Communication from the German Federal Government to the European Commission pursuant to Article 7 of Directive 2012/27/EU of the European Parliament and of the Council of 25 October 2012 on energy efficiency

I. Introduction

On 4 December 2013, the German Federal Government sent the European Commission an initial communication on the planned implementation of Article 7 of Directive 2012/27/EU of the European Parliament and of the Council of 25 October 2012 on energy efficiency, amending Directives 2009/125/EC and 2010/30/EU and repealing Directives 2004/8/EC and 2006/32/EC (EED).

As promised in the December communication, the present communication contains an update to the savings target for the Federal Republic of Germany pursuant to Article 7(1) in conjunction with Annex V No 4c (Section II). It also contains an update to the list of specific policy measures and combinations thereof pursuant to Article 7(9) EED, including the assessment of the cumulative final energy savings to be achieved by these measures during the period 2014–2020 and a more detailed explanation of this assessment and the relevant calculation method (Section III). The relevant requirements in Article 7 and Annex V EED were taken into account when assessing the cumulative final energy savings resulting from the measures.

The planned implementation may be subject to change as a result of future decisions by the Federal Government and the *Bundestag* [Lower House of Parliament]. The Federal Government will therefore issue prompt notifications about other instruments and measures that are relevant for compliance with Article 7(1) EED and in this way ensure that Germany achieves the savings target pursuant to Article 7 EED. The Federal Government will also inform the European Commission of any changes as part of its reporting obligations under Annex XIV Part 1(e) EED.

II. Determination of the savings target in accordance with Article 7(1) to (3) EED

The German Federal Government puts the savings target referred to in Article 7(1) to (3) EED at 1 758 PJ.

1. Calculation in accordance with Article 7(1) EED

The average annual final energy consumption in the Federal Republic of Germany during the period 2010–2012 based on the national energy balance (9 037 PJ[1]) is used as a basis for calculating the savings target pursuant to Article 7(1) EED. The Federal Government also makes use of the possibility (provided for in the second sentence of the second subparagraph of Article 7(1) EED) of disregarding the average annual final energy consumption of the transport sector (2 562 PJ[2]) when determining the target. This reduces the average annual final energy consumption in the years 2010–2012, which is used to calculate the savings target, to 6 475 PJ[3].

However, the baseline value for final energy consumption according to the national energy balance (excluding transport) determined in this way is not the reference value used to determine the savings target, and therefore includes energy volumes that can be ignored in setting the savings target. The Federal Government did not have the underlying energy statistics required to calculate these energy volumes in December 2013, but they have since been determined.

Total energy volumes of 893 PJ were derived, and these are included in the average annual final energy consumption for the years 2010 to 2012 (excluding transport), but can be ignored for the purpose of setting the savings target pursuant to Article 7(1) EED.

The bases for calculation described above produce an average annual energy volume used (excluding transport) for the Federal Republic of Germany during the period 2010–2012 of 5 582 PJ, which is then used as an updated reference value to set the savings target pursuant to Article 7(1) EED. On this basis, the application of Article 7(1) EED gives a cumulative value of 2 344 PJ as an interim savings target.

2. Reduction of the savings target by 25 % in accordance with Article 7(2) and (3) EED

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[1] The slight change in this value compared to the value given in the communication of 4 December 2013 (9 063 PJ) arises from the adjustment/final calculation of the average annual final energy consumption in Germany for 2012 based on the national energy balance.

[2] See footnote 1. The provisional value given on 4 December 2013, and corrected in the present communication, was 2 566 PJ.

[3] See footnote 1. The provisional value given on 4 December 2013, and corrected in the present communication, was 6 497 PJ.

The Federal Government makes use of the possibility provided for in Article 7(2) in conjunction with (3) EED to reduce the value calculated in accordance with Article 7(1) EED of 2 344 PJ by 25 % (586 PJ) to a total of 1 758 PJ, using measures provided for in Article 7(2)(a) to (d) EED in conjunction with Article 7(3) EED. The measures applied here are mainly those in Article 7(2)(d).

Article 7(2)(d) EED states that energy savings resulting from individual actions newly implemented since 31 December 2008 that continue to have an impact until 2020 and that can be measured and verified ('early action'), may be counted towards the energy savings to be achieved pursuant to Article 7(1) EED. Overall, the measures already taken in the Federal Republic of Germany to achieve final energy savings produce cumulative final energy savings resulting from early action of at least 1 092 PJ (cf. detailed description in Section III).

The savings target for the Federal Republic of Germany pursuant to Article 7(1) EED can therefore ultimately be reduced by 586 PJ by applying Article 7(2)(d) EED in conjunction with Article 7(3) EED. On that basis, further cumulative final energy savings of 1 758 PJ are to be provided pursuant to Article 7(1) EED for the period from 1 January 2014 to 31 December 2020.

III. Cumulative final energy savings resulting from policy measures

To achieve the cumulative savings of 1 758 PJ in the period 2014 to 2020, the Federal Republic of Germany is making use of the possibility set out in Article 7(9) EED of counting particular policy measures towards the fulfilment of the savings target pursuant to Article 7(1) EED. Various policy measures or combinations thereof should be used for this. The policy measures described in detail below and the eligible savings resulting from these are subject to the reservation to make amendments contained in Section I.

The Federal Government will also combine the objectives, instruments, financing and the responsibilities of the individual players in a 'National Energy Efficiency Action Plan' (NEEAP). The NEEAP is designed to implement the ambitious national energy efficiency goals of the energy concept confirmed by the new Federal Government along with the monitoring report for 2014. At the same time, the measures to be agreed in the NEEAP will help to reinforce the existing mix of instruments to

implement the savings target under Article 7 EED; these will be notified to the European Commission in a further communication. The reports on additional measures may also be supplemented with reports on other existing strategic measures to improve energy efficiency.

The NEEAP will be drawn up and adopted by the Federal Government in 2014.

Additional measures to be decided upon as part of the NEEAP:

- Replenishment and continuation of the CO_2 building renovation programme;
- Building renovation roadmap, aimed at achieving an almost climate-neutral building stock by 2050;
- Promotion of demanding energy efficiency measures in industry, driven by small businesses and medium-sized enterprises, municipalities and households from the Energy and Climate Fund;
- Establishment of the 'top runner' principle, backed up by national measures;
- Promotion of well-informed and independent energy consulting, particularly regarding the efficiency of heating systems;
- Expansion of free energy advice for households on low incomes and support for investments in energy-saving domestic appliances;
- Improved information to buyers and tenants on the energy quality of a building.
- Further measures still to be specified, e.g.
    - o Review of increased incentives for energy-related renovation;
    - o Further incentives (legal, informational) to expand the energy services market;
    - o Establishment of networks and support for individual initiatives;
    - o Increased contracting.

On this basis, the Federal Government will also keep the European Commission regularly informed of any future changes as part of its reporting obligations pursuant to Article 24 in conjunction with Annex XIV EED.

1. Regulatory measures

M 01: Energy Savings Regulation (new building)				
Regulative law	Start: 2002	End: not planned		Amendment: 2009 and 2014
Forecast of (cumulative) final energy saving	**New annual saving (from 2014)**	**Saving by intermediate milestone (31.12.2017)**	**Saving Total (2014–2020)**	**'Early action' saving Total (2009–2013)**
EnEV	4.1 PJ (2014, 2015); 2.5 PJ (from 2016)	36 PJ	**91 PJ**	144 PJ
Focus of the measure:				
Short description of the measure	The German Energy Savings Regulation [Energieeinsparverordnung – EnEV] sets minimum requirements for the energy quality of the building envelope and systems for new buildings and major renovations of existing buildings. The authorisation for the EnEV comes from the Energy Savings Act [Energieeinsparungsgesetz – EnEG] of 1976, last amended in 2013. Buildings to be constructed must not exceed the annual primary energy needs of a corresponding reference building and must be so designed that the building envelope and systems attain specified minimum standards. The 2009 amendment also tightened the minimum energy requirements for new buildings by an average of 30 %. The amendment to the EnEV that entered into force on 1 May 2014 increased the energy efficiency requirements for new buildings by a further 25 % with effect from 1 January 2016.			
Sector:	Private households; commerce, trade and services; industry	Target group:	Building owners and property developers	
Body responsible for the measure(s):	BMWi / BMUB	Application:	Building envelope, building services	
Lifetime	25 years	Savings by	2044	
Methodological details:				
Calculation formula	Cf. Annex (on the basis of: European Commission 2010: Section 2.3 [Procedure for new building standards]; Prognos 2013)			
Methodological parameters and additional methodological explanations	Cf. Annex; the methodology follows the procedure set out in the EnEV for the existing stock (see M 02 below), except that the previous standard (EnEV 2007 up to 2015, EnEV 2009 from 2016) is used as a reference *(baseline)*. When projecting the area covered by new buildings, the average for the last three years is used. The building completion statistics issued by the Federal Statistical Office [Statistisches Bundesamt] are used as a basis for the area covered by new buildings (2012: Volume 5, Series 1). Different parameters are used according to the type of building. One and two-family houses, apartment blocks and non-residential buildings are considered. The reference values are the living area for residential buildings and the useful area for non-residential buildings. The saving is based on the average heating energy demand and system efficiency levels per square metre of living area (residential) or useful area (non-residential). The heating energy demand and the system efficiency levels are shown as a quotient (final energy demand). In calculating the energy performance indicators, assumptions are made about the surface area to volume ratio (A/V ratio) for the categories of building considered. For one and two-family houses, an A/V ratio of 0.7 is assumed; for apartment blocks and non-residential buildings, a value of 0.4 is assumed.			
Sources/ references:	Prognos 2013; European Commission 2010; Federal Statistical Office 2012; BMWi 2011			

M 02: Energy Savings Regulation (existing stock)				
NB: Figures may be subject to updates based on current legislation				
Regulative law	Start: 2002		End: not planned	Amendment: 2009 and 2014
Forecast of (cumulative) final energy saving	**New annual saving (from 2014)**	**Saving by intermediate milestone (31.12.2017)**	**Saving Total (2014–2020)**	**'Early action' saving Total (2009–2013)**
EnEV	10.7 (2014, 2015; from 2016: 9.7 PJ)	104.3 PJ	**283.5 PJ**	338 PJ
Focus of the measure:				
Short description of the measure	The German Energy Savings Regulation [Energieeinsparverordnung – EnEV] sets minimum requirements for the energy quality of the building envelope and systems for new buildings and major renovations of existing buildings. The authorisation for the EnEV comes from the Energy Savings Act [Energieeinsparungsgesetz – EnEG] of 1976, last amended in 2014. For renovations of the existing stock, depending on the extent of the measures, either the required heat transfer coefficients (U values) must be adhered to (component method) or the maximum annual primary energy needs of the whole building must be shown (balance method). The 2009 amendment tightened the minimum energy requirements by an average of 30 %. The amendment to the EnEV that entered into force on 1 May 2014 tightens up the existing replacement requirement for old boilers to include boilers installed before 1985.			
Sector:	Private households; commerce, trade and services; industry	Target group:	Home and building owners	
Body responsible for the measure(s):	BMWi / BMUB	Application:	Building envelope, building services	
Lifetime	25 years	Savings by	2044	
Methodological details:				
Calculation formula	Cf. Annex (on the basis of: European Commission 2010: Section 2.1 [Procedure for renovation measures]; Prognos 2013)			
Methodological parameters and additional methodological explanations	Cf. Annex; the building stock is used as the reference *(baseline)*. The EnEV 2009 level is used as a target for renovation. This remains essentially the same under the EnEV 2013. Figure 7 shows the calculation method. It is assumed that the EnEV applies to the existing stock in the years 2009 to 2020. The extrapolation assumes constant areas and savings. Different parameters are used according to the type of building. One and two-family houses, apartment blocks and non-residential buildings are considered. The reference values are the living area for residential buildings and the useful area for non-residential buildings. The heating energy demand and the system efficiency levels are shown as a quotient (final energy demand). The performance indicators per square metre of living/useful area are derived from the available expert opinions and official figures (cf. Prognos 2013).			
Sources/ references:	Prognos 2013; European Commission 2010; TU Braunschweig 2012; AG Energiebilanzen 2011; Leibniz-Institut et al. 2011; Mikrozensus 2010; BMWi 2011; Fraunhofer ISI et al. 2008			

