

Second National Energy Efficiency Action Plan of the Republic of Austria 2011



IMPRI NT

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Table of Contents

1 Overview	1
1.1 Summary of the salient points	1
1.2 Development of energy efficiency in Austria.....	5
2 Final energy savings	12
2.1 Overview of the targets and progress up to now	12
2.2 Methods to assess energy savings.....	16
2.3 Bottom-up review of the energy efficiency measures.....	19
2.4 Top-down review of the energy efficiency development.....	46
3 Selected aspect of the transposition of the Directive in Austria ..	76
3.1 Exemplary role of the public sector	76
3.2 Information and advice.....	78
3.3 Voluntary agreements on energy efficiency	83
3.4 Energy services market	85
3.5 Funding methods.....	87
4 Institutions and organisations pursuant to the Energy Efficiency Directive.....	90
5 Annex	92
5.1 Top-down calculation of the P4 indicator	92
5.2 Calculation of savings resulting from tightening construction regula- tions	93
5.3 Basis to assess the uncertainty factor in respect to space heating and hot water	96
5.4 Information and advice measures reported by the federal states ..	101
5.5 Reported energy advice measures of the federal states.....	106
5.6 Reported energy audits of the federal states	109
6 Abbreviations	111
7 List of Tables	112
8 List of figures.....	114
9 Bibliography	116

1 Overview

1.1 Summary of the salient points

The EU's Energy End-use Efficiency and Energy Services Directive¹ requires Member States to submit a second National Energy Efficiency Action Plan (NEEAP) by 30 June 2011. This report combines all content required in this respect and describes selected measures taken by Austria to transpose the Energy End-use Efficiency and Energy Services Directive.

Since 1995 the final energy consumption and energy intensity, measured in final energy per inhabitant, showed an upward tendency in Austria. However, as of 2005, this trend has been reversed, and the indicators mentioned are on the decline.

When the energy intensity is determined as final energy in relation to economic performance (assessed as gross domestic product), a strongly fluctuating, slightly declining development can be observed (see in this respect, Figure 5).

Despite the generally positive development in recent years, the energy scenarios compiled under 'business as usual' framework conditions resulted in the expectation of a continued increasing final energy consumption in the medium term. Therefore, the government programme and the energy strategy devised by the Federal Ministry of Economy, Family and Youth of Austria have accorded the highest priority to increasing energy efficiency, formulated far reaching energy efficiency measures and set the ambitious target to stabilise final energy consumption by 2020 at the level of 2005. Hence, final energy consumption in the year 2020 is not to exceed 1 100 PJ.

¹ Directive 2006/32/EC of the European Parliament and of the Council of 5 April 2006 on energy end-use efficiency and energy services and repealing Council Directive 93/76/EEC.

As reflected in the detailed explanations contained in this report, more specifically in Chapter 2.3, Bottom-up review of the energy efficiency measures, the indicative savings target established by the Energy End-use Efficiency and Energy Services Directive for the intermediate national target for 2010, amounting to 17 900 TJ, was significantly exceeded: The calculated final energy savings determined by the monitoring body by means of the bottom-up method resulting from the reported measures amount to 49,384 TJ effective in 2010 (see Figure 1). 'Early actions', i.e. energy efficiency measures that were established before 2008 and that will still be effective in 2016 by virtue of their cycles, provided a very significant contribution of 33 125 TJ towards this result.

Of the savings reported so far of 49,384 TJ, 46 088 TJ (or 93%) will still be valid in 2016. If the average savings until 2007 are projected until 2016, savings of in total 78 448 TJ will be achieved in 2016. Based on this estimate, should the currently implemented energy efficiency measures and programmes be continued, the 2016 indicative savings target of 80 400 TJ to be met in accordance with the energy End-use Efficiency and Energy Services Directive would already be achieved by 98 %.

These results were also validated by means of top-down calculations (see Table 1, page 15). The final energy savings calculated by means of top-down procedures by far exceed the bottom-up results; hence it can be assumed that the bottom-up results rather represent conservative estimates of the actual savings. The following two figures show an overview of the targets and their achievement.

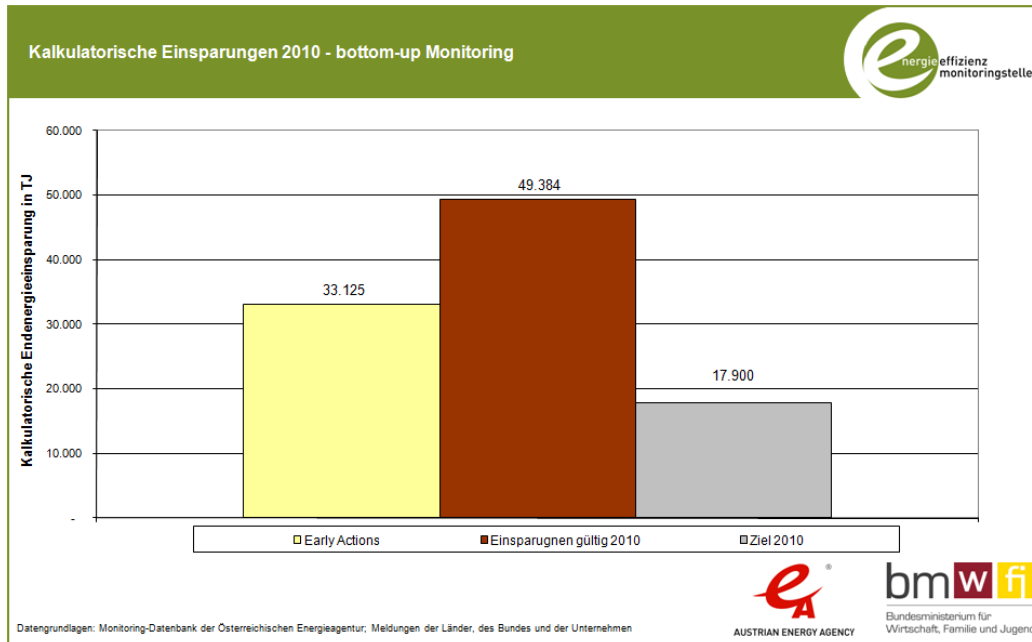


Figure 1: Calculated bottom-up final energy savings to document achievement of the intermediate target until 2010 in accordance with the Energy End-use Efficiency and Energy Services Directive

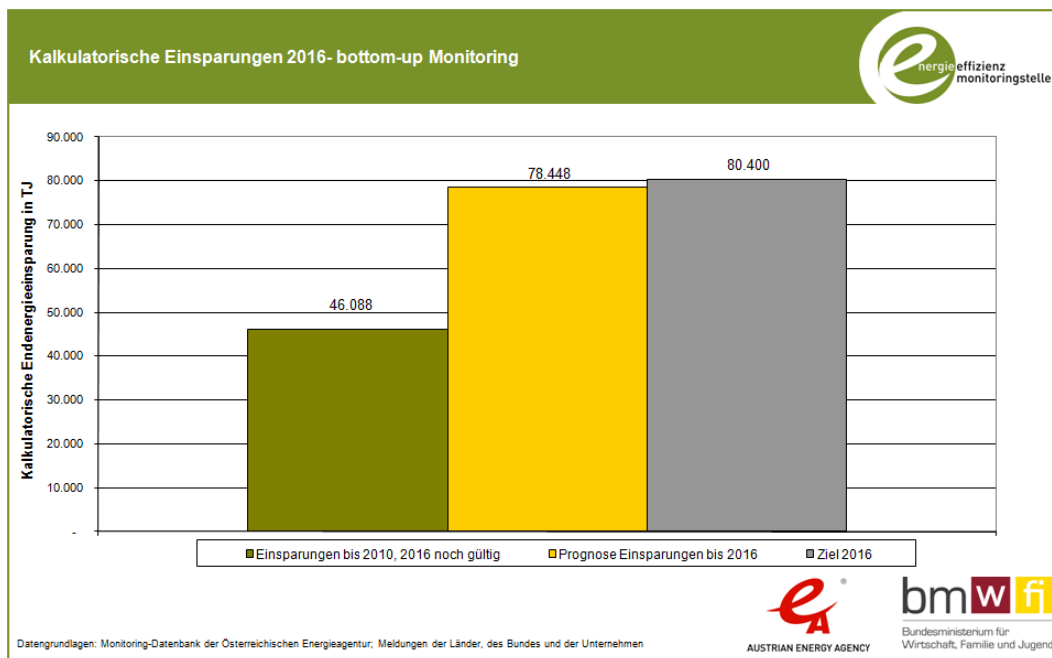


Figure 2: Calculated bottom-up final energy savings to document achievement of the final target for 2016 in accordance with the Energy End-use Efficiency and Energy Services Directive

The savings are largely realised by measures in regard to the building shell and heat provision; more than 80% of the savings valid in 2010 were achieved in these two areas. The majority of savings were on account of

federal state measures. The majority of savings were achieved on account of measures implemented by the federal states.

In Austria the public sector fulfils its exemplary role through

- § extensive renovation of public buildings as part of the federal real estate contracting as well as in part in the context of measures established by federal states;
- § energy efficiency criteria established by the context of the Austrian Federal Procurement Act and by procurement measures of the Federal Government and the federal states;
- § a central federal procurement agency focusing on energy efficiency criteria and
- § specific criteria for public procurement as part of the sustainable procurement action plan.

Information and advice are ensured by manifold and wide-spread federal information campaigns, in particular 'klima:aktiv' (active climate protection). In addition, trained energy consultants of the Austrian Government, the federal states and energy companies provide focused energy advice and energy audits.

To transpose Article 6 of the Directive, voluntary agreements were concluded in Austria with the interest groups of the energy industry. As part of this agreement, energy companies are to save 10872 TJ in final energy consumptions at the level of their customers until 2016 by initiating energy efficiency measures².

Overall, from the perspective of the monitoring body, the main requirements imposed by the Energy End-use Efficiency and Energy Services Directive are already met or the basis for their implementation has already been created. The monitoring body believes that the following outstanding tasks should be dealt with in more detail during the next transposition period until the 3rd NEAAP is issued in June 2014:

- § improvements with regard to qualification, certification, approvals and accreditation of energy services providers, energy advice and energy audits,

² More details in this regard are provided in Chapter 3.3.

- § creation/promotion of energy services (contracting in particular) for the household sector,
- § implementation of transport-related energy efficiency measures,
- § expansion of the monitoring of savings resulting from energy efficiency measures to the transport and public services sector.

1.2 Development of energy efficiency in Austria

The world-wide increase in energy consumption and declining resources make a future-oriented energy policy more vital than ever for Austria. Energy efficiency plays a crucial role in this respect. Hence an overview of the final energy consumption in Austria and the development of energy efficiency will be provided in this Chapter. It describes the Austrian programmes and strategies to deal with the challenges of increasing energy consumption in the face of limited energy resources and presents the targets which Austria has adopted in regard to energy savings and energy efficiency in Austria.

1.2.1 Final energy consumption and development of energy efficiency

Figure 3 shows that the final energy consumption in Austria increased continuously until 2005.

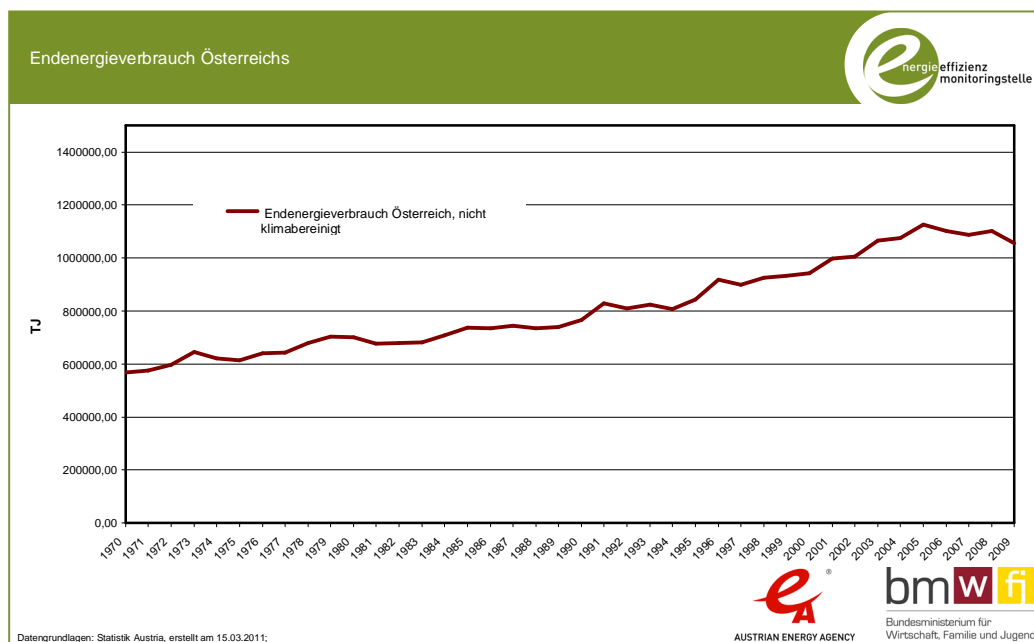


Figure 3: Final energy consumption in Austria, development from 1970 to 2009

With the exception of the agricultural sector, final energy consumption has increased significantly in all sectors. The transport sector, in particular, nowadays consumes more than twice as much energy than in 1970. Figure 4 illustrates final energy consumption in the various sectors in Austria.

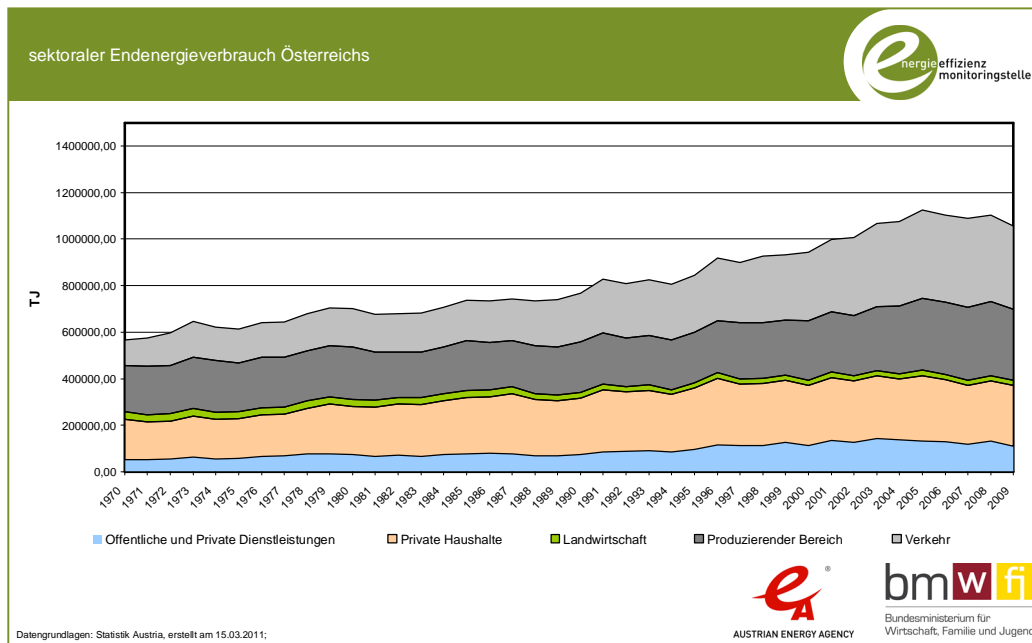


Figure 4: Final energy consumption by sectors in Austria, development from 1970 to 2009

Energy consumption is determined essentially by the growth in population, economy and prosperity. Both the population and the economic performance (measured as gross value added) have grown continuously since 1995. Figure 5 shows that a moderate per capita decline in energy consumption has occurred in Austria only since 2005. Up to this time the energy consumption of per capita in Austria increased continuously.

A decoupling of energy consumption and economic growth was achieved at various stages between 1996 and 2000 as well as between 2005 and 2009. The energy intensity in relation to economic performance shows a fluctuating course. While a significant improvement was achieved from 1996 to 2000, the energy intensity increased again in the period between 2001 and

2004, only to decline again clearly and more significantly until today. In 2009 final energy consumption in relation to economic performance was 6 % lower than in 1995.

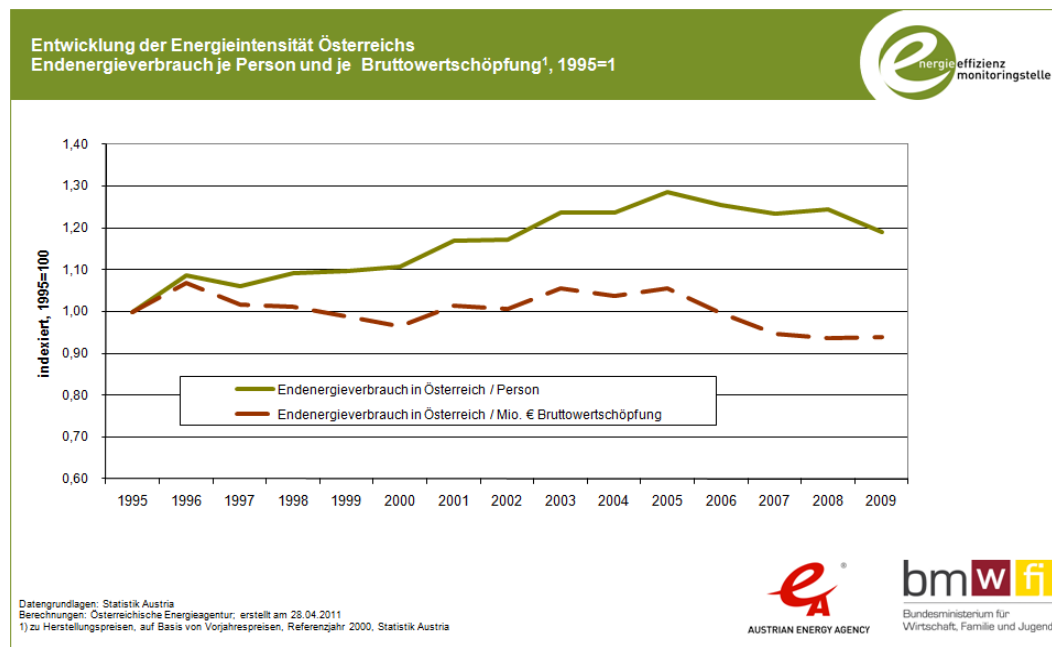


Figure 5: Energy intensity in Austria, development from 1970 to 2009

To promote the decoupling of energy consumption from population and economic growth and to avoid a renewed increase of final energy consumption, the Federal Government programme, the energy concepts of the federal states and the Austrian energy strategy have given the highest priority to energy efficiency.

1.2.2 Programmes, strategies and savings targets

In addition to the adopted programmes and energy strategies of the federal states, the following activities were implemented on the federal level:

Government programme for the XXI Vth legislative period

In the government programme for the XXIVth legislative period (2008 - 2013) the Austrian Federal Government has identified the increase of energy efficiency and the economical use of energy to be important fields of action to achieve the EU climate protection and energy targets.

The government programme lists in this respect specific measures, such as the adoption of an energy efficiency law, a survey of potentials for improving energy efficiency and the promotion of particularly efficient lighting systems. Furthermore, measures to reduce energy consumption for 'stand by' appliances and an energy check of Austrian households are also projected.

To provide incentives for modernisation in the field of energy and climate protection technologies, the Climate and Energy Fund adopted by law in 2007 was endowed with an annual contribution of up to EUR 150 million.

For climate protection reasons the Austrian Federal Government has imposed specific measures, which serve to enhance energy efficiency at the same time.

Hence the government programme projected an agreement between the federal level and the federal states to implement more climate protection as part of housing construction; this agreement was eventually concluded in 2009 and subsequently implemented in the housing construction laws of the federal states.³

This Article 15a agreement includes, e.g. the use of innovative climate-relevant heating and warm-water systems as a prerequisite for subsidies for the construction of housing as well as the phasing out of oil-fired heating in new buildings.

³ Agreement pursuant to Article 15a of the Federal Constitutional Law (B-VG) between the Federation and the federal states on measures in the building sector to reduce the emission of greenhouse gas.

Furthermore, the government programme projected the provision of a total amount of EUR 100 million in 2009 and 2010 for thermal renovation by the Austrian Government. The success of this renovation initiative caused the measure to be continued in 2011.

To enhance the exemplary role of the public sector, the government programme also provides that the new construction and renovation of public buildings are to follow the subsidy standards contained in the Article 15a agreement on measures in the building sector³. In the long run the Federal Government seeks to undertake comprehensive thermal renovation of the Austrian building stock constructed from 1945 to 1980.

The government programme on mobility and procurement contains additional climate-relevant measures.

Energy Strategy Austria

The EU Energy and Climate Change Package obliges Austria to increase the share of renewable energy sources in the gross final energy consumption to 34 % by 2020 and to reduce by 2020 the portion of greenhouse gas emissions in sectors that are not subject to the emissions trading scheme share by 16 % compared to 2005. Pursuant to the Energy End-use Efficiency and Energy Services Directive (Energy Services Directive, ESD), energy efficiency is to be improved by 9 % by 2016, and hence energy end-use savings of 80.4 PJ are to be achieved.

To implement the EU Energy and Climate Change Package and to achieve the 20-20-20 targets of the EU, works to generate the Energy Strategy Austria commenced in April 2009 and were completed in March 2010 (www.energiestrategie.at).

To achieve the Austrian energy and climate change targets, the Energy Strategy establishes that final energy consumption must remain at the level of 2005. Hence, final energy consumption in the year 2020 is not to exceed 1 100 PJ. The implementing measures proposed are divided into the following categories: industrial buildings, production and services, as well as trade and small-scale consumption, mobility, energy provision, security of energy supply and general measures.

According to an assessment of the Energy Strategy Austria, performed by the Austrian Energy Agency, the Environmental Agency, Energie-Control GmbH and a consortium of the Austrian Institute of Economic Research (WIFO) consortium, the measures proposed will make it possible to achieve the targets of the energy strategies by 2020.

Summary presentation of the energy savings targets in Austria

Indicative savings target of 80.4 PJ in 2016 pursuant to the Energy End-use Efficiency and Energy Services Directive

In its first National Energy Efficiency Action Plan (NEEAP), Austria calculated the indicative savings target of 80.4 PJ for 2016, and 17.9 PJ for 2010 respectively, in conformity with the Directive⁴. Hence at least 80.4 PJ in final energy consumption are to be saved by means of energy efficiency measures until 2016.

⁴ Federal Ministry of Economy, Family and Youth (2007), First National Energy Efficiency Action Plan of the Republic of Austria, Vienna, Federal Ministry of Trade, Industry and Labour, pp. 4 - 11.

Stabilisation of the final energy consumption pursuant to the Energy Strategy Austria

The Austrian energy strategy⁵ envisages i.a. to stabilise final energy consumption at the level of consumption in 2005 as an indispensable prerequisite for achieving the targets for 2020 established by the EU. This is the only way in which it will be possible to achieve the targets set by the EU for 2020 for the reduction of greenhouse gas emissions and for the increase of the share of renewable energy sources in the gross final energy consumption for Austria to 34 %. The target value for final energy consumption in Austria in 2020 amounts to 1 100 PJ.

⁵ Federal Ministry of Economy, Family and Youth and Federal Ministry of Agriculture, Forestry, Environment and Water Management, Energy Strategy Austria - proposals for measures.

2 Final energy savings

2.1 Overview of the targets and progress up to now

The extent to which the targets have been met can be measured pursuant to the Energy End-use Efficiency and Energy Services Directive by means of bottom-up and/or top-down calculations. For at least 30 % of the final energy consumption affected by the Directive the attainment of the target must be documented by means of bottom-up monitoring.⁶

Austria only uses bottom-up monitoring to document the achievement of the intermediate target. No combination of top-down and bottom-up monitoring procedure is used to document the attainment of the intermediate target.

To provide the best possible insights into the development of energy efficiency in Austria, this second NEEAP contains in addition to the bottom-up monitoring results also the results of selected top-down analyses (see Chapter 2.4, Top-down review of the energy efficiency development) and compares these results in Table 1.

Energy efficiency measures of the concerned federal and state bodies as well as of companies participating in the voluntary energy efficiency agreements were reported⁷ for the period of 1991 to 2010 as part of the bottom-up monitoring of the transposition of the Energy End-use Efficiency and Energy Services Directive. The computational energy end-use savings established on a national level by the monitoring body to result from these reported measures amount to 49 384 TJ with effect for 2010, and to 46 088 TJ with effect for 2016 (see Figures 6 and 7). Of these, 33 125 TJ (or approximately 42 % of the savings target for 2016) are accounted for by

⁶ European Commission (2006). Energy End-use Efficiency and Energy Services Directive, 2006/32/EC, Annex IV.

⁷ Companies participating in the voluntary agreements on energy-efficiency reported no 'early actions'. Hence energy-efficiency measures are only taken into account since 2008.

'early actions', i.e. energy efficiency measures that were established before 2008 and that due to their cycle will still be effective in 2016.

