Ministry of Environment and Water of Bulgaria

Bulgaria's

SECOND BIENNIAL REPORT

In Compliance with the Obligations under the United Nations Framework Convention on Climate Change According to Decisions 2/CP.17 and 19/CP.18 Of the Conference of the Parties

12/29/2015

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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 Bulgaria (BG_BR2) 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);
- Provisions of financial, technological and capacity-building support to developing country Parties (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 BR2 of Bulgaria.

2. INFORMATION ON GHG EMISSIONS AND TRENDS, AND THE 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 Bulgaria 2015, chapter 1, submitted to the UNFCCC on November 6, 2015. The greenhouse gas data presented in this chapter are consistent with the 2015 GHG inventory submission of Bulgaria to the United Nations Framework Convention on Climate Change (UNFCCC) Secretariat submitted on November 6, 2015 in the CRF Tables.

2.1. SUMMARY INFORMATION ON GHG EMISSIONS TRENDS

2.1.1. TRENDS IN GREENHOUSE GAS EMISSIONS

Description and interpretation of emission trends for aggregated greenhouse gas emissions
In 2013 Bulgaria's greenhouse gas emissions totalled 55 901,98 Gg CO2 without reporting of sequestration from LULUCF sector. The emissions decreased by 53,73 % compared with the base year. Emissions in 2013 were 9.4 % decrease in comparison with the emissions of the previous year.

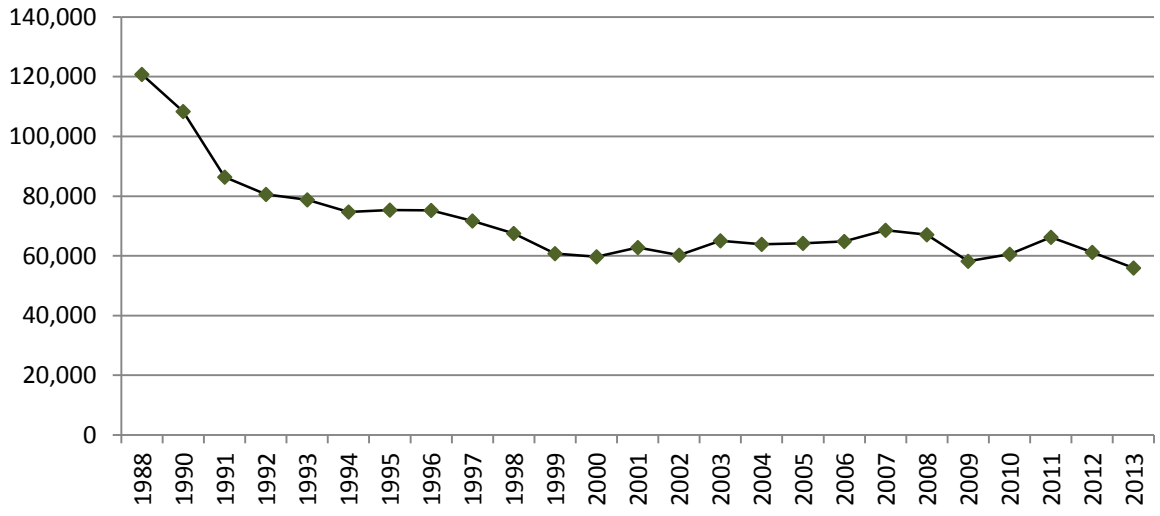


Figure 1 Total GHG emissions (without LULUCF) for 1988 – 2013, Gg CO_2 eq.

The net emissions including reporting of sequestration from LULUCF sector were 46 598, 56 Gg CO2 eq. The emissions decreased by 56.21 % compared with the base year.

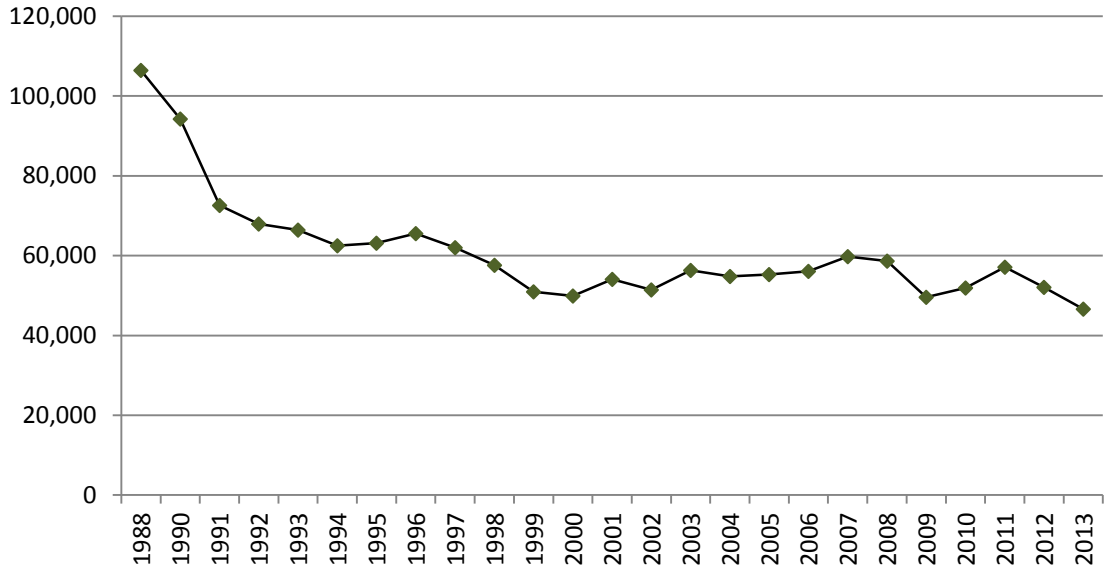


Figure 2 Total GHG emissions (with LULUCF) for 1988 – 2013, Gg CO_2 eq.

The main reasons for the declining GHG emission trend in Bulgaria are the structural economic changes due to the radical transition process from a centrally-planned economy to a market-based economy. This led to a decrease of power production from thermal power stations (and an increase of the shares of hydropower and nuclear power), structural changes in industry (including a decline in production by energy-intensive enterprises and energy - efficiency improvements), introduction of energy efficiency measures in the residential sector and a shift form solid and liquid fuels to natural gas in energy consumption. This also led to a decrease in GHG emissions from the agricultural sector stemming from the decline in the cattle and sheep populations and the use of fertilizers.

Bulgaria experienced a steady declining population trend during the period 1990-2013, which resulted in the reduction of population by 16%.

2.1.2. DESCRIPTION AND INTERPRETATION OF EMISSION TRENDS BY GAS

The most important greenhouse gas in Bulgaria is carbon dioxide. The share of CO_2 emissions from the total greenhouse gas emissions varies around 76% excluding LULUCF and 60% including LULUCF. In absolute terms CO_2 emissions have decreased 52.9% since 1988. Around 70% of total CO_2 eq emissions originate from the Energy sector. The amount of energy-related CO_2 emissions has fluctuated much

according to the economic trend, the energy supply structure (including electricity exports) and climate conditions.

Methane emissions (CH_4) have decreased by 58% from the 1988 level. This is mainly due to the improvements in waste collection and treatment and a reduction in animal husbandry in the Agriculture sector. Correspondingly, emissions of nitrous oxide (N_2O) have also decreased by 62% which has been occasioned mostly by the reduced nitrogen fertilisation of agricultural fields, the biggest decline was in the beginning of time series.

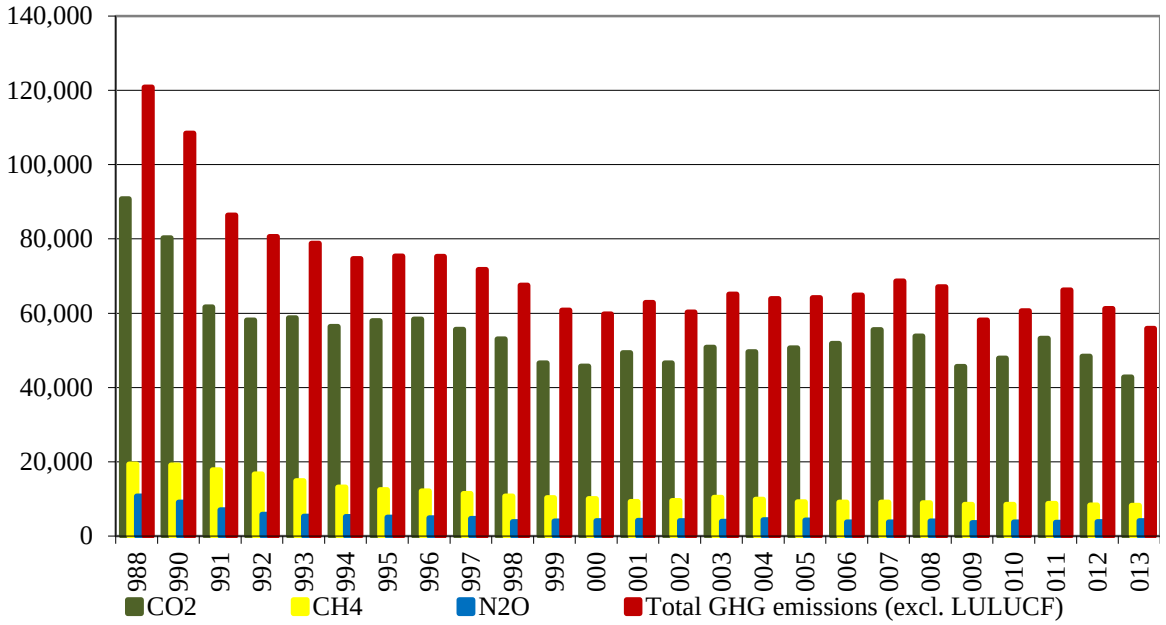


Figure 3 Total GHG emissions in Gg CO2 eq. for 1988 – 2013

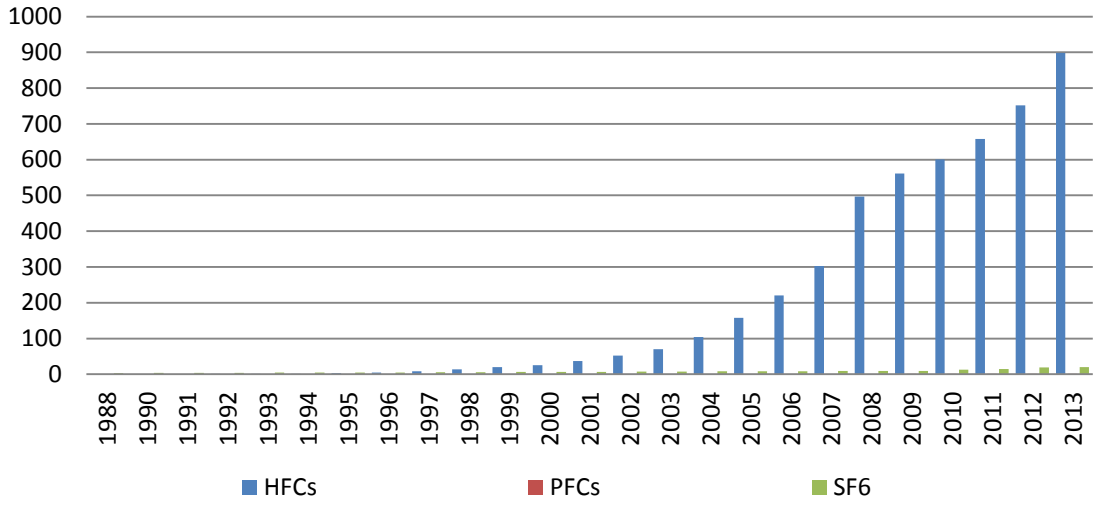


Figure 4 Actual emissions of HFCs, PFCs and SF6 for 1988 – 2013, Gg CO2 eq.

The emissions of F-gases have increased over tenfold during 1995-2013. A key driver behind the trend has been the substitution of ozone depleting substances (ODS) by F-gases in many applications.

2.1.3. DESCRIPTION AND INTERPRETATION OF EMISSION TRENDS BY CATEGORY

Figure 5 below shows the GHG aggregated emission trends by IPCC sectors. The Energy sector, where GHG emissions come from fuel combustion, headed the list in 2013 with the biggest share – 73.6%. Sector Agriculture ranked the second place with 10.6% and sectors Waste ranked the third place with 8% and IP with 7.7 %.

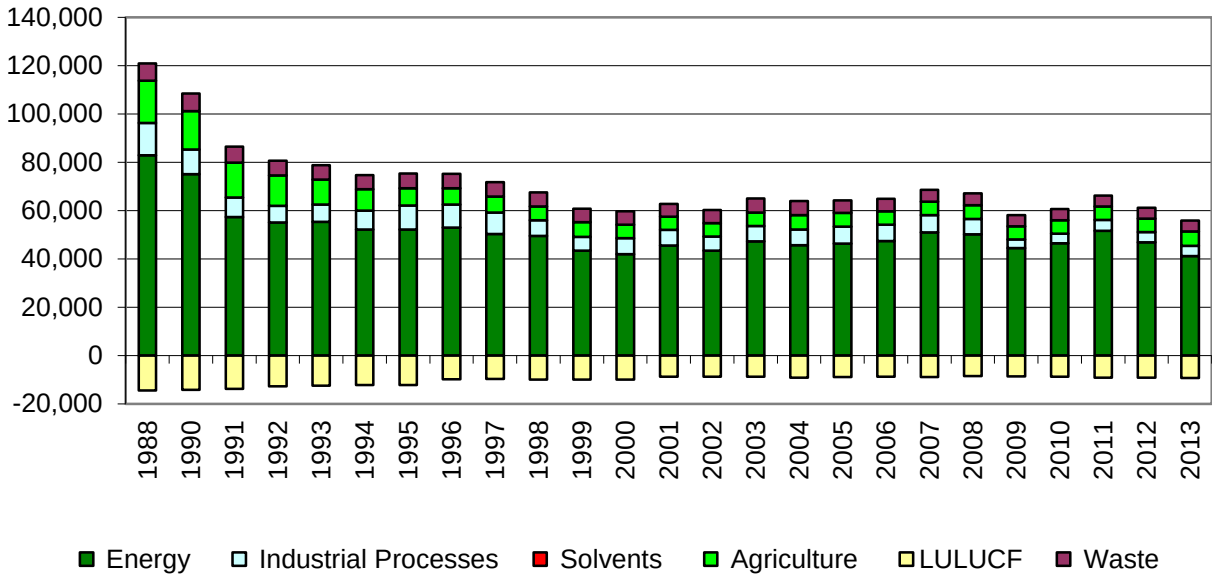


Figure 5 Total greenhouse gas emissions in CO_2-eq. per IPCC sector 1988-2013

Table 1 The reductions of GHG emissions by sectors by base year

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	Change from base to latest reported year
1. Energy	-50,40
2. Industrial Processes	-67,51
3. Solvent and Other Product Use	-65,97
4. Agriculture	-35,40
5. Land Use, Land-Use Change and Forestry(5)	-36,86

6. Waste	-50,40
7. Other	0,00
Total (including LULUCF)	-56,21

ENERGY

Emissions from the energy sector in 2013 decreased by 50.4% compared to the base year (41 123 Gg CO2e in 2013 compared to 82 906 Gg CO2e in 1988). Compared to previous year, the emissions in 2013 decreased with 12.2% mostly due to the decrease of electricity production from fossil fuels in the energy industries sector Main source of emissions in the energy sector is fuel combustion of solid fuels, which is responsible for 62.2% of the emissions from fuel combustion in 2013, followed by liquid fuels with 25.3% and gaseous fuels with 11.6%

The main reasons for the decrease of the GHG emission trend in energy sector are the transition from a centrally-planned economy to a market-based economy, reconstructing of the economy and subsequent economic slowdown. This led to a sharp drop in demand for electricity production from thermal power production.

