SLOVAK REPUBLIC

SECOND BIENNIAL REPORT

in accordance with the decision 1/CP.16
and the decision 2/CP.17

Slovak Hydrometeorological Institute
Ministry of Environment of the Slovak Republic

Bratislava, December 18, 2015

PREFACE

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Version:	1. Version – Final
Date of submission:	December 18, 2015

CONTENTS:

PREFACE **2**

CONTENTS: **3**

1 INTRODUCTION **6**

2 INFORMATION ON GHG EMISSIONS AND TRENDS, GHG INVENTORY INCLUDING INFORMATION ON NATIONAL INVENTORY SYSTEM **7**

2.1 SUMMARY INFORMATION ON GHG EMISSIONS TRENDS 7

2.1.1 Overall GHG emissions trends *7*

2.1.2 Emissions trends by gases *10*

2.1.3 Emissions trends by main source and sink categories *11*

2.2 NATIONAL INVENTORY ARRANGEMENTS 15

3 QUANTIFIED ECONOMY-WIDE EMISSION REDUCTION TARGET **17**

3.1 QUANTIFIED ECONOMY-WIDE EMISSION REDUCTION TARGET 17

3.2 TARGET COMPLIANCE ARCHITECTURE 19

3.2.1 Monitoring Mechanism Regulation *19*

3.2.2 Monitoring and Reporting under the EU Emission Trading System *19*

3.3 OTHER EMISSIONS REDUCTION TARGET 20

3.4 PROGRESS TO QUANTIFIED ECONOMY-WIDE EMISSION REDUCTION TARGET 21

4 POLICIES AND MEASURES **24**

4.1 OVERARCHING POLICIES AND MEASURES: ESD AND EU ETS 24

4.1.1 EU Emission Trading System (EU ETS) *24*

4.1.2 Effort Sharing Decision *26*

4.2 OTHER CROSS-CUTTING POLICIES AND MEASURES 27

4.2.1 Energy Policy of the Slovak Republic adopted by the Governmental Resolution No 548/2014 ..... *27*

4.2.1 Biofuels Policy *27*

4.2.2 Taxation of Energy Products and Electricity *28*

4.2.3 Cross-cutting Policies and Measures no Longer in Place *29*

4.3 SECTORAL POLICIES AND MEASURES – ENERGY 29

4.3.1 National Renewable Energy Action Plan, Governmental Resolution No 677/2010 ..... *30*

4.3.2 Act No 258/2011 Coll. on the Geological Storage of Carbon Dioxide *30*

4.3.3 Energy efficiency Action plan for the period 2014-2016 with the outlook for 2020 (adopted in July 2014) *30*

4.4 SECTORAL POLICIES AND MEASURES: TRANSPORT 31

4.4.1 Tram fleet modernization in Bratislava and Kosice - Action Plan for Energy Efficiency 2011-2013, Governmental Resolution No 301/2011 Coll. *31*

4.4.2 Hybrid transport in cities - Action Plan for Energy Efficiency 2011-2013, Governmental Resolution No 301/2011 Coll. *32*

4.4.3 Modal shift to public transportation - Action Plan for Energy Efficiency 2011-2013, Governmental Resolution No 301/2011 Coll. *32*

4.4.4 Modal shift to public transport - Transport Policy of the Slovak Republic into 2015 ..... *32*

4.4.5 Improved transport behaviour and the road infrastructure - Transport Policy of the Slovak Republic into 2015 ..... *32*
4.4.6 Introduction of Euro 6 emission standards - Transport Policy of the Slovak Republic into 2015 ..... *33*
4.4.7 Governmental Regulation No 246/2006 Coll on the minimum quantity of fuels produced from renewable sources in the petrol and diesel fuels placed on the market in the Slovak Republic *33*
4.5 SECTORAL POLICIES AND MEASURES: INDUSTRIAL PROCESSES AND PRODUCT USE (IPPU) 33
4.5.1 Nitric acid production - Act No 414/2012 Coll. on Emission Trading in Amendments *33*
4.5.2 Aluminium production - Act No 414/2012 Coll. on Emission Trading in amendments *34*
4.5.3 Cement production - Act No 414/2012 Coll. on Emission Trading in Amendments *34*
4.5.4 Lime production - Act No 414/2012 Coll. on Emission Trading in Amendments *34*
4.6 SECTORAL POLICIES AND MEASURES: AGRICULTURE 35
4.6.1 Manure management - Ordinance of the Government of the Slovak Republic No 488/2010 Coll. on Conditions for Granting Subsidies in Agriculture through Direct Payments *35*
4.6.2 New manure management - Ordinance of the Government of the Slovak Republic No 488/2010 Coll. on Conditions for Granting Subsidies in Agriculture through Direct Payments *35*
4.6.3 Agricultural soils - Ordinance of the Government of the Slovak Republic No 488/2010 Coll. on conditions for granting subsidies in agriculture through direct payments *35*
4.6.4 Agricultural soils after the year 2015 - Ordinance of the Government of the Slovak Republic No 488/2010 Coll. on conditions for granting subsidies in agriculture through direct payments *35*
4.6.5 Reduced number of dairy cattle - Ordinance of the Government of the Slovak Republic No 488/2010 Coll. on conditions for granting subsidies in agriculture through direct payments *36*
4.6.6 New animal feeding policy implementation - Ordinance of the Government of the Slovak Republic No 488/2010 Coll. on conditions for granting subsidies in agriculture through direct payments *36*
4.7 SECTORAL POLICIES AND MEASURES: LAND USE, LAND USE CHANGE AND FORESTRY (LULUCF) 36
4.7.1 Rural Development Programme for the Period 2014-2020 ..... *36*
4.7.2 Forest Strategy / Forest Action Plan *36*
4.7.3 Forest measures within the Rural Development Policy *37*
4.7.4 LULUCF accounting *37*
4.8 SECTORAL POLICIES AND MEASURES: WASTE MANAGEMENT 37
4.8.1 Waste Management Plan 2011-2015 ..... *37*
4.8.2 Strategy on Reduction of Biodegradable MSW Disposal 2010 ..... *37*
4.8.3 Water Plan 2009-2015 ..... *38*
4.9 ASSESSMENT OF THE ECONOMIC AND SOCIAL CONSEQUENCES OF RESPONSE MEASURES 38
4.9.1 Adopted legislative measures: fiscal policy instruments *38*
4.9.2 Biofuels Policy *38*
4.9.3 GHG reduction policies *39*

5. PROJECTIONS 40
5.1 CONTEXT 40
5.2 SCENARIOS 40
5.3 KEY PARAMETERS AND ASSUMPTIONS 40
5.4 PROJECTIONS 41
5.4.1 Total aggregate GHG emission projections 41
5.4.2 Emission projections from sector energy excluding transport 45
5.4.3 Emission projections from transport sector 47
5.4.4 Emission projections from sector industrial processes and product use including F-gases 48
5.4.5 Emission projections from sector agriculture 49
5.4.6 Emission projections from sector land use, land use change and forestry 51
5.4.7 Emission projections from waste sector 51
5.4.8 Emission projections from memo items 52
5.4.9 Sensitivity analysis of the GHG emission projections for WEM scenario 53
5.5 SPECIFIC APPROACHES AND SOFTWARE MODELS FOR PARTICULAR SECTORS (METHODOLOGY) 53
5.5.1 Energy (except for transport) – model MESSAGE 53
5.5.2 Transport – model TREMOVE, COPERT IV and expert's judgment 55
5.5.3 Agriculture – expert's software tool 56
5.5.4 LULUCF – expert's software tool 56
5.5.5 Waste – expert's software tool 57
5.5.6 Description of the quality assurance and quality control activities 57
6. PROVISION OF FINANCIAL, TECHNOLOGICAL AND CAPACITY BUILDING SUPPORT TO DEVELOPING COUNTRIES 58
6.1 APPROACH OF SLOVAKIA TO PROVISION OF CLIMATE FINANCE, INLUDING THE PROVISION OF NEW AND ADDITIONAL RESOURCES 58
6.2 FINANCIAL RESOURCES 60
6.2.1 Provision of financial support through multilateral channels 60
6.2.2 Provision of financial support through bilateral channels 60
6.3 TECHNOLOGY DEVELOPMENT AND TRANSFER 60
6.3.1 Slovakia funded technology transfer initiatives and programme 60
6.4 CAPACITY BUILDING 61
6.4.1 Slovakia funded capacity building initiatives and programme 61

ANNEX 1: CTF TABLES FOR THE SECOND BIENNIAL REPORT OF THE SLOVAK REPUBLIC 62

1 INTRODUCTION

By the decision 2/CP.17 it was decided that the developed country Parties should enhance reporting in national communications and submit biennial reports outlining progress in achieving emission reductions and the provision of financial, technology and capacity-building support to non-Annex I Parties, building on existing reporting and review guidelines, processes and experiences.

This Second Biennial Report of the Slovak Republic (2BR SVK) was prepared under the decision 2/CP.17 of the Conference of the Parties under the UNFCCC.

As defined in the UNFCCC biennial reporting guidelines for developed country Parties and referring Annex I to UNFCCC decision 2/CP.17, the information is structured as follows:

- Information on GHG emissions and trends, and the GHG inventory including information on national inventory system (section 2);
- Quantified economy-wide emission reduction target (section 3);
- Policies and measures (section 4);
- Projections (section 5);
- Finance (section 6).

Tabular information as defined in the common tabular format (CTF) for the UNFCCC biennial reporting guidelines for developed country Parties (UNFCCC decision 19/CP.18) were submitted separately in the CTF Tables attached to this submission. For the CTF submission to the UNFCCC, the electronic reporting facility provided by the UNFCCC Secretariat has been used as required by UNFCCC decision 19/CP.18.

Tabular information and list of tables can be found in the Annex 1 of the 2BR of the Slovak Republic.

2 INFORMATION ON GHG EMISSIONS AND TRENDS, GHG INVENTORY INCLUDING INFORMATION ON NATIONAL INVENTORY SYSTEM

The legal basis for the compilation of the GHG inventory and the GHG inventory methodology as well as data availability is described in the National Inventory Report of the Slovak Republic 2015, chapter 1, submitted to the UNFCCC on November 13, 2015. The greenhouse gas data presented in this chapter are consistent with the 2015 GHG inventory submission of the Slovak Republic to the United Nations Framework Convention on Climate Change (UNFCCC) Secretariat submitted on November 6, 2015 in the CRF Tables.

Summary tables of GHG emissions of the Slovak Republic for emission trends by gas and by sector in the common tabular format are presented in the CRF Tables 1(a) and 1(b) in the CTF Tables attached to this submission. These data and the complete submissions of the Slovak Republic under the Regulation (EU) No. 525/2013 of the European Parliament and of the Council are also available on the website of the European Environmental Agency.[1]

2.1 SUMMARY INFORMATION ON GHG EMISSIONS TRENDS

2.1.1 OVERALL GHG EMISSIONS TRENDS

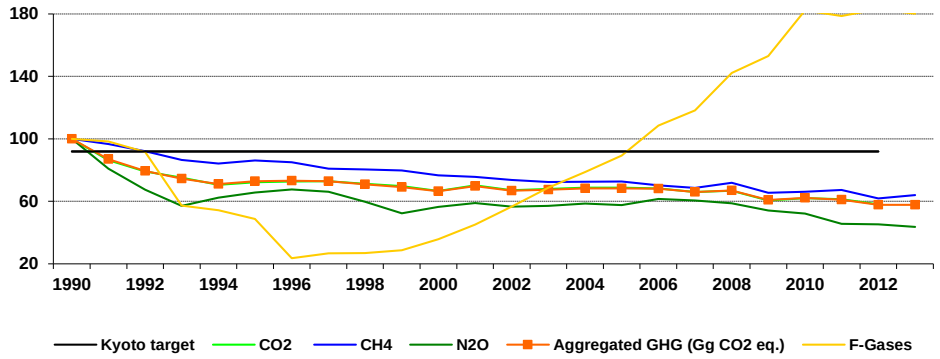
Total GHG emissions were 43 679.16 Gg of CO_2 equivalents in 2013 (without LULUCF). This represents a reduction by 42.17% against the base year 1990. In comparison with 2012, the emissions decreased by 0.06%. The decrease in total emissions of 2013 compared to 2012 was due to decrease in energy and industrial processes sectors in the reaction to lower export and demand. Further increase in the transport category and in consumption of F-gases (mainly HFCs and SF_6) emissions are expected. Unexpected increase occurred in agriculture and waste sectors, which can be explained by the later increase in economic activity after recession year 2009.

Total GHG emissions excluding LULUCF sector have continued to decrease from the base year with the moderate rate in the recent years. Significant changes in methodologies and emission factors were implemented to ensure consistency with the European Emission Trading Scheme (EU ETS), which represent significant progress in quality of estimation through comparison with the verified emissions for all installation included in the EU ETS. In the period 1990 – 2013, the total greenhouse gas emissions expressed in CO_2 equivalents in the Slovak Republic did not exceed the level of the base year 1990. Figure 2.1 shows trends in the gases without LULUCF comparable to the Kyoto target (92%) in relative expression. The emissions of F-gases are only gases which have increasing trend since 1990 due to the increasing use in industry.

Slovakia has reduced its emissions by around 9% between 2005 and 2014 approximated data. According to 2015 projections, Slovakia is on track to overachieve 2020 target, with a 17% margin between the projected emissions and its target, as compared to 2005.

[1] http://cdr.eionet.europa.eu/sk/eu/mmr/art07_inventory/ghg_inventory/

Figure 2.1: *GHG emission trends compared with the Kyoto target (%) in the Slovak Republic*

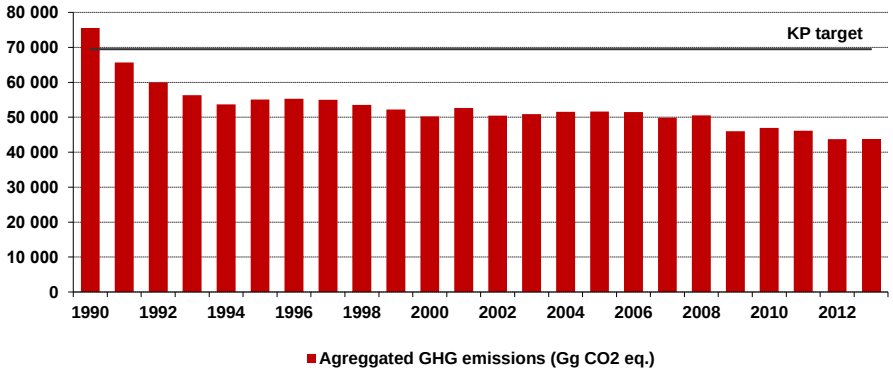


GHG emissions without LULUCF; emissions are determined as of 30.10.2015

Reduction of emissions in Slovakia is a result of combination of different impacts starting from impressive industrial and technological restructuring connected with the fuel switching of fossil fuels from coal and oil to the natural gas (air pollution legislation since 1991 was the main driving force), economy restructuring towards the less energy intensive production (mostly in recent years) and also by temporary changes in production intensity (driven by global and the EU markets). Transport (mostly the road transport), with continuously increasing emissions is an important exception. The continuous pressure is being made in formulating the effective strategy and policy to achieve further reduction of emissions in this sector too. For example, combination of regulatory and economic instruments (toll pay for freight vehicles based on their environmental characteristics, in combination with fuel and emission standards for new cars). The car tax system and the level of fuel taxation, which is close to the EU average, contribute to limit the increase of greenhouse gas emissions in the transport sector.

In Slovakia, trends observed in primary energy intensity could be partly explained by the economic crisis. In addition, structural changes in the manufacturing industry towards less energy intensive industries, such as machinery and automotive industry, can explain why after 2009 the energy consumption did not pick up the same pace as prior to that year, and which led to a significant decrease in primary energy intensity (the GDP grew twice as fast as primary energy consumption). Therefore, the trend observed particularly in primary energy consumption is mainly due to other factors, although some energy efficiency improvements did take place particularly during the period 2005 – 2008. The policy package as well needs significant improvements across sectors.

Figure 2.2: *The aggregated GHG emission trends compared with the Kyoto target (%)*



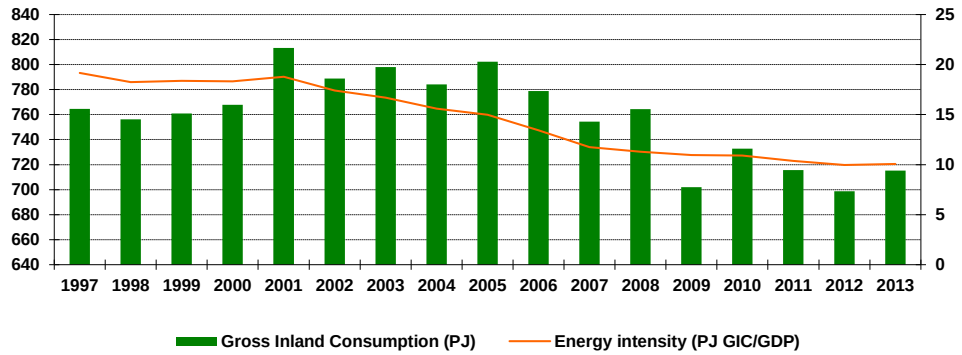
Aggregated GHG emissions without LULUCF; emissions are determined as of 15.11.2015

This important reduction of emissions has resulted above all from the strong although temporary decrease in economy activities, followed by restructuring of economy, joined with implementing new and more effective technologies, reducing the share of the intensive energy industry and increasing share of services in GDP generation. Transport (mostly the road transport), with increasing emissions is a significant exception.

Structural changes in energy sector and the implementation of economic instruments have played main role in achieving the current status, when the trend of GHG emissions does not copy the fast GDP growth. In this context, the most important measure seems to be the adoption of the national legislation on air quality, approved in 1991. The air quality legislation has initiated the positive trend in the reduction of the emissions of basic air pollutants, and indirectly also GHG emissions. At the same time, the consumption of primary energy resources as well as total energy consumption has decreased.

According to the statistical information from the Statistical Office of the Slovak Republic – information database SLOVSTAT, energy industry (production and distribution of electricity, natural gas and water) reached 12% share in total GDP of the Slovak Republic in 2013. Energy intensity is still higher than the average in the EU-15 (member states before 2004 enlargement), despite of its continual decrease. Reason for that is the adversely high share of energy intensive industry in GDP. This trend can be illustrated also by the indicator comparing the gross inland consumption (GIC) of energy resources with the GDP growth. Energy intensity is expressed in PJ/Bio Euro. The significant decrease in gross inland consumption was the result of gas crises from the beginning of 2009 and followed by the lack of resources in energy and iron and steel industry (coke production).

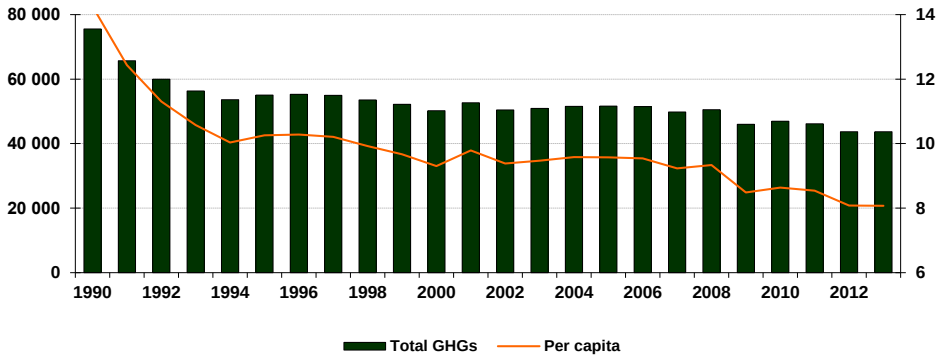
Figure 2.3: *The trend of energy intensity (right y axis) in the period 1997 – 2013 (estimated by the revised statistical approach NACErev.2)*



Beside the basic macroeconomic indicators as GDP, GDP per capita, foreign and domestic trade development, inflation, employment, there are also mentioned the data on the amount of investment in environmental protection and activities in the area of science and research, without specifying their orientation. The economic crisis that began in 2008 has brought a significant weakening of the external demand, causing a decreasing dynamics of the Slovak export, manufacturing, labour market and total domestic demand. The debt crisis in the Eurozone that broke out in 2012 again caused a decline in external demand.

Continuous pressure is being put on formulating the effective strategy and policy to achieve further reduction of the emissions. While the indicator of carbon intensity can be changed much more rapidly in the situation of a high economic growth, GHG per capita is a different case where you can get very impressive results even without any measures, just by higher population growth rate. But this is not the case of the Slovak Republic right now. It will take much longer time to change numerator by the impact of new technologies implementation namely in combination with high dynamic of development in the energy intensive industries.

