



Federal Ministry  
for Economic Affairs  
and Energy



*A good bit of work*

---

# Making more out of energy

---

*National Action Plan on Energy Efficiency*

## Imprint

### Publisher

Federal Ministry for  
Economic Affairs and Energy (BMWi)  
Public Relations  
11019 Berlin, Germany  
www.bmwi.de

### Text and editing

BMWi

### Design and production

PRpetuum GmbH, Munich

### Status

December 2014

### Print

BMWi

### Illustrations

B. BOISSONNET – mauritius images (title), piai – Fotolia (p. 4),  
TaiChesco – iStock (p. 8), alexsl – iStock (p. 12), Gina Sanders –  
Fotolia (p. 13 oben), Lisa S. – shutterstock (p. 13 unten), Alex White –  
Fotolia (p. 14), akarapong – shutterstock (p. 15 links), Bruce Rolff –  
shutterstock (p. 15 rechts), demarcomedia – shutterstock (p. 16),  
vege – Fotolia (p. 18), iCreative3D – shutterstock (p. 22), Lisa S. –  
shutterstock (p. 25), Jorge Salcedo – shutterstock (p. 28), electriceye –  
Fotolia (p. 29), Bobkeenan Photography – shutterstock (p. 31),  
FILATOV ALEXEY – shutterstock (p. 33), auremar – Fotolia (p. 37),  
Mopic – shutterstock (p. 40), Elenamiv – shutterstock (p. 42),  
Robert Churchill – iStock (p. 43)

This brochure is published as part of the public relations work of the Federal Ministry for Economic Affairs and Energy. It is distributed free of charge and is not intended for sale. The distribution of this brochure at campaign events or at information stands run by political parties is prohibited, and political party-related information or advertising shall not be inserted in, printed on, or affixed to this publication.



The Federal Ministry for Economic Affairs and Energy was awarded the audit berufundfamilie® for its family-friendly staff policy. The certificate is granted by berufundfamilie gGmbH, an initiative of the Hertie Foundation.



**This publication as well as further publications can be obtained from:**

Federal Ministry for Economic Affairs  
and Energy (BMWi)  
Public Relations

E-mail: publikationen@bundesregierung.de  
www.bmwi.de

**Central procurement service:**

Tel.: +49 30 182722721

Fax: +49 30 18102722721

# Contents

Summary .....	2
Energy efficiency and energy saving – the key to economic success of the energy transition .....	4
<b>Part A: Goal, status and potential of German energy efficiency policy .....</b>	<b>7</b>
1. Targets and their achievement, need for action .....	8
2. Review: Energy efficiency policy in Germany .....	12
Information and consulting .....	13
Incentives through funding programmes .....	13
Regulatory law .....	14
Price signals and incentives mechanisms .....	15
International aspects .....	15
Research for the energy transition .....	16
Measures by federal states, municipalities and private initiatives .....	18
<b>Part B: New impetus – Energy Efficiency Strategy for the 18th legislative term .....</b>	<b>19</b>
1. Stepping up energy efficiency in buildings .....	22
Short-term measures .....	24
Long-term work process .....	26
2. Energy saving as an investment and business model: New impetus for energy services, energy efficiency technologies and competitiveness .....	29
Short-term measures .....	30
Long-term work processes .....	32
3. Individual responsibility for energy efficiency: Measure – Understand – Take action – Save .....	33
Short-term measures .....	34
Long-term work processes .....	38
4. Upgrading measures in transport .....	40
5. Stakeholder dialogue and monitoring .....	43
Energy transition platforms for energy efficiency and buildings .....	43
Monitoring .....	43
Figures and tables:	
Figure 1: Short-term measures and long-term work processes of NAPE for the 18th legislative term .....	6
Figure 2: Development of non-adjusted primary energy consumption by energy source in PJ .....	9
Figure 3: Development of primary energy consumption by energy source in PJ .....	9
Figure 4: Comparison of scenarios to 2020 .....	10
Figure 5: Primary and end-user energy in Germany .....	11
Figure 6: Learning curve for energy-efficient construction .....	17
Table 1: Central measures in NAPE .....	21

# Summary

Energy efficiency is the twin pillar of the energy transition. The National Action Plan on Energy Efficiency (NAPE) sets out the Energy Efficiency Strategy of the Federal Government for the 18th legislative term. Energy efficiency and energy saving are more than just catchwords, because global demand for energy will continue to grow and this will also make itself felt in the future price. Alongside the ongoing expansion of renewables, the efficient use of energy therefore makes up the other key element for maintaining Germany's leading global position as a business location. It is about more than just saving energy to reduce costs for industry, business or private consumers: It will entail new business models, innovations for energy-saving measures and innovative new products, where German industry can succeed on world markets. At the same time, energy efficiency makes up a major component of the investment strategy for Germany. Energy efficiency investments usually yield a higher rate of return than current long-term investments on the capital markets. Especially in smaller and medium-sized enterprises, this can amount to 20 to 25 percent. This highlights the huge potential afforded by higher energy efficiency.

NAPE aims to convince all stakeholders of the need to raise energy efficiency and involve them in these efforts. It seeks to show them the scope and opportunities and provide evidence confirming the benefits of a commitment to energy efficiency. With an intelligent mix of consulting, communication and information about lucrative efficiency measures, funding facilities and standards for new installations, NAPE contains a set of instruments to motivate companies and consumers to raise energy efficiency and take an initial step towards harnessing the enormous potential. It defines short-term measures and longer-term work processes that will form the core of the Energy Efficiency Strategy for the 18th legislative term.

The central short-term measures of NAPE include:

- Introducing new competitive tendering for energy efficiency;
- Raising funding for building renovation (CO<sub>2</sub> Building Renovation Programme) and introducing tax incentives for efficiency measures in the building sector supported by the Federal Government and state governments. The Federal Government will soon hold talks with the federal states on implementing tax incentives so that a final decision can be made by the end of February 2015 at the latest;
- Setting up energy efficiency networks together with business and industry.

With the introduction of the competitive tendering scheme for energy efficiency measures, we are looking to promote specific projects that can make energy savings with the lowest financial outlay. Increased funding for building renovation is aimed in particular at mobilising the efficiency potential in non-residential buildings that has been neglected so far. Tax incentives for efficiency measures in the building sector will animate home owners to look for specific efficiency potential for their own benefit but it will also lower energy costs for tenants in rented property. Establishing 500 energy efficiency networks together with business associations will enable trade and industry to exchange experience on strategies for worthwhile energy efficiency measures and help many enterprises harness the efficiency potential with a high return on investment.

NAPE also comprises the longer-term work processes for the 18th legislative term. We will develop an Energy Efficiency Strategy for Buildings that besides individual renovation roadmaps will also take account of the functions of buildings and the needs of residents. We will make sustainable improvements in the framework for energy efficiency services to foster new business opportunities for new participants in the energy market. New financing schemes to translate future efficiency gains into liquidity for current investments will improve the investment climate for energy efficiency measures in the long term. We will systematise energy efficiency consulting and define quality criteria for energy consultants in individual fields of application.

Essentially, the National Action Plan on Energy Efficiency defines cross-sectoral energy efficiency measures for the benefit of all stakeholders. Its three cornerstones are:

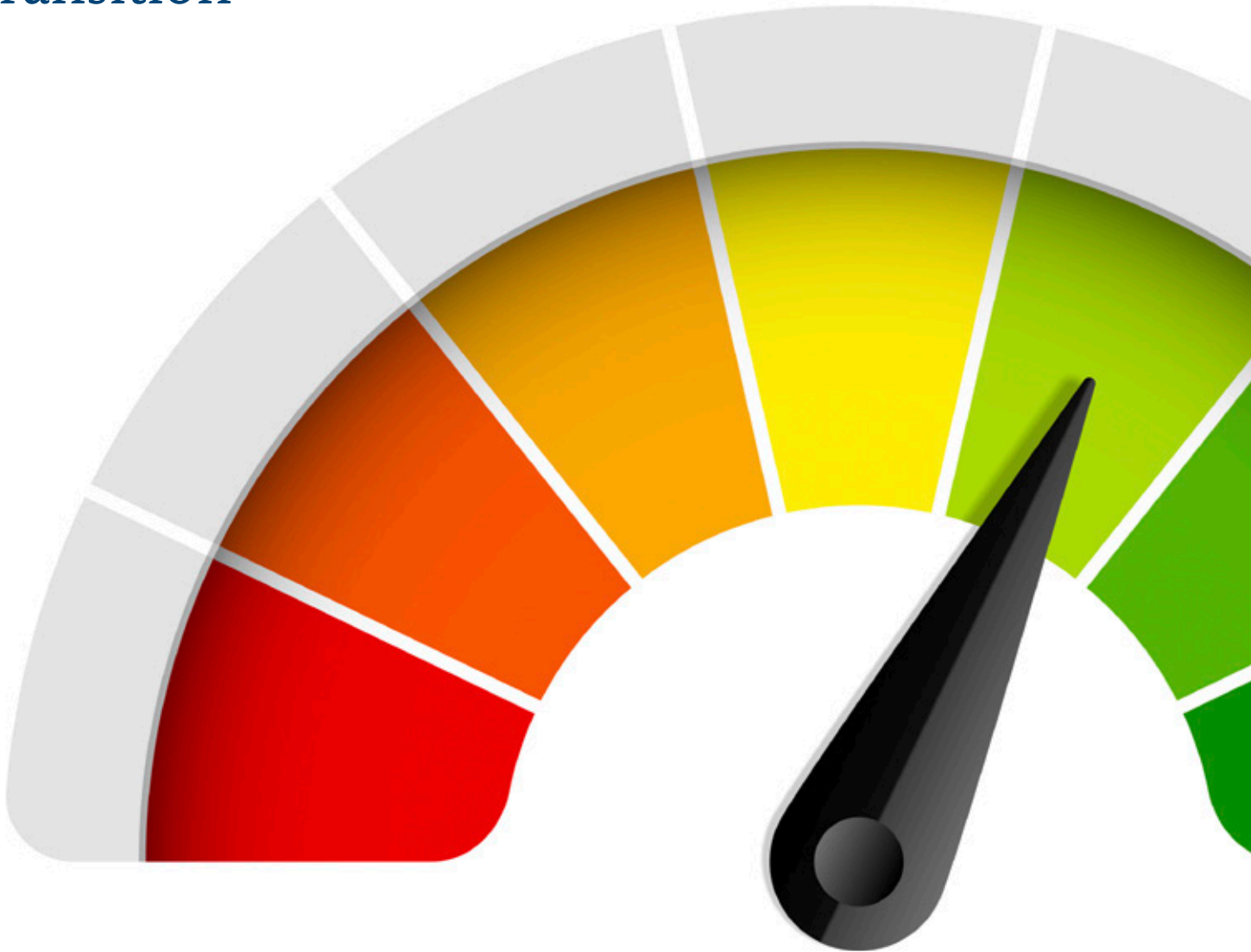
1. **Stepping up energy efficiency in the building sector**
2. **Establishing energy efficiency as an investment and business model**
3. **Increasing individual responsibility for energy efficiency**

With this basic triad, the Federal Government is breaking new ground in energy efficiency policy. In addition, the measures in the transport sector detailed in the Climate Action Programme 2020 will make a major contribution to reducing the consumption and improving the efficiency of energy.

The NAPE measures will enable us to make a major contribution to the Federal Government's goals of increasing energy efficiency and meeting its climate mitigation target.

Where they affect the revenue or expenditure side of the federal budget – the NAPE measures must fit in with the overall budget policy strategy of the Federal Government. Provided they are not funded from the announced package of measures for future investments especially for public infrastructure and energy efficiency, this means that the measures must be generally financed under their own policy portfolio.

# Energy efficiency and energy saving – the key to economic success of the energy transition



With its energy transition, Germany has embarked on a comprehensive and deep-reaching transformation of its energy supply and use. Up to now, the central concerns have been phasing out from nuclear energy, the expansion of new power generating capacities from renewable energies, the attendant demands on infrastructure (grids, storage facilities) and conventional power production. To succeed, however, the energy transition needs the support of a **twin pillar: reducing energy consumption by raising energy efficiency**. This is also essential for achieving the climate mitigation targets. At the same time, energy efficiency will make a major contribution to energy security.

**Energy is essential for our economic system to function and it also has its price.** Supplying affordable, secure, environment-friendly and climate-friendly energy will

pose growing challenges in the medium and long term. As demand continues to rise particularly in the emerging economies, global competition for energy and fuels will intensify. Rising energy prices will place a burden on the German economy as a whole and on end-users both in industry and trade and the private sector. At the same time, although the supply of renewable energies is unlimited in theory, the respective technologies for the production of power and heat are very capital-intensive, so they too must be put to economical and efficient use. This is the only way to ensure affordability and systemic integration and minimise competing uses. Economically viable energy efficiency technologies are already available today and are already being given flanking support through innovation and research promotion and market introduction measures to strengthen the innovative power of German industry. In



most sectors, energy consumption can already be reduced with the available energy efficiency technologies to effectively lower energy costs. Many energy efficiency investments are already worthwhile today.

The bulk of fossil fuels needed in Germany today is imported from abroad; in 2013 alone, the costs of this came to 92 billion euros (Progress Report). While energy trading is generally a desirable thing, energy imports also create dependencies. One way to reduce these is higher energy efficiency.