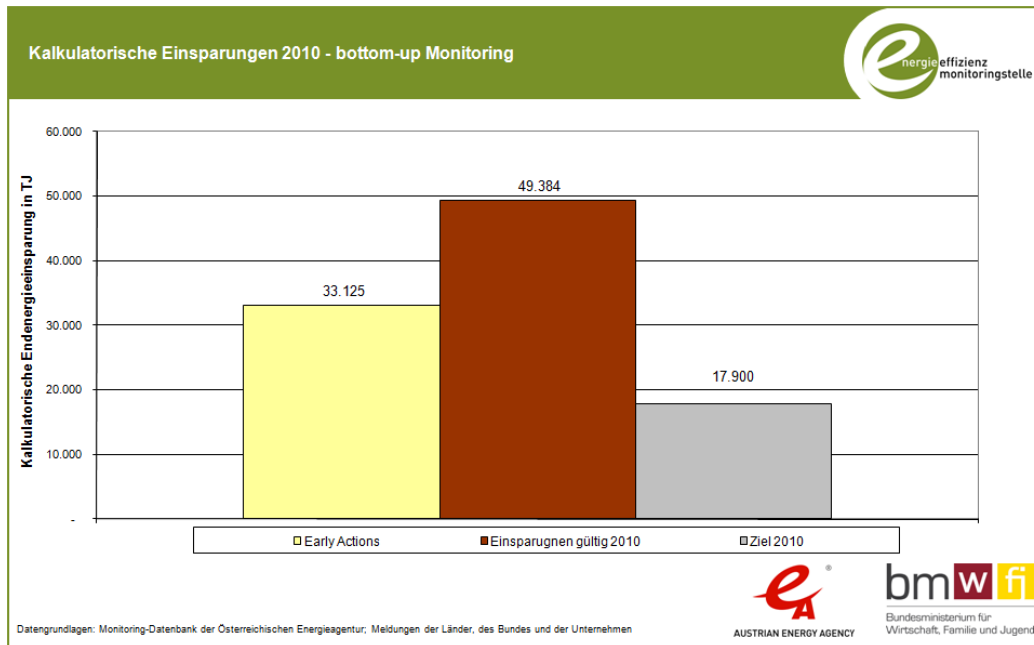


Figure 6: Calculated bottom-up final energy savings to document attainment of the intermediate target by 2010 in accordance with the Energy End-use Efficiency and Energy Services Directive

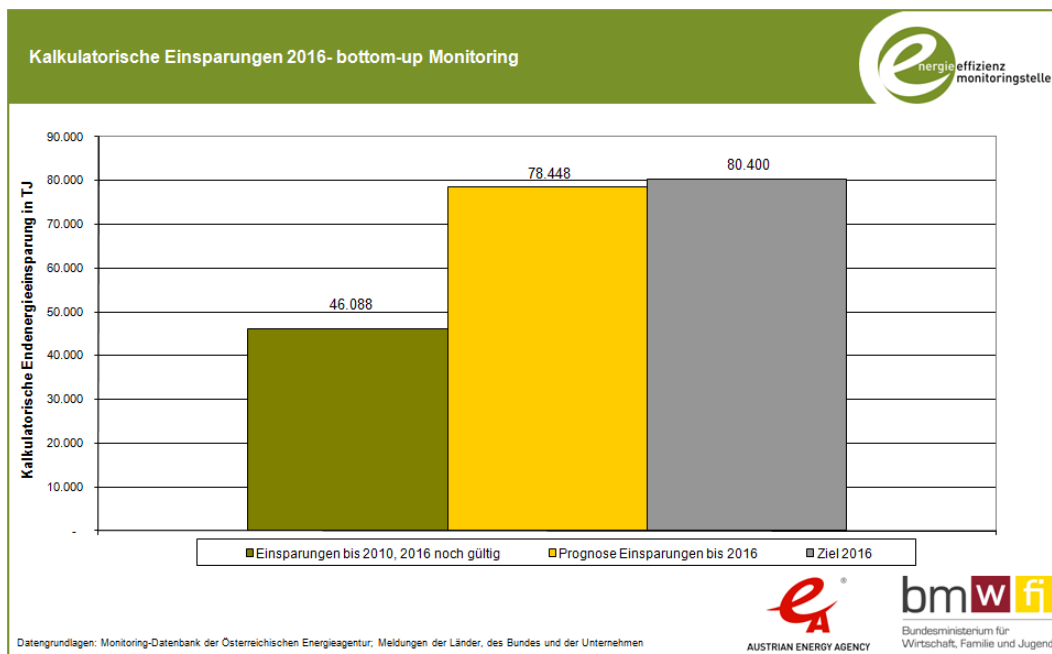


Figure 7: Calculated bottom-up energy end-use saving to document achievement of the final target for 2016 in accordance with the Energy End-use Efficiency and Energy Services Directive

If the average final energy savings calculated for the period between 2008 and 2010 were to be continued linearly until 2016, it would theoretically be possible to achieve bottom-up final energy savings of 78 448 TJ until such time (see Figure 7).

The following Figure 8 illustrates that of the final energy savings of 46 088 TJ that would still be effective in 2016, approximately 80% would result from energy efficiency measures regarding building shells (63.8%) and heat provision (16.2%).

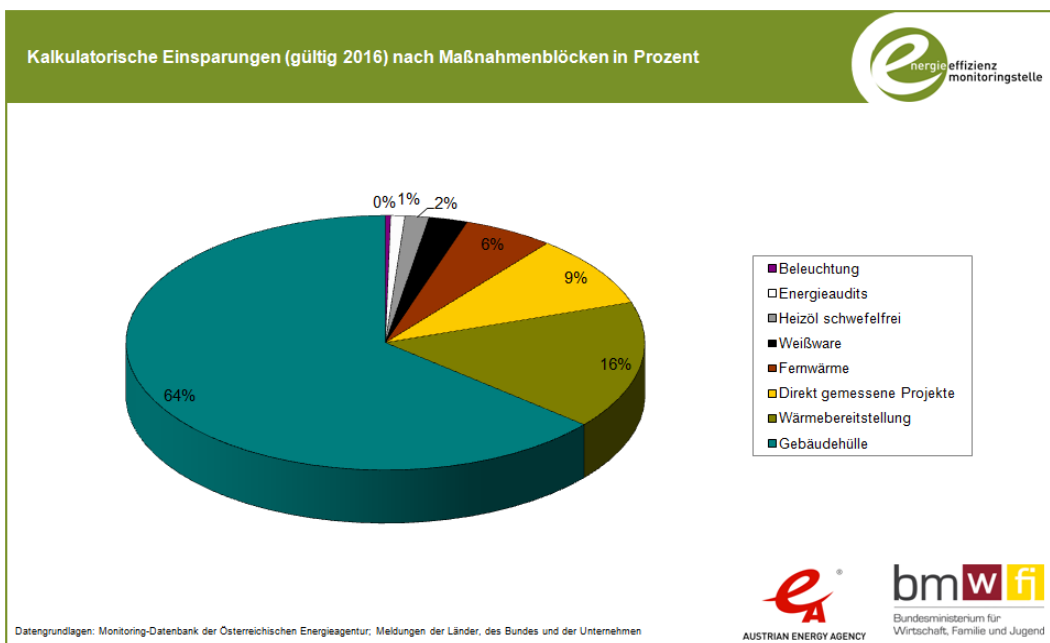


Figure 8: Calculated savings applicable in 2016 pursuant to categories of measures

The table below shows the results of the bottom-up monitoring compared to the results of top-down monitoring.

Table 1: Comparison of computational energy end-use savings in Austria assessed on the basis of top-down and bottom-up calculations

in TJ	Top-down savings ('early actions')	Top-down savings (2008 – 2010)	Bottom-up savings ('early actions')	Bottom up savings (2008 – 2010)	Bottom-up savings (prognosis for 2016)
Households	50 955	5 614	32 255	12 371	68 844
Heating and hot water	46 925	4 441	28 302	10 699	60 201
Appliances	4 030	1 099	not assessed	1 099	3 296
Lighting ⁸	0	74	14	135	418
Horizontal measures ⁹	-		3 939	438	4 929
Businesses and public services	46 215	9 481	870	2 084	5 938
Mobility	6 657	4 878	not assessed	1 804	3 666
Total	103 827	19 973	33 125	16 259	78 448

A comparison of the results contained in Table 1 illustrates that the top-down procedures indicate much higher savings resulting from 'early actions'. Calculation of final energy savings derived from 'early actions' by means of top-down methods resulted in savings amounting to 103 827 TJ. This corresponds to 33 125 TJ savings calculated by means of bottom-up methods.

A different picture is reflected by a comparison of the savings achieved in the period from 2008 to 2010. In this regard considerably lower savings were identified for households by means of top-down calculations (5 614 TJ) than by means of bottom-up calculations (12 371 TJ). The monitoring body believes that this difference is due to the very good bottom-up documentation of measures for the household sector as well as to the relatively high rebound effects in the household sector, which reduce energy savings by means of technical and organisational measures. For the business and mo-

⁸ Bottom-up calculations: Aggregate savings derived from lighting in households and office buildings as well as street lighting.

⁹ Bottom-up calculations: Aggregate savings resulting from energy advice, smart meters and directly measured projects.

bility sectors, the top-down methods show, as in the case of 'early actions', higher savings than the bottom-up procedures.

To document the achievement of the intermediate target by Austria, the savings resulting from 'early actions' calculated by bottom-up methods amounting to 33 125 TJ as well as the calculated saving resulting from the measures established since 2008 amounting to 16 259 TJ are taken into consideration. This results in a saving of 49 384 TJ for 2010. Hence the target of 17 900 TJ established for Austria is reached without any effort.

2.2 Methods to assess energy savings

In the middle of 2010 the European Commission published a proposal for harmonised top-down and bottom-up methods¹⁰. These methods can be used by Member States to calculate energy savings pursuant to the Energy End-use Efficiency and Energy Services Directive. There is no obligation to apply these methods.

Since 2007 the monitoring body participates in the process to develop the methods on a European level. Therefore it was possible to integrate the approaches discussed on a European level into the development of the Austrian methods. Hence the methods applied by the monitoring body for the national monitoring process correspond largely to the methods proposed by the European Commission.

2.2.1 Bottom-up calculation methods

Bottom-up methods to assess final energy savings were developed by the monitoring body in a cooperative process involving the stakeholders affected by the Directive and spanning several years. In workshops and dis-

¹⁰ European Commission, C.E.E. (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.

cussions held in small groups the methods proposed by the monitoring body were debated and amended to include the positions of the stakeholders. The methods developed and applied by the monitoring body focus as far as possible on the methods proposed by the European Commission and can be reviewed in the current methods document¹¹. Any deviations from the European proposal are described in the methods document.

The calculation of the computational final energy savings pursuant to bottom-up monitoring was done in a four-stage process.

- a) Collection of data and evaluation: In the first stage the data entered by the federal states and the Austrian Government into the monitoring database and subjected to plausibility check by the monitoring body (see <http://www.monitoringstelle.at/Datenbank.472.0.html>) were selected. The final energy savings were then calculated on the basis of the bottom-up methods developed by the monitoring body on behalf of the Federal Ministry of Economy, Family and Youth in cooperation with the federal states. These methods are described in detail in the methods document of the monitoring body.¹²
- b) Adjustment owing to double counting: To avoid double counting of measures taken by the Austrian Government and the federal states (e.g. due to double subsidies) possible incidents of double counting were identified in the course of coordination meetings held among the monitoring body, the Federal Ministry of Economy, Family and Youth and representatives of the federal states and taken into account for the purpose of calculating the actual savings.
- c) Supplementary savings resulting from voluntary energy efficiency agreements: Likewise savings reported by energy utilities as part of the voluntary agreements and going beyond the savings reported by the federal states were taken into consideration for the purpose of determining if the targets for 2010 and 2016 were met (to the extent that the calculation methods were compatible).
- d) Adjustment by means of an 'element of uncertainty': Though the calculations were based on the methods proposed by the European Commission, deviations in the calculation of the final energy consumption

11

http://www.monitoringstelle.at/fileadmin/dam/spritspar/downloads/Methodendokument_RK_AT_100916.pdf.

¹² Adensam, H., T. Bogner, et al. (2010), Methoden zur richtlinienkonformen Bewertung der Zielerreichung gemäß Energieeffizienz und Energiedienstleistungsrichtlinie 2006/32/EG, Bottom-up Methoden (Methods to assess the attainment of the target in compliance with the Energy End-use Efficiency and Energy Services Directive 2006/32/EC, Bottom-up methods), Austrian Energy Agency.

with regard to space heating and warm water supply compared to the statistical values compiled by Statistics Austria, the Austrian statistical office, arose. Thus a corrective factor of 0.25¹³ to adjust uncertainties with regard to savings in the field of space heating and warm water was applied. The savings resulting from district heating, heat provision and building shell measures were reduced by this corrective factor.

2.2.2 Top-down calculation methods

Top-down calculation methods use sector-specific or nation-wide aggregate data as point of departure to calculate the extent of energy savings. The annual data are adjusted by the influences which affect energy consumption, but which do not result from technological changes — such as the degree days or structural changes in industrial production — to obtain a faithful reflection of the overall improvement of energy efficiency. Top-down methods do not provide any accurate detailed measurements and hence do not show the causal link between the measures and energy savings resulting therefrom; instead they reflect the overall change in energy efficiency in the concerned sector.

Top-down methods describe the calculation of energy savings with the help of energy efficiency indicators. Energy efficiency indicators are formed by comparing the energy consumption of a year to the level of activities of the same year (e.g. energy consumption per capita, energy consumption for space heating per heated m², energy consumption of an industrial sector per generated EUR, etc.). For the purpose of top-down calculations, the energy efficiency indicator in the base year (2007) is compared to the indicator of the current year, and the difference is multiplied with the current activities level. The following formula is a simplified illustration of the calculation for the year t:

¹³ The corrective factor was established at 25 % by agreement between the Federal Ministry of Economy, Family and Youth, the federal states and the monitoring body. In regard to the calculation basis, see 5.3.

$$Einsparung_t = \left[\frac{Energieverbrauch_{2007}}{Aktivitätsniveau_{2007}} - \frac{Energieverbrauch_t}{Aktivitätsniveau_t} \right] \times Aktivitätsniveau_t$$

In other words, hypothetical energy consumption for the current activities level is calculated on the basis of the energy efficiency level in 2007 and compared to the actual current energy consumption.

The top-down methods applied in Austria correspond essentially to the methods proposed by the European Commission¹⁴. Deviations from these methods are described in Chapter 2.4, Top-down review of the energy efficiency development.

2.3 Bottom-up review of the energy efficiency measures

This chapter describes selected Austrian energy efficiency measures, and to the extent possible, savings resulting therefrom are estimated. The selected TOP measures described in this chapter, and the coordination of their contents, was done in cooperation with the responsible federal states and the Federal Ministry of Economy, Family and Youth.

2.3.1 Buildings

Savings in the building sector determined by means of bottom-up methods result mainly from measures to improve the thermal quality of the building shell, efficiency of heating systems, including promoting the use of alternative energy systems and tightening the requirements set by building regulations. Table 2 provides an overview of the measures and the resulting savings. The measures will be described subsequently in more detail.

¹⁴ European Commission, C.E.E. (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.

Table 2: Overview of measures in the building sector

No	Energy efficiency measure	Affected energy consumption	Final energy savings (TJ)	2010	Expected final energy savings 2016 (TJ)
G.1.	Residential building subsidy — building shell	New buildings and renovation of buildings	13 905		22 705
G. 2.	Residential building subsidy — efficient heating systems	New buildings and renovation of buildings	10 292		18 821
G.3.	Tightening construction law requirements	New buildings and renovation of buildings	14 805		18 676
G.4.	National recovery plan/Renovation voucher	Renovation of buildings	Technical measures still in process of implementation		Technical measures still in process of implementation
G.5	Statutory provisions to promote district heating	Residential and non-residential buildings	Savings cannot be projected by bottom-up calculation		Savings cannot be projected by bottom-up calculation
G. 6.	Energy advice for households	Private households	145		145
	Total savings		39 147		60 347
Residential building subsidy – building shell (G.1.)					
Description					
Category	3: Subsidies				
Duration	Start: 1982	End: -	Adjustments: Continuous tightening of requirements		
Target groups:	Private households Space heating and air conditioning				
Description	In the federal states the enhancement of the thermal quality of residential buildings and the expansion of efficient heating systems are supported by the funds earmarked for residential building subsidies. The subsidy is paid in the form of loans, grants and/or allowances.				
Further information	http://www.help.gv.at/Content.Node/21/Seite.210301.html				
Final energy savings					
Calculation method	Bottom-up method for thermally enhanced building shells ¹⁵				
Savings (TJ/a)	2010: 13 905 TJ		2016 (estimate): 22 705 TJ		

¹⁵ Adensam, H., T. Bogner, et al. (2010), Methoden zur richtlinienkonformen Bewertung der Zielerreichung gemäß Energieeffizienz und Energiedienstleistungsrichtlinie 2006/32/EG, Bottom-up Methoden (Methods to assess the attainment of the target in compliance with the Energy End-use Efficiency and Energy Services Directive 2006/32/EC, Bottom-up methods), Austrian Energy Agency.

Implementation		
National/ regional	Nation-wide, implemented in the federal states	
Budget and financial resources	Average from 2005 to 2009: EUR 2 850 million, of which approximately EUR 550 million for renovations ¹⁶ , including expenditure for G.2.	Federal authorities, federal states
Responsible body / Monitoring	Governments of the federal states / Governments of the federal states	
Overlaps, multiplier factors, synergies	Synergies with the G.6 instrument and overlap with the G.4 instrument exist.	

¹⁶ Amann, W. (2010), Lenkungseffekte der Wohnbauförderung (Steering effects of residential building subsidy), Expert conference 'Europäisches Sozialmodell — der österreichische Wohnungsbau als Best Practice' (The European social model – Is the Austrian residential building best practice?).

Residential building subsidy – efficient heating systems (G.2)			
Description			
Category	3: Subsidies		
Duration	Start: 1982	End: -	Adjustments: Continuous tightening of requirements
Target groups:	Private households Space heating and air conditioning		
Description	In the federal states the enhancement of the thermal quality of residential buildings and the expansion of efficient heating systems are supported by the funds earmarked for residential building subsidies. The subsidy is paid in the form of loans, grants and/or allowances.		
Further information	http://www.help.gv.at/Content.Node/21/Seite.210301.html		
Final energy savings			
Calculation method	Bottom-up methods with regard to 'District heating', 'Boiler replacement', 'Solar thermal installations', 'Heat pumps' ¹⁷		
Savings (TJ/a)	2010: 10 292 TJ	2016 (estimate): 18 821 TJ	
Implementation			
National/ regional	Nation-wide, implemented in the federal states		
Budget and financial resources	included in G.1 instrument	Federal authorities, federal states	
Responsible body / Monitoring	Governments of the federal states / Governments of the federal states		
Overlaps, multiplier factors, synergies	Synergies with the G.6 instrument and overlap with the G.4 instrument exist.		
Tightening construction law requirements (G.3)			
Description			
Category	1: Standards and norms		
Duration	Start: before 1991	End: -	Adjustments: ongoing amendments, but in irregular intervals
Target groups:	Buildings Space heating and air conditioning		

¹⁷ Adensam, H., T. Bogner, et al. (2010), Methoden zur richtlinienkonformen Bewertung der Zielerreichung gemäß Energieeffizienz und Energiedienstleistungsrichtlinie 2006/32/EG, Bottom-up Methoden (Methods to assess the attainment of the target in compliance with the Energy End-use Efficiency and Energy Services Directive 2006/32/EC, Bottom-up methods), Austrian Energy Agency.

Description	In Austria, the thermal quality of buildings is determined as part of the federal building law and/or of the building regulations of the federal states. These instruments contain binding quality criteria for buildings. The requirements vary from federal state to federal state; hence these provisions may determine e.g. the U loads for the components, energy properties or LEK values. These building regulations and laws not only contain requirement in respect of the building shell, but also in respect of the technology employed for facility management. The guidelines of the Austrian Institute for Construction Engineering serve as the basis for the harmonisation of the building regulations and laws. One of these guidelines, OIB Guideline No 6 on energy saving and thermal insulation, exists since 2007 and was implemented by all federal states. This guideline contains requirements with regard to the maximum heating consumption of residential and non-residential buildings - both in respect of newly constructed and comprehensively renovated buildings.	
Further information	http://www.help.gv.at/Content.Node/226/Seite.2260200.html	
Final energy savings		
Calculation method	Pursuant to methods proposed by the European Commission, Baseline for 'early actions', Building regulation 1991, savings from 2008 to 2010: Building regulations 2007, calculation bases, see Annex.	
Savings (TJ/a)	2010: 14 805 TJ	2016 (estimate): 18 676 TJ
Implementation		
National/ regional	Nation-wide, differences in implementation in the federal states	
Budget and financial resources	not applicable	not applicable
Responsible body / Monitoring	Governments of the federal states / Governments of the federal states	
Overlaps, multipliers, synergies	Double counting is methodically excluded, because the applicable building regulations are used as a baseline for all bottom-up methods. Synergies exist with regard to residential building subsidies, which also provides for the promotion of thermal quality of buildings beyond the requirements of the building regulations. Multiplier factor effects exist with regard to the spreading of efficient technologies in the building industry.	

National recovery plan / renovation voucher (G.4.)			
Description			
Category	3: Investment subsidy		
Duration	Start: 2009	End: 2011	Adjustments: National recovery plan (2009) continued as a renovation voucher (2011)
Target groups:	Private households, companies Space heating and air conditioning in existing buildings		
Description	<p>Subsidies are provided for measures to improve thermal insulation (building shell as well as windows and doors) and to improve the weather generation systems of residential buildings and commercially used buildings that were erected before 1 January 1999 or which are at least 20 years old.</p> <p>Household action 2009: The maximum subsidy level amounts to 20% of the (thermal) renovation costs and/or a maximum amount of EUR 5 000.</p> <p>Household action 2011: The maximum subsidy level amounts to 20% of the (thermal) renovation costs and/or a maximum amount of EUR 5 000 plus EUR 1 500 in the case of conversion from heat generation systems to systems based on renewable energy sources.</p> <p>Companies: Subsidy of 30% at most for small and medium-sized enterprises, for at most 40 % of the investment costs.</p>		
Further information	http://www.bmwfj.gv.at/EnergieUndBergbau/Energieeffizienz/Seite/NeuerSanierungsscheck.aspx		
Final energy savings			
Calculation method	Currently there are not yet any data available for these two actions.		
Savings (TJ/a)	2010: n. a., savings are contained in the G.1. instrument.	2016 (estimate): n. a., savings are contained in the G.1. instrument.	
Implementation			
National/regional	National		
Budget and financial resources	<p>Action 2009: Households and businesses: EUR 50 million each</p> <p>Action 2011: Households: EUR 70 million, businesses: EUR 30 million</p>	Federal Ministry of Economy, Family and Youth; Federal Ministry of Agriculture, Forestry, Environment and Water Management	
Responsible body / Monitoring	Municipal loans Public Consulting GmbH, building societies / Federal authorities		
Overlaps, multipliers, synergies	Overlaps with the G.1. instrument and synergies with the G.6 instrument exist.		

Statutory provisions to promote district heating			
Description			
Category	3: Investment subsidy		
Duration	Start: 1982 (FWFG), 2008 (KWK), 2009 (WKLG)	End: 1993 (FWFG)	Adjustments: Statutory amendments FWFG 1985, 1988, 1991
Target groups:	District heat consumers		
Description	<p>The Act to promote district heating (FWFG) provides in addition to subsidies for district heating system subsidies for district heating pipeline and distribution systems. The subsidy is paid out as an investment grant. The KWK Act provides for investment grants for new and subsidies for the operation of existing KWK facilities for public district heating provision. Hence both acts provide a contribution to the provision of district heating infrastructure. The instruments used by the federal states to implement the targets are regionally disparate and include i.a. compulsory connection under certain circumstances, promotion of district heating connection for private households and businesses, promotion of the expansion of district heating, in particular the expansion of biomass block and district heating.</p>		
Further information	<p>http://www.ris.bka.gv.at/Dokument.wxe?Abfrage=Bundesnormen&Dokumentnummer=NOR11006844</p> <p>http://www.ris.bka.gv.at/GeltendeFassung.wxe?Abfrage=Bundesnormen&Gesetzesnummer=10006731</p>		
Final energy savings			
Calculation method	Savings from the operation of energy generation facilities for public supply of district heating cannot be credited for the purposes of Directive 2006/32/EC. Hence no final energy consumption saving can be attributed to this measure. However, the creation of the district heating infrastructure is a prerequisite for the mandatory connection of buildings at the district heating supply and hence for energy savings on the part of final consumers ¹⁸ .		
Savings (TJ/a)	2010: n. a., savings from additional district heating connections are contained in the G.2. instrument.	2016 (estimate): n. a., savings from additional district heating connections are contained in the G.2. instrument.	

¹⁸ Adensam, H., T. Bogner, et al. (2010), Methoden zur richtlinienkonformen Bewertung der Zielerreichung gemäß Energieeffizienz und Energiedienstleistungsrichtlinie 2006/32/EG, Bottom-up Methoden (Methods to assess the attainment of the target in compliance with the Energy End-use Efficiency and Energy Services Directive 2006/32/EC, Bottom-up methods), Austrian Energy Agency.

