Ministry of Economy of the Slovak Republic

Energy Efficiency Action Plan 2017-2019 with an Outlook up to 2020

Bratislava 2017

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Abbreviations

3AP	Third Action Plan – 'Energy Efficiency Action Plan 2014-2016 with an Outlook up to 2020'
4AP	Fourth Action Plan – 'Energy Efficiency Action Plan 2017-2019 with an Outlook up to 2020'
DH	District heating
DHC	District heating and cooling
EBRD	European Bank for Reconstruction and Development
EPC	Building energy performance certificate
EPB	Energy performance of buildings
Commission	European Commission
EMAS	Eco-Management and Audit Scheme
EnPC	Energy performance contracting
ERDF	European Regional Development Fund
ESIF	European Structural and Investment Funds (2014-2020)
IMT	Individual motorised transportation
IROP	Integrated Regional Operational Programme (2014-2020)
CB	Commercial banks
FEC	Final energy consumption
CHP	Cogeneration
OP Research	Operational Programme Science and Research (2007-2013)
OP Competitiveness	Operational Programme Competitiveness and Economic Growth (2007-2013)
OP Environment	Operational Programme Environmental Quality (2014-2020)
RES	Renewable energy sources
PEC	Primary energy consumption:
FU	Fuel
ROP	Regional Operational Programme (2007-2013)
EED	Directive 2012/27/EU on energy efficiency
SF	Structural Funds (2007-2013)
SHDF	State Housing Development Fund
ÚOŠS	Central bodies of State administration

Introduction

The Energy Efficiency Action Plan 2017-2019 with an Outlook up to 2020 (the '4AP' or 'Fourth Action Plan') has been prepared in accordance with Section 4(1)(c) of Act No 321/2014 on energy efficiency and amending certain laws and Article 24(2) of Directive 2012/27/EU on energy efficiency. [1]

This Action Plan is the fourth implementing measure under the Energy Efficiency Policy (adopted by Government Resolution No 576/2007) and follows on seamlessly from the previous three action plans. The preparation of energy efficiency action plans was originally derived from Directive 2006/32/EC on energy end-use efficiency and energy services.[2] The new Directive 2012/27/EU on energy efficiency builds on this requirement, extending the obligation to submit action plans and expanding the scope covered by action plans.

Directive 2012/27/EU also requires annual reporting on the progress achieved towards national energy efficiency targets. These reports evaluate measures and their impact on energy savings in the previous calendar year, as well as the fulfilment of set targets. The 2016 annual report is included with this Action Plan (see Annex 4).

Action plans set out to evaluate energy efficiency measures for the previous three-year period and the fulfilment of energy savings targets, and to plan measures for the pursuit of set energy efficiency targets in the next year. Action plans also report on the implementation of selected measures of Directive 2012/27/EU.

The Fourth Action Plan's results are important for an evaluation of energy efficiency measures nationally, the ongoing fulfilment of set targets, and the planning of measures in furtherance of the targets set up to 2020.

Energy efficiency measures help to enhance energy security, bring down greenhouse gas emissions and other pollutants, increase employment, improve undertakings' competitiveness, and cut household energy costs.

This Fourth Action Plan is a product of cooperation with relevant ministries involved in the Standing Interministerial Working Party on the Preparation of Energy Efficiency Action Plans. Nominated contact persons responsible for providing data to the energy efficiency monitoring system operator (in accordance with the task set under paragraph B.3 of Government Resolution No 350/2014) and representatives of relevant organisations exercising influence over energy savings also assisted.

[1] Directive 2012/27/EU of the European Parliament and of the Council of 25 October 2012 on energy efficiency, amending Directives 2009/125/EC and 2010/30/EU and repealing Directives 2004/8/EC and 2006/32/EC.
[2] Directive 2006/32/EC of the European Parliament and of the Council of 5 April 2006 on energy end-use efficiency and energy services and repealing Council Directive 93/76/EEC (the 'Energy Services Directive').

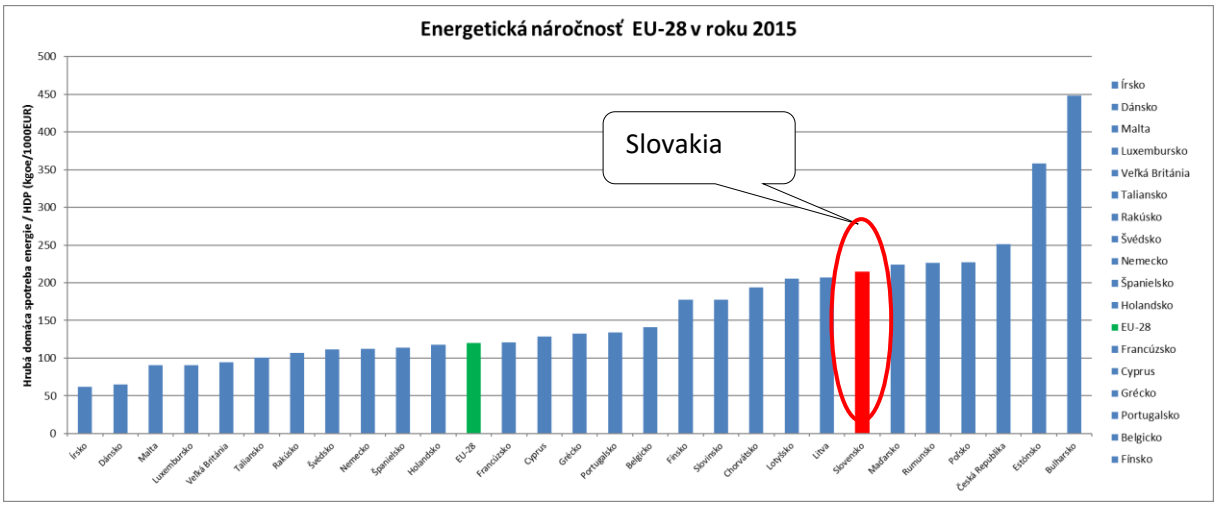
1. Overview of national energy efficiency and energy savings targets

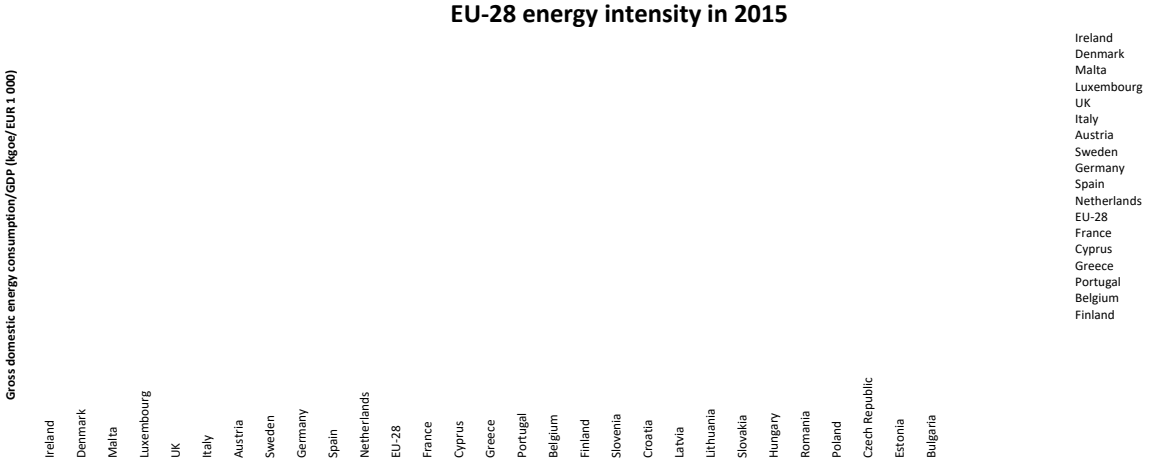
1.1. Energy efficiency in Slovakia today

The strategic objective pursued by the Energy Policy of the Slovak Republic, approved by the Slovak Government under Resolution No 548/2014, is to achieve a competitive low-carbon energy industry supplying all forms of energy safely, reliably, efficiently and affordably, with due consideration for customer protection and sustainable development. Energy efficiency draws on synergy to reduce the economy's energy intensity and contribute to greater energy security. Another of its effects is that it scales down energy undertakings' energy costs. Ultimately, the savings made in primary energy sources help to lessen the energy industry's impact on the environment. In addition, energy efficiency benefits also support other policies – witness employment.

In the past 15 years, national energy intensity has followed a downward trajectory. Significant progress in energy performance improvements is borne out by developments between 2000 and 2015, when, according to Eurostat data (2017), Slovakia reduced its energy intensity by 50.8 %. Between 2006 and 2012, energy intensity contracted by more than 27 %, the largest reduction reported in the EU-28 in this period. This positive trend can be ascribed, among other things, to successful industry restructuring, the introduction of low-energy production processes in industry, improvements in buildings' thermal performance, and the replacement of older appliances with more efficient ones. Nevertheless, measured by EU-28 constant prices, Slovakia has the seventh highest energy intensity, mainly thanks to how industry is structured in this country (a high proportion of very energy intensive industry). Slovakia's energy efficiency priority is to bring down the national economy's energy efficiency farther. The plan is to lower it to the European average.

Graph 1: Comparison of Slovakia's energy intensity with EU Member States





Source: Eurostat (2017)

Slovakia has fully transposed the EU's strategic and legislative framework for energy efficiency into the national and legislative framework. The underlying instruments for the implementation of energy efficiency are energy efficiency action plans, which evaluate energy efficiency measures and establish new measures for the pursuit of energy savings targets. Slovakia has set up a systematised energy efficiency management, planning and monitoring mechanism. The Ministry of Economy, as the general coordinator of the energy savings agenda, has established an interministerial working party involving all relevant central bodies of State administration.

1.2. National energy efficiency and energy savings targets

Two types of national energy efficiency targets have been established:

a) targets pursuant to Directive 2006/32/EU on energy services

In line with Directive 2006/32/EC on energy services, energy efficiency targets were set out in the Energy Efficiency Policy approved under Government Resolution No 576/2007 for 2007-2016 (nine years). The annual savings target in that period was set at 1 % of the average final energy consumption in 2001-2005 (3 122 TJ per year). In the space of nine years, i.e. by 2016, savings amounting to 9 % of the average final energy consumption in 2001-2005 (28 098 TJ) had to be made in Slovakia.

The targets were adjusted for the share of energy consumption by those companies contributing to greenhouse gas emission allowance trading in accordance with

Directive 2003/87/EC and published in the Energy Efficiency Action Plan 2014-2016 with an Outlook up to 2020. According to Article 27 of Directive 2012/27/EU, these targets are applicable until 1 January 2017 and are evaluated within the scope of this Action Plan.

The fulfilment of the target under Directive 2006/32/EC can be evaluated within the scope of this Action Plan almost to its full extent because the evaluation period ends with 2016. A final correction will be made in 2017, when all of the necessary 2016 data will be available.

b) targets pursuant to Directive 2012/27/EU on energy efficiency

In line with Directive 2012/27/EU on energy efficiency, the following energy savings targets were established:

- **a national indicative energy efficiency target** – relating to the period up to 2020, this takes the form of the absolute value of primary energy consumption in 2020 compared with the PRIMES 2007 reference scenario (20 % – 686 PJ) and the absolute value of final energy consumption in 2020 compared with the PRIMES 2007 reference scenario (31 % – 387 PJ) further to Article 3 of the Directive – see 1.3.2.1;
- **a building energy savings target** – corresponding to the annual renovation of 3 % of the total floor area of buildings owned and occupied by central bodies of State administration at least to a level meeting the minimum building energy performance requirements. Slovakia will pursue the target by means of an alternative approach that factors in all public buildings. The national target has been set at 52.17 GWh per year, i.e. 365.19 GWh by 2020 (further to Article 5 of the Directive – see 1.3.2.2);
- **a final consumer energy savings target** – set at 1.5 % of annual energy sales to final customers for each energy supplier. The annual figure for Slovakia has been calculated at 948.75 GWh per year, i.e. total cumulated energy savings up to 2020 are 26 565 GWh (further to Article 7 of the Directive – see 1.3.2.3).

The evaluation of the fulfilment of individual targets under Directive 2012/27/EU in 2016 in this Action Plan takes the form of the continuous monitoring of progress and monitoring of the trajectory in the fulfilment of targets in Slovakia in 2020.

1.3. Evaluation of national energy efficiency and energy savings targets

1.3.1. Evaluation of energy savings targets further to Directive 2006/32/EC

The Energy Efficiency Policy (July 2007) establish energy savings targets up to 2016.[3] The 2016 targets were calculated as energy savings amounting to 9 % of the average value of final energy consumption in 2001-2005. These targets were revised in the Second Action Plan by deducting the share of consumption reported for those companies contributing to greenhouse

[3] The energy savings targets established in accordance with Directive 2006/32/EC are valid until 1 January 2017 (Article 27 of Directive 2012/27/EU).

gas emission allowance trading in accordance with Directive 2003/87/EC[4] (ETS companies). The resultant targets are presented in Table 1.

Table 1: Energy savings targets set in Slovakia's strategy documents in accordance with Directive 2006/32/EC[5] and fulfilment thereof

Indicator	**Energy savings based on the recalculated average final energy consumption in 2001-**		
	[%]	**Plan [TJ]**	**Fulfilment [TJ]**
Annual target	1	3 122	-
Three-year target up to 2010[6]	3	9 366	9 366[7]
Medium-term target up to 2013	5.7	17 728	16 093[8]
Long-term target up to 2016	9	**28 098**	**26 178[9]**
Long-term target up to 2020	11	34 342	-

The annual target for the reporting period was set at 3 122 TJ. The savings planned for the first three-year period (2008-2010) were 9 366 TJ. The savings initially planned for the next three-year period (2011-2013) were also 9 366 TJ, meaning aggregate energy savings of 18 732 TJ between 2008 and 2013. However, in the absence of a permanent energy efficiency support mechanism in that period, in the Second Action Plan the target was set at just 2.7 %, i.e. the medium-term target up to 2013 was reduced from 6 % to 5.7 % of the average $FEC_{2001–2005}$. The overall figure planned for 2008-2013 was calculated at 17 728 TJ.

The long-term 9 % target for 2008-2016, on the strength of the established annual target savings target, amounts to 28 098 TJ. The energy actually saved was 26 178 TJ, i.e. **the planned target was 93.17 % met**.

This evaluation indicates that the **target planned pursuant to Directive 2006/32/EC was not fulfilled**. The figure will be revised during 2017 as all relevant 2016 data become available. The gap was occasioned by the insufficient implementation of savings measures, especially in industry and transport.

Table 2: Energy savings further to Directive 2006/32/EC for 2014, 2015 and 2016.

Sector	**Energy savings further to Directive 2006/32/EC**		
	2014 [TJ/year]	**2015[10] [TJ/year]**	**2016[11] [TJ/year]**
Buildings	1 616.76	1 773.30	1 661.17
Industry	1 015.08	1 633.02	123.94

[4] 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.

[5] These energy savings targets have been adjusted to remove the influence of those companies contributing to greenhouse gas emission allowance trading in accordance with 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.

[6] The targets are set for the end of the year, i.e. including the year to which the target applies.

[7] The Second Action Plan evaluated the First Action Plan.

[8] The Third Action Plan evaluated the Second Action Plan.

[9] Fulfilment of the Third Action Plan as at 31 December 2016 according to data available as at 7 April 2017.

[10] Figures revised as at 7 April 2017 (T-2)

[11] Figures available as at 7 April 2017 (T-1)

Public sector	167.42	409.16	219.15
Transport	77.02	706.16	113.33
Appliances	143.51	191.82	234.44
TOTAL	**3 019.79**	**4 713.46**	**2 352.04**

Energy savings measurement and/or calculation methodology for the requirements of Directive 2006/32/EC (Annex XIV, Part 2.2(b), second paragraph, EED)

The methodology detailed for each measure in Annex 5 was used to calculate savings. The input values applied in the evaluation of savings were verified via the procedures set out in the methodology table and were subsequently used in the calculation. Measures were also taken to avoid the duplicate inclusion of energy savings, as required by Directive 2012/27/EU.

1.3.2. Evaluation of energy savings targets further to Directive 2012/27/EU

1.3.2.1. National indicative energy efficiency target up to 2020, further to Article 3(1) of the Energy Efficiency Directive (Article 3(1) of the EED, Annex XIV, Part 2.1)

The national indicative energy efficiency target was set on the basis of statistics. The preliminary target required by Directive 2012/27/EU was published in the 2013 National Reform Programme and was subsequently updated by reference to 2012 statistics. The resultant national indicative energy efficiency targets up to 2020 are presented in Table 3.

