

Energy Efficiency Action Plan 2011–2013

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1. Introduction

The Energy Efficiency Action Plan 2011–2013 (the “Second AP” or “Second Action Plan”) has been prepared in accordance with Section 3 of Act No 476/2008 on efficiency in energy use (the Energy Efficiency Act) and amending Act No 555/2005 on the energy performance of buildings and amending certain laws, as amended by Act No 17/2007 (the “Energy Efficiency Act”). The Second AP is the second implementing measure under the Energy Efficiency Policy of the Slovak Republic adopted by Government Resolution No 576 of 4 July 2007. The Energy Efficiency Policy of the Slovak Republic defines the overall national indicative energy savings target for 2008–2016 as 9% of the average final energy consumption from the 2001–2005 period, i.e. 37 215 TJ. This target includes the final energy consumption of companies involved in the trading of greenhouse gas emission allowances (“ETS companies”).

The role of the Second AP is to establish a second intermediate indicative energy savings target in the Slovak Republic for the three-year period from 2011 to 2013. The Second Action Plan defines measures and financial and legal instruments to achieve the energy savings target.

The Second Action Plan builds on the Energy Efficiency Action Plan 2008–2010 (the “First AP” or the “First Action Plan”), approved by Government Resolution No 922 of 24 October 2007. Therefore, the Second AP includes an evaluation of measures proposed in the First AP. This evaluation proposes a continuation of the measures under the First AP which have not yet been completed. These measures are supplemented by newly proposed measures so that, during the second three-year period, foundations will be laid for achieving the overall nine-year energy savings target by 2016. This will fulfil the energy savings targets set under Directive 2006/32/EC on energy end-use efficiency and energy services (the “Energy Services Directive”) and adopted in the Energy Efficiency Policy of the Slovak Republic. As a percentage, this target is identical in all EU Member States; in order to meet it, energy efficiency measures need to be set so that it is possible, over a period of nine years, to demonstrate energy savings equivalent to 9% of the average final energy consumption in the 2001–2005 period.

The First AP set an intermediate energy savings target for the first three-year period from 2008 to 2010 at a level equivalent to 3% of the average final energy consumption in the years 2001 to 2005, i.e. 12 405 TJ. In view of the European Commission’s requirement for the final energy consumption of ETS companies to be removed from the overall target, the Second AP includes both a calculation of the absolute net target reduced by ETS company consumption and the net energy savings sub-targets.

According to the European Commission, it is important to stress the **leading role played by the public sector** in energy efficiency, in particular through pilot and model projects aimed at energy savings. The public sector plays an important role in this Action Plan.

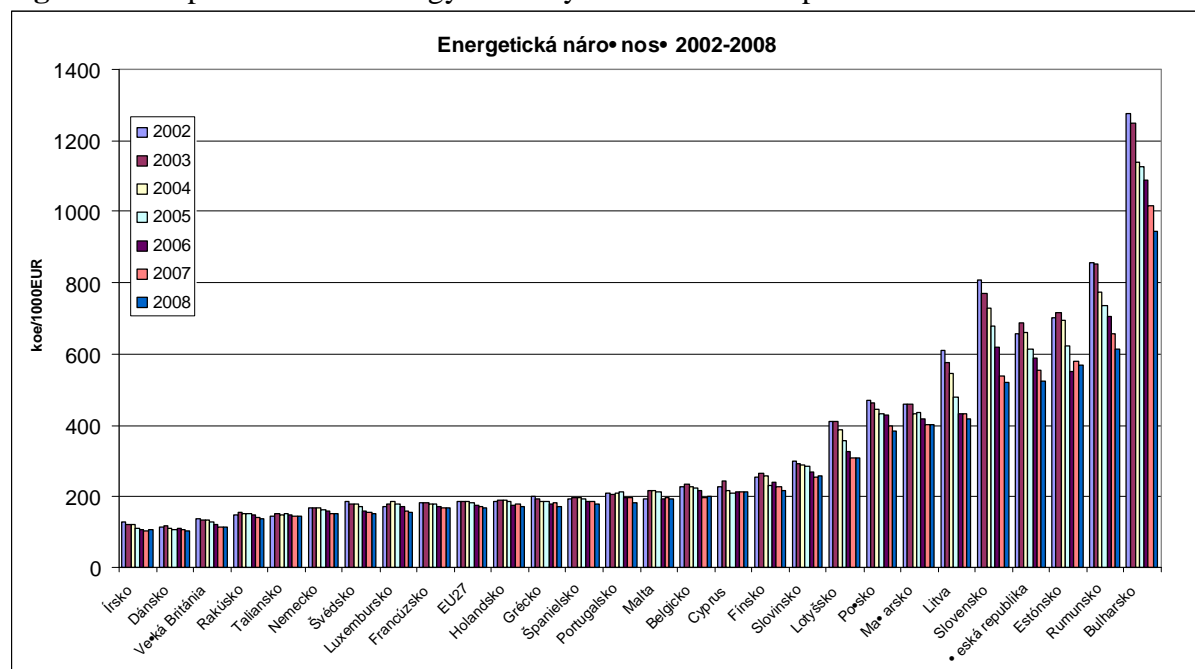
The measures under the Second AP also reflect the requirement arising from Directive 2010/31/EC on the energy performance of buildings (recast) to support the development of low-energy houses and passive buildings.

2. Background and targets for the Second Action Plan

2.1 Developments in the Slovak Republic's energy intensity

One of the Slovak Republic's priorities in the energy sector is a gradual reduction in the energy intensity of the national economy, as evidenced by developments between 2002 and 2008, when the Slovak Republic's energy intensity contracted by nearly 32%, which represents the greatest reduction in energy consumption among all OECD and EU Member States in that period (Fig. 1). Taking the 2001–2005 period as the basis for calculating the savings target, it is clear the Slovak Republic has made significant energy savings.

Fig. 1: Comparison of the energy intensity of the Slovak Republic and EU Member States



Energy Intensity 2002-2008																											
Ireland	Denmark	UK	Austria	Italy	Germany	Sweden	Luxembourg	France	EU27	Netherlands	Greece	Spain	Portugal	Malta	Belgium	Cyprus	Finland	Slovenia	Lithuania	Poland	Hungary	Lithuania	Slovakia	Czech Rep	Estonia	Romania	Bulgaria

Source: Eurostat

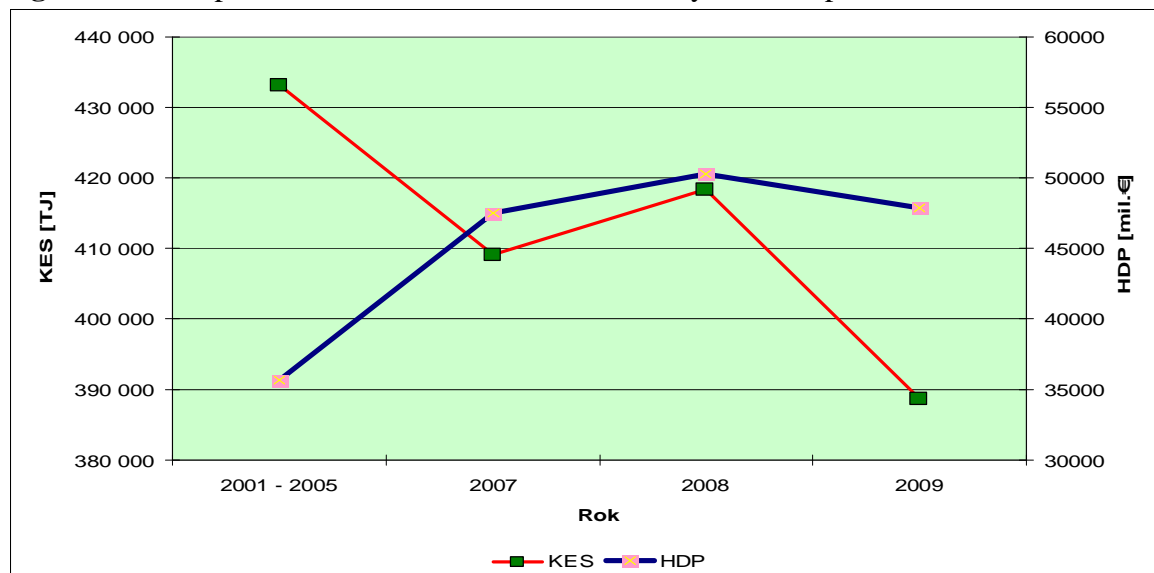
Compared with the average energy consumption in 2001–2005 (12.158 TJ/EUR million), the Slovak Republic reported a marked decline in energy intensity by as much as 31.5% in 2008 and 33.2% in 2009. Compared to 2007, energy intensity decreased by 3.4% in 2008 and 5.7% in 2009 (Fig. 2).

Fig. 3 shows the course of final energy consumption in various sectors of the national economy. Compared with the average values in 2001–2005, energy savings in all sectors of the national economy were reported at 3.4% (in 2008) and 10.2% (in 2009). However, in comparison with 2007, which preceded the First AP, there was a rise in final energy consumption in most sectors in 2008 and 2009. The exception was industry, where, compared to 2007, FEC decreased by 2% in 2008 and by as much as 15% in 2009. It should be noted,

however, that the 2009 FEC reduction in industry was considerably affected by the impact of the economic crisis.

The increase in final energy consumption (“FEC”) in the household and service sectors in 2008 and 2009 was greatly influenced by climate conditions (a higher number of degree days in those years).

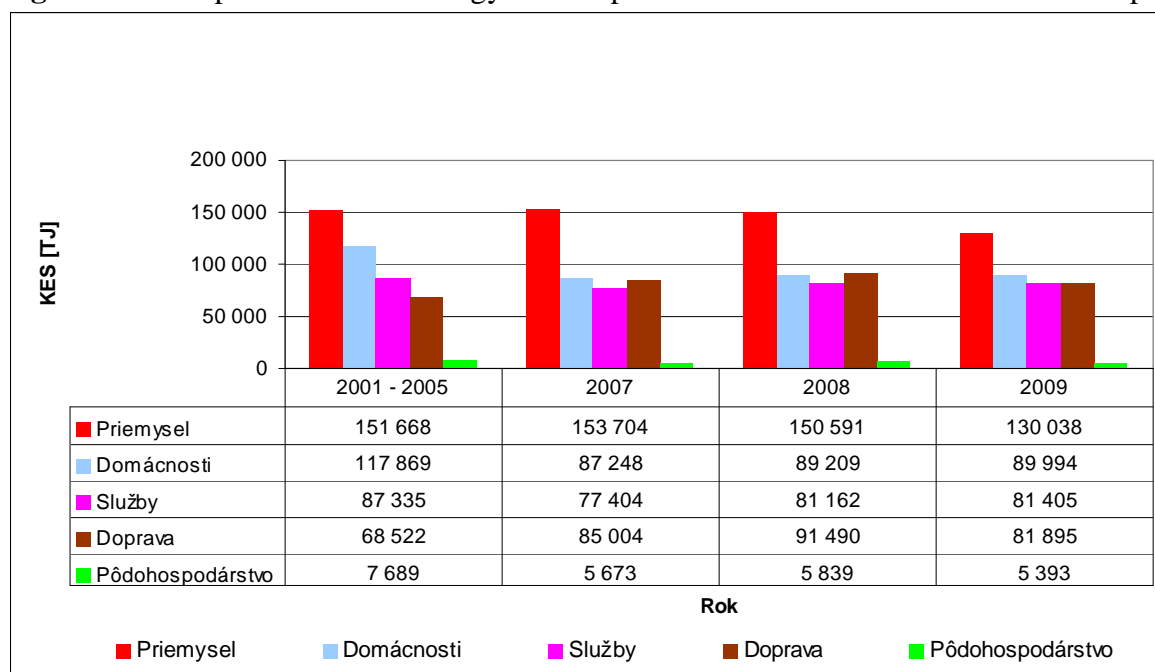
Fig. 2: Developments in FEC and GDP at constant year-2000 prices



FEC (TJ)	Year	GDP (EUR millions)
FEC		GDP

Source: Statistical Office of the Slovak Republic

Fig. 3: Developments in final energy consumption in various sectors in the Slovak Republic



FEC (Tj)

	Year				
Industry					
Households					
Services					
Transport					
Agriculture					
Industry	Households	Services	Transport	Agriculture	

Source: Statistical Office of the Slovak Republic

2.2 Background to the Second Energy Efficiency Action Plan

The Second Action Plan is the second implementing instrument under the Energy Efficiency Policy of the Slovak Republic and is a continuation of the First AP. The most important documents for the preparation of the Second Action Plan are:

- Directive 2006/32/EC on energy end-use efficiency and energy services and repealing Council Directive 93/76/EEC;
- Act No 476/2008 on efficiency in energy use (the Energy Efficiency Act) and amending Act No 555/2005 on the energy performance of buildings and amending certain laws, as amended by Act No 17/2007;
- European Commission recommendations for the Slovak Republic regarding the preparations for the Second AP, set out in the “Synthesis of the Complete Assessment of National Action Plans”,¹ which includes the European Commission’s requirement to supplement the specific calculation of the energy efficiency target and to remove the final energy consumption of ETS companies from that calculation;
- European Commission Recommendations on measurement and verification methods in the framework of Directive 2006/32/EC on energy end-use efficiency and energy services – preliminary draft (the “methodology for calculating savings”), approved by the Commission Committee on Consumption Control of 2 July 2009;

¹ Commission Staff Working Document Sec(2009)889 of 23 June 2009.

- International Energy Agency (IEA) recommendations on energy efficiency, published in the “Energy Efficiency Progress Report, The Slovak Republic”, which was released in 2009 as part of the document “Implementing Energy Efficiency Policies: Are IEA countries on track?”.

According to Section 3(1)(c) of the Energy Efficiency Act, the Action Plan should include, in particular:

- the energy savings target in the Slovak Republic and the measures to achieve that target for a period of three consecutive years;
- an analysis and evaluation of measures taken;
- the proposal of new measures for achieving the energy savings target;
- information for citizens and companies about the exemplary role and actions of the public sector;
- ways to achieve the planned energy efficiency;
- financial and legal instruments for achieving the national indicative energy savings target.

Based on the Energy Services Directive, the Second AP is to be submitted to the European Commission by 30 June 2011.

2.3 Energy savings target

The Energy Efficiency Policy of the Slovak Republic contains concise information on the calculation of the overall national indicative target. Based on the European Commission’s comments on the First AP, the Second AP must include an exact calculation of the overall national indicative target for the entire nine-year period, as well as the documentation used in this calculation.

2.2.1 Calculation of the gross overall national indicative energy savings target

According to Article 4 of the Energy Services Directive, Member States “*shall adopt and aim to achieve an overall national indicative energy savings target of 9% for the ninth year of application of this Directive*” compared to the average final energy consumption in 2001–2005; they are also required to adopt an intermediate national indicative energy savings target for a three-year period, based on the methodology set out in Annex I to the Energy Services Directive.

In this respect, the Energy Efficiency Policy calculates the average FEC in 2001–2005 as follows:

$$FEC_{2001-2005} = (FEC_{2001} + FEC_{2002} + FEC_{2003} + FEC_{2004} + FEC_{2005}) / 5 \quad [2.3-1]$$

$$FEC_{2001-2005} = 413\,506\,TJ \quad [2.3-2]$$

The actual FEC in 2001–2005 is set out in Fig. No 1. These values also include the FEC of ETS companies.

Table 1: Final energy consumption in the years 2001–2005 (TJ/year)

Indicator	2001	2002	2003	2004	2005	2001–2005 average
Final energy consumption (FEC) [TJ/year]	435 192	435 510	400 383	386 340	410 103	413 506

Source: Statistical Office of the Slovak Republic

The average final energy consumption under Table 1 was used to calculate the energy savings target in three of the Slovak Republic's strategy documents, namely the Energy Efficiency Policy of the Slovak Republic (July 2007), the Energy Efficiency Action Plan 2008–2010 (October 2007), and the Energy Security Strategy of the Slovak Republic (October 2008). Energy savings targets, calculated from the average FEC under Table 1, are listed in Table 2 and were calculated using the following equation:

$$SAVING [TJ] = SAVING [\%] * FEC_{2001-2005} [TJ] \quad [2.3-3]$$

Table 2: Energy savings targets up to 2020

Indicator	Energy savings based on the average FEC in 2001–2005	
	[%]	[TJ]
Annual target	1	4 135
Medium-term target up to 2010	3	12 405
Long-term target up to 2016	9	37 215
Long-term target up to 2020	11	45 486

The policy stipulates that the overall national indicative energy savings target up to 2016 will be met on a linear basis. Energy efficiency measures therefore need to be taken every year so as to ensure annual energy savings of 1% of the average FEC in 2001–2005, i.e. 4 135 TJ. The First AP set a medium-term target of 3% of the average FEC in 2001–2005 (12 405 TJ) and a long-term target of 9% of the average FEC in 2001–2005 (37 215 TJ).

2.2.2 Calculation of the net overall national indicative energy savings target

No uniform methodology has been set for separating the consumption of ETS companies from final energy consumption. The overall national indicative target was therefore also set to take account of the consumption of these companies. The measures proposed in the First AP did not include specific measures exclusively for ETS companies.

According to Article 2(b), the Energy Services Directive does not apply to ETS companies which are involved in the trading of greenhouse gas emission allowances pursuant to Directive 2003/87/EC,² and the Commission therefore asked Member States to review their energy savings target by separating the consumption of ETS companies and to adjust draft measures so that the energy savings of ETS companies could not be included in the fulfilment of the energy savings target.

Since the separation of ETS company consumption may involve commercially sensitive information, the energy savings target was calculated on the basis of an expert estimate. The system of emission allowance trading mainly includes industrial companies and producers of electricity and heat. The consumption of ETS companies in the Slovak Republic was

² 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 and amending Council Directive 96/61/EC.

determined on the basis of the National Allocation Plan 2005–2007, the published list of ETS companies and information from the Statistical Office of the Slovak Republic, broken down into industries and regions. Using this background documentation, the share of ETS companies in overall final energy consumption in industry was calculated at approximately 70%. Once converted, the share taken by ETS companies in the Slovak Republic’s final energy consumption is approximately 24.5%.

The average final energy consumption for the period from 2001 to 2005, net of the share of ETS companies, was 312 220 TJ. This basis was used to determine the short-, medium- and long-term savings targets, which are listed in Table 3. The recalculated FEC_{KOR} value, i.e. adjusted for the impact of ETS company consumption, was determined as follows:

$$FEC_{KOR,2001-2005} = FEC_{2001-2005} - FEC_{of\ ETS\ companies} \quad [2.3-4]$$

Table 3: Energy savings targets up to 2020, net of ETS companies’ consumption

Indicator	Energy savings based on the recalculated average FEC in 2001–2005	
	[%]	[TJ]
Annual target	1	3 122
Three-year target up to 2010*	3	9 366
Medium-term target up to 2013*	6	18 722
Long-term target up to 2016*	9	28 098
Long-term target up to 2020*	11	34 342

* Note: the objectives are set for the end of the year, i.e. including the year to which the target applies.

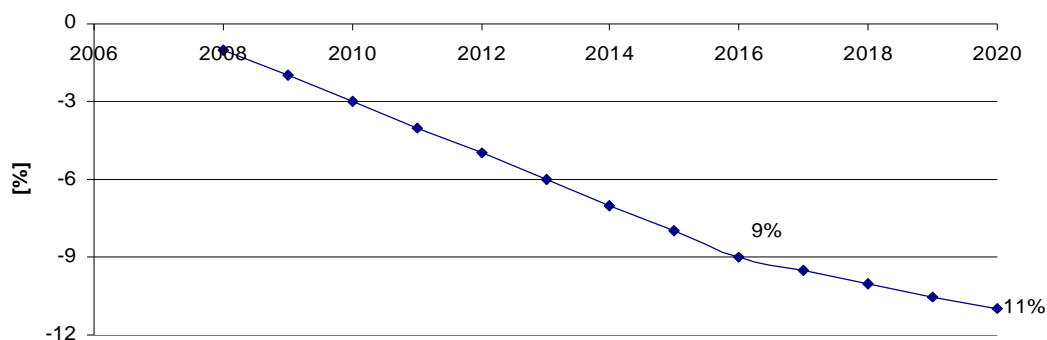
It follows that the energy savings target for the three-year period, after conversion, is **9 366 TJ**. This target is also used as the basic target for the 2011–2013 three-year period in the Second AP. The converted long-term target for the nine-year period from 2008 to 2016, adjusted for the impact of ETS companies, is 28 098 TJ. These values are relevant only if there is no change to the list of ETS companies after 2012.

2.2.3 Calculation of the energy savings target for 2020

The Energy Efficiency Policy of the Slovak Republic defines the Slovak Republic’s basic energy efficiency principles up to 2020.

The long-term energy savings target up to 2020 was clarified for the years 2017 to 2022 in the Energy Security Strategy of the Slovak Republic, showing energy savings of 0.5% per year. This means that the total value of energy savings over the 2008–2020 period is set at 11% of the average FEC in 2001–2005 (45 486 TJ). The smaller anticipated energy savings in the years 2017 to 2020 are due to the reduced potential for less costly savings and the increased cost of other measures. The energy savings target up to 2020, as shown in Fig. 4, was also adopted in the 2010 National Reform Programme as one of the Europe 2020 goals for the Slovak Republic.

Fig. 4: Energy savings targets up to 2020



European energy efficiency measures are currently being updated in response to **Europe 2020**, the strategy which defines the EU energy efficiency objective of achieving 20% savings in primary energy consumption by 2020. The proposed substantial changes in the way energy efficiency is perceived by the European Commission, the designation of energy efficiency as a top priority for the next ten-year period, the change in the nature of the targets from final energy consumption savings to primary energy savings, the resizing of the target from 9% by 2016 to 20% by 2020, and the drafting of new EU energy efficiency legislation and amendments to existing legislation in this sphere will have a significant impact on the promotion of energy efficiency in the Slovak Republic.

It is likely that, along with the new EU energy efficiency action plan being prepared for spring 2011 and the amendment to the Energy Services Directive planned for summer 2011, the European Commission will set entirely new parameters and solutions which will require a response at national level.

Negotiations are currently underway between Member States and the European Commission on what the energy efficiency targets for 2020 should look like. According to the outcome of the Transport, Telecommunications and Energy Council of 7 December 2010, energy efficiency targets for 2020 will be non-binding on Member States.

The Energy Efficiency Policy of the Slovak Republic is regularly evaluated and updated in accordance with the Energy Efficiency Act. In 2012, the Ministry of Economy (“MoEc”) will submit an update of the policy taking account of the new energy efficiency proposals, which should then be reflected in the third action plan.

3. Methods for evaluating the measures of the First Action Plan

In accordance with the Energy Services Directive, and on the basis of the documents referred to in Section 2.1, two methods for assessing the energy savings achieved (bottom-up and top-down) were used to evaluate the First Action Plan.

3.1 *Bottom-up evaluation method*

The bottom-up evaluation method evaluates planned measures based on detailed information on the individual projects under each measure. This method allows for concrete energy savings to be determined directly on the basis of a specific calculation. The Commission recommends that Member States, in assessing the results of the First AP, account for 20% to 30% of energy savings in this way.

To apply the bottom-up evaluation method, detailed documentation is necessary from the ministries responsible for the implementation of individual measures, along with information on the implementation of the specific energy saving projects. When collecting the information, it was impossible to use the system for monitoring efficient energy use (the “monitoring system”) as this is not scheduled to be put into operation until 2011. For many measures, parameters such as energy savings and energy consumption were not monitored directly at the ministries; often, it was only other parameters, focusing, for example, on climate change (CO₂ emissions) or the different amounts of energy needed to heat buildings, that were tracked rather the differences in their actual consumption before and after project implementation. Therefore, in many cases it was necessary to calculate energy savings by alternative means.

Members of staff designated by the ministries were trained to verify the collection of data on energy savings which was in the competence of the ministries. In many cases, the ministry representatives did not have enough information on how energy savings could be quantified or where the basic data required for calculating them could be found.

Nor was an objective evaluation of energy savings an easy task in relation to projects financed from EU Structural Funds, despite the fact that the National Strategic Reference Framework for 2007–2013 (the “NSRF”) includes energy-saving indicators among the horizontal priorities of sustainable development. However, these indicators are not mandatory for all types of projects because some projects deliver energy savings only outside the main objective of the project or programme. In the previous programming period from 2004 to 2006, energy savings were not monitored as an indicator.