Implementation		
National/regional	National	
Budget and financial resources	FWFG: max. 1.1 billion Schillings per year KWK: EUR 55 millions in total from 2006-2012; WKLG: 2010 EUR 10 million and 2011 EUR 20 million	Federal authorities, federal states
Responsible body / Monitoring	Federal authorities, federal states / Federal authorities, federal states	
Overlaps, multiplier factors, synergies	District heating connections are supported by the federal states in the scope of the residential building subsidy (G.1.) are assessed under that heading.	
Energy advice for households		
Description		
Category	2: Advice	
Duration	Start: regional differences, first initiatives in 1980, systematically and comprehensive since 1990	End: - Adjustments: continuously
Target groups:	Private households Space heating and air conditioning, power consumption	
Description	In Austria, the energy advice bodies of the federal states offer advice with regard to energy for households. The quality of the energy advice is ensured by means of a standardised training, consisting of a standard course (A level) and an advanced training course (F level).	
Further information	http://www.klimaaktiv.at/article/articleview/67127/1/25300	
Final energy savings		
Calculation method	Bottom-up method 'Energy advice' ¹⁹	
Savings (TJ/a)	2010: 145 TJ	2016 (estimate): 145 TJ
Implementation		
National/regional	Nation-wide, implemented in the federal states	

¹⁹ Adensam, H., T. Bogner, et al. (2010), Methoden zur richtlinienkonformen Bewertung der Zielerreichung gemäß Energieeffizienz und Energiedienstleistungsrichtlinie 2006/32/EG, Bottom-up Methoden (Methods to assess the attainment of the target in compliance with the Energy End-use Efficiency and Energy Services Directive 2006/32/EC, Bottom-up methods), Austrian Energy Agency.

Budget and financial resources	EUR 10 million (estimate of the representatives of the federal states ²⁰)	Federal state governments
Responsible body / Monitoring	Governments of the federal states / Governments of the federal states	
Overlaps, multiplier factors, synergies	For the purpose of assessing this instrument, only energy savings resulting from changes in behaviour, but not the investive measures thus triggered, are represented.	

²⁰ See minutes of the meeting of 15 April 2010.

2.3.2 Public sector

Savings of 278 TJ towards the 2010 target resulted from the renovation programmes for public buildings. Further measures cannot be assessed by means of bottom-up methods.

Table 3: Overview of measures in the public sector

No	Energy efficiency measure	Affected energy consumption	Final energy savings 2010 (TJ)	Expected final energy savings 2016 (TJ)
O.1.	renovation programmes for public buildings	Public buildings	278	358
O.2.	Procurement of energy efficient products		Savings cannot be projected by bottom-up calculation	Savings cannot be projected by bottom-up calculation
O.3.	Energy efficiency programmes — local authorities		Savings cannot be projected by bottom-up calculation	Savings cannot be projected by bottom-up calculation
	Total savings		278	358

renovation programmes for public buildings (O.1)			
Description			
Category	5: Energy contracting		
Duration	Start: 1999	End: —	Adjustments: —
Target groups:	Public buildings Space heating and air conditioning, lighting		
Description	<p>The Federal Real Estate Contracting is a programme to reduce energy end-use in public buildings. External service providers are used to create overall concepts for the highest possible energy savings. 80 % of the calculated savings go towards the financing of the construction measures. The remaining 20 % are returned to the user of the building. Furthermore, the Federal Real Estate Agency (Company) rehabilitates the federal buildings at a standard beyond the state of the art. The Special Federal Commissioners for Energy are since 1980 responsible for all federal offices in regard to optimisation of the use of energy.</p> <p>The federal states, too, offer contracting for state buildings in isolated instances. Furthermore, in some federal states technical requirements that are stricter than the Building Code must be observed for new buildings or for the renovation of state buildings.</p>		
Further information	<p>http://www.esv.or.at/unternehmen/contracting/</p> <p>http://www.noel.gv.at/Umwelt/Energie/Landesgebaeude/pflichtenheft.html</p> <p>http://www.noel.gv.at/Umwelt/Energie/NOe-Energiebericht-Zahlen-Daten-und-Wissenswertes/landesgebaude.html</p> <p>http://www.bev.gv.at/portal/page?_pageid=713,1806671&_dad=portal&_schema=PORTAL</p> <p>http://www.bmwfj.gv.at/Tourismus/energieeinsparungen/Seiten/Bundescontracting.aspx</p>		
Final energy savings			
Calculation method	Measured values, adjusted in compliance with the directive		
Savings (TJ/a)	2010: 355 TJ, of which buildings of the Austrian Government accounted for 278 TJ plus 77 TJ ²¹ from savings reported by the federal states	2015 (estimate): 358 TJ from federal real estate contracting	

²¹The savings of the federal states resulting from the O.1 measure are contained in the H.6. measure — Directly measured projects.

Implementation			
National/ regional	Implementation by the Austrian Government and the federal states		
Budget and financial resources	not applicable	Federal authorities, federal states	
Responsible body / Monitoring	Federal authorities, federal states / Federal authorities, federal states		
Overlaps, multiplier factors, synergies	The federal real estate contracting helps to reduce the energy consumption and hence the expenditure of the public sector for energy without having to burden the public budget with investments.		
Procurement of energy efficient products (O.2.)			
Description			
Category	2: Exemplary role of the public sector		
Duration	Start: 2001 (Federal Procurement Corporation Act — BB-GmbH-Gesetz)	End: —	Adjustments: —
Target groups:	Public budgets All net energy categories		
Description	In Austria public procurement is governed by the Federal Procurement Act Since the 2007 Amendment Act, ecological aspects must be taken into consideration as part of the award procedure (energy end-use efficiency, for example). Further criteria are defined in the 'National Action Plan to promote sustainable public procurement'. In addition, some federal states have set up their own programmes for energy efficient procurements. The central federal procurement corporation procures supplies for the federal offices, the state offices and local authorities having regard to energy efficiency criteria.		
Further information	http://www.ris.bka.gv.at/GeltendeFassung.wxe?Abfrage=Bundesnormen&Gesetzesnummer=20004547 http://www.nachhaltigebeschaffung.at/ http://www.bbg.gv.at/ueber-uns/unternehmen/ http://www.buy-smart.info/german/beschaffung-und-klimaschutz		
Final energy savings			
Calculation method			
Savings (TJ/a)	2010: n.a.	2016 (estimate): n.a.	
Implementation			
National/regional	National, implementation by the Austrian Government and the federal states		

Budget and financial resources	See synergies	Federal authorities, federal state governments
Responsible body / Monitoring	Federal authorities, state governments / Federal authorities, state governments	
Overlaps, multiplier factors, synergies	Energy efficient procurement has a considerable leverage effect, because public procurement accounts for approximately 17 % of Austria's gross domestic product.	

Energy efficiency programmes for local authorities (O.3.)			
Description			
Category	2: Consulting, information, exemplary role of the public sector; 3. Subsidies		
Duration	Start: differs according to region	End: -	Adjustments: continuously
Target groups:	Municipalities All net energy categories		
Description	In Austria, various energy advice and promotion programmes are available for local authorities. The aim is to support local authorities from the planning of measures up to implementation. This includes the e5 programme for energy efficient local authorities, the Climate Alliance, the energy saving local authorities programme, environmental local authorities, EKKO energy and climate model regions.		
Further information	http://www.publicconsulting.at/kpc/de/home/frdermappe/faq/umweltfrderung/ http://www.esv.or.at/gemeinden/energiespargemeinde/		
Final energy savings			
Calculation method	No assessment of energy end-use savings was made for this measure.		
Savings (TJ/a)	2010: n.a.	2016 (estimate): n.a.	
Implementation			
National/regional	National, implementation by the Austrian Government and the federal states		
Budget and financial resources	Approx. EUR 3 million per annum were reported	Federal authorities, federal state governments	
Responsible body / Monitoring	Federal authorities, state governments / Federal authorities, state governments		
Overlaps, multiplier factors, synergies	Isolated investive measures are evaluated under the heading 'Thermal improvements of the building shell', 'Heat provision' and 'Street lighting'.		

2.3.3 Industry and SMEs

In regard to industrial businesses and SMEs, the investment and advice subsidies for businesses were ranked as top measures. In this sector theoretical bottom-up savings amounting to 2 675 TJ towards the 2010 target were achieved.

Table 4: Overview of measures in the industry and SME sector

No	Energy efficiency measure	Affected energy consumption	Final energy savings 2010 (TJ)	Expected final energy savings 2016 (TJ)
I.1.	Investment and advice subsidies for businesses	All energy consumption categories such as process heat, electricity consumption, space heating and warm water	2 675	5 578

Investment and advice subsidies for businesses (I.1.)			
Description			
Category	2: Advice, information; 3. Subsidies		
Duration	Start: 1993	End: 2013	Adjustments: continuously, most recently in 2009
Target groups:	Companies All net energy categories		
Description	The domestic environmental subsidies (UFI) provide support for businesses and associations to undertake environment-related investments. The assistance consists of an investment grant of up to 30% of the investment costs. In addition, all federal states offer energy advice and support programmes for businesses, in particular the regional programmes, which are co-financed by the EU. The federal 'Energy efficiency voucher' is a advice programme aimed at SMEs.		
Further information	http://www.publicconsulting.at/kpc/de/home/frdermappe/faq/umw_elfrderung/ http://portal.wko.at/wk/format_detail.wk?angid=1&stid=512029&d_stid=0&titel=Gef%C3%B6rderte,Energieberatung,f%C3%BCr,Unternehmen http://www.klimaaktiv.at/article/archive/15130/ http://www.kmu-scheck.at/		
Final energy savings			
Calculation method	Bottom-up method 'Energy audits' ²²		
Savings (TJ/a)	2010: 2 675 TJ	2016 (estimate): 5 578 TJ	
Implementation			
National/regional	National, implementation by the Austrian Government and the federal states		
Budget and financial resources	Federal authorities: EUR 90 million per annum plus funds from the federal states (between EUR 20 000 and EUR 1 million, depending on federal state)	Federal authorities, federal state governments	
Responsible body / Monitoring	Federal authorities, state governments / Federal authorities, state governments		

²²Adensam, H., T. Bogner, et al. (2010), Methoden zur richtlinienkonformen Bewertung der Zielerreichung gemäß Energieeffizienz und Energiedienstleistungsrichtlinie 2006/32/EG, Bottom-up Methoden (Methods to assess the attainment of the target in compliance with the Energy End-use Efficiency and Energy Services Directive 2006/32/EC, Bottom-up methods), Austrian Energy Agency.

Overlaps, multiplier factors, synergies	

2.3.4 Energy supply

In regard to energy supply, measures were reported showing a saving of 14 TJ by measuring the actual energy consumption and by informative billing.

Table 5: Overview of measures in the field of energy supply

No	Energy efficiency measure	Affected final energy consumption	Final energy savings 2010 (TJ)	Expected final energy savings 2016 (TJ)
E.1.	Smart metering and informative billing	Consumption of pipe-supplied energy source of the households	14	14

Smart metering and informative billing (E.1.)			
Description			
Category	2: Registration of consumption		
Duration	Start: 2008	End: -	Adjustments: -
Target groups:	Households Electricity consumption		
Description	Smart meters and informative billing were introduced in Austria on the basis of the Electricity Industry and Organisation Act (EI-WOG), adopted in 2010. Smart Meter pilot projects were introduced in three Austrian federal states. Installation of nearly 24 000 smart meters complying with the necessary requirements pursuant to the Methods Document, as part of the voluntary agreements, was reported at the end of 2010. These meters are evaluated below in the energy savings specified.		
Further information	http://www.ris.bka.gv.at/GeltendeFassung.wxe?Abfrage=Bundesnormen&Gesetzesnummer=20007045		
Final energy savings			
Calculation method	Bottom-up method - 'Smart meters and informative billing' ²³		
Savings (TJ/a)	2010: 14 TJ	2016 (estimate): 14 TJ	
Implementation			
National/ regional	National, implementation by the Austrian Government and the federal states		
Budget and financial resources	not applicable	Energy utilities	
Responsible body / Monitoring	Energy utilities, Austrian Government / Austrian Government		
Overlaps, multiplier factors, synergies	Smart meters are only evaluated if informative billing pursuant to Directive 2006/32/EC was implemented at the same time. Synergies exist at the same time with energy advice, which can be conducted more effectively owing to the more detailed consumption information.		

23

2.3.5 Mobility

In the field of mobility, it was only possible to evaluate measures from the 'klima:aktiv' climate protection initiative by means of bottom-up methods (Table 6).

²³ Adensam, H., T. Bogner, et al. (2010), Methoden zur richtlinienkonformen Bewertung der Zielerreichung gemäß Energieeffizienz und Energiedienstleistungsrichtlinie 2006/32/EG, Bottom-up Methoden (Methods to assess the attainment of the target in compliance with the Energy End-use Efficiency and Energy Services Directive 2006/32/EC, Bottom-up methods), Austrian Energy Agency.

Table 6: Overview of measures in the transport sector

No	Energy efficiency measure	Affected energy consumption	Final energy savings 2010 (TJ)	Expected final energy savings 2016 (TJ)
V.1.	Traffic measures of the Climate and Energy Fund	Final energy consumption of businesses in MIV	Currently savings cannot be projected by bottom-up calculation	Currently savings cannot be projected by bottom-up calculation
V.2.	klima:aktiv transport measures	Final energy consumption of private households and businesses in MIV	18	3 666
V.3.	Top measure — mobility	Final energy consumption of private households and businesses in MIV	Currently savings cannot be projected by bottom-up calculation	Currently savings cannot be projected by bottom-up calculation

Traffic measures of the Climate and Energy Fund (V.1.)			
Description			
Category	3: Subsidies		
Duration	Start: 2007	End:	Adjustments:
Target groups:	Local authorities, clients of public passenger transport services		
Description	<p>The annual programme of the Austrian Climate and Energy Fund includes measures to increase efficiency in the transport sector. This includes inter alia the improvement of the intermodal interface - bicycle traffic/public passenger transport, investment subsidies for the new construction, extension or upgrading of existing connection lines and multi-modal transport systems to enhance the attractiveness and efficiency of combined transport.</p> <p>Measures to enhance the attractiveness of public passenger transport systems is supported by means of regional traffic concepts and technical projects in the form of non-repayable grants to the clients of public passenger transport services pursuant to ÖPNRVG 1999, sections 34 and 26.</p>		
Further information			
Final energy savings			
Calculation method	Currently no evaluation methods are available yet.		
Savings (TJ/a)		2016 (estimate):	
Implementation			
National/ regional	National, implementation by the Austrian Government and the federal states		
Budget and financial resources	2010: EUR 20 million	Federal authorities, federal states	
Responsible body / Monitoring	Climate and Energy Fund /SCHIG GmbH		
Overlaps, multiplier factors, synergies			

'klima:aktiv' climate protection initiative transport measures (V.2.)			
Description			
Category	3: Subsidies		
Duration	Start: —	End: —	Adjustments: —
Target groups:	Businesses		
Description	Measures for environment-friendly, sustainable traffic development and soft mobility — e.g. vehicles with alternative drives, promotion of bicycle and pedestrian traffic, traffic information and logistics system, reduction of the traffic volume, promotion of public traffic, etc., are subsidised.		
Further information			
Final energy savings			
Calculation method	Assessment of the calculated CO ₂ savings (see Annex)		
Savings (TJ/a)	1,804	2016 (estimate): 3,666	
Implementation			
National/ regional	National		
Budget and financial resources	2010: n.a.	Federal authorities	
Responsible body / Monitoring	Federal Ministry of Agriculture, Forestry, Environment and Water Management / KPC / AEA		
Overlaps, multiplier factors, synergies			

Top measure - mobility (V.3)			
Description			
Category	Diverse range of measures		
Duration	Start: -	End: -	Adjustments: -
Target groups:	Mobility		
Description	<p>A wide range of different measures were taken in regard to transport by the Austrian Government and the federal states. These include inter alia:</p> <ul style="list-style-type: none"> • reduction of speed • 'park & ride' • expansion of public passenger transport systems • bicycle infrastructure • shifting transport of goods • electromobility • 'bike & ride' • car sharing • bicycle parking stations 		
Further information			
Final energy savings			
Calculation method	It was not possible to do a bottom-up evaluation, as the measures in regard to transport are very diverse and heterogeneous. Top-down evaluation shows savings of 11,535 TJ for the entire transport sector since 1995.		
Savings (TJ/a)	2010 n.a.	2016 (estimate) n.a.	
Implementation			
National/ regional	National, implementation by the Austrian Government and the federal states		
Budget and financial resources	not applicable	Federal authorities, federal states	
Responsible body / Monitoring	Federal authorities, state governments / Federal authorities, state governments		
Overlaps, multiplier factors, synergies			

2.3.6 Horizontal measures

Horizontal measures were documented in addition to the sector-specific measures. These measures related to taxation, research and training as well as energy labelling. For lack of their own top-measure category - savings resulting from measures to enhance the efficiency of lighting as well as from the directly measured projects are listed in following table.

Table 7: Overview of the horizontal measures

No	Energy efficiency measure	Affected final energy consumption	Final energy savings 2010 (TJ)	Expected final energy savings 2016 (TJ)
H. 1.	Energy and transport taxes	All energy consumption categories	Savings cannot be projected by bottom-up calculation	Savings cannot be projected by bottom-up calculation
H. 2.	Standard consumption excise duty	Individual motorised transport	Savings cannot be projected by bottom-up calculation	Savings cannot be projected by bottom-up calculation
H. 3.	Research and development	All energy consumption categories	Savings cannot be projected by bottom-up calculation	Savings cannot be projected by bottom-up calculation
H. 4.	Education, training and information/raising awareness	All energy consumption categories	Savings cannot be projected by bottom-up calculation	Savings cannot be projected by bottom-up calculation
H. 5.	Energy labelling	Electricity consumption for refrigerating, freezing and washing	1 099	3 296
H. 6.	Directly measured projects. ²⁴	All energy consumption categories	4 219	4 771
H. 7.	Lighting	Electricity consumption for lighting	149	418
	Total savings		5 467	8 485

²⁴ Even though it is not a TOP measure, the savings resulting from this measure are listed here, since they were calculated by means of bottom-up methods. For a description of directly measured projects, see the Methods Document (Adensam, H. et al. (2010), Methoden zur richtlinienkonformen Bewertung der Zielerreichung gemäß Endenergieeffizienz- und Energiedienstleistungsrichtlinie 2006/32/EG (Methods to assess the attainment of the target in compliance with the Energy End-use Efficiency and Energy Services Directive 2006/32/EC), Bottom-up methods, Austrian Energy Agency).

Energy taxes (H.1.)			
Description			
Category	3: Taxes		
Duration	Start: Energy taxes were introduced at various points in time (mineral oil tax on fuels were introduced already during the First Republic, followed by heating oils, on natural gas and electricity in 1995 and on solid fossil heating fuels in 2004.	End: -	Adjustments: continuously
Target groups:	All final energy consumers		
Description	<p>Energy taxation in Austria comprises the following taxes: electrical energy (0.015€/kWh), natural gas (0.066€/m³), coal (0.05€/kg), petrol (0.482€/l; the other tax rates imposed on petrol are without quantitative significance. Tax rate as of 1 Jan. 2011), diesel (0.397€/l; the other tax rates imposed on diesel are without quantitative significance. Tax rate as of 1 Jan. 2011), heating oil (= .060€/kg), extra light heating oil 0.098€/l).</p> <p>In 2005, revenues from energy taxes totalled EUR 4 350 million.</p>		
Further information	<p>Electricity Duty Law, Natural Gas Duty Law, Coal Duty Law, Mineral Oil Tax Law, Energy Duty Refund Law.</p> <p>http://www.ris.bka.gv.at/</p>		
Final energy savings			
Calculation method	not applicable		
Savings (TJ/a)	2010: n.a.	2016 (estimate): n.a.	
Implementation			
National/ regional	National, implementation by the Austrian Government and the federal states		
Budget and financial resources	2010: approx. EUR 4 580 million	The mineral oil tax and the energy duties are federal duties.	
Responsible body / Monitoring	Austrian Government / Austrian Government		
Overlaps, multiplier factors, synergies	Due to their steering effect, energy taxes have synergies with all other energy efficiency measures.		

Standard consumption excise duty (H.2.)			
Description			
Category	3: Taxes		
Duration	Start: 1992	End: -	Adjustments: continuously
Target groups:	Individual motorised transport		
Description	Tax on passenger cars/SUV imposed on initial registration of the vehicle in Austria. The amount of tax/tax rate depends on the specific fuel consumption or on the specific CO ₂ emissions.		
Further information	Standard Consumption Excise Duty Act, http://www.ris.bka.gv.at/		
Final energy savings			
Calculation method	not applicable		
Savings (TJ/a)	2010: n.a.	2016 (estimate): n.a.	
Implementation			
National/ regional	National, implementation by the Austrian Government		
Budget and financial resources	2010: EUR 452 million	Federal authorities	
Responsible body / Monitoring	Austrian Government / Austrian Government		
Overlaps, multiplier factors, synergies			
Research and development (H.3.)			
Description			
Category	Research and development		
Duration	Start: before 1991	End: -	Adjustments: -
Target groups:	All final energy consumers		
Description	According to the energy research survey conducted by the Federal Ministry for Transport, Innovation and Technology (BMVIT), expenditure of the public authorities for energy research in Austria amounted in 2009 to EUR 92.3 million. Direct financing accounted for 85 % of this expenditure and own research by research institutes financed by federal or state funds for 15 %. More than one third was spent in the field of energy efficiency. The increase of		

	expenditure for research in this field was disproportionately high in recent years. Projects in basic research as well as in applied and industrial research are supported. Research by other bodies (e.g. companies) financed by their own resources are not reflected in the above mentioned figures.		
Further information	http://www.nachhaltigwirtschaften.at/iea/results.html/id6324		
Final energy savings			
Calculation method	not applicable		
Savings (TJ/a)	2010: n.a.	2016 (estimate): n.a.	
Implementation			
National/ regional	National, implementation by the Austrian Government and the federal states		
Budget and financial resources	2009: EUR 92.3 million		
Responsible body / Monitoring	Federal authorities, state governments / Federal authorities, state governments		
Overlaps, multiplier factors, synergies	Energy research helps to develop new technologies and to prepare them until they're ready for marketing. Hence there are synergies with a great number of energy end-use efficiency measures.		
Education, training and information/Raising awareness (H.4.)			
Description			
Category	2: Information		
Duration	Start: differs according to region, 1991	End: ongoing	Adjustments: continuously
Target groups:	Citizens, craftspeople, enterprises, public budgets		
Description	Measures in the field of education, training as well as information and awareness-raising are offered by Austrian Government and federal states. On a federal level, the 'klima:aktiv' climate protection initiative is one of the most important information and awareness-raising programmes (see in this respect, Chapter 3.2.4, '). The energy agencies of the federal states offer a comprehensive range of information and services in addition to energy advice. The range includes educational programmes for more efficient use of energy for citizens (evening events and excursions) as well as advanced training courses for craftspeople (ranging from one-day seminars to fully-fledged training courses). In addition, numerous activities to inform the general public about careful use of energy are offered, including events, fair presentations, newspaper ads, brochures, website information, etc.		
Further information	http://www.klimaaktiv.at/ http://www.esv.or.at/		

	http://www.energie-tirol.at/ http://www.energieinstitut.at http://www.energieberatung-noe.at http://www.salzburg.gv.at/energieberatung http://www.burgenland.at/buergerservice/wohnbaufoerderung/energieagentur www.lev.at http://www.energiebewusst.at/		
Final energy savings			
Calculation method			
Savings (TJ/a)	2010: n.a.	2016 (estimate): n.a.	
Implementation			
National/ regional			
Budget and financial resources	2010: Estimate Austria, in total EUR 5 to 10 million		
Responsible body / Monitoring	Governments of the federal states / Governments of the federal states		
Overlaps, multiplier factors, synergies	with the G.6. measure		
Energy labelling (H.5.)			
Description			
Category	2: Information		
Duration	Start: 1994	End: ongoing	Adjustments: continuously
Target groups:	All end users		
Description	The consumption indication ordinances contain requirements for a label ('energy label'), the data sheet, information (in print) and the measuring and inspection procedures for the following appliance categories: refrigerating appliances and freezers, laundry dryers, dishwashers, lamps, electric ovens, durable and consumer goods as well as air conditioning equipment.		
Further information	http://www.bmwfj.gv.at/Ministerium/Rechtsvorschriften/entwuerfe/Seiten/Produkte-Verbrauchsangabenverordnung2011-.aspx		
Final energy savings			
Calculation method	See 2.4.2 Energy efficiency indicators – private households		

Savings (TJ/a)	2010: 1 099 TJ	2016 (estimate): 3 296 TJ
Implementation		
National/ regional	National	
Budget and financial resources	2010: n.a.	
Responsible body / Monitoring	Federal Ministry of Economy, Family and Youth/AEA	
Overlaps, multiplier factors, synergies		

2.4 Top-down review of the energy efficiency development

This chapter presents the development of the final energy consumption in Austria and analyses changes in energy efficiency by means of indicators (top-down procedure). The chapter also describes the calculation of energy end-use savings resulting from the development of energy efficiency indicators.

The following table shows an overview of the final energy consumption savings calculated by means of top-down procedure.