Table 3: Energy efficiency targets expressed as the target final and primary energy consumption in 2020, and evaluation of 2014 and 2015

National indicative energy efficiency targets	[TWh]	[PJ]	Target compared with the baseline scenario in 2020	Fulfilment 2014		Fulfilment 2015
				Statistical Office of the Slovak Republic	Eurostat	Statistical Office of the Slovak Republic
			[%]	[PJ]	[PJ]	[PJ]
Final energy consumption targeted in 2020	105	387	31[12]	367	421	383
Primary energy consumption targeted in 2020	191	686	20[12]	627	639	640

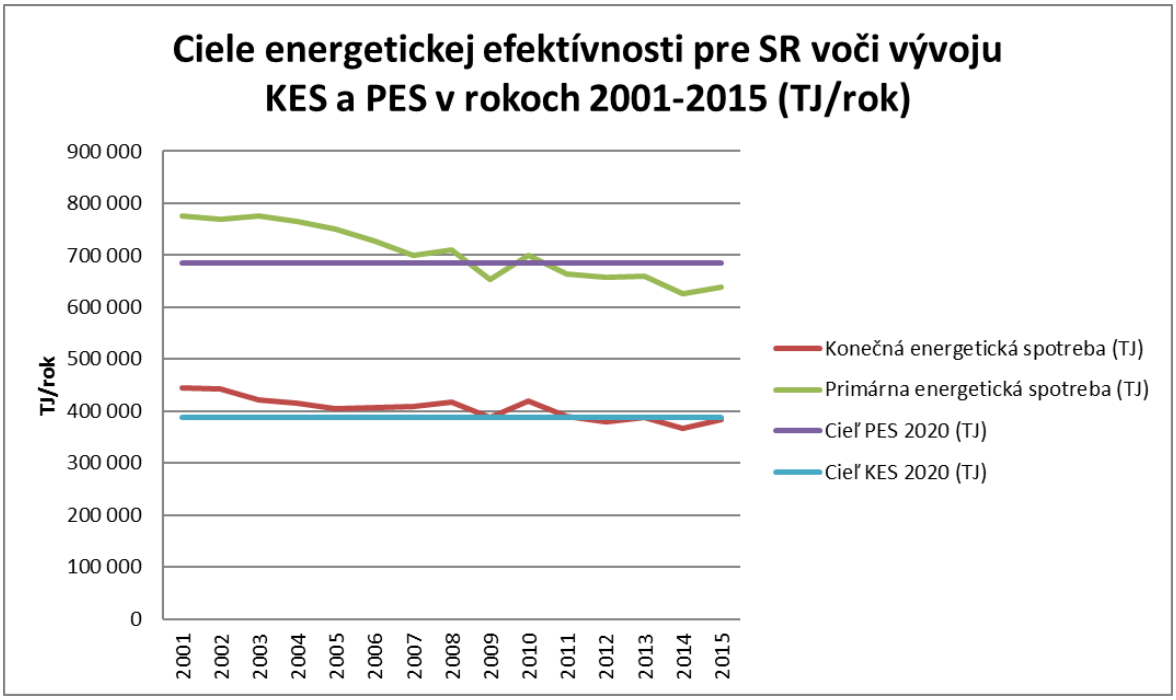
In 2015, neither final nor primary energy consumption kept pace with the national indicative energy efficiency targets for 2020.

The final energy consumption indicators reported by the Statistical Office and Eurostat differ considerably. Statistical Office data served as the basis for the establishment of the indicative target. An evaluation of progress in this target, based on Statistical Offers data, shows that final energy consumption in 2015 fell short of the target set for 2020. Had the target been set

[12] compared to the PRIMES 2007 reference scenario for 2020

and evaluated according to Eurostat data, the preliminary target would initially have been 435 PJ, and Slovakia would also have fulfilled this target in 2014 (the 2015 data are not available).

Graph 2: 2001-2015 energy efficiency targets for Slovakia, expressed as the absolute final (primary) energy consumption



Energy efficiency targets for Slovakia relative to developments infect and PEC in 2001-2015 (TJ per year)

TJ per year

- Final energy consumption (TJ)
- Primary energy consumption (TJ)
- PEC target 2020 (TJ)
- FEC target 2020 (TJ)

Source: Ministry of Economy, prepared according to Statistical Office data for 2014 and 2015

Statistical Office data indicated a year-on-year rise in energy consumption. The one-off year-on-year hike in final energy consumption by approximately 4 % **need not, at this stage, bedevil the pursuit of the national indicative energy efficiency target up to 2020 further to Article 3 of Directive 2012/27/EU**. However, if the same annual growth were to be repeated until 2020, the planned target – expressed as the absolute final (primary) energy consumption – would be overshot by 15 %, so it is important to periodically monitor and

evaluate the year-on-year growth in energy consumption, and final energy consumption in particular.

The expected impact of the target on overall primary and final energy consumption in 2020; explanation of how, and on the basis of which data, this has been calculated (Article 3(1) of the EED).

As the national indicative targets were set with consideration for projected developments in Slovakia's energy consumption, including the implementation of energy efficiency measures, those targets are expected to reinforce the implementation of energy efficiency measures. The targets have a cross-sectional informative, comparative and supportive impact across all sectors. The establishment of an indicative target is a particularly salient issue for interim evaluations of current energy efficiency and plays an informative and coordinating role. The targets' energy consumption impact has yet to be quantified.

1.3.2.2. Building energy savings target (Article 5 of the EED)

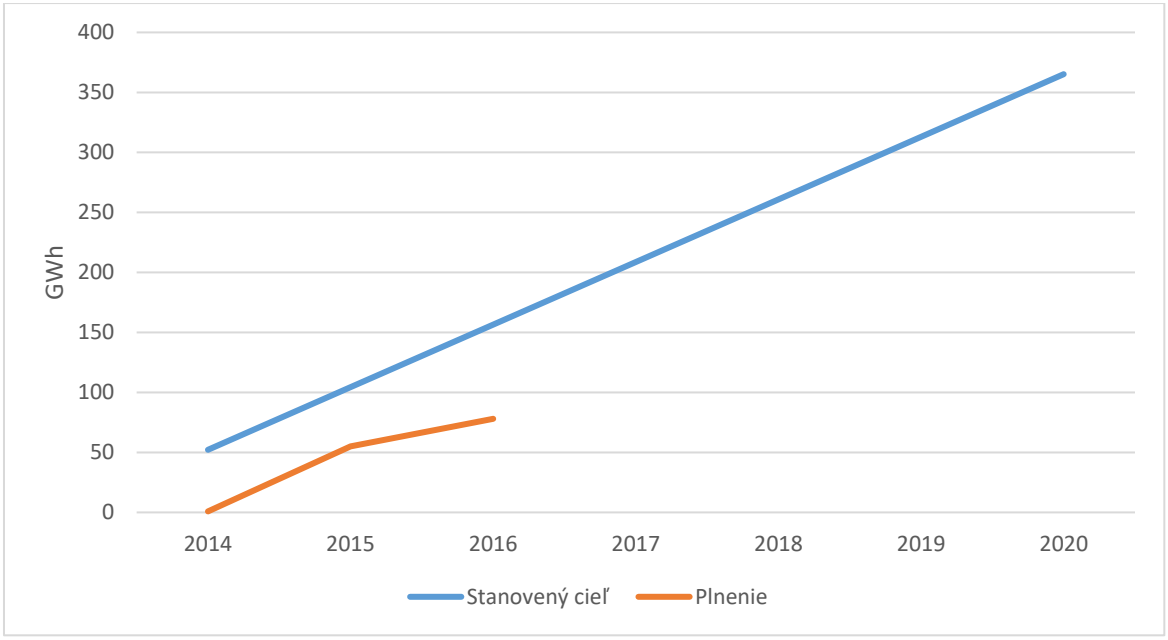
Article 5 of Directive 2012/27/EU requires each Member State to renovate 3 % of the total floor area every year. Further to Article 5(6) of the Directive, Slovakia opted for an alternative approach to the pursuit of the energy savings target, which was set at 52.17 GWh per year.[13]

Since 2014, the only time the objective has been accomplished was in 2015 (54.13 GWh). The saving made in 2016 was just 23.02 GWh, or 44 % of the set annual target. This evaluation indicates that the **energy savings target for buildings, planned pursuant to Directive 2012/27/EU, was not fulfilled in 2016**. One of the main reasons why the target was not reached in 2016 was the persistent scarcity of public resources and the delay in launching the implementation of projects to renovate public buildings with resources from the Operational Programme Environmental Quality (2014-2020). In this light, **satisfactory measures to meet this target** must be proposed by the Ministry of Transport and Construction of the Slovak Republic, which – according to Act No 575/2001 on the organisation of government activities and the organisation of central State administration, as amended – is responsible for the energy performance of buildings.

The deficit in the pursuit of the target must be made up by savings in the coming period (see Graph 3).

[13] Report notifying an alternative approach in accordance with Article 5 of Directive 2012/27/EU on energy efficiency (sent to the European Commission in 2013).

Graph 3: Building energy savings target and the fulfilment thereof in 2014-2016



- Set target - Actual

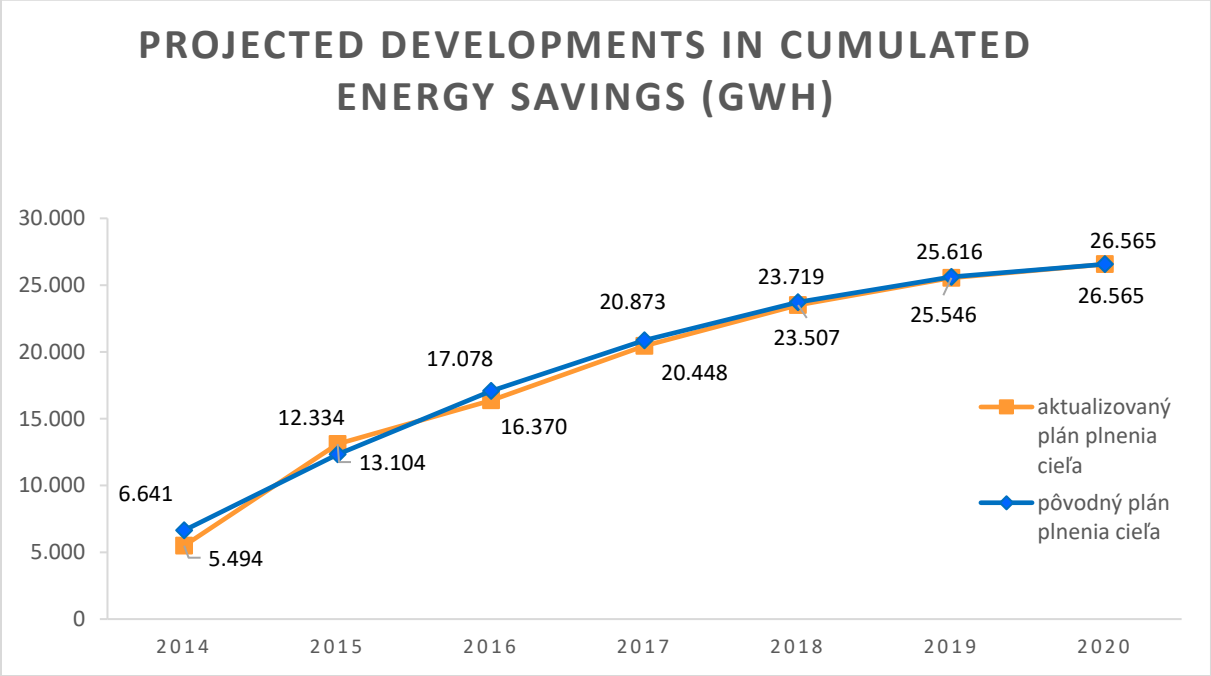
1.3.2.3. Final consumer energy savings target (Article 7 of the EED)

In line with the Directive's methodology, the annual final consumer energy savings target for 2014-20 was calculated to be **948.75 GWh per year** (3 415.5 TJ per year), i.e. the **cumulative target for 2014-2020 is 26 565 GWh** (95 634 TJ).[14] This target is revised every year to reflect how much it has been fulfilled in the previous period so that the cumulative target can be achieved.

Following an evaluation of the pursuit of the target in previous years (2014-2015), the annual target for 2016-2020 was revised to 959.84 GWh per year (see the 2015 annual report).

[14] The target was set as 1.5 % of final energy consumption excluding transport sector consumption for the years 2010 to 2012. The cumulative target up to 2020 was calculated on the strength of the annual target.

Graph 4: Projected developments in cumulated energy savings (GWh)



- Updated target fulfilment plan
- Original target fulfilment plan

Table 4: Developments in the setting of the annual energy savings target (Article 7) and evaluation of the fulfilment thereof

Energy savings target (GWh)	2014	2015	2016	2017	2018	2019	2020
Original target for Article 7	948.75	948.75	948.75	948.75	948.75	948.75	948.75
Updated target in 2016			959.84	959.84	959.84	959.84	959.79
Current progress in the pursuit of the target[15]	**837.67**	**1 308.78**	**653.21**				
Updated target in 2017				**1 019.49**	**1 019.49**	**1 019.49**	**1 019.49**

In 2016, the energy savings identified in Slovakia were **653.21 GWh per year**, i.e. **68.1 % of the updated target**.[16] This evaluation indicates that the **final consumer energy savings target pursuant to Article 7 of Directive 2012/27/EU was not fulfilled in 2016**.

Consequently, the annual targets for 2017-2020 had to be revisited and were newly calculated at **1 019.5 GWh per year**.

[15] Evaluation as at 7 April 2017.

[16] The extent to which the target was fulfilled in 2016 will be adjusted in the coming period by reference to the updated data.

1.3.3. Primary energy savings

Table 5 takes stock of primary energy savings achieved at the reporting date and presents estimates of expected energy savings up to 2020, by sector (Article 3(1) and Article 24(2) of the EED, Annex XIV, Part 2.2(a), thereto).

Table 5: Energy savings planned and achieved in the form of energy consumption

Sector	**Energy savings (PEC) 2014-2016 (3 years) [TJ]**		**Planned energy savings (PEC) 2017-2020 (4 years) [TJ]**
	Planned in the 3AP	**Achieved[17]**	**Planned in the 4AP**
Buildings	4 830	7 905	6 698
Industry	4 020	4 338	10 595
Public sector	2 616	1 245	2 670
Transport	901	1 403	1 660
Appliances	1 154	892	1 412
Energy transformation, transmission and distribution	2 422	1 438	4 328
Total	**15 975**	**17 221**	**27 362**

In the **2014-2016 reporting period**, the energy savings – expressed in the form of primary energy consumption – were **17 221 TJ**.

[17] Evaluation by reference to data available as at 7 April 2017; the year 2016 will be updated in the 2018 annual report.

2. Energy efficiency measures

To fulfil national energy efficiency targets, measures are broken down into:

— energy consumption measures (buildings, industry, public sector, transport, appliances);
— energy transformation, transmission and distribution measures;
— horizontal measures.

2.1 Methodology for the evaluation and planning of energy efficiency measures

Energy efficiency measures are evaluated by collecting data from relevant ministries and organisations responsible for support mechanisms that affect energy savings. The relevant ministries are brought together in a working party comprising members of the Standing Interministerial Commission for the Preparation of Energy Efficiency Action Plans and persons responsible for providing data to the energy efficiency monitoring system operator, nominated in accordance with the task set under paragraph B.3 of Government Resolution No 350/2014. An evaluation of the implementation of measures in 2014-2016 can be found in Annex 1. Methodology used to calculate energy savings for each measure, including the assumptions and equations used, can be found in the Methodology Tables (see Annex 5).

Measures for 2017-2020 were also prepared by collecting data on energy savings[18] and planned financial resources within the working party. Where the relevant data on planned energy savings were unavailable, energy saving figures were determined by the estimated use of relevant financial mechanisms, taking into account the average investment intensity (EUR per MWh) under similar measures in the preceding 2014-2016 period. The resultant values were cross-checked against the draft general government budget (within the framework of the various budget headings). Due use of support mechanisms is expected in the planning of energy efficiency measures. Measures planned for 2017-2019, with an outlook up to 2020, can be found in Annex 2.

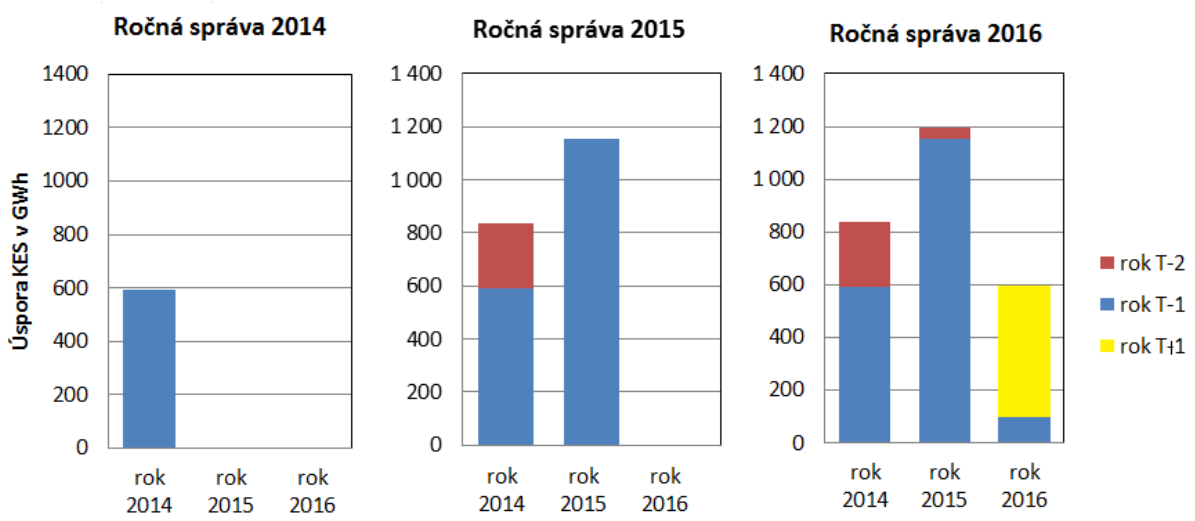
The specific requirements of Directive 2012/27/EU are taken into account when evaluating the fulfilment of each energy savings target. Evaluations of the energy savings target in accordance with Directive 2006/22/EC factor in the total energy savings, whereas evaluations of the final consumer energy savings target pursuant to Directive 2012/27/EU can only encompass savings beyond the scope of requirements laid down by European legislation. Evaluations of the interim fulfilment of the overall cumulative final consumer energy savings target pursuant to Directive 2012/27/EU take into account the lifetime of measures, established, in Slovakia, in Implementing Decree of the Ministry of Economy No 307/2015 on the calculation and fulfilment of energy efficiency targets.