Figure 2.4: *Total GHG emissions in Gg of CO_2 equivalents per capita in 1990 – 2013*



2.1.2 EMISSIONS TRENDS BY GASES

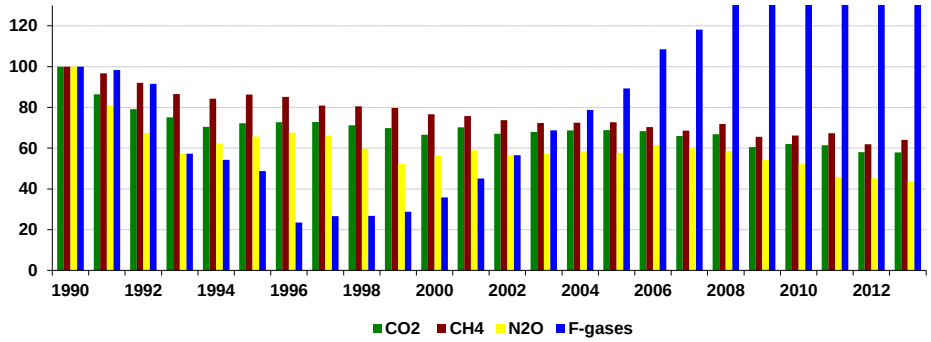
Total anthropogenic emissions of carbon dioxide excluding LULUCF have decreased by 42.06% in 2013 compared to the base year (1990). Nowadays the amount is 35 773.54 Gg of CO_2. Compared to the previous inventory year 2012, the decrease is 0.20%. The reason for the decrease in CO_2 emissions in 2013 is caused mainly by decreasing CO_2 emissions in energy and industrial processes sectors. In 2013, CO_2 emissions including LULUCF sector decreased by 47.09% compared to the base year, and they decreased by approximately 1.68% compared to the previous year caused by increase of removals in LULUCF sector in 2013.

Total anthropogenic emissions of methane without LULUCF decreased compared to the base year (1990) by 35.96% and currently the emissions are 4 527.81 Gg of CO_2 equivalents. In absolute value, CH_4 emissions were 181.11 Gg without LULUCF. Methane emissions from LULUCF sector are 0.36 Gg of CH_4 caused by forest fires. The trend has been relatively stable during the last years with a slight increase in the last year due to the emission increase from agriculture. Methane emissions peaked in 2002 due to the implementation of new waste legislation and increasing emissions from solid waste disposal sites in the Slovak Republic.

Total anthropogenic emissions of N_2O without LULUCF decreased compared to the base year (1990) by 56.10% and currently the emissions are 2 810.56 Gg of CO_2 equivalents. Emissions of N_2O in absolute value were 9.43 Gg without LULUCF. Emissions of N_2O from LULUCF sector are 0.05 Gg from forest fires and cropland. Emissions decreased compared to the previous year 2012 by 3.3% due to the decrease in energy and industrial processes sectors. The trend depends on the nitric acid production. Overall decreasing trend is mainly driven by the decrease in agriculture due to declining number of animals and making use of fertilizers.

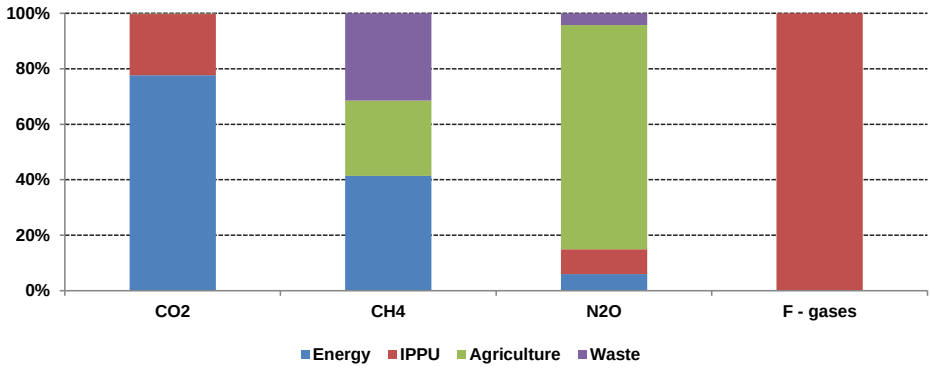
Total anthropogenic emissions of F-gases were 535.14 Gg of HFCs, 9.81 Gg of PFCs and 22.30 Gg of SF_6 in CO_2 equivalents. Emissions of HFCs have increased since 1995 due to the increase in consumption and the replacement of PFCs substances. Emission trend of PFCs is decreasing and emissions of SF_6 are slightly increasing due to the increasing consumption in industry.

Figure 2.5: *Emission trends by gas for the years 2000 – 2013 relative to the 1990 level (relative in %)*



The major share of CO_2 emissions comes from the energy sector (fuel combustion, transport) with the 77.72% share from the total carbon dioxide emissions in 2013 inventory, 22.07% of CO_2 is produced in industrial processes and product use sector and negligible amount is produced in waste (0.02%). The energy related CO_2 emissions from waste incineration are included in energy sector. The 31.46% of CH_4 emissions is produced in waste sector (SWDS), 41.43% of methane emissions is produced in energy sector and 27.08% in agriculture sector. More than 80.78% of N_2O emissions are produced in agriculture sector (nitrogen from soils), 8.98% in industrial processes sector (nitric acid production), 4.24% in wastewaters and 6.00% in energy sector. F-gases are produced exclusively in sector industrial processes (Figure 2.6).

Figure 2.6: *Emission trends by gas in sectors in 2013*



2.1.3 EMISSIONS TRENDS BY MAIN SOURCE AND SINK CATEGORIES

Aggregated GHG emissions from energy sector based on sectoral approach data in 2013 were estimated to be 29 846.42 Gg of CO_2 equivalents including transport emissions (6 842.59 Gg of CO_2 equivalents), which represent the decrease by 47.14% compared to the base year and 0.82% increase in comparison with 2012. Transport sub-sector decreased by 1.80% compared to 2012 and in comparison with the base year it raised by 0.07%.

Total emissions from industrial processes and product use sector were 8 717.87 Gg of CO_2 equivalents in 2013, which was decreased by 11.17% compared to the base year and the decreased by 3.34% compared to the previous year. This sector covers also emissions from solvents use.

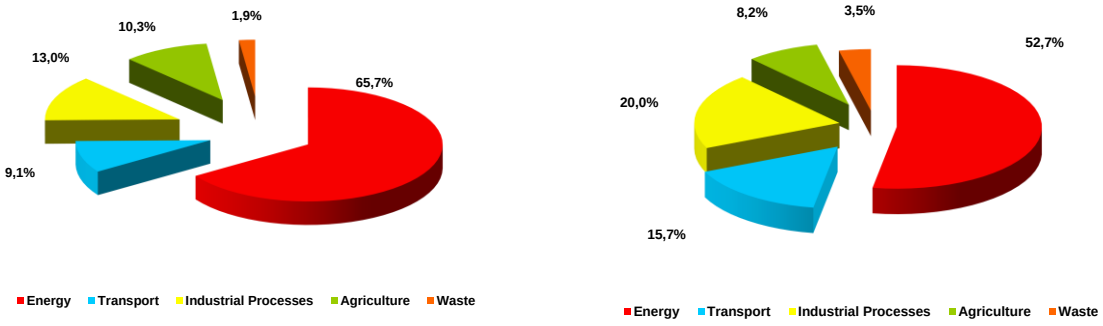
Emissions from agriculture sector were estimated to be 3 564.75 Gg of CO_2 equivalents. It is 54.24% decrease in comparison with the base year and 1.23% increase in comparison to the previous year. The agriculture sector is the sector with the most significant decrease compared to the base year 1990, because of the decreasing trend in cattle numbers and fertilisers use.

Emissions from waste sector were estimated to be 1 550.12 Gg of CO_2 equivalents. The decrease is 0.84% compared to the previous inventory year and the time series are stable for last years. Compared to the base year, the increase was more than 5.95%, because of increased methane emissions from solid waste disposal sites. The emissions from waste incineration with energy use are included into energy sector, category 1.A.1.a – energy industries, other fuels.

The comparison of the 2013 sectors share with the base year is shown on the following Figure 2.7. The significant decrease is visible in energy sector (without transport) and increase in waste and transport sectors. Emissions from international aviation and shipping are excluded from the national totals and therefore not presented here.

International bunker emissions of the inventory are the sum of the aviation bunker and maritime bunker emissions. These emissions are reported as memo items but excluded from national totals. Emissions of greenhouse gases from international aviation increased constantly between 1992 and 2008. Between 2009 and 2013 international bunker emissions decreased, partly reflecting the economic recession. Total GHG emissions from international transport reached 99.42 Gg of CO_2 equivalents in 2013. Emissions from international aviation have more than 95% share.

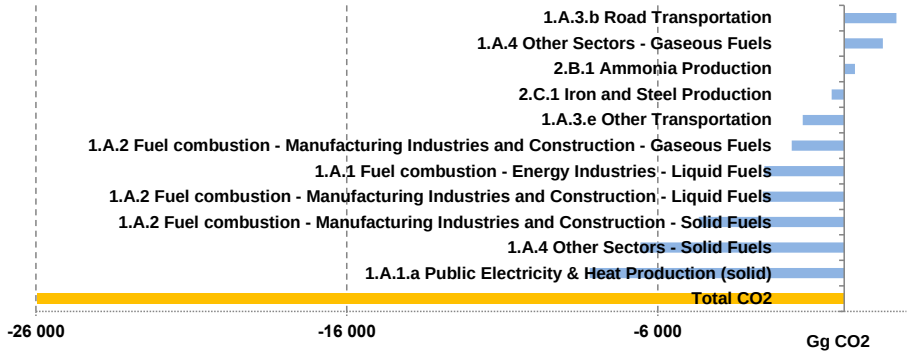
Figure 2.7: *The share of individual sectors in total GHG emissions in 1990 and 2013*



CO_2 emissions from the category 1.A.3.b - Road Transportation – diesel fuel are the largest key source accounting for 17% of total CO_2 emissions without LULUCF in 2013. Between 1990 and 2013, CO_2 emissions in road transportation increased by 1.68 Mt of CO_2, which is 37% increase due to an increase in fossil fuel consumption in this key category (Figure 2.8). Since 1990, the large increase in 'road transportation' related CO_2 emissions was recognized.

Figure 2.8 below, solid fuels from the category 1.A.1.a - Public Electricity & Heat Production is the third largest key category without LULUCF (14%) and the largest decrease (62%) is between 1990 and 2013. The main explanatory factors of emissions decrease is in improvements in energy efficiency and (fossil) fuel switching from coal to gas. A shift from solid and liquid fuels to mainly natural gas took place and an increase of biomass and other fuels has been recorded.

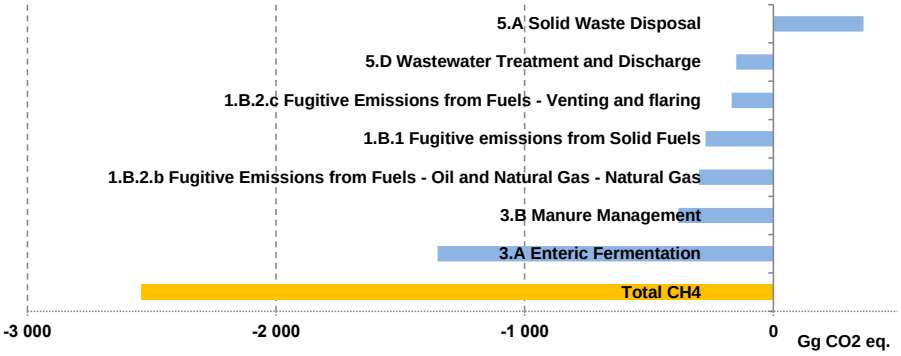
Figure 2.8: *Absolute change of CO_2 emissions by large key categories 1990 to 2013*



CO_2 emissions from solid fuels in the category 2.C.1 - Iron and Steel Production are the largest key category without LULUCF in the IPPU sector, accounting for 11% of total CO_2 emissions in 2013. CO_2 emissions from the category 1.A.2.a in energy sector are the fourth largest key source in the Slovak Republic, accounting for 9% of total GHG emissions in 2013. Between 1990 and 2013, emissions from this category showed the increase by 19%.

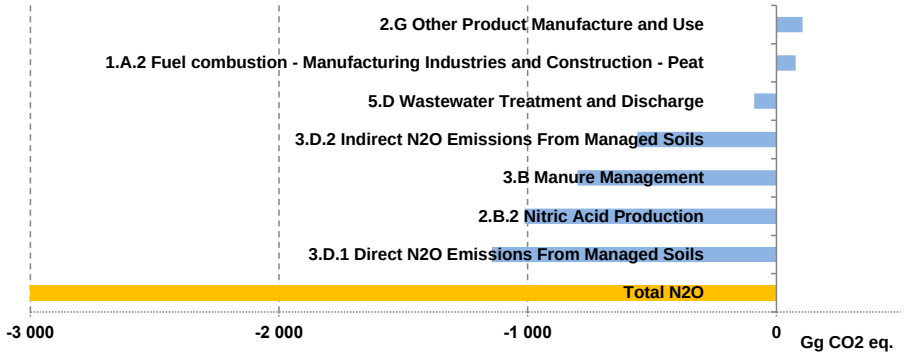
Methane emissions account for 10% of total GHG emissions in 2013 and decreased by 35% since 1990 to 101.72 Gg CH_4 in 2013. The two largest key sources (5.A Solid Waste Disposal on Land at 23% and 3.A Enteric Fermentation at 23% of total CH_4 emissions in 2013) account for 40% of CH_4 emissions in 2013. Figure 2.9 shows that the main reasons for declining CH_4 emissions were reductions in "enteric fermentation of dairy and non-dairy cattle" mainly caused by the decreased of animal numbers and use reductions in "coal mining". Figure 2.9 shows significant decrease in the category 3.A and 3.B and increase in waste sector caused by the change of IPCC methodology used for solid waste disposal sites which considers time layer since 1960.

Figure 2.9: *Absolute change of CH_4 emissions by large key categories 1990 to 2013*



N_2O emissions are responsible for 6.4% of total GHG emissions and decreased by 56% to 9.43 Gg of N_2O in 2013 (Figure 2.10). The two largest key sources causing this trend – 3.D.1 Direct N_2O Emissions from Managed Soils 51% and 3.B Manure Management at 16% of total N_2O emissions in 2013. The main reason for large N_2O emission cuts were reduction measures in the "nitric acid production" and decreasing agricultural activities (Figure 2.10).

Figure 2.10: *Absolute change of N_2O emissions by large key categories 1990 to 2013*



Fluorinated gas emissions account for 1.3% of total GHG emissions. In 2013, emissions were 567 Gg CO_2 equivalents, which was 80% above 1990 levels. The largest key source is 2.F.1 Refrigeration and Air Conditioning and accounts for 89% of fluorinated gas emissions in 2013. HFC emissions from the consumption of halocarbons showed large increases between 1990 and 2013. The main reason for this is the phase-out of ozone-depleting substances such as chlorofluorocarbons under the Montreal Protocol and the replacement of these substances with HFCs (mainly in refrigeration, air conditioning, and foam production and as aerosol propellants). On the other hand, PFC emissions decreased substantially. The decrease has started in 1996 and was the strongest in 1999 and 2000.

The Slovak Republic has selected threshold values for the forest definition for reporting on the activities afforestation, reforestation and deforestation under Article 3, paragraph 3 and 4 of the Kyoto Protocol for the required single minimum values for tree crown cover, land area and tree height in accordance with the forest definition used for reporting to the FAO. Table below presents an overview on these selections. The definitions for the second commitment period are the same as for the first commitment period.

Table 2.1: *Slovak Republic's selection of threshold values for the forest definition for reporting under Article 3 paragraph 3 and 4*

SLOVAK REPUBLIC	Minimum value for tree crown cover	Minimum tree height	Minimum area for forest land area
	20%	5 m	0.3 ha

Article 3, paragraph 4 of the Kyoto Protocol provides the option to include the activities forest management, cropland management, grazing land management and revegetation in the accounting of the commitments for the first commitment period. In the second commitment period all Parties included in Annex I have to account for anthropogenic greenhouse gas emissions by sources and removals by sinks resulting from any activity under Article 3, paragraph 4, elected in the first commitment period, and for forest management (Decision 2/CMP 7, Annex, Paragraph 7).

For the second commitment period, new accounting rules apply for the accounting of emissions and removals in the LULUCF sector. In particular, forest management has become a mandatory activity and additional activities for wetland drainage and rewetting can be chosen as an additional activity. Guidelines for these new rules were developed by the IPCC and adopted by the UNFCCC in decision 6/CMP.9. Subsequently, the accounting rules were almost entirely transferred into EU law in form of the EU LULUCF Decision 529/2013/EU.

For the second commitment period forest management is a mandatory activity under Article 3.4 of the Kyoto Protocol, which will be accounted against a forest management reference level, i.e. a country-specific level of business-as-usual emissions or removals. RMUs will be issued only if forest

management removals are higher, or emissions are lower, than the agreed forest management reference level. Otherwise, Kyoto units will be cancelled. The Table 2.2 contains information on the forest management reference levels as inscribed for Slovakia in the appendix to the annex to decision 2/CMP.7.

In 2013, total CO_2 removals from afforestation/reforestation activities were -443.11 Gg of CO_2 eq. (changes in 36.15 kha to the end of 2013). Total CO_2 emissions from deforestation were 43.03 Gg of CO_2 eq. (changes in 8.12 kha to the end of 2013). In 2013, total removals under the Article 3.3 of the KP were -400.08 Gg of CO_2 eq. with the changed area of 44.27 kha. Net removals from FM activity were 6 764.35 Gg of CO_2 eq.

Table 2.2: *Emissions and removals (Gg of CO_2 eq.) in 2013 resulting from activities under Article 3.3 and 3.4 of Kyoto Protocol*

Activities	2013	2014	2015	2016	2017	2018	2019	2020	Total
A. Article 3.3 activities	**-391.83**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**-391.83**
A.1 Afforestation/ Reforestation	-434.86	NA	NA	NA	NA	NA	NA	NA	-434.86
A.2 Deforestation	43.03	NA	NA	NA	NA	NA	NA	NA	43.03
B. Article 3.4 activities	**6 764.35**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**6 764.35**
B.1 Forest Management	6 764.35	NA	NA	NA	NA	NA	NA	NA	6 764.35
Forest management reference level (FMRL)	*358.00*	*NA*	*NA*	*NA*	*NA*	*NA*	*NA*	*NA*	*358.00*
Technical corrections to FMRL	*NA*	*NA*	*NA*	*NA*	*NA*	*NA*	*NA*	*NA*	*NA*
Forest management cap	*21 149.29*	*NA*	*NA*	*NA*	*NA*	*NA*	*NA*	*NA*	*21 149.29*

2.2 NATIONAL INVENTORY ARRANGEMENTS

The main institutions involved in the compilation of the GHG inventory of the Slovak Republic together with their relationships and linkages for data flows are described in the SVK National Inventory Report 2015, Chapter 1 and in the Chapter 3.3 of the 6th National Communication of the Slovak Republic.

The Ministry of the Environment of the Slovak Republic (http://www.minzp.sk/) is the main body to ensure conditions and to monitor progress of Slovakia to meet all commitments and obligations of climate change and adaptation policy. It is responsible for development and implementation of national environmental policy including climate change and air protection objectives. It has the responsibility to develop strategies and further instruments of implementation, such as acts, regulatory measures, economic and market based instruments for cost efficient fulfilment of adopted goals.

According to the Governmental Resolution No 821/2011 Coll. from 19th December 2011, the inter-ministerial High Level Committee on Coordination of Climate Change Policy was established. This Committee is created at the state secretary level and replaced previous coordinating body, i.e. the High Level Committee on Climate-Energy Package established in August 2008. Committee is chaired by the State Secretary of the Ministry of Environment, other members are the state secretaries of the Ministry of Economy, Ministry of Agriculture and Rural Development, Ministry of Transport, Construction and Regional Development, Ministry of Education, Science, Research and Sport, Ministry of Health, Ministry of Finance, Ministry of Foreign Affairs and the Head of the Regulatory Office for the Network Industries.

Articles 4 and 12 of the UNFCCC require the Parties to the UNFCCC to develop, periodically update, publish, and make available to the Conference of the Parties their national inventories of anthropogenic emissions by sources and removals by sinks of all greenhouse gases not controlled under the Montreal Protocol. Moreover, the commitments require estimation of emissions and

removals as a part of ensure that Parties are in compliance with emission limits, that they have a national system for estimation of sources and sinks of greenhouse gases, that they submit an inventory annually, and that they formulate national programs to improve the quality of emission factors, activity data, or methods.

The obligation of the Slovak Republic to create and maintain the national inventory system (NIS) which enables continual monitoring of greenhouse gases emissions is given by Article 5, paragraph 1 of the Kyoto Protocol. The National Inventory System of the Slovak Republic (http://ghg-inventory.shmu.sk/) has been established and officially announced by Decision of the Ministry of Environment of the Slovak Republic on 1st January 2007 in the official bulletin: Vestnik, Ministry of Environment, XV, 3, 2007.[2] In agreement with paragraph 30(f) of Annex to Decision 19/CMP.1 which gives the definitions of all qualitative parameters for the national inventory systems, the description of quality assurance and quality control plan according to Article 5, paragraph 1 is also required. The revised report of the National Inventory System dated on November 2008 was focused on the changes in the institutional arrangement, quality assurance/quality control plan and planned improvements.