**Energy efficiency is a major component of the investment strategy for Germany.** Recent expenditure for total final energy consumption in Germany amounted to about 356 billion euros, making up about 13.5 percent of gross

domestic product. Energy efficiency measures will contribute to reducing energy spending. In economically viable energy efficiency investments, the initial outlay, for the requisite technologies, for example, is exceeded by savings in energy costs in the medium and long term. These kinds of energy efficiency measures yield a positive return on investment and are not just worthwhile for the economy as a whole, but also for the individual investor. Energy efficiency investments can also generate a higher yield for the investor than the returns currently available on long-term (conservative) capital market investments. Experience shows that the average investment yield from many energy efficiency measures, by small and medium-sized enterprises, for example, can be as much as 20 to 25 percent. In private households as well, energy efficiency investments can afford a distinct yield advantage over conservative types of investment, such as saving certificates, especially if the energy-efficient renovation of buildings is combined with pending maintenance measures that need to be taken anyway. Moreover, energy efficiency investments also boost the economy as a whole to generate more value added, employment and innovation in Germany. Many energy efficiency measures are therefore already being carried out today, but there are also still too many obstacles preventing a broad mobilisation of efficiency potential.

For the implementation of the energy transition and therefore also for effective climate mitigation, energy efficiency efforts are inseparably bound up with renewables expansion. Only with the right energy efficiency strategy can we effectively transform our power supply to meet our economic, environmental, social and societal goals, because the efficient use of energy can contribute to all the aims of the energy-policy triad alike (environment-friendly, secure and affordable supply).

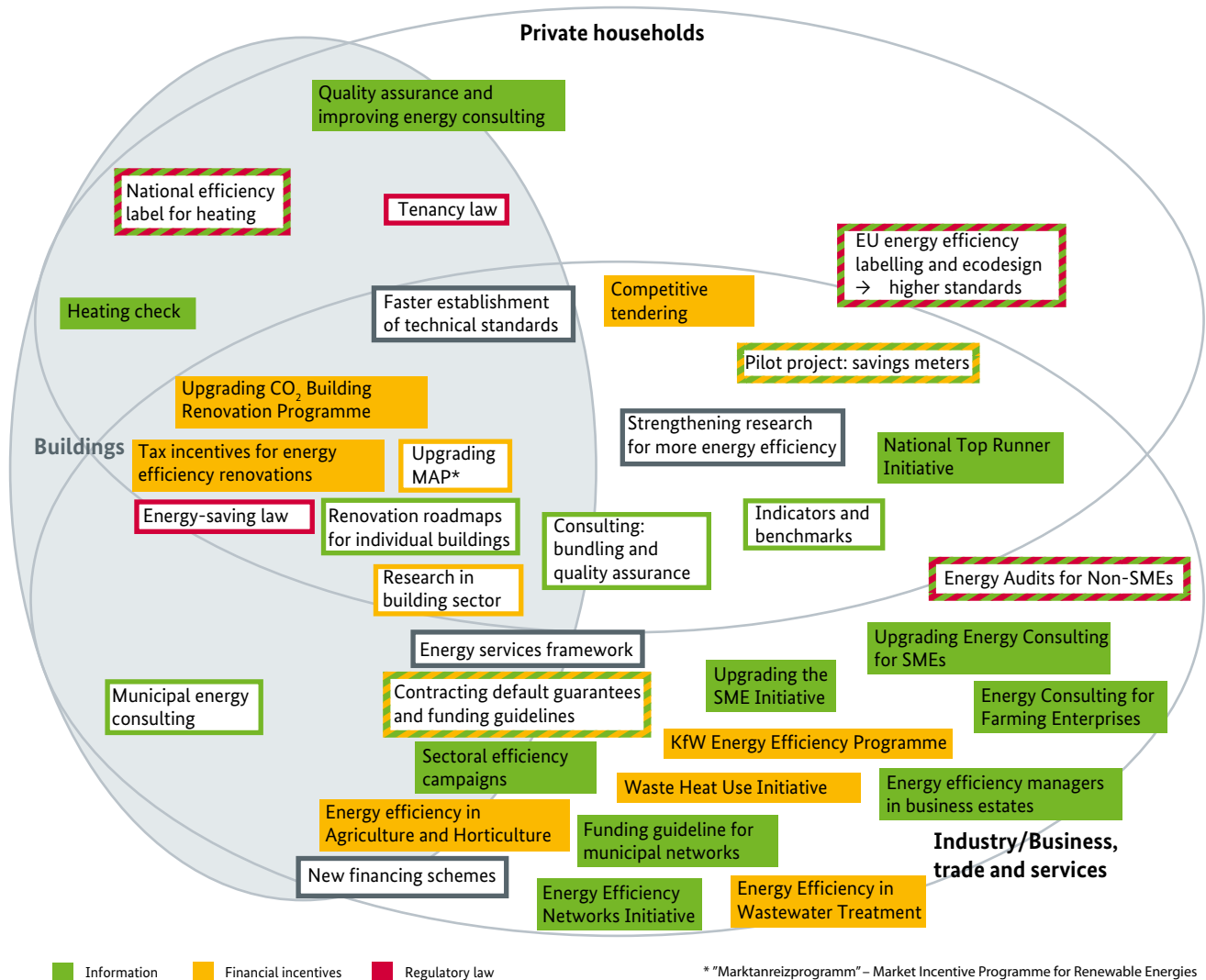
That is why the Federal Government has devised the National Action Plan on Energy Efficiency (NAPE) as its **Energy Efficiency Strategy for the 18th legislative term.** The task of government is to set the parameters and incentives to harness the available potential for raising energy efficiency in the most cost-effective way. The aim must be to involve all stakeholders in energy saving efforts and increased investments in energy-efficient technologies and innovations. As raising energy efficiency is frequently already a worthwhile undertaking for enterprises and end-users today, it need not be left to government intervention alone. This is why NAPE also highlights the scope and responsibility of the various stakeholders for progressively raising energy efficiency as a task for society as a whole.

The key for raising energy efficiency is for companies and consumers to know their own energy consumption and then take action to reduce it. The Energy Efficiency Strategy of the Federal Government identifies the main fields of activity and specifies short-term measures and long-term work processes for each. It combines instruments for information and transparency, incentives and regulatory law in

an intelligent mix. As Figure 1 shows, the measures for raising energy efficiency are largely cross-sectoral in scope.

The proposed measures will also meet the national energy savings targets under the EU Energy Efficiency Directive in full.

Figure 1: Short-term measures and long-term work processes of NAPE for the 18th legislative term





Part A:  
Goal, status and potential of  
German energy efficiency policy

# 1. Targets and their achievement, need for action

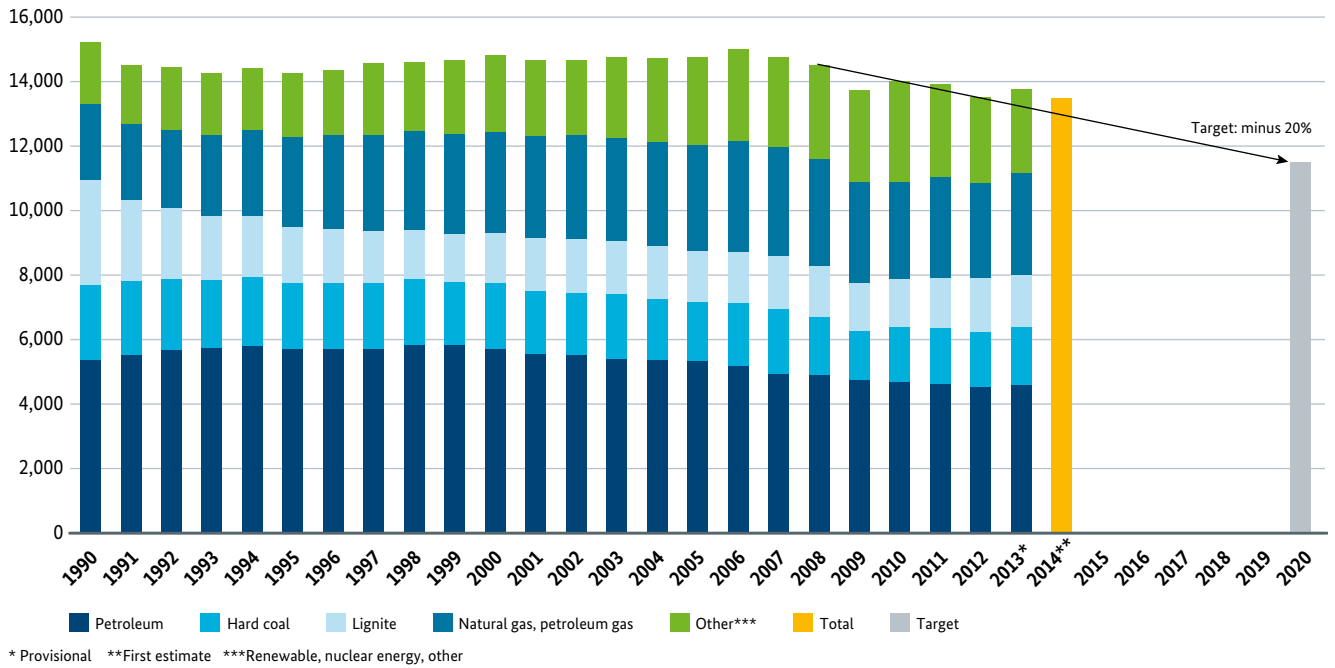


The targets set by the Federal Government in its Energy Concept of 28 September 2010 for reducing energy consumption compared with the baseline year 2008 – particularly the 20 percent reduction of primary energy consumption (PEC) by 2020 and 50 percent by 2050 – still form the basis and frame of reference for its policy. Besides the targets for greenhouse gas reduction and the expansion of renewable energies in its target triad for 2030 of October 2014, the European Union has also made a commitment to a minimum 27 percent saving in primary energy consumption measured against a reference trend by 2030. This target will be reassessed by 2020 with a view to raising it to 30 percent.

A detailed description of the targets and measures for the energy transition is given in the Federal Government's Progress Report. Concurrent with the National Action Plan on Energy Efficiency (NAPE), the Federal Government has also finalised the Climate Action Programme 2020. This sets out the measures it plans to take – also beyond the National Action Plan on Energy Efficiency – to meet its climate target for 2020.

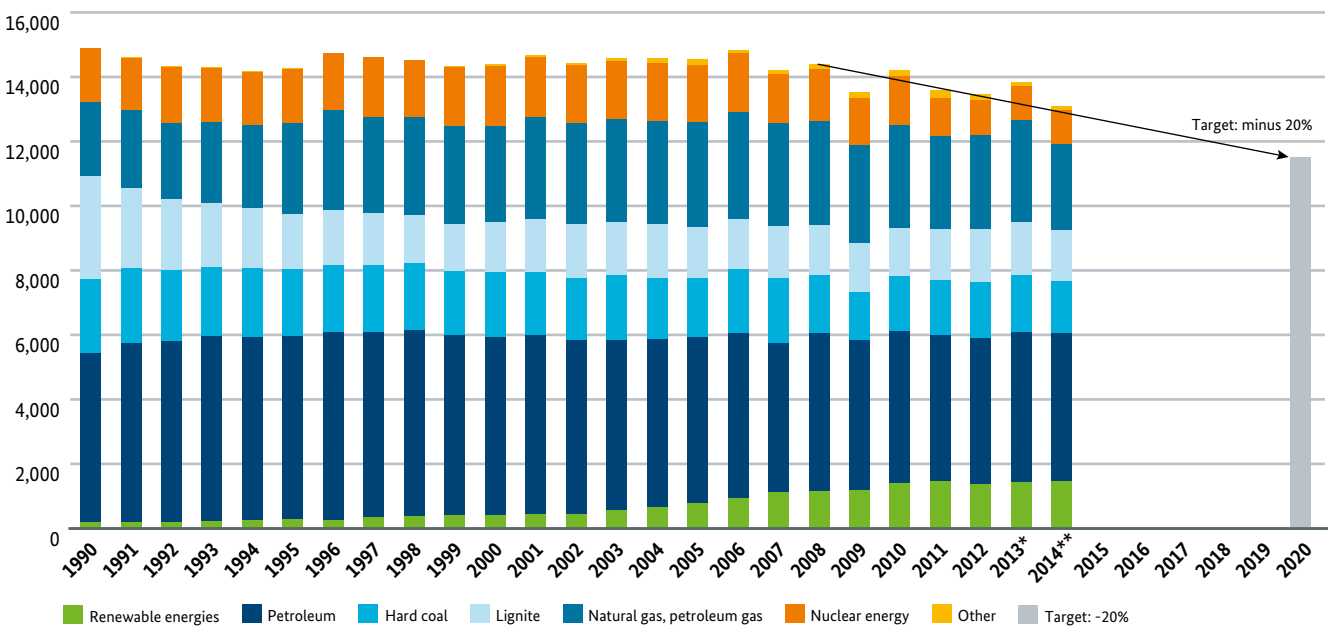
Adjusted for temperature, primary energy consumption (PEC) in the Federal Republic of Germany from 2008 to 2013 declined by 5.1 percent or more than 700 PJ (Source: AG Energiebilanzen 2014).

**Figure 2: Development of primary energy consumption by energy source**  
Adjusted figures in petajoules (PJ)



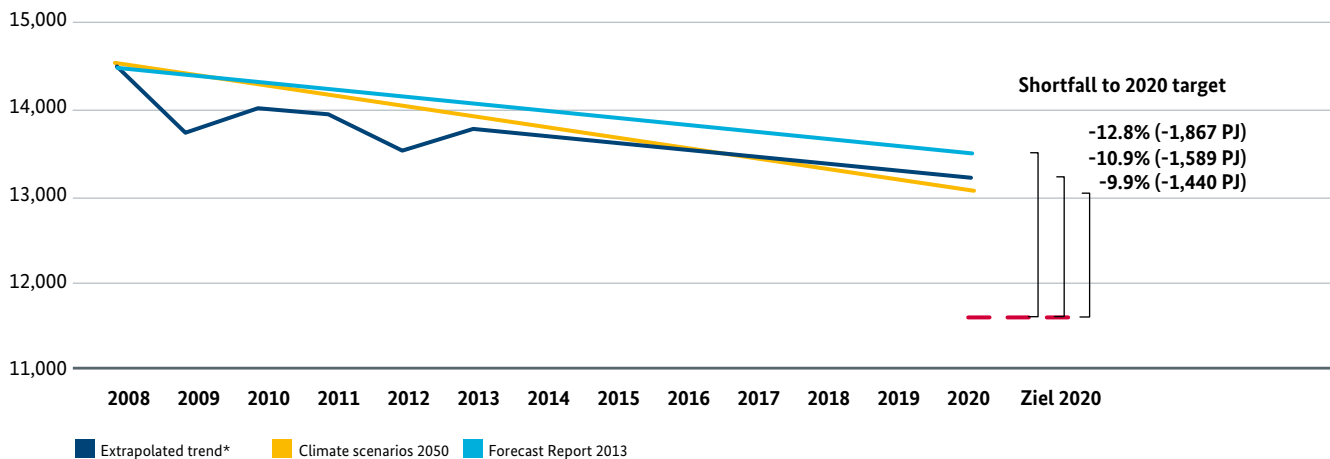
\* Provisional \*\*First estimate \*\*\*Renewable, nuclear energy, other  
Source: AG Energiebilanzen.

