and redevelopment through regulatory law requirements (improving the quality of redevelopments from the point of view of energy).

Applying the Energy Saving Order to residential and non-residential buildings.
Tightening up the requirements relating to new builds and redevelopments by 30 % in 2009 and further tightening up thereafter.
Supplemented by a wide-reaching marketing campaign and training and further education measures.

Anticipated final energy savings as a result of the measures (min. [PJ] – max. [PJ])

Indicative energy savings target for 2016				Intermediate target for 2010			
Power coefficient 1		Power coefficient 2.5		Power coefficient 1		Power coefficient 2.5	
Total	of which electricity	Total	of which electricity	Total	of which electricity	Total	of which electricity
50–60	0	50–60	0	15–20	0	15–20	0

Characteristics regarding the calculation or assessment of final energy savings:
As regards the total final energy savings in the building sector which are assessed as being achievable, it was estimated that 40 % can be attributed to the impact of tightening up the Energy Saving Order and the accompanying funding and information measures

Evaluation: Bottom up
Random determination of the rate of implementation in new builds and redevelopment; projection of total final energy savings across the number of new builds and redevelopments.

Cross-sectoral (measures)			
29	**Energy certificates for the building stock**	**New as of 2007**	**Regulatory law**

Within the framework of transposing the EC Directive on the energy performance of buildings, the phased introduction of energy certificates in respect of the building stock was incorporated in the Energy Saving Order, beginning with older residential buildings as of 1 July 2008 and non-residential buildings as of 1 July 2009.

The energy certificate provides owners, tenants and buyers with information on the quality of buildings in terms of energy, as well as providing recommendations for modernisation regarding low-cost improvements in the energy properties of the structure. By means of energy certificates which are arranged in a consumer-friendly manner, energy consumption and requirements become criteria when selling and leasing. In this way, supported by the funding programmes, incentives are initiated regarding energy-related improvements. With the exception of certain small residential buildings with less than 4 accommodation units, in principle, one is free to choose whether actual energy consumption or the calculated energy requirements is to be taken as a basis in the certificate.

Planned measures:

- A wide-reaching information campaign applied over the long term which is concerned with the qualifications of designers and ensuring the quality of their trade, clearing offices, evaluations.

8.1.6 Cross-sectoral measures (continuation)

Cross-sectoral (measures)			
30	**"E-Energy" and "Smart Metering" technological competition**	**New / planned**	**Standard**

The Federal Ministry of Economics and Technology embarked on the technological competition entitled "E-Energy: a future energy system based on information and communication technologies" on 30 April 2007. This competition is designed to promote the development and testing of integrated concepts regarding the composition of approximately 3 to 5 E-Energy model regions. In this regard, the potential for modernising advanced information and communication technologies and the applications and services within the energy supply chain as a whole, from production to consumption via transport and distribution, which are based on this, are to be exploited.
The focal points of the E-Energy programme in terms of content are the seamless introduction of electronic business and legal transactions and the continuous integration and utilisation of digital technologies to optimise the electricity supply system as a whole.
"Smart metering" should also be included here. This facilitates the continuous recording of energy consumption combined with continuous consumer information by means of suitable feedback systems and also, if necessary, the establishment of tariffs which do not depend on consumption and, consequently, also an impulse to cut off unnecessary energy consumers.

Anticipated final energy savings as a result of the measures (min. [PJ] – max. [PJ])

Indicative energy savings target for 2016				Intermediate target for 2010			
Power coefficient 1		Power coefficient 2.5		Power coefficient 1		Power coefficient 2.5	
Total	of which electricity	Total	of which electricity	Total	of which electricity	Total	of which electricity
4–6	4–6	10–15	10–15	1–2	1–2	2.5–5	2.5–5

Characteristics regarding the calculation or assessment of final energy savings:
Private households sector: field test covering 1,000 private households. Average energy savings from one project - 10 %.
Trade, industry and service sector: field test covering 50 undertakings. Energy savings in relation to the project: 10 % on average. Achievable degree of penetration by 2016: 15 % of undertakings with 50-250 employees: 9,200 in the trade, industry and service sector.
Industrial sector: field test covering 50 undertakings. Energy savings in relation to the project: an average of 3 % for every participating undertaking. Achievable degree of penetration by 2016: 8 % of undertakings with 50-250 employees: 3,400.

Evaluation: Bottom up
Determining the average final energy savings achieved in the field tests; projection using the estimated degree of penetration

Cross-sectoral (measures)			
31	**Improving and expanding training and further education**	**Further development**	**Training and further education**

a) Systematic integration of energy efficiency know-how in college and vocational training
b) Development of training modules on energy efficiency topics in relation to vocational training and further education
c) Extending the offers of further education
d) Supplementation by a wide-reaching marketing campaign and training and further education measures

Training and further education measures, including information and motivational measures, are required in order to successfully apply the other instruments described and to achieve the estimates specified regarding achievable final energy savings in the amount indicated. A separate quantification of final energy savings achieved as a result of training and further education measures is not of any use for this very reason.