M 03: Renewable Energies Heat Act [Erneuerbare Energien Wärme-Gesetz — EEWärmeG]				
Regulative law	Start: 2009	End: not planned		Linked to the amendments to the Energy Saving Regulation 2009 and 2014
Forecast of (cumulative) final energy saving	**New annual saving (from 2014)**	**Saving by intermediate milestone (31.12.2017)**	**Saving Total (2014–2020)**	**'Early action' saving Total (2009–2013)**
EEWärmeG	0.8 PJ; 0.6 PJ (from 2016)	7 PJ	**21 PJ**	30 PJ
Focus of the measure:				
Short description of the measure	The Renewable Energies Heat Act [EEWärmeG] lays down an obligation to use renewable energy sources in the construction of new buildings. The connection to final energy is provided, *inter alia*, by the fact that this Act allows for over-fulfilment of the Energy Saving Regulation [EnEV] as an alternative to the use of renewable energies. Final energy savings under the EEWärmeG are thus linked to the amendments to the EnEV in the area of new buildings. The effects of the measure in terms of final energy savings are presented here.			
Sector:	Private households; commerce, trade and services; industry	Target group:	Building owners and property developers	
Body responsible for the measure(s):	BMUB	Application:	Building envelope, building services	
Lifetime	10–30 years (depending on the individual measure)	Savings by	2029–2049 (depending on the individual measure)	
Methodological details:				
Calculation formula	Cf. Annex (on the basis of: European Commission 2010: Section 2.3 [Procedure for new building standards]; Prognos 2013)			
Methodological parameters and additional methodological explanations	Cf. Annex; the relevant version of the EnEV is applied as the reference *(baseline)*. The target is a 15 % reduction in final energy consumption. When updating the energy performance indicators, the required level as of 2016 set out in the 2014 amendment to the EnEV is used as a basis and it is assumed that the target values in the EEWärmeG will be adjusted in line with the EnEV. When projecting the area covered by new buildings, the average for the last three years is used. The building completion statistics issued by the Federal Statistical Office [Statistisches Bundesamt] are used as a basis for the area covered by new buildings (2012: Volume 5, Series 1).

Different parameters are used according to the type of building. One and two-family houses, apartment blocks and non-residential buildings are considered. The reference values are the living area for residential buildings and the useful area for non-residential buildings. The saving is based on the average heating energy demand and system efficiency levels per square metre of living area (residential) or useful area (non-residential). The heating energy demand and the system efficiency levels are shown as a quotient (final energy demand). In calculating the energy performance indicators, assumptions are made about the surface area to volume ratio (A/V ratio) for the categories of building considered. For one and two-family houses, an A/V ratio of 0.7 is assumed; for apartment blocks and non-residential buildings, a value of 0.4 is assumed. The proportion (by area) of new buildings where the alternative measure 'EnEV -15 %' has been implemented on the basis of the EEWärmeG is determined using the progress report on the EEWärmeG. Based on this legal requirement, for the purpose of simplification a mean reduction in the final energy consumption of 15 % (compared to the EnEV) is applied for the corresponding area. In principle, the other measures under the EEWärmeG may also make a contribution to reducing the final energy consumption. However, it is assumed that the savings effect provided by these measures is already included in the EnEV. | | | |
| Sources/ references: | Prognos 2013; European Commission 2010; BMU 2012; Federal Statistical Office 2012; BMWi 2011 | | | |

2. Investment support

M 04: KfW [German government-owned development bank] support programmes for energy-efficient construction and renovation (CO₂ Building Renovation Programme): - KfW Energy-Efficient Renovation - KfW Energy-Efficient Construction - Replenishment of the KfW programmes for energy-efficient construction and renovation				
Funding	Start: 2009	End: not specified		
Forecast of (cumulative) final energy saving	New annual saving (from 2014)	Saving by intermediate milestone (31.12.2017)	Saving Total (2014–2020)	'Early action' saving Total (2009–2013)
KfW energy-efficient renovation	6.2 PJ	62 PJ	**175 PJ**	219 PJ
KfW energy-efficient construction	0.8 PJ	8 PJ	**22 PJ**	27 PJ
KfW replenishment	0.8 PJ	8 PJ	**23 PJ**	6 PJ
Total	7.8 PJ	78 PJ	**220 PJ**	252 PJ
Focus of the measures:				
Short description of the measures	In the area of energy-efficient construction, support is provided for new buildings that surpass the applicable building standard: KfW Energy-Efficient House 70, 55 and 40, and the Passive House Standard. EUR 50 000 is the maximum amount of funding provided per housing unit, up to 100 % of the eligible costs. The funding is provided through long-term soft loans. The measure has been used to maintain the KfW 'Ecological Construction' programme since 2009. In the area of energy-efficient renovation, the programmes include the provision of support for renovations of existing buildings where the applicable building standard is surpassed (KfW Efficient House standards 55, 70, 85, 100 and 115) and individual measures that meet defined minimum requirements. Support is provided in the form of a low-interest loan (combined with a redemption grant), or alternatively in the form of an investment grant. Depending on the KfW Efficient House standard achieved, the grant may be a maximum of EUR 18 750 per housing unit. For individual measures, the grant may be a maximum of EUR 5 000 per housing unit. The measure is used to maintain the KfW 'CO₂ Building Renovation Programme'. In December 2012, the Federal Government approved a further replenishment of KfW's building renovation programmes by a further EUR 300 million per annum for grants (from 2013).			
Sector:	Private households	Target group:	Home and property owners; owners and developers of new buildings	
Body responsible for the measure(s):	BMWi / KfW	Application:	Building envelope, building services	
Lifetime	10–30 years (depending on the individual measure)	Savings by	2029–2049 (depending on the individual measure)	
Methodological details:				
Calculation formulae	Cf. Annex (for the 'Energy-Efficient Building and Renovation' programmes on the basis of the programme evaluations produced on behalf of the KfW and the BMVBS [cf. BEI/IWU 2012, 2011] and Prognos 2013; for the replenishment of the KfW building renovation programmes on the basis of: European Commission 2010: Section 2.1 [Procedure for renovation measures] and Prognos 2013).			

Methodological parameters and additional methodological explanations	With regard to the 'Energy-Efficient Building and Renovation' programmes (CO_2 Building Renovation Programme), the number of housing units for which funding is provided is taken as the driving variable for the forward projection. The mean for the period 2009–2011 is used for both the number of housing units and for the saving per housing unit. In specific terms, an annual saving of 6.9 MWh per year and housing unit (HU) across 278 000 HUs is assumed in the 'Energy-Efficient Renovation' programme; an annual saving of 4.1 MWh per year and HU across 77 000 housing units is used as a basis in the 'Energy-Efficient Construction' programme.
	With regard to the replenishment of the KfW building renovation programmes, 200 kWh per m^2 living area is assumed as a reference value for the existing building stock. The reference property is a one/two-family house whose energy performance indicator (as stipulated for the existing building stock by EnEV) is exceeded by 15 % following the renovation. Where an A/V ratio of 0.7 is applied, this produces a target value of 111 kWh per m^2 living area. The level of grant awarded is between 10 % and 25 % of the total investment depending on the purpose of the funding. It is assumed that this will trigger an investment volume of EUR 1.5 billion per annum when the scheme enters into force in 2013.
Sources/ references:	Prognos 2013, 2012; European Commission 2010; BEI/IWU 2012, 2011, 2010; dena 2011; KfW 2012 (data delivery)

M 05: KfW investment programmes in municipalities and social facilities (in part CO_2 Building Renovation Programme):				
- IKK — Energy-Related Urban Renewal — Energy-Efficient Renovation - IKU — Energy-Related Urban Renewal — Energy-Efficient Renovation - IKK/IKU — Energy-Related Urban Renewal — Energy-Efficient Renovation - IKK — Energy-Related Urban Renewal — Urban Lighting - KfW Premium Investment Loan for Municipalities / Premium Municipal Investments				
Funding	Start: 2007, 2009, 2012	End: not specified		
Forecast of (cumulative) final energy saving	New annual saving (from 2014)	Saving by intermediate milestone (31.12.2017)	Saving Total (2014–2020)	'Early action' saving Total (2009–2013)
IKK EE Renovation	0.2 PJ	2 PJ	**5.6 PJ**	7.0 PJ
IKU EE Renovation	0.1 PJ	0.6 PJ	**1.6 PJ**	2.0 PJ
IKK/IKU Renovation	0.00 PJ	0.02 PJ	**0.05 PJ**	0.03 PJ
IKK Urban Lighting	0.0 PJ	0.3 PJ	**0.8 PJ**	0.6 PJ
Total	0.3 PJ	2.92 PJ	**8.05 PJ**	9.63 PJ
Focus of the measures:				
Short description of the measures	Among the various support possibilities for municipalities in the area of energy efficiency, the KfW offers (on behalf of BMWi), through the CO_2 Building Renovation Programme, direct loans and sub-loans for the energy-related renovation of schools, school sports halls, day nurseries and buildings used for work with children or young people. Among other things, funding is provided for renovation to new build level (programme part A) to the KfW Efficient House standard 100 and 85, 70 and 55, and for energy-efficient individual measures through the 'IKK — Energy-Related Urban Renewal — Energy-Efficient Renovation' and 'IKU — Energy-Related Urban Renewal — Energy-Efficient Renovation' programmes under the CO_2 Building Renovation Programme. This renovation work may include heat insulation, the replacement of heating or windows (programme part B) or the energy efficiency of public urban lighting. The 'Energy-Related Urban Renewal — Grants for Integrated District Concepts and Renovation Managers' programme does not directly support investments in energy-efficient measures and is therefore included in a different section. Investment measures for sustained improvement in the energy efficiency of the municipal supply systems (district-related heat supply and energy-efficient water supply and sewage disposal) have been supported through the KfW programme 'Energy-Related Urban Renewal — District Supply' in the form of low-interest loans on behalf of BMWi since February 2012 (evaluation still outstanding). The KfW also offers other programmes for municipalities (such as the 'Municipal Energy Supply' programme) which are not included here as they focus primarily on investments concerning conversion.			
Sector:	Public authorities	Target group:	Municipalities	
Body responsible for the measure(s):	BMWi / KfW	Application:	Building envelope, building services, lighting	
Lifetime	10–30 years (depending on the individual measure)	Savings by	2029–2049 (depending on the individual measure)	
Methodological details:				
Calculation formulae	Cf. Annex			
Methodological parameters and additional methodological explanations	The evaluation by [BEI 2011] and the data delivered by KfW are used as a basis for calculating the savings. Reference is made to the information provided by the Baden-Württemberg State Ministry of the Environment in the form of a study on the 2nd NEEAP [Prognos, Difu 2011] when determining the saving per euro invested for the urban lighting programmes. For the forward projection, the investment volume triggered by the measure is taken as the driving variable for the final energy saving. The average saving for 2009–2010 and the mean investment volume for 2009–2011 are used here.			
Sources/ references:	Prognos 2013; BEI 2011; Prognos/Difu 2011; KfW 2012 (data delivery)			