The trend of GHG emissions between 1988 and 2013 was defined by a substantial decrease of emissions from fuel combustion in energy industries (35%) and energy use in manufacturing industry and construction (83%) and in other sectors (70%), as well as a clear increase in GHG emissions from transport (0.9%).

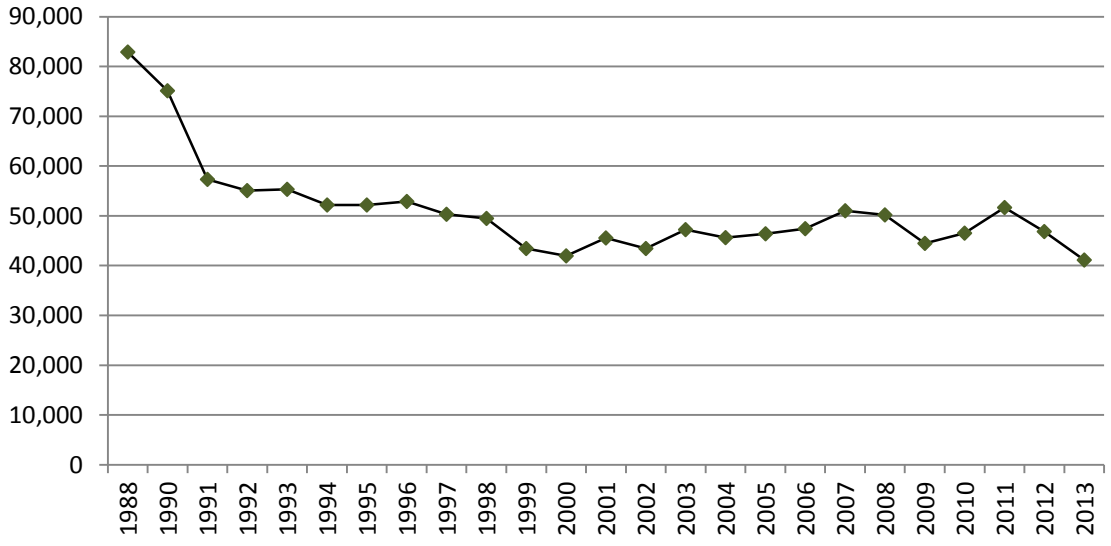


Figure 6 GHG emissions from Energy sector for 1988 – 2012, Gg CO_2 eq.

Chapter 3 of Bulgaria's National Inventory Report 2015 contains a more detailed analysis of GHG emissions in the sector.

INDUSTRIAL PROCESSES AND PRODUCT USE

A steady trend towards emission reduction in this sector is observed since 1988. The emissions in 2013 decreased with 68% compared to the base year.

In the year 2013, 7.7% of national total greenhouse gas emissions (without LULUCF) originated from industrial processes and product use, compared to 11% in the base year 1988. In 2013, greenhouse gas emissions from Industrial Processes and Product use are 4 324,51 CO_2 equivalent compared to 13 311,90 Gg CO_2 in the base year.

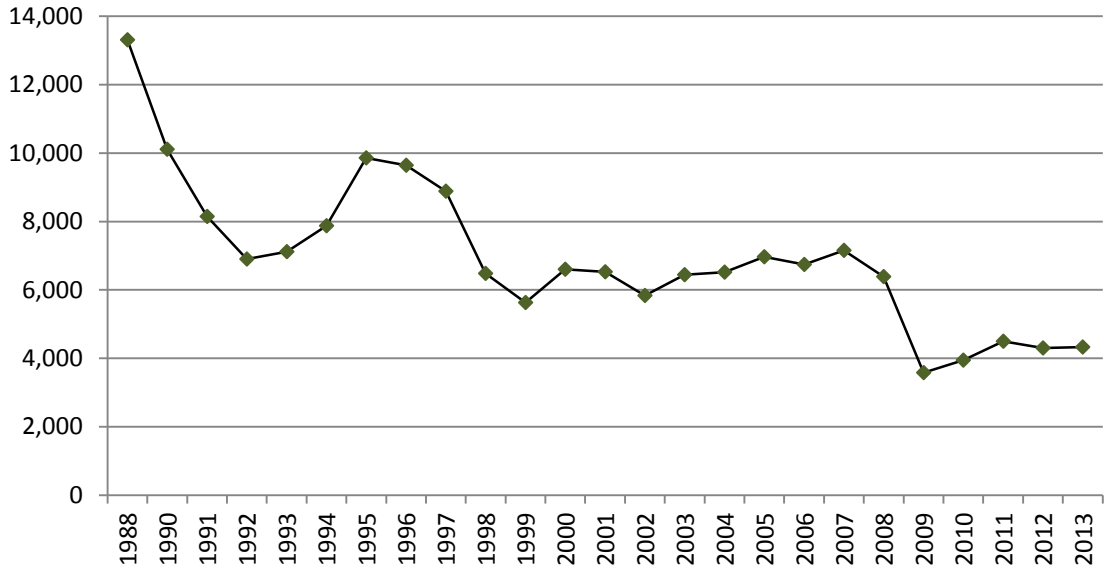


Figure 7 GHG emissions from Industrial processes sector for 1988 – 2013, Gg CO_2 eq.

In 2013 the most important emitting category is Mineral products (mainly production of clinker and quick lime), which share in the total Industrial processes and product use emissions is 44%. The second category by share is Chemical Industry (ammonia and nitric acid production) with 33%, followed by Consumption of Halocarbons and SF_6 with 20.8% share and finally Metal Production (steel) with 0.3%. Greenhouse gas emissions from the Industrial Processes and product use sector fluctuate during the period and reach a minimum in 2009. The reduction in 2013 for the whole sector is 68% while the biggest reduction (compared to the base year) can be seen in Metal Production category – 99%.

This is mainly due to economic crisis and in particular the world economic crisis in 2009. The periods around 1989/1991 and 1997/1999 represent the economic crisis time after which stabilization and

increase in the production rates begins. After 1996 a process of privatization begins which leads to decrease in the plants' production. This process is followed by restructuring and modernization of the production while at the same time some of the enterprises cease operation.

The general reduction in the emissions in the later years of the time period is influenced also by the starting introduction of better technologies on plant level

AGRICULTURE

The overall emission reduction in the sector has amounted to 66% since 1988. In the year 2013 the sector agriculture contributed 10.6% to the total of Bulgaria's greenhouse gas emissions (without LULUCF).

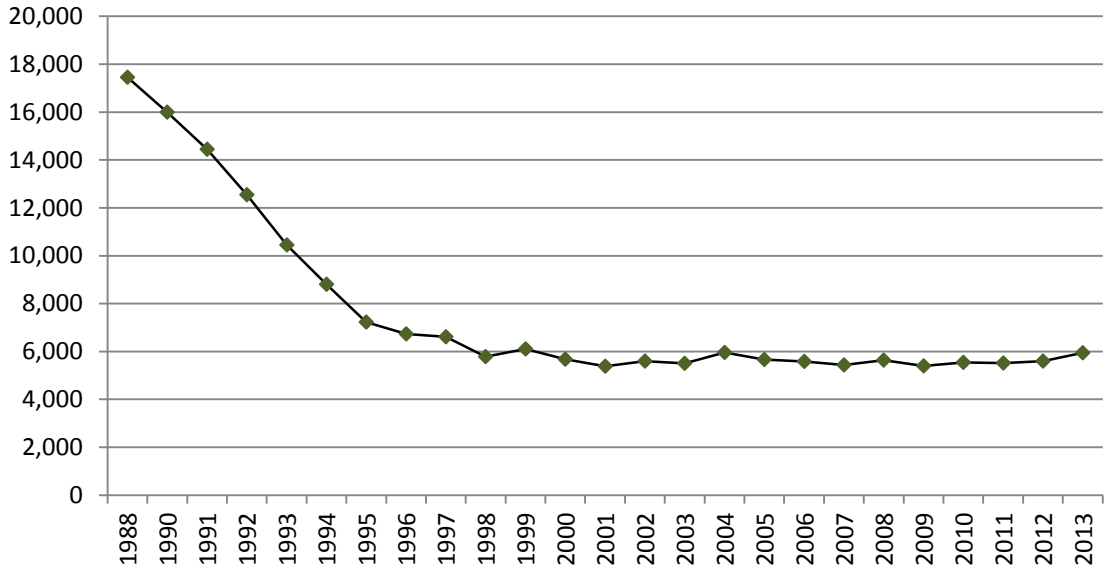


Figure 8 GHG emissions from Agriculture sector for 1988 – 2013, Gg CO_2 eq.

The emission reductions were mainly driven by systematic declines in the agricultural land area due to abandoning of arable lands and reduction in livestock population. Another driver for the emission reduction was the decline in the use of fertilizers.

Chapter 6 of this Report contains a more detailed analysis of GHG emissions in the sector.

LAND-USE CHANGE AND FORESTRY

The LULUCF sector is serving as a sink of greenhouse gases for Bulgaria. The two categories – "Forest land" and "Grassland" are removals of CO_2. All other categories are sources of CO2 emissions. The trend of net CO_2 removals (CO_2 eq) from LULUCF decreases by 35.4% compared to the base year. The main

reason for the overall decrease of the uptakes of CO_2 emissions from LULUCF is due to the fall in removals from category Forest land and the slight increase in emissions from CL, WL and SM categories. The key driver for the fall in removals from FL is the observed decline in the rate of forest growth as the average age of the forest stands increases steadily over the reporting period. In spite of the decrease observed, the share of the removals from the total GHG emissions (in CO_2eq) is still remarkable. The reason for this is that the emissions in the other sectors have dropped dramatically. The share of the removals in the base year has the figure of -11,3% from the total GHG emissions in CO_2-eq, while in the inventoried year the share is -13.5%.

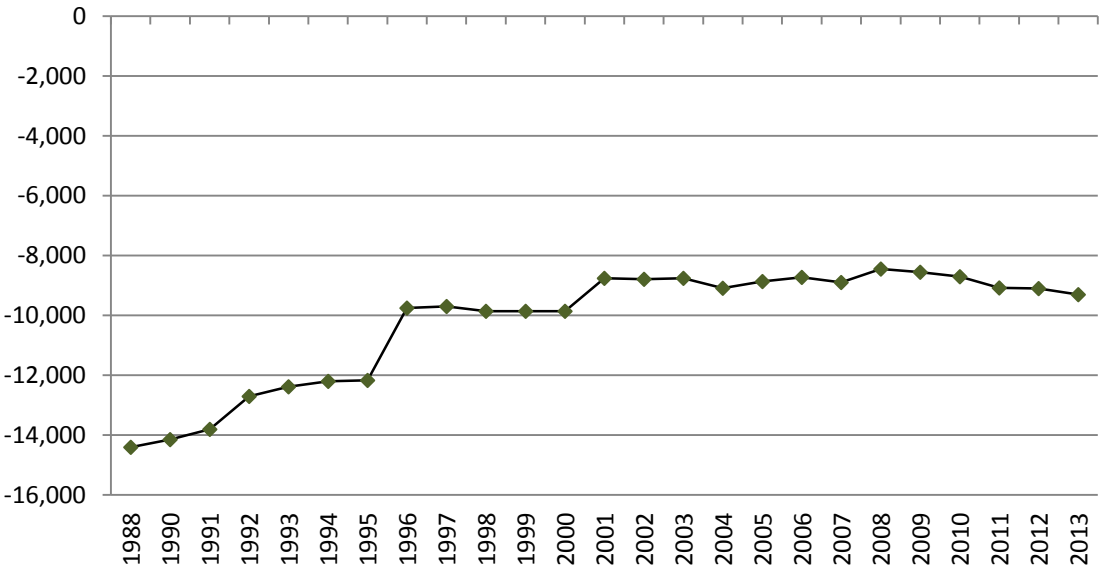


Figure 9 LULUCF emissions and removals for 1988 – 2013 CO_2 eq.

Comparing with the base year an increase in the emissions in croplands, settlements and wetlands is observed. The total emissions from croplands fluctuate during the whole time series. The emissions from Settlements increase last couple of years due to changes from other land uses to Settlements according to the risen infrastructural activities since Bulgaria's joined the EU.

Chapter 7 of Bulgaria's National Inventory Report 2015 contains a more detailed analysis of GHG emissions in the sector.

Waste

The total sector emission reduction from the base year is 36.9 %. The decline was mainly driven by a steady population decline over the past 10 years.

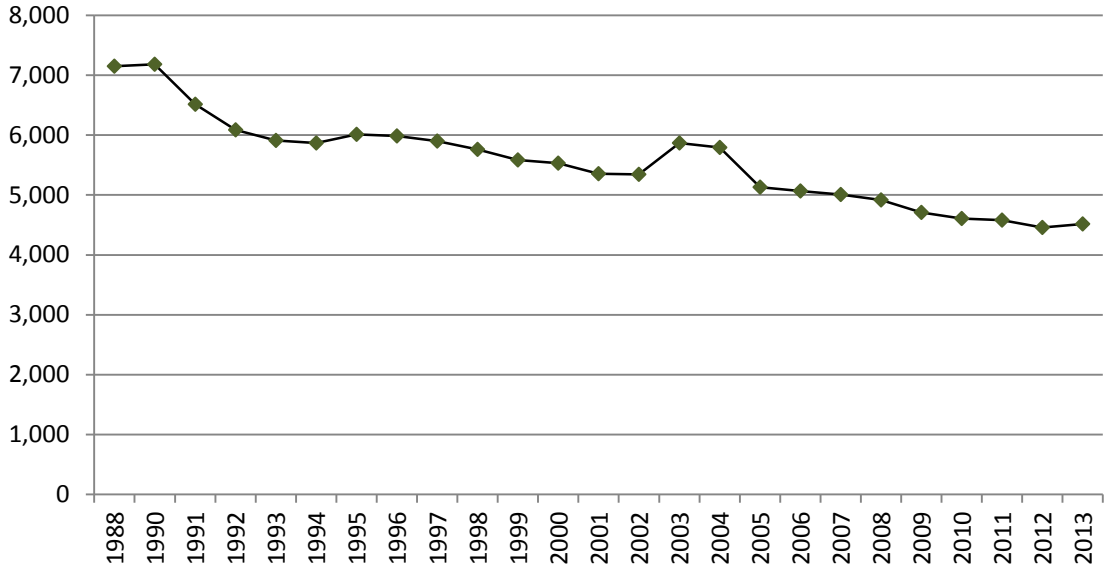


Figure 10 GHG emissions from Waste sector for 1988 – 2013, Gg CO_2 eq.

Chapter 8 of Bulgaria's National Inventory Report 2015 contains a more detailed analysis of GHG emissions in the sector.

2.1.4. DESCRIPTION AND INTERPRETATION OF EMISSION TRENDS FOR INDIRECT GREENHOUSE GASES AND SO_2

Compared to the base year the emissions of non-GHGs emissions decreased as follows:

- NO_x with 52%
- CO with 84%
- SO_x with 7%
- NMVOC with 92%

2.1.5. DESCRIPTION AND INTERPRETATION OF EMISSION TRENDS FOR KP-LULUCF INVENTORY IN AGGREGATE AND BY ACTIVITY, AND BY GAS

Bulgaria is chosen to report under Article 3.3 of the Kyoto Protocol the coverage of carbon pools and emission sources reported under afforestation (A), reforestation (R) and deforestation (D). In accordance with Article 7 KP of the country will report in the National Inventories the following activities, as given in Decision 16/CMP.1 Land use, land-use change and forestry.