Energy savings and financial resources are included in the year of actual completion of project implementation. As the deadline for the submission of action plans and annual reports

[18] Energy savings are presented in the form of an annual figure (e.g. TJ per year, GWh per year), i.e. differently from the cumulated indicators presented under each operational programme up to 2023.

is 30 April, the evaluation of measures carried out in previous years (t-1 or t-2) is incomplete as at that date. Consequently, these data are updated in the following year (t+1) (see Graph 5).

Graph 5: Evaluation of energy efficiency measures and the updating thereof



FEC savings (GWh)	2014 Annual Report			2015 Annual Report			2016 Annual Report			
	2014	2015	2016	2014	2015	2016	2014	2015	2016	year T-2 year T-1 year T+1

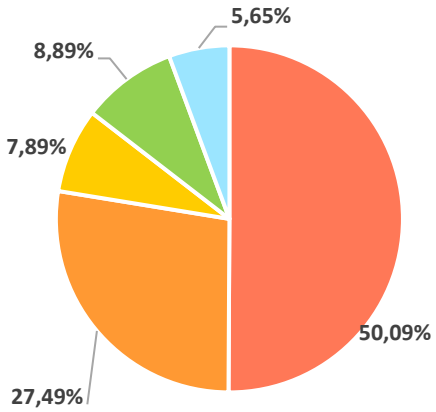
The data on savings achieved in 2016 could therefore be revised in the subsequent 2017 and/or 2018 annual reports once supplementary data not available at the time of preparation of the document have been obtained.

2.2 Energy consumption measures in 2014-2016

Energy consumption measures, under which energy savings are manifested as a reduction in final energy consumption, are broken down by sector (buildings, industry, the public sector, transport and appliances).

Measures are evaluated bottom-up by project or project group, e.g. in the corresponding financial mechanisms. The extent to which individual measures in the pursuit of the target have contributed to the reduction in final energy consumption is depicted in Graph 6.

Graph 6: Reduction in final energy consumption – share of measures in the pursuit of the target in 2014-2016, by sector



	Sector:	Saving [TJ]
	Buildings	5 051.22
	Industry	2 772.04
	Public sector	795.73
	Transport	896.52
	Appliances	569.77
	Total:	**10 085.28**

The buildings sector contributed most to the fulfilment of the savings target by achieving nearly double the savings planned. This was boosted significantly by additional financial resources reallocated from three operational programmes in the 2007-2013 programming period, specifically the Regional Operational Programme, the Operational Programme Bratislava Region, and the Operational Programme Competitiveness and Economic Growth.

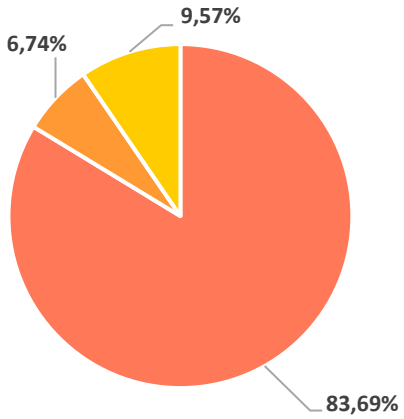
Industry is a particularly important segment. The energy savings potential here started to be unlocked more intensively when compulsory energy audits were introduced in 2009 and financial mechanisms were made available.

2.2.1. Energy efficiency measures in the buildings sector

Energy efficiency measures in the buildings sector focus in particular on:

- improving the thermal performance of buildings via major or partial renovation;
- the new construction of low-energy and ultra-low-energy buildings and nearly zero-energy buildings;
- measures to save energy in building technical systems, implemented by applying conceptual and strategy documents and legislative obligations or via energy services.

Graph 7: Reduction in final energy consumption in the buildings sector – share of groups of measures in the pursuit of the target in 2014-2016



	Groups of measures in buildings:	Saving [TJ]
	Improvements in the thermal performance of buildings	4 227.60
	New construction to a low-energy standard	340.23
	Measures to save energy in building technical systems	483.40
	Total:	**5 051.22**

Improvements in the thermal performance of existing buildings have contributed most to reductions in final energy consumption.

The energy efficiency of buildings has been boosted in particular by the greater funding available to improve the thermal performance of multi-family buildings via the JESSICA financial mechanism. Financial resources were provided to the mediator of the State Housing Development Fund from three operational programmes, i.e. the Regional Operational Programme, the Operational Programme Bratislava Region, and the Operational Programme Competitiveness and Economic Growth.

In addition to resources from the Structural Funds, the State Housing Development Fund also drew on more than EUR 262 million from Slovakia's central government budget to improve the thermal performance of multi-family buildings in 2014-2016. In 2016, the Single-family Building Insulation Support Programme was announced. A further EUR 30 million from the central government budget was allocated to this programme.

Act No 535/2005 on the energy performance of buildings and that Act's implementing regulations encompass the construction of new buildings and requirements regarding the major renovation of existing buildings. As a result of greater awareness and the provision of consulting to target groups, including via the Living with Energy national project implemented by the Slovak Innovation and Energy Agency in 2014-2016, buildings were constructed or renovated beyond the scope of the minimum requirements. This contributed to energy savings in buildings used for housing and commercial services that could be quantified by INFOREG, the system used for the certification of buildings.

The application of Act No 321/2014 on energy efficiency, effective from 1 December 2014, has resulted in the gradual implementation of measures to save energy in building technical systems, in particular by the compulsory hydronic balancing of heat and hot water distribution systems and the appropriate thermal insulation of hot water distribution systems.

An amendment to Act No 657/2004 on thermal energy laid down obligations linked to the installation of means to measure the quantity of hot water and the quantity of heat used for

heating at final consumers, in particular flats in multi-family buildings, and at buildings with their own gas boiler rooms. Following the installation of meters, households in particular started to keep a closer eye on the energy they were consuming, which mainly led to savings in heat used for heating and hot water.

Energy-saving measures in buildings are also underpinned by legislative support for the development of energy services, especially by the establishment of specific transparent conditions for the provision of such services.

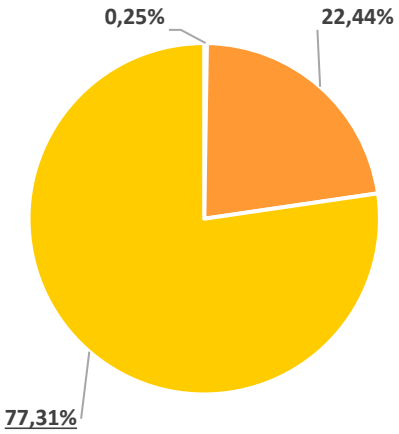
Energy efficiency measures in the buildings sector are evaluated in detail in Annex 1, Table P1-1. Certain significant support measures contributing to targets under energy efficiency measures in the buildings sector are not individually evaluated in order to prevent the duplicate inclusion of energy savings.

2.2.2. Energy efficiency measures in the industry sector

Energy efficiency measures in the industry sector focus in particular on reducing the energy intensity of industrial production by:

- supporting innovation and technology transfers at industrial enterprises (production lines and technology);
- supporting measures on the use of energy at industrial enterprises (industrial energy);
- implementing measures derived from the results of compulsory energy audits and the use of support instruments to reduce the energy intensity of industrial production.

Graph 8: Reduction in final energy consumption in the industry sector – share of groups of measures in the pursuit of the target in 2014-2016



	Groups of measures in industry:	Saving [TJ]
	Innovation and technology transfers	6.86
	Energy use at industrial enterprises	622.12
	Energy audits and other support instruments	2 143.06
	Total:	**2 772.04**

Innovation and technology transfers at industrial enterprises in 2014-2015 were mainly supported under the Operational Programme Competitiveness and Economic Growth via the ‘Innovation and technology transfers’ measure, especially at small and medium-sized enterprises, where a change in production and/or technology processes reduced the energy

intensity of production. Projects implemented under the Operational Programme Bratislava Region also contributed to the energy savings target in industry.

As the processes to implement the European Structural and Investment Funds are demanding, energy savings supported by innovation and technology transfers under the Operational Programme Research and Innovation cannot be expected to emerge until 2017.

Efficient energy use at industrial enterprises was mainly supported in 2014-2015 by the Operational Programme Competitiveness and Economic Growth, specifically by the measure 'Increase in the energy efficiency of primary energy sources and increase in the share of RES consumption in total energy consumption', in which respect enterprises engaged in the following activities in particular:

- improvements in the thermal performance of production halls, operating and administration/production buildings, heat source replacement, energy management;
- the reconstruction and modernisation of existing fossil fuel energy installations to increase the efficiency of facilities;
- high-efficiency cogeneration (CHP) at enterprises;
- the reconstruction of existing power plants for heat distribution (e.g. improvements in the insulation of distribution pipes, the introduction of systems to monitor heat leaks, the reconstruction of heat transfer stations, etc.) at enterprises.

In 2014-2015, similar activities were carried out under the Slovseff II programme. The loan programme, funded by the European Bank for Reconstruction and Development via commercial banks in Slovakia and supported by a bonus in the form of a grant from the Bohunice International Decommissioning Support Fund (BIDSF), has progressed to a third stage. This is the Slovseff III programme, where a bonus is provided under the Green Investment Scheme, which is financed by proceeds from greenhouse gas emission allowances.

With effect from 1 January 2009, Slovakia introduced compulsory energy audits for industrial enterprises and agricultural holdings,[19] based on the amount of energy they consume. The deadline for enterprises and holdings with a total annual consumption up to 20 000 MWh was December 2011; the deadline for those with a total annual consumption of more than 20 000 MWh was December 2013. In response to the results of these energy audits,[20] many enterprises and holdings drew on their own resources to carry out organisational and low-cost measures in particular. The individual enterprises and holdings do not tend to disclose information on the measures they have taken. Information on how the potential for energy savings identified in energy audits has been harnessed will be available quarterly from repeat energy audits at large enterprises[21] or in the form of voluntary reporting by the enterprises and holdings that have implemented such measures.

Energy efficiency measures in the industry sector are evaluated in detail in Annex 1, Table P2-1. Significant support measures contributing to targets under energy efficiency

[19] Act No 476/2008 on efficiency in the use of energy (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.
[20] By the end of 2013, 145 energy audits had been conducted.
[21] Section 14 of Act No 321/2014 on energy efficiency.

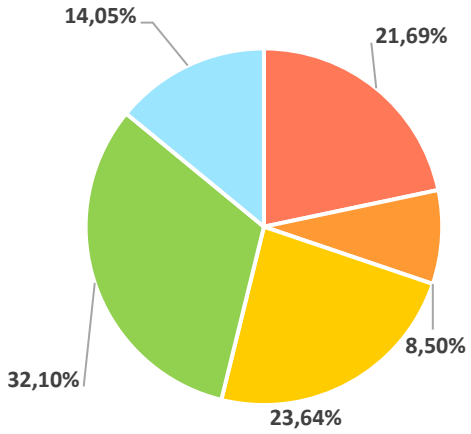
measures in the industry sector are not individually evaluated in order to prevent the duplicate inclusion of energy savings.

2.2.3. Energy efficiency measures in the public sector

Energy efficiency measures in the public sector focus in particular on:

- improvements in the thermal performance of public buildings financed by the EU Structural Funds 2007-2013, 2014-2020;
- improvements in the thermal performance of public buildings financed by internal budgetary resources;
- improvements in the thermal performance of public buildings financed by national and international programmes and funds;
- the upgrading of public lighting;
- measures to save energy in building technical systems via energy services;
- energy-saving measures implemented by applying conceptual and strategy documents and legislative obligations.

Graph 9: Reduction in final energy consumption in the public sector – share of groups of measures in the pursuit of the target in 2014-2016



	Method of financing:	Saving [TJ]
	Buildings – EU SF 2007-2013	172.63
	Buildings – indoor budgetary resources	67.67
	Buildings – national and international programmes/funds	188.14
	Upgrading of public lighting	255.46
	Building technical systems – energy services	111.84
	Total:	**795.73**

Most projects for improvements in the thermal performance of public buildings financed by the EU Structural Funds in the 2007-2013 programming period were implemented by the end of 2013. In 2014-2015, the remainder of the financial resources continued to be drawn, making energy savings of approximately 180 TJ, of which approximately 75 % was in 2015.

The new programming period for the use of ESIF under a Partnership Agreement[22] did not contribute to the financing of energy efficiency projects because it was not until the final

[22] The Partnership Agreement was approved in June 2014.

quarter of 2014 that the individual operational programmes were gradually approved. In 2015, procedures for the use of ESIF were drawn up and approved. Only in late 2015[23] were the first calls for projects with the possibility of improving the thermal performance of public buildings announced. However, significant energy savings cannot be expected until 2017 on account of the evaluation process and the duration of project implementation.

Bodies of State administration and local government used their own budgetary resources to implement measures improving the thermal performance of public buildings to an extent of less than 10 % of the overall energy saving achieved.

Projects supported under national and international programmes and funds, such as the Environmental Fund, EkoFond and Munseff, contributed significantly to the energy savings achieved (approximately 20 %).

The redistribution of the financial resources under the Operational Programme Competitiveness and Economic Growth resulted in additional funding of more than EUR 57 million for the upgrading of public lighting. In 2014-2016, the upgrading of public lighting saved approximately 255 TJ. This is one of the most significant contributions to energy savings made in the public sector.

When Act No 321/2014 on energy efficiency took effect, this paved the way for the application of energy services in the public sector, too. Energy services were used primarily to save energy in building technical systems. The savings achieved in this way amounted to more than 10 % of the public sector energy savings.

The application of legislative measures deriving from Act No 321/2014 on energy efficiency as at 31 December 2015, entailing the compulsory appropriate insulation of hot water distribution systems, has yet to have a significant impact on energy savings in public buildings because these measures can be postponed by two years if a liable entity plans to implement energy-saving measures to an extent greater than that prescribed by law. The increased energy performance requirements for buildings from 1 January 2016 have not been felt much in the public sector either, largely because the number of new public buildings is all but negligible.

Although the application of the principle of energy efficiency in public procurement has the potential to become a pivotal means of achieving energy savings in the public sector, it is administratively taxing to evaluate this measure and the ministries lack the capacity for this.

2.2.4. Energy efficiency measures in the transport sector

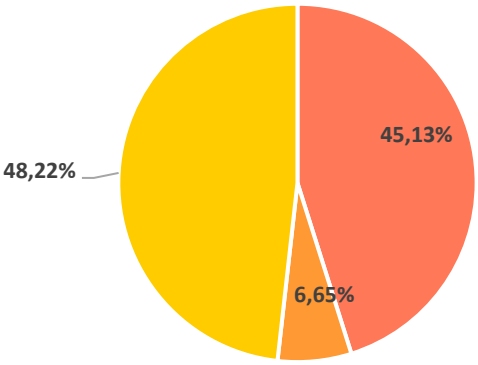
Energy efficiency measures in the transport sector focus in particular on:

- the renewal and modernisation of the mass rail transport rolling stock;
- the renewal and modernisation of the mass road transport fleet;
- the building and upgrading of transport infrastructure.

[23] On 7 December 2015, the Slovak Innovation and Energy Agency announced a call for a ‘Reduction in energy consumption in the operation of public buildings’, with an indicative budget of EUR 150 million.

The building of new transport infrastructure accounts for the largest proportion of savings in transport (see Graph 10). The replacement of the fleet in rail (trains and trams) and bus (buses and trolleybuses) transport accounts for less than a quarter of total savings in the transport sector.

Graph 10: Reduction in final energy consumption in the transport sector – share of groups of measures in the pursuit of the target in 2014-2016



	Groups of measures in transport:	Saving [TJ]
	Rail transport	404.59
	Buses/trolleybuses	59.63
	Transport infrastructure	432.29
	Total:	**896.52**

Transport sector measures were mainly taken in 2014-2015, when the fleet of public transport vehicles was comprehensively renewed in Bratislava and partially also in Košice. Technically and environmentally unfit vehicles (buses, trolleybuses and trams) have been replaced by new ones that contribute significantly to improved urban mass transit services in Bratislava; the decommissioning of old vehicles that are reaching the end of their life has delivered major energy savings.