The effect of some of the proposed measures, particularly legislative ones, cannot be evaluated objectively on an independent basis, due to their cross-cutting impact. Based on this experience, these measures are listed in the Second Action Plan as support measures. Where a legislative measure sets a specific obligation which directly achieves energy savings, the actual savings can be quantified. Energy savings achieved by the implementation of measures on the basis of a legal obligation have not been studied. The obligation to provide information on energy consumption based on the provisions of the Energy Efficiency Act is being phased

in gradually; the necessary data were therefore unavailable by the deadline for the draft of the Second AP.

3.2 Top-down evaluation method

The Commission recommendations served as the basis for determining energy savings via the top-down method. The harmonised indicators and statistical data available from Eurostat, the Statistical Office and the Odyssee-Mure database were used. The calculation of energy savings by this method is based on aggregated data on final energy consumption in different sectors of the national economy, which are subsequently adjusted for “external” influences on energy consumption, such as changes in outdoor temperature, the number of vehicles, the population, GDP and others.

The quantification of energy savings based on harmonised indicators is very sensitive to the quality of the input data. Total energy savings in the First AP were quantified by reference to savings calculated for mandatory indicators in all sectors of the national economy. It was also important to monitor developments in the input data needed to calculate indicators, such as energy consumption and the activities of sectors to which such consumption is linked. In addition, links between energy consumption increases and decreases in inter-related sectors (e.g. a fall in energy consumption in passenger rail transport may be directly linked to increased energy consumption in passenger road transport) needed to be analysed.

It was a major problem to define the index year to which the calculated indicators relate. The energy savings target is proposed on the basis of average final energy consumption from the years 2001 to 2005, and it was therefore assumed that the savings achieved would be relative to that value. However, the Commission requested that the indicators for the years 2008 to 2010 be compared with the year preceding the application of the First AP, i.e. 2007.

There is a large amount of statistical data showing that final consumption developments in 2007 fall outside the overall trend of final energy consumption in the Slovak Republic over the last 10 years. The energy savings were therefore calculated by comparing the indicators with both the 2007 consumption values and average energy consumption in the years 2001 to 2005, which was the basis for planning savings.

4. Assessing the First AP by the bottom-up method by sector

The method for preparing the First Action Plan and Second Action Plans differed significantly in that there was a possibility in the Second AP of drawing on experience from the implementation of measures under the First AP in order to make improvements. This makes it possible to obtain more realistic information on the impacts of individual measures and their contribution to the target, as well as on the importance of a particular measure compared to other measures.

As the implementation of the energy efficiency monitoring system was postponed, this system was not yet in operation when the Second AP was being prepared; system outputs were therefore not available for use in the evaluation of measures from the First AP. Most of the data for assessing the implementation of the First AP were obtained from representatives of the individual ministries in the form of questionnaires prepared by MoEc staff.

One of the significant advantages of this method of data collection was direct contact with the responsible and relevant parties. A significant disadvantage is the labour-intensive, time-consuming nature of the assessment, the different approach to assessment at the individual ministries, and the different factors considered in the calculation of savings. This method made it possible to evaluate those measures in which measurable and calculable energy savings could be directly identified.

4.1 Horizontal measures

Horizontal measures affect several sectors of energy consumption simultaneously. These measures create the conditions for applying the principle of energy efficiency in the economy as a whole as well as in its individual sectors. Since these measures are aimed at energy savings mainly from an investment, educational or organisational perspective, they have a significant impact on the planning and implementation of other specific measures. These other measures include, in particular, legislative measures and informational, monitoring, training and consulting activities aimed at energy savings.

The impact of most horizontal measures is impossible to quantify in terms of measurable savings. Their impact can be better identified by the top-down method. If necessary, the contribution of individual horizontal measures may be determined only on the basis of an expert estimate. For this reason, only the implementation of these measures during the reporting period is described, with no quantification of specific energy savings.

4.1.1 “Energy Auditor” training course

Since 1996, the Slovak Innovation and Energy Agency (the “SIEA”) has been responsible for training specialists in the performance of energy audits. The training is rounded off with a qualification examination, which includes an assessment of energy audit reports. The course has been taken by more than 400 specialists so far.

The Energy Efficiency Act modified the status of energy auditors within the framework of the energy service system. A register of energy auditors is currently maintained by the Ministry of

Economy (the “MoEc”). Applicants are entered in the register of energy auditors once they meet the statutory qualification requirements. By the end of 2010, more than 90 auditors had been enrolled in the register. An energy auditor is required to attend periodic training, provided by the SIEA, every three years. High-quality work by the energy auditors is paving the way for the correct determination of the potential for energy savings.

4.1.2 Provision of information on energy efficiency and on the opportunities for energy efficiency project funding

The SIEA provides information on energy efficiency and funding opportunities for energy efficiency projects in households, businesses and the public sector on the basis of annual contracts between the MoEc and the SIEA. Information is provided at four centres (Bratislava, Trenčín, Banská Bystrica and Košice) by telephone, in writing (e-mail) or in person. Information is also regularly provided at selected exhibitions and trade fairs on energy savings and renewable energy sources, such as AQUATHERM Nitra, KLIMATHERM – ENERGO – EKO Košice and RACIOENERGIA Bratislava. Between 2008 and 2010, several thousand consultations of varying nature and scope were provided.

4.1.3 Educating children on energy efficiency via the Rainmakers Club

As part of the international Kids4Future project aimed at economical energy use and environmental improvements, co-financed by the Intelligent Energy – Europe programme, a three-part story for children aged 6 to 12 years, “The Rainmakers”, has been translated and adapted to national languages and traditions. The story is published in book form and has been gradually distributed to schools. A special website has also been created with activities for children and a teacher’s manual.

The project is being continued on an optional basis by educating children on how they can save energy through collections of stories, games and experiments under the title “Auntie Eta’s Advice”. The project started in 2010 and is part of the national project “Promotion of Education and Guidance on Energy Efficiency and Renewable Energy Use, Including Greater Public Awareness”, which is financed by the Structural Funds under the Competitiveness and Economic Growth Operational Programme, Measure 2.2 “Building and upgrading public street lighting for towns and villages and providing energy guidance”. The national project has the working title “ENERGY FOR LIFE”.

4.1.4 Draft legislation

The main legislation on energy efficiency adopted in this period is Act No 476/2008 of 4 November 2008 on efficiency in energy use (the Energy Efficiency Act) and amending Act No 555/2005 on the energy performance of buildings and amending certain laws, as amended by Act No 17/2007. The provisions of this Act relate to energy conversion, the “transportation” of energy from the point of conversion to the point of consumption, and actual energy consumption. The Act defines the obligations for each sector of energy consumption and creates conditions for the monitoring and evaluation of energy efficiency and energy savings. The Act also lays down the obligation to conduct energy audits in industry and agriculture (by the end of 2011 and 2013, respectively) and determines the status of energy auditors. In addition, the Act defines energy services and the obligation for owners of buildings with a floor area of over 1 000 m² to employ the hydraulic balancing of heating systems and ensure the proper insulation of hot water distribution systems.

4.1.5 Energy efficiency monitoring and information system

The obligation to implement and operate a system monitoring energy use efficiency arises from the Energy Efficiency Act. As the Energy Efficiency Fund which was to have funded the monitoring system had not been established, alternative funding had to be found. After funds were earmarked in the Energy Efficiency Support Programme, an agreement on monitoring system implementation was signed on 1 June 2010. MoEc Decision No 4/2010 designated the SIEA as the organisation responsible for the preparation and operation of the monitoring system. The monitoring system launch date is contractually bound to a deadline of 1 June 2011. Work is currently underway on the software and organisational requirements of the system.

The monitoring system is the most important tool for the assessment of energy savings using the bottom-up method. It is used for data collection and for evaluating the energy saving measures taken; this should result in regular assessments of and, where appropriate, adjustments to energy efficiency measures, after taking account of their overall effect and the capital required to implement them.

4.1.6 “Good advice = savings” awareness campaign

If energy is to be used efficiently, consumers must have access to the information they need (in the form of education, awareness campaigns and guidance) to make decisions about their energy consumption. The SIEA has been running the planned awareness campaign since 2010 under the national ENERGY FOR LIFE project. As part of the campaign, a public opinion poll was conducted in 2010 on awareness of energy conservation and RES use among households and businesses. The poll results are used to plan additional awareness activities, mainly seminars, roundtable discussions, the publication of promotional materials and greater communication with the media.

4.1.7 Energy advice centres in the regions

The originally plan to establish regional advice centres funded by the Intelligent Energy – Europe (“IEE”) programme and the Energy Efficiency Fund (“EEF”) did not materialise as the EEF was not set up. In 2008, IEE funds were used to establish the Nitra Energy Agency; the Ša•a Energy Agency is also in operation. Under the ENERGY FOR LIFE project, the SIEA has significantly expanded its guidance services at the advice centres in Tren•ín, Bansk•a Bystrica and Košice; free telephone advice is also available. Since this is a project funded by the CaEG OP, these funds could not be used to establish an advice centre in Bratislava.

4.1.8 Support for the development of energy services

An important prerequisite for promoting the development of energy services was the establishment of an Energy Efficiency Fund. As the plan was to finance the Fund on the basis of a proportion of energy sales and because of the Government’s efforts not to increase energy prices, no Fund has been established. As an alternative solution, the MoEc approved the Energy Efficiency Support Programme, but the funding for this programme was limited to funds for the establishment of a monitoring system. No funds were allocated to promoting the development of energy services.

4.1.9 “E²” in the state administration - training programme

As part of the training on “E²” in the state administration, the MoEc, in cooperation with the SIEA, drew up methodological guidelines for central government authorities on the provision of data on energy consumption by the central government authorities and the organisations under their control. In 2010, a seminar was held for the responsible staff from central government and public administration bodies on the system and method for collecting and evaluating data on energy efficiency. Training will continue after the launch of the monitoring system, with a focus on its actual use; this measure is funded under a contract between the MoEc and the SIEA.

4.1.10 Energy efficiency – a component of sustainable development education for children and young people

The education of children and young people in the field of sustainable development is covered by the Slovak Environmental Agency’s activities under the “Carbon Footprint” project. In late 2010, under the ENERGY FOR LIFE project, the SIEA prepared an energy “quartet” for distribution to schools along with guidelines on its use.

4.1.11 Application of the principle of energy efficiency in public procurement

Numerous central and local government authorities have incorporated energy efficiency criteria into public procurement technical specifications, contributing to energy savings of **358 TJ** in the reporting period. These measures include energy auditing, the procurement and purchasing of products in the best energy classes, improvements in the thermal properties of the envelopes of buildings owned by those institutions, the installation of new control valves, the hydraulic balancing of heating systems, the purchase of energy-saving lamps, the replacement of boilers, and application of the principles of green public procurement, when buying appliances, computers, vehicles and so on. To facilitate the implementation of energy efficiency criteria in public procurement, the SIEA has drawn up criteria for buildings, computer equipment and passenger vehicles.

4.1.12 Support for research into energy savings – additional measure

Research and development plays an important role in energy savings. In the reporting period, several research projects were carried out with results that may contribute to energy saving in the Slovak Republic. These projects were supported by the Slovak Research and Development Agency (SRDA) and the Scientific Grant Agency of the Ministry of Education, Science, Research and Sport of the Slovak Republic (SGA). A list of projects can be found in Annex 2.

4.1.13 Overall evaluation of horizontal measures

Apart from Measure 1.11 on public procurement, the bottom-up method could not be applied to the evaluation of horizontal measures due to the cross-cutting impact of these measures. The broader application of horizontal measures was hampered by the fact that the Energy Efficiency Fund, intended to finance numerous activities, had not been established. There was a significant shift in the launch date of the monitoring system which is to form an information framework for energy efficiency activities and the monitoring of energy savings. The application of Energy Efficiency Act is expected to be highly beneficial in the coming period as numerous deadlines for legislative obligations are to be met during the Second AP.

Table 4: Summary overview of horizontal measures in the 2008–2010 period

No	Title of measure	Details	Year, period	Duration of measure	Energy savings planned in the First AP	Energy savings achieved in 2008–2010	Investment planned in the First AP	Actual investment in 2008–2010
					[TJ]	[TJ]	[EUR thousands]	[EUR thousands]
1.1	“Energy Auditor” training course	SIEA training course focusing on energy audits in industry	2008 -2010	Since 1997	75.00	A)	29.87	0.00
1.2	Provision of information on energy efficiency and on the opportunities for energy efficiency project funding	Contract between the MoEc and SIEA	2008 -2010	Since 1997	225.00	A)	1493.73	165.00
1.3	Educating children on energy efficiency via the Rainmakers Club	A Kids4Future project co-funded by Intelligent Energy – Europe	2008 -2010	Since 2007	7.50	A)	109.54	60.00
1.4	Draft legislation	Energy Efficiency Act	2008 -2010	Since 2009	0.00	A)	165.97	200.00
1.5	Energy Efficiency Monitoring and Information System	Energy Efficiency Fund	2008 -2010	Since 2009	2600.00	A)	3983.27	1000.00
1.6	“Good Advice = Savings” awareness campaign	Structural Funds (2007–2013), CaEG OP, Measure 2.2 “Building and upgrading public street lighting for towns and villages and providing energy guidance”	2008 -2010	Since 2010	300.00	A)	1668.99	987.00
1.7	Regional energy advice centres	Intelligent Energy – Europe Programme Energy Efficiency Fund	2008 -2010	-	75.00	A)	2489.54	0.00
1.8	Energy service development support	Energy Efficiency Fund	2008 -2010	-	145.00	A)	4315.21	0.00
1.9	“E²” in state administration – training programme	Central government authorities	2008 -2010	-	3.00	A)	199.16	5.00
1.10	Energy efficiency – a component of sustainable development education for children and young people	Supplementary programmes to complement comprehensive and vocational education at schools	2008 -2010	Since 2010	210.00	A)	1327.76	0.00
1.11	Application of the principle of energy efficiency in public procurement	Commitment for central government authorities	2008 -2010	Since 2006	135.00	357.85	8298.48	649038.00 ^{B)}
1.12	Support for research into energy savings – additional measure	SRDA, SGA	2008 -2010	-	A)	A)	0.00	0.00
	TOTAL				3775.50	357.85	24081.52	651455.00

A) In view of the nature of the measure, it cannot be evaluated by the bottom-up method

B) The total cost of the procurement of goods and services (additional costs incurred in connection with the application of energy efficiency criteria cannot be separated)

4.2 Buildings

In the First AP, the building sector comprises residential buildings (family houses and blocks of flats), public sector buildings and buildings in the commercial services sector. Energy savings for most of the measures planned in the building sector can be evaluated by the bottom-up method; the necessary information was provided by operators of buildings, providers of aid and support, and support programme administrators.

4.2.1 Application of legislative measures – hydraulic balancing of heating systems

Act No 70/1998 on energy efficiency lays down rules on efficiency in the operation of heating equipment systems. Under this Act, owners and managers of blocks of flats are required to provide the hydraulic balancing of heating systems, including the installation of thermoregulatory radiator valves. The operating efficiency of heating equipment systems beyond the service point (i.e. heat consumption for heating and hot water) was evaluated on an annual basis. The SIEA drew up an overview of compliance with these obligations up to 2004, which found that roughly 60% of blocks of flats used hydraulic balancing of heating systems, including the installation of thermoregulatory radiator valves.

Paradoxically, the highest energy savings in the heating of blocks of flats were recorded only after the installation of heat cost allocators. Although these allocators made no direct physical contribution to energy savings, they strongly influenced the behaviour of residents, who were able to regulate their heat with thermoregulatory valves, thereby reducing heat consumption for heating by up to 30%.

The “thermal energy” part of Act No 70/1998 was replaced as of 1 January 2005 by the separate Act No 657/2004 on thermal energy, which, in relation to final energy consumption in buildings supplied with heat, laid down the requirement of rational energy use. Compliance is monitored by the State Energy Inspectorate. The obligation to ensure the hydraulic balancing of heating and hot water and the insulation of hot water distribution systems in large buildings is based directly on the Energy Efficiency Act.

The obligation to provide regular information on rational energy use in residential buildings was dropped because of the considerable administrative burden it created. Hydraulic balancing projects, however, continued. By 2010, the number of hydraulically balanced blocks of flats is expected to increase to 80%. However, information on such projects has been limited since 2005, preventing an accurate assessment of the energy savings achieved.

4.2.2 Application of legislative measures – energy performance certification of buildings, periodic inspections of boilers, heating systems and air-conditioning systems

Since 1 January 2008, Act No 555/2005 on the energy performance of buildings and amending certain laws has required building owners to have their buildings certified for energy performance upon the sale or lease of such buildings, upon completion of a new building, or in cases where existing buildings undergo major renovation. This Act was amended by the Energy Efficiency Act, which made it mandatory to register the energy performance certificates of buildings. The Ministry of Transport, Construction and Regional Development (MoTCRD) is responsible for keeping records of certificates. Decree of the

Ministry of Construction and Regional Development (MoCRD) No 625/2006³ was issued to implement the Act, replaced in 2009 by MoCRD Decree No 311/2009,⁴ which reflected the practical need to adjust the criteria values for the measured building operation energy requirement in the certification of buildings.

At the end of 2010, the MoTCRD's database held 9 343 building energy performance certificates. The energy savings amounted to approximately **36.27 TJ**. The calculation of these savings is based on a comparison of the better thermal indicators of certified buildings, weighed against the minimum values for thermal indicators in the relevant class, as specified in MoCRD Decree No 311/2009.

Periodic inspections of facilities used for heat supply in commercial operations on the heat market were carried out annually as of 1998, in accordance with Act No 70/1998 on energy. Since 2005, following the adoption of Act No 657/2004 on thermal energy, these inspections have been carried out every three years. Every year, SIEA officials verify the efficiency of approximately 1 500 boilers. The implementation of Directive 2002/91/EC on the energy performance of buildings introduced the obligation for periodic boiler inspections for all boilers in non-manufacturing structures with an effective rated output of 20 kW or more (Act No 17/2007 on periodic inspection of boilers, heating systems and air-conditioning systems). Reports on inspections of boilers, heating systems and air-conditioning systems under Act No 17/2007 are registered and evaluated by the SIEA. In 2009 and 2010, 750 inspections of boilers were carried out in non-manufacturing structures, of which approximately 15% were voluntary since they were conducted much earlier than required by law. An initial analysis of the reports shows that, in family houses in particular, approximately 15% of boilers have poorer combustion efficiency than that prescribed in the relevant decree.

In view of the delayed implementation of the monitoring system, sufficiently accurate documentation is not currently available for the evaluation of this measure by the bottom-up method.

4.2.3 Improvements in the thermal properties of buildings – State Housing Development Fund (SHDF) – building insulation

The State Housing Development Fund (SHDF) was established in 1997 under Act No 124/1996 on the State Housing Development Fund; it provides support for the expansion and modernisation of the housing stock, particularly in the form of favourable long-term loans.

SHDF assistance is available subject to a reduction of at least 20% in heat consumption required for heating purposes compared to the computationally determined requirement for heat for heating purposes. The heating energy savings actually achieved are not monitored in the individual projects supported by the SHDF. In 2008–2010, the SHDF provided assistance for the insulation of 446 buildings. Since energy savings in individual projects were not monitored, energy savings could be quantified only by applying an average energy savings value of 20% for all projects, i.e. on the basis of the condition for qualifying for loans from SHDF funds. This method for determining the savings resulting from the implementation of projects in 2008–2010 indicates energy savings of approximately **200.7 TJ**.

³ MoCRD Decree No 625/2006 implementing Act No 555/2005 on the energy performance of buildings and amending certain laws

⁴ MoCRD Decree No 311/2009 establishing details concerning the calculation of the energy performance of buildings and the content of energy performance certificates

4.2.4 Improvements in the thermal properties of buildings – Housing Development Support Programme, grants for the removal of system defects in blocks of flats

The purpose of this form of support is to remove system defects in blocks of flats originating from the incorrect specification of materials and details, the incorrect use of construction technology, or a failure to comply with the planned construction procedures. It is used only for the reconstruction of blocks of flats built with panel (prefab) technology.

In light of the primary objective of removing a structural defect, the award of a grant is not subject to the submission of a thermal assessment of structural elements and of the building by the applicant, despite the fact that the technical procedure includes the partial or full insulation of blocks of flats when removing multiple system defects. There has recently been a substantial rise in the proportion of defect repair projects involving the thermal insulation of buildings. As in the case of the SHDF, eligibility for support is not tied to achieving specific minimum savings in heating energy by fixing the defect.

The actual energy savings from the projects supported were not evaluated, which prevents an accurate assessment of the contribution of this measure to overall energy savings. Based on the information available, average energy savings of 20% were used to quantify the energy savings achieved. Energy savings thus calculated can be quantified at **15.78 TJ** for the 2008–2010 period.

4.2.5 Improvements in the thermal properties of buildings – “Building and development of civil infrastructure”

This measure was referred to as a continuation in the upgrading of the existing infrastructure of buildings carried out in 2004–2006 with the support of the Structural Funds. Measure 3.1 (“Building and development of civil infrastructure”) of the Basic Infrastructure Operational Programme (BI OP) supported projects for the insulation of buildings and upgrading of existing technologies within the scope set out in Table 5.

Table 5: Measures supported under the BI OP – “Building and development of civil infrastructure”

Title of sub-measure		Number of projects supported [number]	Grant awarded	
			[SKK]	[EUR]
3.1.1	Building and development of education infrastructure	86	1 047 176 963	34 759 907
3.1.2	Building and development of healthcare infrastructure	28	946 596 703	31 421 254
3.1.3	Building and development of social infrastructure	26	213 960 754	7 102 196
3.1.4	Building and development of cultural infrastructure	38	316 487 146	10 505 448

Source: Report on the implementation of the BI OP

This measure cannot be evaluated by reference to data on quantified energy savings, but only based on the number of completed projects and project costs. During the implementation of the BI OP, energy savings were not monitored in the form of indicators, even in building insulation projects. As most of the 178 renovated buildings are schools and healthcare

facilities, it can be assumed that the energy savings, although precisely quantifiable, were significant.

4.2.6 Improvements in the thermal properties of buildings – Renovation of blocks of flats through commercial banks and building societies

The Slovak Republic provides state subsidies for building-society savings schemes.⁵ The concept of building-society savings schemes can be used to implement measures delivering energy savings. Due to the unavailability of relevant structured information, the savings achieved cannot be evaluated by the bottom-up method. The support for construction and reconstruction projects by means of soft loans does not require any evaluation of building energy indicators. For new non-manufacturing structures, the project evaluations will be encapsulated to some extent through energy performance certification.

4.2.7 Improvements in the thermal properties of buildings – Internally-funded renovation of blocks of flats and family houses

No information is currently available on thermal insulation projects for blocks of flats and family houses financed by the residents. The database of building certificates is not sufficient for this purpose because it does not identify the source of funding for renovation projects. Due to the lack of information, this measure cannot be evaluated by the bottom-up method. As with the previous measure, any significant energy-related renovation of buildings should, as a rule, go through the building permit procedure and then energy performance certification. In the certificate database, 720 renovated family houses are currently registered. It should also be noted that major building renovations do not usually include an “operational assessment” that would provide a realistic view of the achievable energy-savings of buildings after their renovation.

4.2.8 Draft legislative measures – amendment of building regulations

A draft measure included plans for the following activities:

- the creation of a mandatory “building documentation package” in order to clarify and simplify the processing of energy audits and certification of buildings, MoCRD (2008);
- more stringent requirements regarding the thermal properties of buildings and structural elements for new and renovated buildings, MoCRD (2010);
- regular updating of building regulations and procedures for the design, construction and commissioning of buildings, and a further improvement in the quality of work by building authorities, MoCRD (2010).

Of the planned activities, only the draft of the new Building Act (2009) was prepared; however, the legislative process for the preparation of this legal amendment had not been completed by the end of 2010. The measure essentially remains to be implemented in its entirety. It will be applied in the Second AP to a certain degree as part of the transposition of Directive 2010/31/EU on the energy performance of buildings.

4.2.9 Draft legislative measures – updating and amendment of regulations on the energy efficiency of buildings

⁵ E.g. in 2010 the maximum government subsidy was EUR 66.32 per dwelling.