Since the 6th National Communication of the Slovak Republic on Climate Change and the First Biennial Report of the Slovak Republic minor changes within the National Inventory System have occurred, which led to higher robustness, more institutionalization and increase of capacity involved in the preparation of the annual GHG inventories. Major changes have been:

- Increasing number of training and meeting comprising the whole National Inventory System throughout the years, including experts from other EU countries and some stakeholders.
- Framework Agreement between the Ministry of the Environment of the Slovak Republic and the Statistical Office of the Slovak Republic on direct access to the relevant statistical data collected in the energy sector – in force since September 2012 an updated and increasing annually.
- On the meeting of High Level Committee on Coordination of Climate Change Policy the Ministry of the Environment and the Ministry of Agriculture and Rural Development of the Slovak Republic agreed to facilitate the task of implementation of reporting obligations under the UNFCCC and LULUCF sectors under the Kyoto Protocol in 2013. Every year since, the Ministry of Agriculture and Rural Development of the Slovak Republic publishes contracts with its subordinate organisations at the web page of the ministry which helps to maintain this task.
- Enhancement of external inspections by the Ministry of the Environment to control implementation of the QA/QC procedures and improvements in the Plan of Inventory.
- Established procedure for improvement of the QA/QC procedures and Plan on Inventory according to the ERT`s recommendations from the most recent and previous reviews.
- Inventory planning for 2014: Improvement Plan and Prioritization on the basis of the outcomes and recommendations from the Report of the individual review of the annual submission of Slovakia submitted in 2013.
- Approval and publication of the Approval of the National Adaptation Strategy of the Slovak Republic.

[2] "Vestnik" (Official Journal of the Ministry of Environment), XV, 3, 2007, page 19: National inventory system of the Slovak Republic for the GHG emissions and sinks under the Article 5, of the Kyoto Protocol

3 QUANTIFIED ECONOMY-WIDE EMISSION REDUCTION TARGET

The Slovak Republic, as a one of the EU Member State, participate in the EU 2020 emission reduction target under the UNFCCC and the compliance architecture set up within the EU in order to meet that target, and gives an overview of other EU emission reduction targets. The Slovakia also inform about national circumstances and the progress in the fulfilment of the national emission reduction target.

3.1 QUANTIFIED ECONOMY-WIDE EMISSION REDUCTION TARGET

In 2010, the EU submitted a pledge to reduce its GHG emissions by 2020 by 20% compared to 1990 levels (UNFCCC, 2014a). As this target under the convention has only been submitted by EU-28 and not by each of its Member States (MS), there are no specified convention targets for single MS. Due to this, Slovakia as part of the EU-28, takes on a quantified economy-wide emission reduction target jointly with all Member States.

With the 2020 climate and energy package the EU has set internal rules which underpin the implementation of the target under the Convention. The 2020 climate and energy package introduced a clear approach to achieving the 20% reduction of total GHG emissions from 1990 levels, which is equivalent to a 14% reduction compared to 2005 levels. This 14% reduction objective is divided between two sub-targets, equivalent to a split of the reduction effort between ETS and non-ETS sectors of two thirds vs one third (EU, 2009[3]). More detailed information on the SK target is given in CTF Table 2 attached to this submission.

Under the revised EU ETS Directive[4], one single EU ETS cap covers the EU Member States and the three participating non-EU Member States (Norway, Iceland and Liechtenstein), i.e. there are no further differentiated caps by country. For allowances allocated to the EU ETS sectors, annual caps have been set for the period from 2013 to 2020; these decrease by 1.74% annually, starting from the average level of allowances issued by Member States for the second trading period (2008-2012). The annual caps imply interim targets for emission reductions in sectors covered by the EU ETS for each year until 2020. For further information on the EU ETS and for information on the use of flexible mechanisms in the EU ETS see the EU-BR1, Chapter 4.2.2.

Non-ETS emissions are addressed under the Effort Sharing Decision (ESD)[5]. The ESD covers emissions from all sources outside the EU ETS, except for emissions from international maritime, domestic and international aviation (which were included in the EU ETS from January 1, 2012) and emissions and removals from land use, land-use change and forestry (LULUCF). It thus includes a diverse range of small-scale emitters in a wide range of sectors: transport (cars, trucks), buildings (in particular heating), services, small industrial installations, fugitive emissions from the energy sector, emissions of fluorinated gases from appliances and other sources, agriculture and waste. Such sources currently account for about 60% of total GHG emissions in the EU.

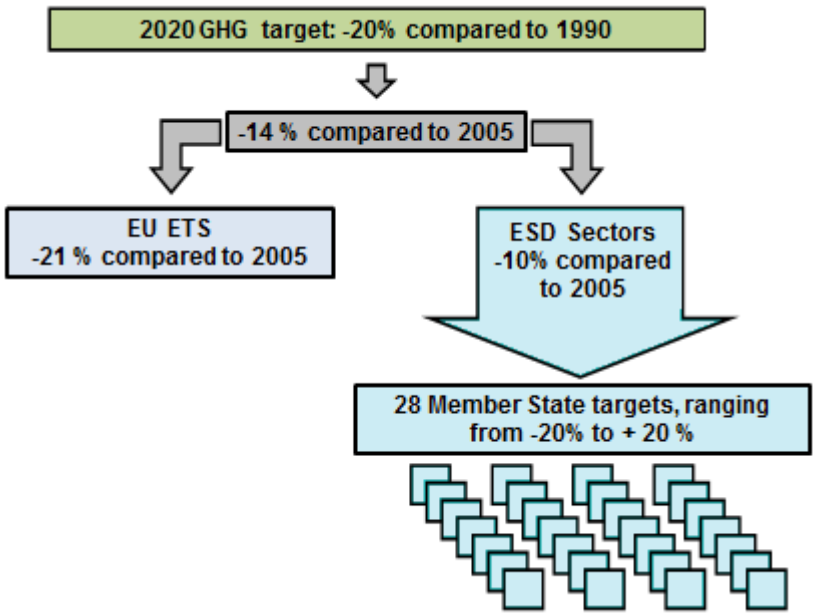
The distribution of the total target across the ETS and ESD is shown on the Figure 3.1.

[3] Directive 2009/29/EC of the European Parliament and of the Council of 23 April 2009 amending Directive 2003/87/EC so as to improve and extend the greenhouse gas emission allowance trading scheme of the Community (OJ L 140, 05.06.2009, p. 63);

[4] Directive 2009/29/EC of the European Parliament and of the Council amending Directive 2003/87/EC so as to improve and extend the greenhouse gas emission allowance trading scheme of the Community;

[5] Decision No 406/2009/EC.

Figure 3.1: *GHG targets under the 2020 climate and energy package*



Source: European Commission

While the EU ETS target is to be achieved by the EU as a whole, the ESD target was divided into national targets to be achieved individually by each Member State. In the Effort Sharing Decision national emission targets for 2020 are set, expressed as percentage changes from 2005 levels. For Slovakia, this percentage changes from 2005 levels are +13%. These changes have been transferred into binding quantified annual reduction targets for the period from 2013 to 2020 (EC 2013),[67] expressed in Annual Emission Allocations (AEAs). The quantified annual reduction targets 2013-2020 of Slovakia are set from 22.9 million AEAs in 2013, and increasing to 25.4 million AEAs in 2020. In the year 2013 verified emission of stationary installations covered under the EU-ETS in Slovakia summed up to 21.8 Gg CO_2 equivalents. With total GHG emissions of 43.7 Gg CO_2 equivalents (without LULUCF) the share of EU ETS emissions is around 50%.

The monitoring process is harmonized for all European MS, especially laid down in the Monitoring Mechanism Regulation.[8] The use of flexible mechanisms is possible under the EU ETS and the ESD. For the use of CER and ERU under the EU ETS, please refer to the Second Biennial Report of the European Union.

The ESD allows Member States to make use of flexibility provisions for meeting their annual targets, with certain limitations. There is an annual limit of 3% for the use of project-based credits for each MS. Slovakia hasn't got a plan to make use of flexibility provisions under the ESD yet. If these credits are not used in any specific year, the unused part for that year can be transferred to other Member States or be banked for own use until 2020.

[6] Commission decision of 26 March 2013 on determining Member States' annual emission allocations for the period from 2013 to 2020 pursuant to Decision No 406/2009/EC of the European Parliament and of the Council (2013/162/EU).

[7] Commission Implementing Decision of 31 October 2013 on the adjustments to Member States' annual emission allocations for the period from 2013 to 2020 pursuant to Decision No 406/2009/ EC of the European Parliament and of the Council (2013/634/EU).

[8] Regulation (EU) No 525/2013 of the European Parliament and of the Council of 21 May 2013 on a mechanism for monitoring and reporting greenhouse gas emissions and for reporting other information at national and Union level relevant to climate change and repealing Decision No 280/2004/EC.

3.2 TARGET COMPLIANCE ARCHITECTURE

For the monitoring of GHG emissions at the EU and the Member State level, the Monitoring Mechanism Regulation has been adopted (see below). Also for the effective operation of the EU ETS, robust, transparent, consistent and accurate monitoring and reporting of greenhouse gas emissions are essential, therefore an annual procedure of monitoring, reporting and verification (MRV) is implemented. Installations and aircraft operators have to monitor, report and verify their annual emissions in accordance with two EU Regulations, the Monitoring and Reporting Regulation (MRR) and the Accreditation and Verification Regulation (AVR).

3.2.1 MONITORING MECHANISM REGULATION

The Monitoring Mechanism Regulation No 525/2013 (MMR) was adopted in May 2013 and entered into force on July 8, 2013. The main aims of the MMR are to improve the quality of the data reported and assist the EU and Member States with the tracking of their progress towards emission targets for 2013 – 2020. The mechanism refers to the following reporting elements:

- Reporting on historical GHG emissions and removals, including national and Union inventory systems and approximated inventories;
- Reporting on low-carbon development strategies;
- Reporting on policies and measures and on projections of GHG emissions and removals
- Member States reporting on financial and technology support provided to developing countries;
- Member States' use of revenues from the auctioning of allowances in the EU ETS;
- Member States' reporting on adaptation to climate change.

In 2014 the Implementing Regulation (EU) No 749/2014 and Delegated Regulation (EU) No 666/2014 were adopted to enable the implementation of the Monitoring Mechanism Regulation in several of its provisions, specifying in more detail the structure of the information, reporting formats, and submission procedures.

3.2.2 MONITORING AND REPORTING UNDER THE EU EMISSION TRADING SYSTEM

The reform of the EU Emission Trading System in Phase III (2013-2020) has resulted in important changes with regard to domestic institutional arrangements for the monitoring and reporting of GHG emissions under the EU ETS. EU ETS MRV now requires complying with two Commission Regulations, one specific to monitoring and reporting (EU No 601/2012) and the other to verification and accreditation (EU No 600/2012). The latter introduces a framework of rules for the accreditation of verifiers to ensure that the verification of an installation's or an aircraft operator's emission report is carried out by a verifier that possesses the technical competence to perform the entrusted task in an independent and impartial manner and in conformity with the requirements and principles set out. These regulations have direct legal effect in the Member States and their provisions apply directly to operators or aircraft operators, verifiers, and accreditation parties. The regulations provide clarity on the roles and responsibilities of all parties (i.e. industrial installations and aircraft operators are required to have an approved monitoring plan) which will strengthen the compliance chain.[9]

[9] http://ec.europa.eu/clima/policies/ets/monitoring/documentation_en.htm

3.3 OTHER EMISSIONS REDUCTION TARGET

In addition to the EU target under the Convention, the EU also committed to a legally binding quantified emission limitation reduction commitment for the second commitment period of the Kyoto Protocol (2013 – 2020). In the Table 3.1 all relevant GHG reduction targets for the EU and their key facts are displayed in an overview. On the left, the table includes the international commitments under the Kyoto Protocol and the UNFCCC. On the right, the Slovakia commitments under the EU Climate and Energy Package and the proposed framework on climate and energy policies until 2030 are included.

Table 3.1: *Overview and comparison of international and EU targets for Slovakia*

ITEM	INTERNATIONAL COMMITMENTS			EU DOMESTIC LEGISLATION	
	KYOTO PROTOCOL		UNFCCC	CLIMATE AND ENERGY PACKAGE	
				EU ETS	ESD
target year or period	First Commitment Period (2008-2012)	Second Commitment Period (2013-2020)	2020	2013-2020	2013-2020
emission reduction target	-8%	-20%	-20%	-21% compared to 2005 on the EU level	Annual targets trajectory with the +13% target in 2020
further targets	-	-	Conditional target of -30% if other Parties take on adequate commitments	Renewable Energy Directive: 14% share of renewable energy of gross final energy consumption in 2020; Energy Efficiency Directive: : indicative target to decrease Final Energy Consumption to 378 PJ and Primary Energy Consumption to 686 PJ in 2020	
base year	1990 1990 for F-gases	2000 (for NF_3)	1990	1990 for overall emission reduction target; 2005 for renewable energy and energy efficiency target; as well as for targets broken down into ETS and non-ETS emissions	
LULUCF	Included ARD and other activities not elected	Included ARD and forest management, other activities not elected	Excluded	Excluded	
aviation	Domestic aviation included. International aviation excluded.	Domestic aviation included. International aviation excluded.	Aviation in the scope of the EU ETS included. In practice total aviation emissions considered.	Domestic and international aviation, as in the scope of EU ETS	Aviation generally excluded, some domestic aviation included (operators below ETS de Minimis thresholds)
use of international credits	Use of KP flexible mechanisms subject to KP rules	Use of KP flexible mechanisms subject to KP rules	Subject to quantitative and qualitative limits	Subject to quantitative and qualitative limits, as set in EU Regulation 1123/2013.	The annual use of credits by Slovakia shall not exceed a quantity equal to 3 % from 2005 levels.
carry-over of units from preceding periods	Not applicable	Subject to KP rules including those agreed in the Doha Amendment	Not applicable	EU ETS allowances can be banked into subsequent ETS trading periods since the second trading period	No carry-over from previous period
gases covered*	CO_2, CH_4, N_2O, HFCs, PFCs, SF_6	CO_2, CH_4, N_2O, HFCs, PFCs, SF_6, NF_3	CO_2, CH_4, N_2O, HFCs, PFCs, SF_6	CO_2, CH_4, N_2O, HFCs, PFCs, SF_6	

ITEM	INTERNATIONAL COMMITMENTS			EU DOMESTIC LEGISLATION	
	KYOTO PROTOCOL		UNFCCC	CLIMATE AND ENERGY PACKAGE	
				EU ETS	ESD
sectors included	Annex A of KP energy, IPPU, agriculture, waste, LULUCF according to KP accounting rules for CP1	Annex A of KP energy, IPPU, agriculture, waste, LULUCF according to accounting rules for CP2	Energy, IPPU, agriculture, waste, aviation in the scope of the EU ETS	Power & heat generation, energy-intensive industry sectors, aviation (Annex 1 of ETS directive)	Transport (except aviation), buildings, non-ETS industry, agriculture (except forestry) and waste
GWPs used	IPCC SAR	IPCC AR4	IPCC AR4	IPCC AR4	

* NF_3 emissions are not occurring in Slovak inventory for the 2000 – 2013

3.4 PROGRESS TO QUANTIFIED ECONOMY-WIDE EMISSION REDUCTION TARGET

For the quantification of the progress to 2020 targets, the development of GHG emissions is the key indicator. The Convention target of a reduction of emissions by 20% from 1990 to 2020 only refers to the emissions of the EU-28 as a whole. GHG emissions of EU-28 are calculated as the sum of MS emissions. With this, GHG emissions of Slovakia are part of EU-28 emissions with a percentage of 0.98% in the year 2013.

The development of GHG emissions in Slovakia is reported in CTF Table 4. Emissions in the sector of LULUCF are not included under the convention target, therefore they are not included in CTF Tables 4 and 4(a). The latter shall be filled with “NA” for not applicable, with the explanation “Numbers for LULUCF are not reported because this sector is not included under the Convention target”.

The use of flexible mechanisms takes place on the one hand by operators in the EU ETS, on the other hand by governments for the achievement of ESD targets. For information on the use in the ETS please see the Second Biennial Report of the European Union. The use of flexible mechanisms in Slovakia currently takes place only by operators in the EU ETS. Slovakia is not planning to use AEA units in the ESD scheme for meeting the annual trajectory target.

The use of flexible mechanisms under the ESD cannot be quantified in the moment: As the compliance assessment for the first year 2013 under the ESD will only take place in 2016, any potential use of units for the first year will only take place in 2016.

Slovakia can only report that no units have been used under the ESD so far and that it hasn’t got any plans to make use of flexibility provisions under the ESD for now. Slovakia is well on the track to achieve 2020 targets set-up in the frame of the European quantified-wide economy target. Following table includes progress in main indicators achieved in 2013.

Table 3.2: *Progress of the Slovak Republic in achievement of 2020 targets in 2013*

Indicator	1990	2005	2013	2020	Targets in 2020
GHG emissions in sector ETS (%) change between year 2005	**NA**	**0%**	**-13.47%**	**-21%**	**No national target**
GHG emissions in sector ESD (%) change between year 2005	**NA**	**0%**	**-17.15%**	**+13%**	**+13% in comparison with the level of 2005**
Total share of RES in gross final energy consumption (%)	**NA**	**7.5%**	**10.9%**	**15.3%***	**14% RES on final energy consumption**

Indicator	1990	2005	2013	2020	Targets in 2020
Final energy consumption (%) change between average of years 2001 – 2005	**NA**	**-5.03%**	**-6.32%**	**-9.04%***	**-11% on the average years 2001 – 2005**

* National targets defined in the national action plans can differ from the targets set up in legislation

Slovakia is well on track for meeting its emission reduction targets resulting from international and EU commitments. In 2013 anthropogenic GHG emissions decreased by 42.17% compared to 1990. Considering EU commitment for sectors covered by the European Emission Trading Scheme (EU ETS) and sectors not covered by the EU ETS and covered by the Effort Sharing Decision (ESD) to decrease its emissions by 20% compared to 1990 Slovakia is also on the track to meet its commitments. GHG emissions in the ETS decreased in 2013 by 13.47% compared to 2005 and ESD emissions, even Slovakia has positive target of 13% up to 2020, decreased in 2013 by 17.15% compared to 2005.

With regard to other targets resulting from Renewable Energy Directive Slovakia is also on track to meet its EU commitments. The share of Renewable Energy Sources on gross final energy consumption in 2013 was 10.9% (with EU target of 14% or 15.34% national target respectively in 2020).

Considering the indicative target set by Energy Efficiency Directive Slovakia has a non-binding target of -11% compared to the average Final energy consumption in years 2001-2005. Within its national commitment the target for the year 2020, taking into consideration reference scenario of Slovak Energy Policy, is 378 PJ which means -9.04%. However saving scenario indicates -13.51% in 2020. With the revision of Energy Efficiency Directive the targets will be changed to help to reach the EU commitment to decrease its energy efficiency by 20% up to 2020.

First commitment period of the Kyoto Protocol (CP1) ended in 2012. As of January 2013, the additional period for fulfilling commitments under the Kyoto Protocol, also known as the “true-up” period began. In 2013 and 2014 the reporting under SEF and SIAR successfully continued and the final annual inventory of CP1 was submitted in 2014.

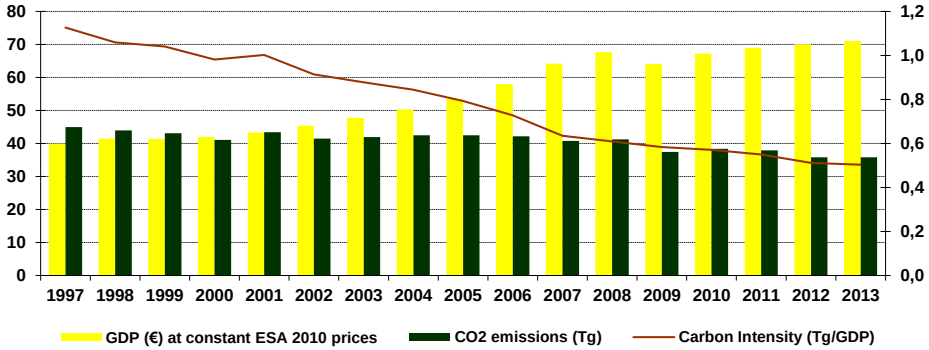
According to the emission inventory submitted in November 15, 2015, the Slovak Republic total anthropogenic emissions of greenhouse gasses expressed as CO_2 equivalent decreased by 42.17% without LULUCF, compared to the base year 1990. This achievement is the result of impacts of several processes and factors, mainly:

- Higher share of services on the GDP.
- Technological restructuring and change in structure of industries.
- Higher share of gaseous fuels on consumption of primary energy resources.
- Gradual decrease in energy consumption for certain energy intensive sectors (except for metallurgy).
- Impact of air protection legislation which regulates directly or indirectly generation of greenhouse gas emissions.
- Global economic and financial crises started in 2009 and the short term crises in oil and natural gas supply from Ukraine at the beginning of 2009 (January-February).