**Figure 3: Development of primary energy consumption by energy source**  
Non-adjusted figures in petajoules (PJ)



\*Provisional \*\*First estimate  
Source: AG Energiebilanzen.

**Figure 4: Comparison of scenarios up to 2020 according to Forecast Report, climate scenarios, extrapolated trend as well as the resulting shortfall to PEC target for 2020**  
PEC non-adjusted (PJ)



\*Based on statistics from 2008 to 2013 (as of 2014)

Sources: Fraunhofer ISI/IFAM, Prognos, Ifeu, Ringel, Ziesing, 2014.

According to an initial estimate by the Arbeitsgemeinschaft Energiebilanzen (Working Group on Energy Balances) based on the first nine months non-adjusted primary energy consumption in Germany will decline by five percent in 2014. Adjusted for the effects of the extremely mild winter, it is expected to be two percent below the previous year's figure.

Absolute primary energy consumption is expected to decline further by 2020. Various scenario calculations – especially the measures scenario from 2012 (from climate mitigation scenarios in 2012) and the Forecast Report of 2013 – and the extrapolated trend based on statistical data predict (without additional measures) a reduction of 7.2 percent to 10.1 percent by 2020 in comparison with the baseline year 2008 (see Figure 4). Progress made so far and the energy-saving measures conducted in the last few years will therefore still not be sufficient to meet the national energy efficiency targets.

This means that a substantial additional PEC reduction of at least 1,400 PJ will be necessary to meet the PEC target in the Energy Concept by 2020. It must, however, be borne in mind that the scenarios cited do not account for energy efficiency measures adopted since October 2012. These include in particular the stricter provisions in the Energy Saving Ordinance (EnEV 2013), the already completed replenishment of the CO<sub>2</sub> Building Renovation Programme

by 300 million euros to a current 1.8 billion euros in annual programme funding and the introduction of programmes for the promotion of energy efficiency in industry. These measures are expected to make for an additional reduction in energy consumption of about 43 PJ (about 2.5 million tonnes of CO<sub>2</sub>-equivalent) by 2020 and have to be included accordingly in the overall assessment.

Primary energy consumption in 2020 is, however, not the only evaluation yardstick for the Federal Government. Also of crucial importance in all energy efficiency measures is to keep a balanced view of long-term target achievement by 2050, for which the 2020 target will be a decisive milestone.

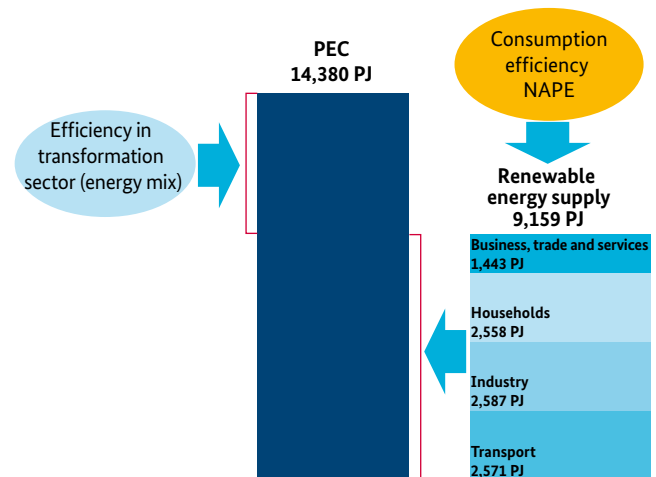
This is why in addition to the short-term measures the Federal Government has set out another ambitious programme with long-term work processes for raising energy efficiency.

Primary energy consumption provides a picture of the production and consumption side. It is a measure of how much energy is needed to provide and distribute the requisite power in Germany and make it available as 'final energy', such as electricity, for the end-user. PEC can therefore be reduced by lowering final energy consumption, e.g. by raising energy efficiency: When less energy is used, less energy must be supplied (consumption efficiency). With equal final energy consumption, however, PEC also depends on effi-

ciency in the generation and use of renewable energies. In energy statistics terms, for example, PEC will also decline, if fossil fuels are replaced by renewable energies. It will also diminish if fossil fuelled power and heat generators are replaced by more efficient facilities (production efficiency).

In addressing final energy consumption, NAPE therefore bundles demand-side measures to reduce energy consumption (consumption efficiency). This is illustrated in Figure 5. The Climate Action Programme also includes additional measures for reducing energy consumption.

**Figure 5: Primary and final energy in Germany (figures from baseline year 2008) and NAPE approach**



Sources: Federal Ministry for Economic Affairs and Energy, AG Energiebilanzen.

## 2. Review: Energy efficiency policy in Germany



Germany has a broad mix of instruments at its disposal for raising energy efficiency and among those of the industrialised countries that have already made tangible progress in decoupling energy consumption from economic growth. Investments in energy efficiency by households and industry boost growth and employment. In the central sector of energy-efficient building renovation, the German Institute for Economic Research (DIW) estimates investments for 2013 of about 39 billion euros in existing residential buildings and about 15 billion euros in existing non-residential buildings.

Energy efficiency instruments, such as public funding and regulatory measures, have been successful in advancing energy efficiency investments. According to a recent study (GWS, Prognos, EWI, 2014), thanks to the government energy efficiency measures introduced since 2010, additional net investments of about four billion euros were made in 2012 and some five billion euros in 2013. In particularly large part, these additional investments were

made by private households but also by industry and business, trade and services. Experience shows that economically viable investments can also halve energy consumption in parts of the commercial sector as well.

The Federal Government has also promoted efficiency measures as a way to facilitate the development and dissemination of innovative energy technologies from Germany. This will also afford enterprises new opportunities on international markets. For example, Germany exports a significant amount of products that are applied in efficiency measures for the rational use and conversion of energy, such as energy efficient electrical appliances, insulation materials or energy efficient components for production processes.

Continued development of successful energy efficiency policy will also support future economic growth in Germany. Various approaches are being pursued here.

## Information and consulting



Information and consulting make up key elements of German energy efficiency policy. Independent and reliable information and comparative data are essential for businesses and private households or the public sector (central government, federal states and municipalities) to make competent investment decisions and to be able to better understand, gauge and assess their own energy consumption and the impacts of energy efficiency measures. Only then can market participants make (energy-conscious) informed decisions. This is why the Federal Government promotes information and advisory services for different target groups.

For example, **consumer protection organisations** and the campaign, **Stromspar-Check PLUS**, provide energy advice to private households. In addition to advisory services, up to the end of 2015 Stromspar-Check PLUS provides/installs simple energy-saving devices for low-income households free of charge and under certain conditions grants a subsidy for the purchase of a high energy efficiency refrigerator. Via the programme, **On-site Energy Consulting**, run by the Federal Office for Economic Affairs and Export Control (BAFA), home owners can obtain an individualised refurbishment plan (see also Chapter B.1).

The programme, **Energy Consulting for SMEs** and the **SME Initiative for the Energy Transition and Climate Protection** supported by the Federal Government together with the German Association of Chambers of Industry and Commerce (DIHK) and the German Confederation of Skilled Crafts (ZDH), for example, specifically target businesses. Moreover, the Federal Government finances the comprehensive energy efficiency campaigns of the German Energy Agency (dena), which provide additional information for diverse target groups (such as the **Energy Efficiency Campaign, Future House and Building Transition**).

Federal advisory services must be developed further to meet target-group needs and conditions and need to be better harmonised in the future. Special attention will continue to be paid to the quality of consulting.

## Incentives through funding programmes

Advisory and information services are supplemented by specific financial incentives to enable target groups to carry out energy efficiency measures in the various fields of application. The funding programmes help to encourage changes in behaviour and set an example by establishing best practices.

Among the programmes for energy-efficient construction and renovation set up by KfW, the federal **CO<sub>2</sub> Building Renovation Programme** is the largest funding instrument in Germany and will be continued, further developed and increased. Energy efficiency measures in buildings are supported with low-interest loans and in part repayment or alternatively investment grants (see Chapter B.1).

The **Guidelines for the support of measures to utilise renewable energies in the heat market** (Market Incentive Programme for Renewable Energies, MAP) promote investments in renewable energy use largely in existing buildings, heating grids and storage facilities supplied from renewable energies. This also saves on fossil fuels, while contributing to attaining the climate-policy targets of the Federal Government at the same time.



Under the **KfW Energy Efficiency Programme**, small and medium-sized enterprises (SMEs) can obtain low-interest loans to finance energy efficiency measures (e.g. in building services and energy technology, building envelopes, machinery, process cooling and heat, heat recovery/waste heat use, metrology and control engineering and information and communications technology).

Also aimed at businesses is the federal programme, **Promotion of High-efficiency Cross-cutting Technologies**, which promotes the replacement of inefficient electromotors, pumps, pressurised air systems, etc. with high-efficiency installations and systems optimisation. The programme, **Promotion of Energy-efficient and Climate-friendly Production Processes**, helps enterprises select the most energy-efficient and environment-friendly investments when planning their production processes. Support is also given for the introduction of energy management systems.

The **Promotion of Measures for Refrigeration and Air-conditioning Equipment** is also aimed at businesses. This programme also includes its own advisory component. The **Promotion of Mini-block-type Thermal Power Stations** up to 20 kW supports installations that provide particularly efficient energy in residential and non-residential buildings.

Under the permanent **Federal Government Programme for the Promotion of Safety and Environment in Road Haulage Companies with Heavy Commercial Vehicles** set up in 2009, the procurement of telematics equipment is, for example, eligible for assistance as a measure to raise energy efficiency.

### Regulatory law

Another major approach in energy efficiency policy is the set of instruments for setting standards in new products or investments. Many of these standards stem from the requirements set by the European Union and Germany utilises them to establish high energy efficiency standards.



The **Energy Saving Ordinance (EnEV)** sets minimum requirements for the quality of energy performance in the envelopes and technical installations of new buildings and larger-scale renovations of existing buildings (see also Chapter B.1).

The directly applicable EU-wide provisions on the **energy labelling of products** ensure that the consumer is already informed about the energy performance of an article prior to purchase and can take his decision accordingly. This ensures transparency and sets a powerful incentive for manufacturers to design more energy-efficient products. The requirement that suppliers and dealers apply the familiar energy label with the efficiency classes from A to G is based on the EU Energy Labelling Directive and EU regulations on individual product groups. With provisions for the necessary market surveillance and sanctions for infringements, the Compulsory Watt Labelling Act (EnVKG), Compulsory Watt Labelling Ordinance (EnVKV) and Passenger Car Fuel Efficiency Labelling Ordinance (Pkw-EnVKV) ensure that these requirements are implemented.

The European regulations on CO<sub>2</sub> reduction for cars and light commercial vehicles set targets for average CO<sub>2</sub> emissions from new vehicles in the EU. These regulations currently make a substantial contribution to reducing energy consumption in transport.

By specifying minimum standards for individual product groups, the requirements for the **design of energy-related products (ecodesign)** make a major contribution to improving energy efficiency. Exploiting potential savings does not just make sense for consumers, it also helps industry gain competitive advantages, because the efficient use of energy enables companies to cut production costs. The EU Ecodesign Directive and product-specific regulations provide the basis for setting binding minimum requirements for the environment-friendly design of energy-related products. Currently, implementing regulations are in force for 23 product groups. The Energy-related Products Act (EVPG) and the EVPG Ordinance regulate the necessary powers of market surveillance authorities in the federal states.

For installations requiring authorisation, the Federal Immission Control Act (BImSchG) contains provisions on the economical and efficient use of energy and is subject to continual review, which also includes issues of improving enforcement, for example.



The EU Energy Efficiency Directive that entered into force on 4 December 2012 provides a comprehensive framework to ensure that the EU reaches its 20 percent higher energy efficiency target by 2020 and that energy efficiency improvements are prepared for after that date. The measures include the specification of national energy efficiency targets for 2020, an annual refurbishment rate for federal properties of three percent, energy savings by end-users of 1.5 percent a year and raising energy efficiency in transformation, transmission and distribution.

### Price signals and incentives mechanisms



Price signals can also set incentives for energy-efficient behaviour. External effects, such as the environmental impacts of energy consumption, are translated into energy prices through energy use tax, for example. This can exert an influence on the decision-making criteria of energy consumers. Separate from this are individual economic and social impacts resulting from the overall set of instruments and these must also be taken into consideration.

At the same time, exemptions are also granted so as not to impair the international competitiveness of manufacturing firms and energy-intensive industries in particular. These concessions are frequently contingent on making effective contributions to climate and energy policy in exchange. For example, relief is only granted as part of **tax capping under the Energy Tax Act and the Electricity Tax Act**, if the enterprises concerned operate an energy or environmental management system (in SMEs, running an alternative system) and the manufacturing sector as a whole reduces its energy intensity in keeping with statutory targets. The **special compensation arrangement under the Renewable Energy Sources Act** is contingent on similar requirements.