Emissions and removals from KP-LULUCF activities are described in Chapter 11of Bulgaria's National Inventory Report 2015.

2.2. NATIONAL INVENTORY ARRANGEMENTS

REQUIREMENTS FOR NATIONAL SYSTEMS FOR GREENHOUSE GAS INVENTORIES AS SPECIFIED IN THE GUIDELINES FOR ARTICLE 5.1 OF THE KYOTO PROTOCOL

The Bulgarian National Inventory System (BGNIS) is developed following the requirements of the provisions of Decision 19/CMP.1 Guidelines for national systems under Article 5, paragraph 1, of the Kyoto Protocol.

In order to reinstate the eligibility under Kyoto Protocol a Compliance Action Plan for ensuring the effective and timely functioning of BGNIS in accordance with the requirements of Article 5.1 of the Kyoto Protocol and Decision 19/CMP.1 was developed and implemented in 2010.

The conclusions and recommendations of ERT set out in the Report of the individual review of the 2010 annual submission of Bulgaria (FCCC/ARR/2010/BGR) indicate that all activities for improvements of institutional, legal and procedural arrangements within the National Inventory System as well as for improvement of quality of inventory are adequately planned and implemented by the Bulgarian government in 2010.

The main results are written in the paragraph §203 from the annual review report FCCC/ARR/2010/BGR - "The ERT concludes that the national system of Bulgaria is performing its required general and specific functions, as set out in the annex to decision 19/CMP.1 with respect to the institutional, legal and procedural arrangements to perform these functions; that the institutional, legal and procedural arrangements established and formalized by the "Ordinance on the way and order of organization of the national inventories of hazardous substances from greenhouse gases in the ambient air" (Ordinance No. 215) that entered into force on 21 September 2010 are fully operational; and that Bulgaria has in place the institutional arrangements and the capacity, including the arrangements for the technical competence of staff involved in the national system, to plan, prepare and manage inventories on an annual basis". As a result from implemented activities for improvements "No questions of implementation were identified by the ERT during the review" (FCCC/ARR/2010/BGR § 207).

In accordance with Decision of Enforcement Branch CC-2010-1-17/Bulgaria/EB from 4 February 2011 Bulgaria is now fully eligible to participate in the mechanisms under Articles 6, 12, and 17 of the Kyoto Protocol.

The activities for improvement of quality of GHGs inventory are planned in order to implement the recommendations of the Expert Review Team set out in the annual review report FCCC/ARR/2014/BGR.

HISTORY OF GHG INVENTORY PREPARATION

The Bulgarian National Inventory System changed over time two times because of decisions of the particular government. In the following table the national circumstances are outlined:

BGNIS until 2007 (submission 2007)	**Present BGNIS (submission 2008-2015)**	**Prospected BGNIS**
←	Centralized inventory	→
Single institute	Single agency	→
Out-sourced inventory	In-sourced inventory	→
Private consultants	**Public/Governmental** (submission with cooperation of consultants)	→
National Inventory Focal Point: Private consultants	National Inventory Focal Point: ExEA	→
←	National Focal Point: MEW	→

Until 2007 the national emissions inventory as well as the relevant NIR under UNFCCC was prepared by an external company through an open tender procedure under the rules of the Public Procurement Law. Since 2008 the Executive Environment Agency (ExEA) is responsible for the whole process of inventory planning, preparation and management.

The national system defines the "road map" in which Bulgaria prepares its inventory. This is outlined in the national inventory preparation cycle (see below part Fulfilment of paragraph 10(a) from Decision 19/CMP.1 Guidelines for national systems under Article 5, paragraph 1, of the Kyoto Protocol).

As it is illustrated in figure 11 and outlined in the following chapters the preparation of the inventory has an institutional "home" that is ultimately responsible for managing the process and has a legal authority to collect data and submit it on behalf of the Bulgaria.

Bulgaria's reporting obligations to the UNFCCC, UNECE and EC are being administered by the MEW. All activities on preparation of GHG inventory in Bulgaria are coordinated and managed on the state level by MEW.

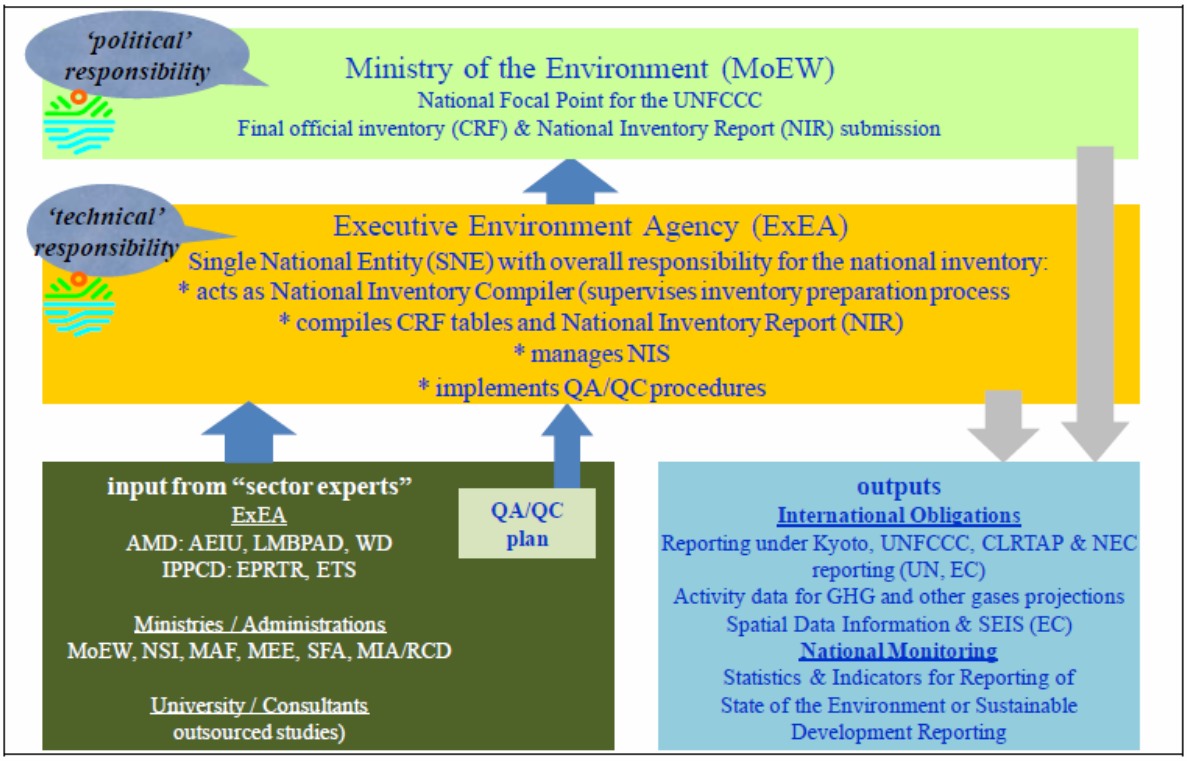


Figure 11 Organizational Chart of the Bulgarian National Inventory System

The Bulgarian Government by MEW (Climate Change Policy Directorate) has the political responsibility for compliance with commitments under the UNFCCC and the Kyoto Protocol, including for functioning of BGNIS in accordance with the requirements of Decision 19/CMP.1 under Article 5, paragraph 1, of the Kyoto Protocol. In order to meet all challenges in this sphere, the Climate Change Policy has been transformed in a separate directorate and its staff has been increased with 6 experts. Now, it consists of 10 persons in total.

The following strategic goals in climate change area were achieved by the Ministry of Environment and Water in 2013:

Climate change mitigation law

Climate change mitigation law adopted on first reading in the National Assembly on 23.10.2013, the in order to incorporate the requirements of the new legislation in 2013. It regulates public relations in implementation of the policy on climate change - powers and duties of the competent authorities and individuals. Absolute prerequisite for the timely implementation of Bulgaria's obligations as a party to the UNFCCC and the Kyoto Protocol and as a country - member of the European Union, is the effective involvement of the competent authorities and private operators in the procedures, which requires clear and comprehensive regulation of their powers, rights and obligations. As a member of the European

Union the Republic of Bulgaria has a number of obligations on the legislative package "Climate & Energy" and participating in the scheme for trading greenhouse gas emissions within the European Union (EU ETS), introduced by Directive 2003/87 / EC. This fact is linked to the performance of many obligations that form the whole sector in climate policy and the implementation of which our country should strike a balance between the interests of industry and the ambitious EU targets for the progressive reduction of greenhouse gases.

National Green Investment Scheme

In order to exploit the possibilities for financing projects to reduce greenhouse gas emissions through the National Green Investment Scheme is a decision of the Council of Ministers № 546/12 September 2013 for addition to the agreement with Austria for the purchase of AAUs in Scheme green investments. It is accepted and a decision of the Council of Ministers № 547/12 September 2013 in connection with the implementation of projects under the Green Investment Scheme.

Finance 40 public and 4 private projects. Public projects to improve energy efficiency in municipal buildings, kindergartens and primary schools. Funded projects are 32 municipalities with 78 sites.

National adaptation strategy

Steps have been taken to prepare national adaptation strategies in order to determine the necessary adaptation measures for vulnerable sectors to the impacts of changing climatic conditions in the region and climatic zone (due to climate change). As a first step was draft document "Analysis of the contribution of the insurance sector and financial instruments to the prevention of risks posed by climate change and the management of loss and damage in Bulgaria" prepared by the Ministry, with the support of the World Bank. His purpose is to analyse the role and importance of the insurance business for the prevention of risks that occur as a result of climate change and taking measures to adapt. The analysis will be included in the national adaptation strategy.

The ExEA has been identified as the responsible organization for preparation of Bulgaria's National GHG Inventory under the UNFCCC and the Kyoto Protocol and designated as single national entity.

The ExEA is represented and managed by an Executive Director

The ExEA's directorates and departments, which are directly involved in operation of the BGNIS are

Environmental Monitoring and Assessment Directorate with the Emission Inventory Department (EID) and Waste Department (WD) and

Permit Regime Directorate with the **Integrated Pollution Prevention and Control Department** (IPPCD) and **Emission Trading Permit Department** (ETPD).

More detailed information on inventory data and inventory arrangements can be found in the Bulgarian National Inventory Report 2015 and in Bulgarian Sixth national communication on climate change united nations framework convention on climate change.

3. QUANTIFIED ECONOMY-WIDE EMISSION REDUCTION TARGET

Under the UNFCCC, the EU and its Member States have taken a joint emission reduction target to reduce its GHG emissions by **at least 20% compared to 1990 by 2020**, with a **conditional offer to move to a 30% reduction**, provided that other developed countries commit themselves to comparable emission reductions and developing countries contribute adequately according to their responsibilities and respective capabilities. This is documented in the UNFCCC revised notes on the "Compilation of economy-wide emission reduction targets to be implemented by Parties included in Annex I to the Convention"[1].

No individual quantified economy-wide reduction target is set for Bulgaria as this 20 % reduction target will be fulfilled jointly by the EU and its Member States.

The EU quantified economy-wide emission reduction target is implemented through the **EU Climate and Energy Package**. The package underpins the EU implementation of the target under the Convention. The 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 the European Union Emission Trading Scheme (EU ETS) and the Effort Sharing Decision (ESD) sectors. These two sub-targets are:

- a 21 % reduction target compared to 2005 for emissions covered by the ETS (including domestic and international aviation);
- a 10 % reduction target compared to 2005 for ESD sectors, shared between the 28 Member States (MS) through individual national GHG targets.

Emission reduction targets under the Effort Sharing Decision

The Effort Sharing Decision No 406/2009/EC, on the effort of Member States to reduce their GHG emissions to meet the Community's GHG emission reduction commitments up to 2020 was adopted on 23 April 2009. The ESD sets binding annual greenhouse gas emission targets for each Member State for the period 2013-2020. By 2020, the **national targets will collectively**

[1] FCCC/SB/2011/INF.1/Rev.1 of 7 June 2011. and FCCC/SBSTA/2014/INF.6

deliver a reduction of around 10 % in total EU emissions from the sectors not included in the EU ETS compared with 2005 levels.

The targets are distributed according to the principle of 'solidarity' in a 'fair and equitable' way allowing for further, accelerated growth in less wealthy countries where economic development still needs to catch up with other Member States. That means that Member States with a low Gross Domestic Product (GDP) per capita will be allowed to emit more than they did in 2005 although these 'positive' limits should still require a reduction effort. Thus, **under the ESD, Bulgaria has a reduction target of not exceeding 20 % by 2020 compared with 2005 for emissions from sectors not covered by the EU ETS.** Bulgaria's Annual Emission Allocation (AEA) for the year 2013 calculated applying global warming potential values from the fourth IPCC assessment report is 28 661 817 AEA. More detailed information on Bulgaria' Annual Emissions Allocations for the period from 2013 to 2020 is provided in *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.*

The Member States' targets under the ESD are translated into an annual emission budget for each Member State. The budget, the so-called Annual Emission Allocation (AEA), corresponds to the absolute amount of emissions allowed to that Member State. The Annual Emission Allocation units, corresponds to one ton of CO_2 each, can be traded between Member States.

Emission reduction targets under the European Union Emission Trading Scheme

The EU ETS is a market based mechanism setting a cap on the total amount of greenhouse gases that can be emitted by operators (factories and other installation in the system) in the EU. As a result, total emissions cannot exceed this cap. In addition, the cap decreases gradually every year.

A joint quantified economy-wide emission reduction target of 20 % for the years 2013-2020 is calculated providing that **in 2020 emissions from sectors covered by the EU ETS will be 21 % lower than in 2005.**

The EU-wide cap imposed on the EU ETS is determined for all EU Member States and the three non-EU countries (Iceland, Norway and Liechtenstein) **without reflecting a specific share for**

each Member State. Allowances allocated in the EU ETS from 2013 to 2020 decrease by 1.74 % annually, starting from the average level of allowances issued by Member States for the second trading period (2008–2012).

This system imposes a lot of additional burden on companies and forces them to monitor, manage and cut the emission. This is a market-based system, so the idea is that the European GHG emission is managed by market-based mechanisms, not by administrative actions.

The allocation of allowances takes place through auctions and free allocation. The share of allowances auctioned on behalf of each Member State in each year is public and can be obtained from the relevant auction platforms.

Nonetheless, free allocation is provided on the basis of EU-wide rules to installation operators within a certain limit. For each of the nearly 12 000 installations in the EU ETS, the allocation has been calculated based on the common rules. A breakdown of the amounts per Member State is not available.

4. POLICIES AND MEASURES

This section provides information on the most important policies and measures implemented in Bulgaria until 1 January 2015 in order to reduce greenhouse gas emissions. The policies and measures are included in the projections on greenhouse gas emissions. Existing policies and measures are previously reported in Bulgarian Sixth National Communication and in the report submitted to the EC in 2013.

The Bulgarian climate change policy follows the multilateral and bilateral international agreements, the EU legislation in the field of climate change as well as the national legislation.

4.1. CROSS-SECTORAL

4.1.1. EU LEVEL

ENERGY TAXATION DIRECTIVE 2003/96/EC

Member States are obliged not to go below minimum rates of taxation for fossil fuels, motors fuels and electricity. The excise duty rates on fuels and electricity for Bulgaria are lower (in some cases significantly) than the EU average for almost all fuels except gas oil and liquid petroleum gas for industrial or commercial use. Natural gas rates are lower than the EU ETD minimum rates, but all other rates are over the minimum required.