Table 8: Summary of the energy end-use savings calculated by means of top-down procedures

Sector/ Sub-sector	Methodology	Final energy savings 1995 to 2007 (TJ)	Final energy savings in 2008/2009 (TJ)	Prognosis of energy savings from 2007 through 2010 (TJ)	Projected energy savings from 2007 through 2016 (TJ)
Private households	See Chapter 2.4.2.1	50 96	5 615*	8 430	25 289
Public and private services	See Chapter 2.4.3.1	0	8 257*	12 386	37 157
production sector	See Chapter 2.4.4.1	46 215	1 224*	1 836	5 507
Traffic	See Chapter 2.4.5.1	6 657	4 878	14 634	43 901
Total pursuant Energy Services Directive		103 827	19 974	37 286	111 854

* achieved savings in 2009

** achieved savings in 2008

Proof of attainment of the intermediate target for 2010 pursuant to the Energy End-use Efficiency and Energy Services Directive must be provided. Since the required statistical data for the calculation of the energy efficiency indicators for 2010 are not available for Austria, a two-phase calculation model was used. In the first phase the energy savings from the available statistical data (2008 and 2009) were calculated by comparison to the base year. The results are shown in the column 'Energy savings in 2008/2009 (TJ)'. The second phase reflects the average savings until 2010 and/or until 2016 extrapolated from these values. The expected savings for the year 2010 and 2016 are contained in the columns 'Expected energy savings 2010 (TJ)' and 'Expected Energy savings 2016 (TJ)'.

For the private households, public and private services sectors as well as for the production sector final energy savings totalling 15 096 TJ were cal-

culated for 2008 and 2009 by means of energy efficiency indicators. For the transport sector, final energy savings in 2008 (due to lack of data for 2009) were calculated to amount to 4 878 TJ by means of energy efficiency indicators. Linear extrapolation shows expected saving totalling 37 286 TJ in 2010. Since the Austrian intermediate target is at 17 900 TJ in 2010, the top-down model shows that the intermediate target was met.

2.4.1 Early actions

Early actions are measures that were implemented in the period from 1991 to 2007 and which are still in force in 2016 due to their project cycle. In accordance with the European Commission's recommendations²⁵, savings resulting from early actions are not to be assessed by means of top-down models but rather by means of bottom-up models (see Chapter 2.3 Bottom-up review of the energy efficiency measures).

To illustrate the effect of the efficiency measures implemented in Austria since the 1990s also by means of statistical data, the effect in regard to the early actions was calculated by means of top-down models in addition to the bottom-up models. The column 'Energy end-use savings 1995 through 2007 (TJ)' in Table 8 shows the energy end-use consumption calculated by means of top-down models. These savings amounted to approximately 104 000 TJ and were thus in total three times as high as the early actions calculated by means of bottom-up models. The savings thus identified merely serve to show Austrian improvements in regard to energy efficiency and are not notified as savings to the European Commission in the framework of the Energy Services Directive.

The indicators used for the calculation and the corresponding graphic illustration are shown in Chapter 2.4.2.

²⁵ European Commission, C.E.E. (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.

2.4.2 Energy efficiency indicators – private households

1. Methodology

All indicators applied in the area of private households are based on the methods recommended by the Commission.²⁶ Deviations from these recommended methods are described below in detail in the context of the descriptions of the various indicators.

The energy units (vary according to indicator) prescribed by the Commission's recommendations are not used in all instances. Rather the energy units applied by the original source were maintained. In the field of private households the source was mostly Statistics Austria, using the TJ energy unit.

2. Basis of data

At the time of reporting the data for the private households were only available until 2009. Hence the savings indicated for this sector represent the savings for the reporting period 2007 through 2009, not for the period 2007 through 2010. A simplified extrapolation of this calculation is shown in Table 8.

Table 9 shows the data used for the calculation of the energy efficiency indicators.

Table 9: Data sources for the private households sector

Indicator	Data source
P1	Energy consumption Statistics Austria (2011). Analysis of useful energy 2009: Principal residences/useful area: Microcensus of Statistics Austria, Transmission of data, Mr Janik: December 2010: Degree days: Eurostat, http://epp.eurostat.ec.europa.eu/portal/page/portal/eurostat/home/ , Data accessed in January 2011

²⁶ European Commission, C.E.E. (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.

P3	Energy consumption Statistics Austria (2011). Analysis of useful energy 2009: Population data: Statistics Austria (2011). Statistics in regard to population size. Compiled on: 19 May 2010.
P4	Stock data: GfK Austria, Retail and Technology (2011). Overall market statistics Austria, unpublished. Lifetimes, based on CEN (2007). Saving lifetimes of Energy Efficiency Improvement Measures in bottom-up calculations. (CEN WS 27). E. K. f. Standardisation. Brussels; Efficiencies of appliances based on: Commission Delegated Regulation (EU) No 1059/2010 of 28 September 2010 supplementing Directive 2010/30/EU of the European Parliament and of the Council with regard to energy labelling of household dishwashers, Supplementing Directive 2010/30/EU of the European Parliament and of the Council with regard to energy labelling of household refrigerating appliances, EcoDesign of Laundry Dryers, Preparatory studies for Ecodesign requirements of Energy-using-Products (EuP) Lot 16, 2008, Supplementing Directive 2010/30/EU of the European Parliament and of the Council with regard to energy labelling of household washing machines
P5	Energy consumption Statistics Austria (2011). Analysis of useful energy 2009: Principal residences/useful area: Microcensus of Statistics Austria, Data provided by data, Mr Janik: December 2010:

In Austria, no data on space cooling consumption by private households are available. Hence it was not possible to calculate the P2 indicator (energy consumption for space cooling per m²).

3. Final energy savings

Table 10 shows the indicators corresponding to the methods proposed by the European Commission and the savings resulting therefrom for 2009, compared to the reference value of 2007.

Table 10: Applied indicators for the private household sector and corresponding savings in TJ

Indicator	Description of indicator	Savings in 2009 in TJ, Base year 2007
P1	Final energy consumption 'Heating' per m ² , after climate adjustment	4 233
P3	Final energy consumption 'hot water' per person	209
P4	Final energy consumption 'Electrical appliances' per appliance	1 099
P5	Final energy consumption 'Lighting' per dwelling	74
	Total	5 615

4. Development of indicators since 1995

To illustrate the development of the indicators (Figure 9 to Figure 11) reference is had to the period from 1995 to 2009. In this way long-term developments can be demonstrated.

Heating intensity of private households, P1 indicator

Figure 9 shows the development of heating intensity in Austrian private households in the period from 1995 through 2009. Furthermore, developments of the parameters to calculate these indicators, the usable area in residential buildings as well as the final energy consumption of the households for space heating are shown

It becomes apparent that the usable area in residential buildings has grown constantly since 1995²⁷. Conversely, the final energy consumption for space heating shows a slightly fluctuating development with a tendency to decline since 1995. Hence the data at hand show in the long run a decoupling of the final energy consumption for space heating from the usable area for private households. While the usable area has increased by more than 30 % since 1995, energy consumption in the same period has declined by about 5 %. This leads to a decline in heating intensity.

The red line shows the heating intensity without climate adjustment, while the orange line shows the heating intensity having regard to climatic conditions. Both lines reflect a declining trend, and hence energy efficiency improvement, since 1995. Yet the red line, without climate adjustment, shows a sharper decline since 1995, and hence greater efficiency improvements, than the orange, climate adjusted line. However, if only the period relevant for the attainment of the target by Austria, i.e. the period from 2007 to

²⁷The hike in the data on the usable area from 2003 to 2004 is due to a change in the manner of survey.

2009²⁸, were taken into consideration, the red, not climate adjusted line would not show any efficiency enhancements. The orange, climate adjusted line (which corresponds to the methods recommended by the European Commission), however, reflects marked savings in 2009 compared to 2007. The savings of 4 233 TJ indicated above are based on this climate adjusted heating intensity.

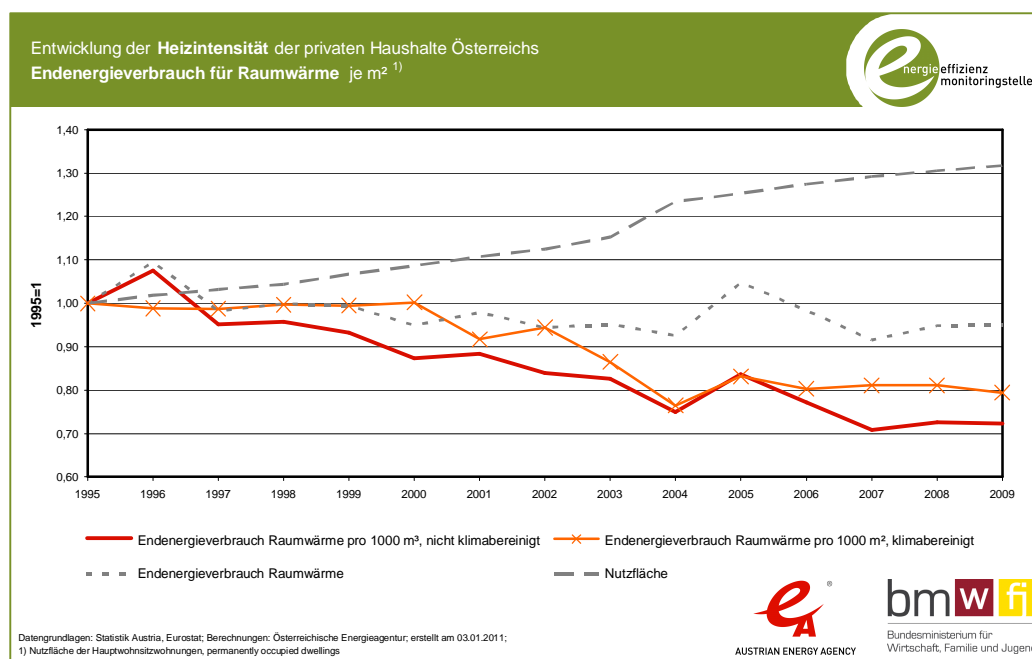


Figure 9: P1 indicator, energy consumption for space heating per m², private households in Austria, 1995-2009

Hot water and cooking

Up to 2007, Statistics Austria only provided combined figures of final energy consumption for hot water and cooking. However, since 2007, the figure of final energy consumed in these two areas are also available separately. In order to reflect both the long-term and the detailed short-term developments, two indicators are reflected in:

§ Total indicator for long-term perspective: energy consumption for hot water and cooking per 1 000 inhabitants for the period from 1995 to 2009 (red line) and

²⁸ According to the methods proposed by the European Commission, the calculations of savings from measures that were implemented before 2008 are only to be done by means of bottom-up methods.

§ detailed indicator for hot water: energy consumption for hot water per 1 000 inhabitants for the period from 2007 to 2009 (orange line) and

The parameters to determine the total indicator, inhabitants and final energy consumption for hot water and cooking, both show a tendency to increase²⁹. The long-term development of the indicator (red line) shows a deterioration of the energy efficiency for hot water and cooking since 1995. However, the short-term development for hot water shows a slight improvement of energy efficiency. The savings reflected in Table 10 of 2009 TJ are based on the detail indicator for hot water.

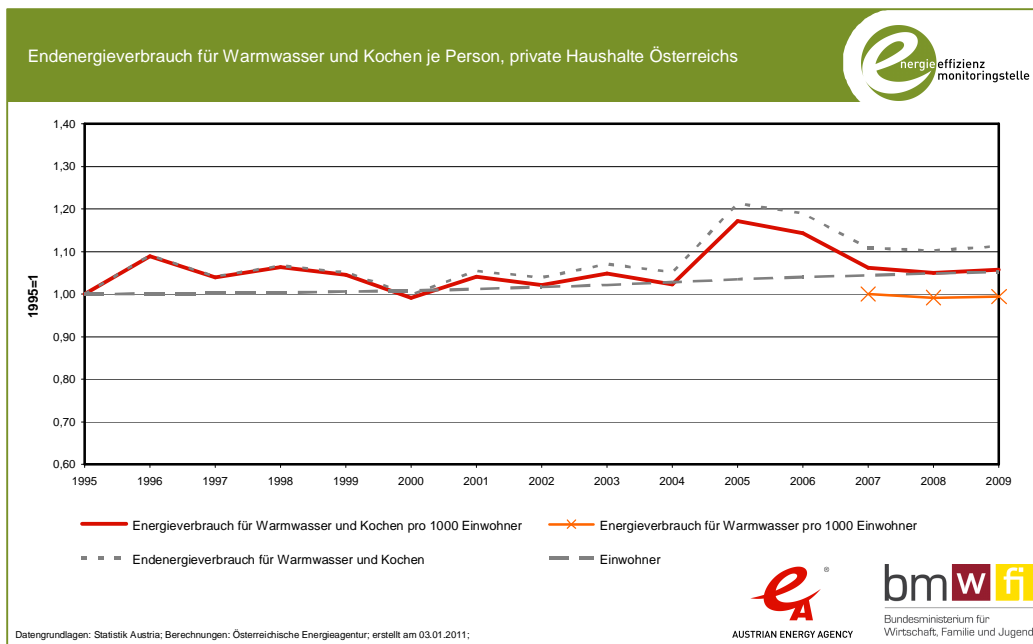


Figure 10: P1 indicator, energy consumption for hot water (and cooking) per person, private households in Austria, 1995-2009

Lighting and EDP, P3 indicator

Figure 11 shows the development of energy intensity for lighting and EDP in the period from 1995 to 2009 as well as the development of energy in-

²⁹The hike in 2005 applies to all useful energy categories of private households. It is assumed that this is due to a statistical imprecision..

tensity for lighting in the period of 2007 to 2009³⁰. The parameters to determine the total indicator, the number of residences and the final energy consumption for lighting and EDP, show different developments³¹. The final energy consumption for lighting and EDP increases substantially faster than the number of Austrian residences. This is also due to the increasing degree of penetration of EDP applications. Having regard only to the energy efficiency for lighting during the past two years, it becomes evident that energy efficiency increased by 1 % in total. The savings specified in Table 10 of 74 TJ are based on the (orange) energy efficiency indicator for lighting.

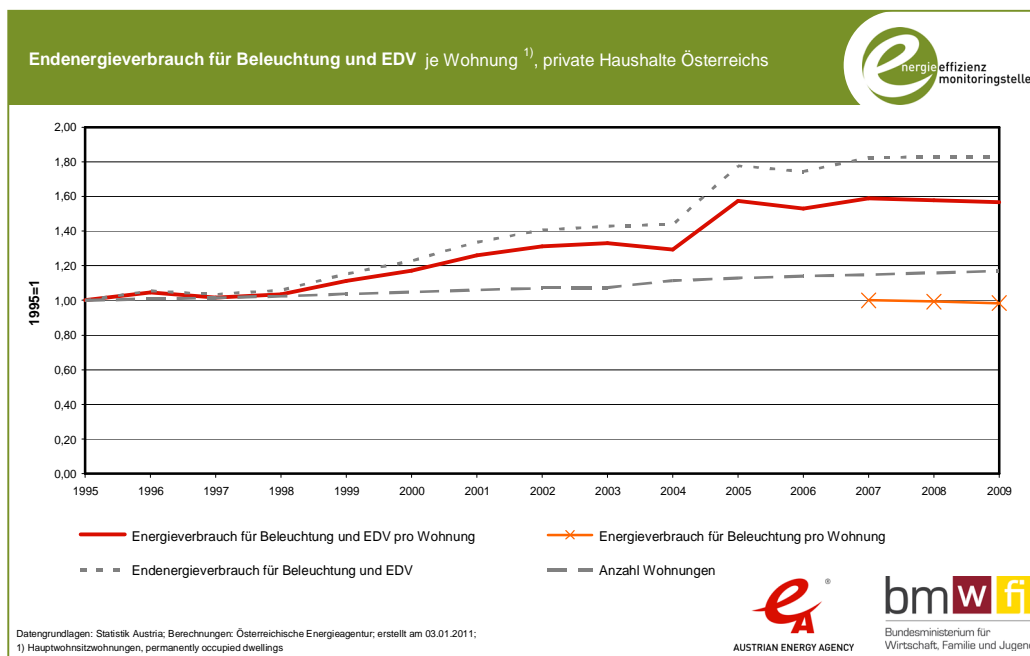


Figure 11: P5 indicator, energy consumption for lighting (and EDP) per person, private households in Austria, 1995-2009

P4 indicator, electrical appliances

To represent the savings derived from efficient electrical appliances, an as-is model was constructed for the following categories of appliances: dish washers, refrigerators, freezers, laundry dryers and washing machines.

³⁰Data on final energy consumption for lighting (without EDP) are only made available by Statistics Austria since 2007.

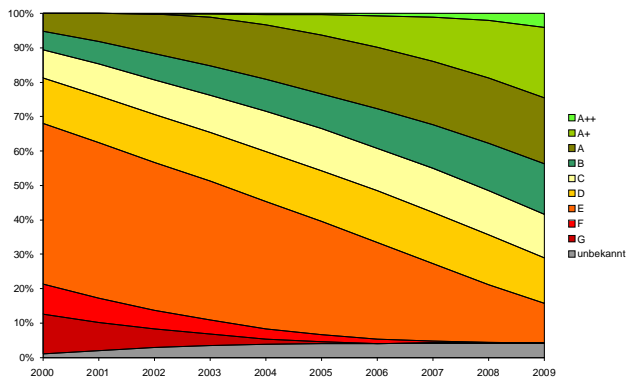
³¹The hike in 2005 applies to all useful energy categories of private households. It is assumed that this is due to a statistical imprecision.

In a first step the existing number of appliances is modelled according to efficiency classes. Assumptions about the service life of the appliances were derived from CEN Draft Proposal³². Data about new purchases per efficiency classes were collected by GfK Austria since 2000³³. Only total sales numbers are available for previous years. Assumptions about the allocation of these new purchases to the efficiency categories were drawn on the basis of expert estimates of the AEA. The existing number of appliances per efficiency class was calculated on the basis of these data and assumptions. The following graph shows the number of appliances differentiated according to efficiency categories between 2000 and 2009.

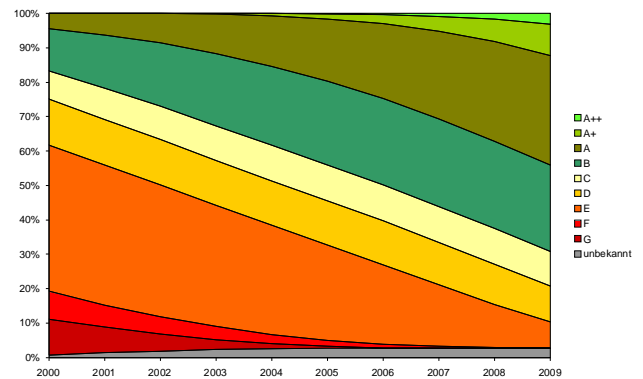
³²CEN (2007), Saving lifetimes of Energy Efficiency Improvement Measures in bottom-up calculations, (CEN WS 27), E. K. f. Standardisation, Brussels.

³³ GfK Austria, Retail and Technology (2011). (2011). Overall market statistics Austria, unpublished.

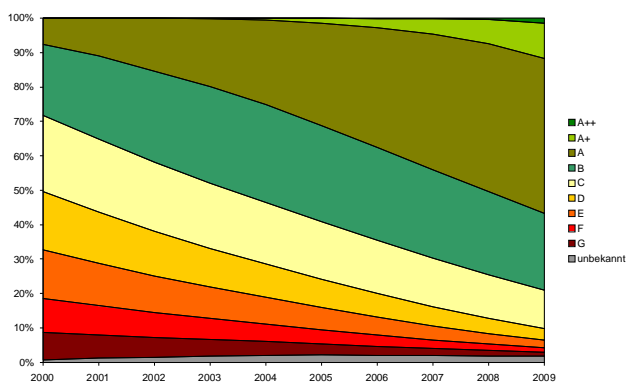
Chest freezers



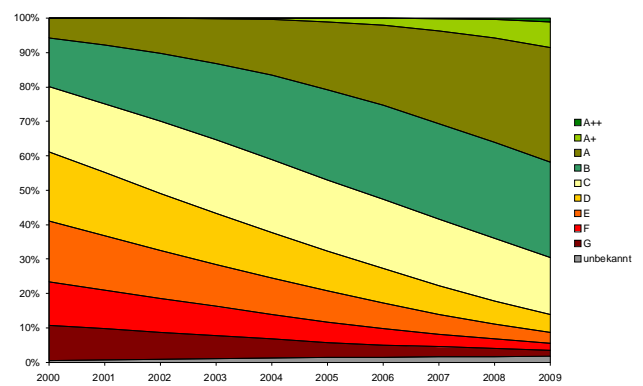
Upright freezers



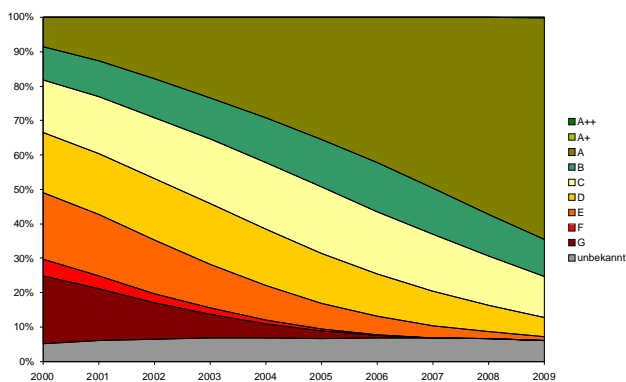
Refrigerator-freezer combinations



Refrigerator



Dishwashers



Washing machines

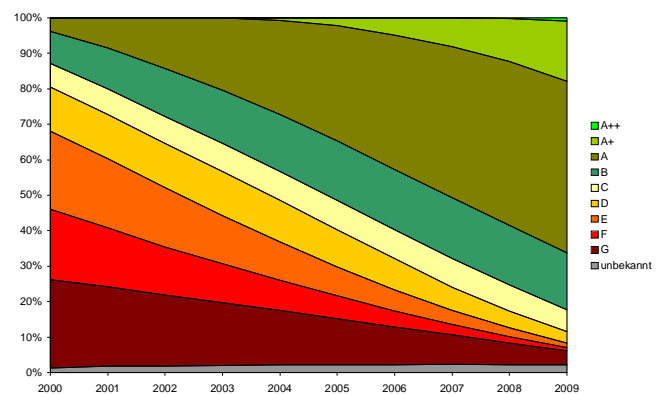


Figure 12: Share of energy efficiency categories in existing appliances from 2000 to 2009 for selected household appliances (Source: GfK Austria 2011 and own calculations)

In a further step the final energy consumption of the number of existing appliances will be calculated. An annual final energy consumption per appliance is allocated to each category of appliances and each energy efficiency

class (for the basis of the data see Table 9). Table 11 provides an overview of the presumed final energy consumption per year per category of appliance and efficiency class. In essence the results are not based on the absolute values but on the differences between the various efficiency categories.

Table 11: Final energy consumption per category of appliance and efficiency class.

kWh/a	Freezers		Refrigerators		Dish washers	Washing machines
	Chest freezer	Upright freezer	Refrigerator single door	Refrigerator-freezer combination		
A+++	118	116	87	124	-	-
A++	178	174	131	186	212	148
A+	237	231	175	249	238	168
A	296	289	219	311	268	193
B	403	395	298	424	302	219
C	511	500	378	537	340	247
D	592	579	437	621	364	260
E	672	658	497	706	424	269
F	807	789	596	847	455	289
G	915	894	676	960	504	310
unknown	473	462	349	497	345	234

The savings in any given year are calculated according to the Commission's recommended methods³⁴ by comparing the final energy consumption in the concerned year with the final energy consumption in 2007 (see in this respect in Annex 5.1 Top-down calculation of the P4 indicator).

The P4 indicator can be considered to be a top-down method as well as a bottom-down method. Though statistical data are used, as with top-down methods, these data relate to a specific measure reduce final energy consumption. The system of marking appliances (energy labelling), which requires the designation of energy efficiency categories for certain categories of appliances, seeks to pursue more emphatically the spreading of efficient appliances in the market. This persistent spreading and the resulting sav-

³⁴ European Commission, C.E.E. (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.

ings are calculated by means of the P4 indicator. Hence the increased spread of efficient electrical appliances that is observed in Austria, and the final energy savings resulting therefrom, are calculated by means of the P4 indicator and used to assess the attainment of the intermediate target by Austria in the period from 2007 to 2009.

Table 12 shows the savings in end energy consumption per appliance category from 2007 to 2009, which are also used to document the attainment of the intermediate target.

Table 12: Savings caused by the emphatic pursuit to spread more efficient electrical appliances in 2009 as compared to 2007, P4 indicator

	Energy savings in 2009 by comparison to 2007 (TJ)
Refrigerators	499
Freezers	337
Dish washers	95
Washing machines	168
Total	1 099

2.4.3 Energy efficiency indicators: Public and private services

2.4.3.1 Methodology

All indicators applied in the area of public and private services are based on the methods recommended by the Commission³⁵. Deviations from these recommended methods are described below. The energy savings are specified in the energy unit TJ used by the original source, Statistics Austria.

³⁵ European Commission, C. E. E. (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.