M 06: Investment support in companies				
- KfW Energy Efficiency Programme - KfW Renewable Energies Standard / Premium - BMWi Efficiency Fund: Promotion of energy-efficient cross-cutting technologies in SMEs / promotion of energy-efficient and climate-friendly production processes				
Funding	Start: 2009/2012		End: not specified	
Forecast of (cumulative) final energy saving	**New annual saving (from 2014)**	**Saving by intermediate milestone (31.12.2017)**	**Saving Total (2014–2020)**	**'Early action' saving Total (2009–2013)**
KfW Energy Efficiency	3.7 PJ	37 PJ	**104 PJ**	61 PJ
KfW Renewable	0.01 PJ	0.1 PJ	**0.2 PJ**	0.2 PJ
Cross-cutting technologies / processes	0.7 PJ	6.8 PJ	**19 PJ**	4.8 PJ
Total	4.41 PJ	43.9 PJ	**123.2 PJ**	66 PJ
Focus of the measures:				
Short description of the measures	The KfW energy efficiency programme provides financing for energy efficiency measures, e.g. in the areas of building and energy technology; building envelopes; machinery; process cooling and heating; heat recovery/waste heat utilisation; measurement, regulation and control technology; information and communication technology; procurement of low-emission commercial vehicles, including the associated costs for planning and implementation support for SMEs. The anticipated energy savings must be calculated before the application is filed; minimum requirements exist with regard to the level of saving (for new investments: 15% less than the average for the industry; for replacement investments: 30 % less than the mean consumption for the last three years). Under the KfW Renewable Energies (Standard/Premium) programme, funding is provided for projects where renewable energy sources are used to generate electricity and where electricity/heat is generated in combined heat and power plants in the form of low-interest loans and partly also through redemption loans. The effects of the programme in terms of final energy savings are examined here. The two programmes, 'Promotion of high efficiency cross-cutting technologies in SMEs' (funding for e.g. energy-efficient pumps, drives or compressed-air systems in the form of investment grants) and 'Promotion of energy-efficient and climate-friendly production processes in the manufacturing sector', were launched under the Energy Efficiency Fund of the Federal Ministry of Economics and Energy [Bundesministerium für Wirtschaft und Energie — BMWi].			
Sector:	Commerce, trade and services; industry	Target group:	Companies	
Body responsible for the measure(s):	KfW, BMWi, Federal Office of Economics and Export Control [Bundesamt für Wirtschaft und Ausfuhrkontrolle — BAFA]	Application:	Building envelope, building services, stationary drives, thermal cross-cutting technologies, processes	
Lifetime	10–30 years (depending on the individual measure)	Savings by	2029–2049 (depending on the individual measure)	
Methodological details:				
Calculation formulae	Cf. Annex.			
Methodological parameters and additional methodological explanations	To calculate the saving, an energy saving per euro employed is estimated for each type of use. For the forward projection, the investment volume triggered by the measure is taken as the driving variable for the final energy saving. For the purpose of projecting the investment volume, it is assumed that the programmes will trigger annual investments in the order of EUR 3.5 billion (cf. Annex: Methodological parameters for investment support in companies). The range of the saving in question varies considerably, not least because of the variety of application systems used. The studies referred to contain values of between 0.02 and 5 kWh/a per euro invested. In the area of cross-cutting technologies and production processes, a value of 0.75 kWh/(a*€) was estimated as a realistic value.			
Sources/ references:	Prognos 2013, 2012; KfW 2012 (data delivery); BfEE 2012 (data delivery); Deloitte 2011; ZSW (various years); CWA 2007			

M 07: Combined Heat and Power Act [Kraft-Wärme-Kopplungs-Gesetz — KWK-G]			
Funding	Start: 2002	End: not specified	Amendments: 2009 and 2012

Forecast of (cumulative) final energy saving	New annual saving (from 2014)	Saving by intermediate milestone (31.12.2017)	Saving Total (2014–2020)	'Early action' saving Total (2009–2013)
KWK-G	0.4 PJ (2014); 0.1 PJ (2015–2020);	2.1 PJ	**4.6 PJ**	-

Focus of the measure:	
Short description of the measures	The purpose of the KWK-G is to make a contribution towards increasing the amount of electricity generated from combined heat and power in Germany to 25 % by 2020 by promoting the modernisation of CHP plants and the construction of new CHP plants, supporting the market launch of fuel cells and promoting the setting up and expansion of heating and cooling networks, and the setting up and expansion of heat and cold accumulators into which heat or cooling energy from CHP installations is fed, in the interest of saving energy, protecting the environment and achieving the Federal Government's climate protection targets. The final energy savings resulting from the Combined Heat and Power Act are presented here.

Sector:	Commerce, trade and services; industry; private households	Target group:	Operators of combined heat and power installations
Body responsible for the measure(s):	BMWi	Application:	Building services
Lifetime	1 year	Savings by	2020

Methodological details:	
Calculation formulae	Cf. Annex.
Methodological parameters and additional methodological explanations	The methodological approach selected is based on the methodology selected in the interim review of the KWK-G. This involves comparing the conversion of final energy into useful energy through CHP against non-combined conversion. For the purpose of the forward projection, it is assumed that the CHP electricity generated will be the same as in the 'Atomic Energy Act [Atomgesetz] 2002' scenario of the interim review of the KWK-G. Only CHP generation that is included in the final energy section of the national energy balance is considered here. This involves CHP plants with an electrical output of less than 1 MW. For the calculation, a distinction is made between seven capacity categories based on the categories of remuneration in the KWK-G: - up to 10 kW$_{el}$, - up to 10 kW$_{el}$, high-efficiency, - 10-50 kW$_{el}$, - 10-50 kW$_{el}$, high-efficiency, - 50 kW$_{el}$–2 MW$_{el}$, - 50 kW$_{el}$–2 MW$_{el}$, high-efficiency, - fuel cell. Only the high efficiency capacity categories and fuel cells are included in the calculation of the saving. 92.5 % efficiency is taken as the reference efficiency for the generation of heat. 100 % efficiency is taken here as the reference efficiency for the generation of electricity. This is substantiated in the analysis of final energy. The generation of electricity, and hence its efficiency, are shown in the conversion section of the national energy balance. With the selected approach, the saving is calculated on the basis of the annual amount generated and not on the basis of the CHP installations. For that reason, one year should be set as the 'lifetime' of the saving and no early savings are therefore eligible. Generally speaking, the impact of CHP is determined by looking at the primary energy. For reasons of consistency, the impact on final energy consumption is evaluated at this point (power factor = 1). In the energy balance, only CHP plants with an electrical output of less than 1 MW are included under final energy consumption. However, CHP plants up to 2 MW$_{el}$ are considered in this document. This imprecision is attributable to the current data for this segment in the Federal Republic of Germany. A moderate overestimate of the saving in the area of CHP should therefore be assumed.
Sources/ references:	Prognos 2013, 2012; Prognos/BEA 2011; Dielmann 2008; Gailfuss 2002, 2000; Prognos/ifeu/BHKW 2013

M 08: National Climate Protection Initiative — market incentive programme to promote the use of renewable energies in the heating market (BAFA part)				
Funding	Start: 1999	End: not specified		
Forecast of (cumulative) final energy saving	**New annual saving (from 2014)**	**Saving by intermediate milestone (31.12.2017)**	**Saving Total (2014–2020)**	**'Early action' saving Total (2009–2013)**
Market incentive programme (BAFA part)	0.8 PJ	8.4 PJ	**24 PJ**	48 PJ
Focus of the measure:				
Short description of the measures	The objective of the programme is to strengthen sales of renewable energy technologies through investment incentives and to improve their economic viability. Funding is provided in the form of a grant from BAFA. Funding is provided, *inter alia*, for efficient heat pumps and solar thermal installations. Where a solar thermal installation and a heat pump are set up at the same time, funding is provided for this in the form of a combination bonus. Since 2010, the target of the funding has been almost exclusively the existing stock of buildings. The measure is evaluated here in terms of its impact on final energy consumption.			
Sector:	Cross-cutting technologies	Target group:	Property owners and property developers	
Body responsible for the measure(s):	BMUB, BAFA	Application:	Building services	
Lifetime	10–20 years (depending on the individual measure)	Savings by	2029–2039 (depending on the individual measure)	
Methodological details:				
Calculation formulae	Cf. Annex (for the programme part 'Heat pump' on the basis of: European Commission 2010: Section 2.4 [Procedure for heating replacement] and Prognos 2013; for the programme part 'Solar thermal technology' on the basis of: European Commission 2010: Section 2.7 [Procedure for solar thermal installations] and Prognos 2013).			
Methodological parameters and additional methodological explanations	For the purpose of the forward projection, a funding volume the same as the average for 2010–2011 is assumed. In specific terms, this means an increase of 436 000 m^2 collector area and an increase or conversion of 991 000 m^2 living/useful area supplied by heat pumps per annum. Assumptions regarding the average living/useful area supplied in each funding case, the heating energy demand per m^2, the system efficiency of the existing system and the heat pump, and the heat yield of 1 m^2 collector area are taken from the 2nd National Energy Efficiency Action Plan for 2011. The actual saving is 460 kWh per m^2 of collector area, or 136 kWh per m^2 living/useful area supplied by heat pumps.			
Sources/ references:	Prognos 2013; European Commission 2010; BMWi 2011; BAFA 2012 (data delivery)			

M 09: National Climate Protection Initiative — further programmes at national level to promote investments in energy efficiency: - **Incentive programme to promote climate protection measures with regard to commercial refrigeration systems** - **Incentive programme to promote micro-CHP installations** - **Electricity projects under the policy for municipalities of the National Climate Protection Initiative**				
Funding	Start: 2009	End: not specified		
Forecast of (cumulative) final energy saving	**New annual saving (from 2014)**	**Saving by intermediate milestone (31.12.2017)**	**Saving Total (2014–2020)**	**'Early action' saving Total (2009–2013)**
General promotion under National Climate Protection Initiative programmes	0.1 PJ	1.0 PJ	**3.1 PJ**	4.4 PJ
Focus of the measures:				
Short description of the measures	Under the incentive programme to promote climate protection measures with regard to commercial refrigeration systems, funding is provided for a status check for refrigeration systems (above a certain size) in operation, the modernisation of refrigeration systems and the construction of new efficient refrigeration systems (basic funding), and waste heat utilisation measures (bonus funding). The objective of the funding provided under the incentive programme to promote micro-CHP plants is to boost the use of micro-CHP plants within the capacity range up to 50 kW in the heating market through investment incentives. Funding is provided for various projects targeting the efficient use of energy in the municipalities under the policy for municipalities of the National Climate Protection Initiative.			
Sector:	Commerce, trade and services; industry; private households; public authorities	Target group:	Companies, building owners, municipalities	
Body responsible for the measure(s):	BMUB, BAFA	Application:	Building envelope, building services, stationary drives, thermal cross-cutting technologies, processes	
Lifetime	10–30 years (depending on the individual measure)	Savings by	2029–2049 (depending on the individual measure)	
Methodological details:				
Calculation formulae	Cf. Annex.			
Methodological parameters and additional methodological explanations	The basis used for determining the contribution by the National Climate Protection Initiative programmes to the general promotion of investments in energy efficiency is the evaluation of the National Climate Protection Initiative (Öko-Institut et al. 2012). As we must assume that all micro-CHP installations receive the CHP bonus, no saving is allocated here to avoid this measure being counted twice.			
Sources/ references:	Prognos 2013; Öko-Institut et al. 2012; UBA 2012			