IPPC DIRECTIVE 2008/1/EC

The national legislation is harmonized with the EU Directives 96/61/EC concerning integrated pollution prevention and control, 2008/1/EC and 2010/75/EU on industrial emissions (integrated pollution prevention and control). The implementation of EU legislation related to IPPC in Bulgaria is ensured by the Environmental Protection Act, promulgated, St. G. № 91/2002 and its amendments. **T**he provisions of the Act are obligatory for new installations from 2002 and for existing installations from 2012.

The act is not dealing directly with greenhouse gas emissions. The IPPC legislation has an indirect impact on GHG emissions through emission limits for pollutants and use of best available technologies. The strengthened emission limits may have an important impact especially on coal-fired power plants and combined power and heat plants. However, it is difficult to estimate the impact of this directive on the GHG emissions.

ECO-DESIGN DIRECTIVE 2005/32/EC

The Eco-design Directive establishes a framework for setting of eco-design requirements for energy using products combined with Directive 2009/125/EC (recast). Under the directive, a set of regulations stipulating requirements on minimal energy efficiency of new electric appliances, were issued. The following regulations are currently implemented in Bulgaria and reflected in the projections:

- Stand-by regulation 2008/1275/EC
- Simple Set-to boxes regulation 2009/107/EC
- Office/street lighting regulations № 2009/245/EC, № 859/2009 and № 347/2010
- Household lighting regulation № 2009/244/EC
- External power supplies regulation № 2009/278/EC
- TVs (+labeling) Regulation № 642/2009, № 1062/2010
- Electric motors Regulation № 640/2009
- Circulators Regulation № 641/2009
- Freezers/refrigerators (+labeling) Regulation № 643/2009, № 1060/2010
- Household washing machines (+ labeling) Regulation № 1015/2010, № 1061/2010
- Household dishwashers (+labeling) Regulation № 1016/2010, №1059/2010
- Industrial fans Regulation № 327/2011
- Air conditioning and comfort fans (Regulation № 206/2012, № 392/2012)
- Tyre labeling Regulations № 1222/2009, 228/2011 and 1235/2011

EU ETS

The European greenhouse gas trading scheme (EU ETS) is a Community market mechanism established in 2005 in order to encourage investments in low carbon production. The scheme is based on the „*cap and trade*" principle and the first two trading periods (2005-2007 and 2008-2012) were regulated by Directive 2003/87/EC. It functioned at Member State level on the basis of National Allocation Plans (NAPs) developed by each country and approved by decisions of the European Commission.

Pursuant to Directive 2008/101/EC, the scope of the ETS is enlarged to cover also aviation activities as of 1 January 2012.

Bulgaria was included *de jure* in the EU ETS after it joined the EU in 2007, but *de facto* its actual participation started after the NAP was approved for the second trading period (2008-2012) by a decision of the Commission from April 2010. At the time of the approval of the NAP, the Emission Trading Scheme in Bulgaria covered 132 installations. The total amount of allowances for allocation was determined at just under 206 million (205,892,286) and included the allowances for installations covered by the scheme, as well as those reserved for new entrants and projects under the Joint Implementation mechanisms of the Kyoto Protocol.

Directive 2009/29/EC on ETS provides for the reduction of greenhouse gas emissions from sources covered by the scheme by 21 % compared to their 2005 levels. The new elements can be summarized as follows:

- inclusion of new sectors and gases;
- harmonized approach – a common cap on emissions, instead of 27 national limits;
- reserve for new entrants set at EU level (5% of the total allocation);
- a single registry;
- gradual increase of traded allowances at the expense of free allocation;
- harmonized rules for free allocation based on ambitious indicators;
- 100% auctioning of allowances for electricity generation.

In Phase III of the scheme, the default means of allocating allowances is auctioning. During the current trading period (2013-2020), approximately the half of emission allowances are allocated for free and half are auctioned. The power sector is included in the EU ETS, and according to the rules in Phase III of the scheme, which commenced in 2013, no free allowances

should be given to the power sector. Under the derogation (Article 10(c) of the revised EU-ETS Directive) free of charge allocation is allowed to existing power plants for a transitional period (a decreasing number free of charge allowances, which by 2020 is 0). This is conditional upon the country and Bulgaria must ensure that at least the equivalent value of the free allowances is invested in modernising their electricity generation through investments set out in a national plan included in their applications. All other installations receive free allocations according to fixed EU benchmarks and risk for carbon dioxide leakage.

Regarding emissions from the aviation sector, since the beginning of 2012, emissions from all flights from, to and within the European Economic Area (EEA) (i.e. the 28 EU Member States, plus Iceland, Liechtenstein and Norway) are included in the EU ETS. The legislation, adopted in 2008, applies to EU and non-EU aircraft operators. As the industrial installations covered by the EU ETS, aircraft operators receive tradable allowances covering a certain level of CO_2 emissions from their flights per year.

In April 2013 the EU decided to temporarily suspend enforcement of the EU ETS requirements for flights in 2012 to and from non-European countries. For the period 2013-2016 the legislation has also been amended so that only emissions from flights within the EEA fall under the EU ETS.

Exemptions for aircraft operators with low emissions have also been introduced. The EU took this initiative to allow time for the International Civil Aviation Organization (ICAO) Assembly to reach a global agreement to tackle aviation emissions.

In October the ICAO Assembly agreed to develop by 2016 a global market-based mechanism (MBM) addressing international aviation emissions and apply it by 2020. Until then countries or groups of countries, such as the EU, can implement interim measures.

EFFORT SHARING DECISION 406/2009/EC

It covers emissions from sectors not covered by the EU ETS, such as transport, housing, agriculture and waste. Under the Decision each Member State has agreed to a binding national emissions limitation target for 2020 which reflects its relative wealth. The targets range from an emissions reduction of 20% by the richest Member States to an increase in emissions of 20% by the poorest. These national targets will cut the EU's overall emissions from the non-ETS sectors by 10% by 2020 compared with 2005 levels.

OTHER INSTRUMENTS ON EU LEVEL

- Recast of the Energy Performance of Buildings Directive (Directive 2010/31/EU)
- Regulation on CO_2 from cars and vans (2009/443/EC and no. 510/2011)
- New F-gas Regulation 517/2014/EU, which repeals 2006/842/EC
- Motor Vehicles Directive 2006/40/EC
- Directive on the geological storage of CO_2 2009/31/EC
- Cogeneration Directive 2004/8/EC
- Directive 2006/32/EC on end-use energy efficiency and energy services
- Completion of the internal energy market (including provisions of the 3rd package)
- Directive on national emissions' ceilings for certain pollutants 2001/81/EC
- Water Framework Directive 2000/60/EC
- Regulation EURO 5 and 6 2007/715/EC
- Eurovignette Directive on road infrastructure charging 2011/76/EU
- Directive on the Promotion of Clean and Energy Efficient Road Transport Vehicles 2009/33/EC
- Regulation Euro VI for heavy duty vehicles 2009/595/EC
- Fuel Quality Directive 2009/30/EC
- Biofuels directive 2003/30/EC
- Landfill Directive 1999/31/EC
- Waste Directive 2006/12/EC
- Waste Management Framework Directive 2008/98/EC
- Nitrate Directive 1991/676/EEC
- Common Agricultural Policy (CAP) Reform 2006/144/EC
- CAP “Health Check” 2008 and the “Set aside” regulation 73/2009
- Eurovignette Directive on road infrastructure charging 2011/76/EU
- Directive on the Promotion of Clean and Energy Efficient Road Transport Vehicles 2009/33/EC

4.1.2. NATIONAL INSTRUMENTS

CLIMATE CHANGE MITIGATION ACT (CCMA)

The administrative framework of the EU ETS is defined by the **Climate Change Mitigation Act (CCMA)** (S.G. 22/2014, last amended S.G. 17/2015). It governs the public relations relevant to the implementation of the European greenhouse gas emission trading scheme and regulates the activities related to the allocation of greenhouse gas emission allowances and the issuance and modification of greenhouse gas emission permits. The act also regulates: the relations involving plans for monitoring and reporting of greenhouse gas emissions; the operation of the national registry for greenhouse gas emission allowances and the activities of the national registry administrator; the issuance, surrendering and cancellation of allowances; the terms and conditions for closure of stationary installations; and the emission allowances for the aviation sector.

Subject to regulation by CCMA is the implementation of joint implementation projects and voluntary schemes, the reduction of greenhouse gas emissions from liquid fuels supplied to the transport sector, as well as the implementation of the obligations under Decision 406/2009/EC on the effort of Member States to reduce their greenhouse gas emissions in order to meet the Community's greenhouse gas emission reduction commitments up to 2020.

CCMA consolidates the numerous provisions relating to its subject that are currently found in various regulatory acts. It settles the connections between national legislation and EU standards in the field of the regulated matter. It also provides the mechanisms needed to fulfil the obligations of Bulgaria under the Kyoto Protocol.

THIRD NATIONAL CLIMATE CHANGE ACTION PLAN (2013 – 2020)

In June 2012 the Third National Action Plan (2013 – 2020) was approved by the Council of Ministers. The Third National Action Plan on Climate Change outlines the framework for action on climate change for the period 2013-2020 in order to fulfil the obligations under The United Nations Framework Convention on Climate Change, The Kyoto protocol and the "Climate - Energy" package of the European Union.

The main objective of the Third National Action Plan on Climate Change (NAPCC) is to outline the framework for action against climate change for the period 2013-2020 and to focus the country's efforts on actions leading to reduction of the negative impacts of climate change and implementation of the undertaken commitments.

The Third National Action Plan on Climate Change provides specific measures for reduction of greenhouse gas emissions across all sectors and these measures are consistent with both the national policy on climate change and the potential of the national economy to reduce emissions. The overall effect of the measures will ensure the implementation of the commitments taken and the achievement of the legally binding European objectives, namely:

- 20% increase in energy efficiency;
- 20% reduction of greenhouse gas emissions compared to their 1990 levels;
- 20% share of renewable energy in the total EU energy consumption by 2020 including a 10% share of biofuels in the transport.

The reduction of greenhouse gas emissions from the sources within the scope of the scheme by 21% compared to their 2005 levels is set for all EU Member States through a linear factor for reducing the permitted emission caps for the sectors under the ETS. For the non-ETS sectors Bulgaria has an individual commitment allowing an increase in emissions by 20% compared to their 2005 level. The national objectives of the Member States, in terms of share of renewables in the final energy consumption by 2020 range from 10% to 49%. Bulgaria's goal is set at 16%, including 10% share of biofuels in the final consumption of transport fuels.

The "Climate and Energy" package does not contain direct binding measures for energy efficiency improvement although it has an indirect effect in this direction. The individual commitments of Member States in the field of energy efficiency are still taken on a voluntary basis and are rather political than legally binding. At this stage they are defined in the context of the strategy "Europe 2020" where resource (including energy) efficiency is a flagship initiative. According to the commitment undertaken within the framework of "Europe 2020", Bulgaria aims to reduce the energy intensity of GDP by 50% by 2020. The implementation of the energy efficiency measures and policies set in the National Energy Strategy until 2020 aim to lead to an improvement of the energy efficiency by approximately 25% or saving more than 5 million toe primary energy compared to the baseline development scenario by 2020.

NAPCC presents an assessment of the status and trends of greenhouse gas emissions in Bulgaria until 2009 in various sectors and the scenarios and projections of the emissions in these sectors by 2030 before and after the implementation of the measures.

The policies and measures for achieving the objectives of the country with regard to climate change are presented by sectors and represent the most significant and voluminous part of the

Third Action Plan on Climate Change. The process of selection of specific measures in each sector includes consultations with the relevant government institutions, numerous consultations with stakeholders, businesses, NGOs and academic circles. The received comments and opinions on the proposed policies and measures have been taken into account. Thus transparency and coordination in preparing the Plan is ensured.

After specifying the policies and measures by sector, their feasibility was analyzed from economic point of view. The effective reduction of greenhouse gas emissions was assessed without need to reduce the production and the consumption on the basis of the baseline scenario for the economic development of the country by 2030.

NAPCC pays special attention to the administrative capacity necessary to implement the planned measures, as well as to the responsibilities for monitoring and reporting the implementation of the Plan. Besides the leading role of the competent institutions it underlines the specific role and functions of municipalities. A special feature of the activities on climate change is that they cover a large number of institutions and bodies both from the central and the local authorities because of their horizontal and cross-cutting nature.

4.1.3. ENERGY SECTOR – PRODUCTION OF ELECTRICITY AND DISTRICT HEATING AND RESIDENTIAL AND SERVICE SECTOR

4.1.3.1. Instruments at EU level

The Energy Efficiency Directive 2012/27/EU

The Energy Efficiency Directive came into force in December 2012, replacing the Energy Services Directive and the Cogeneration Directive 2004/8/EC. The Directive establishes a set of binding measures to help the EU reach its 20% energy efficiency target by 2020. Under the Directive, all EU countries are required to use energy more efficiently at all stages of the energy chain from its production to its final consumption. In order to adjust the national policy to the Directive, the following changes in the national legislation have been implemented:

- Development of National plan for design of buildings with approximately zero energy consumption;
- Issuance of certificates;
- Energy audits;

The main part of the new legislation came into force 2014.

The RES directive 2009/28/EC

The EU has adopted a binding target stating that the proportion of renewable energy has to increase up to 20% of total energy use over the period 2005-2020. The responsibility for attaining this target has been shared among the Member States.

Bulgaria's target is set at 16% share of renewables in the final consumption in 2020 (9.4% based on 2005 data + 5.75% fixed rate + 0.85% based on GDP/capita).

With policy instruments already implemented, Bulgaria has overachieved its commitment towards the EU and meeting the national RES target in 2013. Two reports on the development of renewable energy in accordance to the RES directive have been produced, latest in December 2014. According to that report Bulgaria has overachieved its target by 3%.

Energy Performance of Buildings Directive 2010/31/EC

This is a framework directive within which the Member states decide on minimum requirements for example for energy performance, energy declarations and inspections or advice on thermal boilers. Amendments of the Energy Efficiency Act (EEA) related to transposition of the requirements of Directive 2010/31/EU on the energy characteristics of buildings, stimulation of the energy services market and accelerated adoption of market mechanisms for promotion of energy efficiency are being prepared.

Ecodesign Directive (2009/125/EC) and Energy Labelling Directive 2010/30/EU and their implementing regulations

The Energy Labelling Directive is used together with the Ecodesign Directive in order to set combined energy label requirements and energy efficiency requirements for products.

The directives state which products have to be labelled and contains provisions on how the labelling of household products is to be established. The aim is to reduce energy use from household products. The Directives and their implementing regulations are implemented in the Bulgarian legislation by the Act on the technical requirements for products (last amended 2013) and secondary legislation (Regulation on the labelling, last amended 06/01/2015).

4.1.3.2. National instruments

Third National action Plan – all measures in the energy sector

Depending on the nature of their impact on the GHG emissions levels, the measures are grouped in two types – measures with measurable/direct effect and measures with indirect effect. The measures with direct impact include those leading to reduction of the total GHG emissions resulting from the production of heat and electricity by 2030. A number of measures included in the priority axis will not lead to reduction of GHG emissions in the Energy sector by 2030, but they are a step towards a low-carbon development of the sector and will have a multiplier effect in the coming decades. These include:

- Measures leading to reduction of the carbon intensity of the electricity generation mix by additional production of decarbonised electricity);
- Measures leading to reduction of the carbon intensity of the supplied electricity by decreasing network losses and development of decentralized energy production;
- Measures undertaken by energy companies with effect redirected to other sectors – to energy consumers.