2.4.3.2 Basis of data and uncertainties

The basis of the data used to calculate the final energy savings and energy efficiency indicators for the area of public and private services are based on the useful energy analysis 2009³⁶ and the national accounts³⁷.

Residual component: Service sector

In particular the statistical data of Statistics Austria regarding useful energy analysis or the energy audit in the service sector are fraught with uncertainties. All services are gathered collectively in one sector, the public and private services sector. This sector is a residual component in the energy audit. This explains the severely fluctuating final energy consumption (see Figure 13).³⁸

Changed classification of the economic sectors pursuant to Önace, 2003 and 2008

The classification of the economic sectors³⁹ is done in accordance with the definitions of the energy audit of Statistics Austria. In the course of developing its methods, Statistics Austria converted its classification system from Önace 2003 (Nace Rev. 1.1) to Önace 2008 (Nace Rev. 2) in line with the EU Regulation (EC) No 1893/2006 of the European Parliament and of the Council of 20 December 2006⁴⁰. The composition of the energy audit sectors only changed to a limited extent, yet the conversion causes problems in regard to the comparison with other data groups. For example, the national account (i.a. data on gross value added and employed persons) will only be adapted to Önace 2008 (Nace Rev. 2.2) at the end of 2011. This

³⁶ Statistics Austria (2011), Useful energy analysis 2009, Statistics Austria.

³⁷ Statistics Austria (2010), National accounts 1976-2009, Revision 2008/2009.

³⁸ On the one hand, official data are provided for services sector in Austria by Statistics Austria for the calculation of the indicators in accordance with the application categories (heating, hot water, ...). Yet these data are based on data collected or estimates made in 1998 and hence do not reflect the savings sufficiently accurately in the view of the Austrian Energy Agency.

³⁹ Production sector, public and private services, private households, transport.

⁴⁰ Regulation establishing the statistical classification of economic activities NACE Revision 2 and amending Council Regulation (EEC) No 3037/90 as well as certain EC Regulations on specific statistical domains (OJ L 393 of 30 December 2006), source: http://www.statistik.at/web_de/klassifikationen/oenace_2008_implementation/037313.html

makes it currently impossible to compare the energy audit data with possible reference values such as gross value added or employed persons. From a practical point of view it has become apparent that the conversion to Önace 2008 for the purposes of the allocation of sectors to the energy audit has not caused any changes in the (energy-)relevant sectors. Hence, for the purposes of this NEEAP, the final energy consumption pursuant to Önace 2008 is juxtaposed with the reference values pursuant to Önace 2003. The conversion of the national account to Önace 2008 at the end of 2011 may cause a shift in reference values; hence the results in future reporting obligations may deviate from those notified herein.

Lacking classification pursuant to sub-sectors

In Austria data on the final energy consumption in the sub-sectors for the purpose of calculating the indicators according to sub-sectors of the service sector (P6, P7 indicators in the recommended methods of the European Commission⁴¹) are lacking. Therefore it was only possible to determine a joint indicator for the entire service sector.

In regard to public buildings of the Austrian Government, the statistics of the Special Energy Commissioner of the Federation are available. These statistics were used, and top-down indicators for this sub-sector of public services were calculated. The results are presented in Chapter 3.1 Exemplary role of the public sector.

Armed Forces exception

Any final energy consumption by the Armed Forces, who are exempt from the scope of application of the Energy Services Directive (ESD), was reported by the Federal Ministry of Defence from 2001 to 2005 and excluded from the calculation of the savings target specified in the first EEAP.

⁴¹European Commission, C.E.E. (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.

Since neither current energy consumption data of the Armed Forces nor on the number of employees in the Armed Forces are available, the amount of attained savings in the service sector are reduced by the share which the Armed Forces represents pursuant to the 1st NEEAP⁴²(BMWFJ 2007) in final energy consumption of the service sector (approx. 2 %).

Table 9 shows the basic data used for the calculation of the energy efficiency indicators.

Table 13: Data sources for the public and private services sector.

Indicator	Data source
M3	Energy consumption Statistics Austria (2011). Useful energy analysis 2009, Statistics Austria. Employed persons: Statistics Austria (2010). National accounts 1976-2009. Revision 2008/2009.
M4	Energy consumption Statistics Austria (2011). Useful energy analysis 2009, Statistics Austria. Employed persons: Statistics Austria (2010). National accounts 1976-2009. Revision 2008/2009.

2.4.3.3 Final energy savings

Table 14 shows the indicators corresponding to the methods proposed by the European Commission⁴³ and the savings resulting therefrom for 2009, compared to the reference value of 2007.

Table 14: Applied indicators for the private household sector and corresponding savings in TJ

Indicator	Description of indicator	Savings in 2007–2009 in TJ
M3	Final energy consumption excluding electricity per employee, adjusted according to	2 988

⁴² Federal Ministry of Economy, Family and Youth (2007). First National Energy Efficiency Action Plan of the Republic of Austria. Vienna, Federal Ministry of Trade, Industry and Labour.

⁴³ European Commission, C.E.E. (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.

	climate values.	
M4	Electrical final energy consumption per employee.	5 269
Total		8 257

2.4.3.4 Development of indicators since 1995

To illustrate the development of the indicators (Figure 13 and Figure 14) reference is had to the period from 1995 to 2009. In this way long-term developments can be demonstrated.

Figure 13 shows that energy consumption, excluding electricity and transport, in the service sector more than doubled in the period from 1995 to 2004. A trend reversal and a significant decline of this final energy consumption has been noted since 2005. In total, the final energy consumption is approximately 20 % higher than in 1995. During the entire period of 1995 to 2009 the number of persons in gainful employment increased continuously by somewhat more than 20 %. This is evidence of an improvement in energy efficiency in comparison to 2007. The long-term development of energy efficiency shows a comparatively strongly fluctuating trend and clear improvement since 2004.

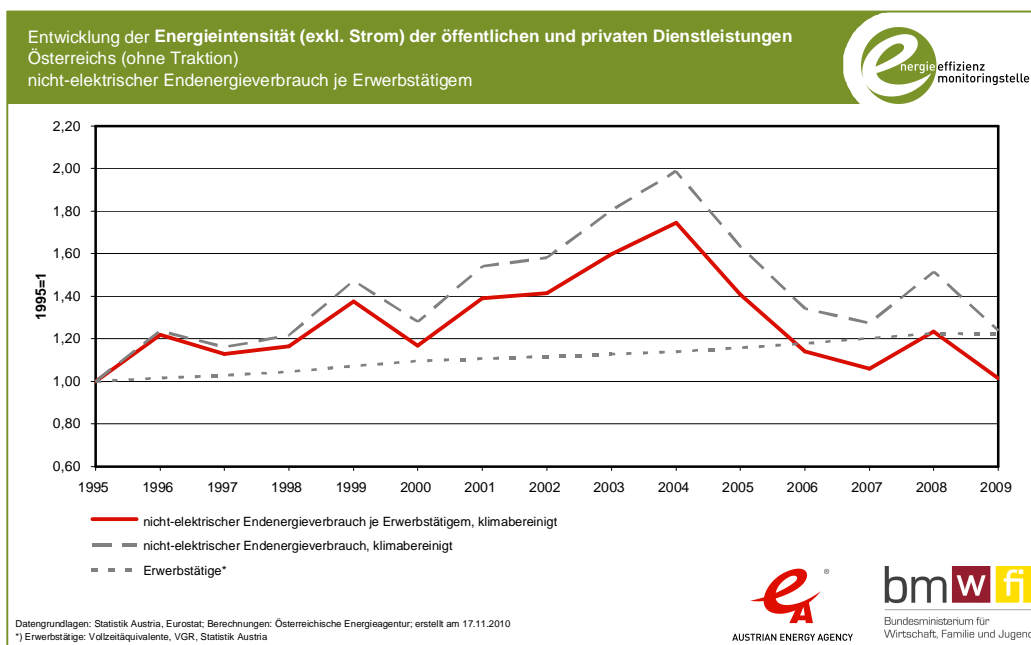


Figure 13: M3 indicator, non-electrical energy consumption of public and private services per person in gainful employment, 1995-2009

Figure 14 illustrates that the demand for electrical final energy in the service sector is fluctuating since 1995 by +/- 20 %. 2009 shows, by comparison to 2007, improvements in energy efficiency. From a long-term perspective, energy efficiency has improved by approximately 20 % in comparison to the period from 1996 to 1999.

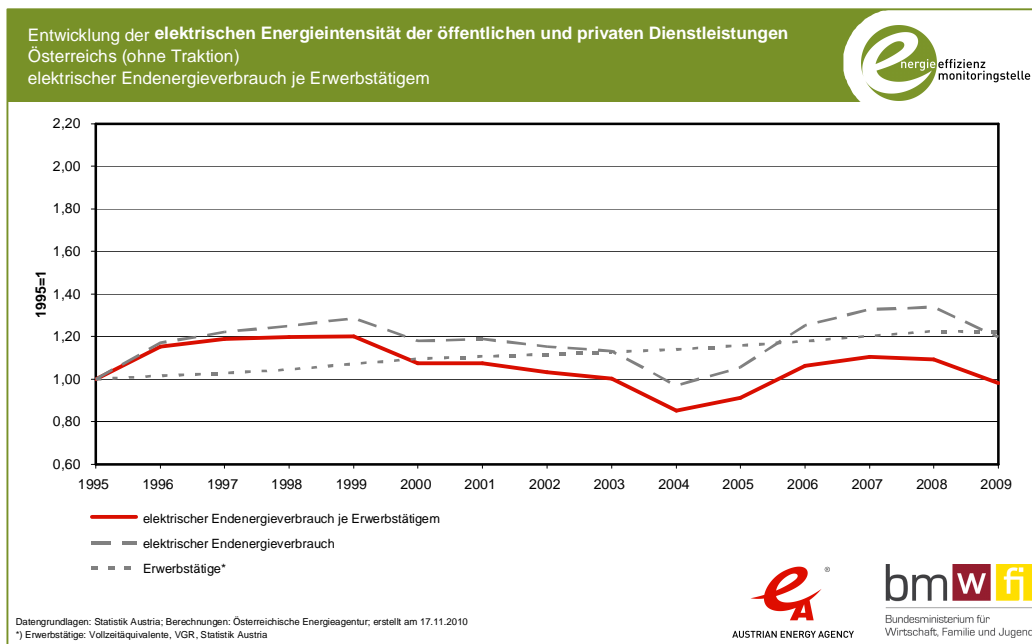


Figure 14: M4 indicator, electrical energy consumption of public and private services per person in gainful employment, 1995-2009

2.4.4 Energy efficiency indicators: Production sector

2.4.4.1 Methodology

According to the methods recommended by the European Commission there is a choice of two indicators for the production sector: sectoral final

energy consumption and related to the sectoral production index or related to the sectoral gross value added.

All indicators applied in regard to the production sector are based on the methods recommended by the Commission⁴⁴. Deviations from these recommended methods are described below. The energy savings are specified in the energy unit TJ used by the original source, Statistics Austria.

2.4.4.2 Basis of the data

The classification of the economic sectors⁴⁵ is done in accordance with the definitions of the energy audit of Statistics Austria. In the course of developing its methods, Statistics Austria converted its classification system from Önace 2003 (Nace Rev. 1.1) to Önace 2008 (Nace Rev. 2) in line with the EU Regulation (EC) No 1893/2006 of the European Parliament and of the Council of 20 December 2006⁴⁶. The composition of the energy audit sectors only changed to a limited extent, yet the conversion causes problems in regard to the comparison with other data groups. For example, the national account (such as data on gross value added) will only be adapted to Önace 2008 (Nace Rev. 2.2) at the end of 2011. To ensure an accurate comparison of the data, the P4 indicator, based on the Önace 2008 production index, will be used for this NEEAP. However, it cannot be excluded that in future other indicators (based on data in regard to gross value added) will be used in connection with the generation of reporting obligations, once all statistics required for the calculation of the indicator have been converted to Önace 2008.

⁴⁴ European Commission, C.E.E. (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.

⁴⁵ Production sector, public and private services, private households, transport.

⁴⁶ Regulation establishing the statistical classification of economic activities NACE Revision 2 and amending Council Regulation (EEC) No 3037/90 as well as certain EC Regulations on specific statistical domains (OJ L 393 of 30 December 2006), source: http://www.statistik.at/web_de/klassifikationen/oenace_2008_implementation/037313.html.

Statistics Austria does not compile a production index for the agricultural sector. Hence no savings are indicated for this sector in the present NEEAP.

The scope of application of the Energy End-use Efficiency and Energy Services Directive generally includes final energy customers. Excluded are businesses that participate in the categories of activities listed in Annex I of Directive 2003/87/EC of the European Parliament and of the Council of 13 October 2003 establishing a scheme for greenhouse gas emission allowance trading within the Community (emissions trading enterprises, Art. 2 b) ESD). The determination of enterprises in Austria that are not subject to the Energy End-use Efficiency and Energy Services Directive is contained in the First NEEAP. The total final energy consumption of these enterprises is excluded from the Energy End-use Efficiency and Energy Services Directive, and hence from the calculation of the energy efficiency indicators and from the final energy savings for the purposes of the Energy End-use Efficiency and Energy Services Directive. This delimitation was done by the Federal Statistical Agency of Austria in connection with the compilation of the First NEEAP (for details, see First NEEAP⁴⁷).

The savings achieved in the individual sectors in the production section are reduced by the average share of the emissions trading enterprises pursuant to the First NEEAP in sectoral final energy consumption from 2001 to 2005. The calculation deviates from the methods recommended by the European Commission, since these shares are not calculated anew each year, since the average shares from 2001 to 2005 are used for adjustment pursuant to the First NEEAP.

Table 15: Data sources, production sector

Indicator	Data source
P14	Energy consumption Energy audit ⁴⁸ Production index: Statistics on the production index (data provided by Sta-

⁴⁷Federal Ministry of Economy, Family and Youth (2007), First National Energy Efficiency Action Plan of the Republic of Austria, Vienna, Federal Ministry of Trade, Industry and Labour.

⁴⁸Statistics Austria (2010), Total energy audit from 1970 to 2009.

2.4.4.3

Final energy savings

Table 16 shows the savings calculated by means of the P14 indicator of the methods recommended by the European Commission⁴⁹ for 2009 in comparison to the reference year of 2007.

Table 16: P14 indicator for the sub-sectors of the production sector and corresponding savings in each case in TJ:

P14 — Sectoral final energy consumption in relation to the production index	
Sub-sector	Savings in 2007–2009 in TJ
Iron and steel production	no savings
Chemicals and petrochemicals	no savings
Minerals and ores, glass	no savings
Vehicle construction	no savings
Machine construction	no savings
Foodstuffs and luxury foods, tobacco	no savings
Paper and printing	no savings
Wood processing	no savings
Textiles and leather	no savings
Construction	no savings
Mining	940
Other production sector	284
Production sector total	1 224

The table shows that only two of the sectors of the production sector, mining and other production sector, have improved their energy efficiency in the reporting period from 2007 to 2009. If the production sector were to be taken as an overall sector, the period from 2007 to 2009 would not reflect any savings. Even though the industry sector 2009, in relation to the applied indicator, produces overall more inefficiently than still before 2007, improvements in energy efficiency pursuant to the Energy End-use Efficiency and Energy Services Directive are shown for the two sectors, mining and other production sector.

⁴⁹ European Commission, C. E. E. (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.

According to the AEA the deterioration of energy efficiency in the production sector from 2007 to 2009 is mainly caused by the economic crisis. The long-term perspective (see next chapter) shows that since 1996 energy efficiency improvements were achieved at an average rate of 1.1 % p.a.

2.4.4.4 Development of indicators since 1996

To illustrate the development of the indicators (Figure 15 through Figure 17) reference is had to the period from 1996 to 2009. In this way long-term developments can be demonstrated.

Figure 15 shows the development of final energy consumption, of the production index and the final energy consumption according to production index for the entire production sector. The production index as well as final energy consumption are increasing continuously and the development in energy efficiency is fluctuating. From 1997 to 2001 the production index increased more rapidly than final energy consumption, and energy efficiency improved. The period from 2002 to 2005 was marked by a decline in energy efficiency. Thereafter, from 2005 to 2007, slight progress in the development of energy efficiency is discernible. Since 2007 final energy consumption is increasing more markedly than the production index. Hence 2007 shows a slight deterioration in energy efficiency in the production sector. The long-term trend from 1996 to 2009 shows clear improvements in energy efficiency; energy efficiency was increased at an average rate of 1.1 % per year.

Figure 16 and Figure 17 each show the three sector with the most markedly declining or the most markedly increasing energy intensity in the period from 1996 to 2009. Among the sectors with the most markedly increasing energy consumption per produced unit are the construction sector, the wood processing sector and the minerals, ores and glass sector; in the wood processing sector energy intensity has increased by nearly 80 %. Since 2004 the construction sector is showing again a decline in energy intensity. However, an increase in energy intensity is not necessary caused

by deteriorating energy efficiency in production, but may be due to other causes such as a conversion in production processes or a change in the product range.

The sectors showing the most significant decline in energy intensity are machine construction, vehicle construction and other production sectors.

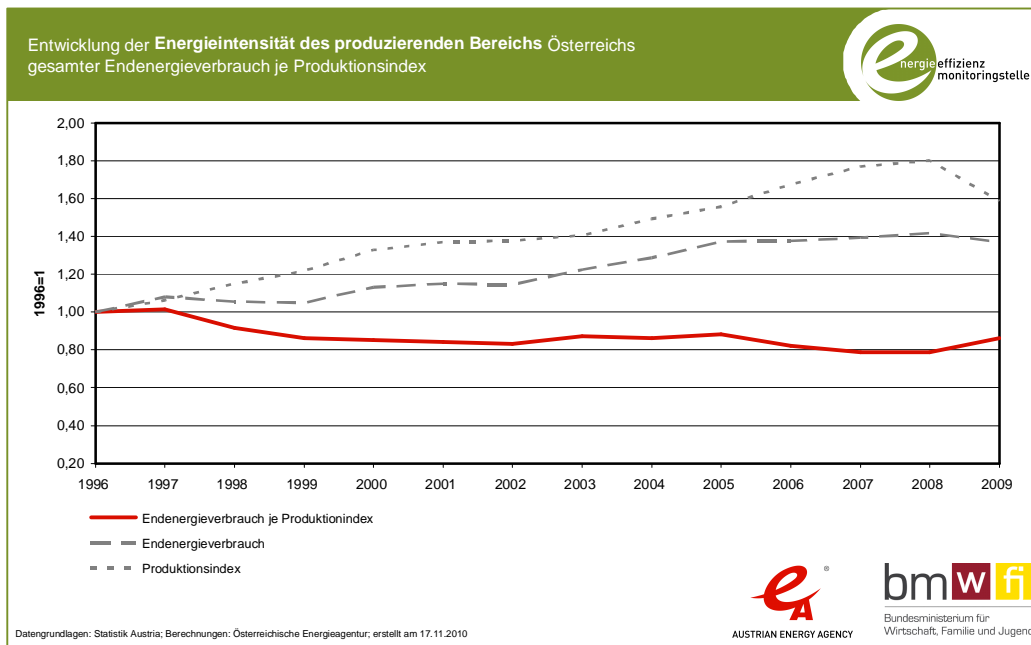


Figure 15: Final energy consumption of the production sector in relation to the production index, 1996-2009

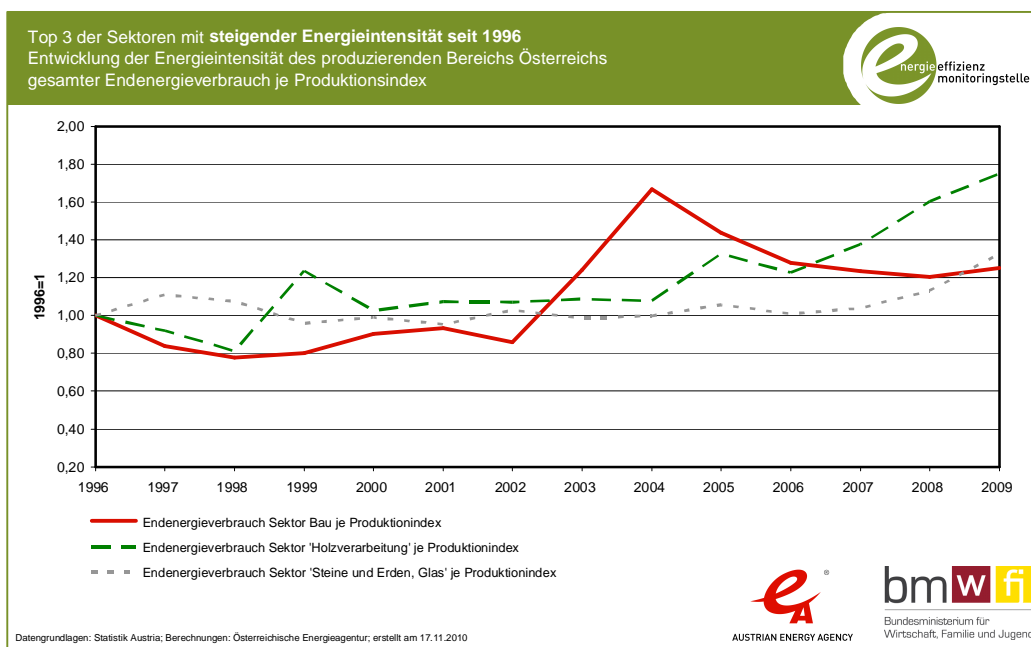


Figure 16: P14 indicator, sectoral energy consumption of the production sector in relation to the sectoral production index, sectors with the most markedly increasing energy intensity, 1996-2009

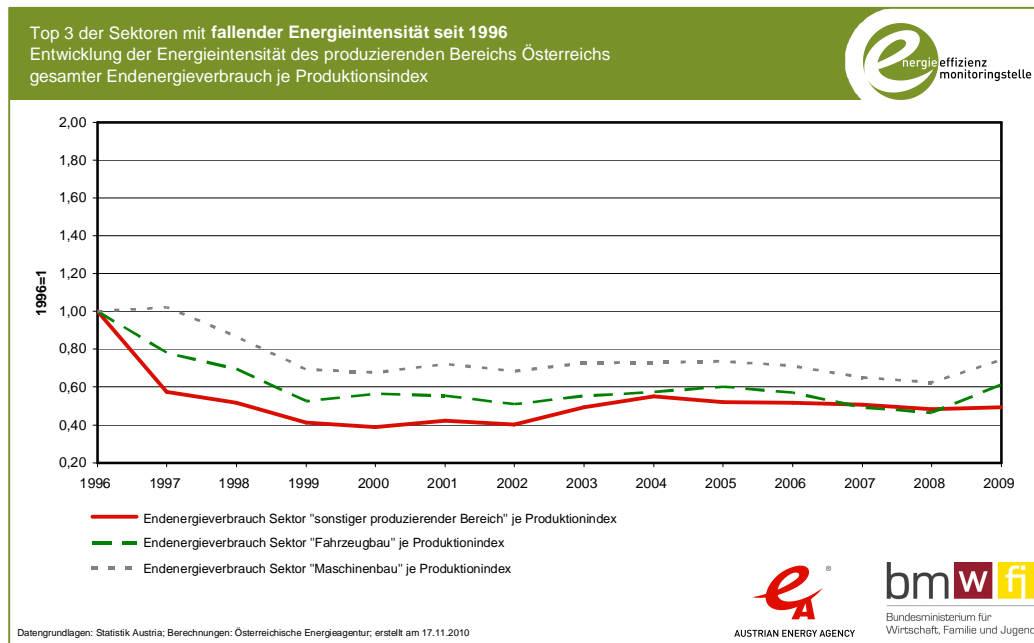


Figure 17: P14 indicator, sectoral energy consumption of the production sector in relation to the sectoral production index, sectors with the most markedly declining energy intensity, 1996-2008

2.4.5 Energy efficiency indicator: Transport

2.4.5.1 Methodology

To calculate the savings in the transport sector the following indicators,
 § P8 - energy consumption of passenger cars per passenger-kilometre
 § A2 - energy consumption of heavy goods vehicles per HGV and
 § M6 - energy consumption of railway transport per tonne-kilometre,
 listed in the methods recommendation of the European Commission, were used. The selection of these indicators was based both on the availability of data in Austria and on the effort required for the calculation and collection of data. For all indicators of the transport sector there is, according to the methods recommended by the European Commission, the possibility to calculate the savings separately — according to petrol and diesel — or as an

aggregate of the two types of fuel. Depending on the type of calculation, different savings will result (the differences may be either positive or negative, depending on both the indicator and on the data of the year in question). Due to the many different sources, the collection of data in the transport sector requires great effort, and the separate specification of diesel and petrol consumption, as well as of all related reference values would mean a tremendous additional effort. Hence, for the calculations made in the scope of the Second NEEAP the aggregate amount of final energy consumption of petrol and diesel were in all cases. For the compilation of the next NEAAP, the data situation should be reviewed again, and if necessary, the methodology should be adapted.

2.4.5.2 Basis of the data

At the time of reporting the data for the transport sector were only available until 2008. Hence the savings indicated for this sector represent the savings for the reporting period 2007 through 2008, not for the period 2007 through 2010. Assuming that the data in the transport sector will continue to develop positively, the actual savings achieved until 2010 will surpass the savings indicated in this report (see also the projection, Table 8).