With its **Electromobility Programme** of 18 May 2011, the Federal Government has already adopted diverse measures for promoting electromobility. To increase the financial incentive for purchasing an environment-friendly electric vehicle, the present five-year **motor-vehicle tax exemption** confined to all-electric-driven passenger vehicles has been extended to include all types, provided these are also all-electric-powered.

To give a special impetus to speed up the development of this market, the funding period for promoting electromobility for motor vehicles registered for the first time by 31 December 2015 has also been extended by another five years to a total of ten years.

The reform of the motor vehicle tax has also made a contribution in the transport sector.

### International aspects

Measures for raising energy efficiency play an important role in supply security and international climate mitigation. By supporting reliable and sustainable energy supply, curbing energy costs, lessening dependencies on energy imports and curtailing climate-damaging carbon emissions, progress in raising energy efficiency contributes to coping with global challenges in energy and climate policy. Together with other industrialised nations, Germany is also leading the way in developing and disseminating energy-efficient technologies at international level. Here, the Federal Government supports the global improvement of energy efficiency both at bilateral and multilateral level. In an energy-policy dialogue, it also seeks to enlist the support of others for the energy transition.



To alleviate Germany's heavy dependency on fuel imports and achieve the goals of the energy transition, under the leadership of the Federal Ministry for Economic Affairs and Energy and the Federal Foreign Office, the Federal Government has in recent years entered into a number of bilateral **energy partnerships** with major energy-producing, energy-transit and energy-consuming countries. Energy partnerships entail regular, structured energy-policy dialogue at government level and the active involvement of business and industry in practical cooperation. They currently include India, China, Brazil, Russia, South Africa, Morocco, Tunisia, Kazakhstan, Nigeria and Turkey. Working groups have been appointed in some of these partnerships that are specifically devoted to exchange on energy efficiency issues.

At **multilateral level**, Germany is an active member of the International Partnership for Energy Efficiency Cooperation (IPEEC). The Federal Government is also involved in various energy efficiency initiatives in international organisations and forums, such as the International Energy Agency (IEA) and the Clean Energy Ministerial (CEM).

The Federal Government communicates the contents and goals of the German energy transition at international level to forge alliances, allay current misgivings and support German industry in its export efforts. German businesses are becoming increasingly aware of the economic potential on the international market for energy efficiency products. With its **Energy Efficiency Export Initiative** since 2007, the Federal Government has been taking measures to flank and support efforts by German suppliers of energy-efficient products, systems and services to access foreign markets. The aim is to promote German know-how internationally, increase the market potential for German energy efficiency technologies abroad and strengthen Germany as a business location.

The Federal Government cooperates on an ongoing basis with partners in Europe and the European Commission to expand renewable energy use and raise energy efficiency at European level as well. Concerted collaboration within the European Union helps to advance the goals of the energy transition also in relations with international partners. A major step at EU level was setting a new EU energy efficiency target for the period after 2020 to 2030.

### Research for the energy transition



Innovations and new energy technologies play a major role for the successful implementation of the energy transition. With its promotion of research in energy technologies, the Federal Government aims to meet its targets in the energy sector and its commitments in climate mitigation policy. An economic policy goal is also to extend the leading position of German firms in modern energy technologies. By broadening the range of technical options for energy transformation and use, energy research also contributes to supply security. This will afford scope for adapting power supply to the changed parameters in the energy sector.

Under its 6th Energy Research Programme, in 2013 the Federal Government allocated about 297 million euros for projects to promote energy efficiency along the whole energy chain – from transportation, distribution and storage to end use in various sectors. In industry, crafts, trade and services, project funding ranges from the energy-efficient rationalisation of individual process stages to the development and introduction of new technologies and system components to complex supply and waste heat recovery schemes. Parallel to this, cross-sectoral cross-cutting technologies will also be upgraded, such as heating and cooling technologies, milling and separation processes and metrology and control technologies. Moreover, the programme will promote the development of new types of process technologies in particular. An increasingly important topic is the interaction of several production processes with energy flows in the whole building. In the project, eta-Fabrik, for example, a pilot factory is currently being constructed to research and optimise energy interactions in metalworking operations. The involvement of an industrial consortium as early as the planning phase will improve the chances for subsequent dissemination. Other fields are rationalising the operation of fossil-fuelled power stations, power generation from hydrogen and interdisciplinary topics, such as energy storage systems or viable power grids for the future.

In view of its importance for the energy transition, the building sector makes up a special priority of research promotion in energy efficiency. A comparison of the development curves of statutory minimum requirements and research activities in buildings shows that research findings have been successfully adopted in building practices (Figure 6).

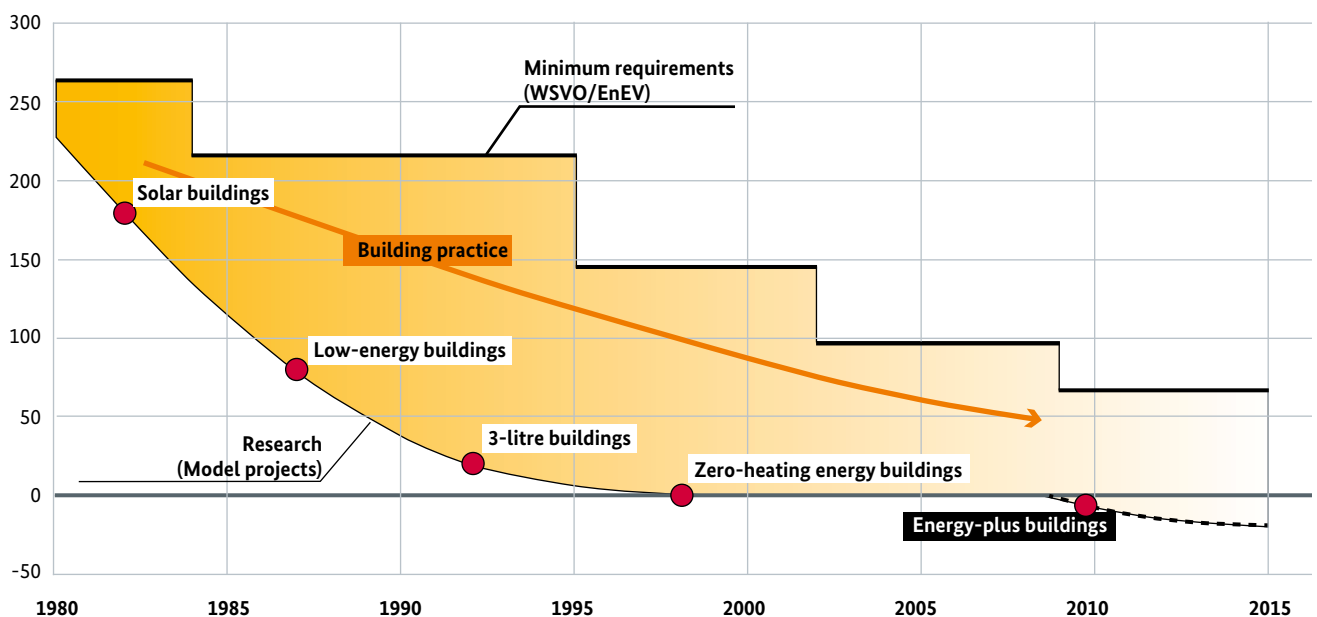
In the Energy Research Programme, the Federal Government supports research and development in energy-efficient buildings and cities with the research initiatives, Energy-Optimised Building (EnOB), Energy-Efficient Cities (EnEff:Stadt) and Energy-Efficient District Heating and Cooling Supply (EnEff:Wärme). Funding allocated in 2013 in this sector reached 57 million euros for 316 ongoing projects. The three research initiatives focus in part on new materials and processes, innovative technologies and systems and planning schemes for energy-optimised buildings and districts. Innovations are carried out and tested for practical feasibility in pilot projects. Accompanying action research documents, analyses and disseminates the findings. Finally, optimising energy-efficient operations builds a bridge from the application of innovative technologies and concepts to construction and operational practice.

With the research initiative, Materials Research for the Energy Transition and the competition, Energy-Efficient City, the Energy Research Programme addresses basic research issues, including in buildings. Forty million euros has been earmarked for this. Construction research also contributes to developing sustainable buildings.

The Federal Government is also stepping up its research efforts with measures outside the Energy Research Programme with the specific aim of harnessing synergies to mobilise energy efficiency potential in relevant areas:

- With the help of smart circuits, higher performance semi-conductor materials and improved electronics packaging, substantial efficiency gains can be made in power electronics in industry.
- At research campuses for long-term cooperation between the scientific community and business and industry, research is being conducted on improving energy efficiency in lightweight vehicle construction, electromobility and gas and power grids. Up to 120 million euros has been earmarked for this over a term of 15 years.

**Figure 6: Learning curve for energy-efficient construction**  
Primary energy requirement in kWh/m<sup>2</sup>a



- Under the Framework Programme Research for Sustainable Development (FONA), the Green Economy Initiative places a focus on the sustainable use of energy and raw materials and harnessing energy efficiency potential through networked power supply systems and the use of waste heat in various industrial sectors.

### Measures by federal states, municipalities and private initiatives

The Federal Government is not alone in promoting higher energy efficiency. Numerous activities at federal state and municipality level also contribute to this. In addition, the federal states also play a decisive role in implementing regulatory provisions in the Energy Saving Ordinance and the EU Ecodesign Regulation, because federal state authorities are responsible for supervising these. There is also room for improvement here. The Federal Government is therefore interested in close exchange with the federal states, which takes place regularly in the relevant central and federal state government working groups. There are also a large number of private actors – from business and environmental associations, to social welfare organisations to individual companies – that also initiate and conduct successful projects for raising energy efficiency.



Part B:  
New impetus – Energy Efficiency  
Strategy for the 18th legislative  
term

The National Action Plan on Energy Efficiency sets out the Energy Efficiency Strategy for the 18th legislative term. One of its major goals is to raise awareness of the economic viability of energy efficiency measures in all sectors. Particularly under present conditions, the return on energy efficiency measures is already higher today than the yield from standard financial investments. Various obstacles, however, stand in the way of harnessing energy efficiency potential. This is where NAPE aims to intervene.

The Federal Government has therefore identified the main fields of activity for energy efficiency policy: stepping up energy efficiency in buildings; energy efficiency as an investment and business model; individual responsibility for energy efficiency; and transport. The **short-term measures** outlined here aim at directly raising energy efficiency. The **long-term work processes** will be specified in more detail and operationalised in the course of the legislative term.

Together with the stakeholders involved in the newly founded Energy Efficiency and Buildings Platforms, the Federal Government will also establish work processes in major thematic clusters. Through these, long-term processes will also be established with NAPE to ensure the ongoing development of available instruments and to increase energy efficiency in the long term.

The Federal Government will also review the option of adopting an Energy Efficiency Act for the effective implementation of NAPE. This would bundle together existing provisions, the implementation of the objectives set down in the coalition agreement and an evaluation procedure. No new regulatory provisions are envisaged.

In designing measures, the Federal Government has adopted the following principles:

Supply information – Provide support – Demand action: The measures will adhere to this triad. Energy efficiency policy is still founded on **information, communication and advice**. Information and advisory services will raise awareness among all energy users of the issue of energy efficiency and provide flanking support for other instruments to harness the maximum potential possible. Only well-informed citizens and companies will be able to take long-term decisions that result in higher energy efficiency and individual energy cost savings. Targeted assistance for

energy efficiency investments will provide incentives for a higher level of efficiency. Regulatory law will require minimum standards for nationwide energy efficiency, in building construction, for example.

Cross-sectoral approach: Energy efficiency is a cross-cutting issue with potential available in all consumer sectors both in heating and power. This is why new cross-sectoral approaches will be adopted in NAPE, such as quality assurance in promoting information and advice, the introduction of a tendering scheme or measures for strengthening the energy efficiency market and energy performance contracting.

Targeted, cost-efficient and good for the climate: As the measures are aimed at meeting the national and European energy efficiency targets, they will also make a contribution to achieving the climate targets. Assistance will be given to cost-effective measures that contribute to measurable energy savings. Besides the targets set for 2020, of decisive importance here also is to keep the long-term targets for 2050 in view.

Leaving aside those in the transport sector, measures for raising energy efficiency are expected to lower primary energy consumption by 390 to 460 PJ and emissions by 25 to 30 million tonnes of CO<sub>2</sub>-equivalent by 2020, which will also make a significant contribution to meeting the Federal Government's climate-protection targets. As detailed in the Climate Action Programme 2020, measures in the transport sector will make an additional reduction in primary energy consumption of about 110 to 160 PJ and contribute to an abatement of greenhouse gas emissions of seven to 10 million tonnes of CO<sub>2</sub>-equivalent. The decisions in energy and climate policy of December 2014 include additional measures for the power sector, which will also contribute curbing primary energy consumption.

The enhanced mix of instruments with the NAPE measures will give a substantial additional impetus for utilising energy efficiency potential in Germany. The short-term measures in NAPE alone can mobilise additional investments worth about between 70 and 80 billion euros by 2020. Thanks to the measures induced by NAPE, businesses and private households will save a total of about 18 billion euros in energy costs by 2020 alone. Over the entire life-cycle of efficiency measures, cost savings will amount to some 90 to 100 billion euros (Fraunhofer ISI/IFAM, Prognos, IFEU, Ringel, 2014).

To support energy efficiency investments, the NAPE measures will also substantially extend and sustain public funding at a high level. The primary contributory factors to this are:

- Introduction of tax benefits for energy-efficient building renovation with annual funding amounting to one billion euros for the period from 2015 to 2019;
- Expansion of CO<sub>2</sub> Building Renovation Programmes by 200 million euros to two billion euros a year in future as of 2015, 300 million euros of which for subsidies;
- Introduction of the new tendering scheme (with the focus on electrical energy efficiency) with increasing funding (2018: 150 million euros);
- Raising the guarantee ceiling for energy performance contracting agreements.