Cross-sectoral (measures)			
32	**Extending energy research in the area of improving energy efficiency**	**Further development**	**Research**

The Federal Ministry of Economics and Technology is laying down new points of emphasis in energy research in the area of energy-optimised building:
a) "Energy-efficient school" (energy-related redevelopment of school buildings. The aim is the 3-litre School up to the Plus Energy School)
b) "Energy-efficient town" (improving energy efficiency in towns and municipalities by integrating and networking new energy technologies in the supply engineering and building services engineering sectors)
c) Continuation of the energy-related application research in the building sector initiated by the Federal Ministry of Transport, Building and Urban Affairs

Anticipated final energy savings as a result of the measures (min. [PJ] – max. [PJ])

Indicative energy savings target for 2016				**Intermediate target for 2010**			
Power coefficient 1		**Power coefficient 2.5**		**Power coefficient 1**		**Power coefficient 2.5**	
Total	**of which electricity**	**Total**	**of which electricity**	**Total**	**of which electricity**	**Total**	**of which electricity**
2.5–3.5	0	2.5–3.5	0	1–1.5	0	1–1.5	0

Calculating or assessing final energy savings:
Data collected within the framework of the monitoring project shows an average final energy saving in accordance with the requirements of energy-optimised construction in the region of 210 kWh/m² a.
Surface volume of the focal point of funding over the last ten years: 266,000 m².
Based on current plans to update and extend the programme concerned with energy-optimised construction, a (conservative) estimate can be made of the medium- and long-term energy savings.

Evaluation: Bottom up
Energy consumption measurements in the context of concomitant research (short- and long-term monitoring)

8.2 Definitions and stipulations

This section provides definitions of terms which are not defined in accordance with Article 3 of the Directive on energy end-use efficiency and energy services which make a significant contribution to the content-related understanding of the National Energy Efficiency Action Plan.

Actors

see Obligated parties

Early Actions

Energy savings which arise in a certain year following the entry into force of the Directive on energy end-use efficiency and energy services on account of energy efficiency measures which were introduced in a previous year (not before 1995), and whose effect is permanent, may be taken into consideration when calculating annual energy savings. In certain instances, where circumstances justify this, measures initiated prior to 1995, but no earlier than 1991, may be considered.

Final energy sources

Energy sources received by the final customer. They result from secondary or, where applicable, primary energy sources, reduced by conversion and distribution losses up to the point of supply to final customers. They are available for conversion into useful energy. Examples include household electrical energy, district heating at the transfer station, heating oil in the final customer's oil tank, wood chips in front of the furnace.

Energy productivity

Quotient of Gross Domestic Product and primary energy consumption.

Sphere of activity

Technical or economic sector in which improvements in final energy efficiency are to be achieved, e.g. redevelopment of existing residential buildings.

Instrument

Political or legal stipulation, programme or market-oriented procedure for reducing final energy consumption, e.g. the Order on energy consumption labelling, the CO_2 building redevelopment programme.

Market partners

Undertakings, institutions or individuals which participate in the application of instruments or the implementation of measures in cooperation with the obligated parties.

Measure

The application of an instrument or the specific technical realisation of an energy efficiency improvement e.g. labelling household appliances with the EU label, improvements in the cladding.

Power coefficient

As per Annex II of the Directive on energy end-use efficiency and energy services, "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."

Undertakings as per Article 2 b) of the Directive on energy end-use efficiency and energy services

At its meeting which took place on 12 April 2007, the committee convened on the basis of Article 16 of the Directive on energy end-use efficiency and energy services put forward three definitions for undertakings as per Article 2 b) of the aforementioned directive which are under discussion:

I. Installation or enterprise which is included in the national emissions trading register and in respect of which total final energy consumption may be quantified using CO_2 data from the emissions trading register or other energy data. Using this data as a basis, the entire quantity of final energy consumed in the respective Member State which is deductible as per Article 2 b) can be estimated.

II. The smallest legal entity of which one or more installations involved in emissions trading are part. Use of data from the emissions trading register and statistics concerning all of the energy purchased by this legal entity. The latter can normally be obtained from the energy providers supplying the electricity.

III. The smallest economic entity of which the enterprises or installations involved in emissions trading are part. This economic entity also includes adjoining enterprises or those which are economically/technically associated with emissions trading installations which may be consulted when calculating the final energy quantities to be deducted.

Obligated party as per Article 2 a) of the Directive on energy end-use efficiency and energy services

"Providers of energy efficiency improvement measures, energy distributors, distribution system operators and retail energy sales companies", i.e. in principle, all actors who supply energy for end use to final customers. Small providers may be excluded by the Member State as per the definition laid down in Article 3 r).

However, this provision does not have any impact on calculating the desired volume of energy savings. It may be relevant when transposing the Directive into national legislation and administrative provisions which must take place by 17 May 2008 as per Article 18(1).

Economic (energy efficiency) potential

The possibility of reducing final energy consumption over the period 2008 to 2016 compared with 2002 assuming a constant quantity and utilisation framework, including the anticipated autonomous technical advances in the context of upcoming investment cycles, and on the assumption of a standard market rate of return as regards the economic lifespan.

8.3 List of abbreviations

A	Training and further education
EEAP	National Energy Efficiency Action Plan
EDL-RL	Directive 2006/32/EC on energy end-use efficiency and energy services
F	Fiscal
For	Research
Fö	Funding
GHD	Trade, industry and service sector
I	Information, motivation, communication
IND	Industrial sector
O	Regulatory law
PHH	Private households
S	Standard
SV	Voluntary agreement
SÜ	Cross-sectoral measures
V	Transport

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