Table 3.3: *Decrease of carbon intensity per GDP in the Slovak Republic since 1998*

Year	1998	1999	2000	2001	2002	2003	2004	2005
GDP in Bio € at ESA 2010 prices	41.48	41.39	41.90	43.29	45.33	47.78	50.29	53.57
CO_2 emission in Tg	43.93	43.10	41.10	43.39	41.44	41.93	42.44	42.48
Carbon Intensity (Tg/GDP)	1.06	1.04	0.98	1.00	0.91	0.88	0.84	0.79
Year	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**
GDP in Bio € at ESA 2010 prices	58.00	64.19	67.69	64.11	67.20	69.02	70.13	71.13
CO_2 emission in Tg	42.20	40.73	41.23	37.42	38.34	37.91	35.84	35.77
Carbon Intensity (Tg/GDP)	0.73	0.63	0.61	0.58	0.57	0.55	0.51	0.50

Figure 3.1: *Comparison of CO_2 emissions per GDP (carbon intensity)*



The Slovak Statistical Office, Dpt. of National Accounts. Within the revision of annual national accounts, ESA 2010 methodology was implemented and reference year was changed from 2005 to 2010 constant prices.

4 POLICIES AND MEASURES

In the European Union and their Member States, there are two distinct levels of policies and measures (PAMs) that have an impact on greenhouse gas emissions:

- *European Union policies, which are proposed by the Commission and subsequently approved, amended or rejected by the Council of the European Union and the European Parliament. These common and coordinated policies and measures are applicable to all Member States, though Member States may implement Directives at different points in time. The EU's National Communication concentrates on these common and coordinated policies and measures.*
- *National policies developed and implemented by the Member States themselves. Therefore we are submitting in the Second Biennial Report of the Slovak Republic brief overview of the most significant climate related PAMs on the EU level together with information on specific national PAMs implemented, adopted or planned to reduce emissions.*

4.1 OVERARCHING POLICIES AND MEASURES: ESD AND EU ETS

4.1.1 EU EMISSION TRADING SYSTEM (EU ETS)

Phase one was a three-year pilot period of learning-by-doing to prepare for phase two, when the EU ETS would need to function effectively to help ensure that the EU and Member States meet their Kyoto Protocol emission targets.

Before the start of the first one, the Slovak Republic had had to decide how many allowances to allocate to each EU ETS installation on its territory. This was done through the first National Allocation Plan. The Slovak Republic prepared and published the National Allocation Plan by May 1, 2004. The European Commission's Decision on the Phase I National Allocation Plan of Slovakia was adopted on October 20, 2004. Statistics from the phase one:

- 175 installations;
- 38 installations closed their accounts;
- 1 installation's permit revoked.

Table 4.1: *Statistics from the Phase I of the National Allocation Plan*

Year	2005	2006	2007
Allocation	30 299 021	30 357 450	30 357 404
Verified emissions	24 892 813	25 200 029	24 153 151

Source: Ministry of the Environment

The EC Decision on the Phase II National Allocation Plan of Slovakia was adopted on November 29, 2006 and amended with decision from December 7, 2007.

Statistics from the phase two:

- 193 installations;
- 30 installations closed their accounts;
- 1 installation's permit revoked.

Table 4.2: *Statistics from the Phase II of the National Allocation Plan*

Year	2008	2009	2010	2011	2012
Allocation	32 166 094	32 140 581	32 356 123	32 617 164	33 432 258
Verified emissions	25 336 706	21 595 209	21 698 625	22 222 534	20 932 903

Source: Ministry of the Environment

Free allocation decreases each year in the Phase III of the EU ETS. Manufacturing industry will receive 80% of its allowances for free in 2013, a proportion that will decrease in linear manner each year to 30% level in 2020. The Slovak Republic has notified the list of installations covered by the Directive in its territory to Commission on August 17, 2012.

- New Entrants Reserve

A maximum of 5% of the EU-wide quantity of allowances over the period of 2013 to 2020 will be reserved to new entrants. To this day, the Slovak Republic registers three official requests.

- New Entrants Reserve 300

None of carbon dioxide capture and geological storage or innovative renewable project from Slovakia has participated at New Entrants Reserve 300 first or second announcement.

- Auctioning

Auctioning is a new way of distributing allowances in the phase three. Preliminary the auctioning started in 2012 with auctioning of 120 million EUAs, from which the Slovak Republic's share was 1.8 million EUAs. The auctions are held at the European Energy Exchange every Monday, Tuesday and Thursday. The whole auction revenue is an income of the Environmental Fund of the Slovak Republic from 2015.

Table 4.3: *The Slovak Republic's revenue from auctions during the period 2012 – 2015*

Period	Jan.-Oct. 2015	2014	2013	2012
	EUR			
Slovak Republic Revenue (EUAs)	69 709 410	57 590 625	61 702 620	12 193 290
Slovak Republic Revenue (EUAAs)	172 550	44 590	-	-
Total SVK Revenue	69 881 960	57 635 215	61 702 620	12 193 290

- Backloading

Backloading is a term used for describing the process to temporarily withhold larger amount of allowances from the auctions in years 2014-2016 and loading them back to the auctions in years 2019-2020. The main objective is to eliminate current surplus of the allowances in the EU ETS and to ensure the rise of carbon price on the market.

- Connecting the EU ETS with other GHG trading schemes, i.e. linking

In Directive 2009/29/EC are provisions which enable to link the EU ETS with other similar schemes created at regional or national levels outside the EU. Currently the negotiations related to linking are on-going between the EU and Australia and the EU and Switzerland.

- MSR

Market stability reserve (MSR) was introduced as long term solution to fight the existing surplus of allowances within the EU ETS. It is an automated mechanism that will automatically decrease the

auctioning volume of the allowances if there is a significant surplus on the market. If there will be need for additional allowances the MSR will be used to increase the auctioning volume. The MSR will be operational from 2019 and all backloaded allowances will become part of this reverse. This will cause continuous increase of carbon price in the EU ETS and stable environment for investors for the next decade.

4.1.2 EFFORT SHARING DECISION

The Effort Sharing Decision[10] establishes annual targets for GHG emissions of Member States between 2013 and 2020, which are legally binding and only refer to GHG emissions that are not included within the scope of the EU ETS, i.e. transport (except aviation), buildings, agriculture (excluding LULUCF) and waste. Each Member State must define and implement national policies and measures, such as promotion of public transport, energy performance standards for buildings, more efficient farming practices and conversion of animal waste to biogas, to limit the GHG emissions covered by the Effort Sharing Decision. Emission limit for the Slovak Republic is +13% by 2020 compared to 2005 levels.

According to GHG emission trends and projections in Europe 2014,[11] projections show that Slovakia could achieve its individual 2020 targets in the sectors not covered by the EU ETS with the current set of domestic policies and measures. Analysis of the trend of total anthropogenic emissions shows stabilization after year 2009 (economic recession), however, the emissions have still not reached the level from previous years, which indicates not fully recovered Slovak economic performance.

Transport and residential heating are the most treated sectors covered and regulated under the ESD.

Total aggregated GHG emissions in transport are at the same level as in the base year, although emissions in road transportation have been increased by 36% in comparison with the base year and emissions in pipeline transport decreased accordingly. Transport contributes 23% to the total GHG emissions (in CO_2 equivalents) and it shows increasing trend since 2000. Therefore, it is necessary to pay attention to the introduction of effective policies and measures for control and reduction of road transport emissions in Slovakia.

Table 4.4: *Evaluation of the ETS and ESD GHG emissions in 2013*

REPORTING YEAR 2013 SUBMITTED IN NOVEMBER 2015					
Category	**Unit**	**Total GHG Emissions**	**ETS emissions**	**ESD emissions**	**Ratio ETS/ESD in %**
GHG emissions	Gg of CO_2 eq.	43 679.16	21 829.40	21 849.76	49.98/50.02
Emissions of CO_2	Gg	35 773.54	21 690.20	14 083.34	60.63/39.37
Emissions of N_2O	Gg	2 810.56	129.40	2 681.16	4.60/95.40
Emissions of PFCs	Gg of CO_2	9.81	9.81	0.00	100%

Projected progress to 2014 – 2020 targets in ESD

Based on approximated emission estimates for 2014, emissions covered by the Effort Sharing Decision (ESD) (i.e. in the sectors which are not covered by the EU ETS) are expected to be below the annual ESD target in 2014. National projections also indicate that 2020 ESD emissions are expected to be below the 2020 ESD target, with the current existing measures (Table 4.5).

[10] Decision 406/2009/EC
[11] http://www.eea.europa.eu/publications/trends-and-projections-in-europe-2014

Table 4.5: *Progress towards GHG targets Decision (ESD emissions) based on projections*

2014 ESD target (% vs 2005)	+2.3%
2020 ESD target (% vs 2005)	+13.0%
2014 ESD proxy emissions (% vs 2005)	-17.7%
2020 ESD projections WEM (% vs 2005)	-15.4%
2020 ESD projections WAM (% vs 2005)	-19.4%

Source: proxy inventory published in July 2015

4.2 OTHER CROSS-CUTTING POLICIES AND MEASURES

4.2.1 ENERGY POLICY OF THE SLOVAK REPUBLIC ADOPTED BY THE GOVERNMENTAL RESOLUTION NO 548/2014

The Energy Policy of the Slovak Republic (Energy Policy) is the strategic document defining the energy sector's primary objectives and priorities to 2035 with a view to 2050. The Energy Policy is a component of Slovakia's national economic strategy given that ensuring sustainable economic growth is conditioned by the reliable supply of affordable energy. The Ministry of Economy of the Slovak Republic is responsible for completing the Energy Policy. The Energy Policy is intended to ensure the sustainability of the Slovak energy sector to contribute to the sustainable growth of the national economy and its competitiveness. The priority from this perspective is ensuring the reliability and stability of energy supply, efficient energy utilization at optimum costs and ensuring environmental protection. A well-functioning energy market with a competitive environment will be strengthened by Energy Policy implementation. As a result, the Energy Policy signals certain measures aimed at decreasing final electricity prices, including the phase-out by 2020 of feed-in tariffs for electricity from renewable energy sources, focus on the use of renewable energy sources in the production of heat, and certain efficiency-enhancing changes to feed-in tariffs applicable to the co-generation of electricity and heat.

GHG affected: CO_2, CH_4 and N_2O

Type of the measure: regulatory

4.2.1 BIOFUELS POLICY

Directive of the European Parliament and of the Council 2009/28/EC on the promotion of energy from renewable sources and amending and subsequently repealing Directives 2001/77/EC and 2003/30/EC was adopted on April 23, 2009. The body responsible for the implementation of the Directive is the Ministry of Economy of the Slovak Republic. The Ministry of the Environment is responsible for the area of compliance with sustainability criteria for biofuels and bioliquids, calculations to determine the impact of biofuels and bioliquids on quantities of greenhouse gas emissions and calculation of greenhouse gas emissions released during the life cycle of fossil fuels. The measures necessary for the functioning within the system at the national level have been developed by the National Action Plan for Renewable Energy, adopted by the Resolution of the Government No. 677/2010 in 2010.

The Slovak Republic transposed articles 17, 18 and 19 of the Directive 2009/28/EC and substantively identical articles 7b, 7c and 7d of the Directive 2009/30/EC by the Act No. 136/2011 Coll.

Amendment of the Act addresses the basic roles and responsibilities of the competent authorities and economic operators in the context of demonstrating compliance with the sustainability criteria for biofuels and bioliquids, which are the conditions for their accounting towards the national target for renewable energy sources.

Ordinance of the Ministry of Environment No. 271/2011 Coll. establishing sustainability criteria and targets to reduce greenhouse gas emissions from fuels came into force on September 1, 2011. The ordinance deals with the details of proving compliance with the sustainability criteria for biofuels and bioliquids.

For assessing compliance with the sustainability criteria throughout the production chain of biofuels and bioliquids, the European legislation institute of voluntary schemes was established, while these schemes are not subject to national approval and national control and each member country has to accept the results of these verification schemes unreservedly.

Ordinance of the Ministry of Agriculture and Rural Development No. 295 Coll. of September 6, 2011 laying down detailed declaration of producer and supplier of biomass for producing biofuels or bioliquids came into force on October 1, 2011. The Slovak Republic introduced a national system of demonstrating compliance with the sustainability criteria for biofuels and bioliquids. The system is based on independent verifiers whose training is organized and who are subject to mandatory examination and registration.

GHG affected: CO_2, CH_4 and N_2O

Type of the measure: regulatory

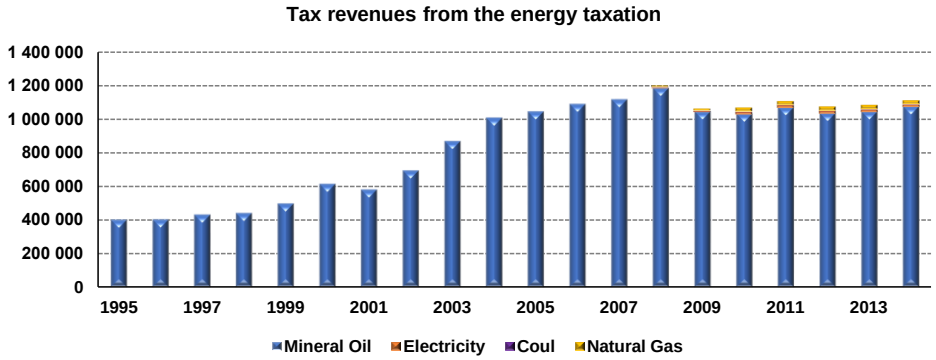
4.2.2 TAXATION OF ENERGY PRODUCTS AND ELECTRICITY

The most significant in terms of generating tax revenue, is the tax on mineral oils. Income from electricity, coal and natural gas is relatively low (Figure 4.1). The Slovak Republic raises relatively little revenue from environmentally related taxes and the implicit tax rate (Figure 4.2) on energy is low. There is substantial scope for environmentally related tax reforms. Heating and process energy use accounts for the largest share in total energy use and CO_2 emissions in the Slovak Republic. As a result, a more harmonized tax treatment of heating and process energy use would raise substantial tax revenues and provide incentives to mitigate CO_2 emissions. This could be achieved by increasing taxes on all fuels used for heating and processing up to the standard rate per unit of energy for natural gas. Ad quantum excise duties could also be indexed for inflation to help prevent the decline in environmentally related tax revenues in real terms over time. Moreover, the Slovak Republic should consider eliminating the gasoline-diesel taxation differential. A gradual increase in the taxation of diesel could also be used to lower the burden from direct taxes, although there might be limited scope for such an increase in the short run without similar rate increases in neighbouring countries to prevent fuel tourism. Company cars should also be taxed more effectively within the PIT. Lastly, the support for electricity production with lignite should be eliminated. Instead, the tax on electricity consumption could be increased and the exemption of the electricity tax for households could be abolished to increase incentives for a more efficient use of electricity. The government could compensate lower income households through targeted tax or benefit measures.

GHG affected: CO_2, CH_4 and N_2O

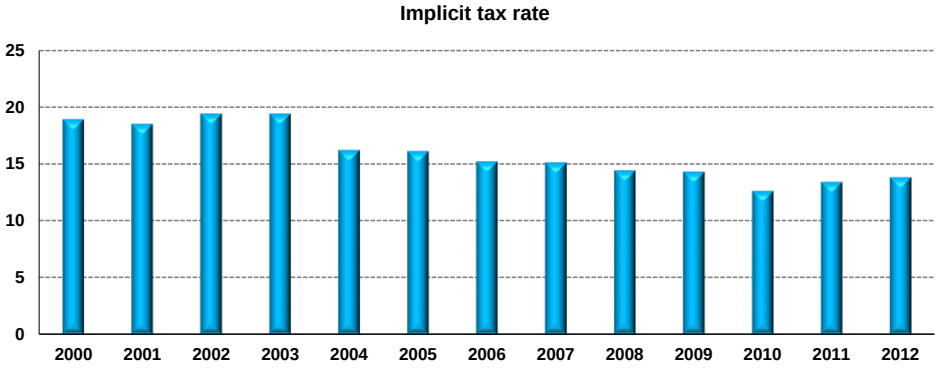
Type of the measure: regulatory

Figure 4.1: *Tax revenues from energy products taxation*[12]



Source: Ministry of Finance of the Slovak Republic

Figure 4.2: *Development in implicit tax rate on energy products in Slovakia in 2000 – 2012*



Source: Eurostat, Ministry of Finance of the Slovak Republic

4.2.3 CROSS-CUTTING POLICIES AND MEASURES NO LONGER IN PLACE

There are none of PAMs with significant effect on GHG emission reduction cancelled in Slovakia without its replacement.

4.3 SECTORAL POLICIES AND MEASURES – ENERGY

Majority of policies within this sector presented in the Sixth National Communication of the Slovak Republic on Climate Change (2013) are still relevant. In addition to legislative instruments on emission trading, Act No. 137/2010 Coll. on air protection as amended plays an important role. This act is complemented with the Act No. 401/1998 Coll. on charges for air pollution as amended which serves for control and regulation of emission limits for basic air pollutants. Monitoring and keeping records on emissions from stationary air polluting sources, as well as the system of fees and charges, that is mandatory for the operators of medium and large scale sources of air pollution, have positively affected greenhouse gas emissions reduction and contributed to decoupling (greenhouse gas emissions do not follow the growth of GDP) of emission trajectory in Slovakia since 1997.

[12] http://ec.europa.eu/taxation_customs/resources/documents/taxation/gen_info/economic_analysis/tax_structures/2015/report.pdf

4.3.1 NATIONAL RENEWABLE ENERGY ACTION PLAN, GOVERNMENTAL RESOLUTION NO 677/2010

Impact of the renewable energy sources in heat and electricity generation. The increase in consumption of biomass for the production of electricity and heat. Implementation of Wind, PV and geothermal energy sources caused decrease of GHG and NG import.

GHG affected: CO_2, CH_4, and N_2O

Type of the measure: regulatory, economic

Start year of implementation: 2013

Implemented in scenario: WEM

4.3.2 ACT NO 258/2011 COLL. ON THE GEOLOGICAL STORAGE OF CARBON DIOXIDE

The Carbon Capture and Storage Directive establish a legal framework for the environmentally safe geological storage of CO_2 to facilitate and encourage the development of an important mitigation measure to reduce CO_2 emissions. Article 2 of the Directive states that the legislation will apply to all geological formations located within the EU that store CO_2 and the requirements will need to be enforced over the entire lifetime of a storage site. Geological storage of CO_2 below 100 kiloton threshold only for the purposes of research and development are exempted from the legislation.

Act defines legal and technological conditions for carbon dioxide capture and geological storage as obligatory measure for newly build electricity generation sources with installed capacity higher than 300 MW. The act governs legal obligations and procedures for individual stakeholders and state administration related to the processes and monitoring of capture and storage of industrial CO_2 emissions in geological formations.

GHG affected: CO_2

Type of the measure: regulatory, economic

Start year of implementation: 2013

Implemented in scenario: WAM

4.3.3 ENERGY EFFICIENCY ACTION PLAN FOR THE PERIOD 2014-2016 WITH THE OUTLOOK FOR 2020 (ADOPTED IN JULY 2014)

Energy efficiency measures in buildings are considered as the most cost effective measures with high potential to be realized in Slovakia. Action plan contain groups of measures described below.

GHG affected: CO_2, CH_4, and N_2O

Type of the measure: economic, regulatory

Start year of implementation: 2014

Implemented in scenario: WEM, WAM

The action plan is divided in the following steps in term of implementation. Therefore also different parts of implementations were considered in WEM and WAM scenarios:

Implemented in WEM scenario:

- Improvements in the thermal performance of buildings - family houses. Renovation family houses with saving energy need at least 20%. Measures financed from owner sources and through the banking sector;
- Improvements in the thermal performance of buildings - residential buildings. Renovation of residential buildings. State Housing Fund was established in 1997 under Act no. 124/1996 Coll. the State Housing Development Fund, providing support for the expansion and modernization of the housing stock, particularly in the form of profitable long-term loans.
- Improvements in the thermal performance of buildings - residential buildings. Housing reconstruction saving energy need at least 20%. The measure follows the initiative "Project JESSICA - the financial engineering", which started in 2013 under the financing agreement signed between the State Housing Fund and the Ministry of Agriculture and Rural Development.
- Energy Performance Certificates of residential buildings: Improvements in the thermal performance of buildings - residential buildings. Housing reconstruction saving energy need at least 20% is based on a database of energy performance certificates (source: IS INFOREG), while the upper limit of the energy class A is considered in the original condition of a residential building energy saving is the difference between the energy supplied and the condition of the dwelling house.
- Improvements in the thermal performance of buildings – public service and office buildings; hotels and restaurants; wholesale and retail trade; schools, school facilities; hospitals. Renewal of the selected type buildings saving energy need at least 20%. Measures financed from own resources.

Implemented in WAM scenario:

- Improved measures from WEM scenario
- Implementation of new low-energy standard for family houses.
- Implementation of new low-energy standard for residential buildings.
- Decrease of the energy consumption in public sector.
- SlovSEFF II: Improvements in the thermal performance of buildings - residential buildings. The measure is a continuation SlovSEFF I.
- SlovSEFF III: The measure is a continuation SlovSEFF I and II. Improvements in the thermal performance of buildings - residential buildings. This follows a similar program it SlovSEFF III.

4.4 SECTORAL POLICIES AND MEASURES: TRANSPORT

4.4.1 TRAM FLEET MODERNIZATION IN BRATISLAVA AND KOSICE - ACTION PLAN FOR ENERGY EFFICIENCY 2011-2013, GOVERNMENTAL RESOLUTION NO 301/2011 COLL.