The figures shown for energy savings, greenhouse gas reductions and the impacts on investments and energy cost savings are based on the findings of the action research project for NAPE. This quantified in particular the impacts of the central short-term NAPE measures. The effects of the long-term work processes cannot always be usefully quantified in advance. A (conservative) estimate has been given for these NAPE measures in primary energy and greenhouse gas savings.

**Table 1: Central measures in NAPE**

Measure	Forecast savings by 2020	
	PEC in PJ	Greenhouse gases in million tonnes of CO <sub>2</sub> -equivalent
<b>Short-term NAPE measures</b>		
Quality assurance and optimising existing energy consulting	4.0	0.2
Granting tax incentives for energy efficiency renovations	40.0	2.1
Upgrading the CO <sub>2</sub> Building Renovation Programme	12.5	0.7
Introduction of a competitive tendering scheme	26–51.5	1.5–3.1
Funding for energy performance contracting (including default guarantees)	5.5–10	0.3–0.5
Upgrading KfW energy efficiency programmes	29.5	2.0
Energy Efficiency Networks Initiative	74.5	5.0
Top Runner Strategy – at national and EU level	85.0	5.1
Energy audit obligation for non-SMEs	50.5	3.4
National energy efficiency label for old heating installations	10.0	0.7
Additional short-term measures in NAPE	about 10	about 0.5
<b>Total for short-term measures</b>	<b>350–380</b>	<b>21.5–23.3</b>
<b>Other measures</b>		
Measures as of October 2012	43.0	2.5
Provisional estimate of effects of long-term work processes	up to 40	up to 4
<b>Total</b>	<b>390–460</b>	<b>approx. 25–30</b>
<i>Transport measures (see Climate Action Programme 2020)</i>	110–162	7–10

Sources: Fraunhofer ISI/IFAM, Prognos, Ifeu, Ringel, 2014.

# 1. Stepping up energy efficiency in buildings



Almost 40 percent of total final energy in Germany is consumed in buildings, with heating accounting for the largest individual portion. This accordingly affords large technical and frequently also economic potential for raising energy efficiency. Innovations and modern energy efficiency technologies are a major precondition for making progress in energy efficiency in buildings. They are therefore also the starting point for upgrading advisory and information services and federal aid policy and regulatory law in this sector.

The aim is to harness even more energy efficiency potential in buildings. Consulting services and information will enable owners, users, investors and service providers to inform themselves about how worthwhile medium-term and long-term investments in energy efficiency are and what savings can be made. They will point out the potential investment return on energy efficiency measures. Another aim is to remove current obstacles and show how measures can be carried out. Measures in energy-efficient renovation

afford a particularly large potential, if components or technical installations need to be replaced for maintenance purposes in any case (coupling principle). Tailored advisory services geared to specific needs will allay misgivings towards building renovation and the efficient construction of new buildings.

Funding programmes, including the CO<sub>2</sub> Building Renovation Programme (KfW funding) and the Market Incentive Programme for Renewable Energies (MAP) assist private and commercial investors to carry out energy efficiency measures in buildings. In addition, by introducing new funding products, such as the KfW Efficiency House Plus in residential construction (2016) or a new programme to promote the construction and refurbishment of commercial buildings, the CO<sub>2</sub> Building Renovation Programme (KfW funding) is among the main drivers for the broad introduction of innovations and new technologies. For example, the Federal Government is making preparations for introducing nearly-zero energy buildings in keeping with the EU



Energy Performance of Buildings Directive. With its criteria for assistance, the Market Incentive Programme will similarly expedite the development of renewable energy technologies.

The continuation and increase of the CO<sub>2</sub> Building Renovation Programme and the consolidation of MAP will give owners and investors the necessary planning certainty and investment security. This too will contribute to combining pending maintenance measures with energy-efficient renovations.

The reduction of energy consumption flanked by renewable energy use is essential to achieve the 2050 target of a nearly climate-neutral stock of existing buildings. Clearly, though, not every technology available on the market today will be able to meet the long-term requirements for 2050. Savings of 80 percent in (non-renewable) primary energy demand can only be achieved with an appropriate, cost-efficient combination of various instruments.

Measures must be voluntary and economically viable. Debate centres on a balanced mix of ongoing and new instruments in the shape of politically and socially acceptable systems of incentives and information that can facilitate implementation by building owners on the basis of consensus, because the energy-efficient modernisation of existing buildings can only succeed if all stakeholders see it as an opportunity. The aim must therefore be to build confidence and foster cooperation among the various stakeholders so that together they can raise people's quality of housing and life, become more independent of fossil fuels and improve supply security in the process. Energy-efficient building renovation and district projects will make a contribution to energy efficiency and climate mitigation, while also increasing regional content to create and secure jobs.

Besides the energy-policy aspect, the energy-efficient renovation of residential buildings poses an additional social challenge. Providing affordable housing has always been a prime concern of housing policy. Particularly in poorly insulated buildings with obsolescent heating technology, ancillary costs have, however, long placed a burden on technical building services, above all for low-income households (so called "second rent"). Highly energy-efficient housing must also be made available for low-income households. To meet the current housing-policy challenges, the Federal Government has therefore launched the Alliance for Affordable Housing and Building under the lead-

ership of the Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety and with the collaboration of the Federal Ministry for Economic Affairs and Energy, which is in charge of energy issues.

Consulting and advisory services will point out the advantages of energy efficiency renovations to owners and users (tenants). Sponsored by the Federal Government, energy consulting provided by consumer protection organisations and the welfare organisation, Caritas, will help allay preconceptions and remove any impediments. They are also an easily accessible introduction to building-related consulting for the owner that can then initiate a more in-depth, competent assessment of the proposed or conducted measures. These comprehensive building-related schemes are supported with on-site consulting services from the Federal Office for Economic Affairs and Export Control (BAFA). They often prompt subsequent and/or more comprehensive investments and help to avoid malinvestment. Energy consulting helps consumers to take cost-effective and efficient measures, because energy efficiency improvements should begin with a review and the preparation of a renovation roadmap. In both comprehensive and single renovation measures, consultants will identify possible measures and the resultant efficiency gains and costs and calculate their economic efficiency. They will also point out particularly cost-effective and affordable steps that can be taken first.

Government advisory services for consumers, building owners, municipalities and businesses must be harmonised with each other and communicated in a more transparent and/or tailored way, so that the prospective client can find the consulting service to suit his needs.

The NAPE measures in this sector will also make a major contribution to the Climate Action Programme 2020 and the overall strategy outlined in it, Climate-friendly Building and Housing, which addresses issues of energy-efficient district and urban development (together with the federal states and municipalities) and fundamental socio-economic aspects.

## ▶ SHORT-TERM MEASURES

### Quality assurance and optimising current energy consulting

Energy consulting to investors and others (including tenants) makes a major contribution to raising their propensity to invest and acceptance of refurbishment measures.

Energy consulting is closely linked with the CO<sub>2</sub> Building Renovation Programme. Assistance is already provided for initial advice at consumer protection organisations, more in-depth on-site consulting from BAFA and the supervision of renovation measures under the KfW Construction Supervision Programme.

After the 2014 amendment of the On-site Consulting Guideline, the following services are eligible for assistance:

- Consulting on comprehensive building renovation (at the same time) or
- Consulting for preparing a renovation roadmap with coordinated individual energy-efficient measures for phased renovation and
- Energy consulting to condominium owners' associations.

Current energy advisory programmes (including consumer protection organisations and on-site consulting from BAFA) will be upgraded to meet specific needs, e.g. by linking and improving the consistency and transparency of advisory services and reducing competition among energy consulting programmes. This will broaden the scope for energy-efficient renovation measures.

#### Implementation

Upgrading energy advisory services by consumer protection organisations and BAFA on-site consulting for building owners and particularly for condominium owners' associations and other actors.

### Tax incentives for energy-efficient renovations

Supplementing the CO<sub>2</sub> Building Renovation Programme (loans, grants) by offering an additional assistance option

Eligible for assistance are measures for raising energy efficiency and installing renewable heating in residential buildings.

The criteria for a tax deduction are based on the CO<sub>2</sub> Building Renovation Programme.

The key points of the tax benefits are:

- Funding amounting to one billion euros a year,
- Tax benefits over a period of 10 years,
- Targeting of owner-occupiers,
- Cost-benefit analysis of potential assistance in rented housing, provided that tax concessions benefit the tenants,
- Assistance independent of tax progression through deduction of tax owing,
- Assistance for individual and comprehensive measures.

#### Implementation

Introduction as of 2015 over a period of five years. The Federal Government will hold talks shortly on implementation with the federal states to take a final decision by February 2015 at the latest.

### Upgrading, continuation and increase of the CO<sub>2</sub> Building Renovation Programme until 2018 (KfW programmes for energy-efficient construction and rehabilitation)

The funding programmes set up by KfW under the CO<sub>2</sub> Building Renovation Programme for energy-efficient construction and renovation (for residential, municipal and social service buildings) make an essential contribution to achieving the goals of the Energy Concept and the coalition agreement and to the implementation of the EU directives on energy efficiency in buildings (market preparation for the introduction of the nearly-zero energy building standard 2019/2021).

With subsidies or low-interest loans in conjunction with repayment grants, the programmes will promote meas-

ures that far exceed the statutory requirements (Energy Saving Ordinance). They will be administered in keeping with conditions on the capital market. Repayment grants will, for example, be raised to achieve a broader impact.

Programmes in residential buildings will be upgraded through the following:

- Introduction of the subsidy assessment standard, Efficiency House Plus, for residential buildings, including consulting;
- Greater mobilisation of condominium owners' associations;
- Allocation of 300 million euros for grant funding with reciprocal cover arrangement for interest subsidies and grant funding.

They will also be supplemented by funding for energy efficiency in non-residential buildings, such as:

- Commercial buildings (including buildings for processing agricultural produce);
- Municipal and social service buildings;
- Introduction of the subsidy assessment standard, KfW Efficiency House Plus, for the non-residential sector, including consulting.

The KfW Efficiency House Plus standard upgrade will also be supported by promoting building research and implementing pilot projects.

The programmes are closely linked with other instruments (including energy consulting, tenancy law, MAP) and will contribute to the achievement of the objectives in tandem with these.

In non-residential buildings, especially factories and warehouses, assistance will be supplemented with guidelines to be prepared in collaboration with the relevant industry.

### Implementation

- Continuation of the successfully tested KfW funding programmes for residential buildings under the CO<sub>2</sub> Building Renovation Programme and introduction of a KfW programme for promoting energy-efficient non-residential buildings in line with the current KfW programmes of the CO<sub>2</sub> Building Renovation Programme.

- Replenishment of funds to two billion euro (increase of 200 million euros a year).
- Allocation of 300 million euros for grant funding.

### Heating check

Old, inefficient heating systems (boilers and peripheral components) afford substantial energy saving potential. This is often located in the low-investment range and could be developed speedily with little effort and at low cost. Many building owners are, however, unaware of the potential and how to take advantage of it.

In voluntary individual local heating checks, specialists (e.g. craftworkers or chimney sweeps) can pinpoint the weak points of an inefficient heating system and make suggestions for improvements in a standardised procedure. Consideration is therefore being given to promoting low-investment measures for improving heating systems. For this, the heating check already designed by industry years ago must, however, be upgraded and adapted to current requirements.

The planned national energy efficiency label for old heating installations (see Chapter B.3) can act as an incentive to carry out a subsequent individual heating check. This will then motivate owners to carry out measures to improve their heating systems.

### Implementation

Development of the heating check in 2015, implementation consistent with the national energy efficiency label for old heating installations.



## ▶▶ LONG-TERM WORK PROCESS

### Key points of the Energy Efficiency Strategy for Buildings

The additional work processes and other operationalised measures are set out in the Energy Efficiency Strategy for Buildings. It pursues the Energy Concept target of achieving a reduction of some 80 percent in primary energy demand in buildings compared with 2008 through a combination of energy savings and renewable energy use by 2050.

The results of the Energy Efficiency Strategy for Buildings will make an important contribution to the overall strategy, Climate-friendly Building and Housing (see Climate Action Programme 2020).

The Energy Efficiency Strategy for Buildings is the strategy paper for the energy transition in buildings. It bundles individual measures and takes broader aspects into account, such as social and societal or financing issues (tendering scheme for heating, yield model, etc.). It can also include monitoring individual measures for objectives achievement, the course adopted and possible readjustments. This calls for an active communication process with the stakeholders on goals and measures. The key points of the Energy Efficiency Strategy for Buildings with the short-term measures will start off a process to be continued as of 2015 with additional comprehensive measures, which will, however, still require certain preparatory work. Examples of key points in the Energy Efficiency Strategy for Buildings are:

#### 1. Energy consulting for municipalities

In investments in municipal buildings and facilities, energy consulting can make a major contribution to raising the propensity to invest and the acceptance of renovation measures. Municipalities and/or municipal corporations have some technically very sophisticated buildings and facilities, which generally require the consulting services of specialised engineering firms. For this, the Federal Government will set up a new funding programme for energy consultants in municipalities. These advisory services will assist them in preparing a renovation strategy for their buildings and facilities. Consultants can point out specific measures for the individual

buildings and facilities – overall renovation (e.g. to an Efficiency House) or alternatively individual measures based on a renovation roadmap.

The consulting service will therefore also support the forthcoming implementation of the nearly-zero energy building standard in keeping with the EU Energy Performance of Buildings Directive and make a contribution to achieving the goal of a nearly carbon-neutral municipal building stock by 2050 – especially for non-residential buildings – and to the public sector's spearheading role.