Another significant step is the replacement of the passenger rail transport fleet, adding new trains and wagons to the regional lines. The improved quality of services offered and the introduction of an integrated transport system in the Bratislava Region also prompted a rise in the number of passengers, with some passengers making the switch from individual motorised transportation. The migration from individual motorised transportation to mass transport was also boosted by a measure enabling certain social groups to use trains free of charge. This was launched in November 2014.

One significant activity was the renewal and construction of tracks (especially the reconstruction of tramlines in Bratislava and Košice, the construction of a tramline and bridge excluding motor vehicles in Bratislava, and the reconstruction of railway lines and adjacent structures).

In October 2016, the Ministry of Economy announced its support for the advancement of electro-mobility with grants of EUR 5 000 for new electric cars and EUR 3 000 for hybrid cars with the possibility of charging via an electric socket.

Government Resolution No 13/2017 approved the Strategic Transport Development Plan up to 2030, as submitted by the Ministry of Transport and Construction. Besides providing a basic framework for the development of transport policy in Slovakia, it defines the clear need to support public passenger transport and measures that will improve the attractiveness of sustainable transport modes, i.e. not only public passenger transport, but also cycling and walking. The Ministry of Transport and Construction is also the managing authority for the Operational Programme Integrated Infrastructure 2014-2020, which declares support for public passenger transport and a modal shift via its performance indicators. The transport segment also benefits from financial support under Priority Axis 1 (Safe and environmental transport in the regions) of the Integrated Regional Operational Programme 2014-2020, the managing authority of which is the Ministry of Agriculture and Rural Development. Although, then, the handling of regional transport falls outside the competence of the Ministry of Transport and Construction's coordination activities, the two ministries work closely together and with regions and municipalities (i.e. the beneficiaries).

In addition to the above, the Ministry of Transport and Construction also cooperates with the regions on the preparation and approval of Regional Integrated Territorial Strategies. These are implementing documents for drawing on grants under the IROP. Under the guidance of the Ministry of Transport and Construction, most regions revised their financial allocations to benefit projects that support public passenger transport and non-motorised transport. The Ministry of Transport and Construction also works with the regions on the preparation of sustainable mobility plans, which are currently at various stages of completion. The point of sustainable mobility plans is to provide expert justification for interventions in transport. Each intervention should increase the support of sustainable transport modes and hence directly increase energy savings. Apart from Bratislava, Žilina and Košice, which have already drawn up their sustainable mobility plans, these documents are expected to be finalised at the turn of 2019.

All processes have thus been conceptually and strategically configured to deliver sufficient blanket support for sustainable transport modes and a modal shift benefiting this transport, thereby lessening the impacts of the use of individual motorised transportation. This is a complex and long-term issue requiring the legislative and institutional backing of all competent bodies, institutions and organisations.

2.2.5 Energy efficiency measures in the appliances sector

Energy efficiency measures in the appliances sector focus in particular on:

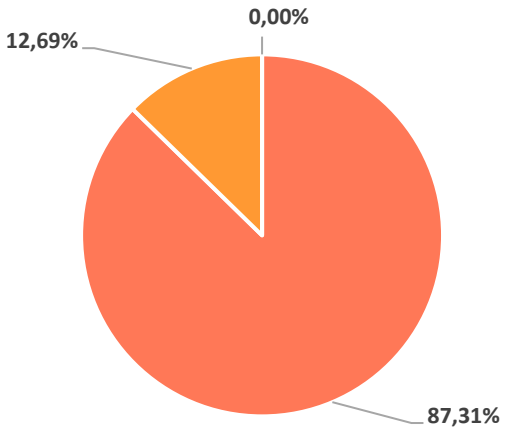
- the replacement of white goods;
- energy-saving lighting;
- the replacement of equipment in households and offices.

The 2014-2016 period saw the continued replacement of white goods and the tightening of minimum technical requirements by the Commission within the scope of established ecodesign and labelling legislation. Consumer awareness campaigns were run to improve the

appeal of more efficient appliances. White-good savings continued to be monitored via the European Committee of Domestic Equipment Manufacturers (CECED), as the data provider.

The biggest change occurred in the use of lights, with LED lighting becoming the standard for virtually all households over the course of this three-year period. Between 2010 and 2012, LED lights were viewed as 'experimental' and their reliability and service life were unknowns. After 2015, households started to treat them as a trendy solution, and halogen and fluorescent lights are being replaced across the board. Fluorescent lights became much less popular because they soon lost their luminance.

Graph 11: Reduction in final energy consumption in the appliances sector – share of groups of measures in the pursuit of the target in 2014-2016



	Groups of measures in the appliances sector:	Saving [TJ]
	Replacement of white goods	497.44
	Energy-saving lighting	72.33
	Replacement of equipment in households and offices	0.00
	Total:	**569.77**

The replacement of electric and electronic household equipment does not include energy-saving lights or white goods. The trend emerging after 2014 was for conventional (desk-top) PCs with a typical power output of 350-650 W to be replaced by laptops with 50-100 W adapters. Sales of mobile computers (laptops, ultrabooks, tablets, etc.) soared, while sales of conventional PCs shrank, the one exception being gaming PCs with high-spec graphics. Nevertheless, there was not enough data available to evaluate the savings achieved by the replacement of such equipment between 2014 and 2016.

The replacement of office equipment could not be monitored in the reporting period. Although the status of 'Green Public Procurement' was introduced, savings in final energy consumption could not be quantified. Figures released by the Slovak Environmental Agency to not include the relevant details on savings. Another factor is that the disclosure obligation incumbent on ministries under Government Resolution No 398/2014 in relation to Act No 321/2014 applies only to above-the-threshold procurement. In practice, office equipment purchases tend to involve below-the-line procurement, i.e. most of these purchases are not covered by the mechanism for the disclosure of information on green public procurement.

2.3 Energy transformation, transmission and distribution measures

Energy savings were fuelled in particular by measures financed under the Operational Programme Competitiveness and Economic Growth, which – partly modified – have continued in the new 2014-2020 programming period under the Operational Programme Environmental Quality. They focus on the construction, reconstruction and upgrading of heat distribution systems and on the construction, reconstruction and upgrading of high-efficiency cogeneration installations with a maximum thermal input of 20 MW. The aim was to adapt heat production and supply to the useful heat required, which is gradually contracting as measures to save energy on the consumption side are phased in. Optimising the production, distribution and consumption of heat, with a stress on employing high-efficiency cogeneration, can help to reduce primary energy sources and develop efficient district heating systems.

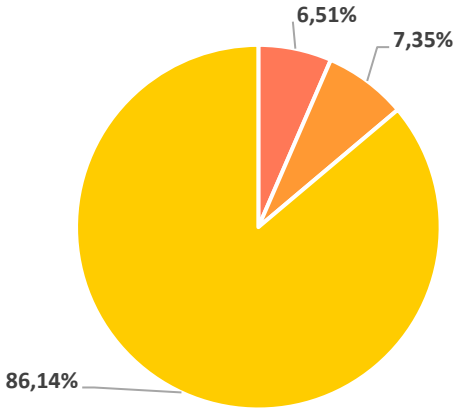
Gas transmission and distribution also made a major contribution to energy savings. In the reporting period, there was a significant reduction in captive consumption.

The minimum efficiency of energy transformation in electricity and heat generation and at CHP installations is set out in Implementing Decree of the Ministry of Economy No 88/2015. That implementing decree also lays down methods to calculate the operating efficiency of electricity and gas infrastructure distribution systems, as well as heat distribution systems, crude oil pipelines, refined oil pipelines, the water supply network, and the sewer system.[24]

Investment measures planned in the operation of electricity and gas energy infrastructure are sent to the Slovak Innovation and Energy Agency as the operator of the Energy Efficiency and Monitoring System in line with the requirements of Act No 251/2012 on energy, as amended, and Act No 321/2014 on energy efficiency.

Graph 12: Reduction in final energy consumption in the transformation, transmission and distribution sector – share of groups of measures in the pursuit of the target in 2014-2016

[24] The evaluation of energy transformation, transmission and distribution for 2016 is not available as at the cut-off date of 7 April 2017 because the deadline for disclosure under Act No 321/2014 on energy efficiency is 30 April.



	Sources of financing:	Saving [TJ]
	Operational Programme	93.57
	Slovseff III	105.75
	Own resources – Act No 321/2014	1 238.53
	Total:	**1 437.85**

2.4 Overall evaluation of energy efficiency measures in 2014-2016

On the strength of individual projects or groups of projects, total energy savings in terms of final energy consumption were quantified at **10 085.28 TJ**. Approximately **EUR 5.7 billion** was spent on the measures.

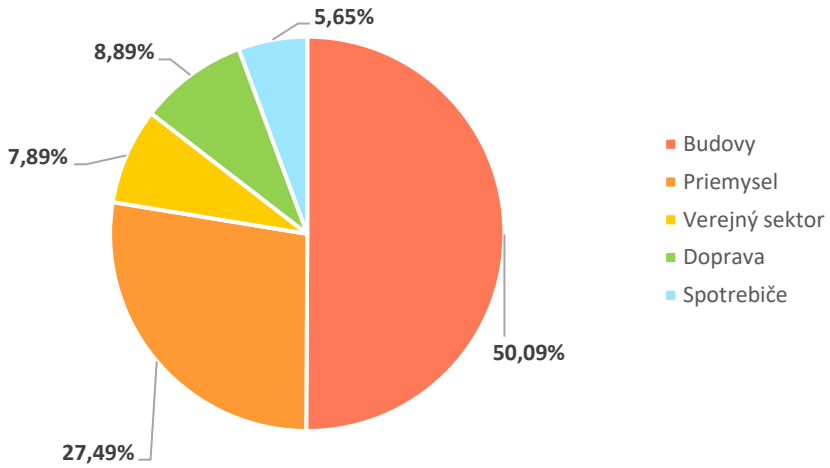
Table 6: Overview of energy savings achieved and financial resources spent in each sector in 2014-2016

Sector	**Energy savings (FEC) 2014-2016 [TJ]**		**Total financial resources 2014-2016 [EUR thousands]**	
	Planned in the 3AP	**Achieved[25]**	**Planned in the 3AP**	**Actual**
Buildings	3 087.00	5 051.22	3 160 612	3 677 826
Industry	2 568.89	2 772.04	873 674	147 022
Public sector	1 671.70	795.73	390 834	290 088
Transport	576.02	896.52	3 868 046	1 456 598
Appliances	737.32	569.77	119 886	104 188
Total	**8 640.93**	**10 085.28**	**8 413 052**	**5 675 721**

The biggest share in energy savings is reported by the building site sector, with approximately 50 %. Industry contributed approximately 27 % to the savings. The sharing of the transport sector is approximately 9 %. The lowest contributions, by percentage, are made by the public sector and the appliances sector.

Graph 13: Share of each sector in the energy savings made in 2014-2016

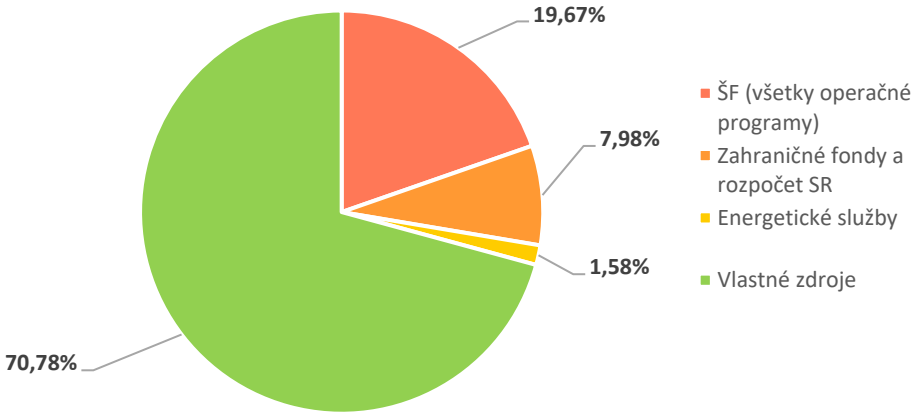
[25] The 2016 energy saving was incorporated solely on the basis of data available at 7 April 2017. It is assumed that a correction will be made in the next annual report once the 2016 data have been updated.



- Buildings
- Industry
- Public sector
- Transport
- Appliances

The share of selected national and international financial mechanisms in the financing of energy efficiency measures in the three-year period from 2014 to 2016 is presented in Graph 14.

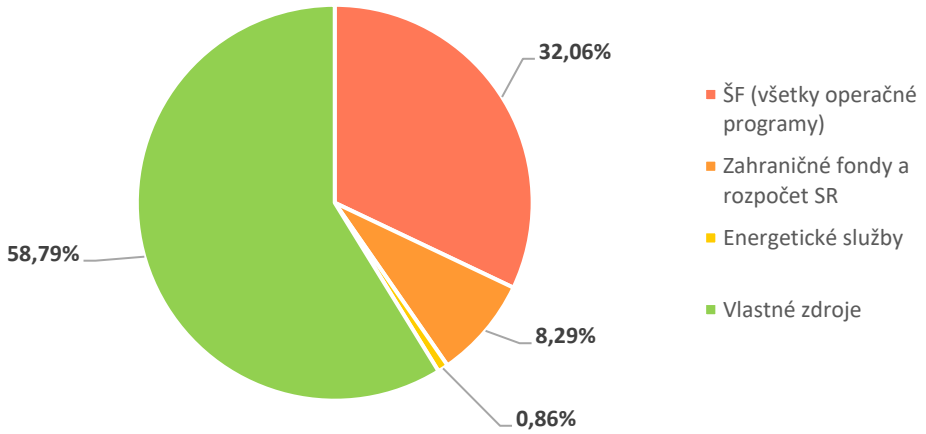
Graph 14: Share of selected national and international financial mechanisms in the financing of energy efficiency measures in 2014-2016



- SF (all operational programmes)
- Foreign funds and national budget
- Energy services
- Own resources

The low share of energy services can be attributed primarily to the fact that a new legislative framework was established for energy services in 2014.[26]

Graph 15: Share of selected national and international financial mechanisms in the financing of energy efficiency measures in 2015



- SF (all operational programmes)
- Foreign funds and national budget
- Energy services
- Own resources

2.5 Energy efficiency measures planned for 2017-2019, with an outlook up to 2020

2.5.1 Measures planned in the buildings sector

In the coming period, there will be continued support for improvements in the thermal performance of multi-family buildings with resources from the State Housing Development Fund, and of single-family buildings with grants from the Ministry of Transport and Construction. Multi-family buildings will also undergo major renovation with resources from the IROP (2014-2020) and the Slovseff III programme.

[26] The evaluation of energy services for 2016 holds true as at the cut-off date of 7 April 2017.

The trend in the amount of the grants awarded by the State Housing Development Fund for the major renovation of multi-family buildings is expected to continue. Projects under the IROP (2014-2020) are expected to be implemented from 2018. Slovseff III follows on from Slovseff II (see 2.2.). Slovseff III is a credit line where grants are awarded under the Green Investment Scheme, which is financed with the proceeds from greenhouse gas emission allowances.

As the minimum energy performance requirements for new buildings have been tightened to the ultra-low-energy standard since 1 January 2016, new buildings can only be built to that standard.

2.5.2 Measures planned in the industry sector

In the coming period there are plans to draw on financing from the ESIF (2014-2020), in particular via the Operational Programme Research and Innovation and the Operational Programme Environmental Quality. Under the Operational Programme Research and Innovation (2014-2020), innovations at industrial enterprises will be supported and may result in energy savings. The Operational Programme Environmental Quality (2014-2020) is geared towards the support of preparations for energy audits at SMEs and the implementation of measures deriving from those energy audits. Resources from the Operational Programme Environmental Quality are only available to enterprises outside the Bratislava Self-governing Region. A grant scheme in the competence of the Ministry of Economy will continue in the coming period in order to support preparations for energy audits at SMEs in the Bratislava Region. A similar scheme is also planned to support the implementation of measures deriving from energy audits for SMEs in the Bratislava Region. The expansion of voluntary agreements to large industrial enterprises is expected to contribute significantly to energy savings. In the future, enterprises that have been awarded investment incentives can also be expected to report energy savings.

2.5.3 Measures planned in the public sector

In the coming period, there will be continued support for improvements in the thermal performance of buildings from existing support mechanisms (in particular the Operational Programme Environmental Quality (2014-2020), the IROP (2014-2020) and the Environmental Fund), where appropriate in combination with the energy services mechanism.

As the uptake of resources from the ESIF (2014-2020) was delayed, the largest volume of public building renovation projects is expected in the 2017-2020 period. Improvements in the thermal performance of public buildings outside the Bratislava Region can be financed by the Operational Programme Environmental Quality; the IROP (2014-2020) can be used to support public buildings even if they are in the Bratislava Region. Environmental Fund grants for the renovation of public buildings are expected to continue along the same lines as in the previous period, i.e. via Activity L3: Enhanced energy efficiency of existing public buildings, including insulation. This programme primarily finances buildings managed by municipalities. In the coming period, improvements in the thermal performance of the

buildings of central bodies of State administration are expected. In all of these programmes financed with public resources, attention needs to be paid to the implementation of deep renovation in order to achieve the greatest possible reduction in a building's energy consumption. This is then also reflected in reduced general government expenditure.