The energy units (vary according to indicator) specified by the Commission's recommendations are not taken into consideration for the calculation. In a first step, the energy units of the original source are converted into TJ. This method does not lead to any differences in results for the applied indicators.⁵⁰

⁵⁰ However, in the case of other indicators, e.g. A1 indicator, results differ owing to different assumption regarding the energy content of fuels (TJ/litre petrol or diesel).

Table 17: Data sources: Transport sector

Indicator	Data source
P8	Statistics Austria (2010). Development of the energy intensity of domestic passenger car transport; OECD, IAE, Eurostat (2005). Energy Statistics Manual. Paris; European Union (2010). EU energy and transport in figures. Luxembourg.
A2 instead of P9	Registration statistics 2008 (Statistics Austria); Austrian Federal Environmental Agency (2011). Austria's annual greenhouse gas inventory 1990-2009. Vienna; OECD, IEA, Eurostat (2005). Energy Statistics Manual. Paris;
M6	Statistics Austria (2011). Useful energy analysis 2009; Statistics Austria; European Union (2010). EU energy and transport in figures. Luxembourg; Annual reports of the Austrian Federal Railways.

There are no sufficiently accurate data available to calculate the indicators in the water transport sector (M7) and for the purpose of calculating the diffusion indicators (P12, P13).

2.4.5.3 Final energy savings

Table 18 shows the savings calculated by means of the P8, A2 and M6 indicators of the methods recommended by the European Commission⁵¹ for 2008 in comparison to the reference year of 2007.

Table 18: Applied indicators for the private household sector and corresponding savings in TJ

	Indicator	Description of indicator	Savings 2007–2008 in TJ
Road transport			
Road - passenger transport	P8	energy consumption of passenger cars per passenger-kilometre	1,981
Road - freight transport	A2	energy consumption of heavy goods vehicles per HGV and	2,666
Railway transport			
Railways total	M6	energy consumption of railway transport per tonne-kilometre,	231

⁵¹ European Commission, C. E. E. (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.

Total			4,878
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2.4.5.4 Development of indicators since 1995

To illustrate the development of the indicators (Figure 18 to Figure 20) reference is had to the period from 1995 to 2008. In this way long-term developments can be demonstrated.

Figure 18 shows very similar, continuous rates of increase in final energy consumption of passenger cars and the actually driven passenger-kilometres. An increase in efficiency, and hence final energy savings, are discernible for the period from 2007 to 2008. In the long term, no large-scale efficiency improvements for the passenger transport sector are discernible. However, due to the large volume of driven passenger-kilometres, even moderate efficiency improvements cause considerable savings.

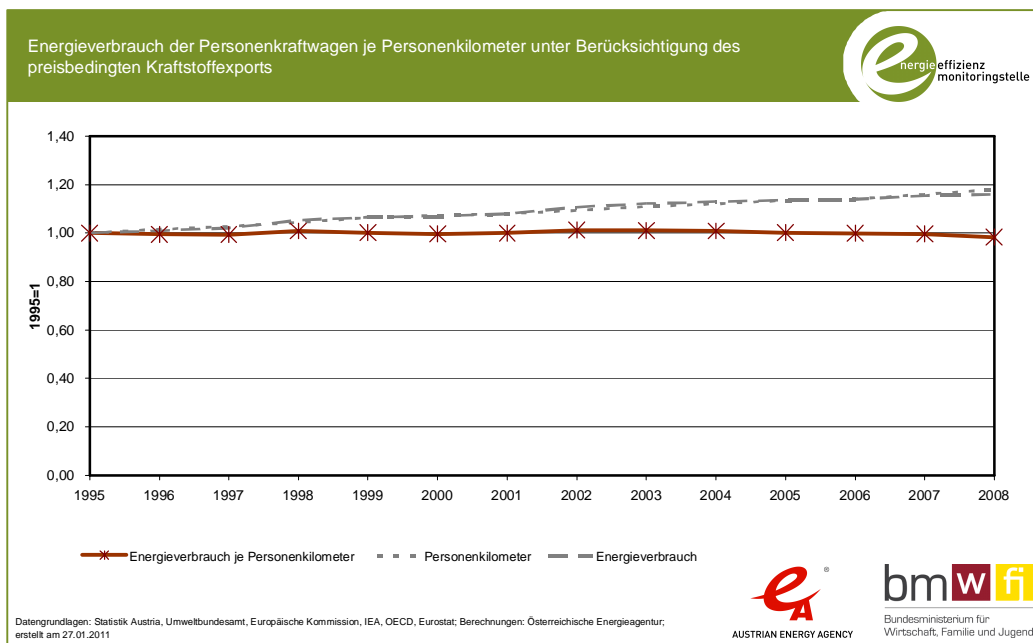


Figure 18: P8 indicator, energy consumption of passenger cars per passenger-kilometre, taking price-related fuel export into consideration, 1995–2008

The A2 indicator shows in the long term a marked deterioration in energy end-use efficiency in the heavy goods vehicle sector. While moderate im-

Improvements in final energy consumption were still discernible from 1995 to 2001, the energy consumption per vehicle steadily increased from 2002 to 2007. However, between 2007 and 2008 the statistical data show again a decline in energy consumption per vehicle; hence clear energy savings amounting to 2,666 TJ were calculated for this period. In view of the long-term trend observation, it cannot be assumed that this trend will continue.

Significant efficiency increases in the long term are discernible for railway transport. Figure 20 shows a clear increase in gross tonne-kilometre with a simultaneous decline in final energy consumption. In this way, energy efficiency was improved by 40 %. However, in view of the long term perspective, the improvements that were shown to occur in the short run since 2007 are only marginal; hence the deductible final energy savings since are rather insignificant (231 TJ).

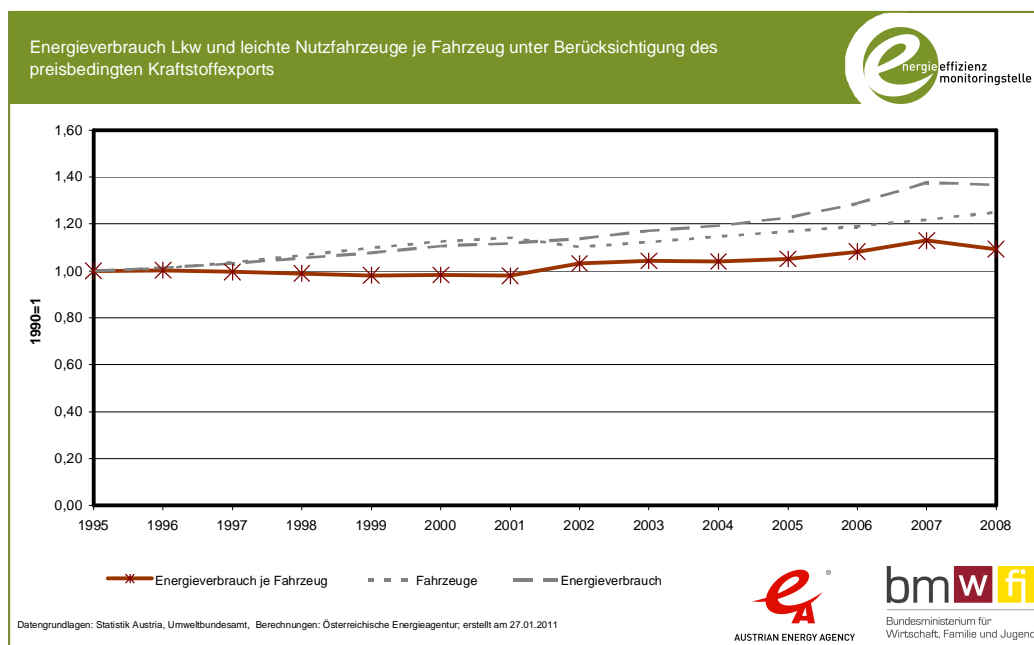


Figure 19: A2 indicator, energy consumption of heavy goods vehicles per vehicle, taking price-related fuel export into consideration, 1995–2008

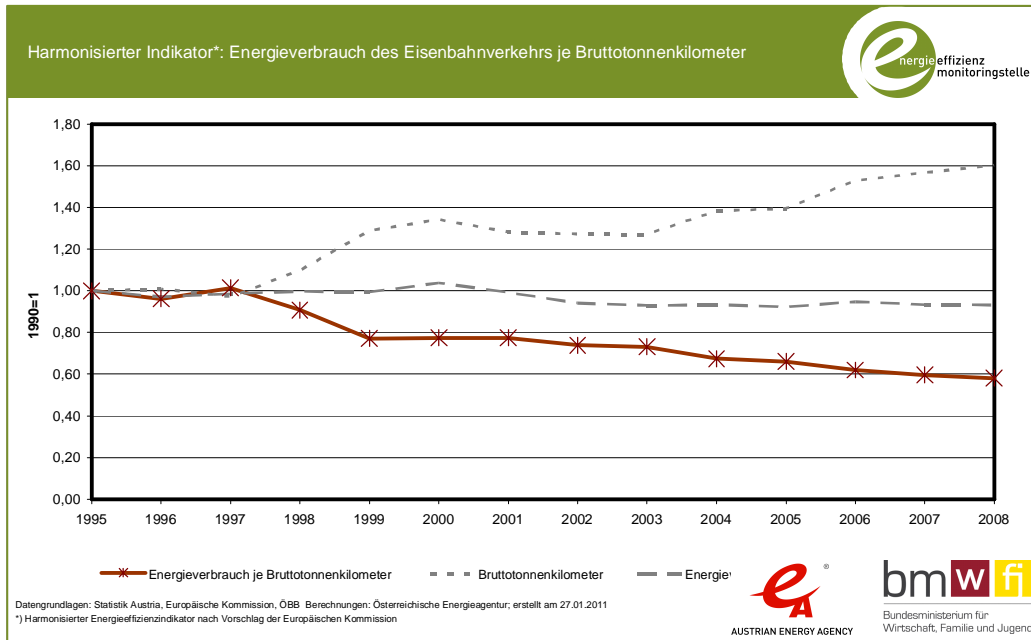


Figure 20: M6 indicator, energy consumption per gross tonne-kilometre, 1995–2008

Evaluation of the top-down results in summary

According to the Austrian Energy Agency, top-down methods or energy efficiency indicators are an important analysis tool to evaluate long-term trend in respect of energy consumption and the development of energy efficiency.

Long-term observation shows that considerable efficiency improvements and final energy savings were achieved since 1995. The heating intensity of private households, the energy intensity of the production sector and of the railway transport sector in particular showed a substantial improvement.

Due to lapses in the collection of statistical data and data uncertainties, the results of top-down calculations are not suitable for a short-term evaluation of the energy efficiency development in Austria for the period from 2007 to 2010. Therefore attainment of the 2010 target for Austria pursuant to the Energy End-use Efficiency and Energy Services Directive is proven exclusively by means of bottom-up methods. Whether recourse can be had to top-down methods in connection with the monitoring of the development in

energy efficiency in the longer run within the scope of the Third NEAAP and to document the achievement of the 2016 target will depend on the future availability of data and will have to be decided in the course of compiling the Third NEEAP 2014.

3 Selected aspect of the transposition of the Directive in Austria

3.1 Exemplary role of the public sector

When transposing the directive, the Member States must ensure that the public sector assumes an exemplary role in regard to investments, maintenance and other expenditures for energy consuming devices, energy services and other energy efficiency measures and takes energy efficiency measures which focus on cost-effective measures that will lead to the most comprehensive energy savings in the shortest possible time.

In Austria, the public sector introduced numerous energy efficiency measures even before the directive entered in to force. For example, Special Federal Energy Commissioners (ESB) monitor already since 1980 the Austrian Government in regard to the optimal use of energy, sustainable cost-saving, increase of energy efficiency and reduction of the emission of pollutants. They can be contacted in matters relating to energy saving, fire protection measures in businesses and maintenance and operation of shelters. Their tasks also include the taking of thermography images of federal buildings, mediation in contracting-related matters and the inspection of facility systems and training of facility managers. The report of the Special Federal Energy Commissioners contains the key energy-related data. The savings relating to federal buildings resulting from the change in these key data were calculated by means of top-down methods to amount to 1,051 TJ, which is substantially above the savings relating to federal buildings reflected by bottom-up calculation methods.

Furthermore, the system of federal property contracting (BIC) established in 1999 by the federal property company, Bundesimmobiliengesellschaft (BIG), serves to pursue the aim of reducing the energy consumption and CO₂emission of federal buildings. In the scope of the BIC, contracts

are awarded to companies with energy efficient comprehensive solutions for buildings. 80 % of the calculated savings go towards the financing of the construction measures. 20 % go to the user of the building. So far more than 400 buildings were contracted, resulting in energy consumption savings of approximately 20 %. Furthermore, approximately EUR 3.5 million in energy costs and 17,500 tonnes CO₂ in total were saved as a result of the contracting. New calls for tenders are currently being preparation. These include 36 objects of the Ministry of the Interior, 40 objects of the Ministry of Education and 37 objects of the Ministry of Justice.

Further energy savings in the public sector can be achieved through the Federal Procurement Corporation (BBG), which administrates the procurement by the public sector. Among BBG's clients are the Austrian Government as well as the state governments and every third municipality. Moreover, a substantial part of the outsourced companies, universities and health facilities resort to the services provided by BBG. BBG offers approximately 250,000 products and services via its contracts, and takes also energy efficiency into consideration, among other aspects of sustainability, for the purpose of these contracts and tender procedures.

The Federal Procurement Act governs public procurement in Austria. Since the 2007 Amendment Act, ecological aspects must be taken into consideration in the course of the award procedure (energy end-use efficiency, for example).

In autumn 2010 a new action plan for sustainable public procurement has entered into force in Austria. It serves as guideline for the procurement of environmentally friendly products and services. The purpose of this action plan is to accord an exemplary role to the public sector and to incite businesses and consumers take their purchasing decisions on the basis of sustainability criteria. In the public sector, the procurement volume accounts for 17 % of the GDP. The aim of the action plan is to raise the awareness of clients and to effectively support them in their role as change agents towards sustainable developments.

3.2 Information and advice

Article 7 and Article 12 of the Directive require information about energy efficiency measures and legal parameters as well as on the availability of high-quality energy audit schemes for all final customers, which are to be performed irrespective of suppliers and to be made available in market segments where they cannot be offered commercially (e.g. private households). Pursuant to Article 11(1) of the Directive, the Member States may support this range of measures by financial subsidies.

In doing so, the federal states make use to a large extent of their regional energy agencies, energy saving associations or energy institutes. These are focal points of contact in respect to energy information and advice and competence centres for issues relating to energy efficiency and renewable energies.

3.2.1 Information

In Austria, information is made available by means of a wide range of advertising and information campaigns (provision of information, information events, demonstration projects, etc.), on a federal level and in the various federal states as well as by the energy utilities. In addition, programmes for further training and courses are offered, and target group-focussed public relations work is done.

Information on the measures of the Austrian Government and the federal states was collected by means of questionnaire. 'klima:aktiv', the most comprehensive climate protection initiative of the Austrian Government, is described in more detail below (see Chapter 3.2.4). The measures of the federal states reflect overall a heterogeneous and very varied picture. Information is not only provided directly to end customers but is in many cases also provided by the local authorities. In addition, competitions and intensive public relations work is done (lecture series, advertisements, in-

dustrial fair presentations, etc.) to provide information on energy efficiency measures to the envisaged target groups.

It is not possible to make any quantitative evaluation of the savings achieved from this broad range of information services. No bottom-down methods were developed in view of the methodical difficulty of establishing a causal link between the information made available and the resulting savings. However, the reported measures of the federal states are listed in detail in the Annex (see in Annex, Chapter 5.4).

3.2.2 Energy advice for households

In addition to the broadly conceived information campaigns and educational measures, the individual federal states and energy utilities offer individual advice services or individualised internet services on ways to save energy from electricity and heat for households and small trade businesses. The scope of the advice services vary according to federal state and can range from providing information by telephone to comprehensive advice before undertaking construction or renovation measures. Such construction measures are often linked to the residential building subsidies offered by the federal states, since information is provided on potential state support in the scope of the energy advisory service.

In the scope of the bottom-up evaluation of energy advice for households, a methodological distinction was made between three quality levels, with Quality Level 3 resulting in the highest level of savings. The savings are calculated on the number of advice services provided, the level of quality and the type of advice provided as well as on a default value for the energy saved owing to such advice. A distinction is made between energy advice (including space heating) and electricity advice. An extensive definition of the advice qualities are contained in the methods document.⁵²

⁵²Adensam, H., T. Bogner, et al. (2010), Methoden zur richtlinienkonformen Bewertung der Zielerreichung gemäß Energieeffizienz und Energiedienstleistungsrichtlinie 2006/32/EG, Bottom-up Methoden (Methods to assess the attainment of the target in compliance with

The federal states have reported in total 48,230 advisory services provided on Quality Level 1. 33,953 advisory services provided on Quality Level 2 and 46,531 advisory services on the highest level, Quality Level 3. Table 19 provides an overview of the reported energy advice services.

Table 19: Reported energy advisory measures of the federal states

Number of energy advisory services	Quality Level 1	Quality Level 2	Quality Level 3
2004	-	111	-
2005	1 309	393	380
2006	5 890	1 839	2 583
2007	5 763	4 202	9 333
2008	12 305	12 533	10 604
2009	16 564	13 997	20 920
2010*	6 399	878	2 711
Total	48 230	33 953	46 531

*Reports for 2010 are not yet fully taken into account

Companies also offer energy advice in the scope of the voluntary agreements. This is done in the various federal states in cooperation with the public sector to ensure that no measure is counted twice. In total savings amounting to 145 TJ were achieved from the energy advice provided by the federal states and the companies.

3.2.3 Energy audits

Pursuant to Article 3(I) of the Directive, an energy audit is a systematic procedure to obtain adequate knowledge of the existing energy consumption profile of an industrial operation and/or installation or of a private or public service, to identify and quantify cost-effective energy savings opportunities, and to report the findings. Unlike energy advice, energy audits only related to enterprises (including agricultural enterprises).

the Energy End-use Efficiency and Energy Services Directive 2006/32/EC, Bottom-up methods), Austrian Energy Agency.

Audits that are being reported in the scope of energy efficiency monitoring were performed by trained and independent auditors. The energy savings result both from the awareness-raising effect of the audits and from the implementation of the technical and organisational measures identified in the audits. The life cycle depends in each case on the implemented measure and does not apply to energy audits in general.

In Austria, energy audits for enterprises are conducted in the scope of the domestic environmental promotion programme (UFI), a support programme of the Federal Ministry of Agriculture, Forestry, Environment and Water Management for enterprises. Certain federal states reinforce this support and also offer energy audits. Furthermore, energy audits for small and medium-sized enterprises were conducted by the Energy Institute of the Austrian Economy and with funds of the Climate and Energy Fund. An 'energy efficiency voucher' is issued to the amount of EUR 675.00. Assistance is provided for advisory services of up to EUR 750.00 net, with the applicant having to bear an own contribution of 10% and the VAT. An enterprise is entitled to apply for two vouchers in the course of 12 months, one for an initial advisory service and one for advice in regard to implementing such advice.

By applying a bottom-up evaluation, energy savings of 1 544 TJ have been calculated to result in 2010 from the measures determined and implemented in the scope of the energy audits as well as the organisational measures.

3.2.4 'klima:aktiv' climate protection initiative

The 'klima:aktiv' climate protection initiative combines a whole range of 'voluntary' climate protection measures under one master brand and thus also provides support for measures to increase energy efficiency. Via 'klima:aktiv' the Federal Ministry of Agriculture, Forestry, Environment and Water Management annually finances approximately EUR 7 million (until

2012) with funds from the UFI-programme as well as of the Ministry. The Austrian Energy Agency is the project promoter and handling agent for managerial matters.

The aim is to actively provide incentives for the supply and demand for climate-friendly and energy efficient technologies and services by means of tailor-made programmes with a focus on energy and mobility. In the four key areas — construction and renovation, energy savings, renewable energies and mobility — the following target group and market-specific support services are provided:

- § Education and training
- § Quality standards and quality management systems
- § Raising awareness and providing information
- § Advice
- § Interlinking and activating key players (such as federal states, local authorities, enterprises, schools, public administrations, tourism organisations, etc.).

Key focus - education and training:

- § More than 5000 craftspeople successfully completed their training under the 'klima:aktiv' climate protection initiative training. In 2010 alone more than 1 000 professionals were trained in 97 courses.
- § E-learning platform for 9 course subjects with 650 participants.
- § Training of advisers: renovation advisers for residential buildings and service buildings, advanced training for energy advisers and sellers of prefab houses in respect of building standards under the 'klima:aktiv' climate protection initiative.
- § Advanced training of craftspeople in connection with the education coordination under the 'klima:aktiv' climate protection initiative(see separate chapter on education).
- § Education campaign for builders and fitters.
- § Specialist training of energy advisers for enterprises in regard to energy management and on the topics of motors, compressed air, ventilation and heat recovery.

Key focus - advice and support:

- § Information about activities and new offers in regard to climate is regularly provided to more than 1 600 local authorities across Austria.

- § 102 e5 local authorities have integrated climate protection comprehensively into their local policies.
- § More than 200 schools actively conduct mobility projects.
- § More than 1 000 enterprises, local authorities and institutions have started mobility projects on climate protection.
- § Saving electricity: 200 public and 120 private enterprises were advised in regard to more energy efficient procurement and use of equipment.
- § 1 600 renovation vouchers in service-providing buildings (benchmark comparisons) lead to renovation of buildings in the sector of trade and tourism and office buildings.
- § 3 200 Austrians attended lectures on renovation and exchange of heaters.
- § 17 500 persons participated in fuel saving training sessions.

Key focus - raising awareness and providing information:

- § Organisation of the Austrian Climate Protection Award (14.7 million viewer contacts in 2010, widespread coverage in print media).
- § 'klima:aktiv' mobile tour in support of electromobility: 19 000 visitors, 31 TV trailers, 37 radio contributions.
- § More than 1 000,000 visitors on the 'klima:aktiv' websites in 2010.
- § More than 10,000 hits on the advice platform topprodukte.at since 2005.
- § 500 events with 1 120 event days in which the 'klima:aktiv' climate protection initiative participated.
- § Attendance at industrial fairs (energy saving fair, Construction & Energy Vienna, various smaller industrial fairs).
- § More than 1 800 contributions in print media in 2010.

3.3 Voluntary agreements on energy efficiency

Article 6 of the Energy End-use Efficiency and Energy Services Directive requires a contribution from energy distributors, distribution systems operators and/or retail energy sales companies in regard to the promotion of energy efficiency and energy services. Member States may require these enterprises to make their contribution in various ways. Austria has opted for voluntary agreements (Article 6(1)(b) of the Directive). After negotiations

of more than one year, the voluntary agreements on energy efficiency were concluded at the end of 2009 with the interest groups affected by Article 6 of the Directive (energy distributors, distribution system operators and retail energy sales companies)⁵³.

In these voluntary agreements on energy efficiency the interest groups undertake to induce their member companies and to offer energy efficiency measures and energy services as envisaged by the ESD. The agreements provide for specific savings targets. The measures to achieve these saving targets can be freely selected by the affected companies as long as these measures are energy efficiency measures and energy services for the purposes of the ESD.

The following specific savings targets are provided for in the voluntary agreements on energy efficiency:

- § Professional association of gas and heat supplying enterprises: 1 800 TJ
- § Association of Austrian energy utilities ('Österreichs Energie'): 1 512 TJ
- § Professional association of the petroleum industry and professional association of the energy trading industry (a voluntary agreement in which both associations participate): 7 560 TJ

Unfortunately, in spite of repeated attempts by the Federal Ministry of Economy, Family and Youth it was not yet possible to conclude a comparable agreement with the representatives of the Austrian biomass industry.

The monitoring of the voluntary agreements on energy efficiency is done by the monitoring body. The registration, validation and calculation of final energy savings of energy efficiency measures in the scope of the voluntary agreements is done in analogy to the monitoring of the energy end-use efficiency measures pursuant to the ESD. However, for the monitoring of the voluntary agreements on energy efficiency certain other measures to the assessment of the savings (which are in part not deductible pursuant to the

⁵³ The voluntary agreements on energy efficiency are available for download at <http://www.monitoringstelle.at/Freiwillige-Vereinbarungen.351.0.html>.

ESD) were used. Furthermore, overlaps of measures conducted simultaneously by public bodies and enterprises may occur while entering the data of the public bodies and of the enterprises into the data base; these overlaps may then cause certain measures to be counted doubly (in violation of the Directive)⁵⁴.

Until 2010⁵⁵ total energy savings of 2 995 TJ were reported by the enterprises and credited towards the achievement of the voluntary agreement in regard to energy efficiency. After eliminating potential double counting and adjusting the result by savings calculated on the basis of other methods not used for monitoring the energy end-use efficiency measure for the purposes of the ESD an amount of 1 321 TJ⁵⁶ remains as result of the voluntary agreement on energy efficiency, which may be credited towards the achievement of the Austrian intermediate target determined in accordance with the Energy End-use Efficiency and Energy Services Directive.