Public transportation in Bratislava capital and in Kosice will improved trams fleet with receiving of 15 one-directional trams and 15 bi-directional trams. The part of tender was also maintenance. New trams will be delivered gradually until the end of the year 2015.

GHG affected: CO_2, CH_4, and N_2O

Type of the measure: regulatory and economic

Status: in force since 2011

Implemented in scenario: WEM, WAM

4.4.2 HYBRID TRANSPORT IN CITIES - ACTION PLAN FOR ENERGY EFFICIENCY 2011-2013, GOVERNMENTAL RESOLUTION NO 301/2011 COLL.

Purchase of low floor hybrid buses for Public transport in selected cities (Zilina, Bratislava, and Košice).

GHG affected: CO_2,

Type of the measure: regulatory and economic

Status: in force since 2011

Implemented in scenario: WEM, WAM

4.4.3 MODAL SHIFT TO PUBLIC TRANSPORTATION - ACTION PLAN FOR ENERGY EFFICIENCY 2011-2013, GOVERNMENTAL RESOLUTION NO 301/2011 COLL.

Support of public transport development and use, including support for the creation of integrated transport systems. The measure consists of the implementation of integration transport system projects in Bratislava capital.

Railways terminals integrated public transport (TIOP) in Bratislava. Railways terminals integrated public transport (TIOP) in Košice Region Phase I (the implementation of the project documentation) and modernisation of tram tracks in Kosice - the second stage ".

GHG affected: CO_2, CH_4, and N_2O

Type of the measure: regulatory and economic

Status: in force since 2011

Implemented in scenario: WEM, WAM

4.4.4 MODAL SHIFT TO PUBLIC TRANSPORT - TRANSPORT POLICY OF THE SLOVAK REPUBLIC INTO 2015

Free travel for students and citizens of retirement age. Discount fares for rail for working people. The modernization of the railway corridor Žilina - Košice - Čierna nad Tisou.

GHG affected: CO_2, CH_4, and N_2O

Type of the measure: regulatory and economic

Status: in force since 2015

Implemented in scenario: WEM, WAM

4.4.5 IMPROVED TRANSPORT BEHAVIOUR AND THE ROAD INFRASTRUCTURE - TRANSPORT POLICY OF THE SLOVAK REPUBLIC INTO 2015

Energy savings are achieved by reducing fuel consumption by users of the road infrastructure in the new technically superior infrastructure in comparison with the original technically outdated road infrastructure. Ensure speedy completion of the motorway network included in the TEN-T routes

Bratislava - Žilina - Košice - Vyšné Nemecke - state border SR / Ukraine (Va corridor; D1 motorway section) Priority of Bratislava - Košice as the main transport and urban move SR, Construction of new high-capacity road infrastructure segments troubleshooting of first-class roads and modernizing rail infrastructure.

GHG affected: CO_2, CH_4, and N_2O

Type of the measure: regulatory and economic

Status: in force since 2015

Implemented in scenario: WEM, WAM

4.4.6 INTRODUCTION OF EURO 6 EMISSION STANDARDS - TRANSPORT POLICY OF THE SLOVAK REPUBLIC INTO 2015

The introduction of more stringent Euro 6 emission standards for new vehicles significantly stricter emission limits of basic pollutants and particulates from traffic. It is anticipated reductions in fuel consumption due to improved efficiency of engines and the production is anticipated reductions in greenhouse gas emissions.

GHG affected: CO_2, CH_4, and N_2O

Type of the measure: regulatory and economic

Status: in force since 2015

Implemented in scenario: WEM, WAM

4.4.7 GOVERNMENTAL REGULATION NO 246/2006 COLL ON THE MINIMUM QUANTITY OF FUELS PRODUCED FROM RENEWABLE SOURCES IN THE PETROL AND DIESEL FUELS PLACED ON THE MARKET IN THE SLOVAK REPUBLIC

Continuously increasing the share of bioethanol and biodiesel blended with gasoline and diesel. It is planned to increase the use of CNG filling stations and infrastructure support.

GHG affected: CO_2,

Type of the measure: regulatory

Status: in force since 2006

Implemented in scenario: WEM, WAM

4.5 SECTORAL POLICIES AND MEASURES: INDUSTRIAL PROCESSES AND PRODUCT USE (IPPU)

4.5.1 NITRIC ACID PRODUCTION - ACT NO 414/2012 COLL. ON EMISSION TRADING IN AMENDMENTS

Act gives provisions for implementation of secondary catalyst at nitric acid production. Nitric acid production is the major source of N_2O emissions. Nitric acid production in the Slovak Republic is an important source of N_2O emissions and a key category in level and trend assessment. Total nitric acid production decreased inter-annually (2013/2014) by 5% and achieved the 2011 level. But the N_2O emissions increased by 12% in 2014 in comparison with 2013. It is a typical characteristic of the used technology (with secondary YARA catalyst) that emissions are low but fluctuate in a certain degree.

Thus continuous monitoring of emissions is necessary.

GHG affected: N_2O

Type of the measure: regulatory and economic

Status: in force since 2013

Implemented in scenario: WEM, WAM

4.5.2 ALUMINIUM PRODUCTION - ACT NO 414/2012 COLL. ON EMISSION TRADING IN AMENDMENTS

Its implementation enables to control efficiency at aluminium production. The technology was changed from Söderberg to prebaked technology in 1996. It resulted in significant decrease of CO_2 and PFC emissions. The improvements in production resulted also in decrease of PFC emissions after 2009. Further improvement in better performance controlling process of electrolysis cells was achieved in 2013. The CO_2 emissions from pitch volatiles combustion and from bake furnace packing material were calculated in 2013 for the first time (according to the IPCC 2006 GL) and the resulting implied emission factor per produced aluminium was estimated.

GHG affected: PFCs

Type of the measure: regulatory and economic

Status: in force since 2013

Implemented in scenario: WEM, WAM

4.5.3 CEMENT PRODUCTION - ACT NO 414/2012 COLL. ON EMISSION TRADING IN AMENDMENTS

Its implementation may cause the partial change in used raw materials. The utilisation of non-carbon raw materials for cement production will start after 2020 (such as ground granulated blast-furnace slag). It is assumed 5% input into kiln load.

GHG affected: CO_2

Type of the measure: regulatory and economic

Status: estimated after 2020

Implemented in scenario: WAM

4.5.4 LIME PRODUCTION - ACT NO 414/2012 COLL. ON EMISSION TRADING IN AMENDMENTS

Its implementation may cause the reduction of dolomite lime production and its replacing with quicklime production. The reduction or closure of dolomite lime mines after 2020 can occur.

GHG affected: CO_2

Type of the measure: regulatory and economic

Status: estimated after 2020

Implemented in scenario: WAM

4.6 SECTORAL POLICIES AND MEASURES: AGRICULTURE

4.6.1 MANURE MANAGEMENT - ORDINANCE OF THE GOVERNMENT OF THE SLOVAK REPUBLIC NO 488/2010 COLL. ON CONDITIONS FOR GRANTING SUBSIDIES IN AGRICULTURE THROUGH DIRECT PAYMENTS

The ordinance represents the national legal framework to meet the targets defined in the EU Common Agricultural Policy in the manure management and agricultural soils. Provisions on measures for manure manipulation and processing in enteric fermentation:

GHG affected: CH_4, N_2O

Type of the measure: regulatory and economic

Status: in force since 2010

Implemented in scenario: WEM

4.6.2 NEW MANURE MANAGEMENT - ORDINANCE OF THE GOVERNMENT OF THE SLOVAK REPUBLIC NO 488/2010 COLL. ON CONDITIONS FOR GRANTING SUBSIDIES IN AGRICULTURE THROUGH DIRECT PAYMENTS

New measures for manure manipulation and processing in enteric fermentation and new animal feeding policy.

GHG affected: CH_4, N_2O

Type of the measure: regulatory and economic

Status: in force since 2015

Implemented in scenario: WAM

4.6.3 AGRICULTURAL SOILS - ORDINANCE OF THE GOVERNMENT OF THE SLOVAK REPUBLIC NO 488/2010 COLL. ON CONDITIONS FOR GRANTING SUBSIDIES IN AGRICULTURE THROUGH DIRECT PAYMENTS

Efficient use and appropriate timing of nitrogen inputs from mineral fertilizers.

GHG affected: N_2O

Type of the measure: regulatory and economic

Status: in force since 2010

Implemented in scenario: WEM

4.6.4 AGRICULTURAL SOILS AFTER THE YEAR 2015 - ORDINANCE OF THE GOVERNMENT OF THE SLOVAK REPUBLIC NO 488/2010 COLL. ON CONDITIONS FOR GRANTING SUBSIDIES IN AGRICULTURE THROUGH DIRECT PAYMENTS

Efficient use and appropriate timing of nitrogen inputs from mineral fertilizers after the year 2015.

GHG affected: N_2O

Type of the measure: regulatory and economic

Status: in force since 2010

Implemented in scenario: WAM

4.6.5 REDUCED NUMBER OF DAIRY CATTLE - ORDINANCE OF THE GOVERNMENT OF THE SLOVAK REPUBLIC NO 488/2010 COLL. ON CONDITIONS FOR GRANTING SUBSIDIES IN AGRICULTURE THROUGH DIRECT PAYMENTS

Decreasing the number of dairy cattle.

GHG affected: CH_4;

Type of the measure: regulatory and economic;

Status: in force since 2010.

Implemented in scenario: WEM

4.6.6 NEW ANIMAL FEEDING POLICY IMPLEMENTATION - ORDINANCE OF THE GOVERNMENT OF THE SLOVAK REPUBLIC NO 488/2010 COLL. ON CONDITIONS FOR GRANTING SUBSIDIES IN AGRICULTURE THROUGH DIRECT PAYMENTS

Decreasing the number of dairy cattle, intensive feeding with active substances

GHG affected: CH_4;

Type of the measure: regulatory and economic;

Status: in force since 2015.

Implemented in scenario: WAM

4.7 SECTORAL POLICIES AND MEASURES: LAND USE, LAND USE CHANGE AND FORESTRY (LULUCF)

4.7.1 RURAL DEVELOPMENT PROGRAMME FOR THE PERIOD 2014-2020

The program of financial support scheme for selected thematic priorities in rural development comprises 56 frame targets for specific policies and measures in this sector with positive environmental impacts. Contribution of supported PAMs to the sustainable development will serve as horizontal criteria for support.

GHG affected: CO_2, CH_4, and N_2O

Type of the measure: regulatory with direct impact on emissions

Status: in force from 2015

Implemented in scenario: WAM

4.7.2 FOREST STRATEGY/ FOREST ACTION PLAN

The Forest Action Plan includes several key actions referring to climate change mitigation: promotion of forest biomass for energy generation, EU compliance with UNFCCC and Kyoto obligations, and protection of EU forests.

GHG affected: CO_2

Type of the measure: regulatory with direct impact on emissions

Status: in force from 2006

Implemented in scenario: WEM

4.7.3 FOREST MEASURES WITHIN THE RURAL DEVELOPMENT POLICY

The forestry is an integral part of rural development; support for sustainable and climate-friendly land use should encompass forest area development and sustainable management of forests.

GHG affected: CO_2

Type of the measure: economic

Status: in force from 2015

Implemented in scenario: WAM

4.7.4 LULUCF ACCOUNTING

Provides the basis for a formal inclusion of the LULUCF sector and ensures a harmonized legal framework allowing the collection of reliable data by robust accounting and reporting in a standardized way.

GHG affected: CO_2

Type of the measure: economic

Status: in force from 2015

Implemented in scenario: WAM

4.8 SECTORAL POLICIES AND MEASURES: WASTE MANAGEMENT

4.8.1 WASTE MANAGEMENT PLAN 2011-2015

The Waste Management Plan 2011 – 2015 includes several key targets referring to climate change mitigation: increase of waste recycling to 35% by 2015, reduction of biodegradable waste disposal in line with the Landfilling Directive (reduction to 50% by 2013, reduction to 45% by 2015 and reduction to 35% by 2020, compared with 1995 level) requirement to introduce separate collection of biodegradable waste and increase of land application of stabilized waste water sludge.

GHG affected: CO_2, CH_4, and N_2O

Type of the measure: regulatory and economic

Status: in force since 2011

Implemented in scenario: WEM

4.8.2 STRATEGY ON REDUCTION OF BIODEGRADABLE MSW DISPOSAL 2010

The Strategy was prepared to enable implementation of the Landfilling Directive. Measures are aimed on increasing separation of recyclables, composting and preparation of RDF.

GHG affected: CH_4 and N_2O

Type of the measure: regulatory

Status: in force since 2010

Implemented in scenario: WEM

4.8.3 WATER PLAN 2009-2015

Water Plan 2009 – 2015 identified the need for reduction of organic pollution of surface water and calls for reconstruction of 157 WWT plants, development of 54 new WWT plants and development of sewer systems in 277 municipalities.

GHG affected: CH_4 and N_2O

Type of the measure: regulatory

Status: in force since 2009

Implemented in scenario: WEM

4.9 ASSESSMENT OF THE ECONOMIC AND SOCIAL CONSEQUENCES OF RESPONSE MEASURES

Implementation of increasingly stringent environmental regulations and economic policies which penalize further use of environmentally harmful substances, technologies and so on might be associated with a range of side effects. It is not excluded that some of possible adverse economic effects will affect some developing and least developed countries having less means for adequate remedial response measures. The magnitudes of these potential impacts are typically given by the stringency of adopted measures, selection of the particular policy instrument, size and strength of the implementing economy relative to the world markets and also the actual macroeconomic set up of the affected developing countries.

In this chapter there are identified potential channels of how domestically implemented environmental policies in the Slovak Republic might have exercised any impact on third countries. Furthermore, any existing evidence about the potential magnitudes of these effects is highlighted. Similarly, the activities in particular those related to the development aid of the Slovak Republic implemented in order to minimize the negative consequences caused by these policies are described in this chapter. The aim is to meet our commitments under the Kyoto Protocol in respect with transparent reporting on potential adverse social, environmental and economic impacts particularly on developing countries.

4.9.1 ADOPTED LEGISLATIVE MEASURES: FISCAL POLICY INSTRUMENTS

Fiscal policy instruments are increasingly being referred to as an efficient instrument to correct existing environmentally related price distortions. The Slovak Republic maintains excise taxes on fossil fuels, electricity and mineral oils. The actual fiscal policy drivers, however, still remain much more linked to the current governmental budgetary situation rather than to provide fiscal incentives for environmentally sound behaviour. Since 2009 only minor changes occurred such as a decrease of the excise tax on diesel, removal of existing exemptions of coal tax payers and increase of excise tax on LPG, CNG and electricity. No impact on any third countries is expected from already implemented fiscal policies and therefore no specific policies to offset any negative effects have been considered.

4.9.2 BIOFUELS POLICY

Biofuels policy discussed in more details in chapter 4.4.5 has been in place to meet the targets required by EU legislation. Increased demand and subsequently also the production of biofuels has not only been reflected by rising commodity prices but also induced land use changes resulting from the reduction of the supply of commodities in direct competition with those used for biofuels world-wide. Therefore, international trade represents the key channel through which the potential negative

economic, social and environmental impacts[13] might be transmitted towards developing countries. Taking into account the low quantities of biofuels in use in the Slovak Republic, we do not expect any negative effects neither on forests destruction nor contribution to the rising world prices of agricultural commodities.[14] Despite its rather low contribution to these developments, the Slovak Republic actively contributes to shaping the international sustainability standards either within its own (and EU internal) legislation process or within the framework of international institutions, such as WTO, FAO, etc. Furthermore, the Slovak Republic has been actively engaged in strengthening the know-how on improving food security and agriculture, land and water management in Kenya. Moreover, scholarships for students from developing countries were offered with preference to those applying to pursue their studies in environmental sciences.

4.9.3 GHG REDUCTION POLICIES

The key policy option was a development of emerging carbon market with resulting carbon price. Among the complementary policies, targets have been adopted to increase the share of renewable energy resources, increase energy efficiency as well as the new legislation which sets more stringent *quality standards for fuels and personal cars.*

Adopted policies could have had some implications for third countries either through the underlying carbon market price mechanisms or requirements to comply with new and tighter environmental regulations. CO_2 emission trading (either EU ETS or Kyoto Protocol emission trading) and increasingly stringent fuel quality standards might have some impact. The major example of its direct impact on the third countries is the integration of aviation sector into the trading scheme. Among indirect effects, the major example is the concern about a possible carbon leakage. Most of the impacts of carbon leakage (shifts of industrial activity to the countries without any GHG emission reduction commitments, potential downward pressure on oil prices, etc.) on the third countries would in fact be rather positive for them.[15] Measures in place to minimize a potential carbon leakage include the provision to enlist economic sectors facing immediate threat of carbon leakage, which will under given conditions continue receiving their CO_2 allowances for free.

Furthermore, increasingly stringent fuel quality standards in Europe might in fact turn out to be positive impact because it might trigger increase of investments in the fuel processing industries in third countries. Rising fuel prices in Europe due to the carbon price (or tax) and quality increase might counter play the rising oil prices particularly due to increasing scarcity of this commodity. Such effects might on the one hand negatively affect revenues of the oil exporting countries, which can be on the other hand still balanced by rising demand from the rest of the world. The final net impact will depend on the benefits derived from expansion of industrial production and costs needed to clean up higher levels of pollution including addressing its consequences.

Apart to emission trading, no other Kyoto Protocol flexible instruments have been used to meet the GHG emission reduction targets by the Slovak Republic, therefore no impact on third countries in this respect is reported.

Activities considered within the preparation of the adaptation strategy to climate change have a local character without any implications for third countries.

[13] Implied excessive land use changes, food shortages or compromised food security.

[14] Please note that the different conclusion might be drawn when considering the implications of the overall EU biofuel policies. Similarly this would also apply in considering the existing agricultural policies within the EU Common Agricultural policy.

[15] In some specific cases, where the polluting entity seeking a location in developing country causing an increase of local pollution, increased environmental damage might outweigh economic benefits.

5. PROJECTIONS

This section presents projections of GHG emissions for three scenarios: "with existing measures (WEM)", "with additional measures (WAM)" and "without measures (WOM)", split by sector and by gas and aggregated in CO_2 equivalents for the Slovak Republic. Projections are presented for the years 2015, 2020, 2025, 2030 and 2035 with the base year 2013. Projections of emissions related to fuel sold to ships and aircraft engaged in international transport are memo items in the CRF Tables and not included in the totals reported in this section.

5.1 CONTEXT

The year 2013 was determined as the reference year for greenhouse gas emission projections for all three scenarios and verified data sets from the national inventory of greenhouse gas emissions were used for modelling. The scenarios are presented in more details in the Chapter 5.4. The gases covered are: CH_4, CO_2, N_2O and F-gases. The sectors covered are: Energy (including transport), Industrial processes and product use (including F-gases), Agriculture, Waste, LULUCF and international transport. Emission projections from international aviation and navigation are not included in national totals.

5.2 SCENARIOS

Projections of GHG emissions were prepared for years 2015, 2020, 2025, 2030 and 2035, based on following scenarios:

- Without measures scenario (WOM) – projections exclude reductions expected from all measures and exclude impacts of ETS after year 2004 (ETS starting year). Without measures scenario represents the reference scenario to define emission level and represents business as usual scenario type - BAU.
- With measures scenario (WEM) – projections reflect all measures implemented or adopted until the year 2013 with expected impact up to 2035.
- With additional measures scenario (WAM) – projections include WEM policies and additional measures officially planned to be adopted in the period up to 2035.

5.3 KEY PARAMETERS AND ASSUMPTIONS

Table 5.1 presents key projection parameters as applied in the base year 2013 and cross years for projections. Table 5.2 gives specific parameters applied for modelling in energy, industry, agriculture and waste sector. This information is also included in the CTF Tables attached to this submission.