Act No 476/2008 on energy efficiency amended Act No 555/2005 on the energy performance of buildings; it introduced the requirement to register the energy performance certificates of buildings, evaluate them on a regular basis, and provide information to the monitoring system operator.

In 2009, MoCRD Decree No 311/2009 entered into effect, fully replacing the original Decree No 625/2006 and adjusting the boundaries of energy classes based on the experience of certification. Methodological guidance was also issued with the decree.

On 1 January 2010, a building energy assessment module was launched in the INFOREG information system, which automatically assigns serial numbers for the energy performance certificates of buildings and keeps records of them. The Slovak Chamber of Civil Engineers, which carries out tests of professional competence for individual points of consumption, had a register of 320 competent officials at the end of 2010. The nature of the measure prevents an evaluation using the bottom-up method.

4.2.10. Improvements in the thermal properties of buildings used within the framework of civil infrastructure

In the 2008–2010 period, 14 projects to improve the infrastructure of amenities were carried out under the Regional Operational Programme (ROP) with the backing of the Ministry of Agriculture and Regional Development (MoARD), achieving energy savings of **22.44 TJ**. Contracts to implement over 900 projects have been signed under this measure. However, actual project implementation is not planned until the years 2011 to 2013, and therefore the savings under this measure will be reflected in the next period. The estimated amount of savings achievable by implementing these contracted projects in the next period is approximately 1 900 TJ.

4.2.11 Improvements in the thermal properties of buildings where health care is provided

In the 2008–2010 period, no projects aimed at improving the thermal properties of operational buildings were implemented under the Health OP, coordinated by the Ministry of Health. In the evaluation of the First AP, only projects financed from the internal resources of healthcare facilities, the budgets of municipalities and higher territorial units (HTUs) or contributions from the national budget were taken into consideration. Underlying documentation was provided by the Ministry of Health (MoH). These projects improved the thermal properties of solid cladding, replaced openings, or upgraded heat sources and heating systems. Energy savings under the projects implemented during the 2008–2010 period were quantified at **46.94 TJ**.

During the 2011–2013 period, the Health OP will support further projects; 25 projects with expected savings of 47 TJ are already known. Projects funded from central government, local and private sources will also continue.

4.2.12 Improvements in the thermal properties of buildings used for education

Under the Research and Development Operational Programme, coordinated by the Ministry of Education, Science, Research and Sport (MoESRS), grant contracts have been signed for

20 projects aimed at improving and enhancing research and development infrastructure in the Slovak Republic, including improving the thermal properties of such facilities' buildings. However, none of the projects had been completed by the end of 2010. Most of these projects will be implemented in 2011 and 2012; therefore the projected savings of approximately 35 TJ will be included in the years 2011 to 2013.

4.2.13 Improvements in the thermal properties of buildings during the regeneration of settlements in the Bratislava Region

Under Measure 1.1 Regeneration of settlements, activity group 1.1.1 Preparation and implementation of integrated urban development strategies in selected areas of Bratislava, no call has yet been made seeking applications for grants under the Bratislava Region Operational Programme. Energy savings under this measure cannot be reported for the period covering the First AP.

4.2.14 Installation of heat pumps and high-efficiency air-conditioning systems in non-manufacturing structures

In view of the link to support from the EEF, which has not been established, this measure was not implemented in practice.

4.2.15. Measures to promote voluntary certification and auditing

In view of the link to support from the EEF, which has not been established, this measure was not implemented in practice.

4.2.16 Construction of buildings with enhanced thermal indicators (new construction systems, low-energy houses, passive houses...)

In view of the link to support from the EEF, which has not been established, this measure was not implemented in practice.

4.2.17 Improvements in the thermal properties of buildings - SLOVSEFF (additional measure)

The SLOVSEFF Programme (2007–2010, Stage I) was allocated support of EUR 15 million from the Bohunice International Decommissioning Support Fund (BIDSF) and credit of EUR 60 million from the European Bank for Reconstruction and Development (EBRD). The funds were divided among the participating commercial banks (Dexia banka Slovensko, a. s., Slovenská sporiteľňa, a. s., Tatra banka, a. s., Všeobecná úverová banka, a. s.) for lending to the private sector, housing managers and residential consumers to invest in energy efficiency development and renewable energy source projects in the Slovak Republic in line with the objectives of the BIDSF.

In preparing the projects, applicants were provided with free technical support in the form of simplified energy audits, a rational energy use plan, and assistance with the submission of loan applications from project consultants. Building renovation grants were awarded subject to proof of energy savings of at least 15% per year after completion of the project. In the first stage, the amount of the grant was 20% of the loan for financing the planned measures. The funds were used mainly to improve the thermal properties of cladding and to build boiler rooms.

The implementation of projects supported under the SLOVSEFF I Programme achieved energy savings of **128.1 TJ** in the 2008–2010 period. The quantification of savings was helped considerably by the strict requirement that savings must be verified, motivated in the

form of support from a grant. The successful running of the programme prompted the launch of Stage II of the SLOVSEFF Programme in 2010.

4.2.18 Government Thermal Insulation Programme (additional measure)

In 2009, the Slovak Government allocated EUR 70.87 million to the Government Thermal Insulation Programme, under which a 15-year interest-free loan was granted to improve the thermal properties of 346 blocks of flats and family houses. The programme was aimed at reducing energy consumption; at the same time, it was conceived as a measure to mitigate the economic crisis. The SHDF was responsible for programme administration, and loans were granted only on condition that, when the application was submitted, the project demonstrated a reduction of at least 20% in the energy requirements for heating.

Since the energy performance results of projects were not subsequently monitored, the assessment of the First AP can only include savings quantified by the reduction in energy requirements, which totalled **15.57 TJ**. Experience of the SLOVSEFF Programme and other specific projects indicates that the actual savings are higher.

4.2.19 Improvements in the thermal properties of buildings – Ekofond (additional measure)

SPP, a.s. set up a non-investment, non-profit fund known as the “Ekofond”, geared towards the promotion of projects aimed at implementing measures to improve energy efficiency and the environment. The fund allocates financial resources through various programmes. Programme 02 (Improvements in the energy performance of buildings) was funded in the reporting period within the scope indicated in Table 6.

Table 6: Measures supported by the Ekofond

Sub-programme		Activity supported	Subsidy [EUR thousands]
02/A	Family houses	thermal insulation of building envelopes	99.6
02/B	Blocks of flats	thermal insulation of building envelopes	497.9
02/C	Non-productive and public buildings	— thermal insulation of building envelopes — replacement of windows	1 440.0
02/D	Schools and educational facilities	— hydraulic balancing of the heating system and thermostating	497.9

Total energy savings from individual projects under this measure are **28 TJ**. In the subsidy allocation process, the projects are evaluated in terms of the achievability of energy savings; the savings are then verified one year after completion of the project, with the release of 30% of the agreed subsidy. The quantified savings may therefore be deemed reliable.

4.2.20 Increase in the energy efficiency of the technical facilities of buildings – Ekofond (additional measure)

In 2009, the replacement of existing boilers with condensing boilers was supported in a Boiler Scrappage Scheme under the Ekofond. In all, 440 boilers were replaced, with a contribution of EUR 223 000 from the Ekofond.

The Ekofond, together with its founder, Slovenský plynárenský priemysel, a.s. (SPP), built on the extremely successful Boiler Scrappage Scheme from 2009 by announcing a new project called EkoBonus on 22 March 2010. Under the EkoBonus project, EUR 568 035 was disbursed and 1 847 boilers were replaced. Minimum savings of 10% of the average fuel consumption of households with gas-fired heating were used for calculating the savings achieved. This measure achieved total energy savings of **3.77 TJ**.

4.2.21 Energy Efficiency in Public Buildings – pilot project (additional measure)

In 2008, a call for the implementation of projects was published under the SIEA-managed pilot project Energy Efficiency in Public Buildings. The project was initiated by the EBRD and is funded by the BIDSF. The aim is to reduce energy intensity in the operation of public buildings in the Trnava and Nitra Regions by means of energy efficiency measures. Renovation work is in progress in the first 16 buildings; procurement procedures are underway for a further 26 projects. This measure will continue in 2011 and 2012; the decision on whether to continue the project after that period will depend on how successful the project is. No projects were completed in the reporting period, and it will therefore not be possible to assess the effect of this measure until the following 2011–2013 period.

4.2.22 Overall evaluation of measures in the Buildings sector

Of all the sectors, Buildings accounted for the most measures. In the 2008–2010 period, savings determined by the bottom-up method amounted to approximately **498 TJ**. The greatest energy savings were achieved by means of support from the SHDF and the SLOVSEFF Programme.

A drawback of some of these measures is the inconsistent monitoring or complete failure to monitor the energy savings achieved by individual projects; this makes subsequent quantification very challenging. One of the reasons why energy savings cannot be accurately quantified is that most of the major renovation projects implemented with the backing of multiple support mechanisms did not include a building certification process.

A significant improvement in project monitoring is expected once the monitoring system has been brought into operation; interim evaluations are also planned.

As the Energy Efficiency Fund was not established, the support measures planned under this fund were not implemented (installation of heat pumps and high-efficiency air-conditioning systems in non-manufacturing structures, measures to promote voluntary certification and auditing, construction of buildings with enhanced thermal indicators). As an alternative solution, the MoEc decided to create an Energy Efficiency Support Programme; however, not enough funding was allocated to this programme. Special action was taken to allocate funds from the MoEc's heading in the national budget so that at least to the system for monitoring energy use efficiency could be implemented.

In the Second AP, the measures aimed at buildings operated by central and local government authorities have been transferred from “buildings” to “public sector”. This is a way of highlighting the public sector's role in energy efficiency.

Table 7: Summary overview of measures in the Buildings sector in the 2008–2010 period

No	Title of measure	Details	Year, period	Duration of measure	Energy savings planned in the First AP	Energy savings achieved in 2008–2010	Investment planned in the First AP	Actual investment in 2008–2010
					[TJ]	[TJ]	[EUR thousands]	[EUR thousands]
2.1	Application of legislative measures	Act 657/2004 – hydraulic balancing of heating and hot water systems	2008 - 2010	Since 2006	641.19	0.00	33 161	0.00
2.2	Application of legislative measures	Act 555/2005 and Act No 17/2007 – energy certification of buildings, regular inspections of boilers, heating systems and air-conditioning systems	2008 - 2010	Since 2005	18.99	36.27	1 892	3613.73
2.3	Improvements in the thermal properties of buildings	State Housing Development Fund – thermal insulation of buildings	2008 - 2010	Since 1996	146.25	200.70	91 283	84360.00
2.4	Improvements in the thermal properties of buildings	Housing Development Support Programme, subsidies for the removal of systemic defects in blocks of flats	2008 - 2010	Since 1996	16.64	15.78	8498	87731.00
2.5	Improvements in the thermal properties of buildings	Structural Funds 2004–2006, BI OP, Measure 3.1 “Building and development of civil infrastructure”, with a focus on the insulation of buildings and upgrading of existing technologies	2008 - 2010	2004-2008	13.68	0.00	6 987	0.00
2.6	Improvements in the thermal properties of buildings	Renovation of blocks of flats – commercial banks, including building societies	2008 - 2010	No limits	148.20	0.00	74686	0.00
2.7	Improvements in the thermal properties of buildings	Renovation of blocks of flats and family houses (thermal insulation, window replacement) – own funds	2008 - 2010	No limits	39.00	0.00	19 916	0.00
2.8	Draft legislative measures	Amendment of building regulations	2008 - 2010	Since 2008	0.00	A)	199	0.00
2.9	Draft legislative measures	Update and amendment of provisions on the energy performance of buildings	2008 - 2010	Since 2008	0.00	A)	199	0.00
2.10	Improvements in the thermal properties of buildings used by civil infrastructure facilities	Structural Funds (2007–2013), Regional Operational Programme, MoCRD	2008 - 2010	2007-2015	36.24	22.44	18 502	0.00
2.11	Improvements in the thermal properties of	Structural Funds (2007–2013), Health	2008 -	2007-2015	10.20	46.94	3 455	432536.00

No	Title of measure	Details	Year, period	Duration of measure	Energy savings planned in the First AP	Energy savings achieved in 2008–2010	Investment planned in the First AP	Actual investment in 2008–2010
					[TJ]	[TJ]	[EUR thousands]	[EUR thousands]
	buildings where health care is provided	Operational Programme, MoH	2010					
2.12	Improvements in the thermal properties of buildings used for education	Structural Funds (2007–2013), Research and Development Operational Programme, MoESRS	2008 - 2010	2007-2015	45.87	0.00	23402	811.00
2.13	Improvements in the thermal properties of buildings during the regeneration of settlements in the Bratislava Region	Structural Funds (2007–2013), Bratislava Region Operational Programme, MoCRD	2008 - 2010	2007-2015	24.15	0.00	12 328	0.00
2.14	Installation of heat pumps and high-efficiency air-conditioning systems in non-productive structures	HP Support Programme (funding from the EEF)	2008 - 2010	Not implemented	83.33	0.00	25354	0.00
2.15	Measures to promote voluntary certification and auditing	Measures to promote voluntary certification and auditing (funding from the EEF)	2008 - 2010	Not implemented	17.5	0.00	5045	0.00
2.16	Construction of buildings with enhanced thermal indicators (new construction systems, low-energy houses, passive houses...)	Low-energy and Passive House Support Programme (funding from the EEF)	2008 - 2010	Not implemented	16.73	0.00	10622	0.00
2.17	Improvements in the thermal properties of buildings – Slovseff	Slovseff	2008 - 2010	Since 2008	0.00	128.10	0.00	38255.43
2.18	Government Thermal Insulation Programme 2009	Rounding-off of the measure from 2009	2009	2009	0.00	15.57	0.00	70871.00
2.19	Ekofond – Improvements in the thermal properties of buildings	Ekofond	2008 - 2010	Since 2009	0.00	28.00	0.00	4200.00
2.20	Ekofond – Increase in the energy efficiency of technical facilities in buildings	Ekofond	2008 - 2010	Since 2009	0.00	3.77	0.00	660.00
2.21	Energy Efficiency in Public Buildings – pilot project	Project funded by the BIDSF	2008 - 2010	Since 2008	0.00	0.00	0.00	0.00
Total			2008 - 2010		1257.97	497.57	335 529	723 038.16

A) In view of the nature of the measure, it is not evaluated by the bottom-up method.

4.3 Appliances

Energy-using appliances are a sector with significant potential for energy savings based on long-term legislative and technical activities – since 1992 a system of European legislation has been in place that governs the energy consumption of appliances and other important appliance inputs. In 2009 and 2010, this legislation was substantially amended in accordance with progress made in reducing the consumption requirements of appliances.

4.3.1 Application of legislative measures on energy labelling

The initial energy labelling measures are defined in Directive 92/75/EEC on the indication by labelling and standard product information of the consumption of energy and other resources by household appliances, and its implementing directives on the energy labelling of specific appliances. This Directive was subsequently (in 2010) superseded by Directive 2010/30/EU on the indication by labelling and standard product information of the consumption of energy and other resources by energy-related products (recast) (the “Energy Labelling Directive”). The new Directive extends the possibilities of energy labelling to all energy-related products and lays down conditions concerning advertising, public procurement and incentives in relation to the various forms of sales and demonstrations of these products. The Framework Directive has been followed up by four delegated Commission regulations setting out conditions for the energy labelling of different appliances (dishwashers, refrigerating appliances, washing machines and televisions), which are directly binding in their entirety and applicable in all Member States. The delegated regulations are gradually replacing the Commission’s implementing directives on the energy labelling of appliances. A list of the delegated regulations can be found in Annex 3.

On acceding to the EU, the Slovak Republic adopted the implementing directives on the energy labelling of specific appliances by means of Government regulations. The delegated regulations, which are gradually replacing the original implementing directives, will also replace the Government regulations in this area. An energy labelling bill transposing Directive 2010/30/EC on energy labelling is currently pending.

In view of the specific nature of this measure, the energy savings achieved cannot be directly quantified by the bottom-up method; nevertheless, the measure has had a significant impact in the “white goods replacement” area.

4.3.2 Information activities – European Committee of Domestic Equipment Manufacturers

Measures in the field of consumer information and greater consumer awareness also contributed to high energy savings by promoting the replacement of white goods; this involved information and promotional activities by manufacturers, retailers, CECED Slovakia and other consumer associations. The information was communicated through retailer advertising (billboards, leaflets and fact sheets). Various retailers held numerous offers designed to make sales of white goods in the best energy categories more favourable.

In view of the specific nature of this measure, the energy savings cannot be directly quantified by the bottom-up method; nevertheless, the measure has had a significant impact in the “white goods replacement” area.

4.3.3 Draft legislative measures in the area of product technical requirements

Three directives on the minimum technical efficiency of refrigerators, boilers and ballasts have been issued in the field of energy efficiency.⁶ The emphasis on energy efficiency at European level required the adoption of framework legislation governing not only particular types of appliances, but also defining the framework conditions for placing appliances on the EU's internal market. This led to the adoption of Directive 2005/32/EC establishing a framework for the setting of ecodesign requirements for energy-using products, which was replaced by Directive 2009/125/EC establishing a framework for the setting of ecodesign requirements for energy-related products (recast). The Framework Directive, which applied only to energy-using products, was extended to all energy-related products in the recast version. On 14 December 2010, Act No 529/2010 on the environmental design and use of products (the Ecodesign Act), transposing Directive 2009/125/EC, was adopted.

The Framework Directive has also been followed up by Commission regulations on the ecodesign requirements for selected product groups; these regulations are directly binding in their entirety and applicable in all Member States. They are gradually replacing the original Energy Efficiency Directives on refrigerators (92/42/EEC), boilers (96/57/EC) and ballasts (2000/31/EC), and thus also the Government's transposing regulations. A list of the Commission regulations can be found in Annex 3.

These measures contribute directly to energy savings; with close monitoring, the energy savings of some of them can be quantified reasonably accurately – in particular, Regulation No 244/2009 and its progressive ban on the sale of conventional bulbs, replacing them with more energy-efficient lamps.⁷ However, specific data from lamp manufacturers are not available. Therefore, it is impossible to evaluate this potentially important measure in terms of electricity savings by the bottom-up method. Based on a qualified estimate, the energy saving between 2008 and 2010 is thought to be in the range of 500 to 1 000 TJ; however, in view of the high uncertainty of the estimate it is not included in the evaluation of savings.

Other direct savings have been achieved by implementing Commission regulations on refrigerators, washing machines and dishwashers, which set the final date on which products in the worst energy efficiency class can be marketed.

4.3.4 Consumer association activities aimed at comparing the energy efficiency of appliances

In the 2008–2010 period, there was no activity under this planned measure. As the European Committee of Domestic Equipment Manufacturers (CECED) is preparing a campaign to promote white goods for 2011, this measure will be transferred to the Second AP.

⁶ Council Directive 92/42/EEC of 21 May 1992 on efficiency requirements for new hot-water boilers fired with liquid or gaseous fuels. Directive 96/57/EC of the European Parliament and of the Council of 3 September 1996 on energy efficiency requirements for household electric refrigerators, freezers and combinations thereof. Directive 2000/55/EC of the European Parliament and of the Council of 18 September 2000 on energy efficiency requirements for ballasts for fluorescent lighting.

⁷ Commission Regulation (EC) No 244/2009 of 18 March 2009 implementing Directive 2005/32/EC of the European Parliament and of the Council with regard to ecodesign requirements for non-directional household lamps.

4.3.5 Consumer information campaigns on the energy efficiency of appliances

This measure was not implemented under the First AP due to the administrative demands of projects supported by the Structural Funds. It will be carried out in the Second AP as part of the ENERGY FOR LIFE project, to be implemented by the SIEA.

4.3.6 Improving the standard of advice for consumers by training appliance importers and retailers

When the First AP was being drawn up, the conditions for the financing of training under the OP were not known in any detail. Following the approval of the Education OP, it became clear that the measure could not be funded under this operational programme. No other information is available on other ways of financing the training of appliance importers. In view of the difficulties relating to practical application, this measure will be discontinued.

4.3.7 White goods replacement

This measure was not supported by the EEF, but took the form of a discount for consumers purchasing a new energy-efficient appliance in exchange for their old, energy-intensive appliance.

The total number of refrigerators and freezers replaced in the Slovak Republic are included in the savings generated by this measure; this is the only programme currently available for all white goods in the Slovak Republic. Only those savings achieved by the exchange of refrigerators and freezers are included in the quantification of energy savings. Energy savings delivered by this measure in the 2008–2010 period amounted to approximately **1 013 TJ**. We assume that the actual energy savings resulting from the total replacement of white goods in this period is much higher.

It is proposed that this measure be continued under the Second AP; it is projected that, with 2.3 million refrigerators and freezers in the Slovak Republic and an average replacement rate of 140 000 appliances per year, this measure will contribute to energy savings for another 10 years at current levels.

4.3.8 Overall evaluation of measures in the Appliances sector

White goods replacement and supporting measures resulted in much greater savings than expected. For the first time, it was possible to quantify actual energy savings directly for some appliances. In the absence of comprehensive data, it was only possible to quantify energy savings in the segment of refrigerators and freezers since 2006. In view of the significant potential for savings, the decommissioning and sales/marketing of other large white goods needs to be monitored in order to ensure the accurate quantification of energy savings achieved by this measure in the coming years.

Table 8: Summary overview of measures in the Appliances sector in the 2008–2010 period

No	Title of measure	Details	Year, period	Duration of measure	Energy savings planned in the First AP	Energy savings achieved in 2008–2010	Investment planned in the First AP	Actual investment in 2008–2010
					[TJ]	[TJ]	[EUR thousands]	[EUR thousands]
3.1	Application of legislative measures	Energy labelling	2008 -2010	Since 1992	240.00	0.00	0.00	0,00
3.2	Voluntary information campaigns aimed at energy-saving appliances	information activities by the European Committee of Domestic Equipment Manufacturers (CECED Slovakia)	2008 -2010	since 2000	15.00	0.00	99.58	0,00
3.3	Voluntary information campaigns aimed at energy-saving appliances	activities by consumer associations to compare the energy efficiency of appliances	2008 -2010	since 2000	7.50	0.00	49.79	0,00
3.4	Draft legislative measures	Establishing technical requirements for products	2008 -2010	Since 1992	0.00	0.00	248.95	0,00
3.5	Information campaigns for consumers on the energy efficiency of appliances	Structural Funds (2007–2013), CaEG Operational Programme, MoEc	2008 -2010	2007-2015	28.50	0.00	99.58	0,00
3.6	Increase in the standard of guidance for consumers by training appliance importers and retailers	Structural Funds (2007–2013), Education Operational Programme, MoESRS	2008 -2010	2007-2015	22.50	0.00	99.58	0,00
3.7	White goods replacement	EEF	2008 -2010	since 2000	60.60	1013.40	47251.54	44563,00
Total			2008 -2010		374.10	1013.40	47849.02	44563.00

4.4 Public sector

Under the First AP, the public sector comprises only measures relating to public street lighting. Other measures aimed at equipment and buildings used by public sector organisations are contained either in the buildings sector or in the horizontal measures (e.g. the application of the principle of energy efficiency in public procurement).

Measures under the First AP were evaluated by sector. In the Second AP, however, all measures concerning public sector are planned and evaluated within the same group.

4.4.1 Public Street Lighting Centre

The Public Street Lighting Centre (PSLC) was founded in 2006 by the Bratislava Energy Centre as part of the project “Removing Barriers to the Reconstruction of Public Street Lighting in Slovakia”, supported by grant funds from the UNDP/GEF. The PSLC’s mission is to encourage investment in the reconstruction of public street lighting in the Slovak Republic by providing consultancy and advisory services in the fields of project preparation, implementation and funding, and during actual reconstruction.

Since its inception, the PSLC has conducted a hundred public street lighting energy audits, prepared eight sets of project documentation for building permits, and drawn up 23 applications for support mechanisms. The PSLC has also provided guidance to more than 100 local and regional government bodies, organised four seminars on public street lighting, and actively presented information on effective public street lighting at several conferences, as well as in the print, radio and television media and its own magazine, Svetlonos, which is available to all local and regional government bodies free of charge.

Annual energy savings after the reconstruction of public street lighting systems supported by PSLC activities amounted to approximately 10.08 TJ/yr in 2010 (this is the cumulative result compared to the situation in 2006). These savings apply to the 5 346 light points addressed in the projects that have been implemented.