Renewable Energy Act (REA) (S.G. 35/2011 last amended S.G. 17/2015) and National Action Plan for Renewable Energy (NAPRE, adopted 09/01/2013)

It regulates and supports the promotion of the use of energy from renewable sources. The main focus is on joint projects and schemes for production of energy from renewable sources with other EU Member States. The municipal councils approve long term and short term programs for promotion of the use of energy from renewable sources and biofuels. The act also contains specific measures for support of the renewable energy and biofuels.

According to Renewable Energy Act all public service buildings as from 1 January 2012 and all other buildings after 31 December 2014 shall have systems for the production of energy from RES, when this is technically feasible and economically justified, as part of the construction of new buildings or the reconstruction, major renovation, rehabilitation or rebuilding of existing buildings.

According to the Second Progress Report on the Promotion and use of Energy from Renewable Sources Bulgaria has overachieved with 3% the national target for 16% share of renewable energy in the gross final energy consumption.

With the national target achieved the incentives for purchasing the electricity from renewable sources on the base of long term contracts and feed-in tariffs shall not apply to new energy facilities for electricity production from renewable sources.

Since 2012 the feed-in tariffs have been significantly reduced. According to an amendment of the Renewable Energy Act in force since January 2014 the public provider, the end suppliers respectively, shall purchase the electricity from renewable sources under the following conditions:

1. At a preferential price - for the quantities of electricity up to the amount of the average annual running time according to the State Energy and Water Regulatory Commission (SEWRC) decision, setting the price of the corresponding producer;
2. At the price approved by the SEWRC, at which the public provider sells electricity to end suppliers and electricity distribution companies – for the quantities exceeding the production under point 1;
3. The quantities under p. 1 and 2 shall be decreased with the quantities used by producers for their own needs, to supply their branches, enterprises and sites, and the quantities they sell at freely agreed prices according to the procedure under Chapter Nine, Section VII of the Energy Act and/or at the balancing market.

In accordance with the **Energy Efficiency Act (EEA) (S.G. 98/2008, last amended S.G. 98/2014)**, the national energy-saving target is allocated in the form of individual energy-saving targets to three groups of obligated parties:

- Energy traders;
- Owners of public service buildings in use with a total floor area of more than 500 m^2 up to 9 July 2015 and a total floor area of more than 250 m^2 after that date;
- Owners of industrial systems consuming more than 3 000 MWh of energy per annum.

In accordance with the amended EEA in 2013 all new buildings shall have a design energy performance certificate. All state or municipal buildings with gross floor area above 500 m^2 (250 m^2 since 9 July 2015) shall have energy audits and energy performance certificate.

The Bulgarian Energy Efficiency Action Plan was developed in 2014 which ensures the inclusion of all obligations. The requirements of Directive 2010/31/EU on the energy performance of buildings are also taken into account.

The indicative national energy-saving targets for the period 2014-2020 are as follows:

- Energy savings at FEC level: 716 ktoe/y;
- Energy savings at PEC level: 1 590 ktoe/y, including 169 ktoe/y in energy transformation, transmission and distribution processes.

In order to fulfil the national energy efficiency target a methodology for the operation of the energy efficiency obligation schemes has been developed in accordance with the requirements of Article 7 of Directive 2012/27/EU on energy efficiency. The national methodology has been drawn up in line with the framework provided in paragraph 4 of Annex V to the Directive.
Air conditioning installations in buildings and hot water boilers with specific power according to the used fuel type are subject to energy efficiency checks. SEDA maintains a database of the inspected systems.
The industrial systems with annual energy consumption over 3000 MWh are subject to mandatory energy efficiency audits, conducted at least once every three years.
EEA provides the implementation of energy efficiency management which is responsibility of the owners of the audited industrial systems and the installations inspected for energy efficiency. The management activities are specifically defined in the act. The administrative authority may impose fines or property sanctions in case of violations of the activities related to the energy efficiency management.
SEDA establishes and maintains a national information system on the state of energy efficiency in Bulgaria.
The financial mechanisms for improving energy efficiency are: voluntary agreements, performance contracting and financing from the Energy Efficiency and Renewable Sources Fund. The Fund supports the implementation of actions and measures for increasing energy efficiency and promoting the production and consumption of energy from renewable sources, except for those activities that are funded by the state budget. The Fund operates under the

Energy Efficiency Act and the donor agreements and it is not part of the consolidated state budget.

The measures aimed at facilitating access to funding for this type of investment projects are envisaged primarily in the **Operational Programmes financed by the ERDF – Operational Programme "Development of the Competitiveness of the Bulgarian Economy 2007-2013", Operational Programme "Regional Development 2007-2013", as well as and in the Operational Programmes for the upcoming programming period – OP "Innovation and Competitiveness" 2014-2020, and OP "Regions in growth" 2014-2020**. These measures include the **granting of public aid with varying intensity – 30-50% of the eligible investment costs in the industry and services and 75-100% of those costs in the building sector**. Part of the aid under these operational programmes is intended for active use of the financial engineering instruments, including microcredit facilities and provision of credit guarantees.

- The **Rural Development Programme** for the two programming periods, co-financed by the European Agricultural Fund for Rural Development, integrates the horizontal objectives for the conservation and restoration of the environment and economic use of resources by promoting and supporting investment in farms utilizing new sources of energy, waste energy, etc. Facilitation of the access to finance for these projects with municipalities and municipal companies as beneficiaries is done through a dedicated tool – Fund for the Local Authorities in Bulgaria – FLAG.
- **The Energy Efficiency and Renewable Energy Fund** will continue to provide additional specialized financial support for this type of investment projects – loans on favourable terms, as well as bank and portfolio guarantees.
- In addition to providing specialized loans and guarantees, incl. use of financial engineering instruments, it is envisaged to reinforce the role **of ESCO (energy service companies performing contracts with guaranteed results)**, especially in respect of energy efficiency measures in public buildings, along with the utilization of the energy management opportunities.
- **The Law on Local Taxes and Charges envisages exemption of existing buildings from property tax for a period of 3-5-7-10 years depending on the period of**

commissioning of the building, the certified class of its energy consumption and the use of renewable energy therein.

4.1.4. INDUSTRIAL EMISSIONS FROM COMBUSTION AND PROCESSES (INCLUDING EMISSIONS OF FLUORINATED GREENHOUSE GASES)

4.1.4.1. Instruments at EU level

Directives and Regulations governing emissions of fluorinated greenhouse gases

The Regulation (№ 842/2006) on Certain Fluorinated Greenhouse Gases came into force on 4 July 2006. During the same period decisions were also taken on a directive that regulates the use of HFCs in air-conditioning units in cars, Directive 2006/40/EC. In June 2014 a new EU Regulation (№ 517/2014) on fluorinated greenhouse gases, repealing Regulation № 842/2006, came into force and applies from 1 January 2015. New F-gas Regulation 517/2014/EU, which repeals 2006/842/EC, is currently included in last proposed amendment of **Clean Ambient Air Act (CAAA - 2015).**

4.1.4.2. Instruments at national level

New F gas Regulation 517 of 2014:

- Into force from 1st January, 2015
- Service and maintenance ban using high GWP refrigerants
- Market bans on HFCs of certain products and equipment
- Phase down of HFCs
- Market quota system for the pre-charged equipment

Extended provisions to include refrigerated units of trucks and trailers, switchgear with some derogation, organic Rankin cycles. Furthermore the thresholds for leak checks will be expressed in CO_2 equivalents to better reflect the environmental impact to be reduced.

Service and maintenance ban using high GWP refrigerants but the use of recycled and reclaimed gases will be allowed until 2030. Pre-charged equipment can only be placed on the market if it is accounted for in the quota system.

The Bulgarian Energy Efficiency Action Plan was developed in 2014 in accordance with the EED requirements.

Third National Action Plan on Climate Change - proposed measures for increasing the energy efficiency in the industrial systems:

- Higher energy efficiency in the industry;
- Use of alternative fuels such as biodegradable waste;
- Establishment of a technological park – introduction of incentives to encourage the private sector to invest in R&D and innovations of widely used production methods aiming at optimal efficiency of resources;
- encouraging the exchange of good practice between enterprises with respect to the efficient use of raw materials in production;

The direct measures involve, on one hand, the technology used in the industry thus creating preconditions for increase in production competitiveness by reducing the energy intensity in the sector and the final energy consumption.

Other measures are aimed at the utilization of alternative fuels such as biodegradable waste, thus increasing resource efficiency, decreasing the dependence on imported fuels and meeting the requirements related to the prohibition of landfilling of biodegradable waste. The measure is consistent also with the estimates in the macroeconomic scenario in Section 7.1 according to which the value added in the industrial sector "Water supply, sewerage, waste management and remediation activities" grows by 94% in 2020 compared to 2009 due to waste management. Moreover, the added value in this sector is expected to increase by additional 75% by 2030 compared to 2020 as a result of the measures and the expectations for economic development.

The establishment of a technological park and a business incubator is a measure with indirect impact on the reduction of greenhouse gases. Its effects can be sought mainly in the following areas: introduction of incentives to encourage private sector investments in R&D and innovations of widely used production methods aiming at optimal efficiency of resources; development of market instruments to encourage environmentally friendly products through efficient use of resources; encouraging the exchange of good practice between enterprises with respect to the efficient use of raw materials in production.

4.1.5. TRANSPORT SUB-SECTOR

4.1.5.1. Iinstruments at EU level

Regulation (EC) № 443/2009, setting emission performance standards for new passenger cars

The regulation applies to motor vehicles – passenger cars registered for the first time in the Community. It sets the average CO_2 emissions for new passenger cars, registered on the territory of the EU, at 130 g CO_2/km by 2015 and the medium-term target is reduction of emissions to 95 CO_2/km by 2020. This should be achieved through improvements in the technology of vehicle engines in accordance with Regulation (EC) № 715/2007 on type approval of motor vehicles with respect to emissions from light passenger and commercial vehicles (Euro 5 and Euro 6). The so called specific emissions are calculated by a formula as a function of vehicle's mass.

The requirements entered into effect gradually by 2015 and the new emission limit values applied were as follows:

- In 2012 – for 65% of the vehicles manufactured in the year;
- In 2013 – for 75% of the manufactured vehicles;
- In 2014 – for 80% of the manufactured vehicles;
- From 2015 emission limits apply to 100% of the fleet of vehicles manufactured in a year.

The Regulation provides a possibility for derogation for the so-called niche manufacturers. It can benefit all manufacturers that register less than 10 000 new cars per year in the EU or manufacturers that account for 10 000 to 300 000 new passenger cars registered in the EU per calendar year together with all their affiliates. It should be noted that the derogation does not provide full exemption from the requirements of the legal act. Upon application the manufacturer must determine its specific emission target that corresponds to its potential to reduce emissions (including economic and technological potential to reduce its specific emissions of CO_2) and that is consistent with the characteristics of the market for the relevant type of car. The derogation is granted by the Commission for a maximum period of 5 years.

A similar approach is applied to the new light-commercial vehicles (vans) with the adoption in 2011 of Regulation (EO) № 510/2011 of the European Parliament and of the Council setting emission performance standards for new light commercial vehicles. It sets the average CO_2

emissions for new light commercial vehicles at 175 g CO_2 /km by 2015 and at 147 g CO_2/km by 2020.

The application of this measure in the transport sector is expected to have a considerable contribution (according to estimates up to one third of the share) to emission reductions in sectors not covered by the European Trading Scheme.

Aviation in the EU Emissions trading system

Aviation is included in the EU Emissions trading system from year 2012 in accordance to Regulation (EU) No 421/2014 of the European Parliament and of the Council of 16 April 2014 amending Directive 2003/87/EC.

RES directive

According to the RES directive all member states should increase the share of renewable energy in final energy consumption used in transport sector to 10% by energy content in 2020.

EC´s Fuel quality directive

In April 2009, Directive 2009/30/EC was adopted which revises the Fuel Quality Directive (98/70/EC). It amends a number of elements of the petrol and diesel specifications as well as introducing a requirement on fuel suppliers to reduce the greenhouse gas intensity of energy supplied for road transport (Low Carbon Fuel Standard). In addition the Directive establishes sustainability criteria that must be met by biofuels if they are to count towards the greenhouse gas intensity reduction obligation.

4.1.5.2. National instruments

CROSS-CUTTING POLICY INSTRUMENTS – vehicle fuel taxes

Petrol and diesel are covered by an **energy tax and excise duties. Value-added tax** is also charged on the sale value. *The lower rate applies for petrol containing minimum 4% biofuels.* Natural gas rates are lower than the EU ETD minimum rates, but all other rates are over the minimum required.

TARGETED INSTRUMENTS: the renewable vehicle fuel strategy

Tax reduction for biofuels

- In respect of the use of biofuels in transport is reduced the excise duty on blended fuels featuring a certain proportion of biofuels with petroleum-based fuels, incl. for unleaded petrol used in transport, in the content of which bio-ethanol is not less than 4% – reduction in excise duty from 710 BGN for 1000 liters to 688 BGN for 1000 liters. For the diesel used in transport, in the content of which biodiesel is not less than 4%, the reduction in excise duty is from 645 BGN for 1000 liters to 596 BGN for 1000 liters.

Transport taxes

- Bulgaria also uses a road vignette system, where cars must pay an annual fee to use public roads in the national road network (outside of settlement road networks). The rate depends on the type of the vehicle (with heavy goods vehicles paying a much higher rate than passenger vehicles), the validity period of the vignette and, for some vehicles, the emissions class.

From 1 January 2014, annual vignette fees range from €34 for passenger vehicles to €665 for heavy goods vehicles with emissions classes Euro 0, Euro I or Euro II.

- An 'Eco-Charge' is paid on all used vehicles when they are registered for the first time on the territory of the Republic of Bulgaria. The charge was previously based on the car type and the year of manufacture but the charging scheme was amended in December 2012 and at presence, one and the same rate applies to all vehicle types. Only new vehicles are not intended to pay Eco-Charge.
- As of 1st January 2013, the electric vehicles are exempted from Motor Vehicle Tax and, as of 1st January 2015 the electric motorcycles and mopeds are also exempted from that tax. For vehicles with engine power up to 74 kW, the following rate reductions are applied:
  - Vehicles fitted with catalytic converters which do not conform to Euro III, Euro IV, Euro V and Euro VI emissions standards: 20% – 40%;
  - Vehicles conforming to emissions standards Euro III and Euro IV: 50%;
  - Vehicles conforming to emissions standards Euro V and Euro VI: 60%;
- tax incentives to manufacturers and users of electromobiles;
- Bulgaria implemented an aircraft noise tax in November 2012.

This tax is levied on all aircraft traffic at one of five international airports in within the country. The tax rate is calculated as a multiple of a "base noise unit" (set at EUR 3.74 since 01.01.2013). The multiplier used varies according to the maximum takeoff weight of the aircraft (helicopters and aircraft under 9 tonnes MTOW are exempt) as well the time of the day of the takeoff or landing and the noise categorization of each aircraft type.

The revenue for the 1-year period from July 2013 to June 2014 for Sofia airport is estimated at BGN 641 thousand (€328 thousand), equivalent to 0.0008% of GDP. The other 4 Bulgarian international airports may be expected to generate significantly less revenues from the noise tax, based on traffic volumes.