From 1 January 2019, all new buildings occupied and owned by public authorities must abide by minimum energy performance requirements for nearly zero-energy buildings.

A survey of the public sector's need for public building renovations, as conducted by the Slovak Innovation and Energy Agency in public buildings, indicates that the potential for energy savings in the public sector is roughly 650 TJ by 2019, with the necessary financing estimated to be approximately EUR 180 million.

2.5.4 Measures planned in the transport sector

The 'Renewal and modernisation of the fleet' will continue in the new period (the replacement of public buses will be financed by the IROP 2014-2020, while the replacement of rail vehicles will be financed by the Operational Programme Integrated Infrastructure 2014-2020). 'Building and upgrading the transport infrastructure' is another measure that will be continued (this will be financed by the Operational Programme Integrated Infrastructure 2014-2020 and the IROP 2014-2020). It is expected that the construction and development of the transport infrastructure, the completion of a coherent superior road infrastructure network, class II and III roads and the upgrading of the main railway tracks, along with the elimination of bottlenecks and blackspots, will pave the way for a reduction in fuel consumption. The Operational Programme Integrated Infrastructure 2014-2020 will promote public passenger transport by improving the quality of the infrastructure for integrated transport systems and urban rail transport. The IROP 2014–2020 will support public passenger transport infrastructure and the rolling stock of public passenger road transport, including support for the creation and introduction of integrated transport systems.

At the same time, more support will be channelled into the development of non-motorised transport in accordance with the above-mentioned National Strategy for the Development of Cycling in the Slovak Republic. This measure will include support for the construction of cycling infrastructure, the introduction of a navigation and information system for cyclists, the provision of parking facilities for cyclists, support for walking, and the creation of traffic-relieved zones, as well as other measures that will result in the elimination of the excessive or disproportionate use of private passenger vehicles in towns.

In addition, a rise in the number of vehicles powered by compressed natural gas and electricity (whether fully electric vehicles or hybrid vehicles) is anticipated in the new period. The main advantages of this are lower specific fuel consumption and reduced emissions of carbon dioxide and particulate matter. As the higher initial investment costs of procuring such vehicles and building a network of filling stations and recharging points remain open challenges, the Ministry of Economy and the Ministry of Transport and Construction will continue to support increases in the number of vehicles in connection with the National Policy Framework for the Development of the Market in Alternative Fuels.

2.5.5 Measures planned in the appliances sector

The replacement of white goods, the installation of energy-saving lights and the tightening of minimum technical requirements by the Commission within the scope of established ecodesign and labelling legislation are expected to continue in the appliances sector. In the coming period, the Ministry of Economy and the Slovak Innovation and Energy Agency, in cooperation with the CECED, are planning to arrange the monitoring of further types of appliances in the white goods segment (i.e. not only fridges and freezers, but also washing machines, vacuum cleaners, dishwashers, and other appliances).

2.5.6 Measures planned in the energy transformation, transmission and distribution sector

Energy savings are fuelled in particular by measures financed under the Operational Programme Environmental Quality (2014–2020) which focus on the construction, reconstruction and upgrading of heat distribution systems, and on the construction, reconstruction and upgrading of high-efficiency cogeneration plants with a maximum thermal input of 20 MW. The aim is to adapt heat production and supply to the useful heat required, which is gradually contracting as measures to save energy on the consumption side are phased in. Optimising the production, distribution and consumption of heat, with a stress on employing high-efficiency cogeneration, can help to reduce primary energy sources and develop efficient district heating systems. As the Operational Programme Environmental Quality is financed by the ERDF, under which it is impossible to implement these measures in the Bratislava Region, the Ministry of Economy is planning to grant subsidies for the reconstruction and upgrading of electricity and heat production plants and heat distribution systems in the Bratislava Region.

2.5.7 Summary proposal of planned measures

The energy savings planned under each energy efficiency measure for the coming 2017-2019 period, with an outlook up to 2020, are calculated on the basis of existing and upcoming energy efficiency measures and the financial resources that are expected to be available by applying the average investment intensity for each measure in the previous period (2014-2016). The results of the planning process, broken down by sector, are presented in Table 7.

Table 7: Overview of energy savings planned and financial resources expected in each sector in 2017-2019, with an outlook up to 2020

Sector	2017-2019			2017-2020		
	Energy saving (FEC)	Energy saving (PEC)	Total financial resources	Energy saving (FEC)	Energy saving (PEC)	Total financial resources
	[TJ]	[TJ]	[EUR thousands]	[TJ]	[TJ]	[EUR thousands]
Buildings	3 251	5 088	1 506 162	4 280	6 698	2 019 247
Industry	5 507	8 618	998 527	6 770	10 595	1 278 815
Public sector	1 362	2 132	636 111	1 706	2 670	800 486
Transport	743	1 163	1 162 470	1 061	1 660	1 683 905

Sector	2017-2019			2017-2020		
	Energy saving (FEC)	Energy saving (PEC)	Total financial resources	Energy saving (FEC)	Energy saving (PEC)	Total financial resources
	[TJ]	[TJ]	[EUR thousands]	[TJ]	[TJ]	[EUR thousands]
Appliances	677	1 059	118 665	902	1 412	158 220
Energy transformation, transmission and distribution	0	3 325	225 681	0	4 328	295 388
Total	**11 540**	**21 385**	**4 647 615**	**14 719**	**27 362**	**6 236 061**

Energy savings planned in the form of final energy consumption are **14 719 TJ** in 2017-2020.

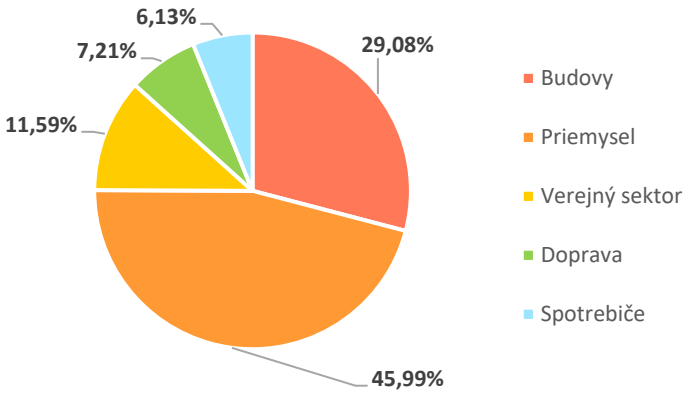
Savings in the form of primary energy consumption are planned at **27 362 TJ** in 2017-2020.[27]

Buildings, industry and the public sector will make the greatest contributions to the planned fulfilment of the energy savings target (see Graph 16). Details of the individual energy efficiency measures proposed for 2017-2019, with an outlook up to 2020, can be found in Annex 2.

These savings can be achieved only in tandem with the application of horizontal and support measures, the direct impact of which on planned energy savings cannot be determined with reasonable precision that will avoid duplication, hence the energy savings for horizontal and support measures are not presented.

In the timeframe up to 2020, the situation in some segments will not change that much. For example, the assumption is that, in the industry segment, the package of ESIF operational programmes will have been exhausted for 2020, hence the savings made in the final year will be lower.

Graph 16: Share of sectors in energy savings planned in 2017-2020



- Buildings
- Industry
- Public sector
- Transport

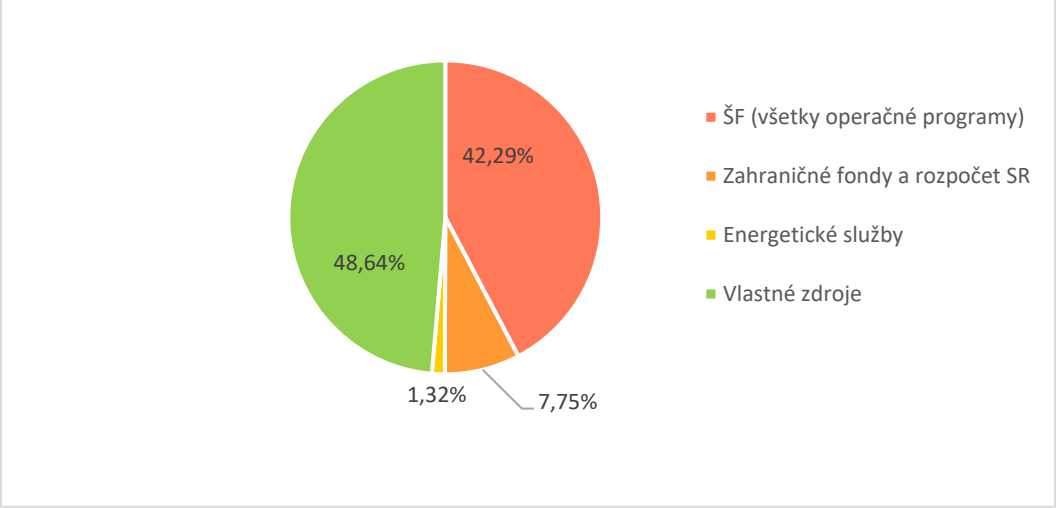
[27] Targets are set pursuant to Articles 3 and 7 of Directive 2012/27/EU on energy efficiency.

- Appliances

The share of selected national and international financial mechanisms in the planned financing of energy efficiency measures is presented in Graph 17.

The measures planned in furtherance of the set target require approximately EUR 6.2 billion (see Table 8).

Graph 17: Share of selected national and international financial mechanisms in the planned financing of energy efficiency measures in 2017-2020



- SF (all operational programmes)
- Foreign funds and national budget
- Energy services
- Own resources

Table 8: Estimated financial resources required to achieve the energy savings planned in each sector for 2017-2019, with an outlook up to 2020

Sector	**Total estimated financial resources [EUR thousands]**					
	2017	**2018**	**2019**	**2020**	**2017-2019**	**2017-2020**
Buildings	482 844	524 749	498 569	513 085	1 506 162	2 019 247
Industry	170 258	477 559	350 710	280 288	998 527	1 278 815
Public sector	179 654	231 834	224 624	164 375	636 111	800 486
Transport	195 780	298 898	667 792	521 435	1 162 470	1 683 905
Appliances	39 555	39 555	39 555	39 555	118 665	158 220

Energy transformation, transmission and distribution	36 546	90 779	91 072	76 991	218 397	295 388
Total	**1 104 637**	**1 663 374**	**1 872 321**	**1 595 730**	**4 640 331**	**6 236 061**

In the planning of measures where the estimated energy savings were unknown, the average investment intensity for similar measures in 2014-2016 was applied (see Table 9). The lowest average investment intensity is reported by the appliances sector; the highest average investment intensity is reported by the transport sector. The high investment intensity in the transport sector can be attributed to the high investment costs per unit of energy saved under Measure 4.2 (Building and upgrading of transport infrastructure). These investment intensities are the average of all measures in the sector; there may be significant differences between them.

Table 9: Overview of the average investment intensity in each sector in 2014-2016

Sector	**Average investment intensity in 2014-2016**
	[Eur/MWh]
Buildings	2 620
Industry	213
Public sector	1 176
Transport	10 593
Appliances	670
Energy transformation, transmission and distribution (PEC)	1 011

3. Policy measures implementing EED

3.1. Horizontal measures

Horizontal measures are presented in Annex 3.

3.1.1. Energy efficiency obligation schemes and alternative policy measures (Article 7 of the EED)

In accordance with Article 7(1) of Directive 2012/27/EU, each Member State must establish an energy efficiency obligation scheme ensuring that energy suppliers or distributors achieve the cumulative FEC energy savings target by 31 December 2020. The cumulative target represents the cumulated annual energy savings established at 1.5 % of the average annual energy sold to final customers by all energy suppliers. The sales of energy, by volume, used in transport may be excluded from this calculation. The exemptions laid down in Article 7(2) of the Directive may be applied in the calculation. Member States may also opt for an alternative approach (Article 7(9) of the Directive) and achieve the cumulative energy savings target (determined in accordance with Section 7(1)) by taking policy measures.

3.1.1.1. Total energy savings during a period of obligation

The application of Article 7 of Directive 2012/27/EU on energy efficiency in Slovakia entails the introduction of an energy efficiency obligation scheme (an 'obligation scheme') or the taking of policy measures aimed at achieving energy savings at least at the level which should be achieved by the obligation scheme. The amount of energy savings was set by reference to the average final energy consumption in 2010-2012; final energy consumption in transport was not included in this energy consumption. For the purposes of Article 7 of the Directive, the annual energy savings target was set as 1.5 % of this calculated value. The cumulative sum of planned energy savings, calculated in accordance with Commission methodology, was adjusted by applying paragraph (2); this adjustment was not allowed to exceed 25 % of the original value of the cumulative sum of planned energy savings.[28]

The resulting cumulative energy savings target for 2014-2020 was therefore set at 26 565 GWh. Of this, the annual energy saving is 948.75 GWh per year.

As the 2014 annual target was undershot, the annual target was increased to 959.84 GWh per year in 2016 and **1 019.49 GWh per year** in 2017 in order to achieve the cumulative target by 2020.

Table 10: Establishment of the cumulative target for the purposes of Article 7 of Directive 2012/27/EU

[28] Information on the implementation of Article 7(2) of Directive 2012/27/EU on energy efficiency in Slovakia (Ministry of Economy, 2014).

Year	Cumulated energy savings in 2014-2020 [GWh]							Total
	2014	2015	2016	2017	2018	2019	2020	
2014	948.75							**948.75**
2015	948.75	948.75						**1 897.50**
2016	948.75	948.75	948.75					**2 846.25**
2017	948.75	948.75	948.75	948.75				**3 795.00**
2018	948.75	948.75	948.75	948.75	948.75			**4 743.75**
2019	948.75	948.75	948.75	948.75	948.75	948.75		**5 692.50**
2020	948.75	948.75	948.75	948.75	948.75	948.75	948.75	**6 641.25**
Σ	**6 641.25**	**5 692.50**	**4 743.75**	**3 795.00**	**2 846.25**	**1 897.50**	**948.75**	**26 565.00**

Source: Information on the implementation of Article 7(2) of Directive 2012/27/EU on energy efficiency in Slovakia (Ministry of Economy, 2014).

3.1.1.2. National energy efficiency obligation scheme pursuant to Article 7(1)

Slovakia had not introduced an energy efficiency obligation scheme by the end of 2016. After considering all aspects, Slovakia decided to make energy savings by means of policy measures (i.e. by means of the alternative approach under Article 7(9) of Directive 2012/27/EU). The projected rise in end-use energy prices, which would ultimately have a negative impact on the business environment, consequently diminishing the competitiveness of the economy and potentially triggering a rise in unemployment, was the major factor in the decision-making process. This effect would have been manifested in a rise in energy poverty, which would have been in direct contravention of the objectives pursued by Directive 2012/27/EU itself.

3.1.1.3. Alternative policy measures adopted in order to apply Article 7(9) and Article 20(6)

Alternative policy measures are applied to achieve the energy savings pursuant to Article 7 of the Directive.

The application of policy measures will be reviewed in 2017 on the basis of an assessment of the application of measures focusing on energy savings in the 2014-2016 period, i.e. an evaluation of measures under this Action Plan, and their contribution to the 2020 energy savings targets.

Energy efficiency measures contributing to the target derived from Article 7 of the Directive (alternative measures) are indicated for the individual sectors in the tables for 2014-2016 (Annex 1) and 2017-2020 (Annex 2).