M 10: Measures by the Landwirtschaftliche Rentenbank to promote investments in energy efficiency					
Funding		Start: 2009		End: not specified	
Forecast of (cumulative) final energy saving	**New annual saving (from 2014)**	**Saving by intermediate milestone (31.12.2017)**		**Saving Total (2014–2020)**	**'Early action' saving Total (2009–2013)**
Rentenbank	<0.1 PJ	0.5 PJ		**1.3 PJ**	1.7 PJ
Focus of the measure:					
Short description of the measures	The Landwirtschaftliche Rentenbank is Germany's development agency for agribusiness, and has been granting advantageous loans for various agricultural investments, including investments in improved energy efficiency, for many years. These funding programmes support both production businesses in agriculture and forestry, viticulture and horticulture, and also manufacturers of agricultural production equipment and dealers and service providers closely connected to agriculture. The various programmes promote energy efficiency in these areas by financing measures by way of low-interest loans etc. for energy-efficient housing for livestock, greenhouses and other buildings and for technical and structural facilities.				
Sector:	Commerce, trade and services	Target group:		Undertakings in the agriculture, fisheries, agribusiness and food sectors	
Body responsible for the measure(s):	Landwirtschaftliche Rentenbank	Application:		Building envelope, building services (heating, ventilation, air-conditioning), lighting, mobile drives	
Lifetime	15-25 years (depending on the individual measure)	Savings by		2034-2044 (depending on the individual measure)	
Methodological details:					
Calculation formulae	Cf. Annex.				
Methodological parameters and additional methodological explanations	An energy saving per euro employed is estimated for each programme area. Assumptions are also made regarding the ratio between investment volume and loan volume. For extrapolation purposes, it is assumed that future demand will be at the same level as the average over the years 2009 to 2013. The range of the saving in question varies considerably, not least because of the variety of application systems used.				
Sources/ references:	European Commission 2010; BMWi 2011; Landwirtschaftliche Rentenbank (data delivery)				

M 11: Measures by the federal states to improve energy efficiency				
Funding	Start: various		End: not specified	
Forecast of (cumulative) final energy saving	**New annual saving (from 2014)**	**Saving by intermediate milestone (31.12.2017)**	**Saving Total (2014–2020)**	**'Early action' saving Total (2009–2013)**
Federal states	1.1 PJ	11 PJ	**30 PJ**	31 PJ
Focus of the measure:				
Short description of the measures	A decision of the conference of finance ministers of the federal states on 5/6 June 2013 introduced systematic monitoring of energy savings by the federal states, to determine their contribution to attaining the savings target set out in Article 7 EED. For this purpose, the federal states identified numerous measures that resulted in energy savings. These measures, mostly aid programmes for various final consumers, are currently being assessed according to the methodological specifications in the EED for their probably savings effect in the period 2014 to 2020 and 2009 to 2013 (early action). The quantitative data on the measures available at this time indicate total cumulative savings of 30 PJ in the period 2014 to 2020. As part of the monitoring by the federal states, further regional measures are now also being quantified. The Federal Government will inform the European Commission of the resulting additional savings in its regular reports, after consultation with the federal states.			
Sector:	Cross-cutting (all)	Target group:	Final consumers	
Body responsible for the measure(s):	Federal states (depending on the measure)	Application:	Building envelope; building services (heating, ventilation, air conditioning); lighting; appliances (white goods, domestic appliances); appliances (brown goods, consumer electronics); appliances (grey goods, information and communication); mobile drives	
Lifetime	10-25 years (depending on the individual measure)	Savings by	2029-2044 (depending on the individual measure)	
Methodological details:				
Calculation formulae	Cf. Annex.			
Methodological parameters and additional methodological explanations	Departmental surveys in the federal states have derived effectiveness indicators for the measures. These effectiveness indicators (e.g. final energy saving, CO_2 reduction, primary energy saving, renovated residential area/units, investments made) are used to estimate final energy savings according to the methodological specifications in the EED. Any double-counting, e.g. replenishment of KfW programmes and accumulation with other federal programmes mentioned here, is eliminated by means of instrument factors.			
Sources/ references:	Prognos 2014; European Commission 2010; BMWi 2011; Federal states 2014, 2013 (data delivery)			

M 12: Other investment programmes to promote energy efficiency which will expire during the period 2009–2013 (only counted as 'early action'):
- **Future Investments Act [*Zukunftsinvestitionsgesetz — ZuInvG*]**
- **Investment pact between federal and state governments and municipalities to modernise the social infrastructure**
- **Environmental premium**
- **Predecessor of the CO_2 Building Renovation Programme (programme is continued in an altered form — see M 02)**
- **Predecessor of the KfW Municipal Loan — Energy-Related Building Renovation (programme is continued in an altered form — see M 03)**
- **ERP Environment and Energy Efficiency Programmes A + B**

Funding		Start: 2009		End: not specified	
Forecast of (cumulative) final energy saving	**Annual Saving ('Early action' only)**	**Saving by intermediate milestone (31.12.2017)**	**Saving Total (2014–2020)**	**'Early action' saving Total (2009–2013)**	
ZuInvG	6.9 PJ	-	-	48 PJ	
Investment pact	0.6 PJ	-	-	4.4 PJ	
Environmental premium	3.7 PJ	-	-	26 PJ	
CO_2 Building	1.7 PJ	-	-	12 PJ	
KfW Municipal Loan	0.04 PJ	-	-	0.3 PJ	
ERP A + B	5.5 PJ	-	-	39 PJ	
Total	18.44 PJ	-	-	129.7 PJ	

Focus of the measures:	
Short description of the measures	Under the Federal Government's 2nd recovery package of January 2009, funds totalling EUR 10 billion were provided to the municipalities and federal states through the Future Investments Act [Zukunftsinvestitionsgesetz — ZuInvG]. The federal states and municipalities agreed to a co-financing contribution of 25 %, which meant that a total of at least EUR 13.3 billion was provided for additional investments in the educational infrastructure and to improve other infrastructure. This funding was also used to carry out numerous projects and measures to improve energy efficiency.
	The '2008 Investment Pact' between federal and state governments and municipalities on energy modernisation of the social infrastructure provided funding for planning and construction measures with regard to social infrastructure buildings in need of improvement in terms of energy efficiency. The financial contribution was provided in the form of a grant towards the investment costs. Funding was particularly provided to municipalities with a difficult budget situation, which therefore find it hard to finance energy-saving measures. They received funding of up to 90 % (as against 66 %) of the investment costs. The investment pact enabled the implementation of measures that otherwise could not have been taken owing to existing obstacles to financing.
	The objective of the support programme granting an environmental bonus (scrapping bonus) was to replace old cars emitting high levels of traditional pollutants with new, more efficient vehicles. To this end, an environmental bonus of EUR 2 500 was awarded upon application to the BAFA as a one-off grant when a private vehicle owner bought a new car or nearly new car (previous year's model) and could prove, at the same time, that an old car (at least nine years old) had been scrapped. The amount of funding was raised to EUR 5 billion owing to the extremely high level of demand. Funding was provided for approx. 2 million cars.
	Under the KfW Municipal Loan — Energy-Efficient Renovation of Buildings, financial support was provided for measures for the energy-related renovation of schools, school sports halls, day nurseries and buildings used for work with children or young people, in the form of soft loans (programme is continued in an altered form — see M 03).
	The ERP Environment and Energy Efficiency Programmes A + B provided financing for energy efficiency measures, for example in the areas of building and energy technology; building envelopes; machinery; process cooling and heating; heat recovery installations; measurement, regulation and control technology; information and communication technology, including the associated costs for planning and implementation support for SMEs.

Sector:	Private households; commerce, trade and services; industry; public authorities; transport	Target group:	Depending on the programme or measure (cf. 2nd NEEAP 2011).
Body responsible for the measure(s):	Depending on the programme or measure (cf. 2nd NEEAP 2011).	Application:	Building envelope, building services, stationary drives, thermal cross-cutting technologies, processes, mobile drives
Lifetime	10–30 years (depending on the individual measure)	Savings by	2029–2049 (depending on the individual measure)
Methodological details:			
Calculation formulae	Cf. 2nd NEEAP (BMWi 2011).		
Methodological parameters and additional methodological explanations	The measures considered in this combination of measures will expire during the period from 2009 to 2013 but will provide final energy savings until 2020 (the values shown therefore relate to the saving during the period 2014–2020). These final energy savings therefore only count towards the target achievement as early savings (resulting from 'early action') in accordance with Article 7(2)(d) EED. The basis for determining the final energy savings is the 2nd NEEAP (BMWi 2011). The methods of calculation are documented there, only the results are used in this notification. The measure 'KfW Municipal Loan — Energy-related Building Renovation' was evaluated following completion of the 2nd NEEAP; the results of this evaluation [BEI 2011] are used here.		
Sources/ references:	BMWi 2011, BEI 2011		

3. Measures affecting prices

M 13: Energy and electricity tax				
Measure affecting prices	Start: 1999 / 2006		End: not planned	
Forecast of (cumulative) final energy saving	**New annual saving (from 2014)**	**Saving by intermediate milestone (31.12.2017)**	**Saving Total (2014–2020)**	**'Early action' saving Total (2009–2013)**
Energy and electricity tax	74 PJ (from 2014) 73 PJ (from 2016) 72 PJ (from 2019)	294 PJ	**511 PJ**	-
Focus of the measure:				
Short description of the measure	The Energy Tax Act [Energiesteuergesetz] and the Electricity Tax Act [Stromsteuergesetz] govern the taxation of various energy sources (e.g. fuel oil, petrol, diesel, natural gas) and of electricity respectively. Because of their effect on prices, these taxes influence the behaviour of final consumers towards an increased use of energy-efficient technologies and economical use of energy.			
Sector:	Cross-cutting (all)	Target group:	Final consumers	
Body responsible for the measure(s):	Federal Ministry of Finance	Application:	Building envelope; building services (heating, ventilation, air conditioning); lighting; appliances (white goods, domestic appliances); appliances (brown goods, consumer electronics); appliances (grey goods, information and communication); mobile drives	
Lifetime	1 year	Savings by	2020	
Methodological details:				
Calculation formula	Cf. Annex (on the basis of: BMWi 2011; Prognos 2013)			
Methodological parameters and additional methodological explanations	Considering and applying the methodological specifications in Article 7 in conjunction with Annex V No 3 EED produces an incentive effect and, from this, a contribution towards attaining the savings target set out in Article 7 EED. In accordance with the provisions of Annex V No 3(a), the minimum requirements laid down in Council Directive 2003/96/EC of 27 October 2003 have been used as a baseline/reference. This means that energy savings resulting from the influence of higher tax rates on energy sources/electricity compared to this reference over the period of the EED, count towards the attainment of the savings target laid down in Article 7 EED. This considers the effect of energy and electricity tax on final consumption broken down by sector, use and energy sources (similar to the approach in BMWi 2011). The trend in energy prices has been taken from the Federal Government's energy scenario II B (cf. Prognos/EWI/GWS 2010, Table 2.2-3 and Table A 1-18). The taxable consumption of the individual consumer categories is taken from the usage balances of the Working Group on Energy Balances, also making use of the energy balance in some cases (this relates to consumption in the transport sector, as aviation is not generally subject to energy tax; in the industrial sector, it relates to the breakdown between heavy and light fuel oil). In the industrial sector, grounds for exemption are also taken into consideration under the peak tax adjustment scheme. The tax reduction based on the subsidy report from the BMF is used for this. The price elasticity values used come from BMWi 2011.			
Sources/ references:	Prognos 2013; BMWi 2011; Prognos/GWS 2009; Prognos/EWI/GWS 2010; AG Energiebilanzen 2012, 2011; BMF 2011; Directive 2003/96/EC			