3.4 Energy services market

Article 6 of the Energy End-use Efficiency and Energy Services Directive also requires energy distributors, distribution system operators and retail energy sales companies to promote energy services and/or energy audits with competitive pricing and to ensure a corresponding offer to their final customers.

In Austria, these requirements are transposed by the conclusion of voluntary agreements on energy efficiency. In the framework of these agree-

⁵⁴ Certain energy efficiency measures are conducted in Austria by both federal and state authorities as well as by enterprises. To prevent such double counting, only savings resulting from voluntary agreements in respect of which no double counting of federal and state measures can occur are taken into consideration.

⁵⁵ It was not possible to take all savings realised in 2010 into account at the time when this report was compiled. In the case of the member companies of the professional association of the gas and heat supplying industry and of the association of Austrian energy utilities the savings achieved in 2008 and 2009 were taken nearly exclusively into account.

⁵⁶ Since savings resulting from the voluntary agreements were only taken into account to the extent that double counting was excluded, the savings calculated to be at 1 321 TJ can be taken to be the bottom limit for the savings that can be credited pursuant to the ESD.

ments the affected companies may offer i.a. energy services and energy audits. The monitoring of the voluntary agreements on energy efficiency shows that the enterprises have actually implemented these requirements. More than 200,000 energy advice services provided to households and more than 300 energy audits at enterprises were reported in the framework of the voluntary agreement on energy efficiency.

Furthermore, pursuant to Article 6 of the ESD the Member States must ensure that sufficient incentives, equal competitive conditions and fair pre-conditions for other market participants as energy distributors, distribution system operators and retail energy sales companies, such as energy service providers, builders of energy installations and energy advisers exist, in order that the energy services, energy audits and energy efficiency measures referred to in Article 6(2)(a)(i) and (ii) may be offered and provided in an independent manner.

This requirement is transposed in Austria both by the 'Dachverband Energiecontracting Austria' (Professional Association for Energy Contracting)⁵⁷ and by promoting energy contracting projects⁵⁸. In addition, the market for energy services is supported by means of a comprehensive programme to rehabilitate more than 200 federal property objects (see Chapter 3.1).

Article 9 of the Energy End-use Efficiency and Energy Services Directive requires Member States to provide the model contracts for energy services markets. Austria complies with this requirement by making a check list of the professional association for Austrian energy contracting agency available.⁵⁹

Furthermore, for the purpose of quality assurance in contracting projects in Austria, the Federal Ministry of Agriculture, Forestry, Environment and Water Management issues the 'Contracting' ecolabel (Guideline for the UZ 50

⁵⁷ see <http://www.contracting-portal.at/show.php>.

⁵⁸ see e.g., http://www.land-oberoesterreich.gv.at/cps/rde/xbcr/SID-32618704-24A9DA91/oe/ECP-RL_2009_neu_10032011_.pdf.

⁵⁹ <http://www.contracting-portal.at/downloads/41.pdf>.

ecolabel)⁶⁰. This certificate formulates the requirements in regard to the contractor, the course of the project and the contracting agreement that must be met in order to obtain the 'Energy Contracting' ecolabel.

3.5 Funding methods

Pursuant to Article 11 of the ESD the Member States may establish funds to subsidise energy efficiency measures and promote the development of a market for energy efficiency measures.

In July 2007 the Federal Act on the establishment of a climate and energy fund was adopted. The aims of the Climate and Energy Fund are:

- § to increase the share of renewable energies,
- § to increase energy efficiency,
- § to increase supply security and reduce imports of fossil energy,
- § to reduce greenhouse gas emissions and
- § to intensify research in the field of climate and energy-related technologies as well as the related aims to secure technology leadership and disseminate environmental and energy-related technologies.

The functions of the Fund are stipulated by a law and include research and development in the field of sustainable energy technologies, climate research, promotion of projects in regard to public and regional transport, mobility management projects and market penetration of sustainable energy technologies. The Fund, which disposes of an annual budget of EUR 150 million is financed primarily by federal funds. Approximately one third of the budget is each allocated to research projects, market introduction initiatives and transport projects; the focus of the allocations may vary from year to year. The Climate and Energy Fund pursues long-term goals. This is also apparent from the consistent continuation of the promotion projects (e.g. New Energies 2020 — in this case, 2011 already saw the fifth call for tenders). A budget of EUR 147 million is earmarked for 2011 to pro-

⁶⁰<http://www.contracting-portal.at/downloads/95.pdf>

vide funding for new, future-oriented climate protection initiatives. Three focal points serve to support the vision of 'Zero Emission Austria'.

§ Models and regions

§ Enhancement of energy efficiency

§ Education — training — raising awareness

A brief description of some promotion measures of the Climate and Energy Fund to finance energy efficiency measures is provided below.

SME voucher

In the context of the SME initiative to enhance energy efficiency, a structured, nationwide incentive system will be set up to induce companies to take energy advice and to implement recommended, economical measures. Grants for qualified and independent energy efficiency advice (initial and implementation advice) are provided to businesses in trade and industry as well as in the agricultural sector. This initiative started in 2008. Approximately EUR 1 million are available each year for this measure.

Solar heating

This measure relates to subsidies for large solar installations in excess of 100 m² that do not benefit from any other subsidy (Research grant, UFI-programme). The subsidy is provided in the form of an investment grant; since 2010 approximately EUR 5 million are granted annually.

Model renovation programme

In the context of this measures exemplary renovations that are particularly energy efficient are subsidised by means of grants. After the programme took off successfully in 2008, between EUR 3 and 4 million are available as of 2010 for this measure.

Transport measures

One of the focal points of the Climate and Energy Fund are the following transport measures:

- § Sector logistics and subsidies for connections: Investment subsidies for the new erection, extension or renovation of existing connecting lines are granted since 2007 with funds ranging from EUR 8 to 13 million p.a.
- § Multi-modal transport systems Projects and individual grants aiming to make combined transport more attractive and efficient were awarded. EUR 8 to 12 million per year are available for such measures, depending on the focus.
- § Intermodal interface for bicycle traffic: Funding by means of non-repayable grants is provided for parties erecting user-oriented infrastructure at the bicycle traffic/public passenger transport interface. Since 2009, EUR 2 million are available for such measures.
- § Making public passenger transport more attractive.
- § Regional traffic concepts: Funding by means of non-repayable grants is provided to the clients of public passenger transport services pursuant to sections 24 and 16 of the Public Passenger and Regional Transport Act (ÖPNRVG).

Technical projects: The Climate and Energy Fund initiated joint projects of the Austrian Government and the federal states. Since 2009, EUR 4 million are continuously held available.

4 Institutions and organisations pursuant to the Energy Efficiency Directive

The Federal Ministry of Economy, Family and Youth, participates as the highest-ranking body of the Austrian Government in all matters relating to the provision of energy and raw materials to the Austrian economy and population and is therefore one of the key players in transposing the Energy End-use Efficiency and Energy Services Directive.

In Austria, energy law is a horizontal issues in regard to the allocation of competences. This results in a division of competences between the Austrian Government and the federal states. The governments of the federal states have far-reaching competences in regard to the transposition of the Energy End-use Efficiency and Energy Services Directive. Based on Article 15a of the Federal Constitutional Law (B-VG), the Austrian Government and the federal states concluded an agreement on the transposition of the Energy Efficiency Directive, which has already been notified to the European Union. In the scope of this agreement, the Austrian Government and the federal states have undertaken in particular in regard to their respective areas of competence, to establish energy efficiency measures and promote energy services to achieve the national indicative energy savings target established by the ESD for 2010 and 2016.

Measures to fulfil the Austrian climate protection targets have a positive impact on the targets of the Energy End-use Efficiency and Energy Services Directive. Hence the Federal Ministry of Agriculture, Forestry, Environment and Water Management also plays a key role in the transposition of the Energy End-use Efficiency and Energy Services Directive. Among the key requirements of the ESD are the creation of a market for energy service providers and the setting up of an energy efficient public procure-

ment system; these matters lie within the responsibility of the Federal Ministry of Agriculture, Forestry, Environment and Water Management.

In Austria, the Austrian Energy Agency was commissioned by the Federal Ministry of Economy, Family and Youth to monitor the transposition of the Energy End-use Efficiency and Energy Services Directive pursuant to Article 4(4) of the Directive. The Austrian Energy Agency is the national competence centre for energy and conducts primarily scientific studies on issues relating to energy efficiency, renewable energy sources and new technologies for the public sector and the economy. It employs approximately 50 experts having an economic, technical and socio-economic academic background to review topics such as the energy industry and policy, energy technologies, international cooperation, mobility as well as buildings and space heating. In the framework of the monitoring of the transposition of the Energy End-use Efficiency and Energy Services Directive, the Austrian Energy Agency cooperates closely with the Austrian Government as well as with the federal states.

5 Annex

5.1 Top-down calculation of the P4 indicator

The savings achieved from the dispersion of efficient electrical appliances is calculated as follows:

$$\text{Einsparung}_t^G = \sum_e \left[\text{UEC}_t^{G,e} \times \text{stock}_t^G \times \left(\text{share}_{2007}^{G,e} - \text{share}_t^{G,e} \right) \right]$$

Einsparung_t^G	Final energy savings for appliance category G at time t (kWh/a)
e	efficiency class (e.g.: A++, A+, A, B, C, D, etc.)
$\text{UEC}_t^{G,e}$	unit energy consumption, final energy consumption per appliance G and efficiency class e at time t (kWh/appliance/a,)
stock_t^G	Existing appliances per appliance category G at time t (number of appliances)
$\text{share}_t^{G,e}$	Share of efficiency classes e per appliance category G at time t

The current energy consumption for electrical appliances is also juxtaposed to the energy that the existing number of appliances would have consumed in the year t on the basis of the efficiency (classification) of the reference year 2007.

This method of calculation deviates from the methods recommended by the European Commission, since the energy consumption is calculated per appliance category, year and energy efficiency class instead of the average energy consumption per appliance category and year.

5.2 Calculation of savings resulting from tightening construction regulations

To assess the savings resulting from the tightening of the provisions of the Construction Law Code, the average final energy consumption for newly constructed residential buildings was assessed on the basis of the existing construction regulations.

The assessment is based on average single-family homes and apartment blocks⁶¹, and with the U-values applicable in each case, heating consumption per m² of heated surfaces was calculated for these model buildings. To prevent double counting of the savings from housing subsidy measures calculated by the bottom-up method, in each respective year at least the reference heating consumption was derived from this method (90 kWh/m² until 2007 and 67.6 kWh/m² 2008 and 2009 as well as 57 kWh/m² 2010). The following tables show the assumed heating consumptions for single-family houses and apartment blocks.

Table 20: Assumed heating consumption for single-family houses 1984-2010

⁶¹see Adensam, H., et al. (2010), Methoden zur richtlinienkonformen Bewertung der Zielerreichung gemäß Energieeffizienz und Energiedienstleistungsrichtlinie 2006/32/EG, Bottom-up Methoden (Methods to assess the attainment of the target in compliance with the Energy End-use Efficiency and Energy Services Directive 2006/32/EC, Bottom-up methods), Austrian Energy Agency, p. 6.

Jahr	EFH HWB ₂₈ in kWh/(m²a)								
	Burgenland	Kärnten	Nieder- österreich	Ober- österreich	Salzburg	Steiermark	Tirol	Vorarlberg	Wien
1984		130,17	125,61	125,55	115,11	127,91	111,35	96,84	173,48
1985		130,17	125,61	125,55	115,11	127,91	111,35	96,84	173,48
1986		130,17	125,61	125,55	115,11	127,91	111,35	96,84	173,48
1987		130,17	125,61	125,55	115,11	127,91	111,35	96,84	173,48
1988	123,58	130,17	98,81	125,55	115,11	127,91	111,35	96,84	173,48
1989	123,58	130,17	98,81	125,55	115,11	127,91	111,35	96,84	173,48
1990	123,58	130,17	98,81	125,55	115,11	102,81	111,35	96,84	173,48
1991	123,58	130,17	98,81	125,55	115,11	102,81	111,35	96,84	173,48
1992	123,58	130,17	98,81	125,55	115,11	102,81	111,35	96,84	173,48
1993	123,58	104,94	98,81	125,55	115,11	102,81	111,35	96,84	90
1994	123,58	104,94	98,81	90,29	115,11	102,81	111,35	96,84	90
1995	123,58	104,94	98,81	90,29	115,11	102,81	111,35	96,84	90
1996	123,58	104,94	90	90,29	115,11	102,81	111,35	96,84	90
1997	123,58	90	90	90,29	115,11	90	111,35	90	90
1998	90	90	90	90,29	115,11	90	90	90	90
1999	90	90	90	90,29	115,11	90	90	90	90
2000	90	90	90	90,29	115,11	90	90	90	90
2001	90	90	90	90,29	115,11	90	90	90	90
2002	90	90	90	90,29	115,11	90	90	90	90
2003	90	90	90	90,29	90	90	90	90	90
2004	90	90	90	90,29	90	90	90	90	90
2005	90	90	90	90,29	90	90	90	90	90
2006	90	90	90	90,29	90	90	90	90	90
2007	90	90	90	90,29	90	90	90	90	90
2008	67,6	70,24	68,01	67,98	70,5	68,77	71,86	67,6	67,6
2009	67,6	70,24	68,01	67,98	70,5	68,77	71,86	67,6	67,6
2010	57,0	59,2	57,3	57,3	59,4	58,0	60,6	57,0	57,0

Table 21: Assumed heating consumption for apartment blocks 1984-2010

Jahr	MFH HWB ₂₈ in kWh/(m²a)								
	Burgenland	Kärnten	Nieder- österreich	Ober- österreich	Salzburg	Steiermark	Tirol	Vorarlberg	Wien
1984		98,42	99,89	90,04	85,88	93,22	86,98	87,48	136,99
1985		98,42	99,89	90,04	85,88	93,22	86,98	87,48	136,99
1986		98,42	99,89	90,04	85,88	93,22	86,98	87,48	136,99
1987		98,42	99,89	90,04	85,88	93,22	86,98	87,48	136,99
1988	98,55	98,42	83,4	90,04	85,88	93,22	86,98	87,48	136,99
1989	98,55	98,42	83,4	90,04	85,88	93,22	86,98	87,48	136,99
1990	98,55	98,42	83,4	90,04	85,88	75,85	86,98	87,48	136,99
1991	98,55	98,42	83,4	90,04	85,88	75,85	86,98	87,48	136,99
1992	98,55	98,42	83,4	90,04	85,88	75,85	86,98	87,48	136,99
1993	98,55	82,09	83,4	90,04	85,88	75,85	86,98	87,48	63,26
1994	98,55	82,09	83,4	67,3	85,88	75,85	86,98	87,48	63,26
1995	98,55	82,09	83,4	67,3	85,88	75,85	86,98	87,48	63,26
1996	98,55	82,09	64,36	67,3	85,88	75,85	86,98	87,48	63,26
1997	98,55	65,33	64,36	67,3	85,88	65,36	86,98	63,86	63,26
1998	64,95	65,33	64,36	67,3	85,88	65,36	61,97	63,86	63,26
1999	64,95	65,33	64,36	67,3	85,88	65,36	61,97	63,86	63,26
2000	64,95	65,33	64,36	67,3	85,88	65,36	61,97	63,86	63,26
2001	64,95	65,33	64,36	67,3	85,88	65,36	61,97	63,86	67,49
2002	57,14	65,33	64,36	67,3	85,88	65,36	61,97	63,86	67,49
2003	57,14	65,33	64,36	67,3	59,53	65,36	61,97	63,86	67,49
2004	57,14	65,33	64,36	67,3	59,53	65,36	61,97	63,86	67,49
2005	57,14	65,33	64,36	67,3	59,53	65,36	61,97	63,86	67,49
2006	57,14	65,33	64,36	67,3	59,53	65,36	61,97	63,86	67,49
2007	57,14	65,33	64,36	67,3	59,53	65,36	61,97	63,86	67,49
2008	48,63	57,23	54,55	52,03	57,69	53,91	48,63	55,23	52,22
2009	48,63	57,23	54,55	52,03	57,69	53,91	48,63	55,23	52,22
2010	39,49	46,47	44,29	42,25	46,84	43,77	39,49	44,84	42,40

The savings per m² are derived from the difference between the heating consumption in 1991 or as of 2008 between the heating consumption in 2007 and the respective year. The savings thus calculated were converted using an average input figure of 1.5 in final energy savings and multiplied

with the annual newly built gross floor area. The following table shows the assumed newly built gross floor area.

Table 22: Increase of gross floor area through newly erected buildings across Austria (in m²) 1991 until 2010

Year	Single family houses	Apartment blocks
1991	10 730 703	7 561 969
1992	4 392 328	2 411 243
1993	4 461 869	1 921 404
1994	3 855 833	1 369 324
1995	5 900 231	3 918 499
1996	4 943 215	2 831 660
1997	3 101 709	2 384 893
1998	3 634 386	2 035 480
1999	5 666 958	3 514 042
2000	4 711 282	3 197 434
2001	5 152 950	3 298 599
2002	4 001 937	2 857 989
2003	6 341 323	4 106 240
2004	18 973 345	9 825 310
2005	4 812 129	2 927 048
2006	5 847 916	2 768 436
2007	4 168 718	2 942 751
2008	3 034 028	2 853 122
2009	3 437 905	2 579 944
2010	6 497 925	2 949 800
Total	113 666 690	68 255 187

5.3 Basis to assess the uncertainty factor in respect to space heating and hot water

i. Total final energy consumption in Austrian private households

The total final energy consumption for space heating and air conditioning of households is derived from the useful energy analysis 2008⁶², and amounts to 189 495 TJ. Since the final energy consumption is related to the location climate and not to the reference climate, like the reference values, the consumption is converted to the reference climate.

⁶² Statistics Austria, Useful energy analysis 2009, Statistics Austria.

ii. Categories of buildings in Austria according to Statistics Austria

The calculation is based on the distribution of usable area in Austria established by the building and housing census of Statistics Austria. The usable area is subdivided into sizes and age categories of buildings.

Table 23: Usable area of principal residences (in 1 000 m²) 2008 according to age and size categories of buildings

Nutzfläche Hauptwohnsitze in 1000 m² im Jahr 2008 nach Baualtersklassen und Gebäudegrößenklassen						
Anzahl Wohnungen	1	2	3 bis 9	10 bis 19	> 19	Insgesamt
vor 1919	23.017,40	8.077,80	9.039,84	7.283,57	7225,77366	54.644,38
1919 bis 1944	10.653,03	3.088,77	4.684,34	3.442,57	1869,6401	23.738,35
1945 bis 1960	18.920,22	7.588,29	6.432,22	5.293,64	2993,4018	41.227,78
1961 bis 1970	22.132,52	9.703,45	6.442,31	6.905,30	5261,46141	50.445,04
1971 bis 1980	29.197,70	10.160,34	4.958,53	5.682,10	6629,8912	56.628,56
1981 bis 1990	26.111,11	5.087,80	6.486,50	4.733,88	3585,438	46.004,74
1991 bis 2000	30.774,37	4.560,82	8.606,01	5.697,01	4099,85184	53.738,07
2001 und später	13.592,98	1.734,36	4.615,33	2.242,54	2419,3374	24.604,54
Insgesamt	174.399,33	50.001,63	51.265,08	41.280,62	34.084,80	351.031,46
Berechnet aus: STATISTIK AUSTRIA, Mikrozensus (Jahresdurchschnitt 2008). Erstellt am: 09.04.2009.						

iii. Heating consumption

Heating consumption is derived from the c-draft of the 'energy input data' of Magistrate Department 39. The allocation was done in the document in relation to characteristic lengths. The existing characteristic lengths were set in relation to model houses, to enable deduction of the number of apartments. The same division as for usable areas was made. Single-family and two-family homes were not distinguished. The values of 2007 still had to be combined with the values of the buildings in the age category '2001 and later' (arithmetically). The resulting heating consumption is depicted below.

Table 24: Estimated heating consumption according to size and age category of building

HWB in kWh/m ² a (BGF)						
Anzahl Wohnungen	1	2	3 bis 9	10 bis 19	> 19	Mittelwert
vor 1919	269,50	269,50	175,20	137,00	137,00	197,64
1919 bis 1944	317,15	317,15	202,90	157,40	157,40	230,40
1945 bis 1960	326,65	326,65	203,20	155,40	155,40	233,46
1961 bis 1970	230,75	230,75	148,10	115,10	115,10	167,96
1971 bis 1980	241,25	241,25	154,95	120,50	120,50	175,69
1981 bis 1990	162,75	162,75	107,05	84,40	84,40	120,27
1991 bis 2000	116,85	116,85	78,10	62,10	62,10	87,20
2001 und später	82,65	82,65	55,58	46,80	44,50	62,44
Mittelwert	218,44	218,44	140,63	109,84	109,55	159,38
Berechnet aus: Bauphysiklabor - Energieaufwandszahlen V01c (Entwurf Pöhn)						

iv. Energy input data

The energy input data were derived from the c-draft of the 'energy input data' of Magistrate Department 39. In this regard the input data were averaged according to the energy source categories established by Statistics Austria, which led to the following results:

Table 25: Energy input data

Energieaufwandszahlen		
	HEAWZ	
	vor	nach
Kohle		
EFH	1,77	2,30
MFH	1,74	2,40
Öl		
EFH	1,55	1,97
MFH	1,57	2,14
Gas		
EFH	1,47	1,95
MFH	1,49	2,14
Strom		
EFH	1,01	1,01
MFH	1,01	1,01
Fernwärme		
EFH	1,12	1,30
MFH	1,18	1,53
Biomasse		
EFH	1,70	2,21
MFH	1,69	2,33
Gewichtet EFH	1,49	1,89
Gewichtet MFH	1,50	2,04

v. Determination of the correction factor

To establish a correction factor, the theoretical consumption value must be compared to the measured final energy consumption.

The theoretical consumption value can be determined by two methods:

§ The first method is based on the heating consumption. The usable area is converted at a factor of 1.2 to the gross floor space. The gross floor space again must be multiplied with the heating consumption and the energy input figure.

Table 26 shows the maximum consumption if the buildings were renovated but maintained their old heating systems; Table 27 shows minimum consumption when the buildings are not renovated. In actual fact the value lies between the two results, since the weighted average value for renovated buildings occurs mainly in buildings with a better heating consumption.

Table 26: Space heat consumption calculated by means of heating consumption, maximum

Anzahl Wohnungen	1	2	3 bis 9	10 bis 19	> 19	Insgesamt
vor 1919	14,05	4,93	3,59	2,26	2,24	27,07
1919 bis 1944	7,65	2,22	2,15	1,23	0,67	13,92
1945 bis 1960	14,00	5,61	2,96	1,86	1,05	25,49
1961 bis 1970	11,57	5,07	2,16	1,80	1,37	21,97
1971 bis 1980	15,95	5,55	1,74	1,55	1,81	26,61
1981 bis 1990	9,62	1,88	1,57	0,90	0,69	14,66
1991 bis 2000	8,14	1,21	1,52	0,80	0,58	12,25
2001 und später	2,54	0,32	0,58	0,24	0,24	3,93
Insgesamt	83,53	26,79	16,28	10,65	8,65	145,90
Berechnet aus: Bauphysiklabor - Energieaufwandszahlen V01c (Entwurf Pöhn)						

Table 27: Space heat consumption calculated by means of heating consumption, minimum

Anzahl Wohnungen	1	2	3 bis 9	10 bis 19	> 19	Insgesamt
vor 1919	11,06	3,88	2,82	1,78	1,76	21,31
1919 bis 1944	6,02	1,75	1,69	0,97	0,52	10,95
1945 bis 1960	11,02	4,42	2,33	1,47	0,83	20,06
1961 bis 1970	9,10	3,99	1,70	1,42	1,08	17,29
1971 bis 1980	12,56	4,37	1,37	1,22	1,42	20,94
1981 bis 1990	7,58	1,48	1,24	0,71	0,54	11,54
1991 bis 2000	6,41	0,95	1,20	0,63	0,45	9,64
2001 und später	2,00	0,26	0,46	0,19	0,19	3,09
Insgesamt	65,75	21,09	12,81	8,38	6,81	114,83
Berechnet aus: Bauphysiklabor - Energieaufwandszahlen V01c (Entwurf Pöhn)						

The theoretical heat consumption for space heating lies between 114.83 and 145.90 TWh/a.

§ The second method is based on the heating energy consumption. The usable area is converted at a factor of 1.2 to the gross floor space. The gross floor space again must be multiplied with the heating energy consumption, weighted according to energy source distribution.

Table 28: Space heating consumption calculated by means of heating energy consumption

Methode 2: Raumwärme mittels HEB in TWh/a						
Anzahl Wohnungen	1	2	3 bis 9	10 bis 19	> 19	Insgesamt
vor 1919	9,72	2,69	2,65	1,82	1,72	18,60
1919 bis 1944	5,57	1,21	1,55	0,90	0,43	9,67
1945 bis 1960	10,32	2,97	2,17	1,36	0,69	17,51
1961 bis 1970	8,89	2,94	1,67	1,43	0,97	15,91
1971 bis 1980	12,13	3,19	1,33	1,22	1,27	19,14
1981 bis 1990	7,87	1,21	1,32	0,80	0,54	11,74
1991 bis 2000	7,28	0,87	1,43	0,81	0,53	10,93
2001 und später	2,75	0,29	0,68	0,29	0,29	4,29
Insgesamt	64,53	15,38	12,80	8,63	6,44	107,79
Berechnet aus: Bauphysiklabor - Energieaufwandszahlen V01c (Entwurf Pöhn)						

The result is some TWh/a below the result of the first method, at 107.79 TWh/a.