The programme will be designed to avoid any overlaps with the ongoing programmes, National Climate Initiative and Urban Energy Rehabilitation.

#### 2. Energy saving legislation

The latest amendment of the Energy Saving Ordinance (Energieeinsparverordnung, EnEV) came into force on 1 May 2014. Key provisions are improvements to the energy performance certificates and higher energy efficiency standards for new buildings as of 2016.

The Energy Saving Ordinance (EnEV) will be revised in 2016 to introduce the nearly-zero energy building standard in pursuance of the EU Energy Performance of Buildings Directive – for private buildings as of 2021 and for public ones as of 2019. The specific minimum requirements with regard to technical and economic feasibility must be ascertained by experts beforehand. Parallel to this, an appraisal is made of whether and to what extent the requirements can be adapted to the alteration, extension and enlargement of existing buildings, where this is economically viable. The energy performance certificates and efficiency classes of buildings will also be reassessed for better transparency and verifiability. Together with the federal states, the Federal Government will also work towards improving execution of the law.

In addition, the Renewable Energies Heat Act (Erneuerbare-Energien-Wärme-Gesetz, EEWärmeG) will be brought into line with the EnEV. An appraisal is made of overlaps at points of intersection and of the scope of simplification, especially with the aim to improve the integration of renewable energies into heat supply for buildings and the effectiveness of the regulation's execution. Consideration will be given to the possibility of amalgamating the EEWärmeG and EnEV.

Energy saving legislation is also concerned with invoicing heating and hot water costs. Under the provisions of the Heating Cost Ordinance in Germany, owners of multi-resident buildings have been obliged since the early 80s to document the respective heating and hot water consumption and to allocate costs accordingly. The introduction of the Heating Cost Ordinance has contributed to an average reduction in energy consumption of approximately 15 percent. An appraisal is made of how far a further development of the provisions on billing and/or consumption data could even increase – usefully and economically viable – energy saving.

### 3. Tenancy law

A landlord has an incentive for modernisation, if he can raise the rent thereafter.

Whether he carries out modernisation measures also depends on his being able to obtain the legally permissible rent increase on the rental housing market. For the tenant, however, an energy-efficient modernisation is particularly advantageous if – as a result – his total rent declines (win-win situation).

If the total rent cannot be maintained at the same level or if costs rise because of other reasons, it is of great importance for the acceptance of energy-related modernisation that housing remains affordable in general.

The possibility of rent increases after energy-related modernisation as foreseen in the tenancy law (Section 559 of the German Civil Code) is presently a decisive economic criterion for taking energy-efficient modernisation measures in existing rental buildings. In the implementation of the reform of rent increases after modernisation as envisaged in the coalition agreement, there is a need to ensure that this does not diminish incentives for energy-efficient modernisations.

In the interests of energy saving and long-term containment of ancillary costs, possible rent increases should be assessed for any additional differentiation.

### 4. Renovation roadmaps for individual residential and non-residential buildings

Existing buildings are often renovated in partial steps, but without a clear objective. Building renovation policy must take particular account of the long-term target for 2050 as set out in the Energy Concept and Energy Efficiency Strategy for Buildings. The separate partial renovations in the voluntary building renovation roadmaps for individual buildings must be coordinated and proceed in phased succession. Based on initial approaches and considerations, a scheme will be devised to point out to owners the best specific technical and economic solutions to suit their own individual situation (e.g. financial resources, family situation, age and condition of building, with possibilities for synchronising maintenance and efficiency measures, etc.).

Measures:

- Developing a standardised procedure,
- Practical testing of procedure by energy consultants,
- Broad assistance for renovation roadmaps in individual buildings (possibly in conjunction with on-site consulting in future).

### 5. Upgrading the Market Incentive Programme for Renewable Energies (MAP)

Current criteria for funding under the Market Incentive Programme for Renewable Energies (MAP) will be reassessed and revised by spring 2015, also with a view to their impact on promoting innovation.

The main focus here is the funding target of raising the renewables ratio in heating and cooling energy consumption to 14 percent by 2020. An in-depth assessment will be carried out of all current fields of application, both renewable energy use for supplying thermal energy for heating buildings and heat supply for industrial or commercial operations (process heat). Besides innovative applications, support will also focus on hybrid systems. MAP is already perpetuated in the 2014 budget and medium-term financial planning.

## 6. Speeding up the establishment of new technical standards (standard setting), including the development of system components for construction and technical installations

Particularly in the buildings sector, new technologies take a long time to gain acceptance on the market, frequently up to 20 years. Manufacturers also need to do more to introduce new technologies onto the market and convince users of their added value.

Buildings still possess a quality of uniqueness. This holds for the building envelope and technical installations. When installing solar heating or heat recovery systems, as is already common in practice, individual systems are ‘fastened together’, so that controlling them can prove difficult.

Besides systems that are necessary to meet individual requirements, in future more system components (modular systems) could be developed that can be interconnected quickly and cost-efficiently with uniform interfaces to adequate quality standards: Generally, modern heating systems are no longer made up of one heat source (boiler); they are supplemented, for example, by solar heating, a ventilation system or a wood pellet stove (which is also connected to the central heating system via a water chamber) and are regulated and controlled with extensive electronics and display devices.

Together with industry, skilled crafts and consumer representatives, the aim of this measure is to establish ‘systemic solutions’ and clearer component interfaces on the market (research, development, market testing and drafting technical regulations where necessary). This will be carried out as part of a longer-term process.

An appraisal will be made of whether these systemic approaches can be extended to include lighting in buildings (particularly non-residential buildings).

## 7. Energy research: Research Network – Energy in Buildings and Districts

By developing new energy and energy-saving technologies in the medium to long-term, energy research will contribute to achieving the power and heating sector goals set out in the Energy Concept. The energy transition can only succeed in the buildings sector if innovative technologies and concepts are developed and introduced quickly onto the market. To raise efficiency and transparency in research promotion in this sector and speed up the practical application of findings, the Federal Government will set up the Research Network - Energy in Buildings and Districts. This will focus on connecting strategic players: Representatives from business and industry, the scientific community and the main multipliers will collaborate to step up exchange at the interfaces of research, practice and policymaking to discuss major research policy topics, such as the implementation of the research initiative, Solar Buildings/Energy-Efficient Cities.



## 2. Energy saving as an investment and business model: New impetus for energy services, energy efficiency technologies and competitiveness



Raising energy efficiency can help achieve the goals of the energy-policy triad, but it also affords market and profit opportunities for innovative businesses. On the one hand, companies that plan very efficient production processes can save on energy costs, earn a profit and enhance their competitiveness as a result. On the other, they can take advantage of growth opportunities on global markets in energy services and energy efficiency technologies. Private households will also benefit from these new markets as clients and investors. Important factors here are the quality and cost transparency of services. Finally, higher energy efficiency will boost investment in Germany as a business location.

This is why energy saving as an investment and business model is a key element in the Federal Government's Energy Efficiency Strategy. NAPE specifically aims at promoting the development of business models for energy saving (e.g. energy performance contracting and other innovative approaches) and spearheading a new approach for promoting close-to-market and cost-effective energy efficiency solutions with the introduction of the competitive tendering scheme. These measures will be evaluated on a regular basis.

## ▶ SHORT-TERM MEASURES

### Introduction of a competitive tendering scheme for energy efficiency

Competitive tendering for efficiency measures affords the opportunity to let the market search for the most cost-efficient, feasible savings potential and compare the measures of various actors in different sectors. In contrast to conventional funding schemes, where a standardised high rate of funding can result in inefficiencies, the tendering procedure will motivate energy service providers, municipal utilities, energy cooperatives, manufacturers and other actors to find economic ways to save energy in the tendered funding area themselves and offer cost-effective measures for carrying them out.

The pilot project for the competitive tendering scheme in electrical energy efficiency, called STEP up!, aims at reducing electricity consumption by promoting electricity-related measures across technologies, actors and sectors (open tender). In closed tenders during the pilot phase, the project will also address specific sectors with known large potential and constraints. This can, for example, involve the replacement of heating pumps, including hydraulic balancing, power-heat measures in industry or green IT. The contract will be awarded to bids for measures with the most economic cost-benefit ratio (euro per saved kWh).

#### Implementation

- As of 2015, pilot phase of the electrical energy efficiency project, STEP up!; planned funding in 2015 of 15 million euros, 2016, 50 million euros, 2017, 100 million euros and 2018, 150 million euros.
- As of 2018, continuation and upgrading based on the evaluation, also possible promotion of energy efficiency measures in heating, subject to appropriate funding. An earlier promotion of heat energy measures will be considered.

### Contracting funding – default guarantees by guarantor banks for contracting finance/funding programme for energy conservation contracting

The typical risks of energy performance contracting (long contract terms, investment risk of contractor, etc.) place a major constraint on financing those contracts.

Expanding the present guarantee facilities of guarantor banks will lessen the default risk for banks and thus enable SMEs to offer energy efficiency measures in the form of energy performance contracting. This requires adjustments to the maximum guaranteed amount.

Assistance will also be given to municipalities and SMEs in making use of energy performance contracting when making energy savings investments.

#### Implementation

- Implementation of a guarantee programme by guarantor banks for investments in energy performance contracting by adjusting the guaranteed amount to up to two million euros for a limited term of three years as of 2015. A decision on the continuation of the special conditions for energy performance contracting will be made based on an evaluation.
- Funding guideline for project developers in energy conservation contracting in 2015.

### Upgrading the KfW energy efficiency programmes

The programme is based on interest subsidies from the KfW for promoting energy-efficient production plants/processes, including cross-sectional technologies with the relatively highest energy savings potential. Programme upgrading will include the introduction of both a new basic standard (10 percent savings) and a new premium standard (30 percent savings). The extent of funding will therefore be made contingent on the amount of energy saved, regardless of the scale of the enterprise. The aim is the simple, transparent and uniform certification of energy savings. The cooperation with the federal states' development agencies will be stepped up and the measure will be publicised.

#### Implementation

Implemented by KfW starting in 2015.



### Waste Heat Use Initiative

About two-thirds of the energy in the industrial sector is used for process heat. Waste heat makes up a large part of this energy input. Besides process rationalisation, the initiative will aim at harnessing more of the substantial energy savings potential afforded by the frequently economically viable utilisation of waste heat.

The Federal Government will take measures to help further reduce avoidable industrial waste heat, by promoting measures for the thermal insulation of industrial facilities, for example. Via the programme, Energy Consulting for SMEs, it will provide greater support for industrial firms by promoting waste heat recovery schemes and simplifying grant funding for improving waste heat use in existing plants.

#### Implementation

- Amendment of the funding guidelines on cross-cutting technologies in 2015.
- Amendment of Energy Consulting for SMEs.

### Pilot programme for energy savings meters

Thanks to technological progress, with the help of smart plugs, terminals or meters or energy management systems it is possible to meter the consumption profile of specific installations and devices and to measure savings at low cost under real conditions of use for the first time (before – after measurement).

Instead of promoting savings through pre-selected technologies or in specific sectors, the programme will support technology-neutral energy savings to incentivise the search for the most cost-effective methods, reduce transaction costs and try out new business models.

In an initial phase, accounting for data protection aspects the pilot trial will explore the technical and organisational possibilities of introducing a financing scheme for energy efficiency based on these energy savings meters that quantifies energy savings so as to provide a technology-neutral funding instrument. It will also assess whether energy efficiency investments can be refinanced from the economies made. Different organisational, technical and financial models will be tested under a funding guideline and be upscaled after successful demonstration. In this kind of compensation scheme, only Ct/kWh will be set as a parameter based on device-specific measurements.

#### Implementation

Start of pilot project in 2015.



## ▶▶ LONG-TERM WORK PROCESSES

### Improving the framework for energy efficiency services

A variety of non-monetary obstacles stand in the way of investments in energy efficiency and energy-saving technologies that would in fact yield a good return. These include: the investor-user dilemma, lack of access to capital, insufficient know-how, the absence of a facilitator and too little priority attached to these investments in comparison with the actual core business or product. Together with the relevant stakeholders, systematic efforts will be made to identify constraints and improve the framework for energy efficiency investments and services and tangible proposals for action will be submitted in 2015. Dialogue with the federal states is also important here, because on the one hand individual states have already adopted promising approaches for promoting energy efficiency services that can set an example as good practices and on the other because responsibility for setting the framework partly falls under federal state purview. The Federal Government will launch an information campaign and appoint a working group on energy performance contracting together with the federal states for mutual learning and joint preparation of improvement measures. As a specific starting point, it will conduct an appraisal of the general contracting eligibility of all properties in public use – with the exception of military facilities – with annual energy costs of more than 100,000 euros and commercial contracting arrangements will be made within five years, provided the measures are not conducted by local authorities on their own with equally large energy savings and at lower cost. The Federal Government will also enter into dialogue with the federal states on this.