Table 5.1: *Key parameters for projections*

Item	Units	2013*	2015	2020	2025	2030	2035
Population	Mil. inhabitants	5.42	5.42	5.41	5.38	5.31	5.22
Gross domestic product	10^9 EUR	73.59	77.33	87.23	99.28	109.94	109.94
EU ETS carbon price	EUR/EUA	NA	7	10	14	35	57
International fuel import prices: Coal	EUR/GJ	NA	7.7	9.5	9.1	10	10.2
International fuel import prices: Oil	EUR/GJ	NA	11.9	13.7	13.8	14.4	14.8
International fuel import prices: Gas	EUR/GJ	NA	7.7	9.5	9.1	10	-

* real data

Table 5.2: *Parameters applied for projections in relevant economical branches*

Item	Units	2013*	2015	2020	2025	2030	2035
Energy sector							
Gross final energy consumption	TJ	379 105	392 533	402 135	412 830	419 562	425 105
Final energy consumption: Industry	TJ	134 692	140 148	149 324	154 349	158 752	161 369
Final energy consumption: Transport	TJ	90 976	93 969	95 223	96 290	100 412	101 855
Final energy consumption: Residential	TJ	86 671	90 079	90 161	94 103	93 618	94 655
Final energy consumption: Agriculture/Forestry	TJ	6 007	6 149	6 054	6 069	6 047	5 972
Final energy consumption: Services	TJ	60 759	62 189	61 373	62 020	60 732	61 253
Transport sector							
Number of passenger-kilometres	million pkm	NA	8 901	9 027	9 627	10 226	10 376
Freight transport tonnes-kilometres	million tkm	NA	45 036	52 390	60 778	69 165	71 262
Agriculture sector							
Livestock: Dairy cattle	1000 heads	199	199	202	165	160	155
Livestock: Non-dairy cattle	1000 heads	269	269	273	230	225	220
Livestock: Sheep	1000 heads	400	400	400	400	400	400
Livestock: Pig	1000 heads	637	650	1 426	1 990	2 215	2 464
Livestock: Poultry	1000 heads	10 969	14 288	16 690	13 000	13 000	13 000
Nitrogen input from application of synthetic fertilizers	kt nitrogen	121	132	135	95	100	105
Waste sector							
Municipal solid waste (MSW) generation	kt MSW	1 744	1 848	2 066	2 314	2 535	2 695
Municipal solid waste (MSW) going to landfills	kt MSW	1 294	1 275	1 348	1 397	1 479	1 500
Share of CH_4 recovery in total CH_4 generation from landfills	%	7%	7%	7%	14%	27%	40%

* real data

5.4 PROJECTIONS

5.4.1 TOTAL AGGREGATE GHG EMISSION PROJECTIONS

Projections of GHG emissions were recalculated to CO_2 equivalents by using of officially agreed and revised GWPs values from the Fourth IPCC Assessment Report. Total GHG equivalent emissions have been prepared for all IPCC sectors, defined cross years and according to relevant scenarios. Table 5.3 gives the results of modelling data in summary by sectors.

Table 5.3: *Total aggregate GHG emission projections by sectors (Gg CO_2 eq.)*

Scenario WOM	2013*	2015	2020	2025	2030	2035
Total excluding LULUCF	43 679.2	44 956.7	45 800.3	47 040.4	48 111.7	48 830.4
Total including LULUCF	35 777.9	36 522.0	36 774.4	37 423.4	37 950.2	38 645.7
1. Energy	29 846.4	31 151.9	31 804.4	32 920.5	34 053.6	34 864.8
of which transport	6 842.6	7 597.8	8 094.4	8 802.6	9 463.2	9 793.5
2. IPPU	8 717.9	9 204.7	9 533.9	9 798.3	9 978.8	10 034.4
3. Agriculture	3 564.8	3 044.7	2 906.0	2 837.4	2 735.3	2 735.3
4. LULUCF	-7 901.3	-8 434.7	-9 025.9	-9 617.1	-10 161.5	-10 184.7
5. Waste	1 550.1	1 555.4	1 556.0	1 484.3	1 344.0	1 195.9

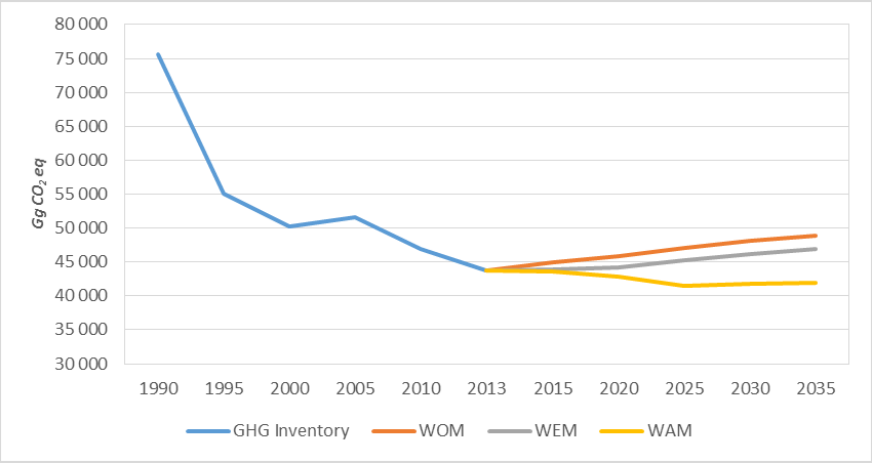
Scenario WEM	2013*	2015	2020	2025	2030	2035
Total excluding LULUCF	43 679.2	43 965.8	44 133.0	45 191.6	46 218.9	46 926.8
Total including LULUCF	35 777.9	35 531.1	35 107.1	35 574.5	36 057.4	36 742.0
1. Energy	29 846.4	30 361.5	30 546.7	31 464.0	32 507.0	33 290.6
of which transport	6 842.6	7 549.3	7 849.9	8 380.2	8 918.1	9 187.0
2. IPPU	8 717.9	9 004.2	9 124.3	9 406.0	9 632.6	9 704.9
3. Agriculture	3 564.8	3 044.7	2 906.0	2 837.4	2 735.3	2 735.3
4. LULUCF	-7 901.3	-8 434.7	-9 025.9	-9 617.1	-10 161.5	-10 184.7
5. Waste	1 550.1	1 555.4	1 556.0	1 484.3	1 344.0	1 195.9
Scenario WAM	**2013***	**2015**	**2020**	**2025**	**2030**	**2035**
Total excluding LULUCF	43 679.2	43 541.0	42 853.9	41 465.8	41 753.0	41 905.9
Total including LULUCF	35 777.9	34 899.2	33 336.8	31 416.6	31 198.0	31 350.9
1. Energy	29 846.4	30 102.5	29 593.0	28 184.5	28 554.7	28 842.9
of which transport	6 842.6	7 295.2	7 312.6	7 482.8	7 719.5	7 837.9
2. IPPU	8 717.9	9 003.5	9 030.3	9 169.1	9 299.1	9 311.9
3. Agriculture	3 564.8	2 879.3	2 674.1	2 627.4	2 554.7	2 554.7
4. LULUCF	-7 901.3	-8 641.8	-9 517.0	-10 049.3	-10 555.0	-10 555.0
5. Waste	1 550.1	1 555.4	1 556.0	1 484.3	1 344.0	1 195.9

* real data

Figure 5.1 shows historical and projected data for total aggregate GHG emissions according to the three scenarios for period 1990 – 2035. Trends of curves indicate our reduction of GHG emissions.

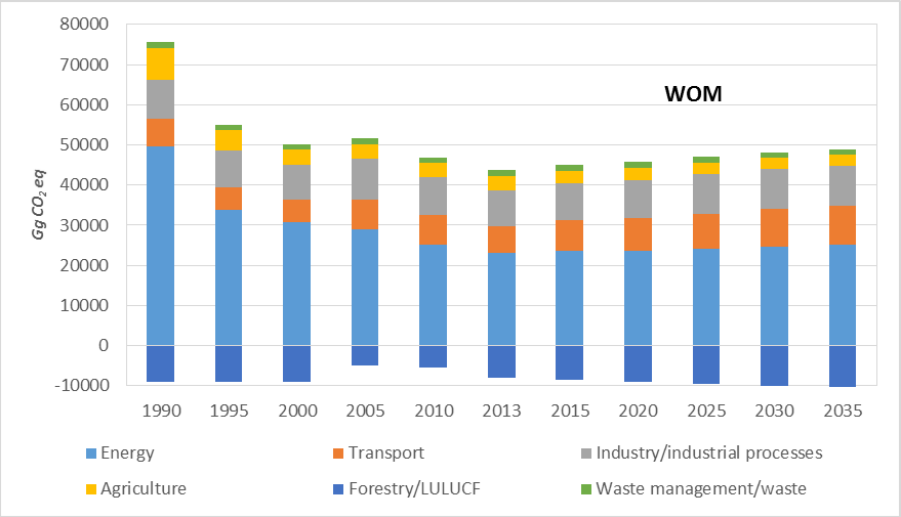
The measures used in the WEM and WAM scenarios have influence on GHG. A linear model was used and therefore in WEM scenario emissions projection shows slowly increase due to expected economic growth which was considered. Projections in WEM scenario reflect such reduction effect that emissions are still slightly growing. It was caused due to the fact that energy and climate policy framework 2030 of the EU and its Member States was only in the preparation phase in 2013.

Figure 5.1: *Total aggregate GHG emission projections (Gg CO_2 eq.)*

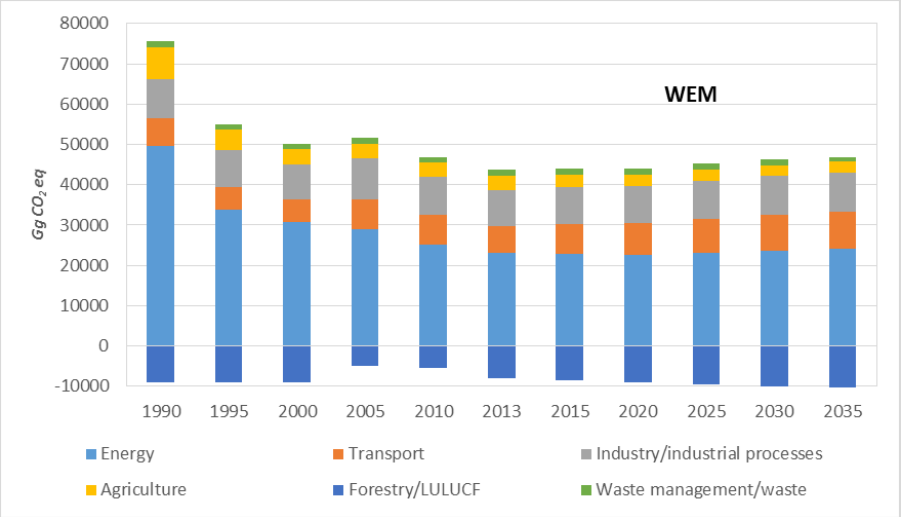


The following figures shows total aggregate GHG emission projections per sector in different scenarios. Figures 5.2, 5.3 and 5.4 illustrate a quantitative evaluation of sectoral share on projections for WOM, WEM and WAM scenarios. The most significant change in period 1990 – 2035 is decreasing share of emissions from energy sector and slightly increasing share of transport emissions.

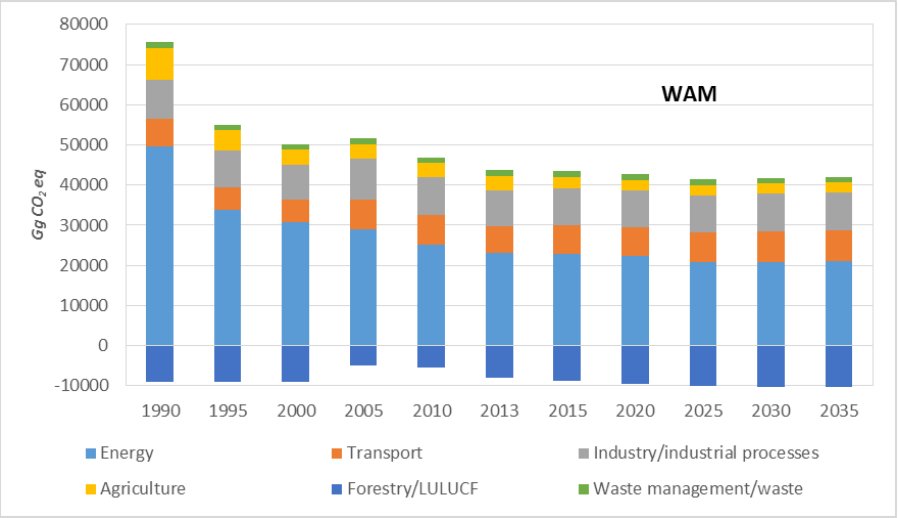
Figures 5.2: *Sectoral share of aggregated GHG emission projections – WOM scenario*



Figures 5.3: *Sectoral share of aggregated GHG emission projections – WEM scenario*

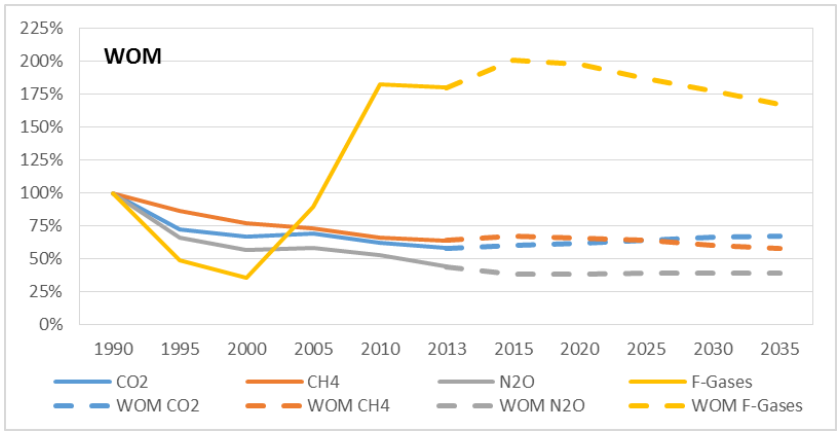


Figures 5.4: *Sectoral share of aggregated GHG emission projections – WAM scenario*

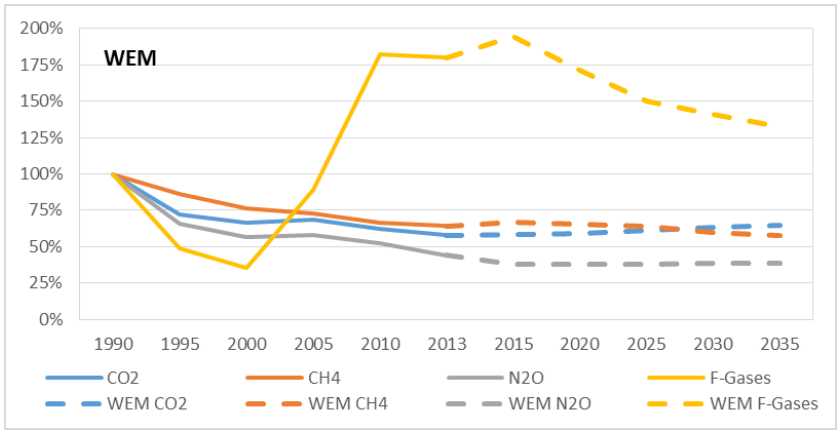


As it is shown on Figures above for PAMs involved in the WEM and WAM scenarios there are not expected significant changes in sectoral contributions to the total GHG emission projections up to 2035. For stronger reductions or changes in sectoral shares specific and more ambitious sectoral policies shall to be applied in future. Figures 5.5, 5.6 and 5.7 show relative aggregated projections of GHG emissions from individual greenhouse gases between 1990 and 2030, for the WEM and WAM scenarios. For absolute values refer to the appropriate CTF Table 6 attached to this submission.

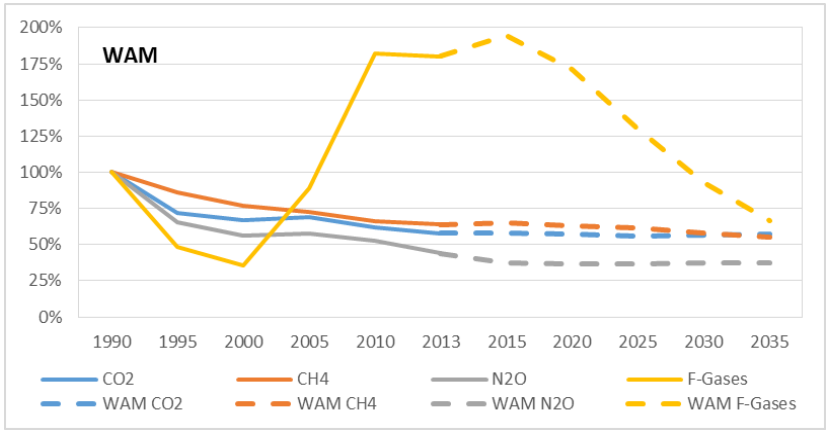
Figures 5.5: *GHG emissions per gas relative to 1990 – WOM scenario*



Figures 5.6: *GHG emissions per gas relative to 1990 – WEM scenario*



Figures 5.7: *GHG emissions per gas relative to 1990 – WAM scenario*



It is expected decrease of all greenhouse gases except F-gases by 2020 in the WEM and WAM scenarios. In the WEM scenario it is expected a decrease of CH_4 emissions but slightly increase of CO_2 and N_2O emissions by 2030. WAM scenario shows in the year 2030 only small increase of N_2O emissions.

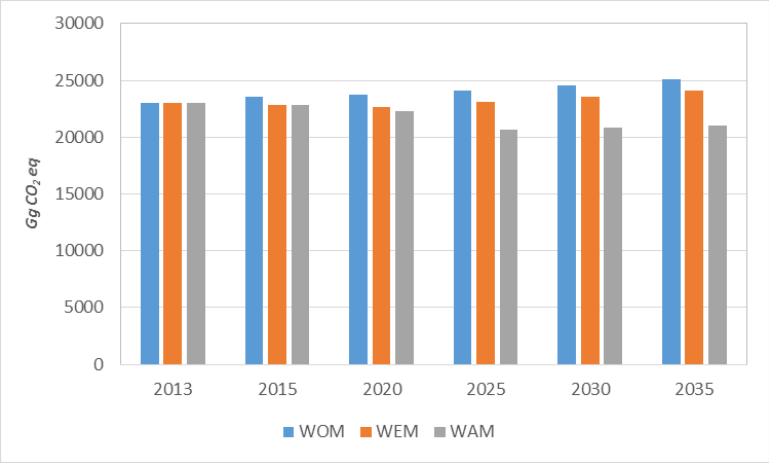
The F-gases are expected to peak by 2015 and then with the help of implemented measures, such as the Regulation (EC) No 842/2006 on F-gases, their decrease by 2030 is expected. Although the increase in figures above seems a substantial, their share on country's overall GHG emissions is small; therefore any complication with fulfilment of our reduction commitments in connection with the F-gases are expected.

5.4.2 EMISSION PROJECTIONS FROM SECTOR ENERGY EXCLUDING TRANSPORT

Sector energy produces GHG emissions from combustion and transformation of fossil fuels. Fugitive methane emissions are generated during the fossil fuel extraction, transport and processing.

The model MESSAGE was used for stationary energy sources, i.e. IPCC categories 1.A.1, 1.A.2, 1.A.4, and 1.A.5, while model TREMOVE was used for transportation 1.A.3. Emissions level in the cross years are determined by the final energy growth rate (WOM) and applied measures (WEM and WAM scenarios).

Figure 5.8: *Total aggregate GHG emission projections in energy sector, excluding transport*



Parameters used in the energy sector:

Modelling emission projections in energy sector are based on following input data and information:

- Updated forecasts of the GDP growth, based on the annual growth rate used in PRIMES model;
- Updated forecasts of the VA growth, based on the annual growth rate used in PRIMES model;
- Updated forecasts of final energy consumption of industrial branches, residential heat generation and other energy consumption in residential, and other non/industrial sectors from PRIMES model;
- In order to estimate the ETS impact, the CO_2 reduction was modelled as the difference between WEM scenario, using existing fuel mix in ETS sources and WOM scenario with fuel mix in these sources same as in year 2004 e.g. the situation before ETS start action;
- Impact of energy saving in residential sector e.g. individual and apartment houses, was

modelled by implementing the Energy Efficiency Action Plan for the period 2014 – 2016 with the outlook for 2020 (adopted in July 2014);

- The input data from the Energy Efficiency Action Plan in period 2013 – 2020 was implemented in WEM scenario, while its estimated prolongation after this period was included in WAM scenario;
- Impact of RES in heat and electricity generation was included in WEM scenario, considering the National Renewable Energy Action Plan (Resolution of the Government of the SR No 677/2010);
- Population growth forecast was based on the data from PRIMES model. Fuel mix and emission data from individual ETS sources as well as data from energy statistics were used as input to MESSAGE model;
- Fuel prices from the Regulatory Office have been used for base year 2013 and its escalation were modelled using EU recommended data. The CO_2 market prices for ETS were used from this source accordingly.

Outcomes from modelling were determined by the reduction potential of measures, their synergies and also by the costs of implementation. Updated figures from macroeconomic and demographic data forecasts were applied for period 2010 – 2035 and GDP growth rate has been reflected in gross value added figures for several industrial sectors.

Parameters used in the energy sector - fugitive emissions:

Fugitive emission projections of CH_4 and CO_2 from coal mining and post-mining in the Slovak Republic for the years 2015 – 2035 were prepared based on data of coal production in the years 2005 and 2010 from single underground mines, have been obtained from companies, and data of expected coal production in the years 2015 – 2035, have been obtained from the Ministry of Economy of the Slovak Republic. For the calculation of fugitive methane and CO_2 emissions there were used the emission factors from the IPCC 2006 GL and specified of mines operator - HBP, a.s. The methane emission projections from abandoned mines were included in the calculation after 2015. Due to lack of input data, the WEM scenario is equal to the WAM scenario. Table 5.4 provides expected values of coal production and fugitive emissions CH_4 and CO_2 from coal mining and post-mining in the years 2015 – 2035.