Optimization of existing transport infrastructure and diversification of transport considering climate

The National long-term programme for promotion of Biofuel use in the transport sector 2008-2020 defines the national indicative targets for biofuels consumption as follows: 2008 – 2%, 2009 – 3.5%, 2010 – 5.75%, 2015 – 8%, 2020 – 10%. The wider use of biofuels in the transport sector is one of the measures for achieving the objectives of the Kyoto Protocol.

The Bulgarian legislation provides mandatory blending of biofuels with petroleum-derived liquid fuels and introduction of electric vehicles in public and private transport. The legislation also provides measures to encourage the use of renewable energy (electricity) at municipal level. The electric cars and two-wheeled vehicles are entitled to free parking on the territory of Sofia Municipality and 1% of all parking spaces in paid parking lots are allocated to two-wheeled vehicles. The electric vehicles in Bulgaria are also exempt from paying annual Motor Vehicle Tax.

The National Action Plan for Promoting the Production and the Accelerated Uptake of Ecological Vehicles, including electric mobility in the Republic of Bulgaria for the period 2012-2014 was adopted in 2012. The Plan lays out the main activities and measures that should be fulfilled in order to stimulate production and demand/use of environmentally friendly vehicles. The expected benefits from the implementation of the specific activities are given in the Plan.

The main policy objectives according to the Plan are as follows:

- Promotion of the production of electric and other eco-friendly vehicles, including specific components

- Promotion of research and development activities related to eco-friendly vehicles and charging systems
- Promotion of consumption/demand of new eco-friendly vehicles
- Accelerated deployment of charging infrastructure for electric and hybrid vehicles
- Organization of awareness-raising campaigns, building capacity of interested parties regarding development of the sustainable mobility

Promotion of sustainable urban mobility

The Third National Action Plan on Climate Change envisages the measures in transport sector with direct effect as follows:

- Rehabilitation and modernization of the existing road infrastructure to ensure optimum speed and optimum driving modes of automobile engines;
- Introduction of intelligent transport systems along the national and the urban road network;
- Increasing the share of public electric transport - rail, trolley, tram, metro;
- Development and construction of intermodal terminals for combined transport.
- Increasing the share of biofuels;

The assessment of the emission saving potential of projects for rehabilitation and modernization is based on existing methodology of the European Investment Bank.

Intelligent Transport Systems (ITS) encompass a wide range of technical solutions designed to improve transport by improving mobility and increasing the safety of road traffic. Telematics (a combination of telecommunications and informatics) uses advanced technologies to meet transport needs. Intelligent transport systems and telematic solutions help improve road safety, promote the efficiency of the used existing infrastructure and contribute to the reduction of environmental pollution through control over traffic flows and management of traffic volume.

The intelligent transport systems in urban settings can include integrated management of public transport charges, enhanced management of customer relationships, traffic forecasts, improved traffic management, traveller information and toll collection. These systems apply advanced technologies to collect more and better data, to make a precise analysis of these data and to link them through more effective networks. The result: more effective, more efficient and better oriented towards citizens on the move services. Source of funding are European

funds with state and municipal co-financing and in some cases Green Investment scheme and private investment.

4.1.6. WASTE

4.1.6.1. Instruments at EU level

Landfill directive (1999/31/EC)

For the implementation of the landfill directive requirements are laid down for the landfilling of biodegradable waste: the quantity to be reduced by 2016 and for methane to be collected from landfills, preferably with energy recovery.

4.1.6.2. Instruments at national level

Landfill tax

Bulgaria is one of the most recent EU Member States to impose a tax on landfilling waste, having introduced the tax from 1 January 2011. Rates have increased each year from 2011 through 2014. Since 2011, the rate has increased more than ten-fold. The current rate for all waste types is BGN 22 (€11.25) per tonne, with plans to increase this rate to BGN 95 (€48.57) by 2020. Rates are double for landfills that do not conform to the standards in the Landfill Directive. Landfill tax is paid on a quarterly basis by municipalities to the Regional Inspectorates for Environment and Water. Total revenues in 2012 amounted to BGN 27.4 million (€14 million), equivalent to 0.035% of GDP. (*Landfill Tax Ordinance 7/2013)*

- Ordinance establishing the terms and conditions for payment of product fees for products after the use of which wide spread waste is generated – SG 53/2008, last amended SG 29/2011;

Bulgaria has imposed a product tax on single-use plastic bags since October 2011. The tax was first imposed at a rate of BGN 0.15 (€0.08) per bag. Since then it has increased annually to the current rate (2014), which is BGN 0.55 (€0.28) per bag. All producers and importers of plastic bags are required to pay the tax, the cost of which is usually passed on to the consumer. Revenues from the plastic bag tax were BGN 18,182 in 2013.

National Waste Management Plan 2014-2020

The National Waste Management Plan 2014-2020 (NWMP) was adopted in December 2014. The NWMP plays a key role in achieving a resource-efficient and sustainable waste management, as the analysis of the current situation shows that in Bulgaria there is significant potential to improve waste prevention and its management, better use of resources,

development of new markets and new jobs, as at the same time reduce the harmful effects of waste on the environment.

Bulgaria has developed a National waste prevention programme (NWPP) in accordance with the requirements of the WFD and Article 50 of the Waste Management Act for the first time. The NWPP is an integral part of NWMP and identifies measures for implementation of the highest level in the waste management hierarchy. The fourth NWMP is the transition from waste management to the efficient use of waste as resources and sustainable development by prevention of their generation, as far as possible.

Successful implementation of the plan will lead to the prevention and reduction of the harmful effects of waste on the environment and human health and reduce the use of primary natural resources. The plan supports the central and local authorities to concentrate limited financial resources from national and EU sources on priority projects in the field of waste management.

National Waste Management Programme (NWMP)

Waste Management Programmes (WMPs) are developed and implemented by the mayors on the territory of the respective municipality.

The measures in the waste sector are targeted as a priority at the subsector of waste disposal and to a lesser extent at the subsector of wastewater treatment in the third NAPCC.

With regard to the landfilling of waste the main efforts are directed towards the prevention of waste generation in order to reduce the amount of waste for disposal, as well as to build infrastructure for waste treatment. The measure “Development of systems for mechanical and biological treatment (MBT) plants for treatment and utilization of compost and biogas” has a relatively high effect and requires 221 million BGN (41.2% of the planned investments in the sector) however 5.8 million tonnes of emissions will be saved by 2020 at an average cost of 38 BGN which makes the measure highly efficient. As an indirect measure, the further development of the collective schemes for separate waste collection worth 80 million BGN, will increase the efficiency and the scope of the systems and will contribute to the diversion of 130 000 tonnes of waste from landfills every year. Prevention of waste disposal will be effected also through market based incentives for households. The amount of the waste charges is to be bound to the quantities of generated waste thus encouraging households to reduce the amount of disposed waste, to use various waste collection schemes and waste recovery at home. Standards are to be introduced for the recycled materials and compost, which will allow the

marketing of these materials, reduce transaction costs and increase the cost efficiency. Separate collection of "green waste" is to be introduced in all municipalities through the updating of their regulations and waste management programmes.

The already landfilled waste also has a high potential to be used as energy and resource. Measures will be implemented to capture and use the biogas in both new and existing landfills and in landfills pending closure, which will improve resource efficiency, reduce dependence on imported energy resources and create added value that is currently being lost without the construction of these installations. The total cost of direct measures under this priority axis is 60 million BGN and the expected amount of saved emissions is 10.9 million tonnes at an average cost of 5.5 BGN per tonne which makes the measure very highly efficient. The indirect measures include measuring and estimation of the amount of biogas in landfilled waste.

Measures will be taken to capture or flare (for the smaller ones) the biogas in urban waste water treatment plants, which will reduce CO_2 emission and enable part of the plants to meet their own energy needs and to improve their profitability and efficiency. The cost of these measures is estimated at 174 million BGN and the expected amount of saved emissions is 1.025 million tonnes which makes an average cost of 170 BGN/tonne.

The measures in this sector will lead to increased resource efficiency and better management of resources throughout their life cycle, will increase the added value, reduce the dependence on imported energy resources thus reducing the costs of households and businesses and increasing the competitiveness of the economy.

4.1.7. AGRICULTURE

4.1.7.1. Instruments at EU level

The Common Agricultural Policy

On 16 December 2013 the Council of EU Agriculture Ministers formally adopted the four Basic Regulations for a reformed CAP as well as Transition Rules for 2014. Farmers should be rewarded for the services they deliver to the wider public, such as landscapes, farmland biodiversity, climate stability even though they have no market value. Within the CAP second pillar, rural development, Member States have the possibility and are requested to adopt measures on climate mitigation and adaption.

The CAP has various impacts on agriculture and forestry but also on the preservation of the environment on some 70% of the EU territory, and the quality of life of 50% of the EU

population. CAP is supposed to contribute to the objectives of the Cohesion Policy by promoting balanced territorial development, but also to ensure the safety and quality of foods consumed in the Common Market.

4.1.7.2. National instruments

Agricultural Producers Support Act (APSA) *(S.G. 58/1998, last amended S.G. 12/2015)* regulates state support to farmers with regard to the implementation of the measures included in the National Plan for Agricultural and Rural Development. Support is provided to farmers that operate and are registered in disadvantaged areas or in areas covered by the "Natura 2000" network.

There are three sources of agricultural support to Bulgarian farmers: the CAP First Pillar instruments (financed by the EAGF), the CAP Second Pillar instruments (financed by the EAFRD) and the national support schemes (state aid schemes) as notified to the European Commission.

APSA envisages development and approval of a National Strategic Plan for Rural Development and a Rural Development Programme.

APSA regulates some of the activities through which the measures envisaged for the Agriculture sector of the NAPCC can be implemented, as well as the activities related to biofuel production. *APSA is the law regulating the key financial mechanism for management of agricultural activities. Most of the proposals – whether introduction of best practices for rice production or for encouragement of crop rotation, especially with nitrogen-fixing crops, for restoration of degraded agricultural lands, or the introduction of water saving irrigation technologies – can be applied using the financial mechanisms regulated by APSA.*

Agricultural Land Protection Act (ALPA) (Last amended S.G. 98/2014)

ALPA allows land use change of agricultural land only in certain specific cases.

Burning of stubbles and other plant residues in agricultural lands is prohibited. The users of agricultural land are held responsible for the burning of stubble and other plant waste on the agricultural land and must participate in their extinguishing.

The owners and the users of agricultural land are entitled to tax and credit preferences when implementing the mandatory limitation on agricultural land use as well as when implementing projects to restore and improve the fertility of agricultural land.

ALPA contains a legal framework covering some of the activities envisaged for the Agriculture sector in the NAPCC, such as counteracting the burning of stubble and plant waste and promoting agricultural practices aimed at reducing greenhouse gas emissions.

To achieve the objectives of the National Action Plan on Climate Change for the Agriculture sector 25 measures were developed and grouped in 2 priority goals and 6 priority axis. The proposed measures are aimed at reducing emissions from the major sources in the sector. The measures are consistent with the condition of the sector and the main priorities of the CAP for the period 2014-2020. One of the main challenges facing CAP is finding a solution to the increasingly aggravated production conditions in agriculture due to climate change and the need for farmers to reduce their share of greenhouse gases, to play an active role in mitigating climate change and to provide energy from renewable sources. In this regard there is an opportunity to promote the implementation of a number of measures in the field of direct payments, market support and rural development in order to mitigate climate change.

Based on the analysis of the major sources of emissions the following two main objectives are defined in the Agriculture sector:

- Reduction and/or optimization of emissions from the agricultural sector;
- Increasing the awareness and the knowledge of both farmers and the administration in terms of actions and their effect on climate change.

The following priorities refer to these main objectives:

1. Reduction of emissions from agricultural land;
2. Reduction of methane emissions from the biological fermentation in animal husbandry;
3. Improving the management of manure;
4. Optimization of the use of plant residues in agriculture;
5. Improving the management of rice fields and technology for rice production;
6. Improving the knowledge of farmers and the administration regarding reduction of emissions from the Agriculture sector.

4.1.8. LAND USE, LAND USE CHANGE AND FORESTRY (LULUCF)

4.1.8.1. National Instruments

The Forestry Act (FA) (SG 19/2011, last amended S.G. 98/2014)

Forestry activities are subject to planning. Forest planning is carried out at three levels and includes a National Strategy for Forest Development and a Strategic Plan for Forest Development, regional development plans for woodlands and forestry plans and programmes. The forestry management plans and programmes determine the admissible level of use of forest resources and the guidelines to achieve the goals of forest management for a period of 10 years. FA prohibits the reduction of the total percentage of forest land in the country. The change of land use in forest areas is possible only in certain specified cases.

Some of the activities planned in the National Action Plan Climate Change (NAPCC) for the Land Use, Land Use Change and Forestry sector should be implemented through the planning mechanisms of the FA. *An example of such activity is the support for increasing the share of certified forests which aims to increase the carbon capture potential of forests.*

National Strategy for Development of the Forestry Sector in the Republic of Bulgaria for the period 2013-2020 (NSDFSRB)

The strategic document reflects the European and national policies and strategic documents related to forests and forestry sector in Bulgaria, basic principles and analysis of the forestry sector in Bulgaria in the period 2006 - 2011, the vision, mission and objectives, priorities and measures, sources of funding to achieve the objectives of the Strategy and monitoring its implementation.

Strategic Development Plan for the Forestry Sector (SDPFS) 2014-2023

This plan is developed with the financial support of the European Social Fund under Operational Program Administrative Capacity's project "Strategic Planning in the Bulgarian Forests – a Guarantor for Effective Management and Sustainable Development". These strategic documents can be found on the website of the Executive Forest Agency (EFA): http://iag.bg/docs/lang/1/cat/5/index.

The implementation of the Operational objectives with the corresponding budget, timeline, expected results, performance indicators, responsible institutions and stakeholders is regulated in specific sub-activities in SDPFS as follows:

Operational objective 1 from SDPFS "Increasing of the forest area, tree growing stock and the stock of carbon in forest areas"

Operational objective 2 from SDPFS "Improving the management and use of forests"

Operational objective 3 from SDPFS "Increasing the effectiveness of preventing and combating forest fires and illegal activities in the forests"

Operational objective 4 from SDPFS "Increasing the resilience and adaptability of forest ecosystems to climate change"

The above mentioned **operational objectives** and activities are expected to have a direct and sometimes indirect positive effect on both the adaptation of forest ecosystems to climate change, as well as on the reduction of the negative impact of climate change, including by increasing the absorption of greenhouse gases from the atmosphere.

The aforementioned "Programme of Measures for the Adaptation of Forests in the Republic of Bulgaria and Mitigation of the Negative Impact of Climate Change on them" is approved in 2011 by the Minister of Agriculture and Food under the proposal of the Executive Director of EFA. In the Program are identified and designated concrete measures (the Program is published on the EFA website at http://www.iag.bg/docs/lang/1/cat/5/index).