Table 29: Comparison of the theoretically calculated energy consumption for space heating with the results of the useful energy analysis

Method	Theoretical result	Useful energy analysis (reference climate)	Difference in %	Correction factor
Heating consumption x input figure	413 400 – 525 250 TJ	198 101 TJ	209 – 265 %	0.38 – 0.48
Heating energy consumption	388 000 TJ	198 101 TJ	196 %	0.51

The result deviates by more than twice the final energy consumption according to the useful energy analysis. This permits the conclusion that the buildings are heated to a lesser extent than calculated in the energy passes. In other words, either less rooms are heated or the heating temperature is reduced.

Heating consumption is also reduced by waste heat from the operation of electrical appliances (cooking, electronic equipment, etc.) and hot water (in particular tanks and pipes). Taking these facts into consideration, the correction factor might be between 0.38 and 0.73. A correction factor of 0.73 can only be achieved if the waste heat from warm water and appliances is fully taken into account.

5.4 Information and advice measures reported by the federal states

Short name	Description	Start of activity
EKKO energy concepts for local authorities	In the context of village renovation, the Federal State of Burgenland makes subsidies available to local authorities for the creation of municipal energy concepts that also have a significant information and motivation impact on the population. Already approximately 30 % of all local authorities in Burgenland participate in EKKO.	not specified
Municipal facility management	In the context of the municipal facility management project, all Carinthian local authorities were informed or trained in approximately 20 regional events on municipal facility management, in particular in regard to energy efficiency, management of resources and organisational processes. These events served to raise awareness.	Sept 2007
Practical aspects of municipal facility management	Advanced training events at the Carinthian Administrative School: Facility management for local authorities – Basic principles as well as introduction and benefit; Illustration of a life cycle and impact on transparency and preserving value; Optimised use of all available resources; Facility managers and their internal marketing strategies (transparency for the political actors, how to calculate the total costs, ...); Water damage, a core problem and its sustainable solutions; Basic principles of organising facility planning; Structure and implementation of municipal facility management. Scheduled training events serve to raise awareness.	March 2011
Municipal construction works	Information event on more professional planning and implementation of municipal construction projects, taking into account energy consumption, responsibility of the public sector for building culture and its exemplary role. This event served to raise awareness.	Sept 2008

Short name	Description	Start of activity
Basic principles of municipal facility management	Advanced training events at the Carinthian Administrative School: Basic principles of facility management; management approaches for facility management; Implementation in your municipality; Key figures — benchmarking; Awareness-raising measures in regard to energy efficiency, space, material and human resources and funding.	May 2009
Quality of spaces in school buildings	Provision of information: Acoustics, lighting, ventilation. This event served to raise awareness in regard to the construction of school buildings.	May 2010
Issues relating to energy efficiency in municipal structural engineering	Provision of information: Environmental protection, energy concepts, organising planning of facilities. This event serves to raise awareness in regard to municipal structural engineering.	May 2011
Training on how to save energy for drivers of heavy goods vehicles.	Regular training sessions for drivers of heavy goods vehicles	July 2007
Information initiative on the topic of energy efficiency	Information aimed at various target groups by means of standard marketing instruments.	2004
'Stromsparen im Haushalt und Betrieb' (Saving electricity at home and at work')	Know-how platforms	2004
'Richtig Hell' (Light up properly)	Information campaign to increase efficiency of lighting	2007
'Strom sparen jetzt' (Save electricity now)	Information campaign on more efficient use of electricity at home.	2008
'Strom sparen im Büro' (Saving electricity at the office)	Information campaign on more efficient use of electricity in offices.	2010
Service range for local authorities and the staff of local authorities	Expansion of the range of existing education and training events in regard to energy for local authorities; Information, advice and education/training of staff of local authorities; Support for local authorities in regard to energy-related matters.	2000
Information, advice, education and training	Integration of information on how to save energy at all levels of education; expansion of the existing range of education and training events in regard to energy (www.energyacademy.at).	1994
Information, motivation, advice, education	For various groups of consumers (private households, commerce and industry, public facilities).	2000
Training and qualification	Improved qualification, certification and approval in regard to energy efficiency - closing educational gaps	2004

Short name	Description	Start of activity
Support for local authorities in regard to energy planning	Establishment of a tool for extended energy planning by regional and local authorities (manual).	2000
Expansion of range of information services	Media campaigns: Lifestyle: better living with less energy; modernisation of buildings as a joint action programme of the federal state in conjunction with commerce and banks.	2009
Information campaign	Information campaigns on the topic of energy efficiency and climate protection in municipalities	2009
Energy efficiency and climate protection in the Federal State of Lower Austria. Companies	Cooperation with energy intensive companies to stimulate energy efficiency measures, establishment and advertisement for 'best practice' projects, motivation of companies to provide training for energy commissioners, raising awareness for increased use of energy contracting, promotion of energy efficient or renewable energy technologies; continued award of climate prizes.	2009
Saving of electrical energy	Communication and consulting initiative for companies and service providers, communication and consulting initiative for households, support of the platform for energy efficient appliances — 'topprodukte.at'.	2009
Energy consumption monitoring and user feedback in households	Campaign for wide-spread implementation of such projects in cooperation with the association of the energy industry as well as professional associations of crafts and trade.	2009
Advanced training events	The aim is to establish advanced training events in addition to the existing range, in cooperation with the Chamber of Industry and Commerce for Lower Austria, the professional associations of the crafts and ECOplus clusters. These are also to aim at new target groups.	2009
Efficient mobility	Sustainable mobility is a focal point in education and training; promotion of mobility concepts at large-scale events; expansion of the campaign on fuel-saving ways to drive a car ('Spritsparend Fahren'), promotion of fuel saving training sessions for car fleets and private users; raising awareness on driving in fuel-saving way among persons driving company cars.	2009
Promotion of cycling and pedestrian traffic and traffic-saving measures	Training for process organisers of village and urban renewal programmes on climate protection, advice on the design of municipal transport ways (in a cycling and pedestrian-friendly manner).	not specified
Mobility management and mobility consulting	Establishment of nation-wide mobility centres of the Environmental Agency, deployment of mobility ad-	not specified

Short name	Description	Start of activity
	visers in local authorities, schools, businesses, administrations, etc.; trial projects for public passenger transport; making mobility management more attractive in cooperation with the climate protection initiatives of the Austrian Government in regard to transport; public relations work and raising awareness for the use of electric vehicles in connection with mobility centres.	
Information, advice and calls for tenders for municipal buildings	Support in drawing up the project, drafting of the contract, calls for tenders, etc.	not specified
'Stromfresser' (Electricity-saving campaign)	Communication and consulting initiative for households, commercial businesses and schools in regard to economical and efficient use of energy.	not specified
Continuation of the campaigns on the topic of energy and climate		not specified
Lectures (schools, municipal gatherings)	The audiences are informed about savings potentials and their implementation in the course of lectures and advice sessions. In addition the Salzburg AG provides incentives by offering to provide advice and guidance during implementation.	not specified
Saving fuel	Information activities in conjunction with providers (e.g. driving schools); offering and promoting training courses to develop energy efficient driving skills; publication of an information brochure on how to drive in a fuel-efficient way ('Energiesparend Fahren').	not specified
'Schritt für Schritt in die Energieautonomie' (step-by-step road to energy autonomy)	Information campaign in connection with the 'Energiezukunft Vorarlberg' (energy future of the Federal State of Vorarlberg) programme. Creating awareness about energy consumption among wide-spread parts of the population; resources, changing habits, etc.	2010
Cycling competition	Making bicycles as means of transport more attractive	2008
Climate protection prize	A climate protection prize is awarded in conjunction with Vorarlberg Medienhaus publishers.	2006
Support for conferences and industrial fairs	Support for appropriate industrial fairs and conferences (e.g. the Dornbirner Fair with a focus on energy/ TRI Solar conference, etc.).	
Education and training of civil service employees.	Expansion of the range of education and training events.	2000
Expansion and adjustment of existing educational, training and information	Actions, programmes and campaigns for the public sector, increased involvement of commercial busi-	2000

Short name	Description	Start of activity
services and activities according to need	nesses	
Educational programme	Broad programme on advanced training in energy-related matters with a focus on renewables, facility management and energy efficient buildings.	2000
Grant for professorship on energy efficiency	at the Dornbirn University of Applied Sciences focusing on corporate energy management	2011
Intensive public relations work	Lecture series, advertisements, presentations at industrial fairs	ongoing
Advanced training programmes for commerce and industry	In cooperation with the Federal State/University of Applied Sciences/Energy institute and Federal State, executive education courses are offered (e.g. EUREM course).	2011
Working group on education in connection with the 'Energiezukunft Vorarlberg' (energy future of the Federal State of Vorarlberg) programme.	The transmission of know-how on energy-related matters and sustainability is a core focus of the 'Energiezukunft Vorarlberg' programme. A specific working group focuses on the planning, coordination and implementation of educational measures.	2011
Expansion of the information and advisory services for households and small-scale consumers.	Information on energy saving is prepared for residential and heating users.	2000
Support for energy efficiency driving licences	Support by offering training courses	2000
Public relations work	Conception and implementation of systematic public relations measures by informing specific target groups on specific subjects.	not specified
Information and advice	Cycling maps, internet platforms, bicycle action days, cycling-friendly fuelling stations, etc.	not specified
Corporate and school mobility management	Special consideration for the use of bicycles	not specified
Communication initiatives	Communication of content of VKV'06 in Vorarlberg state and local administrations, communication of the VKV'06 slogan, public relations work, communication in connection with new infrastructure.	not specified
Cycling training and advertisements promoting the use of bicycles as means of transport	Initiatives to promote and enhance the image of transport by bicycle, cycle training at schools, cycling training for elderly people and people with a migration background, annual action programmes to promote bicycles (e.g. bicycle competition) for municipalities, organisations.	not specified
Advanced training measures	for municipal actors and managerial staff	not specified

Short name	Description	Start of activity
Circulation pumps — focus action at industrial fairs in cooperation with manufacturers and energy advice	Looking for means of cooperation with manufacturers	01.2007
Distribution of information regarding energy efficient appliances according to target groups (cooperation with energy utilities),	e.g. use of energy-saving light bulbs/light tubes; efficient electrical appliances, stand-by use	01.2007
Environmental management programme in magistrate department (PUMA)	Motivation and raising awareness regarding energy efficiency and energy saving for magistrate employees	01.2005
Raising awareness in regard to circulation pumps among fitters (training focus)	Compilation of professional information and distribution to fitters (for consideration in the course of the compulsory heating system inspections)	01.2009
Information and advice for public administration	User motivation in administrations (distribution of information, training measures, internal competitions - who saves the most energy?)	01.2007
Public relations work in schools and educational facilities for youths	Establishment of an energy saving/energy efficiency focus in schools, crèches and extra-curricular educational facilities for children and youths	01.2008

5.5 Reported energy advice measures of the federal states

Short name	Description	Start of activity
2011 regional programme for environmental and energy consulting	The regional programme, financed jointly by the Austrian Government and the Federal State of Burgenland, offer subsidised advisory services in the field of environmental protection and energy to businesses. This measure aims to induce investments into energy efficiency in the economy of Burgenland.	April 2011
Energy advisory services for private households	The Federal State of Burgenland offer energy consulting free of charge for private persons, who undertake to construct new buildings, renovate buildings or upgrade to a more efficient heating system.	not specified

Short name	Description	Start of activity
Independent energy advice	Advice for construction projects, including renovations	2007
e5 local authorities	Audit process to increase the energy efficiency of local authorities who participate in the programme.	01.2004
Energy advice for households, local authorities and businesses	see www.energiesparverband.at	not specified
Expansion of BEK and energy advice for the commercial sector	Energy advice for commercial businesses	2004
Energy advice and energy information	Expansion of energy advice to all areas to promote the planning and implementation of measures.	2004
Expansion of advisory service in regard to the new construction or renovation of private residential properties	Creation of cooperations and use of synergies, advisory services for special target groups	2009
Advice for local authorities	Establishment of energy platforms in the regions; support in generating energy concepts; advice for local authorities in regard to planning and calls for tenders as well as in regard to the erection and renovation of municipal buildings; advice on how to optimise the use of energy-efficient outdoor lighting systems and decorative lighting systems; advice and support in connection with calls for tenders (e.g. savings for cooling; revenues for renewable energies).	2009
Energy consumption monitoring and user feedback in households	Pilot projects and their evaluation for energy monitoring and user feedback systems for various consumer groups	2009
Advisory services for energy efficient newly constructed buildings, modernisations and street lighting	Extension of advice centres for citizens, support for advanced training, expansion of energy monitoring and controlling	2009
Energy accounting	Introduction of energy accounting in Salzburg local authorities	not specified
Energy check of service buildings	Advice for renovation works	not specified
Energy check for tourism businesses	Advice for renovation works	not specified
e5-programme for energy efficient local au-	Qualification and awards for local authorities in the field of energy efficiency and climate protec-	1998

Short name	Description	Start activity of
thorities	tion	
Energy report on buildings — single-family homes, apartment blocks and municipal buildings (overview and detailed)	Analysis, resolution of weak points and calculation of energy consumption as well as savings potentials	not specified
Energy advice as a largely free-of-charge service	Advice for all Salzburg residents on the efficient use of energy	not specified
Advice for local authorities	Advice for local authorities on energy-related matters (building, heating systems, etc.)	not specified
Information, advice for private service buildings	Target groups: tourism businesses; cooperation with the ecological facility of the 'klima:aktiv' climate protection initiative	not specified
Energy advice Salzburg	Free advice in 17 regional advice centres	not specified
Energy advice	Energy advice for final customers, private households and local authorities	not specified
Energy accounting in local authorities	More than 50 local authorities have implemented energy accounting; the aim is to also provide this service online; more than 500 buildings in the benchmarking database.	2000
e5-programme for energy efficient local authorities	Advice programme for local authorities — implementation of an e5 team.	1998
Energy advice for residents	State-wide energy advice service.	1990
Energy advice for local authorities	Initial advice programme for local authorities that do not participate in the e5-programme.	01.1996
Advice for local authorities	Assistance for local authorities in energy-related issues, incentives for requesting assistance.	2000
Support for local authorities in planning energy provisioning	Preparation of data, energy concepts, scope for action in regard to zone planning.	2000
Energy advice for tourism businesses	In particular for hotels and the catering trade	2004
Energy advice for office buildings		2004
Programme for sustainable construction	Support programme for local authorities in regard to highly efficient renovation or new construction of buildings.	not specified
Renovation advice	Generation of an overall renovation concept, including energy pass.	2009
Mobility advice	For businesses and local authorities, as well as in municipalities, crèches and schools, public and	

Short name	Description	Start of activity
	private businesses and facilities.	

5.6 Reported energy audits of the federal states

Short name	Description	Start of activity
Targeted energy advice for energy intensive sectors	Determination of key figures in regard to energy and process-related energy audits	1994
Energy sector concepts, advice and promotion	Use of environmental management, ecological designs	2000
Use of energy bench-marking		2000
Waste heat potential	Collection of data on waste heat potential of large industrial enterprises and determination of its use as district heating; generation of concepts for the use of waste heat in businesses (taking economic concerns into account) and establishing the determination of the use of waste heat in businesses (duty to use waste heat) since 2004.	1994
Project planning for the use of waste heat		2008
Promotion of energy management in businesses (accounting department)		2004
Energy efficiency and climate protection in the Federal State of Lower Austria Businesses	Expansion of energy advice in businesses, support for businesses in introducing energy accounting, monitoring, controlling and management	2009
Analysis and management of loads, consulting, design and erection	Consulting and optimisation for use of LM systems	
Energy check of production sector	Advice	not specified
Energy consulting for businesses	in particular in regard to appliances, lighting and buildings	not specified
Business development — environmental consulting	Energy check and energy technology, environmental check and environmental technology	2007

Short name	Description	Start of activity
Energy advice for commerce and industry	Advisory services for commercial and industrial businesses — divided according to the various sectors (tourism, etc.) in connection with the regional programme; cooperation with 'Klima:aktiv' climate protection initiative.	2004
Establishment of a central energy information management system for all properties owned by the City of Vienna (introduction of standardised energy accounting) and of the energy controlling of the properties owned by the City of Vienna.	The data are mainly collected in a central data base; development of benchmarks.	01.2007

6 Abbreviations

AEA	Austrian Energy Agency
AZ	Output figure
BBG	Bundesbeschaffungsgesellschaft (Federal Procurement Corporation)
BIC	Bundesimmobiliencontracting (Federal Property Contracting)
BIG	Bundesimmobiliengesellschaft (Federal Property Company)
BMWFJ	Federal Ministry of Economy, Family and Youth
EC	European Community
ESD	Energy Savings and Energy Service Directive 2006/32/EC
Heating energy consumption	Heating energy consumption
HWB	Heating consumption
IEA	International Energy Agency
km	kilometre
KPC	Kommunalkredit Public Consulting
LKW	Heavy goods vehicle
MIV	Individual motorised transport
NEEAP	National Energy Efficiency Action Plan
OECD	Organisation for Economic Cooperation and Development
ÖPNV	Public passenger transport
ÖPNRVG	Public Passenger and Regional Transport Act
PKW	Passenger car
RL	Directive
SCHIG	Railway infrastructure service corporation
TJ	Terajoule
TWh	Terawatt hour

7 List of Tables

Table 1: Comparison of computational energy end-use savings in Austria assessed on the basis of top-down and bottom-up calculations	15
Table 2: Overview of measures in the building sector.....	19
Table 3: Overview of measures in the public sector	28
Table 4: Overview of measures in the industry and SME sector.....	33
Table 5: Overview of measures in the field of energy supply	35
Table 6: Overview of measures in the transport sector	37
Table 7: Overview of the horizontal measures	41
Table 8: Summary of the energy end-use savings calculated by means of top-down procedures	47
Table 9: Data sources for the private households sector.....	49
Table 10: Applied indicators for the private household sector and corresponding savings in TJ.....	50
Table 11: Final energy consumption per category of appliance and efficiency class.....	57
Table 12: Savings caused by the emphatic pursuit to spread more efficient electrical appliances in 2009 as compared to 2007, P4 indicator.....	58
Table 13: Data sources for the public and private services sector.	61
Table 14: Applied indicators for the private household sector and corresponding savings in TJ.....	61
Table 15: Data sources, production sector	65
Table 16: P14 indicator for the sub-sectors of the production sector and corresponding savings in each case in TJ:	65
Table 17: Data sources: Transport sector	71
Table 18: Applied indicators for the private household sector and corresponding savings in TJ	71
Table 19: Reported energy advisory measures of the federal states	80
Table 20: Assumed heating consumption for single-family houses 1984-2010	93

Table 21: Assumed heating consumption for apartment blocks 1984-2010.....	94
Table 22: Increase of gross floor area through newly erected build- ings across Austria (in m ²) 1991 until 2010	96
Table 23: Usable area of principal residences (in 1 000 m ²) 2008 according to age and size categories of buildings	97
Table 24: Estimated heating consumption according to size and age category of building	98
Table 25: Energy input data	98
Table 26: Space heat consumption calculated by means of heating consumption, maximum	99
Table 27: Space heat consumption calculated by means of heating consumption, minimum.....	99
Table 28: Space heating consumption calculated by means of heat- ing energy consumption.....	100
Table 29: Comparison of the theoretically calculated energy con- sumption for space heating with the results of the useful energy analysis	100

Figure 1: Calculated bottom-up final energy savings to document achievement of the intermediate target until 2010 in accordance with the Energy End-use Efficiency and Energy Services Directive.. 3

Figure 2: Calculated bottom-up final energy savings to document achievement of the final target for 2016 in accordance with the Energy End-use Efficiency and Energy Services Directive 3

Figure 3: Final energy consumption in Austria, development from 1970 to 2009 6

Figure 4: Final energy consumption by sectors in Austria, development from 1970 to 2009..... 6

Figure 5: Energy intensity in Austria, development from 1970 to 2009 7

Figure 6: Calculated bottom-up final energy savings to document attainment of the intermediate target by 2010 in accordance with the Energy End-use Efficiency and Energy Services Directive..... 13

Figure 7: Calculated bottom-up energy end-use saving to document achievement of the final target for 2016 in accordance with the Energy End-use Efficiency and Energy Services Directive 13

Figure 8: Calculated savings applicable in 2016 pursuant to categories of measures..... 14

Figure 9: P1 indicator, energy consumption for space heating per m², private households in Austria, 1995-2009 52

Figure 10: P1 indicator, energy consumption for hot water (and cooking) per person, private households in Austria, 1995-2009 .. 53

Figure 11: P5 indicator, energy consumption for lighting (and EDP) per person, private households in Austria, 1995-2009 54

Figure 12: Share of energy efficiency categories in existing appliances from 2000 to 2009 for selected household appliances (Source: GfK Austria 2011 and own calculations)..... 56

Figure 13: M3 indicator, non-electrical energy consumption of public and private services per person in gainful employment, 1995-2009 62

Figure 14: M4 indicator, electrical energy consumption of public and private services per person in gainful employment, 1995-2009.... 63

Figure 15: Final energy consumption of the production sector in relation to the production index, 1996-2009..... 68

Figure 16: P14 indicator, sectoral energy consumption of the production sector in relation to the sectoral production index, sectors with the most markedly increasing energy intensity, 1996-2009.. 68

Figure 17: P14 indicator, sectoral energy consumption of the production sector in relation to the sectoral production index, sectors with the most markedly declining energy intensity, 1996-2008.... 69

Figure 18: P8 indicator, energy consumption of passenger cars per passenger-kilometre, taking price-related fuel export into consideration, 1995–2008 72

Figure 19: A2 indicator, energy consumption of heavy goods vehicles per vehicle, taking price-related fuel export into consideration, 1995–2008 73

Figure 20: M6 indicator, energy consumption per gross tonne-kilometre, 1995–2008.....74

9 Bibliography

Adensam, H., T. Bogner, et al. (2010), Methoden zur richtlinienkonformen Bewertung der Zielerreichung gemäß Energieeffizienz und Energiedienstleistungsrichtlinie 2006/32/EG, Bottom-up Methoden (Methods to assess the attainment of the target in compliance with the Energy End-use Efficiency and Energy Services Directive 2006/32/EC, Bottom-up methods), Austrian Energy Agency, 90 pages, see http://www.monitoringstelle.at/fileadmin/dam/spritspar/downloads/Methodendokument_RK_AT_100916.pdf

Amann, W. (2010), Lenkungseffekte der Wohnbauförderung (Steering effects of residential building subsidy); Expert conference 'Europäisches Sozialmodell — der österreichische Wohnungsbau als Best Practice' (The European social model – Is the Austrian residential building best practice?), presentation paper.

Federal Ministry of Economy, Family and Youth (2007), First National Energy Efficiency Action Plan of the Republic of Austria, Vienna, Federal Ministry of Trade, Industry and Labour, 117 pages.

Federal Ministry of Economy, Family and Youth and Federal Ministry of Agriculture, Forestry, Environment and Water Management, Energy Strategy Austria - proposals for measures, 139 pages.

CEN (2007), Saving lifetimes of Energy Efficiency Improvement Measures in bottom-up calculations, CEN WS 27, Brussels, 25 pages.

European Commission (2006), Energy End-use Efficiency and Energy Services Directive 2006/32/EC.

European Commission (2010), Commission delegated Regulation (EU) No 1059/2010 of 28 September 2010 supplementing Directive 2010/30/EU of the European Parliament and of the Council with regard to energy labelling of household dishwashers.

European Commission, C.E.E. (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. 87 pages, see

http://www.monitoringstelle.at/fileadmin/dam/spritspar/downloads/ESD_Recommended_measurement_and_verification_methods_draft.pdf.

European Parliament and Council (2010). Supplementing Directive 2010/30/EU of the European Parliament and of the Council with regard to energy labelling of household refrigerating appliances, EcoDesign of Laundry Dryers and washing machines and Preparatory studies for Ecodesign requirements of Energy-using-Products (EuP) Lot 16, 2008.

European Union (2010), EU energy and transport in figures, Luxembourg.

Eurostat (2011), Degree days, URL:

<http://epp.eurostat.ec.europa.eu/portal/page/portal/eurostat/home/>.

Data retrieved in January 2011.

GfK Austria, Retail and Technology (2011), Overall market statistics Austria, unpublished.

OECD, IEA, et al. (2005), Energy Statistics Manual, Paris.

Statistics Austria (2010), Development of the energy intensity of domestic passenger car transport, Excel table.

Statistics Austria (2010). Total energy audit from 1970 to 2009:

Statistics Austria (2010), Microcensus, data provided by Mr Janik, December 2010.

Statistics Austria (2010), National accounts 1976-2009, Revision 2008/2009.

Statistics Austria (2011), Useful energy analysis 2009, Statistics Austria.

Statistics Austria (2011), Statistics in regard to population size, Compiled on: 19 May 2010.

Austrian Federal Environmental Agency (2011), Austria's annual greenhouse gas inventory 1990-2009, Vienna, 54 pages.