The most significant energy efficiency policy measures contributing to the target pursuant to Article 7 of Directive 2012/27/EU include:

- Energy efficiency obligations established by legislation of general application beyond the scope of obligations required by EU regulations
- Operational Programme Competitiveness and Economic Growth, 2007-2013 Structural Funds
- Operational Programme Health, 2007-2013 Structural Funds
- Operational Programme Transport, 2007-2013 Structural Funds
- Regional Operational Programme, 2007-2013 Structural Funds
- Operational Programme Research and Development, 2007-2013 Structural Funds
- State Housing Development Fund – Residential Building Insulation
- Operational Programme Environmental Quality, 2014-2020 ESIF
- Operational Programme Integrated Infrastructure, 2014-2020 ESIF
- Integrated Regional Operational Programme, 2014-2020 ESIF
- Slovseff III Green Programme
- Subsidy schemes within the purview of the Ministry of Economy
- Environmental Fund
- Grants to insulate single-family buildings
- Voluntary agreements

Table 11: Overview of the most significant policy measures for the fulfilment of the target under Article 7 of Directive 2012/27/EU

Source of financing	Measures
Liable entities' own resources	- Compulsory energy audits for industrial enterprises and agricultural holdings with annual energy consumption of more than 2 500 (5 000) MWh by 31 December 2011 (2013)
Liable entities' own resources	- Compulsory hydronic balancing of heat and hot water distribution systems, including the appropriate thermal insulation of hot water distribution systems for buildings with a total floor area of more than 1 000 m² (Act No 476/2008 and Act No 321/2014 on energy efficiency)
Liable entities' own resources	- The obligation to monitor, evaluate and provide consumption data to the operator of the energy efficiency monitoring system for central bodies of State administration, municipalities, higher territorial units, organisations where they act in the capacity of the founder, and owners/managers of buildings with a total floor area of more than 1 000 m² (Act No 476/2008 and Act No 321/2014 on energy efficiency)
Operational Programme Competitiveness and Economic Growth, 2007-2013 Structural Funds	- Innovation and technology transfers at industrial enterprises - Increased energy efficiency in industrial production
Operational Programme Health, 2007-2013 Structural Funds	- Improvements in the thermal performance of buildings – hospitals and healthcare facilities
Operational Programme Transport, 2007-2013 Structural Funds	- Renewal and modernisation of the fleet - Building and upgrading of the transport infrastructure
Regional Operational Programme, 2007-2013 Structural Funds	- Improvements in the thermal performance of public buildings – schools and school facilities, social service facilities, cultural facilities, etc.
Operational Programme Research and Development, 2007–2013 Structural Funds	- Improvements in the thermal performance of public buildings – schools and school facilities
State Housing Development Fund – Residential Building Insulation	- Improvements in the thermal performance of residential buildings
Operational Programme Environmental Quality, 2014-	- Energy auditing at SMEs and the implementation of measures derived from energy audits

Source of financing	Measures
2020 ESIF	- Reductions in the energy intensity of public buildings - Production, approval and implementation of plans for sustainable energy and reductions in greenhouse gas emissions - Introduction of energy management systems, including energy audits and environmental management - Support for the development of energy services regionally and locally - Construction, reconstruction and modernisation of heat distribution systems - Construction, reconstruction and modernisation of electricity and heat production plants via high-performance combined production with a maximum thermal input of 20 MW - Improvements in the energy efficiency awareness of children and young people - Energy efficiency information campaign - Monitoring and information system – interconnection with most energy efficiency support mechanisms
Operational Programme Integrated Infrastructure, 2014-2020 ESIF	- Renewal and modernisation of the fleet - Building and upgrading of the transport infrastructure - Support for the development and use of public passenger transport, including support for the creation of integrated transport systems
Integrated Regional Operational Programme, 2014-2020 ESIF	- Support for the development of non-motorised transport, especially cycling - State Housing Development Fund – EU-funded residential building insulation (see above)
Slovseff III Green Programme	- Improvements in the thermal performance of residential buildings - Improvements in energy efficiency in industry
Subsidy schemes within the purview of the Ministry of Economy	- Implementation of measures derived from energy audits at SMEs in the Bratislava Region - Enhanced energy efficiency of heat distribution in the Bratislava Region
Environmental Fund	- Improvements in the thermal performance of public buildings
Grants to insulate single-family buildings	- Improvements in the thermal performance of single-family buildings
Voluntary agreement	- Implementation of energy efficiency measures at entities, especially in industry and energy, to achieve the agreed energy savings or to provide information

3.1.1.4. Published energy savings achieved as a result of the implementation of an energy efficiency obligation scheme

Not applicable.

3.1.1.5. Published energy savings achieved as a result of the implementation of alternative policy measures

Energy savings at final customers are broken down by sector, as referred to in Table 12.

Table 12: Energy savings for compliance with Article 7 of Directive 2012/27/EU for 2014-2016

Sector:	Savings for the fulfilment of the target under Article 7					
	2014 (updated April 2016)		2015 (updated January 2017)		2016[29] (01/2017)	
	[TJ/year]	**[GWh/year]**	[TJ/year]	**[GWh/year]**	[TJ/year]	**[GWh/year]**
Buildings	1 616.76	**449.10**	1 773.30	**492.58**	1 661.17	**461.44**
Industry	1 015.08	**281.97**	1 633.02	**453.62**	123.94	**34.43**
Public sector	162.81	**45.22**	409.16	**113.65**	219.15	**60.88**
Transport	77.02	**21.39**	706.16	**196.16**	113.33	**31.48**
Appliances	141.46	**39.29**	189.98	**52.77**	233.95	**64.99**

[29] Data available as at 7 April 2017 were processed for the evaluation of 2016.

TOTAL	3 013.12	**836.98**	4 711.62	**1 308.78**	2 351.55	**653.21**

Further to these preliminary results, Slovakia reviewed the target for the planned 2017-2020 period so that the overall cumulative energy saving for 2040-2020 would be 26 565 GWh. The trend in energy savings is presented in Table 13.

Energy savings target and the fulfilment thereof [GWh]	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**
Original target for Article 7	948.75	948.75	948.75	948.75	948.75	948.75	948.75
Updated target in 2016			959.84	959.84	959.84	959.84	959.79
Current progress in the pursuit of the target (01/2017)	837.67	1 308.78	653.21				
Updated target in 2017				1 019.49	1 019.49	1 019.49	1 019.49

Table 13: Energy savings target (original and updated) and the fulfilment thereof

As the target for the purposes of Article 7 of Directive 2012/27/EU on energy efficiency is expressed as a cumulative figure, the data on energy savings achieved in 2014-2016 are presented in the form of a matrix showing the development up to 2020 (see Table 14). The reduction in energy savings in the past few years stems from the lifetimes of the individual activities carried out under the measures. In total, over the force of Article 7 of Directive 2012/27/EU thus far, the contribution to cumulative energy savings, quantified up to 2020, has been **16 370.14 GWh**.

Table 14: Energy savings for compliance with Article 7 of Directive 2012/27/EU by alternative measures for 2014-2016

Year	**Cumulative energy savings up to 2020 [GWh]**			
	2014 (current)	**2015 (current)**	**2016**	**Σ (2014-2016)**
2014	837.67			837.67
2015	837.67	1 308.78		2 146.45
2016	837.67	1 308.78	653.21	2 799.66
2017	837.67	1 308.78	653.21	2 799.66
2018	837.67	1 308.78	653.21	2 799.66
2019	652.94	1 308.78	653.21	2 614.93
2020	652.94	1 065.94	653.21	2 372.09
Cumulative for 2014-2020	**5 494.25**	**7 609.85**	**3 266.04**	**16 370.14**

3.1.1.6. Details of the national rates selected in accordance with Annex IV to the EED

National rates for the conversion of total energy consumption into the same physical unit, selected in accordance with Annex IV to the Directive, are presented in Implementing Decree of the Ministry of Economy No 327/2015.

3.1.1.7. Information on any method, other than the one provided for in Annex V, Part 2(e), to the EED, used to take into account the lifetimes of energy savings

The lifetimes of measures that are to be considered in the evaluation of the target derived from Article 7 of the Directive are set out in Implementing Decree of the Ministry of Economy No 327/2015.

3.1.2. Energy audits and energy management systems (Article 8 of the EED)

Slovakia introduced compulsory energy audits as an alternative policy measure for the pursuit of energy savings targets (FEC) under Act No 476/2008 on efficiency in the use of energy from 1 January 2009. The obligation to conduct energy audits was laid down for industrial enterprises and agricultural holdings, depending on their total annual energy consumption, by 31 December 2011 for entities with total annual energy consumption of up to 20 000 MWh, and by 31 December 2013 for entities with total annual energy consumption of more than 20 000 MWh, to be repeated every five years. The possibility of replacing this with the introduction of an energy or environmental management system was not permitted.

Large enterprises are required to conduct energy audits with effect from 1 December 2014 (Article 8 of Directive 2012/27/EU). Under the Energy Efficiency Act, a large enterprise is an undertaking that is not a small enterprise or a medium-sized enterprise defined under special legislation.[30] In 2012, there were 614 large enterprises (thus defined) in Slovakia. Because the size of enterprises in the energy efficiency monitoring system had not previously been monitored, it is impossible to quantify the number of audits conducted in the previous period at large enterprises in accordance with Article 8 of the Directive. The same applies to Article 8(5) of Directive 2012/27/EU.

Within the 30 days of an energy audit, large enterprises are required to send the operator of the energy efficiency monitoring system a summary information sheet with the basic data on the energy audit. More comprehensive data are provided by the energy auditor by 31 March of the following calendar year. The data are used to monitor the potential for energy savings at enterprises.

In the light of practical experience that has been gained in the past, we recommend, at EU level, modifying the obligation of energy auditing by type of enterprise to an obligation by quantity of energy used by an enterprise or by the energy intensity of an enterprise.

[30] Annex I to Commission Regulation (EU) No 651/2014 of 17 June 2014 declaring certain categories of aid compatible with the internal market in application of Articles 107 and 108 of the Treaty (Text with EEA relevance) (OJ L 187, 26.6.2014).

As regards the alternative possibility of introducing a certified system of energy or environmental management, in order to monitor the energy-saving measures that have been implemented, it is advisable to establish the obligation to provide data on the measures taken at intervals of at least four years.

Table 15: Overview of energy audits carried out

Energy audits carried out in 2011-2013		
(b) number of energy audits carried out in 2011-2013	210	According to Section 8 of Act No 476/2008.
(b) number of energy audits carried out at large enterprises in 2011-2013	-	It is impossible to extract this from the total number because the data provided to the operator of the energy efficiency monitoring system contain information on energy efficiency measures, but not on the type of enterprise.
(b) number of energy audits carried out at large enterprises in 2014-2016	629[31]	2014: 68 2015: 448 2016: 113[31]
(c)(1) number of large enterprises in Slovakia:	614 (2012)	In accordance with Article 8 of Directive 2012/27/EU
(c)(2) number of enterprises to which Article 8(5) of Directive 2012/27/EU applies.	-	The relevant register to monitor the type of enterprises defined as 'non-SME' has not been introduced.

3.1.3. Metering and billing (Articles 9 to 11 of the EED)

Requirements for the metering and billing of individual forms of energy are laid down in Act No 251/2012 on energy and Act No 657/2004 on thermal energy. Conditions of regulation for electricity, gas and thermal energy are laid down in Act No 250/2012 on regulation in network industries.

3.1.4. Consumer information programmes and training (Articles 12 and 17 of the EED)

The Slovak Innovation and Energy Agency started implementing a national project entitled 'Promoting awareness and consulting in energy efficiency and in the use of renewable energy sources, including public awareness' in 2009. It was implemented via the Operational Programme Competitiveness and Economic Growth and was successfully completed on 31 December 2015. The project aimed to increase the level and quality of public awareness of energy efficiency and RES use. The project focused on the provision of professional energy consulting, especially for households, the public sector, enterprises and students. This national

[31] Number of audits (enterprises only) as at 7 April 2017. The final number will not be available until 2018.

project entailed the establishment of LIVING WITH ENERGY advice centres in Trenčín, Banská Bystrica and Košice, where interested parties received consulting free of charge. They were able to receive advice in person, by email or via a toll-free telephone line. Consultants from the advice centres, energy experts and the Slovak Innovation and Energy Agency's Communication and International Cooperation Department provided energy advice and consulting free of charge to public sector representatives, enterprises and the public at advice centres, exhibitions and various events. Thousands of interested parties made use of these consultations.

The project also included the preparation and publication of printed materials on energy savings and RES use. Numerous brochures and leaflets were published for the different target groups. Primary schools were particularly interested in Auntie Eta's Advice Folders with Energy Experiments. Teachers and students were able to work with these materials directly in their lessons. This project of consulting and awareness of the energy efficient low-carbon economy will continue for all energy-using target groups in the 2014-2020 programming period.

3.1.5. Availability of qualification, accreditation and certification schemes (Article 16 of the EED)

The following qualification schemes have been introduced in energy efficiency and energy use:

- Act No 321/2014 on energy efficiency – energy auditor, provider of a guaranteed energy service
- Act No 251/2012 on energy, as amended – person professionally competent to engage in business in the energy sector
- Act No 657/2004 on the thermal energy sector, as amended – person professionally competent to engage in business in the thermal energy sector
- Act No 309/2009 on the support of renewable energy sources, as amended – installer of RES equipment in buildings
- Act No 476/2008 on energy efficiency – energy auditor (amended by Act No 321/2014)
- Act No 555/2005 on the energy performance of buildings, as amended – person professionally competent to engage in the energy performance certification of buildings
- Act No 50/1976 on spatial planning and building rules (the Building Act), as amended – general provision on the need for a professional qualification in the performance of certain building works

In terms of professional competence for an energy auditor and a provider of a guaranteed energy service, training, experience and an examination of professional competence are required. For professionally competent persons, a system for subsequent increases in qualifications at intervals of between three and five years has been introduced. The professional qualification and quality control system is provided by the Slovak Innovation and Energy Agency, which keeps lists of professionally competent persons.

3.1.6. Energy services (Article 18 of the EED)

Since 1 December 2014, energy services have had legislative support in the Energy Efficiency Act. Sections 15 to 20 of this Act introduced an entire system for the definition and support of energy services.

On its website at http://www.mhsr.sk/poskytovanie-energetickej-sluzby/145697s, the Ministry of Economy keeps a list of ancillary energy service providers. The method used to make entries in the list is governed by Implementing Decree of the Ministry of Economy No 99/2015 on providers of ancillary and guaranteed energy services.

A guaranteed energy service is an energy service provided under a contract on energy efficiency with a guaranteed energy saving, i.e. an energy efficiency contract. The provision of an energy service with a guaranteed energy saving is a regulated trade. On its website at http://www.mhsr.sk/poskytovanie-energetickej-sluzby/145697s, the Ministry of Economy keeps a list of guaranteed energy service providers. The method used to make entries in the list is governed by Implementing Decree of the Ministry of Economy No 99/2015 on providers of ancillary and guaranteed energy services.

The Act also contains the compulsory content of an energy efficiency contract where energy service provision affects the public sector. In addition, the Slovak Innovation and Energy Agency provides support and awareness for energy service development. It also provides training and refresher courses for persons professionally competent to provide a guaranteed energy service.

Energy service providers are required to send data on energy services provided in the previous calendar year to the energy efficiency monitoring system (see Table 16).

Table 16: Energy savings achieved via energy services

Energy savings via energy services	2014	2015	2016[32]
	[TJ]	[TJ]	[TJ]
Provision of energy services in the buildings sector (1.7)	5.67	4.22	70.61
Provision of energy services in the public sector (3.14)	22.64	40.64	14.93

3.1.6.1. Information on measures adopted or planned to be adopted for the support of energy services

In 2012-2014, barriers to the development of energy services in Slovakia were identified. Measures were prepared in response to those barriers, which mainly comprised low awareness of guaranteed energy services, low trust shown towards providers of guaranteed energy services, and the insufficient basic regulatory framework. Some of these barriers were removed by Act No 321/2014 on energy efficiency, which introduced a basic system for the provision of energy services, the concept of a person professionally competent to provide a guaranteed energy service, the content of an energy efficiency contract for the public sector,

[32] Situation as at the data cut-off date, i.e. 7 April 2017.

and information obligations for the Slovak Innovation and Energy Agency. Basic policy and regulatory barriers for energy services were also largely swept away.

However, barriers related to financing and financial mechanisms remain. The basic characteristic of a guaranteed energy service is the repayment of an investment (it is a repayable form of financing) from energy savings which are achieved by the implementation of the measure, the amount of which is guaranteed. At the same time, however, this benefit hinders the development of the market in guaranteed energy services because it assumes the repayment of investments from resources that the beneficiary of the GES would have used to cover energy costs in the future. In other words, any support based on non-repayable forms of financing is a major competitor to a GES. In particular, this concerns grants and support funds and, especially in Slovakia, the European Structural and Investment Funds.

The expectations of potential GES beneficiaries regarding the availability and use of such financial resources are a chapter in themselves. Potential guaranteed energy service beneficiaries (especially in the public sector) often wait from the date of notification of the preparation of such a mechanism until the time this mechanism is launched, which can take several years. In this time, they tend to be reluctant to consider other methods of increasing energy efficiency (including guaranteed energy services), despite the objectively low likelihood of success in obtaining non-repayable resources.

Another barrier is the need for the deep renovation of buildings, where investments in structural measures (insulation) protract the payback time considerably. In practice, longer payback times are manifested in the use of other types of financial mechanisms, but the financial potential offered by energy savings cannot be harnessed here.

The last financial barrier identified is the problem posed by capital expenditure in the public sector according to Eurostat methodology and the related reporting of public debt. Any public sector borrowing increases capital expenditure and hence the public debt. Despite its budget neutrality (i.e. it has no impact on the budget deficit), Eurostat treats a GES as an instrument increasing the public debt. However, this is not just a problem for Slovakia. In particular, it affects countries with a high debt, where public investments are severely restricted. In certain other countries, this poses a major risk, hence broader GES application is also inhibited there. DG ENERGY negotiates with Eurostat and other responsible DGs on the opportunities available for a different way of factoring in public sector expenditure so that guaranteed energy services can be excluded from public debt or at least taken into consideration differently.

For these reasons, the conditions for the provision of energy services, especially in the public sector, are insufficient.

To dismantle other financial barriers, cooperation among stakeholders needs to be coordinated nationally at least in the following areas:

- to make the expectations of potential public sector GES beneficiaries more realistic in terms of the opportunities available to them to obtain non-repayable financing for projects to improve energy efficiency;
- to facilitate multiple-source financing for projects to improve energy efficiency in the public sector by combining non-repayable financing from support mechanisms (the

ESIF) with repayable financing based on the monetisation of future guaranteed energy savings.