M 14: HGV toll				
Measure affecting prices	Start: 2005		End: not planned	
Forecast of (cumulative) final energy saving	**New annual saving (from 2014)**	**Saving by intermediate milestone (31.12.2017)**	**Saving Total (2014–2020)**	**'Early action' saving Total (2009–2013)**
HGV toll	3.0 PJ	12.1 PJ	**21 PJ**	-
Focus of the measure:				
Short description of the measure	Since 2005, an HGV toll has been collected from trucks above a permitted total weight of 12 tonnes for journeys on motorways. In July 2011, the toll was extended to major roads (direct motorway connections, out of town, minimum length of 4 km, at least two lanes in each direction and a central reservation); this has been implemented since 1 August 2012. Depending on the class of pollutant, the toll rates are currently EUR 0.141 to 0.274 per km for trucks with up to three axles, and EUR 0.155 to 0.288 per km for vehicles with more than three axles. Because of its effect on prices, the HGV toll influences the behaviour of final consumers in the transport sector (trucks) towards an increased use of energy-efficient technologies, reduced mileage and substitution effects in favour of other modes of transport.			
Sector:	TRANS	Target group:	Final consumers	
Body responsible for the measure(s):	Federal Ministry of Finance	Application:	Mobile drives	
Lifetime	1 year	Savings by	2020	
Methodological details:				
Calculation formula	Cf. Annex (on the basis of: BMWi 2011; Prognos 2013)			
Methodological parameters and additional methodological explanations	Considering and applying the methodological specifications in Article 7 in conjunction with Annex V No 3 EED produces an incentive effect and, from this, a contribution towards attaining the savings target set out in Article 7 EED. The elasticity approach is used as a calculation formula. The methodology is based on BMWi 2011, including the assumptions made as to price elasticity, price changes for diesel fuel and the average specific consumption of the vehicles liable for the toll. The price increase brought about by the HGV toll relates to vehicle usage costs per kilometre. These are based on wages and materials costs of EUR 0.40, diesel fuel costs of EUR 0.44 Euro and average toll costs of EUR 0.17 per kilometre.			
Sources/ references:	Prognos 2013; BMWi 2011; ProgTrans/IWW 2007; Federal Office for Goods Transport [Bundesamt für Güterverkehr] 2010, 2011, 2012; BGL 2012; DIW 2012			

M 15: Air traffic tax				
Measure affecting prices	Start: 2011		End: not planned	
Forecast of (cumulative) final energy saving	**New annual saving (from 2014)**	**Saving by intermediate milestone (31.12.2017)**	**Saving Total (2014–2020)**	**'Early action' saving Total (2009–2013)**
Air traffic tax	4.2 PJ	16.8 PJ	**29 PJ**	-
Focus of the measure:				
Short description of the measure	Since 2011, an air traffic tax has been levied on transactions (usually the purchase of a ticket) that entitle a passenger to fly out of a German airport. The amount of air traffic tax is derived from the destination of the flight, so it is at least broadly dependent on the distance. From 1 January 2013, the air traffic tax rates laid down by law vary in three distance categories between EUR 7.50, EUR 23.43 and EUR 42.18. This provision within the Air Traffic Tax Act is intended to include air travel in mobility taxation, to create incentives for environmentally responsible behaviour.			
Sector:	TRANS	Target group:	Final consumers	
Body responsible for the measure(s):	Federal Ministry of Finance	Application:	Mobile drives	
Lifetime	1 year	Savings by	2020	
Methodological details:				
Calculation formula	Cf. Annex (on the basis of: BMWi 2011; Prognos 2013)			
Methodological parameters and additional methodological explanations	The elasticity approach is used as a calculation formula. For each of the three distance classes (domestic/short-haul, medium-haul and long-haul), specific values are laid down for price elasticity and for consumption based on flying or substitution. The methodological parameters have been taken from a study by infras commissioned by the BMF. The performance indicators for specific consumption by the aviation sector have been taken from publications by EMEP/EEA and the Öko-Institut. The performance indicators for specific consumption by the substitute modes of transport have been taken from BMWi 2011 (for rail travel) and from DIW 2012 (for private motor transport).			
Sources/ references:	Prognos 2013; BMWi 2011; EMEP/EEA 2010, Öko-Institut 2004, infras 2012, DIW 2012.			

M 16: Emissions trading				
Measure affecting prices	Start:		End: not planned	
Forecast of (cumulative) final energy saving	**New annual saving (from 2014)**	**Saving by intermediate milestone (31.12.2017)**	**Saving Total (2014–2020)**	**'Early action' saving Total (2009–2013)**
Emissions trading	4.3 PJ (2014); 4.8 PJ (2015); 5.2 PJ (2016); 5.7 PJ (2017); 6.4 PJ (2018); 7.2 PJ (2019); 8.0 PJ (2020);	20 PJ	**41 PJ**	-
Focus of the measure:				
Short description of the measure	From a certain size category upwards, plants that generate power from fossil energy sources are subject to emissions trading. It must be assumed here that the costs of CO_2 certificates are passed on to the final consumer. Because of its effect on prices, emissions trading therefore influences the behaviour of final consumers towards an increased use of energy-efficient technologies and economical use of energy.			
Sector:	Cross-cutting (all)	Target group:	Final consumers	
Body responsible for the measure(s):	BMUB	Application:	Building envelope, building services (heating, ventilation, air-conditioning), lighting, stationary drives, thermal cross-cutting technologies, processes	
Lifetime	1 year	Savings by	2020	
Methodological details:				
Calculation formula	Cf. Annex (on the basis of: BMWi 2011; Prognos 2013)			
Methodological parameters and additional methodological explanations	An elasticity approach is used as a calculation formula, i.e. it considers the effect of emissions trading on electricity prices and on the resulting energy savings. The influence of emissions trading in terms of its pricing effect on ten reference consumer categories is examined here, i.e. the effects of emissions trading on the transformation sector are not taken into account in the calculations. The ten reference categories, and the development of the electricity price components for these categories, are taken from Prognos (2011). The breakdown of electricity consumption across the reference categories is taken from Prognos/ISI/TUM 2010, while the effect of CO_2 certificate prices on the purchase price is based on Prognos 2012. The price elasticity values used come from BMWi 2011.			
Sources/ references:	Prognos 2013, 2012, 2011; BMWi 2011; AG Energiebilanzen 2012; Prognos/ISI/TUM 2010; CWA 2007			

4. Measures to improve energy efficiency through information and advice

M 17: Federal Advisory Programmes:
- **On-site energy consultation (BAFA)**
- **Energy consultation by consumer organisations (Federation of German Consumer Organisations [*Verbraucherzentrale Bundesverband — vzbv*])**
- **Energy checks (vzbv)**
- **Energy efficiency checks for low-income households (Caritas)**
- **Energy consultations for SMEs (KfW)**

Information, motivation, communication	Start: between 1978 and 2012 (depending on the measure)	End: not planned		
Forecast of (cumulative) final energy saving	**New annual saving (from 2014)**	**Saving by intermediate milestone (31.12.2017)**	**Saving Total (2014–2020)**	**'Early action' saving Total (2009–2013)**
On-site consultation	0.2 PJ	2.3 PJ	**6.5 PJ**	8.1 PJ
vzbv consultation	0.1 PJ	1.1 PJ	**3.1 PJ**	3.9 PJ
Energy consultations for SMEs (KfW)	1.5 PJ	15 PJ	**41 PJ**	54 PJ
vzbv energy checks	0.03 PJ	0.3 PJ	**0.8 PJ**	0.2 PJ
Energy efficiency checks (Caritas)	0.04 PJ	0.4 PJ	**1.2 PJ**	1.6 PJ
Total	1.87 PJ	19.1 PJ	**52.6 PJ**	67.8 PJ

Focus of the measures:	
Short description of the measures	Any on-site consultation by a qualified energy advisor leading to complementary recommended measures which (even with gradual renovation) result in the building being regarded as permanently renovated in terms of energy savings in keeping with the efficiency principle is eligible for support from the BAFA. The financial contribution in the form of a non-repayable grant for 50 % of the consultancy costs is paid to the advisor.
	The energy consultations provided by consumer organisations at their premises generally consist of a 30-minute specialist consultation on energy-related topics (solar thermal power, photovoltaics, geothermal energy, biomass, CHP, energy-efficient renovation/construction of buildings, domestic appliances, energy-saving behaviour), which is offered at the advisory centres of the consumer organisations for an additional payment of EUR 5 by the consumer. Several topics are generally discussed at a consultation.
	In addition, on-site energy-related and energy efficiency checks have been offered to private consumers, and in particular also to tenants, by consumer organisations for a small EUR 10 contribution to the costs since 2012 (free of charge to low-income households). Under this programme, home owners can also have a building check carried out for a EUR 20 contribution to the costs or have their condensing boiler heating system inspected for a EUR 30 contribution to the costs.
	As a separate programme from the above, Caritas also offers free energy efficiency checks specifically for low-income households together with the Association of Energy and Climate Protection Agencies in Germany [*Bundesverband der Energie- und Klimaschutzagenturen Deutschlands — eaD*]. These checks are performed by 'energy-saving assistants'. Long-term unemployed people are trained as energy-saving assistants in this respect.
	The purpose of the KfW energy consultations for SMEs is to highlight weaknesses in the use of energy in SMEs, and provide proposals or specific action plans for improvements to save energy and costs. Grants are awarded for qualified and independent energy efficiency consultations in SMEs. SMEs can receive funding for an initial consultation and/or a detailed consultation lasting several days.

Sector:	Private households; commerce, trade and services; industry (depending on the measure)	Target group:	Home and property owners, private consumers, SMEs (depending on the measure)

Body responsible for the measure(s):	BMWi; for the energy efficiency checks provided by Caritas: BMUB	Application:	Building envelope; building services (heating, ventilation, air conditioning); lighting; appliances (white goods, domestic appliances); appliances (brown goods, consumer electronics); appliances (grey goods, information and communication); mobile drives
Lifetime	10–30 years (depending on the individual measure)	Savings by	2029–2049 (depending on the individual measure)
Methodological details:			
Calculation formula	Cf. Annex (on the basis of: BMWi 2011; Prognos 2013 and the corresponding programme evaluations)		
Methodological parameters and additional methodological explanations	Cf. Annex; the methodological approach is based on BMWi 2011, taking account of the individual independent programme evaluations. The savings are then quantified on the basis of the subsequent individual investment measures triggered by the consultations. In terms of the methodology, it is also taken into account that not every consultation results in the implementation of the individual measures proposed. With regard to the forward projection, the average of the last three available years is taken as a basis. For the energy-related and energy efficiency checks by the consumer organisations (which were not started until October 2012), an annual volume of 10 000 consultations and an annual saving identical to that for the energy efficiency check by Caritas are assumed as an evaluation is not yet available for this measure.		
Sources/ references:	Prognos 2013; Ifeu/ISOE 2009; Öko-Institut et al. 2012; IREES/ FhG ISI 2010; Ifeu/TNS Emnid 2008, 2005; Kfw 2012 (data delivery); BAFA 2012 (data delivery)		

M 18: Promotion of energy management systems (EMS) under the Energy Efficiency Fund				
Funding, information, motivation, communication	Start: 2013		End: not planned	
Forecast of (cumulative) final energy saving	**New annual saving (from 2014)**	**Saving by intermediate milestone (31.12.2017)**	**Saving Total (2014–2020)**	**'Early action' saving Total (2009–2013)**
EMS funding	0.03 PJ	0.3 PJ	**0.9 PJ**	0.2 PJ
Focus of the measure:				
Short description of the measure	With this BMWi programme under the Energy Efficiency Fund, since August 2013 companies have been able to apply to the BAFA for a grant for the initial certification of either an energy management system to DIN EN ISO 500001 or an energy monitoring system. In addition, there is the option of applying for grants for the purchase of measurement technology and software for energy management systems. The total amount of funding can be up to EUR 20 000 per company.			
Sector:	Commerce, trade and services; industry	Target group:	Companies	
Body responsible for the measure(s):	BMWi	Application:	Building envelope; building services (heating, ventilation, air conditioning); lighting; appliances (white goods, domestic appliances); appliances (brown goods, consumer electronics); appliances (grey goods, information and communication); mobile drives	
Lifetime	10–30 years (depending on the individual measure)	Savings by	2029–2049 (depending on the individual measure)	
Methodological details:				
Calculation formula	Cf. Annex (on the basis of: BMWi 2011; Prognos 2013)			
Methodological parameters and additional methodological explanations	Cf. Annex.; the number of participating companies is used as a basis for the calculation. An energy consumption figure and a potential saving resulting from the introduction of the EMS are assumed for each company. These figures can be used to work out the saving produced by the measure (cf. calculation formula in the Annex). For the purpose of the calculation, it is assumed that participating companies have energy costs of around EUR 150 000 per annum. With an assumed mixed price for energy of EUR 26.50 per GJ, this corresponds to energy consumption of 5.66 TJ. 1.3 % is assumed as the economic saving potential. For the purpose of the forward projection, a volume of 1 000 applications for funding per annum is estimated under the Energy Efficiency Fund.			
Sources/ references:	Prognos 2013; BMWi 2011;			