Projects in the reconstruction process offer potential savings of approximately 1.19 TJ/yr. The potential savings under all projects on which the PSLC has advised or which it has otherwise helped to implement are approximately **15.84 TJ**. Several of these projects are funded, for example, by the Norwegian Financial Mechanism and the EEA Financial Mechanism or by the Structural Funds; to avoid double counting, energy savings under this measure are not included separately in the total public sector savings.

4.4.2 Provision of energy services related to public street lighting

In view of the change in the launch date of the monitoring system, energy savings achieved by the provision of energy services in the operation of public street lighting cannot be evaluated by the bottom-up method. On the basis of documentation identified in the application of the arrangements for the reconstruction and subsequent operation of public street lighting systems in major cities by private companies, we estimate that the savings under this measure were at least **10 TJ** in the period under review.

4.4.3 Draft legislative measures

The minimum requirements for the energy efficiency of lamps used in public street lighting systems are laid down by EC Regulation 245/2009 implementing Directive 2005/32/EC of the European Parliament and of the Council with regard to ecodesign requirements for fluorescent lamps without integrated ballast, for high intensity discharge lamps, and for ballasts and luminaires able to operate such lamps. This Regulation is also binding on the Slovak Republic. This measure could contribute to energy savings by unblocking the sale of inefficient luminaires and lamps – it can be evaluated by the bottom-up method only by drawing on information on sales of such luminaires, which is not currently available.

4.4.4 Upgrading of public street lighting – Structural Funds

The upgrading of public street lighting is intended to replace obsolete, often broken luminaires and lamps with new, less energy-intensive luminaires and lamps offering better illumination. Only solutions using best available technology (BAT) can be applied in the implementation of this measure.⁸ The project must also include a system to control the operation and intensity of the lighting, which can increase savings by about 10% to 15%.

Public street lighting upgrade projects supported by the Structural Funds under the Competitiveness and Economic Growth OP (Measure 2.2) have reached the implementation phase. Of the projects from the first call, 117 are in progress and will be completed in 2010 and 2011. The savings planned from the implementation of these projects, 13.7 TJ, will be included in the Second AP. In the second call, the evaluation process is under way and the number of projects to be supported will not be known until 2011. It will be possible to evaluate the overall effect of the measure only in the Second AP.

4.4.5 Upgrading of public street lighting – EEA Financial Mechanism and Norwegian Financial Mechanism

Public street lighting upgrading projects financed by the EEA Financial Mechanism and the Norwegian Financial Mechanism were completed in the 2008–2010 period and contributed **5.53 TJ** to energy savings. There are no immediate plans to continue this measure from such funds.

4.4.6 Overall evaluation of measures in the Public Sector sector

In the public sector, energy savings of **15.53 TJ** were quantified by the bottom-up method in the 2008–2010 period. This low performance can mainly be attributed to the fact that public street lighting upgrade projects funded through the Structural Funds have not yet been completed and therefore could not contribute to the savings in the period under review. Nor can savings from the provision of public street lighting energy services be quantified, as there is no access to data on individual projects that could be categorised as energy services.

⁸ Information on BAT in this sector is available in the BREF reference document on best available technologies for energy efficiency, published in June 2008, Seville JRC.

Table 9: Summary overview of measures in the Public Sector in the 2008–2010 period

No	Title of measure	Details	Year, period	Duration of measure	Energy savings planned	Energy savings achieved	Investment planned in the First AP	Investment in 2010
					[TJ]	[TJ]	[EUR thousands]	[EUR thousands]
4.1	Public Street Lighting Centre	Advice on the operation and upgrading of public street lighting systems	2008 -2010	Since 2006	3.00	0.00	375.09	0.00
4.2	Provision of energy services related to public street lighting	Funding of projects aimed at making savings in public street lighting	2008 -2010	ongoing	241.60	10.00	44977.76	0.00
4.3	Provision of energy services related to public street lighting	Setting of minimum energy efficiency requirements for public street lighting	2008 -2010	Since 2009	0.00	0.00	49.79	0.00
4.4	Upgrading of public street lighting	Structural Funds (2007–2013), CaEG Operational Programme, Measure 2.2	2008 -2010	2007-2015	155.73	0.00	33572.99	0.00
4.5	Upgrading of public street lighting	Norwegian Financial Mechanism and EEA Financial Mechanism	2008 -2010	2008-2010	5.85	5.53	2718.58	3382.75
Total			2008 -2010		406.18	15.53	81694.21	3382.75

4.5 Industry

Industry measures were also planned for ETS companies originally. The reduction in the energy savings target and the exclusion of energy savings from measures implemented by ETS companies lowered the potential for the energy savings planned in industry in the First AP by as much as 70%.

4.5.1 Application of legislative measures

The application of legislative measures in the draft First AP was based on the principle that industrial cogeneration and heating plants also contribute to heat supply in connection with the periodic verification of the operating efficiency of heating equipment systems under Act No 657/2004 on thermal energy, which applies in particular to the energy industry, and that compliance with the principles for economical energy-use in relation to heat supplies would also lead to a rationalisation in the use of energy consumed directly at industrial plants.

As this measure mainly concerns ETS companies, its benefit in achieving the objectives of the First AP is essentially negligible.

4.5.2 Transfer of new, progressive and environmentally friendly technology

This measure, focusing on the transfer of new, progressive and environmentally friendly technology, was financed by the Structural Funds under the Industry and Services Sectoral Operational Programme (SOP) (Measure 1. Support for the development of new and existing undertakings and services). As energy saving indicators were not monitored during the implementation of the Industry and Services SOP in the years 2004 to 2006 for Measure 1.1. Support for the development of new and existing undertakings and services, it is impossible to evaluate the measure by the bottom-up method. Since the programming period of the 2004–2006 Structural Funds has ended, there are no plans to continue this measure in the Second AP.

4.5.3 Guiding the energy intensity of industry to a level comparable with the EU through savings and efficiency gains

This measure, aimed at increasing the efficiency of production processes, upgrading production facilities, renovating boilers, recovering waste heat, and introducing combined heat and power generation, was financed by the 2004–2006 Structural Funds under the Industry and Services SOP (Measure 4.1 Support for energy savings and the use of renewable energy sources). Seventeen projects with total energy savings of approximately **475.20 TJ** were implemented under this measure.

Since the programming period of the 2004–2006 Structural Funds has ended, there are no plans to continue this measure in the Second AP.

4.5.4 Energy audits at undertakings – a basis for determining the potential for energy savings

Energy audits are an important means of identifying potential savings at undertakings and should form the basis for the implementation of energy saving measures. The Energy

Efficiency Act imposed the obligation to conduct periodic assessments (every five years) of the energy intensity of operations in industry and agriculture. As the deadlines for the first obligatory assessments are the end of 2011 and the end of 2013, respectively, and as the EEF was not established as one of the instruments promoting voluntary energy auditing, the impact of the measure in 2008–2010 cannot be evaluated by the bottom-up method.

4.5.5 Monitoring and control of energy consumption at industrial undertakings

The funds to support the monitoring and control of consumption at industrial undertakings and the introduction of an energy management system were meant to come from the EEF, which was not established. This measure was partially covered by the SLOVSEFF Programme (see Section 4.5.10) and industrial undertakings' own resources. Two projects were realised under the Monitoring and Targeting Programme, funded by the Global Environmental Facility (GEF). The value of the savings achieved is approximately 159.6 TJ. Relevant information is not available on all projects for an overall evaluation of the measure using the top-down method.

4.5.6 Optimisation of energy conversion and distribution at industrial undertakings

The programme to support the optimisation of energy conversion and distribution at industrial undertakings was also meant to be funded by the EEF. Activities consistent with the planned measure were partially supported by the SLOVSEFF Programme and covered by industrial undertakings' own resources. The evaluation of the SLOVSEFF Programme's role in the Industry sector is set out in Section 4.5.10. The data necessary for an evaluation of activities financed from private sources are not available.

4.5.7 Innovation and technology transfers at industrial undertakings

Innovation and technology transfers are financed by the Structural Funds from the 2007–2013 programming period under (CaEG OP), Measure 1.1 Innovation and technology transfers. Under this measure, contracts have been signed to implement eight energy efficiency projects, of which only three were completed in 2010. The values of the measurable impact indicators (i.e. including energy savings) for these three projects will be available in 2012. The obligation to monitor energy savings based on a measurable impact indicator was set out in the terms and conditions of the call under this measure. It will be possible to evaluate the measure during the 2011–2013 period.

4.5.8 Increased energy efficiency in industrial production

Increases in the energy efficiency of industrial production can be supported under the Structural Funds from the 2007–2013 programming period via the CaEG OP (Measure 2.1 Increased energy efficiency in production and consumption and the introduction of progressive technologies in the energy sector). As most of the projects supported will not be completed until 2011, the energy savings monitored as impact indicators will be quantified in 2012.

4.5.9 High-efficiency cogeneration

High-efficiency cogeneration projects can also be supported under the Structural Funds from the 2007–2013 programming period via the CaEG OP (Measure 2.1 Increased energy

efficiency in production and consumption and the introduction of advanced technologies in the energy sector). However, businesses were put off by the time-consuming administration of projects supported by Structural Funds, and generally opted to use the support system under Act No 309/2009 on the promotion of renewable energy and high-efficiency cogeneration. The support mechanism under this Act is effective from January 2010 and the results of the first year of the Act's practical application will not be known until sometime in 2011.

4.5.10 Energy efficiency in industry - SLOVSEFF

The programme SLOVSEFF (see Section 2.4.17) also financed projects on energy efficiency in industry, mainly aimed at the renewal of heat generation installations, heat and compressed air distribution systems, the thermal insulation of industrial buildings and energy management. Projects were supported by a grant of 7.5% of the volume of lending under the programme. SLOVSEFF support for projects on energy efficiency in industry saved approximately 154 TJ of energy.

4.5.11 Overall evaluation of measures in the Industry sector

In the industry sector, energy savings quantifiable using the bottom-up method were achieved mainly with funding from the Structural Funds established for the 2004–2006 programming period and the SLOVSEFF Programme. Most projects financed under the 2007–2013 programming period have not yet been completed and the impact will be reflected in the evaluation of the 2011–2013 period. Measures that were meant to be supported by the EEF were partly covered by the SLOVSEFF Programme and partly financed from private sources.

Overall, based on the bottom-up method, energy savings in industry were quantified at **629 TJ**. However, it is well known that a number of other measures were carried out during the reporting period that helped to reduce energy intensity in industry. These projects were carried out mainly with private resources and the relevant data are unavailable.

Table 10: Summary overview of measures in the Industry sector in the 2008–2010 period

No	Title of measure	Details	Year, period	Duration of measure	Energy savings planned in the First AP	Energy savings achieved in 2008–2010	Investment planned in the First AP	Actual investment in 2008–2010
					[TJ]	[TJ]	[EUR thousands]	[EUR thousands]
5.1	Optimisation of energy conversion and distribution at industrial undertakings	Programme to promote the optimisation of energy conversion and distribution at industrial undertakings	2008 - 2010	-	729	A)	7667.80	A)
5.2	Transfer of new, progressive and environmentally friendly technologies	2004–2006 Structural Funds, Industry and Services SOP, Measure 1.1 Support for the development of new and existing undertakings and services	2008 - 2010	2004-2008	1.38	B)	2350.13	B)
5.3	Guiding the energy intensity of industry to a level comparable with the EU through savings and efficiency gains	2004–2006 Structural Funds, Industry and Services SOP, Measure 1.4 Support for energy savings and the use of RES	2008 - 2010	2004-2008	1.194	475.20	3153.42	13 188.08
5.4	Energy audits at undertakings - a basis for determining the potential for energy savings	Programme to promote and upgrade systems for the monitoring and control of consumption at industrial undertakings	2008 - 2010	-	75	C)	13012.02	C)
5.5	Monitoring and control of energy consumption at industrial undertakings	EEF, GEF	2008 - 2010	2007 - 2010	159.6	20.59	7634.60	B)
5.6	Optimisation of energy conversion and distribution at industrial undertakings	Programme to promote the optimisation of energy conversion and distribution at industrial undertakings	2008 - 2010	-	105	C)	66387.84	C)
5.7	Innovation and technology transfers at industrial undertakings	Structural Funds (2007–2013), CaEG OP, Measure 1.1	2008 - 2010	2007-2015	26.73	D)	14799.84	D)
5.8	Increased energy efficiency in industrial production	Structural Funds (2007–2013), CaEG OP, Measure 2.1	2008 - 2010	2007-2015	67.14	D)	33449.51	D)
5.9	High-efficiency cogeneration	Structural Funds (2007–2013), CaEG OP, Measure 2.1	2008 - 2010	2007-2015	10.94	D)	20746.20	D)
5.10	SLOVSEFF – industry	BIDSF	2008 - 2010	Since 2008	0.00	153.730	0.00	13209.56
Total			2008 - 2010		1175.98	649.52	169201.36	26397.64

A) item not evaluated – mainly focused on ETS companies

B) item not evaluated – no relevant data available

C) item not evaluated – the measure was not implemented because the planned financial mechanism (EEF) was not established

D) item not evaluated – a delay in the implementation of the measure (evaluation in 2011 to 2013)

4.6 Transport

Energy consumption in transport is one of the greatest challenges in achieving energy savings because transport is a long-term growing indicator in the field of final energy consumption. It is therefore necessary to propose measures that will facilitate a reduction in energy consumption in this sector while maintaining at least the same comfort of travel.

4.6.1 Application of legislative measures

The following legislative measures were applied during the reporting period:

- **Regulations on motor vehicle technical requirements** - the approximation of EU legislation concerning motor vehicle technical requirements.
- **Act No 280/2006 on the compulsory initial qualification and periodic training of certain drivers** – periodic training is an opportunity for those holding a certificate of initial qualification and drivers who are exempted from obtaining an initial qualification to update knowledge important for their work, with a particular emphasis on road safety and the rationalisation of fuel consumption.

4.6.2 Application of policy documents – bus and passenger rail transport policy – bus transport

The aim of this measure, constituting the financing of public interest services (public transport buses funded from the budgets of higher territorial units and towns), is bus fleet renewal. Subsidies for suburban public transport reduce carriers' costs and, to some extent, prevent increases in fares. This measure is evaluated by the questionnaire method, although the energy savings it makes cannot be assessed with sufficient accuracy due to the low proportion of completed questionnaires that are returned. Sufficiently accurate data are available only in connection with the granting of subsidies in the public interest, but not as regards the energy savings achieved by this measure. Benchmarking was used to calculate energy savings of **325.72 TJ** in 2008–2010; this was achieved by replacing old vehicles with new ones with much better fuel consumption and improved capacity. A partial overlap with Measure 1.11, concerning the renewal of HTU bus fleets, is possible.

4.6.3 Application of policy documents – bus and passenger rail transport policy – rail transport

The financing of rail transport under this measure is intended to fund the renewal of railway fleets operated in the public interest based on railway development policy. It draws on the document “Železni•ná spo•nos• Slovensko, a.s. Rolling Stock Upgrading and Development 2008–2010 (2012)” and the Progress Report on Projects to Operate the Rolling Stock of Železni•ná spo•nos• Slovensko, a.s. This measure achieved savings of **500 TJ**.

4.6.4 Application of policy documents – update of the combined transport development policy, MoTPT Order No 491/M-2006

This measure is intended to transfer freight from direct road transport to the railways. Government subsidies (Order of the Ministry of Transport, Posts and Telecommunications [MoTPT] No 491/M–2006 of 7 December 2007 on the subsidisation of combined transport) reduce transportation costs. The saving is calculated (in tkm) on the basis of goods transported directly by road and by rail transport (including collection and distribution) and the average specific energy consumption in road and rail transport (kJ/tkm). In 2008–2010, a government subsidy was granted for the transportation of sugar beet to sugar refineries and for a change in the mode of transport with the shipping company transporting the goods across the Slovak Republic. The change in the modes of transport led to energy savings of **35.15 TJ** in 2008–2010. No funding has been allocated to this measure since 2011.

4.6.5 Application of policy documents – possibility of limiting the age of vehicles used in the public interest

Placing an age limit on vehicles prompts periodic renewal of the vehicle fleet, resulting in a reduction in average fuel consumption in transport. The savings made under this measure are already included in the calculation of savings set out in Sections 4.6.2 and 4.6.3.

4.6.6 Replacement and upgrading of rolling stock in passenger rail transport

Rolling stock replacement and upgrading reduces average consumption by the rolling stock used in passenger rail transport. This measure is financed by the Structural Funds from the 2007–2013 programming period via the Transport OP (Measure: Public rail transport). Because of the delay in the implementation of projects, which will not be completed until after 2010, energy savings in the 2008–2010 period cannot be quantified by the bottom-up method. This measure is expected to last until 2017.

4.6.7 Improvement in vehicle energy efficiency – change in the motor vehicle tax structure, placing older vehicles at a disadvantage

This measure was implemented in the form of economic development assistance, with government funding allocated for the replacement of older vehicles with newer ones, i.e. until 31 December 2009, a “scrappage premium” provided to those who sold their old vehicle and bought a new one in its place. Under Decrees of the Ministry of Economy No 2/2009 and No 3/2009, the scrappage premium was open to those with a vehicle more than 10 years old who took it off the road.⁹ EUR 55.25 million was allocated to the first and second rounds of the scrappage scheme. Altogether, 44 200 vehicles, with an average age of 21 years, were scrapped, most of which were ŠKODAs, followed by VAZ and FIAT cars. From a regional perspective, most cars were scrapped in Prešov; the leading district for scrapped vehicles was Bratislava. More than 54% of vehicle owners were over 50 years old. As new vehicles are categorised under the Euro IV emission class, which features enhanced energy-efficient engines combined with lower fuel consumption, this vehicle replacement scheme leads to better fuel economy.

⁹ MoEc Order No 2/2009 of 4 March 2009 amending MoEc Order No 1/2005 on the granting of subsidies within the competence of the MoEc, as amended.

MoEc Order No 3/2009 of 3 April 2009 amending MoEc Order No 1/2005 on the granting of subsidies within the competence of the MoEc, as amended.

The following assumptions were applied in the calculation by the top-down method. If new cars are used in the same way as scrapped cars, these new cars will produce 18 163 tonnes of CO₂ per year, which is 2 235 tonnes of CO₂ less than the old scrapped cars, i.e. an 11% saving in CO₂ emissions. If the emission factor is incorporated, energy savings in the first round of the scrappage scheme can be quantified at 30.617 TJ, followed by 26.055 TJ in the second round. Overall, this measure saved approximately **56.67 TJ** of energy in 2008–2010.

4.6.8 Infrastructure charging as a means of balancing the different modes of transport

Charges have been applied to road infrastructure only since 1 January 2010, further to MoTPT Decree No 88/2009 – Tolling Rules. Information on the investment cost of implementing the measure in 2008–2010 and information on the energy savings in 2010 will become available during 2011. Motor vehicles weighing over 3.5 tonnes are required to pay a toll. This measure will continue in the future.

4.6.9 Traffic control optimisation and intelligent transport systems

Traffic control optimisation was intended to remove bottlenecks and thereby reduce fuel consumption. The intelligent transport system (ITS) project has yet to be implemented. Government Resolution No 22/2009 requires its implementation by the end of 2013. The project should be financed by the Structural Funds (2007–2013) under the Transport OP.

4.6.10 Public transport optimisation (transport service plans)

No relevant information is available for an assessment of this measure. There are no plans to continue this measure in the future.

4.6.11 Building transport infrastructure and removing bottlenecks

This measure concerns the construction of motorways and expressways financed by EU funds and the national budget. The removal of bottlenecks and increases in traffic flow help to reduce average fuel consumption. In the calculation of energy savings, consumption on old and new roads is compared, based on the same traffic intensity. The calculation relies on traffic intensity in the year in which the structure is put into operation (this is measured on certain sections). In sections where intensity is not measured, estimates and traffic intensity growth assumptions were used. The vehicle mix was also estimated.

Energy savings delivered by this measure in 2008–2010 amounted to **258.34 TJ**. In the 1996–2007 period, i.e. before the First Action Plan, the construction of motorways and expressways resulted in savings of 1 680.76 TJ. The construction of motorways and expressways is a long-standing priority of the Slovak Republic. Therefore, this measure will continue in the 2011–2016 period. In the first quarter of 2011, the Slovak Government should approve the Motorway and Expressway Preparation and Construction Programme for 2011–2014, which will include the sections planned for this period and details on how they are to be funded.

More realistic energy savings for the years 2013, 2016 and 2020 can be set by this calculation only after approval of the Motorway and Expressway Preparation and Construction Programme for 2011–2014. At present, we know that only one motorway section and four expressway sections will be completed by 2013, delivering total savings of approximately 65 TJ.

4.6.12 Building a basic network of public intermodal transport terminals

The plan was for this measure to be financed by the 2007–2013 Structural Funds via the Transport OP (Measure: Intermodal transport infrastructure). From 2011 onwards, container terminals (intermodal transport terminals) should be put into operation; annual energy savings are calculated from 2013 to 2020. It is therefore impossible to quantify the energy savings in the 2008-2010 period.

4.6.13 Overall evaluation of measures in the Transport sector

In view of the delayed implementation of measures planned in the transport sector, up to 50% of planned energy savings can be quantified by the bottom-up method. The largest share of energy savings was generated by bus fleet replacement (Section 4.6.2), the upgrading of rolling stock (Section 4.6.3), the scrappage scheme (Section 4.6.7) and the building and upgrading of transport infrastructure – motorways (Section 4.6.11). Total energy savings calculated in this sector are **1 176 TJ**.

Table 11: Summary overview of measures in the Transport sector in the 2008–2010 period

No	Title of measure	Details	Duration of measure	Energy savings planned in the First AP	Energy savings achieved in 2008–2010	Investment planned in the First AP	Actual investment in 2008–2010
				[TJ]	[TJ]	[EUR thousands]	[EUR thousands]
6.1	Application of legislative measures	Regulations on technical requirements, Act No 280/2006	since 2006	12.00	0.00	99.58	0.00
6.2		Bus and passenger rail transport policy – financing of public interest services – buses (HTU budgets, public transport – towns)	MoTCRD	75.00	325.72	358494.32	271479.30
6.3		Bus and passenger rail transport policy – financing of public interest services – financing of rail transport	MoTCRD	405.00	500.00	896235.81	35623.15
6.4		Update of the combined transport development policy, MoTPT Order No 491/M–2006 – combined transport subsidies	MoTCRD	60.00	35.15	13941.45	1041.00
6.5		Possibility of limiting the age of vehicles used in the provision of public interest services – financing of public service interests (HTU)	MoTCRD	50.00	0.00	3319.39	0.00
6.6	Vehicle fleet upgrading	Replacement and upgrading of rolling stock in passenger rail transport – SF (2007–2013), Transport OP – Public rail transport	2007-2015	30.00	0.00	142534.69	21096.48
6.7		Improvement in vehicle energy efficiency – change in the motor vehicle tax structure, placing older vehicles at a disadvantage – scrappage scheme	2009	150.00	56.67	6638.78	365047.41
6.8	Traffic optimisation	Infrastructure charging as a means of balancing the different modes of transport	MoTCRD	800.00	0.00	706200.62	0.00
6.9		Traffic control optimisation and intelligent transport systems, Structural Funds (2007–2013), Transport OP	2007-2015	50.00	0.00	2323.57	0.00
6.10		Public transport optimisation (transport service plans), MoTPT, HTU, municipalities, towns	MoTCRD	150.00	0.00	24895.44	0.00
6.11	Building and upgrading the transport infrastructure	Building the transport infrastructure and removing bottlenecks, EU and national funding	since 1992	950.00	258.34	1692889.86	1681435.00
6.12	Building a basic network of public interports	Structural Funds (2007–2013), Transport OP – Intermodal transport infrastructure	2007-2015	50.00	0.00	100688.77	255.90
Total				2782.00	1175.88	3948262.28	2375978.24

4.7 Overall evaluation of the implementation of measures by the bottom-up method

Energy savings of 3 689 TJ were reported using the bottom-up method, i.e. 30% of the total unadjusted target set for 2008–2010 in the First Action Plan and 40% of the adjusted target for 2008–2010. This met the Commission's requirement to demonstrate a 20-30% share of planned savings calculated by the bottom-up method. The Appliances and Transport sectors accounted for the largest share of measures where savings could be directly quantified. The total demonstrable cost of implementing the measures was approximately EUR 3.29 billion, i.e. about 80% of the planned funding.