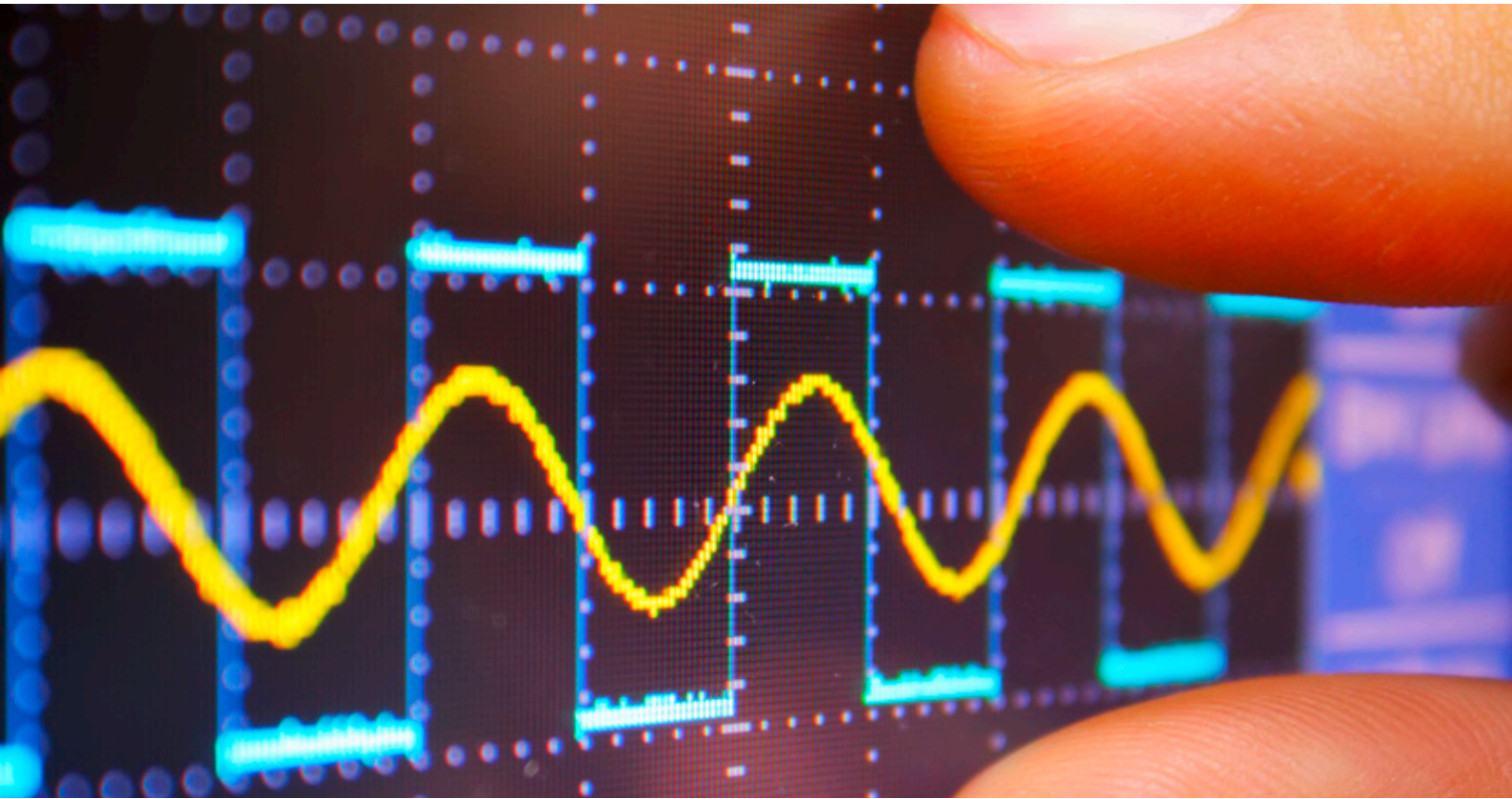
### New financing schemes

While investment opportunities in effective energy efficiency measures actually yield a sufficiently high return to be able to obtain suitable finance from investors, these lucrative investments are not made in practice due to many different problems. These include the complexity and small scale of investments in energy efficiency, the problem of liquidity tied up elsewhere and companies' operational requirements for payback periods, the involvement of disparate actors, too few project developers for energy efficiency and finally the resultant difficulties for banks and capital providers to conduct a risk assessment as a basis for investing capital. The Federal Government will initiate and try out new financing schemes, for transferring future profits into liquidity for energy efficiency investments in the present, for example, to develop and implement suitable approaches.

### Strengthening research for more energy efficiency

Excellent, broad-based and closely networked energy research is an essential requirement to try out viable strategies for the future and bring new high-efficiency technologies faster onto the market. This is why the Federal Government attaches so much importance to applied and project-funded research for more energy efficiency and will expand its promotion measures in this sector. To improve the efficiency of research promotion and translate the findings into practice more quickly, it is considering founding a Research Network Energy Efficiency.

### 3. Individual responsibility for energy efficiency: Measure – Understand – Take action – Save



Many households and enterprises can only make a rough estimate of their energy consumption, cannot quantify it at all or are unable to identify or assess potential savings. According to a survey by dena, the German Energy Agency, only about 14 percent of businesses operate an energy management system. They often do not know how much energy they use in a year and consequently they also have no idea how to reduce their energy consumption and costs.

Diversely detailed and especially also low-threshold, nationwide and high-quality energy consulting services to meet client needs are a key element for pinpointing lucrative energy saving options and avoiding malinvestment. Demand for the available advisory services is stagnating or in decline. The measures in NAPE for raising the effectiveness of advisory programmes will improve quality assurance in energy consulting and build confidence in qualified consulting. Assuring the high quality of consultants and their services is essential for this.

Information on new efficiency technologies and their advantages must be as easy to understand and accessible as possible for consumers. For businesses, exchange of experience on potential savings and technologies in independently organised networks is a major option that has proven effective. The network approach also emphasises the actors' own responsibility.

Improving metrology is also essential for successful energy efficiency measures. This includes better methods for quantifying baselines and the cost and energy savings resulting from energy efficiency measures.

## ▶ SHORT-TERM MEASURES

### Energy Efficiency Networks Initiative

The object of this measure is to set up and implement nationwide energy efficiency networks on a voluntary basis, where companies can define and implement energy efficiency targets for their network in a direct exchange of experience supervised and moderated by energy consultants. One aim of the network approach is to strengthen corporate responsibility. The Federal Government has therefore started an initiative with major private-sector associations and organisations to establish about 500 networks with uniform minimum requirements by 2020. These minimum requirements provide for conducting energy audits in each company and setting a savings target for each network based on individual corporate goals and harnessing potential savings in keeping with the network target. The networks will be assisted by a qualified energy consultant. The measures conducted will be reviewed every year.

To a limited extent, the energy efficiency networks will be organised in different ways depending on certain criteria (scale of participant enterprises, sectoral or cross-sectoral networks).

#### Implementation

Start in 2015, target: 500 networks by 2020.

### Advisory services for municipal energy efficiency networks

This funding programme aims to help municipal energy efficiency networks attract participants, provide support and advice in their establishment and operation and assure quality. Network implementation can draw on findings from previous energy advisory measures or available climate mitigation plans as promoted in the National Climate Initiative.

#### Implementation

Start in 2014/2015.

### Promoting energy efficiency managers to mobilise potential, e.g. in business estates

So far, raising energy efficiency has primarily been the concern of individual companies. Neighbouring and surrounding enterprises or also municipal properties (within or adjacent to a business estate) have not yet been included in energy efficiency measures or energy strategy development. Intercompany synergies have been left untapped.

Promoting energy efficiency managers is a way to identify in-company and intercompany energy efficiency potential, on business estates, for example, and harness this together with the participant companies. Energy efficiency managers will assess the basic energy-consumption data of the participant enterprises, provide advice on available funding programmes, point out economically viable energy efficiency options and support and supervise the practical implementation of measures. Their tasks will also include possible cooperation with neighbouring firms and municipal institutions, etc. and facilitating efficient, economic and lower-emission supply systems. The Federal Government will appraise ways to support the activities of energy efficiency managers with certified qualifications and expand consulting services. This programme will be designed and carried out with suitable partners.

#### Implementation

As of 2015.

### Sectoral energy efficiency campaigns

The current instruments in climate and energy policy and the measures for industry, business, trade and services are often cross-sectoral in scope without any focus on a specific sector. Greater savings could be made if more sectoral measures were taken.

The sectoral climate mitigation and energy saving campaign of the German Hotels and Restaurants Association (DEHOGA) carries out a number of specific measures primarily to discover the scope for energy savings in the sector.

Following up on this, energy efficiency campaigns will also be developed and promoted in other business and industry sectors tailored to their specific needs and conditions.

### Implementation

As of 2015.

#### EU energy efficiency labelling and ecodesign

As part of EU negotiations on amending the EU Energy Labelling Directive, Germany will advocate informative labels for consumers, faster decision-making processes and a stronger EU Top Runner Strategy. Its demands include the following:

- For product groups where best energy efficiency classes have already been allotted, these should be re-assessed (rescaling). An energy label should be selected for rescaling that consumers can understand as easily as possible (e.g. A – G). When introducing or replacing a label it should be ensured that the top efficiency classes have not yet been assigned to afford enough scope for rapid development. Labels should include additional information, such as absolute energy consumption.
- The Energy Labelling Directive should provide precise specifications for conducting preparatory studies on product groups to improve their information content and be able to adopt appropriate implementing measures sooner. The specification of energy efficiency requirements is also based on a certain definition of cost. In forthcoming preparatory studies, initial experience could be gained with a more sophisticated cost concept (e.g. taking the break even point as a reference, which goes beyond the notion of least life cycle cost) without altering the one in current use. This way, preparatory studies could describe the impacts of specifications at a higher energy efficiency standard. The preparatory study should also place more emphasis on benchmarks.
- EU online database: Manufacturers should enter the data they must publish anyway (label information, product datasheets and relevant data under the EU Ecodesign Directive) into an online database. The data input would be generally accessible and could be compiled as consumer-friendly information and circulated

by third parties. This would provide a complete overview of the current EU-labelled models available on the market. In addition, this online database could be used to identify the respective best product lines (top runner principle) to boost competition among producers. Providing data in the database would also relieve manufacturers of the current obligations to provide information and the administrative costs incurred. The online database could also be used to improve market surveillance.

The requirements for products under the EU Ecodesign Directive should be to a high standard. They must always make reference to a specific product group. Preparatory studies for ecodesign and label regulations should examine the possibility of a higher standard cost definition in the future. Besides least life cycle cost, equal life cycle cost should also be cited. With this additional cost concept, the preparatory study could assess the impacts of requirements at a higher energy efficiency standard.

### Implementation

The EU Commission proposal for the revision of the Energy Labelling Directive has been announced for the beginning of 2015.

### National Top Runner Initiative

With its National Top Runner Initiative (NTRI), the Federal Government will bundle measures for speeding up the market penetration of high-quality services and products (top runners) that contribute to reducing energy consumption.

NTRI aims at increasing the motivation for electrical and product-specific energy efficiency and the rational use of power and extend it along the value chain – from appliance manufacturers to dealers to consumers – in product lines and across sectors. Specific intervention points here are the communication of the two legislative instruments, the Energy Labelling and EU Ecodesign Directives. As part of NTRI, in collaboration with relevant stakeholders and based on assessments of potential, proposals will be prepared for upgrading and improving these instruments. Another European energy efficiency instrument for equipment and products, the voluntary label for the most energy-efficient equipment, EU Energy Star, will be integrated into NTRI.

The ongoing stakeholder dialogue on upgrading energy-efficient products will be continued under NTRI. It will also develop an externally moderated dialogue with equipment manufacturers, dealers and consumers to identify additional scope for making improvements to energy-efficient products. This will help mobilise potential energy savings on the one hand and develop products to meet consumer needs on the other.

#### Implementation

Start of measures in 2015;  
Earmarked funding: six million euros a year.

### Energy audit obligation for non-SMEs (implementation of Article 8 of the EU Energy Efficiency Directive 2012/27/EU)

Large-scale enterprises (non-SMEs) will be obliged to carry out regular energy audits complying with DIN EN 16247-1 – the first of them by 5 December 2015 and then every four years. Companies that operate an energy management system certified to DIN EN ISO 50001 or an EMAS environmental management system will be exempted from the obligation to conduct energy audits. By cabinet decision of 5 November 2014, the Federal Government adopted a draft bill to amend the Energy

Services Act (EDL-G) to implement Article 8 (4-7) of the Energy Efficiency Directive.

#### Implementation

Amendment of EDL-G.

### Upgrading the SME Initiative for Energy Transition and Climate Mitigation

The Federal Ministry for Economic Affairs and Energy and the Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety have agreed to continue the SME Initiative for Energy Transition and Climate Mitigation. In the course of the extended initiative, the Federal Government will step up the dialogue already underway between policymakers and SMEs, improve information and advice and promote long term exchange of experience. The focus will be on information exchange and activities for raising energy efficiency and reducing greenhouse gas emissions in SMEs.

The SME Initiative for the Energy Transition and Climate Protection also provides a broad platform for publicising and disseminating the goals of NAPE and the Climate Action Programme.

#### Implementation

Continuation after 2015;  
Earmarked finance: five million euros (four million euros of which in federal funds).

### Upgrading Energy Consulting for SMEs

Current funding facilities will be aligned with the provisions of the Energy Efficiency Directive 2012/27/EU on high-quality energy audits.

Grants under the Energy Consulting for SMEs programme will be increased as of 1 January 2015 and can include a scheme for waste heat utilisation and implementation support for at least one proposed energy efficiency measure. The programme for SMEs will thus be upgraded. SMEs will also be informed about contracting opportunities.

More extensive consulting services and grants for subsequent implementation support can be expected to help clear the way for energy efficiency measures.

### Implementation

Amendment of funding guideline, entry into force in 2015.

### National Energy Efficiency Label for Old Heating Installations

The aim of the measure is to motivate building owners to replace old, inefficient heating systems to raise the replacement rate. As part of their regular inspections, it will, for example, oblige district chimney sweeps to assign energy labels for boilers over 15 years old as required by EU Regulation 811/2013. The energy label issued will assign the boiler to a specific energy efficiency class and owners will receive information on energy cost savings and be referred to additional energy consulting services (e.g. heating check or on-site consulting).

The labelling obligation will be extended over a period of seven years to even out the generated demand. The energy efficiency label for old heating installations will apply to the whole range of chimney-sweep heating system inspections up to 400 kW (single and two family homes to large, multi-storey residential buildings). In a simple procedure, chimney sweeps will be able to assign the heating system to an efficiency class using model lists or software, without having to make their own measurements or calculations. The obligation of chimney sweeps to affix the label will be regulated in the Energy Consumption Labelling Act (EnVKG) and the Sweeping and Inspection Regulation (KÜO). The intention is to provide support towards the costs of label issuance under the measure, National Energy Efficiency Label for Old Heating Installations.