As regards the **management of pastures, grasslands and meadows** from the State and Municipal Land Funds (SLF and MLF), given that these are lands with special status, whose main purpose is their use for livestock grazing and mowing, to this moment is prepared an Amending Act of the Ownership and Use of Agricultural Land Act, introducing a simplified regime for the use of these lands as intended. The draft legislative act provides for rental and lease of pastures, grasslands and meadows of SLF and MLF to be done without a tender procedure, as they will be allocated only to the owners or users of holdings with grazing livestock registered in the System for animal identification and registration of holdings under Bulgarian Food Safety Agency, according to the number and type of registered animals at market price determined by an independent appraiser in accordance with the conditions for maintaining the land in good agricultural and environmental condition. Pastures, grasslands and meadows of SLF and MLF remaining free after allocation of their registered owners of grazing animals will be auctioned, and to persons who undertake responsibility to maintain them in good agricultural and environmental condition. Rental contracts and leases concluded in this way can be terminated before the expiry of their term, if there is non-compliance with the conditions for maintaining the land in good agricultural and environmental condition defined pursuant to Art.42 of the Farmers Support Act. It should be noted that the purpose of sustainable and strict management of the landed estates of the SLF, which fall within the

ecological network of special areas of conservation, called "Natura 2000", representing a way of permanent usage - "pastures", "pastures, grasslands", "pastures with shrubs", "meadows" or "fields" - private state property, for which Ministry of Environment and Water has issued orders to comply with specific restrictions and the exact borders. They are brought to the attention of MAF for their reflection in the sketches of the landed estates. They are available for use in strict compliance with the restrictions, which are monitored in the checks.

On pastures of municipal land, the existing provisions of the Ownership and Use of Agricultural Land Act is stipulated that the decision of the municipal council, annually lays down rules for the use of grasslands and pastures that contain:

- Operational perspective plan for grazing;
- Parts of grasslands and pastures, mainly for mowing;
- Measures for the protection, maintenance and improvement of grasslands and pastures, such as cleaning of bushes and other unwanted vegetation, anti-erosion activities, fertilization, temporary fencing;
- Parts of grasslands and pastures for artificial pasture for planting with appropriate grass mixtures;
- Mode of use, prohibitions and restrictions depending on the specific features of the landscape, soil, climate and other natural conditions.

According to the provision of Art.25 of the Ownership and Use of Agricultural Land Act is determined that the ownership of the municipalities on pastures and grasslands is public and only exceptionally allowed to be declared as private municipal property, in case of the change of use of grasslands and pastures under the Municipal Property Act, in cases defined in Paragraph 3 (points from 1 to 5) of the above-mentioned article, as follows:

- for construction of technical infrastructure under the Spatial Planning Act;
- for investment projects received a certificate for investment class A or class B or priority investment project under the Investment Promotion Act when it stated in the certification of the project;
- for creating of new or expand existing construction boundaries of urbanized areas (settlements and settlement formations), as well as creating or expanding the boundaries of individual regulated landed estates outside them;

- for investment projects related to socio-economic development of the municipality;
- other cases determined by law.

In the above-listed cases, the municipal council adopts a decision expressing prior consent to change the use of pastures and grasslands, subject to the terms and conditions regulated by special laws (Protection of Agricultural Land Act) and regulations to maintain a reserve of permanent grasslands, and provided that there is no shortage of land for the needs of livestock.

As regards to the arable lands, pursuant to Art. 7 of the Ownership and Use of Agricultural Land Act, is regulated that the eroded, polluted, salty, acid and waterlogged agricultural lands are recovered and improved on the basis of a set of activities or technologies that operate on the basis of pre-designed, coordinated and approved technologies and projects approved by the Expert Council.

Mines, quarries and other areas with disturbed soil profile, ash ponds, tailings, landfills and other waste depots, old riverbeds, routes of abandoned canals, roads, railways and construction sites after dismantling of engineering equipment, finishes and superstructure are subject to reclamation, which is based on pre-established, coherent and approved the project, which is an integral part of the project for construction of the site. The procedure for using humus after its withdrawal, reclamation, land improvement and the adoption of reclaimed areas is defined in Regulation № 26 for land reclamation, improvement of low-productive lands, withdrawing and utilization of the humus layer.

One of the main strategic documents containing measures for the Land Use, Land-Use Change and Forestry sector, is **the Third National Action Plan on Climate Change (NAPCC)** (http://www.moew.government.bg/?show=top&cid=570).

4.2. SUMMARY OF POLICIES AND MEASURES

Name of mitigation action	Sector (s) affected	GHG(s) affected	Objective and/or activity affected	Type of instrument	Status of implementation	Brief descriptione	Start year of implementation	Implementing entity or entities	Estimate of mitigation impact (not cumulative, in kt CO2 eq)
Improvement of production efficiency in existing coal-fired power plants	Energy	CO2	increase the efficiency of production of the power plants	Other (Research)	Implemented	In 2007-2009 the average carbon intensity of electricity generation from coal-fired power plants is 1.2 t CO2 equivalent per MWh. Measures to increase the efficiency of production in a cost effective way can lead to reduction of this factor by approximately 5% -7% which is equal to 1.3 mln. tonnes annual reduction of carbon dioxide emissions from existing coal-fired power plants by 2020 or cumulatively 4.68 mln. tonnes of CO2 eq. for the entire period . The expected reductions in greenhouse gases are calculated on the basis of estimates as follows: 20% of the potential to be realized by 2014; additional 30% to be realized by 2016, 30% – by 2018, and 100% of the potential for reducing emissions as a result of the modernization of coal-fired plants within the period by 2020. These targets are cumulative respectively for the period until 2014 - the first two-year period, until 2016 – for a four-year period, until 2018 – for a six-year period and until 2020 - for the entire period by 2020.	2013	MEE	4680
Fuel substitution – from coal to natural gas	Energy	CO2	Substitution of coal in the energy sector with natural gas	Economic	Implemented	The European Emission Trading Scheme and the competition on the electricity market encourage the transition to lowcarbon technologies and fuels such as natural gas. Every 100 MW coal-based generating capacity substituted with natural gas will be reflected as a reduction of 450 thousand tonnes of CO2 per year. The target values are calculated by years and the commissioning of 100 MW is envisaged for the period by 2014; additional 100 MW are envisaged by 2016, another 200 MW - for the period until 2018 and additional 200 MW until 2020, or a total of 600 MW new, substituting gas capacity for the period 2012-2020.	2013	MEE	11 700
Increasing of high efficiency combined production	Energy	CO2	Support of the increase of efficient cogeneration of heat and electricity.	Economic |Fiscal| Regulatory	Implemented	The Energy Strategy of the Republic of Bulgaria envisages that the co-generation of electric energy will account for 15% in the electric energy mix by 2020. The co-generation of heat and electric energy improves the overall efficiency of fuel use and saves the primary energy needed to produce the two types of energy separately. The increased share of electricity produced by co-generation and the saved primary energy will be reflected as a reduction in the carbon intensity of the electricity generation mix.	2013	MEE	1 600

Increasing the share of heating and cooling based on renewable energy sources	Energy	CO2	Reduction of greenhouse gas emissions	Regulatory	Implemented	The measure is intended to create conditions for sustainable development of the district heating sector in Bulgaria and for substitution of conventional fuel for production of thermal energy with renewable sources. The introduction of renewable thermal energy will be gradual and will start with generation of 2% thermal energy from renewable sources in 2014 reaching 10% of the generated thermal energy, mainly from biomass. The cumulative effect of the measure will lead to reduction of greenhouse gases emitted by the district heating systems by 488 000 t until 2020. The contribution of the measure towards the national target in the field of renewable energy sources is relatively small - about 1%.	2012	MEE	488
Implementation of the measures in the programme for accelerated gasification (PAG) in Bulgaria	Energy	CO2	Reduction of end-use energy intensity of households	Other (Fiscal)	Implemented	The Energy Strategy of Bulgaria envisages creation of conditions for access to the gas distribution system to 30% of households in 2020 and substitution of electricity used for heating purposes which would save households more than 1 bln. BGN of energy costs. The use of natural gas instead of electricity for heating and domestic purposes can save about 100kWh/year at least, and up to 1800 kWh/year per household. The evaluation of the potential decrease of emissions was made with the following assumptions: a household with 3 members, an apartment with 70 m2 of heated area, without energy saving measures, using electricity for heating and household needs. The average annual consumption of energy for heating is about 11 188 kWh. In view of the delayed implementation of policies in this area a conservative scenario with 15% gasified domestic needs was considered when assessing this measure. An emission factor was adopted with regard to electric energy as in the National Programme for Renovation of Residential Buildings in the Republic of Bulgaria. In the absence of reliable data and projections a scenario of even development was used for a period of 7 years until the total percentage rate of gasified households is reached in 2020.	2013		2476,427

After the entry into force of the new directive on energy efficiency - restoration of the specified annual percentage of the overall public and government buildings (with total area over 250m2)	Energy	CO2	Improving the energy efficiency in municipal dwellings	Other (Economic)	Adopted	The measure will come into effect after adoption of the new Energy Efficiency Directive (EED) expected by the end of 2012. At this stage of negotiations within the EU legislative bodies the percentage of buildings that are to be retrofitted per year laid down in the draft directive is 3%, which is acceptable for our country according to the Bulgarian position on the proposal. State-owned and municipal dwellings68 account for 3,1% of the total number of buildings in the country according to data from the National Statistical Institute. 64% of them are two-room and three-room dwellings, while another 22,9% have four or more rooms (we assume that they fall into this group). Assuming 3% annual sanitation means that 4562 buildings are to be retrofitted by 2020 (their number will be revised according to the scope and percentage laid down in the EED). Pursuant to thematic objective 4 "Support for the transition to a low carbon economy" of the draft financial regulations for the period 2014 - 2020 it is envisaged for the next programming period OP Regional Development to support energy efficiency measures in buildings. Measures will be implemented in both public and residential buildings and their cost is estimated at about 950 mln.BGN. In addition, the operational program for the next programming period will provide for energy efficiency measures to be applied horizontally to the public health, social, cultural, educational and sports infrastructures, along with the envisaged construction and repair activities.	2015	MEE	204,135

Introduction of mandatory energy efficiency scheme (reduction of the consumption of fuel and energy in the energy end-use consumption)	Energy	CO2	This measure is proactive and is consistent with the announced direction and actions of the EC aiming at reducing fuel and energy consumption.	Regulatory	Adopted	This measure is proactive and is consistent with the announced direction and actions of the EC aiming at reducing fuel and energy consumption. Precondition for achieving the estimated effect are the regulatory changes with the view of introducing a requirement for specific (proportional) annual reduction of the amount of energy provided on the market by distribution companies and traders in energy (end-use consumption). Market mechanisms and incentives to reduce fuel and energy consumption need to be established along with mandatory schemes and market of energy services (market of "white" certificates/ certificates of energy savings). The measure is consistent with the new policy proposed by the EC to improve the energy efficiency in end-use consumption by saving annually fuel and energy equivalent to 1.5% of the energy provided by distribution companies and traders in energy on the market for the previous year (excluding energy in transport). The annual energy savings, respectively obligations, will be constant value (expressed in percentage) until 2020. To introduce such a scheme it is necessary to undertake appropriate legislative changes and to prepare its structure and operation. The responsible persons will be determined in the course of development of the scheme. These can be both traders in fuel and energy or end consumers. The actual reduction of fuel and energy consumption occurs in end-use consumption and should be a result of implemented measures. The anticipated effect is determined on the basis of projected fuel and energy consumption in the Industry and Household sectors where the consumption is expected to decrease by 1,5% on an annual basis. The decrease in final fuel and energy consumption according to the objectives will lead to reduction of emissions as follows: 40.5ktCO2eq. (by 2016); 41.4 ktCO2eq. (by 2020)	2014	MEE	105,173

Replacement of the obsolete and inefficient equipment for production of energy with new equipment	Energy	CO2	The measure applies to the end-use consumption of fuels, their conversion into energy for heating, cooling and domestic hot water and to energy consumption.	Regulatory	Implemented	The process should be linked to the activities for control and inspection of heating and air conditioning installations. The financial incentives should combine existing schemes with mandatory co-financing by the beneficiary. The measure is linked also to the activities provided in SNAPEE in accordance with the Regulation adopted pursuant to Art. 15 of Directive 2009/125/EC establishing a framework for the setting of ecodesign requirements for energy-related products . The measure applies to the end-use consumption of fuels, their conversion into energy for heating, cooling and domestic hot water and to energy consumption. The assessment of the impact is made on the basis of the projected consumption of fuels in the Households and Services sector taking into account also other related measures.	2013	MEE	72,383
Development and staged implementation of national programme "1000 sunny roofs"	Energy	CO2	Commissioning of a bivalent system for preparation of hot water for domestic needs - evacuated tube solar collectors and heat pump units (air) for 1000 multi-family buildings (46 apartments, households with 3 members).	Economic	Adopted	Commissioning of a bivalent system for preparation of hot water for domestic needs - evacuated tube solar collectors and heat pump units (air) for 1000 multi-family buildings (46 apartments, households with 3 members). The effect was evaluated on the basis of electricity, taking into account the consumption of the heat pump units. This program is not laid down in a national strategic document, however it is in line with the national RES policy and encourages the production of heat from RES. 164.9 GWh of electricity can be saved per year (by 2020) as a result of the development and implementation of this programme.	2015	MEE	107,2
Audits for energy efficiency and implementation of the prescribed measures	Energy	CO2, HFCs, PFCs	Industrial systems with annual energy consumption over 3 000 MWh are required to have their energy efficiency audited every three years.	Regulatory	Implemented	Industrial systems with annual energy consumption over 3 000 MWh are required to have their energy efficiency audited every three years. The prescribed measures are mandatory. Energy Efficiency for Competitive Industry is a new programme that provides low-interest loans to small and medium-sized enterprises. The total amount of funds under the programme is €300 mln.. €150 million of this amount will be provided by Operational Program Competitiveness and the remaining amount -from EBRD credit lines through the Bulgarian commercial banks	2008	MEE	1778

Use of biomass in the combustion units of installations	Energy, Waste Management	CO2, CH4, N2O	The aim is to decrease the use of fossil fuel use and increase share of the alternative fuel and wastes. Reduction of heat price. Improved waste management and reduced GHG emissions from waste sector.	Regulatory, Economic	Adopted	The aim is to increase the use of waste as an alternative fuel such as: separately collected household waste (RDF); sludge from domestic sewage water; agricultural waste and waste from the food industry; industrial waste mixed with biomass. It is related to the ban on landfilling of biodegradable waste. The procedure for a green industry is intended to attain more efficient use of waste products. It is proposed to finance in the next programming period facilities that enable the utilization of sludge from urban wastewater treatment plants in industrial installations.	2014	MEE, MOEW	3880
Construction of installations for mechanical and biological treatment (mbt) and installations for treatment and recovery of compost and biogas	Waste Management	CH4	Gradual reduction of biodegradable waste intended for landfilling 2010-2020.	Economic	Implemented	The measure is incorporated into the National strategic plan for gradual reduction of biodegradable waste intended for landfilling 2010-2020. As a result of its implementation for the period 2013-2020 5 289 000 tonnes of biodegradable waste will be diverted from landfills. An additional impact of the measure will be the substitution of phosphate fertilizers in agriculture with compost produced at waste treatment installations.	2013	MOEW	5823,7
Capture and burning of biogas in all new and in the existing reginoal landfills	Waste Management	CH4	360 mln. Nm3 methane will be burned by 2020 with the introduction of systems for capture and flaring of biogas in all regional landfills.	Regulatory, Economic	Implemented	The requirement for design and operation of landfills is provided for in Ordinance №8/2004. It is necessary to improve the control over its implementation. 360 mln. Nm3 methane will be burned by 2020 with the introduction of systems for capture and flaring of biogas in all regional landfills. The combined effect of the two measures is expected to be 5 070 122 total reduction in tonnes CO2 eq. by 2020.	2013	MOEW	5070,1