In the case of appliances, energy savings are derived from the replacement of refrigerators and freezers; other appliances are not included in these savings due to a lack of information. However, it would be reasonable to assume that the energy savings from the replacement of other appliances, affected mainly by legislation on ecodesign and energy labelling, could be as much as 2 PJ over three years.

In transport, it was possible to quantify most of the savings under the required measures by a straightforward calculation based on reduced fuel consumption and CO₂ emission reductions. However, despite these savings measures, absolute energy consumption in transport continues to grow, primarily because of the increasing numbers of cars and lorries.

Of the horizontal measures, only one could be partially quantified – energy savings achieved in public procurement. An important finding was that energy savings planned separately for individual horizontal and other support measures cannot be quantified directly, but that their impact can be demonstrated in sectoral evaluations by the top-down method.

Measures in the buildings sector are addressed mainly through various support funds, but not even these sources provided enough viable data on the consumption of the buildings supported before and after project implementation, and consequently on energy savings. The calculated energy savings for buildings are therefore lower than the savings actually achieved. In addition, some of the planned measures were not realised.

Most of the public sector measures (public street lighting) have been transferred to the Second Action Plan over the course of their implementation, along with the energy savings achieved. In the Second AP, measures from other sectors will be transferred to the public sector so as to demonstrate the leading role played by the public sector.

In the industry sector, numerous measures were not implemented because the planned supporting financial mechanism was not established. Some measures were aimed at ETS companies and therefore have not been included in the evaluation of the adjusted energy savings target under the First AP.

Measures proposed for financing from the Energy Efficiency Fund could not be implemented because the fund did not exist; only one of these measures was subsequently addressed by alternative means. In this respect, energy savings were reduced by 1 530 TJ and the postponement of the monitoring system's launch until 2011 has impaired the ability to quantify savings by a further 2 600 TJ.

Some measures under the First AP were started but are not scheduled for completion until 2011–2013; accordingly, the related energy savings will have to be included in the Second Action Plan. This is particularly true of measures financed by the Structural Funds.

In many cases, the relevant data needed to evaluate individual measures were not available. This was often due to a lack of awareness among responsible persons or because specific projects did not monitor energy savings or any other parameters allowing for a calculation of these savings. In many cases, if the primary objective of the project was not to save energy, but to achieve, for example, a reduction in energy consumption, energy savings were not monitored for that project. Even if data on energy savings are specified in the project, it is not included or evaluated in the summary statistics.

Table 12: Overall evaluation of the implementation of all measures in the First AP by the bottom-up method

Sector	Energy savings 2008-2010 [TJ]		Investment 2008–2010 [EUR thousands]	
	Planned	Actual	Planned	Actual
Horizontal measures	3 775.50	357.85	2 4081.52	651 455.00
Buildings	1 257.97	497.57	335 530.77	814 040.27
Appliances	374.10	1013.40	47 849.03	44 563.00
Public sector	406.18	15.53	81 694.22	14 882.75
Industry	1 175.98	628.93	169 201.35	26 397.64
Transport	2 782.00	1175.88	3 948 262.30	2 339 211.48
Total	9 771.73	3689.17	4 606 619.20	3 890 550.14
Proportion of total planned savings	39.4%			

It is therefore very important for the monitoring of energy savings to be compulsorily introduced in all programmes that have a direct impact on energy savings, even assuming that reduced energy intensity is not their primary mission. In projects financed by the Structural Funds, the “energy savings” indicator should be mandatory for all projects. Moreover, it is necessary to provide training for responsible central government and public administration workers concerning the planning and evaluation of energy savings opportunities.

Total energy savings reported for the various measures, i.e. by the bottom-up method, are 3 679 TJ, which is **39.4%** of the total adjusted energy savings target set for the 2008–2010 period (i.e. less the share of ETS companies). Overall, approximately 85% of the planned funding has been used up. However, the energy savings of many investments cannot be quantified until after 2010.

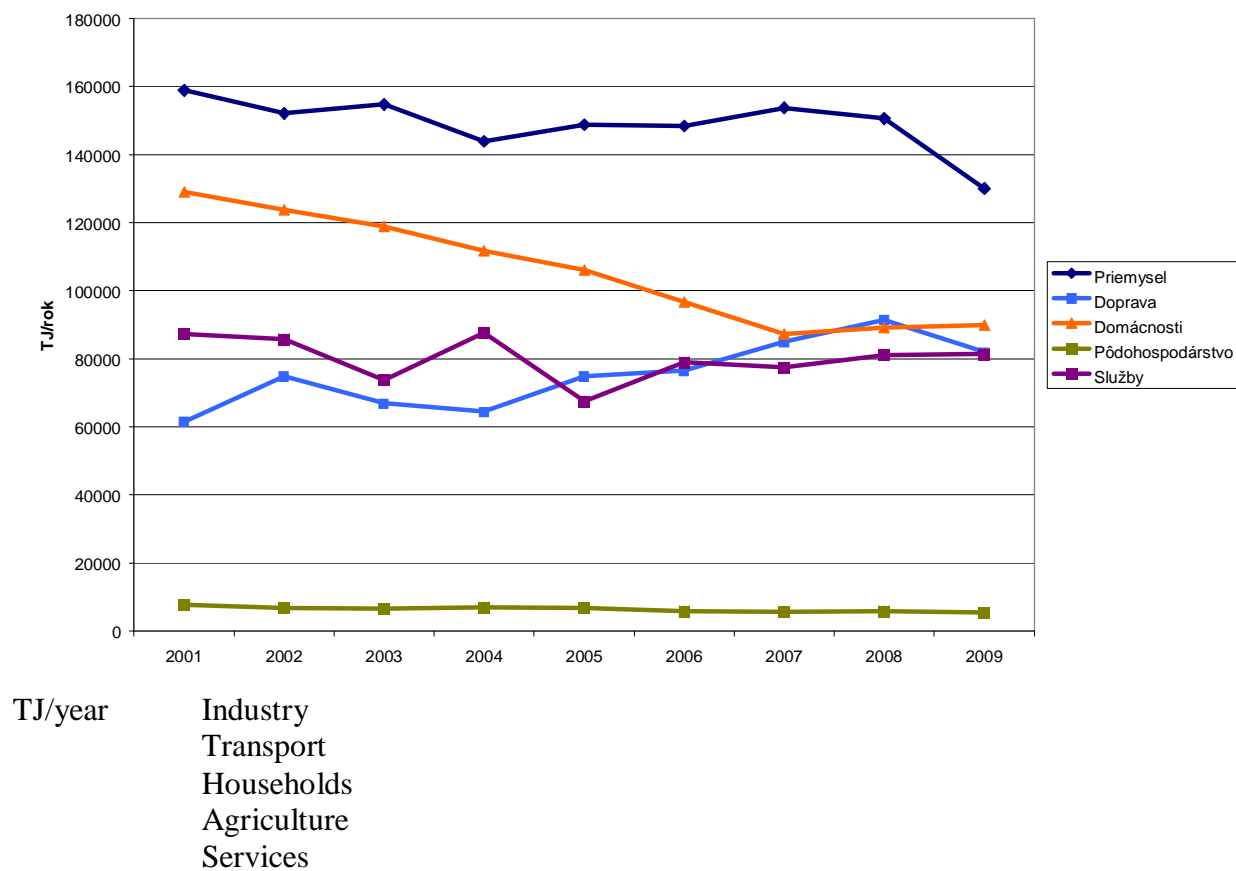
Evaluations of savings for each measure provide information on the impact of the energy-saving measures. However, the result depends on the ability to quantify energy savings in individual sectors, and therefore the importance of monitoring the savings achieved under the measures needs to be highlighted in the coming period.

5. Evaluation of energy savings by the top-down method

In this part, the savings in the different sectors are evaluated based on indicators for the top-down method, as recommended by the European Commission. This method was used to calculate all the required indicators (M1-M8); national and international statistics were sourced in the calculation. In particular, Eurostat information was used, which was compared with national indicators (e.g. from the Statistical Office of the Slovak Republic, the Ministry of Transport, Construction and Regional Development, and the Transport Research Institute) and where necessary adjusted. Individual data were also compared with information from the international Odyssee project, although this information was not generally used as input data in the calculations (except for the number of permanently occupied dwellings). In view of the missing FEC data for 2010, it will not be possible to supplement the calculation of savings using indicators for that year until the second half of 2011. The history of the monthly consumption of primary energy sources over the first ten months of 2010 shows a level of consumption similar to that in 2009, but with a slight downward trend in the last two months. Using the top-down method, it can therefore be assumed that there were further energy savings in 2010.

Total savings are derived from consumption in 2008 and 2009 compared with the average consumption in 2001–2005, i.e. the period covered by the target calculated on the basis of the Energy Services Directive. This method was chosen because it reconciles target performance evaluation methodology with the target calculation methodology. However, according to the European Commission, the indicators required for the years 2008 to 2010 must be relative to 2007. Accordingly, energy savings are also calculated in comparison with 2007, as required by the European Commission. The formulas for calculating the savings are identical, except that the reference period is different.

Fig. 5: Developments in final energy consumption in various sectors in 2001–2009



Source: Statistical Office of the Slovak Republic, 2011

Table 13: Summary tables of indicators required under top-down methodology (TJ)

Indicator		Unit of measurement	Period										
			2001/2005	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
M1	Non-electricity energy consumption of households with long-term residential occupancy, adjusted for climatic conditions	toe/dwelling	17008.74	17049.45	18950.41	19417.92	16535.18	15814.70	14325.51	13489.85	12807.66	13376.98	12826.19
M2	Electricity consumption of households per dwelling	kWh/dwelling	2967.74	3263.26	3134.38	3079.75	2998.08	2856.15	2770.35	2685.94	2680.72	2623.31	2544.27
M3	Non-electricity energy consumption of the service sector per employee in full-time equivalent adjusted for climatic conditions	toe/employee	1.17	1.77	1.44	1.27	1.03	1.23	0.90	1.08	1.08	1.13	1.09
M4	Electricity consumption of the service sector per employee in full-time equivalent	kWh/employee	0.51	0.40	0.54	0.54	0.47	0.54	0.44	0.42	0.44	0.43	0.45
M5	Energy consumption of road vehicles per car equivalent	toe/car equivalent	0.64	0.51	0.58	0.58	0.58	0.71	0.76	0.70	0.74	0.71	0.62
M6	Energy consumption of rail transport	goe/tkm	5.93	0.00	5.92	5.85	6.02	6.17	5.08	4.43	5.09	4.96	5.72
M7	Energy consumption of inland waterways transport	koe/tkm	0.06	0.00	0.04	0.07	0.08	0.06	0.07	0.04	0.05	0.04	0.03
M8-1+2	FEC/VA – Metallurgical and foundry industry	goe/EUR	1697.99	1907.79	1594.70	1998.53	1837.56	1617.33	1441.81	1332.33	949.63	883.54	997.43
M8-3	FEC/VA – Chemical industry	goe/EUR	934.85	1010.82	1026.08	1007.05	926.23	880.55	834.35	591.70	567.72	543.44	440.16
M8-4	FEC/VA – Mining and quarrying (except fuel)	goe/EUR	1471.08	1139.77	1959.65	1920.18	1218.50	1248.50	1008.55	891.60	871.45	488.42	186.14
M8-5	FEC/VA – Food and tobacco industry	goe/EUR	379.10	303.23	278.76	516.41	428.45	329.95	341.93	262.66	244.39	189.45	181.49
M8-6	FEC/VA – Textiles, leather and clothing	goe/EUR	182.49	200.52	167.70	190.54	186.42	207.64	160.17	117.15	91.86	97.61	84.31
M8-7	FEC/VA – Paper and printing industry	goe/EUR	1171.07	567.17	992.04	1054.91	1226.94	1332.96	1248.52	1112.17	1141.86	1002.30	1216.19
M8-8	FEC/VA - Engineering industry and industry for the processing of other metals	goe/EUR	150.92	187.81	179.26	170.62	162.02	120.84	121.87	122.67	108.63	92.76	95.31
M8-9	FEC/VA – Other industry	goe/EUR	427.16	402.92	413.40	469.36	450.69	374.77	427.58	333.64	287.86	251.84	280.41

FEC – final energy consumption

VA – value added

The values of the calculated indicators are shown in Table 13. Table 14 shows savings, calculated on the basis of the indicators in Table 13, achieved in each sector based on a comparison with the 2001–2005 period and a comparison with 2007. The method for calculating the indicators and the related savings is set out in Annex 1.

As the necessary statistical data for 2010 are not available, the First AP cannot be evaluated in full using the top-down approach. For the time being, savings have been calculated only to the end of 2009. These indicators and the related savings for 2010 will be calculated later.

Table 14: Energy savings calculated by the top-down method using mandatory indicators

Indicator		Energy savings [TJ]				
No	Description	2008/ 2001-05	2009/ 2001-05	2008/ 2007	2009/ 2008	2009/ 2007
M1	Non-electricity energy consumption of households in toe per permanently-occupied dwelling, adjusted for degree days	22606	26201	-3544	3450	-93
M2	Electricity consumption of households in kWh per household	2144	2653	357	495	852
	Households – total	24750	28854	-3187	3945	759
M3	Non-electricity energy consumption of the service sector in toe per employee in full-time equivalent, adjusted for degree days	2490	4679	-2599	2232	-367
M4	Electricity consumption of the service sector in kWh per employee in full-time equivalent	4449	2916	841	-1455	-613
	Service sector - total	6939	7595	-1758	777	-980
M5	Energy consumption of road vehicles in toe per car equivalent	-8498	2946	4378	12114	16492
M6	Energy consumption of rail transport in goe/tkm	387	63	54	3996	4049
M7	Energy consumption of inland waterways transport in koe/tkm	827	1598	472	559	1031
	Transport – total	-7284	4607	4904	16669	21572
M8-1+2	FEC/VA – Metallurgical and foundry industry	7838.36	4868.49	636.01	-791.48	-155
M8-3	FEC/VA – Chemical industry	1411.30	1637.14	87.57	341.79	429
M8-4	FEC/VA – Mining and quarrying (except fuel)	3116.72	2751.85	1214.87	647.37	1862
M8-5	FEC/VA – Food and tobacco industry	6538.16	6280.33	1893.98	253.05	2147
M8-6	FEC/VA – Textiles, leather and clothing	1419.86	1511.65	-96.29	204.78	108
M8-7	FEC/VA – Paper and printing industry	0.00	0.00	0.00	0.00	0
M8-8	FEC/VA - Engineering industry and industry for the processing of other metals	8794.49	6382.86	2399.11	-292.66	2106
M8-9	FEC/VA – Other industry	1763.33	1298.87	362.31	-252.85	109
	Industry – total	30882.22	24731.19	6497.56	110.00	6606
	Total	55286.22	65787.19	6455.56	21501	27957

The savings calculated using these indicators differ considerably, whether relative to the 2001–2005 reference period or to 2007. These differences between sectors are mainly due to the sensitivity of the indicators to input data and the variations in this data. It is therefore also necessary to monitor the savings in individual sectors in a broader context, by comparing the absolute value of consumption in each year of the 2001–2009 period. Energy consumption trends in the different sectors are shown in Figure 5.

5.1 Households

Absolute consumption

The household sector reports the largest decline in absolute energy consumption compared to other sectors of the national economy in the 2001–2009 period, although total consumption increased slightly in 2007–2009.

Indicator trends

The consumption of electricity (electricity consumption) and other energy (non-electricity consumption) per dwelling has steadily fallen since 2000; therefore, in 2009 significant energy savings could be quantified compared with average consumption in 2001–2005. Savings in energy consumed for heating purposes have been achieved by the extensive thermal insulation of blocks of flats in particular, a practice widespread in Slovakia since about 2005. The increase in the number of dwellings with improved thermal properties in the reporting period also helped to reduce per-dwelling consumption. Electricity consumption was reduced mainly due to the use of appliances with better energy specifications, and also partly as a result of major information campaigns focusing on saving electricity.

However, following an increase in energy consumption in 2008 and 2009, energy savings calculated using indicators relative to the 2007 reference period are much lower compared to the 2001–2005 reference period, which is inconsistent with the long-term trend and the measures taken.

5.2 Service sector

Absolute consumption

The sector's total consumption fluctuated in the 2001–2009 period; since 2007, consumption has been slowly rising.

Indicator trends

Non-electricity consumption declined after 2000, but has risen again since 2005 as the quality and range of services has improved (an increase in the number of service providers). Electricity consumption declined slightly until 2004, but has grown since 2005. Both indicators reflected energy savings compared to the 2001–2005 period, which can be explained by the introduction of efficient electrical appliances and lamps in this sector.

The calculation of energy savings using indicators relating to 2007 showed a negative result. As final energy consumption in the service sector is estimated in surveys and the data does not necessarily reflect the actual situation accurately, it is important in respect of the Second AP to calculate as large a proportion of energy savings as possible in this sector by the bottom-up method.

5.3 Transport sector

Absolute consumption

The transport sector's total consumption rose slightly in the 2001–2009 period; since 2007, consumption has been growing at a faster rate. The energy consumption trend in transport is

inconsistent with the savings reported by the indicator, which highlights a reduction in energy intensity per car and does not take into account the fact that savings are offset by the increasing number of cars and higher traffic volume.

Indicator trends

Since 2000, energy consumption has increased in the road transport sector, mainly due to an increase in the number of cars and lorries. Reductions in fuel consumption generated by the lower energy intensity of road vehicles are negated by the overall increase in the number of vehicles, and therefore no absolute savings have been made in this sector. A reduction in energy consumption can be reported only in rail and waterway transport, where consumption is declining due to lower traffic levels as transport and shipping operations switch to the roads. Nevertheless, these savings in rail and waterway transport are very low compared to the increased consumption in road transport.

5.4 Industry sector

Absolute consumption

Energy consumption in industry has been gradually decreasing since 2001. Since 2007, this trend has been magnified by the economic crisis. The annual decrease in energy consumption in industry between 2008 and 2009 was 13.65%.

Indicator trends

The top-down calculation of indicators in industry took into account only those entities not classified as ETS companies. Apart from the buildings sector, the industry sector reported the highest energy savings compared to the 2001–2005 period. Savings were made by reducing the energy intensity of operations and by transferring to new energy-efficient technologies. These savings were achieved as a result of investments in innovation and keener competitiveness; they were financed mainly by private sources, partly by the EU and partly by the national budget in the form of investment incentives. The highest total savings were recorded in engineering (cars) and the food industry.

The industry sector has reported extremely high savings in both reference periods.

5.5 Overall evaluation of the implementation of measures by the top-down method

With reference to indicators relating to 2007, the total energy savings calculated by the top-down method amount to **27 957 TJ**.

Table 15: Energy savings calculated by the top-down method using mandatory indicators

No	Description of indicator	Energy savings [TJ]
M1, 2	Households – total	759
M3, 4	Service sector - total	-980
M5, 6	Industry – total	21 572
M7, 8	Transport – total	6 606
Total		27 957

As the top-down method uses official statistics which are released with a delay of one year, the calculations could only work with data from 2008 and 2009. Data for 2010 will be available at the end of 2011.

6. Overall evaluation of the implementation of the First Action Plan

Total energy savings in 2008–2009 calculated by the top-down method were **27 957 TJ** relative to 2007.

The bottom-up method revealed energy savings of **3 689 TJ**, i.e. approximately **30%** of the unadjusted planned energy savings target for 2008–2010.

Taking into account the final energy consumption of ETS companies, the value of the adjusted energy savings targets was put at 9 366 TJ. The bottom-up method revealed energy savings of **3 689 TJ**, i.e. approximately **39%** of the planned net energy savings target for 2008–2010.

As both of the conditions for demonstrating savings under Directive 2006/32/EC were fulfilled, it can be concluded that the **Slovak Republic met the medium-term energy savings target for 2008–2010**.

Overall, approximately EUR 3.29 billion (80% of the planned funding) was invested in order to achieve the target. Additional resources of EUR 500 set out enumerated in the First Action Plan have been used in projects where the savings will not be made until after 2010.

The first Energy Efficiency Action Plan for 2008–2010 clearly demonstrated the need to monitor energy efficiency parameters and the need for an accurate monitoring system to collect and evaluate such data. A response must be found to these needs in order to evaluate the effects of the set energy efficiency measures in the national economy.

The main barrier to the evaluation of most of the measures was the lack of relevant data and information, combined with the insufficient experience of the persons responsible for implementing the energy efficiency measures at all levels.

7. Measures for the 2011–2013 period

Many of the measures under the Second AP are essentially a continuation of measures from the First AP. These ongoing measures have been adjusted where necessary to reflect previous evaluation experience. Measures which are not implemented or cannot be properly evaluated are not taken into consideration in the coming period.

Besides these ongoing measures, new measures are also planned under the Second AP. All measures are divided by sector. Each sector has specific, measurable measures and support measures contributing to further savings within the sector. Horizontal measures are an important part of the Second AP, creating conditions for savings across multiple sectors.

7.1. Buildings

Buildings are divided into housing (family houses and blocks of flats) and service sector buildings. To profile the leading role played by the public sector in energy efficiency, the measures in the Second AP that are aimed at improving the thermal properties of public buildings have been classified under the group of public sector measures.

Approximately 80% of the buildings in use are older buildings where the main energy-saving measures comprise improvements to thermal properties and to the energy efficiency of the building's technical facilities. New measures for the support of new buildings are designed primarily to promote the construction of low-energy houses and passive houses. The savings planned in this sector are **1 754 TJ**.

Target:	to reduce or minimise energy consumption used for heating and cooling while maintaining thermal comfort, and to reduce the energy consumed in the production of hot water
Target group:	owners and operators of non-manufacturing structures (family houses, blocks of flats, office buildings, hotels...)

7.1.1 Improvements in the thermal properties of buildings – family houses

In the 2011–2013 period, projects financed by commercial loans aimed at the renovation of family houses will be continued. It is projected that approximately 50 000 family houses will be renovated; assuming a 20% saving on average heating requirements, this equates to energy savings of 818 TJ. When quantifying these savings, it is important to monitor activities in this area. Monitoring will be based on SIEA surveys and the evaluation of energy performance certificates.

In the 2011–2013 period, the Government Thermal Insulation Programme will continue, expanding its scope to include support for the further renovation of family buildings. This instrument takes the form of a 15-year loan; repayments are returned to the pool and can be used for further loans. This measure should contribute approximately 33 TJ to energy savings in family houses. The results of this measure will be tracked via a monitoring system.

The total estimated savings made by renovating family houses in the coming period is **851 TJ**.

7.1.2 Improvements in the thermal properties of buildings – blocks of flats

In the 2011–2013 period, blocks of flats will continue to be renovated under the State Housing Development Fund (SHDF) via the Housing Development Programme (subsidies for the removal of system defects in blocks of flats), and the SLOVSEFF II Programme. In all government grant programmes, it would be preferable to introduce minimum energy saving requirements and the monitoring of actual post-project savings, following the example of SLOVSEFF I. During this period, projects under the Government Thermal Insulation Programme from 2009 will come to end, providing additional savings of 139 TJ.

It is projected that the SHDF will support the renovation of approximately 150 buildings per year; assuming a minimum 20% saving on the energy needed for heating purposes, this equates to energy savings of 76 TJ. It is also assumed that the part of the Housing Development Support Programme (a scheme which is not primarily focused on energy savings) concerning subsidies for the removal of systemic defects in blocks of flats will be used to support a further hundred buildings a year. Ten per cent will be intended for improvements in the thermal properties of buildings; it is envisaged that the need for heating in these renovated buildings will be reduced by 20%. This programme is projected to make savings of 38 TJ.

As with family houses, the further renovation of blocks of flats will also be funded internally; assuming that 20% of the energy requirement will be saved and that 50 normal blocks of flats will be renovated every year, the potential energy savings are approximately 25 TJ.

The SLOVSEFF II Programme will also continue, with plans to renovate 320 buildings in the 2011–2013 period, resulting in savings of up to 200 TJ.

In addition to the programmes above, the Government Thermal Insulation Programme will also remain in place. This programme is expected to renovate 150 normal blocks of flats per year, delivering savings of approximately 152 TJ.

The total estimated savings made by renovating blocks of flats in the coming period is **630 TJ**.