3.1.6.2. Qualitative overview of the internal market in energy services

The groundwork for the quality provision of energy services in Slovakia is laid by the legislative framework adopted for guaranteed energy services. Applicable legislation defines a guaranteed energy service as a regulated trade that may be provided only by a holder of a valid certificate of professional competence (or an energy auditor). Certification of professional competence to provide a GES is contingent on compliance with qualification requirements, the documentation of the necessary experience, and the passing of an examination of professional competence. The validity of a certificate is contingent on the completion of refresher courses at least once every three years. These provisions ensure compliance with the minimum professional standards required for the quality provision of guaranteed energy services.

Another quality assurance method underpinning the provision of guaranteed energy services is the self-regulation of GES providers, expressed by their accession to the European Code of Conduct for Energy Performance Contracting.

There is currently no formalised system to evaluate the quality of GES projects. However, market information from guaranteed energy service projects implemented in Slovakia indicates that the quality and professionalism of GES providers is one of the decisive factors having a positive impact on decision-making on GES projects by the beneficiaries thereof. No negative experience concerning the quality of project implementation was recorded during the reporting period. In the absolute majority of cases, the implemented projects complied with the agreed parameters, including the fulfilment of the guaranteed energy savings. In certain cases, where the agreed saving was not achieved, the GES providers provided compensation for this in a pre-agreed manner.

3.1.7. Other energy efficiency measures of a horizontal nature (Articles 19 and 20 of the EED)

The first National Energy Efficiency Action Plan includes a list of the measures referred to in Article 19(1). SK 14.11.2012 Official Journal L 315/51.

In response to requirements to resolve issues related to an increase in a tenant’s interest in energy prices and investments in savings-related measures, Slovakia has proposed – in the draft Energy Efficiency Act – the obligation of the separate charging for energy in the provision of a lease, if a separate designated meter has been installed and if the premises have a floor area of more than 1 000 m².

3.1.7.1. Energy efficiency measures undertaken to implement Article 19 of the EED.

Not applicable.

3.1.7.2. Information on the national energy efficiency fund

Not applicable. No energy efficiency fund has been created.

3.1.7.3. New horizontal measures

The horizontal measures taken in 2014-2016 are detailed in Annex 3.

'Support measures', which were not explicitly evaluated because their impact is cross-sectional and cannot be attributed to a given measure, also contributed to energy savings under other measures.

3.2. Energy efficiency in buildings

3.2.1. Building renovation strategy (Article 4 of the EED)

The basic policy and strategy document prepared with the aim of making it possible to define investment opportunities for the renovation of building stock in Slovakia and the forms of financing thereof is the Strategy for the Renovation of Residential and Non-residential Building Stock in the Slovak Republic (approved under Government Resolution No 347/2014). The Ministry of Transport and Construction, responding to a requirement deriving from Directive 2012/27/EU and Act No 321/2014, as well as from Task C.2 of Government Resolution No 398/2014 regarding this Act, is preparing an update of the Strategy, which is to be approved by the Slovak Government in April 2017.

3.2.2. Other energy efficiency in the buildings sector

The most important energy efficiency measures in the buildings sector (including public buildings) include:

- Support programmes and other fiscal stimuli – the support of building renovation from national resources (the State Housing Development Fund, government premiums for building society savings schemes, Insulation of Single-family Buildings), Structural Fund resources (e.g. the Regional Operational Programme, the Operational Programme Science and Research, the Operational Programme Health, the IROP, and the Operational Programme Environmental Quality) and other resources (the initiatives Munseff I, II, Slovseff I, II, III, and others).
- Legislative measures – the obligation to ensure the hydronic balancing of a building's heating system after every intervention in the thermal protection or technical system thereof, to ensure the regulation of heat supply in a building, to ensure and maintain the hydronic balance of hot water distribution systems (for buildings with more than 1 000 m²), and to install suitable thermal insulation for heating and hot water distribution systems (for buildings with more than 1 000 m²), and the obligation to arrange for periodic checks on heating systems and air-conditioning systems.
- Other support measures in the buildings sector include information campaigns of the Ministry of Transport and Construction and the Slovak Innovation and Energy Agency, and consulting under the 'Living with Energy' programme.

3.3. Energy efficiency in public bodies

3.3.1. Buildings of central bodies of State administration (Article 5 of the EED)

According to Article 5(1) of Directive 2012/27/EU on energy efficiency, each Member State shall ensure that, as from 1 January 2014, 3 % of the total floor area of heated and/or cooled buildings owned and occupied by central bodies of State administration is renovated each year to meet at least the minimum energy performance requirements for buildings. This target may also be pursued by an alternative approach (Article 5(6) of the Directive) achieving the same level of energy savings as the basic approach.

According to Section 10(6) of Act No 321/2014 on energy efficiency, the Ministry of Transport and Construction keeps a list of relevant buildings,[33] which it publishes on its website and updates every year by 31 December. The list states the total floor area of the building and its energy performance. The total floor area of these buildings is more than 400 000 m². The Ministry of Transport and Construction publishes a specific list of relevant buildings (for every year) on its website.[34]

In 2013, Slovakia notified an alternative approach to the Commission in the document entitled 'Report notifying an alternative approach in accordance with Article 5 of Directive 2012/27/EU on energy efficiency'. And energy savings target for all public buildings totalling **52.17 GWh per year** was set for the alternative approach.[35]

By applying a savings calculation using the bottom-up method according to the list of certificates of renovated public buildings in the INFOREG information system,[36] total energy savings of **80.40 GWh** were identified for 2014-2016 (see Table 17).

Table 17: Energy savings in public buildings in 2014-2016

Public buildings renovated in 2014-2016	2014 [GWh/year]	2015 [GWh/year]	2016 [GWh/year]	Total [GWh/year]
Administration buildings – renovation	0.85	13.88	10.79	**25.52**
Buildings of schools and school facilities – renovation	-	24.68	9.96	**34.64**
Hospital buildings – renovation	-	15.57	4.67	**20.24**
TOTAL	**0.85**	**54.13**	**25.42**	**80.40**

Source: INFOREG information system (2015, 2016, 2017)

[33] 'Relevant building' means a building managed by a central body of State administration which, as at 1 January of the given calendar year, fails to comply with the minimum energy performance requirements for buildings pursuant to Section 4(3) of Act No 555/2005 on the energy performance of buildings, as amended by Act No 300/2012, if its total floor area is more than 250 m².

[34] http://www.telecom.gov.sk/index/index.php?ids=170474

[35] Report notifying an alternative approach in accordance with Article 5 of Directive 2012/27/EU on energy efficiency, December 2013.

[36] To quantify the energy savings, for administration buildings a share of public buildings amounting to 50 % of all administration buildings in the database of certificates was used.

3.3.2. Buildings of other public entities (Article 5 of the EED)

3.3.2.1. Public structures and entities – information on measures taken for the adoption of energy efficiency plans

Slovakia provided financing for the production of local and regional low-carbon strategies from the ESIF 2014-2025 via the Operational Programme Environmental Quality. In keeping with the national low-carbon strategy that is under preparation, the aim of this activity will be to draw up and implement regional and local low-carbon strategies or parts thereof, with an assessment of the supply of all available types of usable energy, including energy used in transport, processed using methodology under the action plan for sustainable energy development, as applied in the Covenant of Mayors. The emphasis should be on low-carbon measures, especially for energy efficiency and RES use, with due consideration for environmental protection, especially in connection with the production of greenhouse gas emissions and pollutant emissions released into the year. Where a particular site has a district heating system, an integral part of the low-carbon strategy should be updates of the municipal development policy in the field of thermal energy, with consideration for falling demand for useful heat, and with a specification of the procedure for the subsequent optimal adaptation of heat distribution and production. Public financial resources of EUR 14.1 million are planned for the 2014-2020 programming period. This mechanism is expected to be put into actual use in 2017.

3.3.2.2. List of public entities that have drawn up an energy efficiency action plan

The following municipalities have drawn up an energy efficiency plan in accordance with Article 5(7) of the Directive within the scope of the Covenant of Mayors: Bratislava, Nitra, Moldava nad Bodvou, Trakovice, Malženice, Pobedim, Turčianske Teplice.

3.3.3. Purchasing by public entities (Article 6 of the EED)

The obligation to procure products and services with high energy efficiency is laid down by Act No 343/2015 on public procurement and amending certain laws, as amended. According to Section 42(5) of Act No 343/2015, when an energy-related product is to be procured, the contracting authority – in the description of the subject-matter of the contract – establishes requirements only for an energy-related product that complies with highest-performance criteria and belongs to the highest energy efficiency class pursuant to a special regulation. The obligation to procure products that comply with the highest-performance criteria and belong to the highest energy efficiency class does not apply to contracts where the estimated value is lower than the financial limit under Section 5(2) of Act No 343/2015 or if the procurement of a product pursuant to Section 42(5) in the highest energy efficiency class of the highest performance is not appropriate in view of cost-effectiveness, is not economically viable for the contracting authority, is not technically appropriate, or does not facilitate competition.
The obligation to procure products that comply with the highest-performance criteria and belong to the highest energy efficiency class therefore only applies to above-the-threshold contracts. Financial limits are set by the Office for Public Procurement.

In the evaluation of bids for products and services in the public sector, the Ministry of Economy recommends taking account of the product life-cycle costs and, even

with below-the-threshold contracts, procuring products that comply with the highest-performance criteria and belong to the highest energy efficiency class, especially in relation to:
- heat production facilities;
- air-conditioning and ventilation facilities;
- computer technology;
- interior lighting.

Measures to improve energy efficiency in public procurement and contracting guidelines under the Public Procurement Act as an evaluation criterion from the point of view of the effectiveness of operating costs in the procurement of energy-related products, tyres, services, public buildings, the renovation of public buildings, packages of energy-related products, etc., are published on the Slovak Innovation and Energy Agency's website.

3.4. Other end-use energy efficiency measures in industry and transport

3.4.1. Details of significant measures to increase energy efficiency in industry

For the energy industry and drinking water supply, Slovakia has introduced the obligation to periodically monitor and evaluate the energy intensity of the transmission and distribution of electricity, natural gas, fuel and heat, as well as the energy intensity involved in the operation of public water supply and sewage systems.

In the construction of facilities for the production of electricity or facilities for the production of heat, in the conditions prescribed by the Energy Efficiency Act it is necessary to arrange for an energy audit assessing the alternative possibility of building a cogeneration facility.

3.4.2. Details of significant measures to increase energy efficiency in passenger and freight transport

The building of road infrastructure has the greatest impact on the savings achieved. Slovakia is preparing new projects to interconnect roads and build expressways.

Slovakia has prepared a grant scheme for electric vehicles in passenger transport. These grants are available to natural persons. The EUR 5 000 grant per vehicle is intended to spur on the market in electric vehicles. The grant scheme was launched in autumn 2016.

3.4.3. Details of significant end-use energy efficiency measures in industry

In 2016, the Ministry of Economy drew up a scheme to promote energy auditing for SMEs in the Bratislava Region, with a total allocation of EUR 300 000. A similar mechanism will be implemented for less developed regions with financing from the Operational Programme Environmental Quality, drawing on EUR 12 million from the ESIF.

3.5. Support of efficient heating and cooling

3.5.1. Comprehensive assessment (Article 14 of the EED)

The comprehensive assessment under Article 14(1) was first conducted in 2015. According to the assessment results, Slovakia generated 4 473 GWh of electricity by means of high-efficiency cogeneration in 2014; this is approximately 14.7 % of the total electricity produced in Slovakia. In total, 11 446 GWh of heat produced by high-efficiency cogeneration was supplied, corresponding to 32.8 % of the total production of useful heat.

The prevailing cogeneration technology in terms of electricity production comprises steam condensing extraction turbines or back-pressure turbines. In the past five years, the share of the installed capacity of cogeneration using cogeneration technology with internal combustion engines has increased significantly. Their installed capacity now represents 26.8 % of the total installed capacity.

The cogeneration fuel mix is dominated by fossil fuels, specifically natural gas (21 %), hard coal (18 %) and brown coal (10 %). In the past five years, the share of RES has increased significantly. Biomass 12 %, biogas 9 %. In addition to the construction of CHP plants fired by woody biomass, the co-combustion of biomass with fossil fuels in existing or reconstructed heat sources in public and company CHP plants also contributes to the overall share of biomass combustion.

3.5.1.1. Assessment of progress achieved in comprehensively assessing the potential of high-efficiency cogeneration and efficient district heating and cooling

In the wake of an assessment of the potential offered by high-efficiency cogeneration, there are plans to increase the installed electrical capacity of facilities by approximately 106 MW compared to 2014, in particular by installing internal combustion engines.

Table 18: Estimated economic potential of electricity produced by cogeneration

Year	Actual				Projected			
	2011		2014		2020		2025	
Cogeneration technology	Installed capacity	Electricity produced	Installed capacity	Electricity produced	Installed capacity	Electricity produced	Installed capacity	Electricity produced
	[MWe]	[GWh]	[MWe]	[GWh]	[MWe]	[GWh]	[MWe]	[GWh]
Combined cycle gas turbine	394.9	874.0	394.9	908.9	394.9	947.8	394.9	967.6
Steam back-pressure turbine	583.0	1370.6	577.0	1 288.1	582.8	1340.4	594.4	1 367.2
Steam condensing extraction turbine	1622.9	1299.9	1631.1	1 081.4	1647.4	1153.2	1663.9	1 164.7
Gas turbine with heat recovery	25.4	124.8	25.4	91.6	30.5	115.8	36.6	139.0
Internal combustion engine	47.1	231.5	187.1	1 095.0	261.9	1571.3	340.4	2 042.7
Other technology	0.0	0.0	1.2	7.9	5.9	38.7	8.8	58.1
Total	**2 673.3**	**3 900.8**	**2 816.7**	**4 472.8**	**2 923.3**	**5 167.2**	**3 039.1**	**5 739.2**

Compared to 2014, in 2020 there are plans to increase electricity produced in cogeneration facilities to approximately 17 % of the total electricity produced.

The harnessing of this planned potential is not broken down into individual years. The average annual installed capacity should come to approximately 17.8 MW. However, electricity grid congestion in 2015 severely restricted the construction and/or increases in the capacity of cogeneration facilities. The coming period will be a time of waiting for the results of a study on the possibility of connecting electricity-producing facilities to the electricity grid and subsequently re-evaluating the potential to use high-efficiency cogeneration.

Other reasons for the delay in the building and upgrading of facilities for high-efficiency cogeneration and efficient district heating systems are an expected change in the tariff policy system for electricity produced from RES and for high-efficiency cogeneration, and the announcement of a call under the Operational Programme Environmental Quality to support investments in this area.

3.5.1.2. Description of the procedure and the methodology used to carry out a cost-benefit analysis to satisfy the criteria of Annex IX to the EED

A specific feature of the economic evaluation is that, in addition to standard economic criteria influencing evaluations of the construction of cogeneration facilities, it is necessary to take account of conditions under the system currently applied and projected by the regulatory authority for the regulation of justified costs in the price of heat and electricity.

The price of heat derived from cogeneration is currently set as a maximum price reflecting economically justified costs and reasonable profit. The electricity price for which distribution companies purchase electricity is set as a fixed price. Heat and electricity prices are regulated every year by the regulatory authority. The system for the regulation of economically justified costs determines the calculation of such costs and the method for their breakdown, the 'energy method', which allocates a share of the jointly incurred justified costs of cogeneration to electricity and heat.

In the economic evaluation of the opportunity to apply high-efficiency cogeneration with the technology of an internal combustion engine fuelled by natural gas, an economic evaluation was conducted that split the joint costs of the construction and operation of a cogeneration facility using the 'commercial value (economic) method'. With this method, the cost equivalent of sales revenue for electricity (sold under market conditions) is deducted from the total costs of a producer of electricity by means of cogeneration, and heat is encumbered with the balance of the remaining costs. If the price determined in this way is competitive on the market, it is worth constructing the cogeneration facility. Otherwise, cogeneration is possible for captive electricity consumption, or existing support mechanisms may be used in construction (because of the reduction in fixed costs).

When modelling the suitability of cogeneration with the technology of an internal combustion engine fuelled by natural gas, current actual economic factors are used as a basis. Particularly significant factors in this respect are:

- the heat price on the heat market;
- the natural gas price;
- the feed-in price of electricity;
- the investment costs of the cogeneration facility, the method used to finance the investment;
- the operating parameters, and particularly the operating efficiency of the facility;
- the annual use of the installed capacity;
- specific operating costs.

The procedure set out in more detail in a separate document. [37]

3.5.2. Other measures addressing efficient heating and cooling (Article 14 of the EED)

The amendment to Act No 657/2004 on thermal energy by Act No 100/2014 expanded the compulsory assessment of the impact of the construction of new heat production facilities on the operation of existing efficient district heating systems and if, under the conditions laid down in the Act, the impact is negative, the competent body – the municipality or the Ministry of Economy – will not issue a construction permit.

[37] Economic and technical evaluation of district heating in Slovakia and comprehensive assessment of the national potential for district heating. Comprehensive assessment of the national potential for the application of high-efficiency cogeneration, December 2015.

Since 2014, municipalities operating a public a distribution system are required to ensure that the municipality's thermal energy development is updated within five years of the date on which Act No 100/2014 takes effect. The local district heating system objectives need to be clearly defined in the policy.