M 19: Promotion of municipal concepts and networks:				
- **Energy Efficiency Fund: Municipal networks**				
- **National Climate Protection Initiative: Municipal climate protection concepts**				
- **Energy-Related Urban Renewal — Grants for Integrated District Concepts and Renovation Managers**				
Funding, information, motivation, communication	Start: 2014, 2009, 2011		End: not planned	
Forecast of (cumulative) final energy saving	**New annual saving (from 2014)**	**Saving by intermediate milestone (31.12.2017)**	**Saving Total (2014–2020)**	**'Early action' saving Total (2009–2013)**
Municipal networks	0.02 PJ	0.1 PJ	**0.1 PJ**	-
Climate protection concepts	0.04 PJ	0.4 PJ	**1.1 PJ**	1.0 PJ
District concepts	0.04 PJ	0.4 PJ	**1.1 PJ**	0.9 PJ
Total	0.1 PJ	0.9 PJ	**2.3 PJ**	1.9 PJ
Focus of the measures:				
Short description of the measure	The objective of the planned BMWi support programme for municipal networks is to create incentives for the setting up of municipal energy efficiency networks, and the setting up and operation of exemplary networks of municipalities. Within the framework of professionally managed, standardised network cooperation on the basis of high quality standards, a high-quality energy controlling system with low transaction costs is to be introduced and a comprehensive transfer of experience and knowledge is to be facilitated.			
	Under the National Climate Protection Initiative, the BMUB promotes the creation and implementation of municipal climate protection concepts covering all climate-related areas, and the creation and implementation of partial concepts relating to key priority areas or measures in the municipalities. In the implementation of municipal climate protection projects, financial support is provided for the setting up of a body for climate protection management, the implementation of a selected climate protection measure as part of climate protection management and the introduction or continuation of energy-saving models in schools.			
	Under the 'Energy-Related Urban Renewal — Grants for Integrated District Concepts and Renovation Managers' programme supported by the BMWi and enforced by the KfW, detailed integrated district concepts to improve the energy efficiency of buildings and infrastructure are created and financing is provided for a renovation manager who will prepare the renovation concept with the involvement of the owners and supervise the implementation of the energy-related renovation measures for a maximum of three years.			
Sector:	Public authorities	Target group:	Municipalities	
Body responsible for the measure(s):	BMWi, BMUB / KfW	Application:	Building envelope; building services (heating, ventilation, air conditioning); lighting; appliances (white goods, domestic appliances); appliances (brown goods, consumer electronics); appliances (grey goods, information and communication); mobile drives	
Lifetime	10–30 years (depending on the individual measure)	Savings by	2029–2049	

Methodological details:	
Calculation formula	Cf. Annex (on the basis of: BMWi 2011; Prognos 2013)
Methodological parameters and additional methodological explanations	Cf. Annex; the energy consumption of municipal properties including street lighting is used as the reference value for the calculation. According to [Prognos, Difu 2010, Table 4-8], the municipalities with over 2 000 inhabitants consume a total of around 140 PJ per annum. With 5 412 municipalities in this size category, this produces a mean energy consumption figure of 26 TJ per municipality. Reference is made here to [Jaccard et al. 1997] for the potential saving compared to a municipality that does not have a municipal energy management system. A level of between 15 % and 30 % per municipality can therefore be achieved within 16 years. An annual saving of 1.25 % is estimated based on 20 %. Reference is made to the current funding provided to determine the number of cases. The total number of municipalities participating in the municipal energy networks pilot project is assumed to be 60. The annual number of climate protection concepts under the National Climate Protection Initiative is assumed to be 140. The annual number of acceptances under the 'Energy-Related Urban Renewal — Grants for Integrated District Concepts and Renovation Managers' KfW programme is also assumed to be 140.
Sources/ references:	Prognos 2013; BMWi 2011; Jaccard/Failing/Berry 1997; Prognos/Difu 2010; Öko-Institut et al. 2012; KfW 2012 (data delivery)

Annex:

I. Formulae and methodological parameters for calculating the final energy savings resulting from policy measures or combinations thereof

1. Regulatory measures

M 01: EnEV (new building)

Calculation formula:

$$\frac{SHD_{init}}{\eta_{init}} - \frac{SHD_{new}}{\eta_{new}} = UFES$$

$$\text{Increase in living area/useful area} \times UFES = \text{Saving from the measure [kWh / a]}$$

Abbr- eviaton	Description	Data
SHD_{init}	Specific heating demand before [kWh / m² a]	According to the previous building standard, corrected using heating degree-days
η_{init}	Efficiency of the heating system before	
SHD_{new}	Specific heating demand after [kWh / m² a]	According to the new building standard, corrected using heating degree-days
η_{new}	Efficiency of the heating system after	

Methodological parameters:

	Reference	EnEV 2007	EnEV 2009	EnEV 2014
One/two-family houses	kWh/ m²LA	130	96	74
Apartment blocks and non-residential buildings	kWh/ m²LA	110	78	60
	kWh/ m² UA	90	65	50

Type	Reference	Completed area [million m²]
One/two family houses	Living area	12
Apartment blocks and non-residential buildings	Living area	5
	Useful area	28

M 02: EnEV (stock)

Calculation formula:

$$\frac{SHD_{init}}{\eta_{init}} \quad - \quad \frac{SHD_{new}}{\eta_{new}} \quad = \quad UFES\ [kWh/m^2\ living\ area]$$

$$Renovated\ area \quad \times \quad UFES \quad = \quad Saving\ from\ the\ measure\ [kWh/a]$$

Abbreviation	Description	Data
SHD_{init}	Specific heating demand before [kWh / m² a]	Either "individual" previous consumption or average for existing building stock in the year of the measure, corrected using heating degree-days
η_{init}	Efficiency of the heating system before	
SHD_{new}	Specific heating demand after [kWh / m² a]	According to the new building standard, corrected using heating degree-days
η_{new}	Efficient of the heating system after	

Methodological parameters:

Type	Reference	Stock	EnEV 2009	EnEV 2014
One/two family houses	kWh / m²LA	181	125	(no change)
Apartment blocks	kWh / m²LA	156	90	
Non-residential buildings	kWh / m² UA	103	77	

Type	Reference	Stock [billion m²]	Renovated area p. a. [million m²]
One/two family houses	Living area	2,2	17
Apartment blocks	Living area	1,4	17
Non-residential buildings	Useful area	2,6	32

M 03: Renewable Energies Heat Act [*Erneuerbare Energien Wärme-Gesetz — EEWärmeG*]

Calculation formula:

$$\frac{SHD_{init}}{\eta_{init}} - \frac{SHD_{new}}{\eta_{new}} = UFES$$

$$\text{Increase in living area/useful area} \times UFES = \text{Saving from the measure [kWh / a]}$$

Abbr-eviation	Description	Data
SHD_{init}	Specific heating demand before [kWh / m² a]	According to the previous building standard, corrected using heating degree-days
η_{init}	Efficiency of the heating system before	
SHD_{new}	Specific heating demand after [kWh / m² a]	According to the new building standard, corrected using heating degree-days
η_{new}	Efficiency of the heating system after	

Methodological parameters:

Reference value (baseline) for the EEWärmeG				
	Reference	EnEV 2007	EnEV 2009	EnEV 2014
One/two family houses	kWh / m² LA	130	96	74
Apartment blocks and non-residential buildings	kWh / m² LA	110	78	60
	kWh / m² UA	90	65	50

Target value for the replacement measure EnEV – 15 %				
	Reference	EnEV 2007	EnEV 2009	EnEV 2014
One/two family houses	kWh / m² LA	111	82	63
Apartment blocks and non-residential buildings	kWh / m² LA	94	66	51
	kWh / m² UA	77	55	43

Type	Reference	Increase [million m²]	EnEV – 15 % percentage
One/two family houses	Living area	12	
Apartment blocks and non-residential buildings	Living area	5	52 %
	Useful area	28	

2. Investment support

M 04 (1): KfW support programmes for energy-efficient construction and renovation (CO$_2$ Building Renovation Programme)

Calculation formula:

Funded housing units	x	UFES	=	Saving from the measure [kWh / a]

Abbreviation	Description	Data
Funded living units	Housing units for which funding is provided through the programme	
UFES	Average saving per year and housing unit	Programme evaluation

M 04 (2): Replenishment of the KfW building renovation programmes

Calculation formula:

Replenishment of volume of funding	x	$\dfrac{1}{\text{Funding leverage ratio}}$	=	**Investment volume [€]**	
Investment volume [€]	x	$\dfrac{1}{\text{Spec. investment}}$	=	**Renovated area [m² living area]**	
$\dfrac{SHD_{init}}{\eta_{init}}$	–	$\dfrac{SHD_{new}}{\eta_{new}}$	=	**UFES [kWh / m² living area]**	
Renovated area	x	**UFES**	=	**Saving from the measure [kWh / a]**	

Abbr-eviation	Description	Data
	Replenishment of volume of funding; funding expected to be added to the existing programmes	
Funding leverage ratio	Ratio of funding to investment triggered	
spec. investment	Average investment spent in EUR per m2 living area to achieve the prescribed standard	
SHD_{init}	Specific heating demand - standard [kWh / m² a]	Either "individual" previous consumption, or average for existing building stock in the year of the measure, corrected using heating degree-days
η_{init}	Efficiency of the heating system - standard	
SHD_{new}	Specific heating demand - funded [kWh / m² a]	According to the energy standard as funded under the Act
η_{new}	Efficiency of the heating system - funded	

M 05: KfW investment programmes in municipalities and social facilities

Calculation formula:

Investment volume	x	UFES	=	Saving from the measure [PJ / a]

Abbreviation	Description	Data
UFES	Saving per euro invested	From evaluation
Investment volume	Investment volume co-financed by the programme	From evaluation or by the executing agency for the programme

Methodological parameters:

Programme / part of programme	Annual investment [€ million]	UFES [kWh /€]
KfW Energy-Efficient Renovation — Municipalities	158	0.50
KfW Social Investment — Energy-related Renovation of Buildings	34	0.68
KfW Energy-Efficient District Supply — Municipalities	1.1	0.51
Street lighting (new lights)	0.7	0.59
Street lighting (replacement/retrofitting)	8.4	0.98
Lighting in case of light signaling devices	0.4	0.30

M 06: Investment support in companies

Calculation formula:

Investment volume	x	UFES	=	Saving from the measure [PJ / a]

Abbr-eviation	Description	Data
UFES	Saving per euro invested	From evaluation
Investment volume	Investment volume co-financed by the programme	From evaluation or by the executing agency for the programme

Methodological parameters:

Programme / part of programme	Annual investment [€ million]	UFES [kWh / €]
KfW Energy Efficiency Programme / KfW Environment Programme		
Energy-efficient new buildings	1 590	0.015
Building and energy technology / building envelope / renovation of buildings at EnEV new building level	60	0.68
Environmentally friendly retail	(2011 only:) 210	0.06
Machinery incl. cross-cutting technology / heat recovery, waste heat utilisation / measurement, regulation and control technology / process cooling, process heating	1 440	0.75
Efficiency Fund: Energy-efficient cross-cutting technologies / energy-efficient and climate-friendly production processes		
Cross-cutting technologies	200	0.75
Production processes	80	0.75