7.1.3 Improvements in the thermal properties of buildings – service sector

Buildings in the commercial service sector include office buildings (outside the public sector), hotels and restaurants, retail and wholesale buildings, and other commercial service buildings (e.g. sports facilities). The renovation of these buildings will be financed by the CaEG OP (Measure 3.1 – Tourism) and own funds (bank loans). Total energy savings under this measure are projected to be **124 TJ**.

7.1.4 Construction of low-energy buildings and passive buildings

In the coming period, it is expected that low-energy and passive buildings will be built in the form of both family houses and blocks of flats financed from households' own resources via commercial loans. Total energy savings under this measure are projected to be **49 TJ**.

7.1.5 Hydraulic balancing of heating systems

The hydraulic balancing of heating and hot water systems, the insulation of hot water systems and automatic control of the heating medium on all heating appliances in response to the air temperature in heated rooms that are habitually occupied (e.g. via thermoregulatory valves) in accordance with Section 6 of Act No 476/2008 on energy efficiency. According to Section 17(4) of the Act, all large buildings of over 1 000 m² must be hydraulically balanced and have thermostatic valves fitted by the end of 2013. Under the Act, all blocks of flats over 1 000 m² must comply with this requirement by 2013 (currently only 80% of these blocks of flats have been brought into compliance).

In view of the fact that, since 2005, the information available on such projects has been limited, preventing an accurate assessment of the energy savings achieved, the monitoring of these measures will have to be resumed. This will also avoid non-compliance with the Act.

Savings of up to a 20% reduction in heat consumption for heating purposes are envisaged in the remaining blocks of flats that are not yet hydraulically balanced. Of the total number of blocks of flats, approximately 20% are not yet balanced. The completion of the hydraulic balancing of heating systems for all blocks of flats will result in energy savings of approximately **100 TJ**.

7.1.6 Support measures in the buildings sector

- Application of legislative measures – Act No 555/2005 – Energy performance certification of buildings

Where government funding is granted, the certification of each such renovated building must be compulsory to ensure the effective monitoring of energy savings.

The energy performance certificate under the Act should contain fair qualitative and quantitative values.

Within the monitoring system, certificate details will be linked to other data from support programmes for the renovation and reconstruction of existing buildings and for the construction of new low-energy and passive buildings. The aim is to achieve the fullest possible overview of the energy savings that are being made in the buildings sector, and to increase the accuracy of energy saving calculations in this sector.

- Application of legislative measures – Act No 17/2007 – periodic inspections of boilers, heating systems and air-conditioning systems

For the purposes of determining energy savings, the monitoring of inspections of boilers, heating systems and air-conditioning systems in accordance with Act No 17/2007 must be improved and intensified to such a level that the energy savings achieved by this measure can be realistically evaluated.

- Draft (amendment to) legislative measures concerning the implementation of Directive 2010/31/EU – the Building Act, Act No 555/2005, Act No 17/2007 and associated secondary legislation

The MoTCRD is preparing an update of the Policy on the Energy Performance of Buildings for 2012 which will take into account other requirements of Directive 2010/31/EU. In the future, there are plans for energy performance certification to include cost-optimal energy savings for buildings, which also follows from Directive 2010/31/EU. In principle, this means the best ratio between an investment in thermal insulation and other technical measures to improve energy efficiency on the one hand, and the heating costs saved over the life of the building on the other.

- *Application of legislative measures – Act No 476/2008 on energy efficiency*

Under Section 6(1)(c), an owner of a public building is required to provide the monitoring system operator with a dossier on total energy consumption for the previous calendar year, if so requested by the monitoring system operator. The monitoring system operator is responsible for proposing the method and form to be used in the provision of such information. In the future, it would be advisable to extend this obligation to all buildings, in order to cover the overall energy consumption of the buildings sector in the Slovak Republic.

- *Conceptual solution promoting the construction of low-energy and passive buildings*

In the 2011–2013 period, there are plans to develop a legislative and technical solution promoting the construction of low-energy and passive buildings.

Table 16: Summary overview of measures in the buildings sector (excluding public buildings) in the 2011-2013 period

No	Title of measure	Specification of measure	Financial mechanism	Responsible ministry	Savings planned in 2011–2013	Funding [EUR thousands]					
					[TJ]	EU	National budget	Co-financing from national budget	HTUs, municipalities, towns	Private sources	Total
1.1	Improvements in the thermal properties of buildings	Family houses	Own funds	-	818	0	0	0	0	500 000	500 000
			Government Thermal Insulation Programme II	MoTCRD	33	0	3 000	0	0	17 000	20 000
1.2	Improvements in the thermal properties of buildings	Blocks of flats	SHDF	MoTCRD	76	0	63 900	0	0	15 000	78 900
			Subsidies for systemic defects	MoTCRD	38	0	15 000	0	0	30 000	45 000
			Own funds	-	25	0	0	0	0	20 000	20 000
			Government Thermal Insulation Programme II	MoTCRD	152	0	27 000	0	0	153 000	180 000
			Government Thermal Insulation Programme – final arrangements from 2009	MoTCRD	139	0	0	0	0	0	0
			Slovseff II	MoEc	200	12 000	0	0	0	80 000	92 000
1.3	Improvements in the thermal properties of buildings	Office buildings (excluding public buildings)	Own funds	-	21	0	0	0	0	9 300	9 300
		Hotels, restaurants	CaEG OP, Measure 3.1 Tourism	MoEc	11	8 751	0	1 544	0	10 295	20 590
		Hotels, restaurants	Own funds, Rural Development OP	-	40	0	0	0	0	8 400	8 400
		Retail, wholesale	Own funds	-	36	0	0	0	0	4 800	4 800
		NGO buildings	Ekofond	-	16	0	0	0	9 000	2 771	11 771

1.4	Construction of low-energy and passive buildings	Family houses	Commercial banks	-	46	0	0	0	0	18 363	18 363	
		Blocks of flats	Commercial banks	-	3	0	0	0	0	4 284	4 284	
1.5	Application of legislative measures	Act 476/2008 – hydraulic balancing of heating and hot water systems, insulation of hot water systems		Central government bodies	100	0	11 002	0	34 106	14 472	59 580	
PO D1	Application of legislative measures	Act No 555/2005 – energy performance certification of buildings		MoTCRD	A)	0	58	0	204	1326	1 588	
PO D2	Application of legislative measures	Act No 17/2007 – periodic inspections of boilers, air-conditioning systems and heating systems		MoEc	A)	0	290	0	989	2 970	4 249	
PO D3	Draft (amendment to) legislative regulations	— Building Act, Act No 555/2005, Act No 17/2007 and associated secondary legislation in connection with the implementation of Directive 2010/31/EU		MoEc / MoTCRD	A)	0	40	0	0	200	240	
PO D4	Conceptual solution promoting the construction of low-energy and passive buildings			MoTCRD	A)	0	0	0	0	0	0	
Buildings – total						1 754	20 751	120 290	1 544	44 299	892 181	1 079 065

A) energy savings are determined by the top-down method in evaluations

7.2 Appliances

In the evaluation of energy savings under the First AP, white goods replacement proved to be a very effective measure and this type of measure is therefore to be continued for the next three years. Total savings of **985 TJ** are envisaged.

Target:	to reduce or minimise energy consumption required to operate electrical appliances and equipment
Target group:	households, service providers, manufacturers, importers and retailers of appliances

7.2.1 White goods replacement

In the past 20 years, there have been huge advances in the energy efficiency of refrigerators and freezers. Compared to refrigerators and freezers 20 to 30 years ago, new refrigerators deliver energy savings of up to 60%. This underscores the need for the prompt introduction of new classes of energy efficiency in energy labelling. Additional classes up to A+++ should be created.

Comparisons are made with the 1980s and 1990s because this reflects the current age of refrigerators and freezers being delivered to certified collection points and other organisations. In 2008–2010, the median year in which refrigerators now being scrapped were purchased was 1985, and the average annual consumption was 1 000 kWh. As the Slovak Republic has more than 2.3 million refrigerators and freezers, and approximately 140 000 units are replaced every year, this measure has the potential to generate significant electricity savings in the household sector for at least another 10 years (assuming replacement began in 2006 and all old, inefficient refrigerators and freezers are replaced by new, more efficient models). This is therefore a priority measure in the field of appliances.

From 2011 to 2013, it is projected that 360 000 refrigerators with average annual energy consumption of 900 kWh will be replaced with new units requiring average annual consumption of 330 kWh. Energy savings of **740 TJ** are therefore feasible over the course of the three years. This measure is likely to be continued in the 2014–2016 period.

Besides refrigerators, freezers and energy-saving lamps, there is also major potential for energy savings in other white goods, especially those that are subject to energy labelling and ecodesign requirements. Progress and savings can be predicted on the basis of the timetable for the prohibition of sales of appliances in the worst classes of energy efficiency, as listed in the regulations of the European Commission on the ecodesign of refrigerators,¹⁰ washing machines¹¹ and dishwashers.¹² If there is a substantial improvement in the input data used to

¹⁰ Commission Regulation (EC) No 643/2009 of 22 July 2009 implementing Directive 2005/32/EC of the European Parliament and of the Council with regard to ecodesign requirements for household refrigerating appliances (Text with EEA relevance)

¹¹ Commission Regulation (EU) No 1015/2010 of 10 November 2010 implementing Directive 2009/125/EC of the European Parliament and of the Council with regard to ecodesign requirements for household washing machines (Text with EEA relevance)

¹² Commission Regulation (EU) No 1016/2010 of 10 November 2010 implementing Directive 2009/125/EC of the European Parliament and of the Council with regard to ecodesign requirements for household dishwashers (Text with EEA relevance)

calculate the energy savings of other white goods, the greatest potential savings can be expected with washing machines.

7.2.2 Replacement of lamps with energy-saving alternatives

Commission Regulation No 244/2009¹³ establishes the efficiency, functional and ecodesign requirements for placing non-directional household lamps on the market, including lamps that are marketed for non-household use or are integrated into other products. It also establishes product information requirements for special purpose lamps.

Regulation No 244/2009 directly prohibits the sale and marketing of new conventional light bulbs with a power of 100 W or more from 1 September 2009 and with a power of 75 W or more from 1 September 2010. The timetable provided under Regulation 244/2009 makes references to ongoing annual steps until September 2013.

Commission Regulation No 245/2009¹⁴ governs the ecodesign of fluorescent lamps, ballasts and other lamps (apart from non-directional household lamps); the mandatory specifications of these lamps must be met 1, 3 and 8 years after the entry into force of this Regulation.

In most cases, these lamps are replaced by compact fluorescent lamps and, nowadays, LED lamps. This measure generates direct energy savings that can be determined if data on the number of exchanged and replaced fluorescent lamps are available. At present, the reluctance of manufacturers operating in this sector in the Slovak Republic to disclose the data needed to calculate energy savings is posing a problem. Energy savings of up to **200 TJ** can be reliably estimated in the years 2011 to 2013.

7.2.3 Replacement of electric and electronic household equipment with energy-saving alternatives

Besides white goods, other electrical and electronic household equipment also offers a large potential for energy savings. Energy labelling and ecodesign requirements have therefore been introduced for televisions,¹⁵ set-top boxes¹⁶ (e.g. equipment needed to receive digital television signals) and stand-by systems.¹⁷ Progress and savings can be predicted on the basis of the timetable for the prohibition of sales of appliances in the worst classes of energy efficiency, as listed in the regulations of the European Commission for efficiency, functionality and ecodesign. The need to reduce consumption is particularly pressing for

¹³ Commission Regulation (EC) No 244/2009 of 18 March 2009 implementing Directive 2005/32/EC of the European Parliament and of the Council with regard to ecodesign requirements for non-directional household lamps (Text with EEA relevance)

¹⁴ Commission Regulation (EC) No 245/2009 of 18 March 2009 implementing Directive 2005/32/EC of the European Parliament and of the Council with regard to ecodesign requirements for fluorescent lamps without integrated ballast, for high intensity discharge lamps, and for ballasts and luminaires able to operate such lamps, and repealing Directive 2000/55/EC of the European Parliament and of the Council (Text with EEA relevance)

¹⁵ Commission Regulation (EC) No 642/2009 of 22 July 2009 implementing Directive 2005/32/EC of the European Parliament and of the Council with regard to ecodesign requirements for televisions (Text with EEA relevance)

¹⁶ Commission Regulation (EC) No 107/2009 of 4 February 2009 implementing Directive 2005/32/EC of the European Parliament and of the Council with regard to ecodesign requirements for simple set-top boxes (Text with EEA relevance)

¹⁷ Commission Regulation (EC) No 1275/2008 of 17 December 2008 implementing Directive 2005/32/EC of the European Parliament and of the Council with regard to ecodesign requirements for standby and off mode electric power consumption of electrical and electronic household and office equipment (Text with EEA relevance)

televisions, because some new technologies have much higher energy consumption (e.g. plasma televisions).

This measure is especially important for set-top boxes as television transmitters migrate from analogue to digital, because energy consumption will increase when large numbers of set-top boxes are introduced in households in order to process digital signals.

Energy savings of 10 TJ can be expected in the years 2011 to 2013 for Measure 2.3.

7.2.4 Replacement of office equipment with energy-saving alternatives

Office equipment must meet the requirements of Regulation 108/2008 (Energy Star).¹⁸ In addition, within the scope of the ecodesign regulations, the inclusion of office equipment with provisions, for example, on stand-by systems is proposed in certain Commission regulations. This measure relates to office equipment not used in the public sector. Energy savings of **35 TJ** can be expected in the years 2011 to 2013 for Measure 2.4.

7.2.5 Support measures for the appliances sector

- *Application of legislative measures*

Support measures, which go some way to creating significant potential for savings in the field of appliances and also help to tap into that potential, mainly comprise the Ecodesign and Energy Labelling Directive and the legislative regulations transposing them into Slovak legislation (Act No 529/2010 on ecodesign and government regulations on the energy labelling of appliances). The government regulations will shortly be replaced by a new upcoming Energy Labelling Act, which should be adopted in summer 2011; its implementing regulations will be Commission regulations on individual appliances, which will replace existing implementing directives and regulations of the Slovak Government. From 2011 to 2013, further parallel delegated Commission regulations on energy labelling and Commission regulations laying down ecodesign requirements for household appliances such as tumble dryers and vacuum cleaners should be issued.

- *Information campaigns aimed at energy-saving appliances*

Information campaigns focusing on energy-saving appliances mainly intended for households comprise another support measure encouraging the replacement of appliances. These campaigns will be run via CECED, consumer associations, retailers, the MoEc and the SIEA. A CECED information campaign on white goods is being prepared for 2011. This greater engagement and sales support for energy-efficient white goods will be aimed at increasing energy savings generated by the purchase and replacement of white goods. The failure of support measures, leading to the purchase of less expensive and less efficient appliances, can be documented, for example, in the average consumption of new refrigerators and freezers placed on the market: in the 2005–2008 period, purchases concentrated on refrigerators with a

¹⁸ Regulation (EC) No 106/2008 of the European Parliament and of the Council of 15 January 2008 on a Community energy-efficiency labelling programme for office equipment (recast version)

lower average power consumption, but in the past two years there have been increasing sales of refrigerators in worse energy classes.

- *Introduction of transparent monitoring of the replacement of white goods and other appliances and equipment on the market*

It is important to create new records or an innovative way of measuring energy savings by quantifying the replacement at least of those white goods and other appliances that fall under the Energy Labelling and Ecodesign Directives. The aim is to obtain information on the energy savings achievable by replacing appliances, and to provide a basis for highlighting the true potential of this type of measure. It will be incorporated as a special module into the system for monitoring efficiency in energy use; the basic input data would be data on the appliances owned by households, obtained from the census which is to be carried out by the Statistical Office in 2011.

Table 17: Summary overview of measures in the appliances sector in the 2011-2013 period

No	Title of measure	Specification of measure	Responsible ministry	Savings planned in 2011–2013	Funding [EUR thousands]					
					[TJ]	EU	National budget	Co-financing from national budget	HTUs, municipalities, towns	Private sources
2.1	White goods replacement	Own funds, special offers from retailers and manufacturers	-	740	0	0	0	0	144 000	144 000
2.2	Energy-saving lighting	Own funds, special offers from retailers and manufacturers	-	200	0	0	0	0	15 750	15 750
2.3	Replacement of electric and electronic household equipment	Own funds, special offers from retailers and manufacturers	-	10	0	0	0	0	500	500
2.4	Replacement of office equipment	Own funds, special offers from retailers and manufacturers	-	35	0	0	0	0	500	500
POD 5	Application of legislative measures	Energy labelling, Ecodesign	MoEc	A)	0	13	0	0	0	13
POD 6	Information campaigns aimed at energy-saving appliances	CECED, consumer associations, retailers, MoEc, SIEA	CECED, MoEc	A)	0	0	0	0	20	20
POD 7	Introduction of transparent monitoring of the replacement of white goods and other appliances and equipment on the market	Statistical Office (SOSR), SIEA, CECED, consumer associations	CECED, MoEc, SOSR	A)	0	0	0	0	0	0
Appliances – total				985	0	13	0	0	160 770	160 783

A) energy savings are determined by the top-down method in evaluations

7.3 Public sector

The main responsibilities of the public sector in the Second AP are the renovation of buildings, with measures to improve thermal properties for public buildings (seats of central, local and regional government and public authorities), the specification of technical conditions in public procurement to generate energy savings (appliances, service vehicles), the upgrading of public lighting, and other activities delivering energy savings in the public sector.

The renovation of public buildings will be financed by the Structural Funds under several operational programmes (Health OP, Science and Research OP, ROP), the national budget and own funds. In addition, the Slovak Republic will run the Energy Efficiency in Public Buildings pilot project, which will provide grants for the renovation of healthcare and educational facilities and public office buildings. Total savings of **2 234 TJ** are envisaged.

Target:	to reduce energy consumption in the public sector
Target group:	central government bodies, public authorities, local government bodies, and organisations in their role as founding bodies

7.3.1 Improvements in the thermal properties of buildings – Healthcare facilities

This measure will be financed by the Health OP, under which 25 projects with expected savings of 47 TJ have been contracted and will be implemented in the 2011–2012 period. Other projects for the renovation of healthcare facilities are planned using the budgetary appropriations of those facilities; most of these facilities are partially funded by the Ministry of Health (MoH), i.e. these funds will come from the national budget. Several projects for the renovation of healthcare facilities are also funded under the Energy Efficiency in Public Buildings pilot project, which was launched in the 2008–2010 period and is financed by the BIDSF. This measure will contribute approximately **144 TJ** to energy savings.

7.3.2 Improvements in the thermal properties of buildings – Schools and educational facilities

Much of this measure will be financed by the Structural Funds and partly by the Energy Efficiency in Public Buildings pilot project. The Structural Funds will be used for the renovation of educational facilities via the Research and Development OP and, within the scope of Measure 1.1 Education infrastructure, via the Regional Operational Programme. Projects under both operational programmes have already been launched, with the last due for completion in 2012.

The estimated savings generated through the Research and Development OP are 34 TJ. More than 900 projects for the renovation of school buildings have already been contracted under ROP Measure 1.1. The estimated savings under this measure are 1 814 TJ. Overall, the renovation of schools and educational facilities is expected to make energy savings of **1 858 TJ**.

7.3.3 Improvements in the thermal properties of buildings – Social services

Buildings used to provide social services (e.g. children's homes, retirement homes, social service homes, etc.) will mainly be renovated under ROP Measure 2.1 Infrastructure of social services, social protection and social care. Currently, 114 projects for buildings of this type have been contracted. The implementation of this measure will result in energy savings of **82 TJ**.

7.3.4 Improvements in the thermal properties of buildings – Cultural facilities

Cultural facilities will also be renovated under the ROP (via Measure 3.1 Strengthening the cultural potential of the regions). Forty-two projects have already been contracted under this measure. However, as few of these projects have an impact on energy savings, the expected energy savings are 4 TJ.

7.3.5 Improvements in the thermal properties of buildings – Office buildings

Office buildings will be renovated under the Energy Efficiency in Public Buildings pilot project (15 TJ) and under the Bratislava Region OP (4 TJ). Total energy savings under this measure are projected to stand at **19 TJ**.

7.3.6 Upgrading of public street lighting

The upgrading of public street lighting carries on from the First AP and is realised under Measure 2.2 of the CaEG OP. Of the projects from the first call, 117 are in progress and will be completed in 2011-2012, with savings of 13.7 TJ planned. The range of projects in the second call is expected to be somewhat smaller. The resulting savings from both calls will be approximately 27 TJ. It is expected that towns and municipalities will also upgrade public street lighting using their own funds (with savings estimated at 3 TJ) and through energy services (estimated savings of 6 TJ). As part of its exemplary role, the public sector is expected to enter into agreements with municipalities and towns under which they will voluntarily disclose information about these projects to the operator of the monitoring system for efficiency in energy use.

7.3.7 Application of the principle of energy efficiency in public procurement

This measure is a continuation of Measure 1.11 under the First AP. The evaluation of the First AP shows that considerable energy savings can be achieved in public procurement. Nevertheless, there are gaps in the monitoring and evaluation of this measure, as evaluators of this measure have only limited information about energy efficiency and the calculation of savings achieved by public procurement.

This measure is aimed at the purchase of more energy-efficient appliances, lighting and technical equipment by central government bodies, HTUs, and towns and municipalities through the specification of technical energy efficiency requirements in public procurement. This measure thus seeks to make more efficient use of public funds appropriated under the budgetary headings of individual entities. Investments in energy savings therefore do not constitute additional expenditure from the national budget.

The estimated amount of savings is **100 TJ**. If these savings are to be achieved, it will be necessary to provide enough clear information for the contracting authorities as part of the support measures, along with training for those evaluating the savings under this measure.

Public sector office equipment must meet the requirements of Regulation 108/2008 (Energy Star). In addition, within the scope of the ecodesign regulations, certain Commission regulations include office equipment, e.g. in relation to stand-by systems. These measures, in combination with the obligation to define technical parameters and requirements for public procurement (under the Energy Labelling Bill – the part concerning the amendment to the Public Procurement Act), will significantly reduce the energy consumption of such equipment in public sector offices.

7.3.8 Support measures for the public sector

- *E² in state administration – training programme*

In the evaluation of the First AP, there was a clear lack of energy efficiency awareness in central government bodies, particularly in terms of identifying energy saving opportunities. It is therefore necessary to provide training on this issue to the employees of central government and public authorities who are responsible for energy balancing and for the operation of buildings and facilities, as well as to personnel responsible for procurement that is capable of achieving energy savings.

Expert seminars of a general nature will be held for all relevant employments of central government and public authorities. Other, more intensely focused seminars will be prepared for those employees who are responsible for proposing, coordinating and evaluating energy-saving measures at their authority. This measure is implemented by the SIEA and is funded under the MoEc's heading of the national budget.

- *Support for the construction of nearly zero energy buildings in the public sector*

In order for the public sector to play its leading role defined by the EU Energy Services and Energy Labelling Directives and to meet the targets under Directive 2010/31/EU on the energy performance of buildings (recast), whereby all new buildings in the public sector are to be nearly zero energy buildings as of 2019, it is necessary to promote a gradual transition to this type of building, particularly through the adoption of appropriate legislation and standards. Compliance with this condition is contingent on an expert knowledge of design services and services related to the construction of such buildings.

- *Publication of supporting documents to uphold the leading role of the public sector – the methodology for promoting green procurement and the inclusion of energy efficiency principles in public procurement rules.*

The support of the public sector's leading role will include the publication of supporting documents. The methodology for promoting green procurement will make it possible to define opportunities for the application of energy efficiency in public procurement. In accordance with the upcoming Energy Labelling Act, it will assist in the application of measures defined in that Act, and in the incorporation of energy efficiency principles into public procurement rules.