Table 5.4: *Fugitive emission projections CH_4 and CO_2 from coal mining and post-mining in Slovakia*

Year	Brown coal	Emissions CH_4	Emissions CO_2	CO_2 eq.
	t	t	t	t
2005	2 511 152	17 613	20 781	461 106
2010	2 370 000	15 386	19 740	404 390
2015	2 075 000	13 669	19 203	341 716
2020	1 800 000	12 550	17 499	313 761
2025	1 800 000	12 731	17 168	318 267
2030	1 800 000	12 713	17 168	317 815
2035	1 800 000	11 618	17 168	290 453

The emission projections of fugitive CH_4 from transport and distribution of natural gas and oil in the Slovak Republic have been calculated from the total primary energy and fossil fuels production and transformation assumptions included in the reference scenario 2013 baseline non-CO_2 for the years 2015 – 2035 (provided by the European Commission). For the calculation of fugitive methane emissions, there were used the emission factors from the IPCC 2006 Guidelines for National GHG

Inventories - Chapter 4: Fugitive Emissions and the IPCC Good Practice Guidance and Uncertainty Management in National GHG Inventories - Fugitive Emissions from Oil and gas operation. Due to lack of input data, the WEM scenario is equal to the WAM scenario. Table 5.5 provides expected values of production, transmission and distribution of oil and natural gas in the years 2015 – 2035.

Table 5.5: *Oil and natural gas production, processing, transmission and distribution and expected development up to 2035*

Activity	Units	2005	2010	2015	2020	2025	2030	2035
Oil production	kt	31	13	14	0	0	0	0
Oil processing	kt	5 598	5 453	5 078	5 273	5 124	5 018	5 012
NG production	Million m^3	147	104	88	93	93	92	87
Long-distance NG transmission	Million m^3	73 900	65 302	69 652	68 455	67 601	66 660	69 201
NG distribution	Million m^3	7 399	6 098	5 662	5 602	5 580	5 524	5 288

5.4.3 EMISSION PROJECTIONS FROM TRANSPORT SECTOR

The existing measures in the transport subsector and the other sectoral information from the Ministry of Transport, Construction and Regional Development of the Slovak Republic were taken into consideration for WOM, WEM and WAM scenarios. Projections in transport sector were prepared by the model TREMOVE, which is based on data from COPERT model, used for emission inventory in road transport.

Model TREMOVE includes two basic scenarios:

- BC scenario (Base Case) is the baseline scenario used for WOM and WEM projections;
- POLICY scenario is scenario with active "reduction" policy used for WAM projections.

Scenario without measures (WOM) is identical with the BC scenario of TREMOVE model with the following assumptions:

- technology at EURO 4 standards with maintaining of emission limits;
- share of biofuels at the 2010 level (4.41% of biodiesel and 2.34% of bioethanol in gasoline);
- no support for rail or other combined transportation network.

Scenario with existing measures (WEM) is identical with the BC scenario of TREMOVE model with the following assumptions:

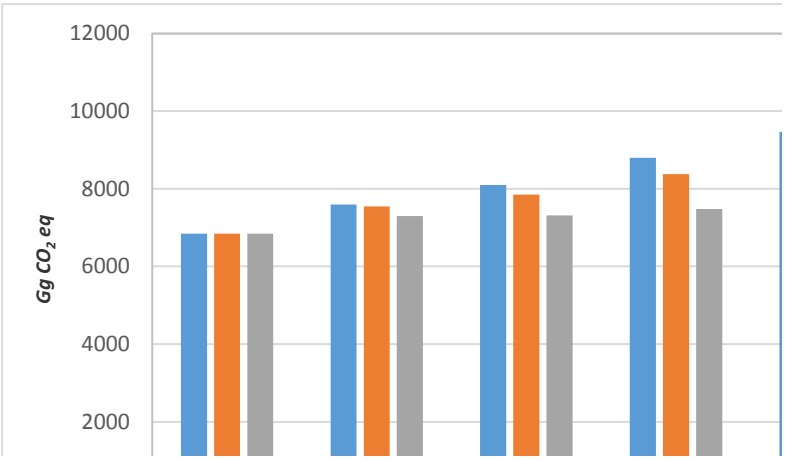
- the current state of transport and transport performance is identical with the transportation forecast until 2030 (in line with the documents from the Ministry of Transport, Construction and Regional Development of the Slovak Republic);
- technology of road vehicles is on EURO 5 standards;
- increasing share of biofuels (biodiesel in diesel and bioethanol in gasoline) up to 8.5% by 2020 to the reference value share on final energy consumption of biofuels in transport according to the Act No. 492/2010 on Mineral Oil Tax.

Scenario with additional measures (WAM) is identical with the POLICY scenario of TREMOVE model with the following assumptions:

- operates with significantly lower fuel consumption, which reduces emissions (traffic and transportation performance and condition of the vehicle fleet are the same level as in the BC scenario);

- scenario assumes significant savings in fuel economy (introduction of zero-emission vehicles, low-emission vehicles, vehicles with low fuel consumption);
- technology of road vehicles is on EURO 5 standards, since 2015 on EURO 6 standards;
- increasing share of biofuels (biodiesel and bioethanol) up to 8.5% in 2020;
- intensive support of rail and combined transport (adjustment of elasticity parameters of demand is not often testified);
- higher support for CNG – a significant increase of CNG filling stations.

Figure 5.9: *Total aggregate GHG emission projections in sector Transport*



5.4.4 EMISSION PROJECTIONS FROM SECTOR INDUSTRIAL PROCESSES AND PRODUCT USE INCLUDING F-GASES

The industrial processes and products use sector is not in general as sensitive to different PAMs implementation as energy sector, due to the principle of emissions production following the technology and stoichiometry. One of the most important measures in this sector is using BAT technologies. Therefore the basis for all scenarios is the value added growth following the reference scenario with the only one limitation that is maximal technological capacity of production.

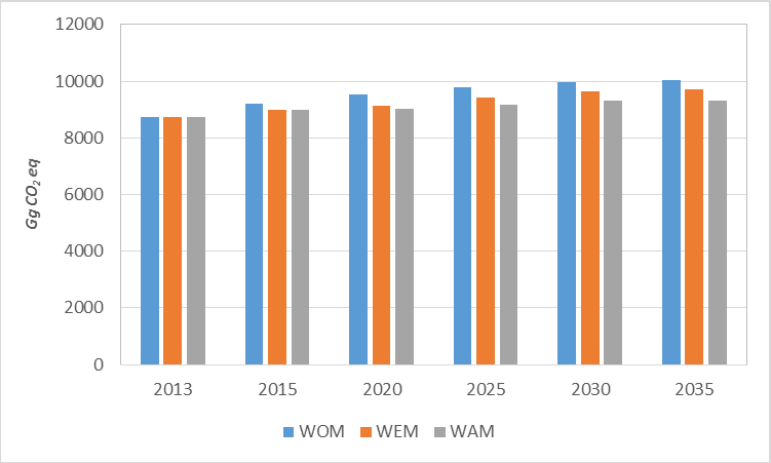
Parameters and other information used in WEM scenario:

- New ammonia production unit with the higher capacity (+20%), lower emissions (-10%) will be put in operation in 2016. Old production unit of ammonia will be closed;
- Modernisation of production unit of ethylene with the lower emissions (-16%) will be put in operation in 2016 (using BAT);
- Closure of the iron and steel production in one of the plant due to geopolitical situation in 2015;
- Ferroalloy production will be oriented on ferrosilicon with higher silicon content (lower CO_2 emissions, higher CH_4 emissions);
- Stable PFCs emissions from aluminium production due to constant operation of aluminium plant;
- The HFCs emissions increase will be less dynamic due to increase of coolants with new HFCs gases (with lower GWP) and continual replacement of recycling HCFC coolants with “natural coolants”.

Parameters identified in WEM scenario above were modified to WAM scenario as follow:

- New ammonia production unit with the higher capacity (+20%), lower emissions (-12%) will be put in operation in 2016. Old production unit of ammonia will be closed;
- The utilisation of non-carbonates raw materials for cement production will start after 2020 (such as ground granulated blast-furnace slag). It is assumed 5% input into kiln load;
- The reduction or close of dolomite lime after 2020 can be occurred;
- Ferroalloy production will be oriented on ferromanganese (lower CO_2 and CH_4 emissions);
- In addition to the parameters described in the WEM scenario for F-gases, foams containing HFCs will be forbidden; coolants with high GWP will be restricted, too.
- Service of electric equipment's will be possible only on BAT level technology and only in close systems.
- The utilisation of F-gases with lower GWP in aerosols and fire extinguishers will be mandatory.

Figure 5.10: *Total aggregate GHG emission projections in industrial processes and product use sector including F-gasses*



5.4.5 EMISSION PROJECTIONS FROM SECTOR AGRICULTURE

The mitigation potential in agriculture is mostly connected with the manure management (storage, application on soil) and animal feeding policy. Since 2011, there have been no policy papers approved on climate change in field of plant production or animal management. Nowadays, the Rural Development Programme for 2014 – 2020 was prepared, where those issues were incorporated to the measures (for example organic farming). From the older policy, the Act No 220/2004 Coll. on the Protection and Use of Agricultural Land as amended, partly address the issue of poorer quality land use for the establishment of plantations of fast growing trees. It is a land with lower quality and the biomass production from them will increase the renewable energy use, thereby reducing the need for fossil fuels. Current legislation and recommended good agricultural practice with measures taken is mainly manifested in the storage of waste from animal production and the integration of waste to agricultural land. Although detailed mapping of storage space lacks, it can be assumed that in Slovakia in 2015, all liquid waste will be stored in covered area for more than 120 days. This allows the use of effective measures also in field of the incorporation of waste into agricultural land. This assumption will be fulfilled for new construction of storage space. This measure has the greatest impact in the pigs breeding. Part of the liquid waste is then absorbed by straw and is stored in solid form. After 2015, therefore, further scope for reducing emissions from manure storage is not expected.

Biogas processing is currently not enough supported therefore there work only 4 biogas plants in Slovakia. Effective control of nitrogen paths in cycle of agricultural production changes loss of nitrogen emissions into valuable fertilizer. Storage of waste is possible only in intensive farms for grazing animals (sheep, goats, horses, some categories of cattle), it has only limited application for housing. The most relevant climate change mitigation activities in the agriculture sector are part of the EU Common Agricultural Policy, Agricultural Market and Income Support (1st pillar of the EU Common Agricultural Policy) and in the Rural Development Policy (2nd pillar of the EU Common Agricultural Policy).

Previous emission projections up to year 2030 assumed additional significant decreasing in numbers of animals which is not in comply with the recent internal document Conception of the Agricultural Development of the Slovak Republic for years 2013 – 2020 prepared by the Ministry of Agriculture and Rural Development (Table 5.6). Pursuant to new the Conception, the endeavour of Slovakia is to ensure self-sufficiency at important agricultural commodities with the aim to achieve the level of 80% up to 2020. That leads to the supporting of livestock primary production in Slovakia which is also closely linked to employment policy in agricultural sector.

Table 5.6: *Parameters for trend development in animal production*

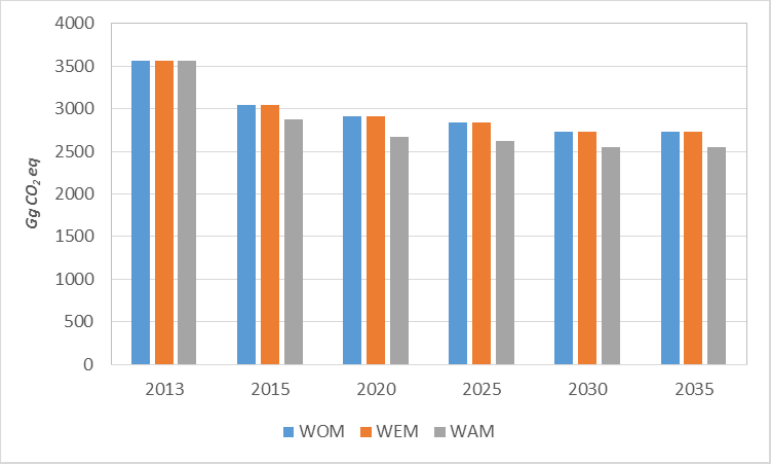
Animal	2013*	2014	2015	2016	2017	2018	2019	2020
	Conception of the Agricultural Development of the Slovak Republic for years 2013-2020							
	Animal numbers (in thousands)							
Cattle	467.8	468.1	468.8	470.3	471.9	473.0	473.8	474.4
Pigs	525.1	584.4	650.4	780.4	1 014.6	1 129.1	1 355.0	1 425.9
Poultry	13 211.0	13 607.4	14 287.7	14 932.1	15 380.0	15 687.6	16395.1	16 690.0

* real data

The WOM scenario is identical with the scenario with measures. Scenario with additional measures includes the strict implementation of CAP recommendations mostly in manure management and agricultural soils as was implemented in the Regulation No 488/2010 Coll.

- Scenario with existing measures (WEM) – scenario includes new measures in manure manipulation and processing in enteric fermentation and manure management categories.
- Scenario with additional measures (WAM) – scenario includes new measures in manure manipulation and processing and in addition new animal feeding policy implementation in enteric fermentation and manure management categories.

Figure 5.11: *Total aggregate GHG emission projections in Agricultural sector*



5.4.6 EMISSION PROJECTIONS FROM SECTOR LAND USE, LAND USE CHANGE AND FORESTRY

Emission and removal projections in the LULUCF sector were based on sectoral strategy document the Rural Development Programme of the Slovak Republic 2014 – 2020. This strategy was developed taking into account adopted National Forest Program of the Slovak Republic as well as the Indicative Action Plan of the Slovak Republic for 2009 – 2013. The Indicative Action Plan contains 56 frame targets for specific policies and measures (mitigation) in the LULUCF sector. Emission and sink projections were updated for all scenarios (WOM, WEM and WAM) and projection parameters (area of managed forest).

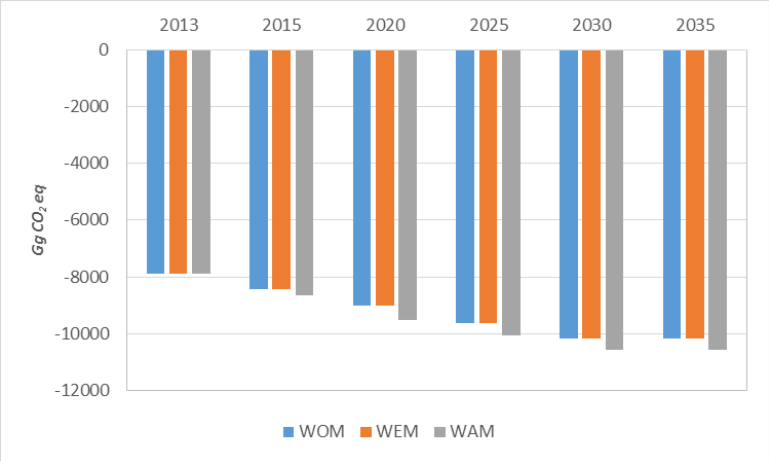
Projections of GHG emissions/removals (CO_2, CH_4, N_2O) in sector LULUCF were not updated from the last submission. Small changes are caused by application of revised GWP AR4.

Projections were prepared based upon following measures:

- Afforestation of non-forested areas;
- Grassing of arable soil;
- Increasing protection against forest fires.

Results of modelling are presented in emission projections template according to the IPCC categories.

Figure 5.12: *Total aggregate GHG emission projections in LULUCF sector*



5.4.7 EMISSION PROJECTIONS FROM WASTE SECTOR

Modelling of municipal waste and wastewater emission projections was based on the demographic prognosis prepared by the Demographic Research Centre in 2002 and updated in 2008. This prognosis shows an increase of population until 2024 and after then a slight decrease. The activity data on municipal and industrial waste generation was based on the statistical publication “Waste”, and extrapolated to population or industrial production predictions. Information on wastewater generation was based on the Statistical Yearbook and complemented by the expert estimations on sludge based on judgment from the Association of Treatment Experts of the Slovak Republic.

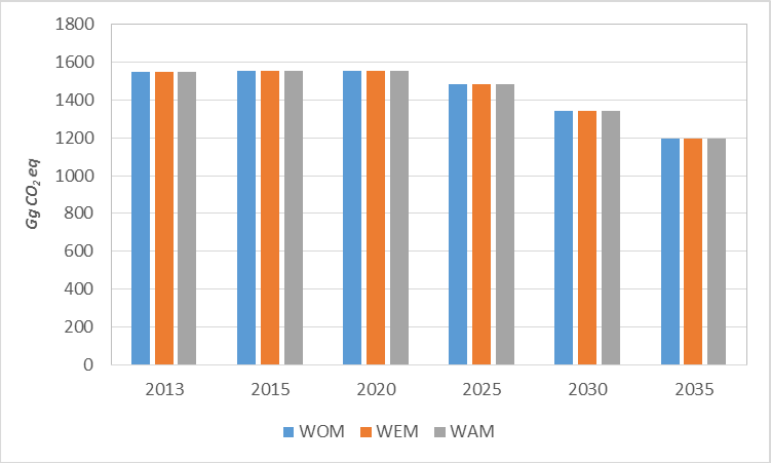
The following parameters and other information were used in Waste sector projections scenarios:

- WEM scenario takes into account the current status of waste management in conformity with the effective legislation and the estimated development of waste management according to effective Waste Management Plan and Plan for Development of Public Severs without the

introduction of any specific measures.

- Scenario with additional measures (WAM) was not prepared because policies and measures needed after the year 2013 to achieve policy targets cannot be quantified.

Figure 5.13: *Total aggregate GHG emission projections in Waste sector*



5.4.8 EMISSION PROJECTIONS FROM MEMO ITEMS

GHG emission projections from memo items are not included in the national total. These projections of GHG emissions have been developed only for the scenario WEM. Slovak memo items contain emission projections from international bunkers, emissions from biomass and long-term storage of C in waste disposal sites. Tables below shows detailed split of emissions by gases.

Table 5.7: *Projections of aggregated GHG emissions from Memo items (Gg of CO_2 eq.)*

Category	2013*	2015	2020	2025	2030	2035
International bunkers	99.4	147.0	149.5	150.5	151.9	151.9
Aviation	*84.8*	*112.4*	*115.0*	*115.9*	*117.4*	*117.4*
Navigation	*14.6*	*34.6*	*34.6*	*34.6*	*34.6*	*34.6*
CO_2 emissions from biomass	1 862.2	1 863.2	1 863.2	1 863.2	1 863.2	1 863.2
Long-term storage of C in waste disposal sites	178.6	179.6	179.6	179.6	179.6	179.6
Memo items	**2 140.2**	**2 189.8**	**2 192.3**	**2 193.3**	**2 194.7**	**2 194.7**

Table 5.8: *Projections of CO_2 emissions from Memo items (Gg)*

Category	2013*	2015	2020	2025	2030	2035
International bunkers	96.9	145.3	147.9	148.9	150.3	150.3
Aviation	*84.0*	*111.7*	*114.3*	*115.3*	*116.7*	*116.7*
Navigation	*12.9*	*33.6*	*33.6*	*33.6*	*33.6*	*33.6*
CO_2 emissions from biomass	1 862.2	1 863.2	1 863.2	1 863.2	1 863.2	1 863.2
Long-term storage of C in waste disposal sites	178.6	179.6	179.6	179.6	179.6	179.6
Memo items	**2 137.7**	**2 188.1**	**2 190.7**	**2 191.7**	**2 193.1**	**2 193.1**

Table 5.9: *Projections of N_2O emissions from Memo items (Gg)*

Category	2013*	2015	2020	2025	2030	2035
International bunkers	0.008	0.004	0.004	0.004	0.004	0.004
Aviation	*0.003*	*0.002*	*0.002*	*0.002*	*0.002*	*0.002*
Navigation	*0.006*	*0.002*	*0.002*	*0.002*	*0.002*	*0.002*
Memo items	**0.008**	**0.004**	**0.004**	**0.004**	**0.004**	**0.004**

Table 5.10: *Projections of CH_4 emissions from Memo items (Gg)*

Category	2013*	2015	2020	2025	2030	2035
International bunkers	0.002	0.018	0.018	0.018	0.018	0.018
Aviation	*0.001*	*0.004*	*0.004*	*0.004*	*0.004*	*0.004*
Navigation	*0.001*	*0.014*	*0.014*	*0.014*	*0.014*	*0.014*
Memo items	**0.002**	**0.018**	**0.018**	**0.018**	**0.018**	**0.018**

* real data

5.4.9 SENSITIVITY ANALYSIS OF THE GHG EMISSION PROJECTIONS FOR WEM SCENARIO

A decomposition analysis tool was used for the sensitivity analysis preparation. More detailed sensitivity analysis will be provided in next submission of this report. Variation of GDP growth parameter has been used. Table 5.11 shows GDP growth in WEM scenario (low and high GDP growth). Low GDP values are in fact GDP values taken from PRIMES model and high GDP values are based on trend from PRIMES model.