Where entities draw on financing from the Operational Programme Environmental Quality to draw up local low-carbon strategies,[38] thermal energy development is a compulsory part of the strategy.

For the further development of efficient district heating systems, financing was secured from the ESIF in the 2014-2020 programme in period for the construction and reconstruction of facilities for the use of RES, high-efficiency cogeneration facilities and heat distribution systems in order to increase the number of efficient district heating systems and, by adapting heat distribution systems to current demand for useful lead, to increase the efficiency of heat distribution.[39]

3.6. Energy transformation, transmission, distribution, and demand response

Assessments of the energy efficiency of electricity and gas infrastructure have been introduced in the form of an obligation for individual market participants doing business – in accordance with the requirements of Act No 251/2012 on energy – in the field of electricity and gas and operating electricity or gas infrastructure.

Electricity

In electricity, the energy efficiency potential of the transmission system operator and the distribution system operators was evaluated. Evaluations were carried out by entities contributing to the operation of the transmission system and distribution systems.

The transmission system operator, Slovenská elektrizačná prenosová sústava, a.s. (SEPS), has long been exploring measures to improve energy efficiency and make savings, taking into account – as its primary objective – the security and reliability of electricity supplies in its demarcated area, as well as compliance with international obligations stemming from its ENTSO-E membership. SEPS plans and implements investment projects to ensure the gradual replacement of morally and technically obsolete facilities, to ensure the reduced costs of operating and maintaining new facilities, and to increase economic efficiency. New electrical substations are commissioned as part of development activities.

It is important to stress, however, that there is only limited opportunity to tackle line losses because transit flows occasioned by the interconnection of markets in Europe are beyond active reach. Furthermore, the currently assigned system of capacity rights does not ensure the harmony of trade and physical flows in cross-border sections and across the Slovak transmission system.

[38] Operational Programme Environmental Quality, Priority Axis 4, Investment Priority 4.4, Measure 4.4.1A.
[39] Operational Programme Environmental Quality, Priority Axis 4, Investment Priorities 4.1 and 4.5.

Nevertheless, SEPS strives to lower losses by building new lines and renovating old ones so that impedance is decreased during transmission. Losses are also reduced by the phasing-out of the 220 kV system and its replacement with a 400 kV system, which also has a positive impact on lowering losses in this system.

The energy efficiency of electricity transmission is evaluated by reference to the annual balancing data for the transmission system.

Year	Electricity transmitted [GWh]	Share of losses in electricity transmitted [%]
2012	29 314.20	1.125
2013	28 276.81	0.975
2014	29 603.71	0.996

Transmission system losses are divided according to the individual components in the transmission chain in which the losses occur during electricity transmission.

Facility	Power dissipation [MW]	Electricity loss [%]
Transformers	5.945	18.29
Lines	39.926	77.73
Coils	1.029	3.98

As investment plans are defined in the Energy Act according to internal market rules, in November 2014 the transmission system operator (SEPS) drew up a Ten-year Transmission System Development Plan for 2015-2024, in which it set out investment plans for the next 10 years that encompassed requirements to safeguard electricity transmission, load management and network interoperability. The plan contains an overview of electrical substations, lines, the connections of large sources to the network, cross-border interconnections, compensation facilities – coils and transformers, with a description of their lifetime, the reliable operating time left, and the projected lifetime. This document can be found online at: http://www.sepsas.sk/seps/Dokumenty/ProgRozvoj/2016/03/DPR_PS_2016_2025.pdf

In Slovakia, electricity is currently distributed via three regional distribution systems (East, Central and West Slovakia) and approximately 150 local distribution systems. The energy efficiency of distribution systems is evaluated in accordance with a requirement under Act No 321/2014 on energy efficiency and in line with Implementing Decree of the Ministry of Economy No 88/2015 laying down the extent of the evaluation, the method of calculation and the values of the energy efficiency of energy sources and distribution systems, which superseded Implementing Decree No 428/2010. The average values of the energy efficiency of electricity distribution in Slovakia are set out in Table 19.

The distribution system operator is required to operate the distribution system securely and reliably while respecting applicable national legislation. Measures improving energy efficiency are defined in Slovak legislation. In particular, these are:

- The operator sends the calculation of the distribution system’s energy efficiency to the energy efficiency monitoring system;
- the introduction of smart metering systems in accordance with Implementing Decree No 338/2013;

- the installation of high voltage/low voltage transformers in accordance with Commission Regulation (EU) No 548/2014 on implementing Directive 2009/125/EC with regard to small, medium and large power transformers;
- the distribution system development plan, which, according to the Energy Act, distribution system operators with more than 100 000 offtake points must send to the Ministry of Economy every year;
- Methodological Guideline of the Regulatory Office for Network Industries No 05/12/2015 of 11 June 2015.

Table 19: Average electricity distribution efficiency

Year	Average electricity distribution efficiency [%]
2013	94.58
2014	95.47
2015	94.15

Basic measures to improve energy efficiency include the replacement and upgrading of existing facilities. These are measures that are carried out when facilities reach the end of their life, or earlier if the replacement of the facility would be economically effective soon after the replacement. In particular, this concerns the replacement of the transformers, usually at the end of their life or when the system is being expanded. A new transformer must comply with the requirements of Commission Regulation (EU) No 548/2014. Other measures include the installation and introduction of smart metering systems in the distribution systems, the reconstruction of electrical substations, the optimisation of the operation and number of transformers, depending on the projected offtake of electricity in the given system, the introduction of control and diagnostic processes in the system, reactive power compensation and the introduction of automatic compensation control, the replacement of EHV, HV and LV cabling, the mapping of distribution systems, the upgrading of connection boxes, the replacement of lighting with LED lights and the installation of movement sensors for lighting, the installation of devices for the remote collection of data, and improvements in the energy efficiency of the structures in which such facilities are located.

Approximately EUR 90 million is invested annually in these types of measures in the regional and local distribution systems. The amount of investment in the planned years hovers around this level. It seems likely that this trend will be maintained in the next 10 years.

Gas

In the gas sector, evaluations were carried out by the transmission system operator, distribution system operators and storage system operators.

The transmission system operator, eustream, a.s., carried out most of the key measures in 2005-2015. In particular, this included optimisation of the operation of the transmission system and optimisation of compressor technology. With the opening of the new Slovak-Hungarian interconnection and the Slovak-Ukrainian interconnection, and following the implementation of the project for a Slovak-Polish interconnection, as well as other projects interconnecting neighbouring states with bidirectional gas flows, such as the planned

eastring project, it will be necessary to harness opportunities to optimise operations involving such a comprehensive network.

Compressor operation optimisation made it possible to replace obsolete technology with new technology, which significantly increased the efficiency of compressors while cutting down on emissions. Operation optimisation makes it possible to increase the flexibility of the operation of compressor stations and the entire transmission system, and also safeguards secure, reliable and automated operation. Emission requirements under European legislation necessitated significant emission abatement, thereby improving the efficiency of network operations.

In the next 10 years, projects will be implemented to upgrade and reconstruct gas transmission technology, which in particular will involve the upgrading of the compressor station control system, the redesign of RENet compressor stations, further improvements in the precision and objectivity of measuring systems, improvements in operational safety, and better transmission system flexibility associated with new cross-border interconnections that have been opened in the past three years or are planned for the near future.

Gas is distributed by approximately 50 distribution system operators. The energy intensity of gas distribution is evaluated in accordance with Implementing Decree of the Ministry of Economy No 88/2015.

The average energy intensity of gas distribution (in MWh/MWh) was 0.012 in 2014 and 0.0006 in 2015.

The main measures planned in the next 10 years include the permanent shutdown of the heating of technological premises in control stations and the introduction of a switch-off and switch-on mode for the heating of the flow-through volume of natural gas, depending on the size of distribution, the exchange of boilers needed for gas heating, the reconstruction of control stations, optimisation of compressor performance, optimisation of the measurement and remote transmission of data, the optimisation of network pressure, the insulation of heat distribution systems and exchangers, improvements in the energy efficiency of heating operations in control stations, control of gas converters and preheating and gas heating, the control of route valves, pipeline leakage control and the additional insulation of pipelines, control of the switching-off of lighting and the introduction of smart metering systems in the distribution and supply of gas.

Storage system operators identified the following measures as the most important for them: optimisation of the operation of storage facilities, upgrading of the system for the monitoring and management of the productivity of machinery and technological units, and the possibility of reusing technological heat in operations. Operators of local distribution systems with short piping often reported no measures that they had planned for the next 10 years.

The necessary investment identified in the gas sector amounts to approximately EUR 30 million for the full 10-year period. Large investment projects for cross-border interconnections, as set out in the 10-year gas transmission system development plan (TYNDP), need to be added to that amount.

3.6.1. Energy efficiency criteria in network tariffs and regulation (Article 15 of the EED)

3.6.1.1. Description of planned or adopted measures to ensure that incentives in tariffs that are detrimental to the overall efficiency of the generation, transmission, distribution and supply of energy are removed (Article 15(4) of the EED)

According to Section 11(1), transmission system access and electricity transmission (d) and distribution system access and electricity distribution (e) are also subject to price regulation. The method used to calculate the maximum price can be found in an implementing decree of the Regulatory Office for Network Industries.[40]

3.6.1.2. Description of planned or adopted measures to incentivise system operators to enhance efficiency in the design and operation of infrastructure (Article 15(4) of the EED)

According to Section 9(1)(j) of Act No 250/2012, the Regulatory Office for Network Industries organises selection procedure for a supplier of technology that will increase the energy efficiency of systems or reduce electricity consumption, and for a supplier who will prepare the construction and construct new electricity facilities, for which economic incentives are provided.

3.6.1.3. Description of planned or adopted measures to ensure that tariffs allow suppliers to improve consumer participation in system efficiency, including demand response (Article 15(4) of the EED)

And Implementing Decree of the Regulatory Office for Network Industries on price regulation in the electricity sector favours, for the individual rates of tariffs, final electricity customers directly connected to the transmission system.[40]

3.6.2. Facilitation and promotion of the demand response (Article 15 of the EED)

According to Section 9(3)(a) of Act No 250/2012, the Regulatory Office for Network Industries, in cooperation with the Ministry of Economy, updates – initially by 31 December 2013 and thereafter every two years as at 30 June – methodological guidelines for electricity and natural gas undertakings on the optimisation of electricity and gas use, including the provision of services to electricity and gas customers that focus on improved efficiency in energy use, the application of prices and conditions for the supply of electricity and gas in a manner geared towards improved efficiency in energy use, the introduction of smart metering systems, and the upgrading of systems with a view to improving efficiency in energy use.[41]

3.6.3. Energy efficiency in system design and regulation (Article 15 of the EED)

Details can be found in a guidance note of the Regulatory Office for Network Industries.[41]

[40] For example, Implementing Decree of the Regulatory Office for Network Industries No 17/2017 establishing price regulation and certain conditions for the performance of regulated activities in the electricity sector.
[41] For example, Methodological Guideline No 05/12/2015 of 11 June 2015.

Conclusion and recommendations

On the one hand, the Fourth Energy Efficiency Action Plan assesses energy efficiency measures for 2014-2016 and the fulfilment of the set energy savings targets, and proposes planned energy efficiency measures for the next three-year period, with an outlook up to 2020, so that Slovakia's commitments can be met by 2020. A major emphasis is placed on bottom-up evaluations of energy efficiency measures by reference to specific projects, and on a detailed description of the evaluation methodology. The Fourth Action Plan, besides energy consumption measures, includes energy transformation, transmission and distribution measures.

The individual targets pursuant to Directives 2006/32/EC and 2012/27/EC, including their justification, were evaluated in the evaluation part in Chapter 1.

The data available for 2016 indicate that the energy savings target **established up to 2016 in accordance with Directive 2006/32/EC, amounting to 28 098 TJ, has not been met.** In the pursuit of this target, **26 178 TJ** was achieved, i.e. **93.2 %**. As for the fulfilment of the 2016 targets under the individual articles of Directive 2012/27/EU, it appears that energy consumption in Slovakia is currently on track for the **national indicative energy efficiency target set pursuant to Article 3 for 2020, but this could be compromised if fundamental changes are not made.** Another of the targets evaluated was the energy savings target for buildings; **this target, established in accordance with Article 5 of the Directive, was not met**. Central bodies of State administration must therefore take reasonable measures to comply with the target under the Government-approved 'Plans for the Renovation of Relevant Buildings'.

The last target to be evaluated in accordance with this Directive is the **final consumer energy savings target pursuant to Article 7, which was found not to have been fulfilled in 2016.** Consequently, the annual targets for 2017-2020 had to be revisited and were raised from **959.84 GWh per year** (the target as at 2016) to **1 019.49 GWh per year** (the target calculated as at 2017). One of the main reasons why the targets were not reached in 2016 was the persistent scarcity of public resources for energy efficiency measures (including resources for the renovation of the buildings of central bodies of State administration) and the delay in launching the implementation of projects financed by the European Structural and Investment Funds. Certain shortcomings in the implementation of measures also emerged in the industry and transport sectors. It should be noted that, **if arrangements are not made for the timely and complete uptake of the Structural Funds and other support mechanisms**, the target pursuant to Article 7 of the Directive could be compromised. Hence in the future the uptake of funding from these resources will have to be secured.

The second part of the document discussed the actual action plan for 2017-2019, with an outlook up to 2020. The proposals of planned energy efficiency measures for 2017-2019, and where appropriate up to 2020, drew on specific projects and support programmes in the individual sectors. The planning was configured so that, in all segments of the national economy, the targets under the various articles of Directive 2012/27/EU would be fulfilled. In the future, then, it will be necessary to focus on the rigorous implementation of support

mechanisms and to push more actively for the use of existing financial mechanisms. The most striking potential for energy savings continues to lie in industry and buildings.

As this implies that Slovakia is not fulfilling most of the targets that have been set, we propose the following recommendations, broken down by sector, for the ministries in whose purview the sectors lie.

Recommendations:

1. **Buildings sector** – actively champion the support of measures geared towards the energy performance of holdings. In particular:
    a. Continue promoting the insulation of multi-family buildings via the State Housing Development Fund and the insulation of single-family buildings via a budget heading of the Ministry of Transport and Construction and, in this support, seek out opportunities to favour deep renovation.
    b. Ensure that resources under the Operational Programme Environmental Quality and the IROP (2014-2020) are taken up as quickly as possible.
2. **Industry sector** – actively champion the support of measures geared towards energy intensity reductions in industry. In particular:
    a. Ensure that resources under the Operational Programme Environmental Quality and the Operational Programme Research and Innovation (2014-2020) are taken up as quickly as possible.
    b. Propose a method to support the implementation of measures deriving from energy audits for SMEs in the Bratislava Region.
    c. Continue supporting energy auditing in the Bratislava Region via a de minimis scheme.
    d. Intensify cooperation with professional organisations with a view to entering into voluntary agreements under which industrial enterprises commit themselves to energy-saving targets.
    e. In the provision of fiscal incentives, take into account the preference for projects impacting on energy savings.
    f. Propose new targeted instruments to promote reductions in energy intensity in the various branches of industry.
3. **Public sector** – the measures to date have not been configured sufficiently to ensure the fulfilment of the building-related target. If the target is to be pursued, other resources need to be secured to capitalise on the major potential for energy savings in this sector (in particular the renovation of buildings, but also public procurement) because they have long been undersized. Investments in the implementation of measures in this sector will also be reflected in lower public spending. In particular, this involves the following activities:
    a. Ensure that resources under the Operational Programme Environmental Quality and the IROP (2014-2020) for public buildings, including schools, are taken up as quickly as possible.
    b. Secure financing for the renovation of the buildings of central bodies of State administration and organisations within their purview. Arrange for this

through their budget headings. Sufficient resources need to be secured for deep renovation, not only for partial solutions to states of serious disrepair.

c. When financing the renovation of public buildings, ensure the efficient spending of public funds by taking account of the need for deep renovation and future energy cost savings.
d. Actively promote the principles of energy efficiency in public procurement, even where contracts are below the threshold, provided that this is cost-effective – especially in the letting of buildings, the procurement of leases of non-residential premises, vehicles, and building technical systems for heating and air-conditioning. Make subsequent arrangements for monitoring.
e. Actively promote solutions to accounting issues at European level if projects are financed via energy services.
f. Support the optimisation of energy consumption for central and local government entities.

4. **Transport sector** – ensure the active promotion of measures to reduce total energy consumption in transport, in particular by reducing the impact of individual motorised transportation, increasing the share of public passenger transport (or halting the trend towards individual motorised transportation), increasing the attractiveness and availability of functioning infrastructure for public passenger transport and non-motorised transport (especially cycling), and increasing the share of public freight transport in overall freight transport.
5. **Appliances sector** – actively promote the replacement of appliances, in particular by means of targeted information and awareness activities, and ensure the improved monitoring of the energy savings achieved.
6. **Energy transformation, transmission and distribution sector** – actively champion the support of measures geared towards energy intensity reductions. In particular:
    a. Ensure that resources under the Operational Programme Environmental Quality (2014-2020) are taken up as quickly as possible.
    b. Ensure that resources under the State aid scheme and de minimis scheme, deriving from the budget heading of the Ministry of Economy, are taken up.