Table 18: Summary overview of measures in the public sector in the 2011-2013 period

No	Title of measure	Specification of measure	Financial mechanism	Responsible ministry	Savings planned in 2011-2013	Funding [EUR thousands]					
					[TJ]	EU	National budget	Co-financing from national budget	HTUs, municipalities, towns	Private sources	Total
3.1	Improvements in the thermal properties of public buildings	Healthcare facilities	2007-2013 SF, Health OP	MoH	47	65 601	0	11 577	4 062	0	81 240
			Healthcare facility appropriations	MoH	95	0	7 234	0	0	0	7 234
			Energy Efficiency in Public Buildings – pilot project	MoEc	2	714	0	0	0	0	714
3.2		Schools and educational facilities	Energy Efficiency in Public Buildings – pilot project	MoEc	10	3 810	0	0	0	0	3 810
			2007-2013 SF, Research and Development OP	MoEd SR	34	82 143	0	14 496	5 086	0	101 725
			2007-2013 SF, ROP, Measure 1.1 Education infrastructure	MoARD	1 814	228 521	0	40 327	14 150	0	282 998
3.3		Social services	2007-2013 SF, ROP, Measure 2.1 Infrastructure of social services, social protection and social care	MoARD	82	112 361	0	19 828	8 982	0	141 171
3.4		Cultural facilities	2007-2013 SF, ROP, Measure 3.1 Strengthening the cultural potential of the regions	MoARD	4	6 068	0	1 071*	771	0	7 910
3.5		Office buildings	Energy Efficiency in Public Buildings – pilot project	MoEc	15	5 476	0	0	0	0	5 476
			SF (2007-2013), Bratislava Region OP	Bratislava Self-Governing Region (BSR)	4	0	0	0	0	0	0
3.6	Upgrading of public street lighting		2007–2013 SF, CaEG OP, Measure 2.2	MoEc	27	29 572	0	3 525	1 655	0	34 752
3.7	Application of the principle of energy efficiency in public procurement			Central government bodies	100	0	8 299	0	0		8 299
POD8	E ² in state administration – SIEA training programme			MoEc	A)	0	195	0	0		195

No	Title of measure	Specification of measure	Financial mechanism	Responsible ministry	Savings planned in 2011-2013	Funding [EUR thousands]					
					[TJ]	EU	National budget	Co-financing from national budget	HTUs, municipalities, towns	Private sources	Total
POD 9	Support for the construction of nearly zero energy buildings in the public sector			MoTCRD	A)	0	100	0	0	0	100
POD 10	Issue of supporting documents to uphold the leading role of the public sector			MoEc/Public Procurement Office (PPO)	A)	0	0	0	0	0	0
Public sector – total					2 234	534 266	15 828	90 824	34 706	0	675 624

A) energy savings are determined by the top-down method in evaluations

7.4 Transport

Transport is a sector that has followed a trajectory of growing energy consumption in recent years. This increase is mainly attributable to Slovakia's recent economic growth. Freight transport logistics services play the main role in this respect. The transport sector is therefore emerging as a centre of interest in terms of energy efficiency, because the number of new vehicles is rising and traffic volumes are expanding, creating considerable potential for energy savings. Basic measures concerning principles to reduce the energy intensity of transport are set out in the document "Transport Development Strategy of the Slovak Republic up to 2020" (Government Resolution No 158/2010 of 3 March 2010).

The measures for 2011 to 2013 are largely ongoing measures; most of them are linked to financing under the Structural and Cohesion Funds via the Transport Operational Programme. Total savings of **899 TJ** are envisaged.

Target:	to reduce energy consumed in the transportation of goods and passengers
Target group:	road users, owners and managers of transport links, owners and operators of vehicles, central government, local government

7.4.1 Bus and passenger rail transport policy, including restrictions on vehicle age

An analysis of the current situation shows that the proportion of public transport has recently decreased significantly, giving way to private automobile transport. This trend has negative implications for the environment, increasing the energy intensity of transport, requiring the building of new infrastructure and heightening the risk of accidents. Not least, the falling number of passengers carried by public transport pushes up demands on the public resources needed to finance public transport.

Measures to increase the attractiveness of public transport are aimed at improved infrastructure, integrated transport systems, fleet replacement, and the introduction of public procurement when ordering services in the public interest, in order to reduce the overall costs of providing public passenger transport. In addition to the measures above regarding the supply of high-quality public passenger transport, external conditions will be created to reduce demand for private car use through regulatory intervention, with the aim of deterring individual car use for the daily commute to work or school and encouraging drivers to limit car use to their recreational needs instead.

It is also important to promote the use of alternative fuels (CNG, LPG) in public transport, to support projects for the development of alternative propulsion systems, to encourage regular emission inspections and roadworthiness checks, and to guide changes in demand towards more energy-efficient transport. In the forthcoming period, it is expected that the use of alternative fuels in road transport will improve, more CNG-powered buses will be deployed in public transport, and fleet replacement will be geared towards more environmentally friendly and energy efficient vehicles.

This is a measure continued from the First AP. Energy savings in the reporting period are estimated at **85 TJ**.

7.4.2 Bus and passenger rail transport policy – financing of services in the public interest – regional rail transport

This is a measure continued from the First AP. In 2011, a new ten-year contract was concluded – a Contract for Transport Services in the Public Interest with Železni•ná spo•nos• Slovensko, entailing a subsidy of EUR 205 million for 2011 (the amount of the subsidy for services in the public interest is determined separately each year), with similar subsidies also expected for 2012 and 2013. Energy savings are projected at **20 TJ**. Its final amount is likely to be affected by the closure of selected regional routes.

7.4.3 Upgrading of rolling stock – passenger rail transport

This measure is based directly on the document “Upgrading and Development of the Rolling Stock of Železni•ná spo•nos• Slovensko for 2008–2012”. Energy savings are projected at **30 TJ**.

7.4.4 Building and upgrading of road infrastructure

This measure concerns the construction of motorways and expressways for road traffic. The removal of bottlenecks and black spots, the completion of the integrated network of superior road infrastructure, improved traffic flow and increased mobility reduce average fuel consumption. The measure “Building the transport infrastructure and removing bottlenecks, EU and national funding” has made a significant contribution to energy savings.

Information on the financing and construction of individual sections for 2011–2013 will be known in May 2011, after approval of the Motorway and Expressway Preparation and Construction Programme for 2011–2014. The programme will also significantly affect construction conditions and hence energy savings for the years 2016 and 2020. At present, we know that only one motorway section and four expressway sections will be completed by 2013, delivering savings of approximately **291.5 TJ**. More realistic energy savings for the years 2013, 2016 and 2020 can be set only after approval of the Motorway and Expressway Preparation and Construction Programme for 2011–2014.

7.4.5 Building a basic network of public interports

This measure is aimed primarily at the construction of new intermodal transport terminals and improvements in logistics through the promotion of intermodal transport. The implementation of this measure will enhance operational efficiency and increase the share of intermodal transport in the total traffic volume by transferring some transport operations from the roads to the railways and waterways.

However, as the new intermodal transport terminals are not due to open until 2013, this measure should not undergo major development until 2014–2016. The estimated savings under this measure are **370 TJ** up to 2013.

7.4.6 Support for the development and use of public passenger transport

This measure is directly inspired by the 2008 document “Developing Public Passenger Transport in Preference to Individual Transport”. The prime objectives of this strategy are:

- temporal and spatial availability (time spent inside and outside a vehicle, the accessibility of stops, full geographical coverage at a reasonable quality and reasonable cost, and the practicality of public transport for passengers with reduced mobility and orientation,
- comfort, quality and the range of supplementary services (quality vehicles, reliability of the transport process, and the availability of information on the possibilities and conditions for using public transport).

However, there is a clear trend for many of Bratislava's residents and workers to use private vehicles, which must be countered. Assuming a daily reduction in Bratislava's traffic by 5 000 cars (which would also prevent congestion and fill the half-empty vehicles used for public transport) and an average journey of 15 km, an average of 2 litres of petrol per car would be saved every day. Over 250 working days, that would equal 2.5 million litres of petrol per year and an annual saving of **82.5 TJ**.

The Public Passenger Transport Support Programme in the form of the planning and implementation of integrated systems in conurbations and in selected major cities, motivation for people to use the integrated transport system, integrated timetables for rail, trams, buses, and trolley-buses, and the introduction of integrated transport systems in regular passenger coach services in conjunction with urban public transport and rail transport. The anticipated reduction in the number of cars in cities, improvements in local transport service coverage, simplification of the transport system (the use of single transport documents, information and communication technologies to enhance information for the travelling public), and the improved harnessing of the potential offered by regional rail services within the ITS.

7.4.7 Reduction of specific energy consumption in individual transport

The continuation of vehicle replacement in individual transport, an increase in the rate of fleet replacement including the use of alternative methods, roadworthiness checks and emission controls, the treatment of limit emissions for vehicles in use, and the use of LPG and CNG. It can be assumed that ongoing vehicle replacement, (more thorough) roadworthiness tests and emission controls, and use of alternative fuels offer potential savings.

7.4.8 Improvements in support for non-motorised modes of transport (cycling)

Support for the continued construction of the cycling infrastructure, a signpost and information system for cyclists, cycle paths, parking facilities for cyclists. Cuts in the emissions produced, better cycling infrastructure, reduced traffic volumes in conurbations, and improved traffic conditions in towns.

POD11 Traffic control optimisation and intelligent transport systems (road transport)

Transport trends in developed countries in recent years have been characterised by significant increases in road transport to the detriment of other types of transport. This development has a number of negative environmental impacts and increases road congestion and the accident rate.

Studies and analyses by the European Commission show that, if the expected objectives are to be met, it will be necessary to give priority to the realisation and implementation of concrete solutions in road transport based on the use of information and communication systems and

technologies that help to reduce the negative factors and impacts of road transport with lower demands on public funding and that create conditions for greater private sector involvement.

The strategy behind the production of the Intelligent Transport System Development Support Programme anticipates the construction of a National Traffic Information System. The aim is to build a comprehensive nationwide system of traffic information based on the implementation of information and communication systems and technologies in road transport in the Slovak Republic. The National Traffic Information Centre is a component of the National Traffic Information System, facilitating the integration of traffic information and traffic data from agenda-based information systems and telematics applications.

The implications of the implementation of this programme will be felt gradually in the better use of road infrastructure capacity, the gradual creation of conditions to eliminate congestion and speed up the traffic, a reduction in the accident rate, improved traffic safety and a reduction in the negative impacts on the environment. Among individual entities in the transportation process, the effects will be manifested mainly in the streamlining of the transportation process.

The project has yet to be implemented. Under Government Resolution No 22/2009, its implementation has been put back to the end of 2013. This is a support measure.

Table 19: Summary overview of measures in the transport sector in the 2011–2013 period

No	Title of measure	Financial mechanism	Responsible ministry	Savings planned in 2011-2013	Funding [EUR thousands]					
				[TJ]	EU	National budget	Co-financing from national budget	HTUs, municipalities, towns	Private sources	Total
4.1	Bus and passenger rail transport policy + restriction on vehicle age	HTUs, towns	HTUs, towns	85	0	0	0	358 494	0	358 494
4.2	Bus and passenger rail transport policy – financing of public interest services – regional rail transport	MoTCRD	MoTCRD	20	0	448 118	0	0	0	448 118
4.3	Upgrading of rolling stock – public rail transport	2007-2013 SF, Transport OP	MoTCRD	30	77 962	0	150 441		7 904	236307
4.4	Building and upgrading the transport infrastructure	2007-2013 SF, Transport OP	MoTCRD	291,50	372 769	334 996	373 598		45 192	1126555
4.5	Building a basic network of public intermodal transport terminals	2007–2013 SF, Transport OP – Intermodal transport infrastructure	MoTCRD	370	54 567		64 360			118 927
4.6	Support for the development and use of public passenger transport	MoTCRD	MoTCRD	82,50	0	50	0	100	0	150
4.7	Reduction of specific energy consumption in individual transport	MoTCRD	MoTCRD	10		0	0	0	0	0
4.8	Improvements in support for non-motorised modes of transport (cycling)	MoTCRD	MoTCRD	10		0	0	2 849	102	2 951
POD 11	Traffic control optimisation and intelligent transport systems (road transport)		MoTCRD	0	0	0	0	0	0	0
Transport – total				899	505 298	783 164	588 399	361 443	53 198	2 291 502

7.5 Industry

The evaluation of the First AP confirmed that industry made a major contribution to energy savings, despite the fact that the EEF had not been established. At present, although potential energy savings have not been specifically quantified, past experience indicates that there is still sufficiently large potential to implement measures that will provide returns relatively soon. More precise information on potential energy savings in industry and agriculture will be available on the basis of data from the mandatory energy audits (Act No 476/2008) in the years 2011 to 2013.

In the planning of measures under the Second AP, it is assumed that reductions in the energy intensity of industry will continue in the future. It should be noted that the proposed measures relate only to those industrial undertakings which are not included in the emissions trading scheme under Directive 2003/87/EC. Total savings of **2 490 TJ** are envisaged.

Most of the projects contracted through the Structural Funds via the CaEG OP and projects under the SLOVSEFF II Programme will be carried out in the 2011–2013 period.

Target:	to reduce energy intensity in the creation of value added in industry
Target group:	entities involved in industrial output

7.5.1 Innovation and technology transfers at industrial undertakings

In accordance with the Innovation Strategy of the Slovak Republic, the measure aims to increase the competitiveness of existing undertakings by introducing innovative and advanced technologies, to create an environment capable of expanding the innovation potential of industrial undertakings, and to develop production with minimal environmental impact, which is in most cases contingent on reduced energy consumption and CO₂ emissions, in order to prepare for the sustainable development of industry.

7.5.2 Increased energy efficiency in industrial production

Reductions in the energy intensity of industrial production in the Slovak Republic are one of the highest priorities as, in view of the utility potential of investments relative to energy savings, this is one of the most promising sectors of the national economy.

7.5.3 Application of legislative measures

According to Section 8 of Act No 476/2008, industrial and agricultural undertakings are obliged to evaluate the energy intensity of production in the form of energy audits. It is expected that, following such auditing, undertakings will implement identified cost-free and low-cost measures to reduce their energy intensity within one year of the audit, as such measures will also reduce their energy costs.

Table 20: Summary overview of measures in the industry sector in the 2011–2013 period

No	Title of measure	Financial mechanism	Responsible ministry	Savings planned in 2011-2013	Funding [EUR thousands]					
				[TJ]	EU	National budget	Co-financing from national budget	HTUs, towns	Private sources	Total
5.1	Innovation and technology transfers at industrial undertakings	2007–2013 SF, CaEG OP, Measure 1.1	MoEc	58	728	0	129	0	1 114	1971
		2007-2013 SF, BSR OP	(BSR)	4	70	0	12	0	55	137
5.2	Increased energy efficiency in industrial production	20007–2013 SF, CaEG OP, Measure 2.1	MoEc	44	3953	0	698	0	245	4 896
		Slovseff II – industry	MoEc	144	3000	0	0	0	26 000	29 000
5.3	Application of legislative measures	Energy audits at industrial undertakings pursuant to Act No 476/2008	MoEc	2240	0	0	0	0	280 000	280 000
Industry – total				2490	7 751	0	839	0	307 414	316 004

7.6 Horizontal measures

Horizontal measures are an important factor in the reduction of final energy consumption within the national economy. Most of them create conditions for the realisation of specific measures in individual sectors. As a rule, savings generated by the implementation of these measures cannot be quantified by the bottom-up method. In the case of horizontal measures in the Second AP, only an expert estimate is provided of the total savings that could be achieved through these measures. Savings in the evaluation of the Second AP will be calculated by the top-down approach in individual sectors.

Target:	to increase energy efficiency = enhanced energy security
Target group:	energy-consuming entities

7.6.1 “Energy Auditor” training course

Act No 476/2008 on energy efficiency modified the status of the energy auditor. A register of energy auditors is currently maintained by the MoEc. An applicant is entered in the register of energy auditors on meeting the statutory qualification requirements. An energy auditor is required to attend periodic training, provided by the SIEA, every three years. The SIEA will hold the first course for candidates interested in becoming energy auditors in 2011. In 2012, the SIEA will hold mandatory retraining for auditors as three years will have elapsed since the first auditors were entered in the register maintained by the MoEc.

7.6.2 Educating children on energy efficiency

Children will be educated on how they can save energy in the form of collections of stories, games and experiments under the title “Auntie Eta’s Advice”. This project was launched in 2010 under the national ENERGY FOR LIFE project, which is implemented by the SIEA (see Section 4.1.3) and will last until 2015.

7.6.3 Energy efficiency information campaign

Since 2010, the SIEA has been running a public information campaign as part of the national ENERGY FOR LIFE project, which will continue until 2015. As part of the campaign, a public opinion poll was conducted in 2010 on awareness of energy conservation and RES use among households and businesses. The poll results will be used to plan additional awareness activities, mainly seminars, roundtable discussions, and the publication of promotional materials.

7.6.4 Draft legislative measures

In the 2011–2013 period, there are plans to prepare the following legislative measures that will contribute to enhanced energy efficiency in the Slovak Republic:

- Amendment to Act No 555/2005 on the energy performance of buildings and amending certain laws, as amended by Act No 17/2007, in connection with the implementation of

Directive 2010/31/EU of the European Parliament and of the Council of 19 May 2010 on the energy performance of buildings.

- Amendment to Act No 17/2007 on the periodic inspection of boilers, heating systems and air-conditioning systems and amending certain laws, in connection with the implementation of Directive 2010/31/EU of the European Parliament and of the Council of 19 May 2010 on the energy performance of buildings.
- Amendment to Act No 476/2008 on efficiency in energy use (the Energy Efficiency Act) and amending Act No 555/2005 on the energy performance of buildings and amending certain laws, as amended by Act No 17/2007, based on the results of the implementation of the law in practice, particularly in relation to rights and obligations in the provision of energy services.
- Decree of Ministry of Economy of the Slovak Republic establishing the energy efficiency of energy conversion in the operation, upgrading and building of electricity production facilities and heat production facilities.
- Decree of the Ministry of Economy of the Slovak Republic laying down technical requirements for the thermal insulation of heat and hot water systems.

7.6.5 System for monitoring efficiency in energy use

The obligation to operate a system monitoring energy use efficiency arises from Act No 476/2008 on energy efficiency. In accordance with MoEc Decision No 4/2010, delegating the performance of activities under Act No 476/2008 to the Slovak Innovation and Energy Agency, the SIEA was appointed as the organisation responsible for the preparation and operation of the monitoring system. The monitoring system is one of the key instruments used in evaluating energy efficiency measures primarily by the bottom-up method. It is intended for the evaluation of the energy saving measures taken; this should result in regular assessments of, and, where appropriate, adjustments to, energy efficiency measures, taking into account their overall effect and the capital required to implement them. The monitoring system will be operated on the basis of annual contracts between the MoEc and the SIEA. The system itself does not contribute to savings, but by using data from the projects and programmes implemented it is possible to increase significantly, for example, the effectiveness of support programmes.

In connection with the monitoring of energy savings, arrangements also need to be made to keep track of energy savings in programmes and measures that are not primarily focused on energy issues. In programmes financed by the Structural Funds, for example, an “energy savings” indicator should be mandatory for all projects.

In view of the requirement under Directive 2006/32/EC on energy services to exclude ETS companies from action plans and energy-saving targets, information on CO₂ emissions also needs to be linked to the monitoring system. However, a calculation of CO₂ emissions saved by measures in the Action Plan, excluding ETS companies, requires the interconnection of the NEIS and ETS databases (see below).

7.6.6 Harmonisation of reporting systems in respect of the sources used to monitor air emissions

Bearing in mind the need to split industry into companies involved in ETS emission allowance trading and those which are not involved, it is necessary to interlink the monitoring system database with databases on the reporting of CO₂ emissions. To obtain an accurate calculation of CO₂ emissions from measures under the Second AP and other action plans, an electronic link must be made between the NEIS and ETS reporting systems in respect of the sources used to monitor air emissions.

An improvement from the legislative standpoint is prepared for the post-2012 period, when the new ETS Directive and Decision No 406/2009/EC on the joint effort to reduce emissions outside the ETS enter into force; here, we are to establish a national system for emissions outside the ETS. However, harmonisation is essential.

7.6.7 Energy service development support

Energy service development support will mainly encompass the adaptation of the legal environment (part of Measures 6.4) and the education and awareness of public sector workers (covered by the E² in State Administration training programme and Measure 6.8). To increase awareness of energy services, there are plans to draw up guidance for public sector entities aimed at explaining and recommending appropriate practices in the use, procurement and financing of energy services within the existing legislative framework. Specific projects will be funded primarily from private sources.

7.6.8 Energy consulting

The following activities are planned under this measure:

- Regional energy advice centres
- Energy management support in towns and municipalities
- Provision of information on energy efficiency and on the opportunities for project funding (SIEA, MoEc consultancy)
- Consultancy services of energy companies
- Energy savings – ECB project

Under the ENERGY FOR LIFE project, the SIEA will continue operating advice centres in Trenčín, Banská Bystrica and Košice until 2015.

7.6.9 Support for research into energy savings

Support for research into savings of final and primary energy is necessary in order to generate new ways of implementing energy-saving measures in the future. Research projects on this theme are supported by SRDA and SGA funding and are listed in Annex 2.

It is important to highlight the focus of innovative research and development within the framework of the **Long-term Plan for Government Science Policy**, currently being prepared within the **substantive** research and development priority “Energy and the Energy Sector”, on research and development aimed at increasing the energy efficiency of all systems and

equipment belonging to the key energy consumers in relation to the use of available energy sources, and on research and development into new renewable energy systems, with a view particularly to increasing their efficiency and effectiveness and enhancing their economic efficiency in response to **Europe 2020**, as well as the **OECD Green Growth Strategy**.

7.6.10 Cross-sectional introduction of the monitoring of energy savings

The monitoring of energy savings was meant to be taken into account automatically and introduced complementarily in programmes and measures that are not primarily focused on energy issues. For example, in programmes financed by the Structural Funds, an “energy savings” indicator is mandatory for all projects.

7.6.11 Analysis of the potential energy savings in various sectors of the national economy

A basic requirement when addressing energy savings is the need to know how much can be saved and where. In view of rapidly decreasing energy intensity and the attainment of high energy savings in recent years, measures delivering what are relatively smaller energy savings must also be identified. The initial and most striking measures will soon end, making it difficult to maintain the pace and amount of savings.

It is therefore necessary to consolidate existing analyses and analytical studies in respect of potential savings in the sectors and, subsequently, to update them in accordance with the requirements for energy savings in detailed form up to 2020, with an outlook laying down basic procedures for the years 2030 and 2050. In those sectors where such documents do not exist, they should be drawn up.

7.6.12 Analysis of energy efficiency support mechanisms in the Slovak Republic

In order to tap the existing potential for energy savings in the Slovak Republic, it will be necessary to analyse the possibilities for operating an energy efficiency support mechanism in the Slovak Republic.

7.6.13 Assistance for towns and municipalities in the preparation of Sustainable Energy Action Plans

The preparation of a Sustainable Energy Action Plan is one of the conditions for towns and municipalities to enter into the Covenant of Mayors, and should include the target to reduce CO₂ emissions by at least 20% by 2020. Towns and municipalities may apply for technical assistance in the preparation of this action plan through the IEE II Programme, which may cover up to 100% of the cost. Under this measure, seminars will be held to educate representatives of towns and municipalities about the Covenant of Mayors, and the conditions and possibilities for the financing of sustainable energy projects aimed at towns and municipalities from EU funds. At present, only two Slovak cities are involved in the Covenant of Mayors – Nitra and Moldava nad Bodvou (of a total of 2 181 participating towns and municipalities throughout the EU). The goal is to involve at least 50 other towns and municipalities in this programme, which can be achieved through seminars for towns and municipalities in each self-governing region. The seminars will be organised by the SIEA at its regional offices and will be financed under Measure 2.2 of the CaEG OP.