M 07: Combined Heat and Power Act [*Kraft-Wärme-Kopplungs-Gesetz — KWK-G*]

Calculation formula:

			Electricity generation	x	$\dfrac{1}{\eta_{CHP,\,el}}$	= Fuel input for combined heat and power generation
Electricity generation	x	$\dfrac{1}{\eta_{ref,\,electricity}}$	+ Heat generation	x	$\dfrac{?\;1}{\eta_{ref,\,heat}}$	= Fuel input for non-combined generation
			Fuel input for non-combined generation	–	Fuel input for combined heat and power generation	= Saving from the measure [kWh / a]

Abbreviation	Description	Data
Electricity generation	Amount of electricity fed in under the KWK-G	
Heat generation	Generation of heat associated with CHP generation of electricity, shown as power to heat ratio	
$\eta_{CHP,\,el}$	(Electrical) efficiency of the CHP installation	
$\eta_{ref,\,electricity}$	Reference efficiency for non-combined generation of electricity	100 % if based solely on final energy.
$\eta_{ref,\,heat}$	Reference efficiency for non-combined generation of heat	

Methodological parameters:

	Development of CHP electricity generation [GWh]											
	2009	2010	2010	2012	2013	2014	2015	2016	2017	2018	2019	2020
<10 kW$_{el}$	324	324	324	321	319	316	314	311	308	305	302	298
<10kW$_{el}$, eff	99	99	156	212	267	321	374	440	504	566	627	686
10-50 kW$_{el}$	381	381	380	378	375	372	369	366	362	359	355	351
10-50 kW$_{el}$, eff	171	171	269	365	460	553	644	758	868	976	1081	1184
50 kW - 2 MW	3874	3874	3867	3838	3809	3780	3751	3721	3682	3644	3605	3566
50 kW - 2 MW, eff	556	556	812	1061	1306	1547	1785	2138	2479	2813	3139	3457
Fuel cell	7	7	7	7	7	7	7	7	7	7	7	7

	Electr. efficiency	Power-to heat ratio	Reference	
			Power factor	Therm. efficiency
<10 kW$_{el}$	26%	0.40		
<10kW$_{el}$, eff	28%	0.42		
10-50 kW$_{el}$	30%	0.48		
10-50 kW$_{el}$, eff	33%	0.50	100%	92.5%
50 kW - 2 MW	37%	0.64		
50 kW - 2 MW, eff	40%	0.69		
Fuel cell	35%	0.57		

M 08: National Climate Protection Initiative — market incentive programme to promote the use of renewable energies in the heating market (BAFA part)

Calculation formula (heat pump programme part):

$$\left(\frac{1}{\eta_{old}} - \frac{1}{\eta_{new}} \right) \times SHD = UFES\ [kWh/m^2]$$

$$UFES \times A \times \text{Number of heating systems replaced} = \text{Saving from the measure } [kWh/a]$$

Abbreviation	Description	Data
η_{old}	Efficiency of the old heating system	Average efficiency of existing systems
η_{new}	Efficiency of the new heating system	
SHD	Specific heating demand [kWh/m² a]	
A	Average area heated by the heating system [m²]	

Calculation formula (solar thermal technology programme part):

$$\frac{USAVE}{\eta_{existing\ system}} = UFES\ [kWh/m^2\ collector\ area\ a]$$

$$\text{Installed collector area} \times UFES = \text{Saving from the measure } [kWh/a]$$

Abbreviation	Description	Data
USAVE	Average annual saving per m2 of collector area, i.e. the average heat production per m2 of collector area [kWh/m2 a]	
$\eta_{existing\ system}$	Efficiency of an average water heating system	Average efficiency of existing water heating systems -

M 09: National Climate Protection Initiative — further programmes at national level to promote investments in energy efficiency

Methodological parameters:

Programme	Average annual saving	
	Greenhouse gases [t CO$_2$e]	Final energy [GWh]
Commercial refrigeration systems	17 860	24
Policy for - municipalities – electricity projects	8 460	15
Programme to promote micro-CHP installations	67 680	see KWK-G

M 10: Measures by the Landwirtschaftliche Rentenbank to promote investments in energy efficiency

Calculation formula:

Total loans	x	Financing portion	=	Investment volume [€]

Investment volume [€]	x	Spec. saving	=	Saving from the measure

Abbreviation	Description	Data
Finan - cing portion	Ratio between total loans and investment triggered	
spec. saving	Average saving per euro invested	

3. Measures affecting prices

M 13: Energy and electricity tax

Calculation formula:

$$\left(\text{Energy / Electricity Tax} - \text{Min. threshold under EED} \right) \times \frac{1}{\text{Energy price}} = \Delta p \; [\%]$$

$$\text{Energy cons. observed} \times \frac{1}{1 + \Delta p \; \partial e/\partial p} = \text{Energy cons. w/o Energy and Electricity Tax [PJ]}$$

$$\text{Energy cons. w/o Energy and Electricity Tax} - \text{Energy cons. observed} = \text{Saving from the measure [PJ / a]}$$

Abbreviation	Description	Data
Energy / Electricity Tax	Tax rate in € per GJ, differentiated by energy source	
Min. threshold under EED	Limit for energy tax. Savings may only be counted for taxes over this minimum threshold	Directive 2003/96/EC
Energy price	End-customer prices according to energy source in € per GJ	
Energy cons. observed	Energy consumption acc. to use, sector and energy source for which tax is collected	
$\partial e/\partial p$	Price elasticity	
Δp	Percentage price increase	

Methodological parameters:

	Use / energy source	Price-elasticity	Tax rate [€/GJ]	Minimum threshold [€/GJ]	Price-increase 2010 [%]	Taxable consumption [PJ]
PHH	RW, Heating oil, light	-0.2	1.72	0.6	5%	500
	RW, Natural gas	-0.2	1.53	0.3	6%	833
	RW, Electricity	-0.2	5.69	0.28	9%	67
	WW, Heating oil, light	-0.05	1.72	0.6	5%	62
	WW, Natural gas	-0.05	1.53	0.3	6%	157
	WW, Electricity	-0.05	5.69	0.28	9%	72
	Electrical appliances	-0.025	5.69	0.28	9%	368
GHD	RW, Heating oil, light	-0.2	1.72	0.6	5%	169
	RW, Natural gas	-0.2	1.53	0.15	7%	336
	RW, Electricity	-0.2	5.69	0.14	9%	36
	PRO, Heating oil, light	-0.025	1.72	0.6	5%	148
	PRO, Natural gas	-0.025	1.53	0.15	7%	54
	PRO, Electricity	-0.025	5.69	0.14	15%	188
	other, Electricity	-0.025	5.69	0.14	15%	281
IND	Heating oil, light	-0.1	0.86	0.6	2%	83
	Heating oil, heavy	-0.1	0.38	0	4%	34
	Natural gas	-0.1	1.15	0.15	10%	717
	Electricity	-0.025	4.27	0.14	15%	203
TRA	Petrol	-0.25	20.28	12.19	19%	792
	Diesel	-0.05	13.06	10.31	7%	1194

PHH = private households

GHD = commerce, trade and services

IND = industry

TRA = transport

M 14: HGV toll

Calculation formula:

$$\left(\frac{1}{1 + \Delta p\, \partial e/\partial p} - 1 \right) \times \text{Mileage liable for toll, observed} = \text{Mileage avoided by HGV toll [km]}$$

$$\text{Mileage avoided by HGV toll [100 km]} \times \text{Spec. consumption [MJ / 100 km]} = \text{Saving from the measure [MJ / a]}$$

Abbreviation	Description	Data
Spec. consumption.	Average consumption by vehicles liable for toll	
Mileage observed	Mileage liable for toll	
$\partial e/\partial p$	Price elasticity in relation to mileage	
Δp	Percentage price increase	

Methodological parameters:

	2009	2010	2010	2012	2013	2014	2015	2016	2017	2018	2019	2020
Mileage liable for toll [bn km]	24.4	23.4	26.7	24.8	24.8	24.8	24.8	24.8	24.8	24.8	24.8	24.8
Price increase – vehicle running costs	22%	20%	18%	20%	20%	20%	20%	20%	20%	20%	20%	20%
Average consumption, artic. [GJ/1000 km	12.8	12.8	12.4	12.6	12.6	12.6	12.6	12.6	12.6	12.6	12.6	12.6
Price elasticity	-0.05											

M 15: Air traffic tax

Calculation formula:

| Spec. consumption aviation | − | Spec. consumption substitution mix | = | UFES [MJ / 100 pkm] |

$$\text{Mileage observed} \times \frac{1}{1 + \Delta p\ \partial e/\partial p} = \text{Mileage without air traffic tax [pkm]}$$

$$\left(\text{Mileage without air traffic tax} - \text{Mileage observed} \right) \times \text{UFES} = \text{Saving from the measure [MJ / a]}$$

Abbreviation	Description	Data
Spec consumption aviation	Energy use in person-km	
Spec. consumption substitution mix	Weighted energy use for mileage eliminated by the measure	
Mileage observed	Mileage observed despite the measure	
$\partial e/\partial p$	Price elasticity in relation to mileage	
Δp	Percentage price increase	

Methodological parameters:

	Ø distance [km]	Spec. consumption [MJ / 100 Pkm]		Substitution portion [%]			
		Air	Subst	No trip	Int.. airport	MIT	Rail
Domestic	435	182	52	33%		33%	33%
Short	1 380	130	39	25%	25%	25%	25%
Medium	3 790	116	0	15%	85%		
Long	8 000	112	0	15%	85%		
spec.consumption substitution [MJ/100 Pkm]				0	0	111	45

	Price increase [%]	Price elasticity
Domestic	2.0 %	-0.92
Short	1.2 %	-0.92
Medium	1.9 %	-0.76
Long	1.9 %	-0.76

M 16: Emissions trading

Calculation formula:

$$\left(\text{Tax / duty} - \begin{array}{c} \text{poss.} \\ \text{min. threshold} \\ \text{under EED} \end{array} \right) \times \frac{1}{\text{Energy price}} = \Delta p \; [\%]$$

$$\text{Energy consumption observed} \times \frac{1}{1 + \Delta p \; \partial e/\partial p} = \begin{array}{c} \text{Energy consumption} \\ \text{without tax /} \\ \text{duty [PJ]} \end{array}$$

$$\begin{array}{c} \text{Energy consumption} \\ \text{w/o tax /} \\ \text{duty} \end{array} - \begin{array}{c} \text{Energy consumption} \\ \text{observed} \end{array} = \begin{array}{c} \text{Saving from the} \\ \text{measure} \\ \text{[PJ / a]} \end{array}$$

Abbreviation	Description	Data
Energy / Electricity tax	Tax rate in € per GJ, differentiated by energy source	
Min. threshold under EED	Limit for energy tax. Savings may only be counted for taxes over this minimum threshold	Directive 2003/96/EG
Energy price	End-customer prices acc. to energy source in € per GJ	
Energy consumption observed	Energy consumption by use, sector and energy source for which tax is collected	
$\partial e/\partial p$	Price elasticity	
Δp	Percentage price increase	

Methodological parameters:

Reference class	2014			2020		
	Cons-umption [TWh]	Price [€/MWh]	Increase [%]	Cons-umption [TWh]	Price [€/MWh]	Increase [%]
Private households	142	254	120%	142	277	121%
GHD, 50 MWh /a, Low voltage	109	193	189%	109	214	189%
GHD, 200 MWh /a, Low voltage	30	190	194%	30	211	193%
GHD, 1000 MWh /a, Low voltage	8	198	112%	8	221	112%
IND, 50 MWh, Low voltage	44	190	186%	44	211	186%
IND, 200 MWh, Low voltage El. Tax Act relief	87	184	202%	87	204	201%
IND, 1000 MWh/a, Medium voltage, El.Tax Act relief	11	158	184%	11	178	180%
IND, 10 GWh /a, Medium voltage, wit e. tax relief, with SPA, without EEG S. 41 equalization scheme	18	142	197%	18	162	191%
IND, 100 GWh /a, High voltage, with el. tax relief, with SPA, with EEG exemption	41	78	29%	41	85	43%
IND, 1 TWh /a High-voltage, with el. Tax relief, with SPA, with EEG S. 41 equalization scheme	21	74	13%	21	81	26%