### Implementation

Amendment of EVKG and KÜO in 2015, period for label issuance as of 2016.



### Funding Programme – Energy efficiency in Wastewater Treatment

To exploit the large potential for electricity savings and resultant greenhouse gas reductions, the Federal Government will introduce and support energy checks and analyses in municipal wastewater treatment plants for a period of five years. It will only provide assistance for checks and analyses conducted to DWA Worksheet A 216. Based on the findings of the funding programme, after three years an appraisal will be made together with the federal states of whether municipal wastewater treatment plants should in future be obliged to conduct energy checks and analyses.

### Implementation

Start of funding guideline in 2015.

### Energy Consulting for Farming Enterprises

At present, only a small fraction of farmers appreciate the possible benefit of energy efficiency advisory services. They also place very high demands on the professional qualification of consultants. To meet this need, the Federal Government will initiate the first nationwide funding programme for energy efficiency consultants in agriculture. The consultants must assess the whole farming enterprise for potential energy efficiency measures and make specific proposals. This is the only way to mobilise the potential in farming enterprises on the scale needed to achieve energy efficiency targets.

At average consulting costs of 1,500 euros per farm for three years, six million euros a year will be allocated to enable up to 4,000 enterprises to avail themselves of

advisory services. In farming enterprises inspected in Baden-Württemberg, energy efficiency consultants were able to determine average annual potential CO<sub>2</sub> savings of over seven tonnes of CO<sub>2</sub>-equivalent per farm.

### Implementation

2016 to 2018.

#### Restart of federal programme – Promotion of energy efficiency in agriculture and horticulture

From 2009 to 2012, the Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety and the Federal Ministry of Food and Agriculture jointly conducted a federal programme for promoting energy efficiency in agriculture and horticulture financed by the Energy and Climate Fund. However, it had to be suspended several times and few applications were submitted due to the economic crisis. The willingness of enterprises to invest and the resultant demand only increased substantially towards the end of the programme. In actual practice, there is, however, still keen interest.

Horticulture in particular affords enormous potential for energy savings. Combustion in this sector currently amounts to 7,330 GWh a year. In the ZINEG research project (an initiative for a future low-energy greenhouse), energy savings of up to 70 percent were made in greenhouse production.

As of 2016, five million euros a year will be provided for this over a funding period of three years.

### Implementation

2016 to 2018.



## LONG-TERM WORK PROCESSES

#### Consulting and advisory services: Bundling and quality assurance

In collaboration with business and industry, scientific research, civil society and training providers engaged in energy efficiency consulting, current advisory services will be appraised for their clarity, effectiveness, quality standard compliance and the consistency and comparability of qualification requirements for consultants. Where possible and expedient, advisory services for the respective fields of activity will be amalgamated. In the process, the current quality assurance instruments in energy consulting, such as the list of energy efficiency experts, will be extended to include additional target groups and the present criteria for these instruments will be streamlined as far as possible for the respective fields of activity. Criteria will also be defined to ensure that consultants are highly qualified and advisory services will be organised for high standards and transparency. Where necessary, initiatives will be taken to develop and monitor new uniform quality standards. The contents of the energy consulting programmes will meet the requirements of the EU Energy Efficiency Directive and be better adapted to the respective needs of clients. At the same time, quality standards for energy efficiency consulting will be diversified more in line with different fields of activity. The aim is to develop comprehensive advisory services with clearly defined criteria for consultants in the respective fields of activity. Consideration will also be given to the possibility of authorising ‘energy consultant’ as an occupational profile.

#### Developing indicators and benchmarks in businesses and for households

Before energy can be put to more efficient use, information is needed on present consumption, baselines have to be defined and future energy consumption must be measurable. Established comparative databases, methods, indicators and benchmarks can be used for this and instruments can be added to the present set to compile and use this data. The Federal Government will support the introduction of suitable methods and metrology (before/after) and innovative technologies (IT-based measurement, analytical and management systems) to quantify energy savings and assure the quality of energy efficiency measures.



Typical energy consumption figures, such as sectoral minimum, maximum, average and reference indicators, including the range of energy consumption of relevant cross-cutting applications and technologies and their publication as comparators can in future help to harness energy efficiency potential. Based on this, for example, indicators and comparators can be developed to quantify the envisaged amount of savings in comparison with a reference figure (similar to the Efficiency House categories in buildings). A methodology being developed on behalf of the Federal Government for defining operational indicators will be put to a practical test in a pilot project, revised based on the experience gained and finally rolled out. Operational indicators can provide the basis for work in energy efficiency networks and consulting. An appraisal will be made as to whether best practices can be developed for relevant sectors and cross-cutting technologies. Relevant indicators will be adjusted to keep pace with ongoing technological progress.

#### Energy efficiency in information and communication technology (ICT)

Power demand in ICT is undergoing a number of fundamental developments that in part run counter to each other. Technological progress (hardware/components) has contributed to distinct improvements, while ongoing increased use combined with the growing number of terminals and their larger size has increased power consumption in ICT. In addition, the software issue in electrical energy efficiency has not been fully addressed so far.

There is scope for potential savings in many areas of ICT overall (see for example the results of the Federal Economics Ministry's IT2Green projects), in telecommunications networks or computer centres, for instance:

- In telecommunications networks, power demand in the access networks scales with the number of connections and in the transport networks with bandwidth needs at peak load. Telecommunications companies are currently in the process of converting the present technology to high-performance and streamlined IP/WDM systems. This will make for substantial savings in the transport network.

- Considerable reductions in electricity consumption can be made by exploiting the technological scope for improvement (including infrastructure) and higher capacity in new server and storage technologies.

The Federal Ministry for Economic Affairs and Energy has commissioned a study on the present trend in ICT power demand in Germany. Amidst the rapid changes in the ICT landscape, in the present context it will assess power demand, identify current trends, forecast future ICT power demand and recommend courses of action to reduce it. Based on the findings and recommendations of the study, specific measures will be taken to mobilise energy efficiency potential in ICT.

Estimates have already been made of potential savings in individual ICT segments. For example, a study by Fraunhofer IZM and Fraunhofer ISI (2009; based on data from 2007) estimates feasible savings of about 2.2 to 4.4 million tonnes of CO<sub>2</sub>-equivalent with a 20 to 40 percent energy reduction in computer centres, if the Blue Angel criteria for energy-efficient computer centre operation are applied.

## 4. Upgrading measures in transport



At over 2,600 PJ, transport accounted for about 28 percent of total final energy consumption in 2013, with greenhouse gas emissions in the sector amounting to some 17 percent of the German greenhouse gas balance. Reductions have been made in both in recent years. More action needs to be taken so that the transport sector can make an appropriate contribution to climate mitigation and energy savings targets, despite the growing volume of traffic. Almost all measures contribute to reducing of CO<sub>2</sub> emissions and energy consumption at the same time. This is why no separate energy-saving measures in transport are cited in the National Action Plan on Energy Efficiency beyond those in the Climate Action Programme 2020.

Increased use of efficient drive technologies, shifting operations to the most efficient means of transport and additional improvements in transportation management afford large potential for reducing energy consumption and CO<sub>2</sub> emissions. The German motor-vehicle and parts supply industry are global leaders in developing efficient drives for vehicles. Retaining this leading position in global competition is also an important industrial-policy concern.

The major measures taken so far for reducing energy consumption in transport are the European regulations on CO<sub>2</sub> reduction in passenger and light commercial vehicles, fuel taxation and the heavy goods vehicle toll.

As an important implementing instrument for the energy transition in transport under the National Sustainable Development Strategy, the Mobility and Fuel Strategy (MFS) adopted by the Federal Cabinet in June 2013 will be continued. So far, it has provided an overview of the technologies and energy and fuel options in the various transport sectors.

The EU Directive, Clean Power for Transport, also obliges the Member States to build fuelling and charging infrastructure for alternative fuels. National strategic plans must be drafted for this by the end of 2016. The consistent introduction of electromobility, primarily to lessen the dependency of motor vehicle transport on petroleum products, is of very great importance especially for meeting the medium-term and long-term energy savings targets. The Federal Government will therefore continue to support the development and testing of electric drives for motor vehicles and take additional

measures to enhance their market penetration. Other fields of activity include the further development of the heavy goods vehicle toll and expanding and strengthening public passenger, rail freight, bicycle and pedestrian transport.

The measures for curbing CO<sub>2</sub> emissions and energy consumption in the transport sector comprise (see Climate Action Programme 2020):

- Promoting the increased application of electric drives in motor vehicles by setting a suitable framework for speeding up the market penetration of electric vehicles to meet the target of one million licensed vehicles by 2020 (greenhouse gas reduction of 0.7 million tonnes of CO<sub>2</sub>-equivalent). Particular consideration is being given to a special depreciation allowance for commercially-used electric vehicles jointly financed by central and federal state governments.
- Coordinated with the federal states, the Federal Government will launch a procurement campaign in 2015 to provide information on electromobility and also increase the ratio of electric vehicles in the fleets maintained by central and federal state governments.
- Moreover, the Federal Government will conduct a field trial to test the increased use of electric drives in heavy commercial vehicles.
- Limited-term funding programme for the market introduction of energy-efficient commercial vehicles as of 2016 (greenhouse gas reduction 1.1 to 1.5 million tonnes of CO<sub>2</sub>-equivalent).
- Strengthening rail freight transport through investments in infrastructure expansion on a significantly larger scale than in the past (greenhouse gas reduction 1.5 to 1.8 million tonnes of CO<sub>2</sub>-equivalent).
- Extending the heavy goods vehicle toll to vehicles above 7.5 tonnes total weight and 1,100 km of four-lane federal roads and in the next step to all federal roads as of 2018 (greenhouse gas reduction 0.3 to 0.7 million tonnes of CO<sub>2</sub>-equivalent).
- Fiscally neutral graduation of the heavy goods vehicle toll depending on energy consumption, including advocating for the creation of the related framework at EU level (greenhouse gas reduction 1.5 to 2.3 million tonnes of CO<sub>2</sub>-equivalent).
- Strengthening waterways as a means of transport by relocating freight to waterways, taking account of nature conservation regulations.
- Boosting regional economic activities by bundling transport operations in conurbations and deploying more cargo bikes (greenhouse gas reduction 0.5 to 1.1 million tonnes of CO<sub>2</sub>-equivalent).
- Environment-friendly planning of public passenger transport by means of numerous measures for the environment-friendly and climate-friendly organisation of local and long-distance public passenger transport (greenhouse gas reduction 1.0 to 1.3 million tonnes of CO<sub>2</sub>-equivalent).
- Promotion of cycling and walking through the allocation of federal funds for the construction of cycle paths and the development of new financial instruments (greenhouse gas reduction 0.5 to 0.8 million tonnes of CO<sub>2</sub>-equivalent).
- Promotion of fuel-efficient driving by issuing vouchers for fuel-saving training when purchasing a new vehicle, supported where possible by the motor vehicle and insurance industry (greenhouse gas reduction 0.4 to 0.8 million tonnes of CO<sub>2</sub>-equivalent).
- Support for car-sharing by adopting a Car-Sharing Act to include user benefits in towns and municipalities.
- Incentives for climate-friendly mobility in the federal administration aimed at the increased use of public transport (0.15 to 0.3 million tonnes of CO<sub>2</sub>-equivalent).

- Measures in aviation as part of the European regulation initiative to create a single European airspace, Single European Sky, and support for climate mitigation in maritime transport, initially through the EU Regulation on Monitoring, Reporting and Verification of CO<sub>2</sub> emissions from Maritime Transport and where possible followed by the introduction of a global system to compile and report on CO<sub>2</sub> emissions from maritime transport under the auspices of the International Maritime Organisation (IMO) (greenhouse gas reduction of up to 0.6 million tonnes of CO<sub>2</sub>-equivalent).
- Prolongation of tax benefits for natural and liquid gas beyond 2018 in pursuance of the coalition agreement (greenhouse gas reduction of 0.25 million tonnes of CO<sub>2</sub>-equivalent).
- Upgrading instruments and measures for a comprehensive and technology-neutral strategy to reduce emissions in transport at EU level.



## 5. Stakeholder dialogue and monitoring



### Energy transition platforms for energy efficiency and buildings

With the energy transition dialogue platforms, the Energy Efficiency Platform and the Buildings Platform, the Federal Government brings together relevant actors from business and industry, civil society and the scientific community along with representatives of the federal states to frame joint strategies to expedite efforts to raise energy efficiency in Germany.

Via these platforms over the past few months, the federal states, associations and non-governmental organisations submitted a variety of proposed measures for NAPE and the Energy Efficiency Strategy for Buildings. These have been evaluated and included in work on NAPE. Consultations have also taken place with the platform participants and proposers to discuss initial design ideas and drafts for NAPE and assess additional innovative approaches.

This ensured that the sectoral knowledge of the associations and the views of the interest groups were accounted for in work on NAPE.

The platforms will also continue to operate in the future implementation of NAPE and meet at regular intervals. The Federal Government will also attach importance to interaction among the different processes and initiatives (e.g. as part of the Alliance for Affordable Housing and Construction or in the research network, Energy in Buildings and Districts). This ongoing dialogue with relevant actors is crucial in particular for the further-reaching measures and long-term work processes initiated by NAPE. The Buildings Platform, for example, will make a major contribution to the Climate Action Programme 2020 and to drafting the Energy Efficiency Strategy for Buildings by the end of 2015. The Federal Government will specifically tailor the working arrangements for the platforms to guarantee that NAPE is implemented with stakeholder involvement.

### Monitoring

The implementation of NAPE will be monitored as part of the Federal Government's annual review of the implementation of the energy transition and will be supervised and evaluated by the independent expert commission for the monitoring process, Energy of the Future.