Table 21: Summary overview of horizontal measures in the 2011–2013 period

No	Title of measure	Specification of measure	Responsible ministry	Funding [EUR thousands]					
				EU	National budget	Co-financing from national budget	HTUs, municipalities, towns	Private sources	Total
6.1	“Energy Auditor” training course	Aptitude test in accordance with Act No 476/2008, including periodic training	MoEc	0	105	0	0	30	135
6.2	Educating children on energy efficiency	Energy for Life, 2007–2013 SF, CaEG OP, Measure 2.2	MoEc	85	0	15	0	0	100
6.3	Energy efficiency information campaign	Energy for Life, 2007–2013 SF, CaEG OP, Measure 2.2	MoEc	2 550	0	450	0	0	3 000
6.4	Draft legislative measures	Amendments to legislative regulations prompted by the European Parliament, the Council and the Commission and based on experience; (clarification of) the legislative framework for the use of energy services, particularly in relation to business in the thermal energy sector and public procurement (requirement of the Slovak Union of Towns)	MoEc	0	200	0	0	0	200
6.5	Monitoring and information system	Operated by the SIEA, funded by the national budget	MoEc	0	2 000	0	0	0	2 000
6.6	Harmonisation of reporting systems in respect of the sources used to monitor air emissions		MoEnv	0	0	0	0	0	0
6.7	Energy service development support	IEE	Towns and municipalities	30	0	0	10	12	52
6.8	Energy consulting	Regional energy advice centres	HTUs	0	0	0	0	0	0
		Energy management support in towns and municipalities	Towns and municipalities	0	0	0	0	0	0
		Provision of information on energy efficiency and on the opportunities for project funding (SIEA, MoEc consultancy)	MoEc	689	540	122	0	0	1 351
		Consultancy services of energy companies	-	0	0	0	0	1 500	1 500

No	Title of measure	Specification of measure	Responsible ministry	Funding [EUR thousands]					
				EU	National budget	Co-financing from national budget	HTUs, municipalities, towns	Private sources	Total
		Energy savings – ECB project	-	0	0	0	0	45	45
6.9	Support for research and development in energy savings		MoEd SR	0	0	0	0	0	0
6.10	Cross-sectional introduction of the monitoring of savings		MoEc	0	0	0	0	0	0
6.11	Analyses of the potential energy savings in sectors of the national economy		MoEc	0	0	0	0	0	0
6.12	Analysis of energy efficiency support mechanisms in the Slovak Republic		MoEc	0	0	0	0	0	0
6.13	Assistance for towns and municipalities in the preparation of Sustainable Energy Action Plans		MoEc	0	3	0	0	0	3
	Horizontal measures – total			3 354	2 848	587	10	1 587	8 386

8. Overview of energy savings planned for 2011–2013

Table 22 contains an overview of the funds and energy savings planned for the years 2011 to 2013.

Table 22: Summary overview of measures in the 2011–2013 period

Sector	Savings planned in 2011-2013	Funding [EUR thousands]					
	[TJ]	EU	National budget	Co-financing from national budget	HTUs, municipalities, towns	Private sources	Total
Buildings	1 754	20 751	120 290	1 544	44 299	892 181	1 079 065
Public sector	2 234	534 266	15 828	90 824	34 706	0	675 624
Industry	2 490	7 751	0	839	0	307 414	316 004
Transport	899	505 298	783 164	588 399	361 443	53 198	2 291 502
Appliances	985	0	13	0	0	160 770	160 783
Horizontal measures	A)	3 354	2 848	587	10	1 587	8 386
Total	8 362	1 071 420	922 143	682 193	440 458	1 415 150	4 531 364

A) Savings are included in previous measures.

The measures planned in the Second AP should contribute to fulfilment of the 2011–2013 energy savings target of **8 362 TJ**, which represents **2.7% of average energy consumption in 2001–2005**.

9. Conclusion

The current Second Energy Efficiency Action Plan 2011–2013 evaluates the experience of and results from the application of measures under the First Action Plan and proposes energy saving measures for the next three years.

A significant barrier to the evaluation of individual measures was the lack of relevant data, often caused by a lack of awareness among the persons responsible or because specific projects did not monitor energy savings or any other parameters allowing for a calculation of these savings.

The approach to measures proposed in the First Action Plan can be characterised in particular as an effort to apply mainly low-cost measures. Most of the proposed measures from the First Action Plan continue to offer high potential for energy savings. This applies in particular to measures financed by the Structural Funds, where resources have been specifically allocated with the intention to cover more than a quarter of the planned savings. In addition to the ongoing measures, the Second AP includes proposals for new measures concerning the buildings, industry and transport sectors in particular.

The monitoring system will significantly help towards making the data on the energy savings achieved more objective and realistic, with a tendency to shift as far as possible towards identifying savings via the bottom-up method, which is much more exact than the top-down method.

Attachment: List of measures fulfilling the requirements set in Article 10(2) of the Directive of European Parliament and European Council 2010/31/EU on energy performance of buildings

Measures in the building sector

- 1.1. Improvement of the thermo-technical features of buildings - Family houses
 - 1.1.1. Improvement of the thermo-technical features of buildings - Family houses – Own resources
 - 1.1.2. Improvement of the thermo-technical features of buildings - Family houses - Governmental insulation program II.
- 1.2. Improvement of the thermo-technical features of buildings - Multifamily buildings
 - 1.2.1. Improvement of the thermo-technical features of buildings - Multifamily buildings - State Fund for Building Renovation
 - 1.2.2. Improvement of the thermo-technical features of buildings - Multifamily buildings - Subsidies for systemic defects
 - 1.2.3. Improvement of the thermo-technical features of buildings - Multifamily buildings - Own resources
 - 1.2.4. Improvement of the thermo-technical features of buildings - Multifamily buildings - Governmental insulation program II.
 - 1.2.5. Improvement of the thermo-technical features of buildings - Multifamily buildings - Governmental insulation program - continuation of the program set in 2009
 - 1.2.6. Improvement of the thermo-technical features of buildings - Multifamily buildings – Slovseff II.
- 1.3. Improvement of thermo-technical features of buildings - commercial buildings
 - 1.3.1. Improvement of the thermo-technical features of buildings – Administrative buildings (except for public buildings) - Own resources
 - 1.3.2. Improvement of the thermo-technical features of buildings - Hotels, restaurants - Operational Programme Competitiveness and economic growth, 3.1 tourism
 - 1.3.3. Improvement of the thermo-technical features of buildings - Hotels, restaurants - Own resources, Operational Programme Rural Development
 - 1.3.4. Improvement of the thermo-technical features of buildings - Retail sale, wholesale - Own resources
 - 1.3.5. Improvement of the thermo-technical features of buildings - Buildings of non-profit organisations - Ekofond
- 1.4. New construction of low energy and passive buildings – Family houses
 - 1.4.1. New construction of low energy and passive building - Family houses - Commercial banks
 - 1.4.2. New construction of low energy and passive buildings - Multifamily buildings – Commercial banks
- 1.5. Application of legislative measures - Act No. 476/2008 Coll. - hydraulic balancing of heating and hot water distribution systems, insulation of hot water distribution systems

- POD1 Application of legislative measures - Act No. 555/2005 Coll. - energy certification of buildings
- POD 2 Application of legislative measures - Act No. 17/2007 Coll. - regular inspection of boilers, air-conditioning and heating systems
- POD3 Draft (amendment) of legislative measures - Construction Act, Act No. 555/2005 Coll., Act No. 17/2007 Coll. and the related secondary legislative acts related to implementation of the directive 2010/31/EU.
- POD 4 Strategic solution for support of new construction of low energy and passive buildings

Measures in public sector

- 3.1. Improvement of the thermo-technical features of public buildings - Health care establishments
 - 3.1.1. Improvement of the thermo-technical features of public buildings - Health care establishments - Structural funds 2007-2013, Operational Programme Health care
 - 3.1.2. Improvement of the thermo-technical features of public buildings - Health care establishments - Budgetary sources of health care establishments
 - 3.1.3. Improvement of the thermo-technical features of public buildings - Health care establishments - Pilot project on energy efficiency in public buildings
- 3.2. Improvement of the thermo-technical features of public buildings - Education buildings
 - 3.2.1. Improvement of the thermo-technical features of public buildings - Schools and school establishments buildings - Pilot project on energy efficiency in public buildings
 - 3.2.2. Improvement of the thermo-technical features of public buildings - Schools and school establishments - Structural Funds 2007-2013, Operational Programme Research and development
 - 3.2.3. Improvement of the thermo-technical features of public buildings - Schools and school establishments - Structural Funds 2007-2013, Regional Operational Programme, measure 1.1 Infrastructure of education
- 3.3. Improvement of the thermo-technical features of public buildings - Social services - Structural Funds 2007-2013. Regional Operational Programme, measure 2.1 Infrastructure of social services, social-legal protection and social guardianship
- 3.4. Improvement of the thermo-technical features of public buildings - Cultural establishments - Structural Funds 2007-2013, Regional Operational Programme, measure 3.1 Strengthening of cultural potential of regions and tourism infrastructure
- 3.5. Improvement of the thermo-technical features of public buildings – Administrative buildings - Pilot project on energy efficiency in public buildings
- 3.6. Improvement of the thermo-technical features of public buildings - Administrative buildings - Structural Funds 2007-2013. Operational Programme Bratislava region

POD 9 Support of new construction of nearly zero energy buildings in the public sector

Annex 1 Calculation of indicators by the top-down method

The European Commission requires Member States to report savings by means of minimum indicators calculated by the top-down method. These indicators were calculated according to the equations set out in the European Commission's guidance document "European Commission Recommendations on measurement and verification methods in the framework of Directive 2006/32/EC on energy end-use efficiency and energy services. Preliminary draft." ("the Methodology"). This Annex describes the data and equations used for each mandatory indicator.

In the Commission's methodology, savings are broken down into the following sectors:

1. Household sector
2. Service sector
3. Transport sector
4. Industry sector

1. Household sector

Indicator M1 – Non-electricity energy consumption of households in toe per permanently occupied dwelling adjusted for climate conditions

Equations used:

Equation to calculate the indicator	Equation to calculate the energy saving
$\frac{E^{H_{NE_EL}}}{D} * \frac{MDD_{25}^{kúrenie}}{ADD^{kúrenie}}$	$\left[\left(\frac{E_{2007}^{H_{NE_EL}}}{D_{2007}} * \frac{MDD_{25}^{kúrenie}}{ADD_{2007}^{kúrenie}} \right) - \left(\frac{E_t^{H_{NE_EL}}}{D_t} * \frac{MDD_{25}^{kúrenie}}{ADD_t^{kúrenie}} \right) \right] * D_t$

Where:

$E^{H_{NE_EL}}$ - non-electricity energy consumption in households

$MDD_{25}^{kúrenie}$ - average number of degree days in the period from 1980 to 2004 (25-year average)

$ADD^{kúrenie}$ - current number of degree days

D_t – Number of permanently occupied dwellings in year t

t – year t

Data sources used:

The following basic data and sources were used in the calculation of the M1 indicator and savings:

Non-electric energy consumption is calculated as the difference between total household energy consumption and electricity consumption in households; both figures come from Eurostat. The resulting non-electric energy consumption in households was adjusted for the influence of climate conditions by multiplying the ratio of average and current degree days for the Slovak Republic (Eurostat). Information on the number of permanently occupied dwellings from Odyssee was used to calculate the specific consumption of non-electric energy.

Indicator M2 – Electricity consumption of households in kWh per dwelling

Equations used:

Equation to calculate the indicator	Equation to calculate the energy saving
$\frac{E^{H_{EL}}}{D}$	$\left(\frac{E_{2007}^{H_{EL}}}{D_{2007}} - \frac{E_t^{H_{EL}}}{D_t} \right) * D_t$

Where:

$E^{H_{EL}}$ - electricity consumption in households

D_t – Number of permanently occupied dwellings in year t

Data sources used:

In the calculation of the indicator M2, the same data sources as for M1 were used – electricity consumption from Eurostat, the number of permanently occupied dwellings from Odyssee.

Table 1. Sources for the calculation of indicators M1 and M2 – household sector

Used to calculate the indicator	Basic information	Source
M1	Energy consumption in households	Eurostat
M1, M2	Electricity consumption in households	Eurostat
M1	Current degree days in the Slovak Republic	Eurostat
M1	Average degree days in the Slovak Republic in 1980–2004	Eurostat
M1, M2	Number of permanently occupied dwellings	Odyssee

2. Service sector

Indicator M3 – Non-electric energy consumption in the service sector in toe per employee (FTE), adjusted for climate conditions

Equations used:

Equation to calculate the indicator	Equation to calculate the energy saving
$\frac{E^{S_{NE-EL}}}{em^{S_{fe}}} * \frac{MDD_{25}}{ADD^{kúrenie}}$	$\left[\left(\frac{E^{S_{NE-EL}}_{2007}}{em^{S_{fe}}_{2007}} * \frac{MDD_{25}^{kúrenie}}{ADD_{2007}^{kúrenie}} \right) - \left(\frac{E^{S_{NE-EL}}_t}{em^{S_{fe}}_t} * \frac{MDD_{25}^{kúrenie}}{ADD_t^{kúrenie}} \right) \right] * em^{S_{fe}}_t$

Where:

$E^{S_{NE-EL}}$ - Non-electric energy consumption in the service sector

$em^{S_{fe}}$ - total number of employees (FTE)

MDD_{25} - average number of heating days in the past 25 years

$ADD_t^{kúrenie}$ - current number of heating days in year t

t – year t

Data sources used:

Non-electric energy consumption is calculated as the difference between the total household energy consumption and electricity consumption in the service sector; both figures come from Eurostat. The resulting non-electric energy consumption in households was adjusted for the influence of climate conditions by multiplying the ratio of average and current degree days for the Slovak Republic (Eurostat). Information on the number of full-time employees in the service sector was used to calculate the specific consumption of non-electric energy. This information was calculated based on the average number of employees in the service sector (Slovstat database, Statistical Office) and the proportion full-time employees to the total number of employees in the sector (Slovstat database, Statistical Office).

Indicator M4 – Electricity consumption of the service sector in kWh per employee (FTE)

Equations used:

Equation to calculate the indicator	Equation to calculate the energy saving
$\frac{E^{S_{EL}}}{em^{S_{fe}}}$	$\left(\frac{E^{S_{EL}}_{2007}}{em^{S_{fe}}_{2007}} - \frac{E^{S_{EL}}_t}{em^{S_{fe}}_t} \right) * em^{S_{fe}}_t$

Where:

$E^{S_{EL}}$ - electricity consumption in the service sector

$em^{S_{fe}}_t$ = total number of employees (FTE)

Data sources used:

The indicator is calculated on the basis of electricity consumption from Eurostat and the number of employees (FTE).

Table 2. Sources for the calculation of indicators M3 and M4 – service sector

Used to calculate the indicator	Basic information	Source
M3	Energy consumption in the service sector	Eurostat
M3, M4	Electricity consumption in the service sector	Eurostat
M3	Current degree days in the Slovak Republic	Eurostat
M3	Average degree days in the Slovak Republic in 1980–2004	Eurostat
M3, M4	Average number of employees by economic activity (SK NACE Rev. 2), expressed as persons	SOSR, Slovstat database
M3, M4	Employees by type of working hours and gender, expressed as thousands of persons	SOSR, Slovstat database

3. Transport sector

Indicator M5 – Energy consumption of road vehicles in toe per car equivalent

Equations used:

Equation to calculate the indicator	Equation to calculate the energy saving
$\frac{E^{RV}}{S^{RVCAeq}}$	$\left(\frac{E_{2007}^{RV}}{S_{2007}^{RVCAeq}} - \frac{E_t^{RV}}{S_t^{RVCAeq}} \right) * S_t^{RVCAeq}$

Where:

E^{RV} - energy consumed by road vehicles

S_t^{RVCAeq} – fleet (number of vehicles), expressed as car equivalent

Data sources used:

The indicator is calculated on the basis of road transport energy consumption (source: MoTCRD) and the number of vehicles, expressed as car equivalent. The car equivalent is calculated on the basis of the number of each type of road vehicle from Eurostat and the following assumptions for the equivalent:

Table 3. Estimated car equivalent values by type of vehicle

Vehicle type	Car equivalent	Source of estimate
Motorcycles	0,15	Methodology
Cars	1	Methodology
Buses, trolley-buses	15	Methodology
Trams	0	MoEc and SIEA assumption
Goods vehicles (3.5 - 12.5 tonnes)	1,8	Methodology
Semitrailer	4	Methodology
Trailer	4	Assumption based on the methodology
Road tractor	4	Assumption based on the methodology

Indicator M6 - Energy consumption of rail transport in goe/tkm

Equations used:

Equation to calculate the indicator	Equation to calculate the energy saving
$\frac{E^R}{T^R}$	$\left(\frac{E_{2007}^R}{T_{2007}^R} - \frac{E_t^R}{T_t^R} \right) * T_t^R$

Where:

E^R – energy consumption of rail transport

T^R – total rail transport distance in tkm

Data sources used:

The indicator was calculated on the basis of energy consumption in rail transport from Eurostat (data from the Statistical Office were used for the years 2000 to 2001) and rail transport performance in tkm. Rail transport distance was calculated as the sum of the freight rail transport distance in tkm from Eurostat and passenger rail transport distance. The passenger rail transport distance in passenger-kilometres from Eurostat was converted to tkm based on the assumption that the average weight is 80 kg per person.

Indicator M7 - Energy consumption of inland waterways transport in kgoe/tkm

Equations used:

Equation to calculate the indicator	Equation to calculate the energy saving
$\frac{E^W}{T^W}$	$\left(\frac{E_{2007}^W}{T_{2007}^W} - \frac{E_t^W}{T_t^W} \right) * T_t^W$

Where:

E^W – energy consumption of inland waterways transport

T^W – total inland waterways transport in tkm

Data sources used:

The indicator was calculated based on the energy consumption of inland waterways transport from the MoTCRD and the inland waterways transport distance in tkm, also from the MoTCRD.

Table 4. Sources for the calculation of indicators M5, M6 and M7 – transport sector

Used to calculate the indicator	Basic information	Source
M5	Energy consumption of road transport	Eurostat
M5	Car equivalent	Based on the Methodology and an expert estimate
M6	Energy consumption of rail transport	Eurostat
M6	Freight rail transport distance in tkm	Eurostat
M6	Passenger rail transport distance in passenger km	Eurostat
M7	Energy consumption of inland waterways transport	MoTCRD
M7	Inland waterways transport distance	MoTCRD

4. Industry

Indicator M8 - Energy consumption of industrial sub-sectors per value added in real terms
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Equations used:

Equation to calculate the indicator	Equation to calculate the energy saving
$\frac{E^{I^x}}{VA^{I^x}}$	$\left(\frac{E_{2007}^{I^x}}{VA_{2007}^{I^x}} - \frac{E_t^{I^x}}{VA_t^{I^x}} \right) * VA_t^{I^x} * K_{2007}^{I^x}$

Where:

E^{I^x} - energy consumption of industrial sub-sector x

K^{I^x} – proportion of the energy consumption of the industrial sub-sector included in the EU ETS, including installed combustion plants in non-ETS industries

VA^{I^x} – value added in constant prices in the industrial sub-sector

Data sources used:

The indicator was calculated for the following industrial sub-sectors: metallurgical and foundry industry, chemicals (including rubber and plastics manufacturing), mining and quarrying (except fuel), food and tobacco industry, textiles, leather and clothing, paper and printing industry, engineering industry and industry for the processing of other metals, and other industry not elsewhere specified.

Energy consumption information for these sub-sectors exists in Eurostat. The added value for the individual sub-sectors was drawn from Eurostat – NACE 60. Whereas energy consumption is classified in NACE rev. 2, the value added is set out in NACE R1, with the much more detailed division of sub-sectors. The sub-sectors were therefore aggregated so that the resulting sub-sectors correspond to the division of the industry sector into sub-sectors both for energy consumption and value added. The value added from Eurostat is expressed in current prices, and it is therefore converted into constant prices based on a conversion rate obtained from Statistical Office data.

While this indicator is calculated for the entire industry, the energy saving calculation takes into account only those sub-sectors which are covered by Directive 2006/32/EC and therefore are not included in the emissions trading scheme (EU ETS). Individual sub-sectors have been assigned the K factor, which reflects the proportion of the sub-sector covered by Directive 2006/32/EC and was set by a qualified estimate based on a review of ETS companies falling under each industry sector. The following sub-sectors or parts thereof are included in the emissions trading scheme: paper and printing industry (the entire sub-sector, hence the K factor is zero), metallurgy and foundry industry (K = 0.1), chemicals (K = 0.1), other industry not elsewhere specified (including glass and ceramics, K = 0.25).

5. Establishment of final savings for 2008, 2009 and 2010

Total final savings for the years 2008, 2009 and 2010 are calculated as the sum of savings for each year:

$$ES_{Total} = ES_{2008} + ES_{2009} + ES_{2010}$$

Where:

ES – energy saving in a given year

Annex 2 Energy research projects with potential benefit for energy savings

Table 1 Energy research projects supported in 2008–2010

Research project title	Funding	Status
Unconventional energy unit with a cooling internal combustion engine.	SRDA	Closed
Comprehensive analysis and optimisation of losses in the power grid	SRDA	Open
Micro-cogeneration unit based on the combustion of solid biomass	SRDA	Open
Solar-gas hybrid heat engine using highly concentrated sunlight and advanced ceramic materials	SRDA	Open
Determination of the energy balance of the technical facilities of buildings using renewable energy sources for energy auditing, certification and the monitoring of buildings	SGA	Open
Biotechnological recovery of domestic renewable sources for biologically active products useful in the food industry, pharmacy and veterinary practice.	SGA	Open
Agroclimatic and hydrological analysis and establishment of the energy and consumptive water willow safeguard factor in the modelling and forecasting of biomass and its subsequent use as a renewable energy source	SGA	Open
Environmental and energy aspects of biomass use	SGA	Open
Research into the use of thermal energy from renewable sources in agricultural drying technology, with an assessment of ecological and technical implications	SGA	Open

Table 2 Energy research projects planned for 2011-2013

Research project title	Funding	Launch
Research into an adaptive multi-storage-unit power system for renewable energy	SGA	2011
Progressive solutions for medical technology installations and ventilation systems in the creation of an internal environment in buildings to reduce their energy intensity.	SGA	2011
Energy-efficient systems in environmental engineering using renewable energy sources and applying automation technology for intelligent buildings	SGA	2011
Theoretically and experimentally reasoned proposal for energy savings and environmentally friendly building envelopes	SGA	2011
Opportunities for SME participation in diversification of the energy infrastructure	SGA	2011

Annex 3 European Commission regulations on ecodesign and energy labelling

European Commission regulations on ecodesign

Commission Regulation (EC) No 1275/2008 of 17 December 2008 implementing Directive 2005/32/EC of the European Parliament and of the Council with regard to ecodesign requirements for standby and off mode electric power consumption of electrical and electronic household and office equipment

Commission Regulation (EC) No 107/2009 of 4 February 2009 implementing Directive 2005/32/EC of the European Parliament and of the Council with regard to ecodesign requirements for simple set-top boxes

Commission Regulation (EC) No 244/2009 of 18 March 2009 implementing Directive 2005/32/EC of the European Parliament and of the Council with regard to ecodesign requirements for non-directional household lamps

Commission Regulation (EC) No 245/2009 of 18 March 2009 implementing Directive 2005/32/EC of the European Parliament and of the Council with regard to ecodesign requirements for fluorescent lamps without integrated ballast, for high intensity discharge lamps, and for ballasts and luminaires able to operate such lamps, and repealing Directive 2000/55/EC of the European Parliament and of the Council

Commission Regulation (EC) No 278/2009 of 6 April 2009 implementing Directive 2005/32/EC of the European Parliament and of the Council with regard to ecodesign requirements for no-load condition electric power consumption and average active efficiency of external power supplies

Commission Regulation (EC) No 640/2009 of 22 July 2009 implementing Directive 2005/32/EC of the European Parliament and of the Council with regard to ecodesign requirements for electric motors

Commission Regulation (EC) No 641/2009 of 22 July 2009 implementing Directive 2005/32/EC of the European Parliament and of the Council with regard to ecodesign requirements for glandless standalone circulators and glandless circulators integrated in products

Commission Regulation (EC) No 642/2009 of 22 July 2009 implementing Directive 2005/32/EC of the European Parliament and of the Council with regard to ecodesign requirements for televisions

Commission Regulation (EC) No 643/2009 of 22 July 2009 implementing Directive 2005/32/EC of the European Parliament and of the Council with regard to ecodesign requirements for household refrigerating appliances

Commission Regulation (EC) No 859/2009 of 18 September 2009 amending Regulation (EC) No 244/2009 as regards the ecodesign requirements on ultraviolet radiation of non-directional household lamps

Delegated European Commission regulations on energy labelling

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

Commission Delegated Regulation (EU) No 1060/2010 of 28 September 2010 supplementing Directive 2010/30/EU of the European Parliament and of the Council with regard to energy labelling of household refrigerating appliances

Commission Delegated Regulation (EU) No 1061/2010 of 28 September 2010 supplementing Directive 2010/30/EU of the European Parliament and of the Council with regard to energy labelling of household washing machines

Commission Delegated Regulation (EU) No 1062/2010 of 28 September 2010 supplementing Directive 2010/30/EU of the European Parliament and of the Council with regard to energy labelling of televisions