4. Measures to improve energy efficiency through information and advice

M 17: Federal Advisory Programmes

Calculation formula:

Number of consultations	x	UFES	=	Saving from the measure [kWh / a]

Abbr-eviation	Description	Data
UFES	Average saving p.a.	Programme evaluation

Methodological parameters:

Programme	Consultations p.a. ['000	UFES [MWh / consultation]
BAFA on-site consultation	23	6.2
Energy consultations on the premises of consumer organisations	52	1.3
KfW energy consultations for SMEs	5	189
Caritas energy efficiency check	15	0.8
Energy Efficiency Fund: energy-related and energy efficiency checks in private households	10	0.8

M 18: Promotion of energy management systems (EMS) under the Energy Efficiency Fund

Calculation formula:

Number of participating companies	x	Energy consumption per company	=	Energy consumption under management [PJ]
Energy consumption under management [PJ]	**x**	**Saving compared with BAU**	**=**	**Saving from the measure [PJ / a]**

M 19: Promotion of municipal concepts and networks

Calculation formula:

Number of participating municipalities	x	Energy consumption per municipality	=	Energy consumption under management [PJ]
Energy consumption under management [PJ]	**x**	**Saving compared with BAU**	**=**	**Saving from the measure [PJ / a]**

II. List of sources

Abbreviation	Source
AGEB 2011	Working Group on Energy Balances 2011: Application balances for the final energy sectors in Germany in 2009 and 2010 (as at November 2011).
AGEB 2012	Working Group on Energy Balances 2012: Energy balance of the Federal Republic of Germany for 2010.
AGEB 2013	Working Group on Energy Balances 2013: Evaluation tables for the energy balance of the Federal Republic of Germany from 1990 to 2012 (as at July 2013).
BAFA 2012	Federal Office of Economics and Export Control [*Bundesamt für Wirtschaft und Ausfuhrkontrolle — BAFA*] 2012: Statistics on the market incentive programme and on 2012 on-site consultations (unpublished data).
BEI 2011	Bremer Energie Institut 2011: Evaluation of the KfW programmes 'KfW Municipal Loan — Energy-related Renovation of Buildings', 'Energy-Efficient Renovation — Municipalities' and 'Social Investment — Energy-related Renovation of Buildings' from 2007 to 2010.
BEI/IWU 2010	Bremer Energie Institut, Institute for Housing and Environment [*Institut Wohnen und Umwelt — IWU*] 2010: Effects of the 2009 funding cases under the KfW CO_2 Building Renovation Programme and the 'Energy-Efficient Renovation' programme.
BEI/IWU 2011	Bremer Energie Institut, Institute for Housing and Environment 2011: Monitoring of the KfW programmes 'Energy-Efficient Renovation' in 2010 and 'Ecological/Energy-Efficient Construction' from 2006 to 2010.
BEI/IWU 2012	Bremer Energie Institut, Institute for Housing and Environment 2012: Monitoring of the KfW programmes 'Energy-Efficient Renovation' and 'Energy-Efficient Construction' in 2011.
BfEE 2012	Federal Energy Efficiency Centre [*Bundesstelle für Energieeffizienz — BfEE*] 2012: Statistics on support scheme guidelines under the Energy Efficiency Fund in 2012 (unpublished data).
BMF 2011	Federal Ministry of Finance [*Bundesministerium der Finanzen — BMF*] 2011: 23rd report on subsidies. Report by the Federal Government on the development of federal grants and tax incentives for the period from 2009 to 2012.
BMU 2012	Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety [*Bundesministerium für Umwelt, Naturschutz, Bau und Reaktorsicherheit — BMU*] 2012: Progress report on the Renewable Energies Heat Act [*Erneuerbare Energien Wärme-Gesetz — EEWärmeG*] pursuant to Section 18 EEWärmeG (submitted to the *Bundestag* on 19 December 2012).
BMVBS 2011	Federal Ministry of Transport, Building and Urban Development [*Bundesministerium für Verkehr, Bau und Stadtentwicklung — BMVBS*] (ed.) 2011: Types and existing stock of heated non-residential buildings in Germany. BMVBS online publication 16/2011.

Abbreviation	Source
BMWi 2011	Federal Ministry of Economics and Technology [*Bundesministerium für Wirtschaft und Technologie — BMWi*] (ed.) 2011: Second National Energy Efficiency Action Plan (NEEAP) of the Federal Republic of Germany, including accompanying methodology document.
BReg 2012	Federal Government [*Bundesregierung — BReg*] 2012: Draft of a Second Act Amending the Energy and Electricity Tax Act [*Entwurf eines Zweiten Gesetzes zur Änderung des Energiesteuer- und des Stromsteuergesetzes*].
CWA 2007	'CEN Workshop Agreement on Saving Lifetimes of Energy Efficiency Improvement Measures in Bottom-Up Calculations 2007' (here: value for 'public lighting' and 'behavioural/social measures')
Deloitte 2011	Deloitte&Touche GmbH 2011: Support measures to improve energy efficiency in small and medium-sized enterprises (SMEs) and industry
dena 2011	German Energy Agency [Deutsche Energie-Agentur] 2011: dena renovation study — part 2. Economic viability of energy-related renovation in owner-occupied residential buildings.
Dielmann 2008	Prof. Dr Dielmann 2008: Combined heat and power I. Skript WS 2008/2009, Aachen University of Applied Sciences [*FH Aachen*], Jülich Campus.
European Commission 2010	European Commission (Directorate-General for Energy, Directorate C, Unit C.4 Energy Efficiency) 2010: Recommendations on measurement and verification methods in the framework of Directive 2006/32/EC on energy end-use efficiency and energy services (preliminary draft excerpt of 2 July 2010, unpublished).
Fraunhofer ISI et al. 2009	Fraunhofer Institute for Systems and Innovation [*Fraunhofer ISI*]/Technical University of Munich [*TU München*] (Chair of Energy Economy and Application Technology [*Lehrstuhl für Energiewirtschaft und Anwendungstechnik*])/ GfK 2009: Energy consumption of the sector: Commerce, trade and services for the period 2004–2006
Gailfuß 2000	Gailfuss, M. 2000: Market survey: CHP installations up to 100 KW electrical output. Heat engineering/supply engineering, 12/2000, p. 46–57.
Gailfuss 2002	Gailfuss, M. 2002: Micro-CHP installations — module overview by the CHP Information Centre [*BHKW Infozentrum*] in Rastatt.
Ifeu/ISOE 2009	Institute for Energy and Environmental Research [*Institut für Energie und Umweltforschung — Ifeu*] in Heidelberg, Institute for Social-Ecological Research [*Institut für sozial-ökologische Forschung — ISOE*] in Frankfurt am Main 2009: Evaluation of the Cariteam Energy Saving Service in Frankfurt am Main.
Ifeu/TNS Emnid 2005	Institute for Energy and Environmental Research in Heidelberg/TNS Emnid 2005: Evaluation of the energy consultations provided at their premises by the consumer organisations, the German Association of Housewives of Lower Saxony [*Deutsche Hausfrauenbund Niedersachsen*] and the Bavarian Consumer Service [*Verbraucherservice Bayern*].
Ifeu/TNS Emnid 2008	Institute for Energy and Environmental Research in Heidelberg/TNS Emnid 2008: Evaluation of the 'On-Site

Abbreviation	Source
	Energy-Saving Consultation' support programme.
IREES/Fraunhofer ISI 2010	Institute for Resource Efficiency and Energy Strategies [*Institut für Ressourceneffizienz und Energiestrategien — IREES*], Fraunhofer ISI 2010: Evaluation of the 'Energy Efficiency Consultation' funding programme as a component of the Special Fund for Energy Efficiency in Small and Medium-Sized Enterprises (SMEs).
Jaccard/Failing/Berry 1997	Mark Jaccard, Lee Failing and Trent Berry 1997: 'From equipment to infrastructure: community energy management and greenhouse gas emission reduction'. *Energy Policy* Vol. 25, No 13, 1065-1074, 1997.
KfW 2012 (data delivery)	KfW [German government-owned development bank] 2012: Statistics on the KfW programmes 'Energy-Efficient Renovation', 'Energy Efficient Renovation — Municipalities', 'Energy consultations for SMEs' and 'KfW Special Energy Efficiency Fund' (unpublished data).
Öko-Institut et al. 2012	Institute for Applied Ecology [Öko-Institut], Arepo-Consult, Environmental Policy Research Centre (FFU), Ecologic Institute, FiFo Institute for Public Economics, University of Cologne [Fifo Köln], Ziesing, H.-J. 2012: Evaluation of the national part of the climate protection initiative of the Federal Ministry for the Environment, Nature Conservation and Nuclear Safety.
Prognos 2011	Prognos AG 2011: Development of the electricity prices for selected commercial consumer categories and analysis of the energy intensity figures for selected industries.
Prognos 2012	Prognos AG 2012: Determination of the impact of KfW support programmes for energy-efficient construction and renovation in terms of promoting growth. Commissioned by KfW.
Prognos 2013	Prognos AG 2013: Final energy savings target pursuant to Article 7 EED and estimate of the energy savings that can be achieved through policy measures.
Prognos/BEA 2011	Prognos AG, Berliner Energieagentur 2011: Interim review of the Combined Heat and Power Act (KWK-G).
Prognos/Difu 2010 and 2011	Prognos AG, German Institute of Urban Affairs [*Deutsches Institut für Urbanistik — Difu*] 2010 and 2011: Final energy savings in federal states and municipalities resulting from actions by the public sector to improve energy efficiency in the context of the EU Energy Services Directive.
Prognos/EWI/GWS 2010	Prognos AG, Institute of Energy Economics at the University of Cologne [*Energiewirtschaftliches Institut an der Universität zu Köln — EWI*], Gesellschaft für Wirtschaftliche Strukturforschung 2010: Energy scenarios for a federal energy concept.
Prognos/GWS 2009	Prognos AG, Gesellschaft für Wirtschaftliche Strukturforschung 2009, Analysis and modelling of energy consumption development.
Prognos/ifeu/BHKW 2013	Prognos AG, Institute for Energy and Environmental Research in Heidelberg, BHKW-Consult 2013: Accompanying scientific research as part of the renewal of the incentive programme to promote micro-CHP installations. Analysis of the position of the micro-CHP installation in the electricity and heat market.
Federal Statistical Office	Federal Statistical Office [*Statistisches Bundesamt —*

Abbreviation	Source
(various years and sources)	*Destatis*]: → Volume 5 (Construction Activity and Accommodation), Series 1 (FS5, R1) → Volume 5 (Construction Activity and Accommodation), Series 1, 2010 supplementary survey on the microcensus (FS5, R1-Z2010)
TU Braunschweig 2012	Braunschweig University of Technology [*Technische Universität Braunschweig*] 2012: Comparative figures for consumption in residential buildings.
UBA 2012	Federal Environment Agency [*Umweltbundesamt — UBA*] 2012: Development of the specific carbon dioxide emissions of the German electricity mix from 1990 to 2010 and initial estimates for 2011.
ZSW **(various years)**	Baden-Württemberg Centre for Solar Energy and Hydrogen Research [*Zentrum für Sonnenenergie- und Wasserstoff-Forschung Baden-Württemberg — ZSW*]: Evaluation of the KfW programmes to promote the use of renewable energies.