Table 5.11: *Overview of GDP growth values used in the sensitivity analysis*

Mio Euro (2010)	2013	2015	2020	2025	2030	2035
WEM GDP	73 593	77 326	87 232	99 281	109 936	117 677
High GDP	73 593	80 367	90 662	103 185	114 260	122 305
Low GDP	73 593	74 400	83 931	95 524	105 777	113 224

Table 5.12: *Results of sensitivity analysis on total GHG emission projections excluding LULUCF using different GDP growth assumptions*

GHG emissions (Mt CO_2-eq)	2013	2015	2020	2025	2030	2035
Reference	43.76	43.97	44.13	45.19	46.22	46.93
Higher GDP	43.76	45.69	45.87	46.97	48.04	48.77
Lower GDP	43.76	42.3	42.46	43.48	44.47	45.15

5.5 SPECIFIC APPROACHES AND SOFTWARE MODELS FOR PARTICULAR SECTORS (METHODOLOGY)

5.5.1 ENERGY (EXCEPT FOR TRANSPORT) – MODEL MESSAGE[16]

Model MESSAGE is used for energy projections. Detailed description of model MESSAGE was presented in the Fifth National Communication of the Slovak Republic on Climate Change and the Report on Progress in achieving the Kyoto Protocol.

The energy sector and particularly CO_2 emissions represent the majority of national GHG emission balance. Therefore abatement of CO_2 has the most decisive impact on the national GHG reduction target. Stationary energy sources can be divided into following groups, each of them characterized with the different nature of CO_2 abatement possibilities:

[16] Detailed description of model MESSAGE was presented in the Fifth National Communication of the Slovak Republic on Climate Change and the Report on Progress in achieving the Kyoto Protocol, MŽP SR, Bratislava 2005 (www.enviro.gov.sk).

Electricity generation:

Large share of electricity is produced by the non-fossil energy sources such as nuclear and hydropower plants. The thermal coal power plants are used for regulation in grid. Due to the social priorities focused on ensuring the employment in coal mining sector Slovakia will still operate power plant to produce electricity by combustion of domestic lignite. The independent power producer (IPP) electricity generation is mainly operated by industrial and local combined heat and power (CHP), where heat demand represents the main driving force for generation level. The other non-fossil fuel generation units (wind, new small hydropower and PV) have only small share on total electricity generation.

The fuel mix and products (metal, carbonates consumption) from individual ETS sources were used as inputs into model, together with GHG and other emissions. The input data for ESD sources were based on the Energy Balance of the Statistical Office of the Slovak Republic.

Oil refinery:

There is only one oil refinery that is on-line connected with petrochemicals complex. The implementation of deep processing improvements in previous years resulted in increased production of light products, such as gasoline, gas oil for petrochemical application and in decrease of residual heating oil production. Consumption of residual heating oil significantly declined due the strict environmental legislation targets. The blending of fuels with biomass is applied in this refinery. CO_2 abatement for oil refinery was not considered in applied scenarios.

Gas utility:

Natural gas demand has increased in previous period and represents the main source for heat production in public and residential sectors. CO_2 emissions and CH_4 fugitive emissions from the gas utilities are connected with the gas transmission from Eastern to Western Europe and also distribution within Slovakia. Emission level will be dependant mostly on the volume of transport and in limited scale also by the implementing of specific measures mostly at the compress stations. The mitigation measures are for example measures to prevent methane leakage from pipelines, substituting electrical ignition to gaseous ignition.

Metallurgy:

There is one steel mill in Slovakia, US Steel Kosice. It is responsible for the largest share of CO_2 emissions for individual company. Production chain includes the coking battery, blast furnace and primary and secondary making processes of steel. The secondary gases as coking gas, blast furnace gas and converter gas originated from supplied coking coal are used in this company for CHP, technology heating, etc. Small share of cooking gas is exported to other company in its neighbourhood. Company is continuously investing in technology improvement. The fuel switching is limited to the large extent by the need of secondary usage of gases. Nevertheless some changes in production activities are considered. One possibility represents the exclusion of pig iron production which should lead to impressive CO_2 emission decrease but with the large negative impact on employment and national economy. Main focus during the modelling was given to following options:

- Fuel switch and co-combustion of coal with biomass;
- Implementation of new renewable energy sources such as biomass, wind, PV and geothermal;
- Demand side measures for the heat supply;
- Carbon capture and storage for electricity production.

Ranking of individual measures and their allocation into the scenarios were applied according to the installation business plan. Nevertheless, it has nothing to do with the ranking as occurred according to incremental abatement costs designed with the use of MESSAGE model. This approach was based on the following assumptions:

- Fuel price for individual fuels, based on national data;
- Fuel price escalation was based on the assumption of oil, gas and coal price escalation recommended by the European Commission for the Biennial Report 2015;
- CO_2 allowance prices were based on the European Commission's recommendation for the Biennial Report 2015;
- CO_2 abatement was calculated for the whole modelling period of 2010 – 2030.

The highest level of abatement can be achieved by implementing the biomass combustion or carbon capture and storage. The carbon capture and storage technology is considered for the WAM scenario as one theoretical option which is not yet considered in the electric utility business plan.

5.5.2 TRANSPORT – MODEL TREMOVE[17], COPERT IV[18] AND EXPERT'S JUDGMENT

TREMOVE is a transport and emissions simulation model developed for the European Commission. It is designed to study effects of different transport and environment policies on the emissions of the transport sector. The model estimates the transport demand, the modal split, the vehicle fleets, the vehicle stock renewal, the emissions of air pollutants and the welfare level under different policy scenarios. All relevant transport modes are modelled, including aviation. Maritime transport is treated in a separate model. TREMOVE covers the period of 1995 – 2030, with yearly intervals.

TREMOVE is a policy assessment model to study effects of different transport and environment policies on the emissions of the transport sector. The model can be applied for environmental and economic analysis of different policies, such as road pricing, public transport pricing, emission standards, subsidies for cleaner cars, etc.

The broad scope of the TREMOVE model makes it possible to assess integrated environmental policy packages covering the whole of Europe and all modes. On the other hand, the level of detail is sufficient to simulate effects of country- or mode-specific measures. Welfare costs of policies are calculated taking into account costs to transport users, transport suppliers, governments as well as the general public.

The strength of TREMOVE is that it is an integrated simulation model. The model simulates, in a coherent way for passenger and freight transport, the changes in volume of transport, modal choice and vehicle choice (size & technology) relative to transport and emissions baseline.

The transport demand module describes transport flows and the users' decision making process when it comes to making their modal choice. Starting from the baseline level of demand for passenger and freight transport per mode, period, region, etc., the module describes how the implementation of a policy measure will affect the users' and company's choice between these 388 different transport types. The key assumption here is that the transport users will select the volume of transport and their preferred mode, period, region, etc. based on the generalized price for each mode, such as cost, tax or subsidy and time cost per kilometres travelled. The output of the demand module consists of passenger kilometres (pkm) and ton kilometres (tkm) that are demanded per transport type for a given policy environment. The pkm and tkm are then converted into vehicle kilometres.

[17] http://www.tmleuven.be/methode/tremove/home.htm
[18] http://emisia.com/content/copert-documentation

The vehicle stock turnover module describes how changes in demand for transport or changes in vehicle price structure influence the share of age and type of vehicles in the stock. The output of the vehicle stock module is twofold; we split both the total fleet and the number of km for each year according to vehicle type and age.

The fuel consumption and emissions module is used to calculate fuel consumption and emissions based on the structure of the vehicle stock, number of kilometres driven by each vehicle type and driving conditions.

GHG emissions from road transport in annual inventory are calculated by method of EMEP/CORINAIR which is included in the program product for the calculation of emissions from road transport - COPERT IV. Therefore the name of method is the same as the name of model COPERT. Besides GHG emissions, the COPERT IV model calculates emissions of all current pollutants including limited pollutants (CO, NO_2, NOx, PM, HC), heavy metals and persistent organic pollutants, as well as exhaust and non-exhaust emissions. Determination of CO_2 emissions is in principle identical with the method of IPCC tier 2 according to Good Practice Guidelines 2000.

CH_4 and N_2O emissions are calculated for individual categories of vehicles and then they are summarised in order to calculate the total amount. Emission factors for CH_4 and N_2O according to model COPERT IV are different for different fuels, different vehicles and different levels of technology. In the case of CH_4 emissions, they also depend on average speed. In version COPERT 9.0, vehicle fleet is divided into six basic categories and 241 sub-categories according to the scale of city/town road and motorway operation. The calculation method makes use of technical data on individual categories and sub-categories of vehicles in combination with several parameters specific for particular country which makes use of this method.

These characteristics are as follows: vehicle park structure, age of vehicles, prevailing character of the operation, fuel parameters and climate conditions. The calculation of emissions is based on five basic parameters: total fuel consumption, vehicle park, driving conditions, emission factors and other parameters. Exhaust emissions from road transport are divided in two types, which are hot emissions produced by the engine of vehicles heated on the operational temperature and cold emissions from starting cold engine. These emissions are additional. The calculation of the emissions including CO_2 and partially also N_2O is based on fuel consumption.

5.5.3 AGRICULTURE – EXPERT'S SOFTWARE TOOL

Calculation of emission projections were based on the mathematical formulas and definitions described in the IPCC Guidelines for the land use and land use change categories. Emission factors, conversion factors are consistent with the factors used in emission inventory. The calculation tool is based on MS Excel platform and the calculation includes different PAMs (in numerical formulation) according to the scenarios WEM and WAM.

5.5.4 LULUCF – EXPERT'S SOFTWARE TOOL

Calculation of emission projections were based on the mathematical formulas and definitions described in the IPCC Guidelines for the land use and land use change categories. Emission factors, conversion factors are consistent with the factors used in emission inventory. The calculation tool is based on MS Excel platform and the calculation includes different PAMs (in numerical formulation) according to the scenarios WEM and WAM.

5.5.5 WASTE – EXPERT'S SOFTWARE TOOL

Calculation of emission projections were based on the mathematical formulas and definitions described in the IPCC Guidelines for Waste and waste water categories. The IPPC Waste Model was used for estimating emissions from disposal. Emission factors, conversion factors are consistent with the factors used in emission inventory. The calculation tool is based on MS Excel platform and the calculation includes different PAMs (in numerical formulation) according to the scenarios WEM.

5.5.6 DESCRIPTION OF THE QUALITY ASSURANCE AND QUALITY CONTROL ACTIVITIES

QA/QC process is not fully implemented yet (is in the process of development). However, input data from the national inventory are the subject of QA/QC process in the National Inventory System (NIS). Quality assurance and quality control activities are similar to the QA/QC procedure described in the National Inventory Report of the Slovak Republic.

Results of projections are verified in following steps:

- During preparation phase and during cooperation with experts.
- Input data approval by the MOE and the SHMU (projections coordinator).
- During adjusting and calibration of models.
- Data are send for approval to the Expert Group for Low-Carbon Strategy.
- Unclear issues are consulted on each step by interested parties (ministries, SHMU, co-operating research and expert institutions and external experts).

Basic QA/QC activities are also provided by the ETC/ACM and EEA after uploading of related reporting files to the CDR database.

6. PROVISION OF FINANCIAL, TECHNOLOGICAL AND CAPACITY BUILDING SUPPORT TO DEVELOPING COUNTRIES

The chapter provides information on the provision of financial, technological and capacity-building support to developing countries. It embraces information on climate related financial support which Slovakia provided to developing countries during the years 2013 and 2014. It also gives the overview of relevant climate related projects specifically aimed at addressing climate change or related activities that were primarily designed for other purposes, but are also contributing to the area of mitigation or adaptation process. Of the total portfolio, following activities were selected: activities in the field of climate change adaptation, mitigation projects, technology transfer support and capacity building projects for water, waste management, ecological agriculture, food security, afforestation and renewable energy sources development. Slovakia used the UNFCCC Common Tabular Formats (CTF) as the template for provision of public financial support attached to this submission.

6.1 APPROACH OF SLOVAKIA TO PROVISION OF CLIMATE FINANCE, INLUDING THE PROVISION OF NEW AND ADDITIONAL RESOURCES

Slovakia became a member of the community of donors providing assistance to developing countries with its accession to the OECD (2000), European Union (2004) and OECD Development Assistance Committee – DAC (2013). Preparatory process and the Membership in these organizations have made a significant contribution to the creation of the mechanism for Slovak Official Development Assistance (ODA). The policy of development assistance is in legislation governed by Act No. 617/2007 Coll., on ODA and amendment of Act No. 575/2001 Coll., on the Organization of Activities of the Government and Central State Administration, as amended.

For the period 2014 – 2018 there have been set 10 territorial priorities of the Slovak ODA within two main SlovakAid programmes:

1. Development Interventions Programme;
2. Transformation Experience Sharing Programme.

Slovak Republic cooperates with the following partner countries:

1. programme countries: Afghanistan, Kenya, Moldova;
2. project countries: Albania, Belarus, Bosnia and Herzegovina, Georgia, Kosovo, Ukraine;
3. country with exceptional humanitarian and development needs: South Sudan.

Slovak development cooperation will generally focus on the following seven areas:

- Education – training focusing on access to the labour market and self-employment, education of teachers and equipment of educational facilities;
- Healthcare - basic healthcare, nutrition programmes, education of the population and public awareness of prevention and healthcare, education of healthcare personnel;
- Good governance and building of civil society - public finance management, public sector reform, enhancement of rule of law and public participation in democratic processes, security sector reform, activities of civil experts within international crisis management;
- Agriculture and forestry - implementation of new techniques and methods, processing of

agricultural products with focus on their marketing and sales, food security, soil protection;

- Water and sanitation - drinking water supply, water and waste management;
- Energy – with focus on energy security and alternative resources;
- Support of market development of the environment, small and medium enterprises.

Development cooperation of the Slovak Republic during the period 2014 – 2018 is based on eight main programmes:

- Development Interventions Programme;
- Transformation Experience Sharing Programme;
- Business Partnership Programme;
- Humanitarian Aid Programme;
- Governmental Scholarships Programme;
- Programme for Sending Development Workers and Civil Experts to Developing Countries;
- Development Education and Public Awareness Programme;
- Capacity Building Programme.

Cooperation instruments for main programmes are:

- Block grants;
- Small grant scheme
- Financial contributions (micro-grants);
- Supply of goods and services;
- CETIR;
- Start Up;
- Trilateral cooperation;
- Earmarked contributions to international organisations;
- Slovak Republic - UNDP cooperation;
- Slovak Republic - EBRD Technical Cooperation Fund;
- Loans with a grant element;
- Financial contributions;
- Financing scholarships.

The Slovak Republic also participates in development activities of the international community through the EU and international organisations and institutions. Multilateral development cooperation can be perceived as an instrument for support of those developing countries and sectors in which it is not effective for the Slovak Republic to act on a bilateral basis. Assistance in the form of multilateral contributions has made up approximately 75 % of the total Slovak ODA. Priority of the Slovak Republic in multilateral development assistance is to increase the engagement of Slovak entities in the programmes and projects of the EU, UN and other international organisations and international financial institutions. The goal of the Slovak Republic is to actively participate in the decision-making process of the EU, multilateral organisations and institutions to which it contributes, and which reflect Slovak attitudes, values and priorities of foreign policy and development cooperation in specific activities of these international organisations.[19]

[19] https://www.mzv.sk/web/en/foreign_policy/slovak_aid

6.2 FINANCIAL RESOURCES

6.2.1 PROVISION OF FINANCIAL SUPPORT THROUGH MULTILATERAL CHANNELS

Slovakia defines those financial contributions as being climate specific which funded climate relative activity defined as mitigation, adaptation, cross-cutting or other climate specific activity. If there are climate specific contributions reported in Second Biennial Update Report, core/general and climate specific data should be mutually exclusive – funds should only be reported in one of the categories. Slovakia concerns some of the multilateral as well as bilateral contributions as climate specific. Climate specific category concerns contributions to multilateral climate funds and dedicated projects managed by multilateral institutions, for instance in 2013 and 2014 Slovakia contributed to Montreal Protocol Multilateral Fund, Montreal Protocol Trust Fund, UNFCCC, Kyoto Protocol under UNFCCC, World Meteorological Organisation (WMO) and funded 5 climate relative projects through the European Bank for Reconstruction and Development (EBRD).

The total climate specific financial contribution provided by the Slovakia to developing countries Parties to the UNFCCC through multilateral channels in the years 2013 – 2014 was 643 942 € (684 574 $). Of this support, 264 997 € (281 718 $) was directed to mitigation, 228 476 € (242 893 $) to adaptation and 150 469 € (159 963 $) to cross-cutting. In 2013 – 2014 Slovakia provided 305 225 € (324 484 $) core contributions to multilateral organizations, including to the operating entities of the financial mechanism of the UNFCCC. Detailed financial support provided through multilateral channels is included in the CTF Table 7a attached to this submission.

6.2.2 PROVISION OF FINANCIAL SUPPORT THROUGH BILATERAL CHANNELS

With respect to bilateral contribution, Slovakia funded climate related study programmes for foreign students, capacity building projects and technology transfer in different developing countries. The total support by the Slovakia to developing country Parties to the UNFCCC through bilateral channels in 2013 and 2014 was 1 912 313 € (2 032 979 $). Of this support, 297 606 € (316 385 $) was directed to mitigation and 1 614 707 € (1 716 594 $) to adaptation. Detailed financial support provided through bilateral channels is included in the CTF Table 7b attached to this submission.

6.3 TECHNOLOGY DEVELOPMENT AND TRANSFER

All the Slovak bilateral and multilateral climate financial support provided to developing countries in 2013 and 2014 was channelled through the Official Development Assistance (ODA) in accordance with the OECD DAC methodology. In order to get better picture of the support for capacity building and technology transfer activities, we reflected the information in a separate tables, CTF Table 8 – technology development and transfer, and CTF Table 9 – capacity building. CTF Table 8 and CTF Table 9 attached to this submission.

6.3.1 SLOVAKIA FUNDED TECHNOLOGY TRANSFER INITIATIVES AND PROGRAMME

Macedonia and Moldova, Programme 05T04, 2014, 28 808 €

The Programme focuses on capacity building and technical support of databases on nutritional composition of food in Moldova and Macedonia. The method of implementation focuses on three main areas – Capacity building, training support and software development. In Macedonia, University of St. Cyril and Methodius, Slovakia arranged training for two employees. In Moldova, Technical University of Moldova, Slovakia provided the database programme Daris and supported the development and utilization of the food database. This initiative is important as there is no functioning specialized database workplace in these countries.

6.4 CAPACITY BUILDING

In the years 2013 – 2014, the Slovak Republic has implemented more than 30 capacity building projects, mainly in the form of bilateral cooperation - see CTF Table 7a and 9 attached to this submission. All of them have been realized under the Official Development Assistance on the basis of open calls of the Slovak Agency for International Development Cooperation. Another form of support is scholarships that Ministry of Education, Science, Research and Sport of the Slovak Republic provided to students from developing countries, which represent territorial priorities for ODA. All of the scholarships were provided to students whose study programme was environmental oriented, for example agricultural machinery, environmental science, geodesy and cartography, land protection and land use, environmental planning and other. In addition, there were also 5 projects implemented through multilateral channels, in particular through the European Bank for Reconstruction and Development. Their reports are presented in the CTF Table 7a attached to this submission.

6.4.1 SLOVAKIA FUNDED CAPACITY BUILDING INITIATIVES AND PROGRAMME

Kyrgyz Republic, SK-EBRD, ODA, 2014, 74 795 €

Example of a climate relevant support in the form of capacity building is derived from a Technical Cooperation Fund (grant) managed by the European Bank for Reconstruction and Development with the focus on capacity enhancement of the Kyrgyz Civil Society Organisation Camp Alatoo regarding residential energy efficiency. See the CTF Table 9 attached to this submission.

Ministry of Education, Science, Research and Sport, Inter-ministerial Programme SR 05T 08, ODA, 2014, 156 415 €

The programme is aimed at providing governmental scholarships to students from developing countries - recipients of ODA. The scholarships were given to students from 17 different developing countries that could choose from several study programmes aimed at protection of the environment, ecology and environmental sciences. A part of the financial contribution was provided at the beginning of their study and the second part after the graduation. Financial contribution was also provided to public universities to cover their additional costs. See the CTF Table 9 attached to this submission.

All the provided bilateral and multilateral climate finance implicated in the Second Biennial Update Report has the status *provided*, as all of the Slovak financial contribution has been already paid up.

At the moment Slovakia does not possess any information on climate related private finance mobilization, therefore this Biennial Update Report embraces only the financial support from the public sector.

ANNEX 1: CTF TABLES FOR THE SECOND BIENNIAL REPORT OF THE SLOVAK REPUBLIC

Overview on CTF tables provided with the first Biennial Report:

CTF Table 1:	Emission trends
CTF Table 2:	Description of quantified economy-wide emission reduction target
CTF Table 3:	Progress in achievement of the quantified economy-wide emission reduction target: information on mitigation actions and their effects
CTF Table 4:	Reporting on progress
CTF Table 4(a)II:	Progress in achievement of the quantified economy-wide emission reduction targets – further information on mitigation actions relevant to the counting of emissions and removals from the land use, land-use change and forestry sector in relation to activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol
CTF Table 4(b):	Reporting on progress
CTF Table 5:	Summary of key variables and assumptions used in the projections analysis
CTF Table 6(a)/(c):	Information on updated greenhouse gas projections under a 'with measures' scenario and under a 'with additional measures' scenario
CTF Table 7:	Provision of public financial support: summary information
CTF Table 7(a):	Provision of public financial support: contribution through multilateral channels
CTF Table 7(b):	Provision of public financial support: contribution through bilateral, regional and other channels
CTF Table 8:	Provision of public financial support: provision of technology development and transfer support
CTF Table 9:	Provision of public financial support: capacity – building support