Introduction of anaerobic stabilization of sludge with management capture and burning of biogas in new plants and plants under reconstruction in settlements with population equivalent over 20 thousand residents	Waste Management	CH4, N2O	A cost-benefit analysis for each project should justify or discourage the recovery of methane.	Regulatory, Economic	Implemented	A cost-benefit analysis for each project should justify or discourage the recovery of methane. Practice has shown that it is technologically feasible and economically viable to produce electricity from the biogas emitted from the methane tanks of large wastewater treatment plants (more than 50 000 PE) in order to cover the main share of the energy needs of the plants. An additional effect of the stabilization of sludge at UWWTP will be achieved as a result of the possibility to use the stabilized sludge in agriculture so as to recycle the nutritional substances, to preserve the fertile soils and to limit the use of agricultural chemicals and synthetic fertilizers.	2013	MOEW	1025,6
Encouraging the use of suitable crop rotation, especially with crops fixing atmospheric nitrogen	Agriculture	CH4	The introduction of sustainable crop rotations that include plant cover in winter and legumes (beans, soybeans, alfalfa, clover) will prevent soil erosion and will retain organic carbon (carbon sequestration), which is a potential tool for reducing greenhouse gases.	Economic	Implemented	Rotation means science-based successive rotation of crops in time and place on a farmland. The period required for all crops to pass through all fields following the order of the crop rotation scheme is called rotation period or rotation. The introduction of sustainable crop rotations that include plant cover in winter and legumes (beans, soybeans, alfalfa, clover) will prevent soil erosion and will retain organic carbon (carbon sequestration), which is a potential tool for reducing greenhouse gases. The proposed budget for the measure is based on: 350 BGN/ha is the current payment for biological field crops under Measure 214 of RDP 2007-2013; 150 BGN/ha is the current payment for the introduction of rotation under Measure 214 of RDP 2007-2013. This measure covers: 20 000 ha, of which 60% in organic production. Organic production: 12 000 ha X 350 BGN/ha = 4 200 000 BGN Crop rotation: 8000 ha x 150 BGN/ha = 1 200 000 BGN	2013	MAF	6,4

Management of degraded agricultural land using: Biological reclamation with grass species typical of the region. Management of degraded agricultural land using: Implementation of erosion control measures and soil treatment methods	Agriculture	CH4	Management of degraded agricultural land	Economic	Implemented	Soil erosion is a process of mechanical destruction and weathering of soil by the action of water and wind. It gradually reduces the amount of nutrients and the humus in soil. Erosion aggravates the structure, as well as the water and air regime of soil. The combination of the specific natural and economic conditions in Bulgaria is a reason for the high risk of degradation processes in agricultural soils. The most common processes of soil degradation include water and wind erosion, pollution, reduction of organic matter stocks (humus), compaction, acidification, salinization, loss of biodiversity. More than 60% of the country is affected by varying degrees of erosion. 11.8 % of the country's territory is severely eroded. 65% of agricultural land is threatened by water erosion and 24% is threatened by wind erosion. The average annual intensity of soil erosion varies according to land use, but soil loss in agricultural lands is estimated at 12.256 tones/ha a year on average. The water erosion of soil controls the stocks of organic carbon and their distribution on the landscape which affects the circulation of carbon, the content of carbon dioxide in the atmosphere and the global warming. The proposed budget for the measure is based on reclamation of 2500 ha: • 2500 ha x 380 BGN/ha = 950 000 BGN Erosion control practices for 2500 ha • 2500 ha x 145 BGN/ha = 362 500 BGN The amounts used are under the current Measure 214 Agrienvironmental payments under RDP 2007-2013	2013	MAF, MOEW	20
Improvement of the manure use and management	Agriculture	CH4	All activities aimed at storage and handling of manure should take into account both the type of manure - solid or liquid - and the technologies for gathering and processing.	Education, Research, Planning	Implemented	Production, processing and management of manure is one of the most significant sources of the greenhouse gas CH4 in agriculture. All activities aimed at storage and handling of manure should take into account both the type of manure - solid or liquid - and the technologies for gathering and processing. The investment support is crucial to motivate the farmers to build such expensive facilities. The proposed budget for the measure is based on: The average cost of building facilities for storage of manure for one farm with 50 cows is 130 000 BGN. 1000 x 130 000 BGN = 130 000 000 BGN For training: 300 livestock holdings x 690 BGN = 207 000 BGN	2013	MAF	1,2

Introduction of low-carbon practices for processing manure, e.g. composting, transformation of manure into biogas under anaerobic conditions	Agriculture	CH4	Improved animal waste management systems	Research, Economic, Education, Regulatory	Adopted	The introduction of low carbon practices for the processing of manure can reduce the emissions from its storage. This requires considerable accumulation of knowledge and experience at regional level, since the efficiency of the implementation of the measure depends on the conditions under which it is implemented. It is therefore advisable to establish model farms in different production areas of the country in order to accumulate practical experience that can be presented to the farmers. Given the resources required by such investments and the need for changes in the production process it is advisable to provide also investment support. The reduction of emissions depends on the type of animals: - holdings that breed pigs: 811 kg CO2 eq. per head - holdings that breed cattle: 78 kg CO2 eq. per head - holdings that breed sheep: 4 kg CO2 eq. per head - holdings that breed birds: 18.4 kg CO2 eq. per head The proposed budget for the measure is based on: For training: 200 livestock holdings x 690 BGN = 138 000 BGN For model farms – 1 000 000 BGN	2014	MAF	0,75
Technical support for farmers for tilling soil/ stubbles	Agriculture	CH4	Improved management of organic soils, Other activities improving cropland management	Economic	Adopted	The use of plant residues in agriculture requires both a change or adjustment of the production processes as well as investment in new equipment and machinery. This requires substantial financial resources and supporting them is appropriate. The efficient recovery of waste will reduce the need for burning stubble. The reduction of emissions is estimated at 3.62 kg CO2 eq. per ton production. The proposed budget for the measure is based on: 5000 holdings x 45 000 BGN = 225 000 000 BGN	2014	MAF	0,66
Financial support for improving the equipment and the technology of production	Agriculture	CH4	Other agriculture	Regulatory, Economic	Adopted	In recent years, rice production in the country has been gradually recovering its potential. The introduction of low carbon technologies and methods is necessary, feasible and appropriate in this specific period.	2014	MAF	0,01

Utilization of "non-wooded areas intended for afforestation" in forest areas	LULUCF	CO2	Increasing forest area has an important role in offsetting the greenhouse gas emissions from other sectors. The afforestation of non-wooded areas in the long term will increase the capacity of the forests as sinks of greenhouse gases.	Economic	Implemented	The measure is consistent with the requirements set out in the Forestry Act (2011). The needed financial resources are estimated on the basis of the accepted mean values of investments. The implementation of the measure is important for achieving the goals of NAPCC because forests are a major carbon sink and a reservoir of 90-95% of the total amount of sequestered carbon in the LULUCF sector. Increasing forest area has an important role in offsetting the greenhouse gas emissions from other sectors. The afforestation of non-wooded areas in the long term will increase the capacity of the forests as sinks of greenhouse gases.	2013	MAF	13,38
Afforestation of abandoned agricultural land, barren and deforested areas, eroded and threatened by erosion land outside forest areas	LULUCF	CO2	The implementation of the measure will increase the absorption of greenhouse gases and thus contribute to climate change mitigation, to the protection of biodiversity and of the soil against erosion.	Economic, Research	Implemented	The proposed measure corresponds to those with codes 223 and 226 under the Rural Development Programme. It is possible to apply under this programme with projects and to obtain appropriate funding. The needed financial resources are estimated on the basis of accepted mean values of investments. There is a potential for creating new forests outside the forested areas especially over the last two decades, when large territories of the agricultural land is not cultivated. The implementation of the measure will increase the absorption of greenhouse gases and thus contribute to climate change mitigation, to the protection of biodiversity and of the soil against erosion. To achieve the objective of the measure it is necessary, before undertaking afforestation activities, to make an inventory of the areas that are suitable for afforestation and to conduct applied scientific studies to evaluate their suitability and possibility for afforestation; appropriate recommendations for suitable species should be provided on the basis of the conditions of the places where they grow.	2013	MAF, MRDPW and municipalities	35,2

Increase of areas for urban and suburban parks and green zones	LULUCF	CO2	Increasing the areas of urban and suburban parks and green zones and keeping them in good condition will contribute to increased absorption of greenhouse gases and to better quality of the living environment.	Economic	Implemented	The proposed measure corresponds in part to measure with code 322 form the Rural Development Programme that provides funding opportunities. The measure is also related to Ordinance № 5 on Spatial Planning Rules and Standards, setting standards for the surface area of public green areas in cities. The needed financial resources are estimated on the basis of the accepted mean values of investments. The expansion of urban areas and the intensive building in recent years is a prerequisite for significant emissions of greenhouse gases. Increasing the areas of urban and suburban parks and green zones and keeping them in good condition will contribute to increased absorption of greenhouse gases and to better quality of the living environment. The measure will contribute also to the gradual achievement of the standards for green areas laid down in the General Development Plans.	2013	MRDPW, Municipalities	2,5
Restoration and sustainable management of wetlands. Protection and preservation of wetlands in forest areas, peatlands, marshlands	LULUCF	CO2, CH4	The restoration and the conservation of wetlands and woodlands and their proper management will enhance their efficiency as carbon stores.	Research, Economic, Regulatory	Implemented	The main instrument for the protection of wetlands is the Convention on Wetlands which is transposed in the Biological Diversity Act. The wetlands are designated as protected areas with priority or are included in Natura 2000. They will be subject to management plans that are currently being developed and that will be supplemented by special programmes for management in view of climate change. The needed financial resources are estimated on the basis of the accepted mean values of investments. Wetlands are characterized by great biological diversity and play an important role in carbon retention because they are among the most productive ecosystems. The restoration and the conservation of wetlands and woodlands and their proper management will enhance their efficiency as carbon stores	2013	MOEW	4,7

Restoration and maintenance of protective forest belts and new anti-erosion afforestation	LULUCF	CO2	Besides the direct effect for absorption of carbon by the new forests in these zones, there are also significant indirect effects associated with preventing wind erosion after the restoration of belts.	Regulatory, Economic	Implemented	The first step is to update the programme for restoration of shelter belts and the specific activities will commence after its approval. Besides the direct effect for absorption of carbon by the new forests in these zones, there are also significant indirect effects associated with preventing wind erosion after the restoration of belts. The information on the areas and the funds necessary for the restoration is provided by EFA.	2013	MAF, EFA	8,4
Increasing the density in the listed natural and artificial plantations	LULUCF	CO2	Increasing the density in the listed plantations by supporting their natural regeneration or using other methods.	Research, Economic, Planning	Implemented	A first step can be the assignment of scientific studies followed by amendments to the regulations. Activities will commence on this basis with the view of increasing the density in the listed plantations by supporting their natural regeneration or using other methods. The information on the areas and the necessary funding is provided by EFA.	2013	EFA/MAF	16,7
Rehabilitation and modernization of the existing road infrastructure to ensure optimum speed and optimum driving modes of automobile engines	Transport	CO2	Improved transport infrastructure	Economic	Adopted	Assessment of the emission saving potential of projects for rehabilitation and modernization – within the EIA. Existing methodology of the European Investment Bank. (http://www.eib.org/attachments/strategies/footprint_summary_of_the_methodologies_en.pdf)	2014	MF, MTITC, MRDPW, Road Infrastructure Agency	542,5

Introduction of intelligent transport systems along the national and the urban road network	Transport	CO2, CH4, N2O	Intelligent transport systems and telematics solutions help improve road safety, promote the efficiency of the used existing infrastructure and contribute to the reduction of environmental pollution through control over traffic flows and management of traffic volume.	Fiscal, Regulatory, Economic	Adopted	Intelligent Transport Systems (ITS) encompass a wide range of technical solutions designed to improve transport by improving mobility and increasing the safety of road traffic. Telematics (a combination of telecommunications and informatics) uses advanced technologies to meet transport needs. Intelligent transport systems and telematics solutions help improve road safety, promote the efficiency of the used existing infrastructure and contribute to the reduction of environmental pollution through control over traffic flows and management of traffic volume. The intelligent transport systems in urban settings can include integrated management of public transport charges, enhanced management of customer relationships, traffic forecasts, improved traffic management, traveler information and toll collection. These systems apply advanced technologies to collect more and better data, to make a precise analysis of these data and to link them through more effective networks. The result: more effective, more efficient and better oriented towards citizens on the move services.	2014	MTITC	1017,2
Increasing the share of biofuels	Transport	CO2, CH4, N2O	The most promising projects in Bulgaria are the projects for production of ethanol and biodiesel.	Regulatory	Implemented	Biofuels are fuels produced from biomass and used in transport. They diversify the energy mix and reduce the dependence on fossil fuels. The main types of biofuels are bioethanol, biodiesel, biogas, synthetic biofuels, bio-hydrogen, pure vegetable oils. The most promising projects in Bulgaria are the projects for production of ethanol and biodiesel. The consumption of biodiesel in Bulgaria in 2010 amounted to 38 911.13 tonnes. In the previous two years these amounts were respectively 4260 t and 6566 t. The Renewable Energy Sources Act (Art. 47(1)) introduces stages for the introduction of certain percentages of biodiesel and bioethanol content in the relevant fuel, as well as requirements to the types of biofuels and sustainability criteria which they must meet.	2012	MEET, SEDA, MOEW	407
Reducing the share of trips by private motor vehicles	Transport	CO2, CH4, N2O	Improving the urban public transport and non-motorized transport development	Economic, Planning, Regulatory	Implemented	Reducing the share of trips by private motor vehicles by improving the urban public transport and non-motorized transport development.Project-oriented approach – specific implementation	2012	MRDPW	678

Development and promotion of cycling	Transport	CO2, CH4, N2O	Promotion of cycling	Education, Information, Economic	Implemented	Project-oriented approach – specific implementation 1. Design and construction of new cycling infrastructure 2. Developing systems for use of municipal bicycles Trainings and campaigns	2013	MF; MRDPW; MEW;	1017,2
Increasing the share of public electrical transport - railways, trolley, tram, metro	Transport	CO2, CH4, N2O	Increasing the share of public electrical transport.	Fiscal	Adopted	OP "Transport" 2007-2013, Priority axis 1 "Development of railway infrastructure along the major national and Pan-European transport axes" provides for: modernization of the railway line Sofia – Plovdiv; reconstruction and electrification of railway line Svilengrad - Turkish border; renewal of sections of railway infrastructure on the railway line Plovdiv - Burgas (along Trans-European Transport Network); modernization of railway line Sofia - Dragoman (along TEN-T); design of the construction of railway line Vidin - Sofia. Given the crucial importance of the central section of Line 2, it is currently a separate Sofia Metro Expansion Project which is included in Operational Programme Transport, with financing by the European Regional Development Fund, with national and local co-financing. This stretch covers the section: "Road junction Nadezhda - Central Railway Station – Sv. Nedelya Square - Cherny Vrah Blvd." International tender procedures were conducted in 2007-2008 for selection of contractors of this project and the contracts entered into force in December 2008 with a time limit for completion - autumn 2012. The expected effect of the implementation of such measures is reduction of hazardous and greenhouse gases – 90 500 tonnes CO2 per year.	2014	MF; MTITC; MRDPW; National Railway Infrastructure Company, municipal governments	142

Development and construction of intermodal terminals for combined transport	Transport	CO2, CH4, N2O	Increase of the degree of utilization of more environmentally friendly modes of transport and creation of favorable conditions for increasing the added value of transport activity with overall reduction of transport costs per unit of GDP.	Economic	Adopted	The measure aims to achieve a two-sided effect, consisting, on one side, in increase of the degree of utilization of more environmentally friendly modes of transport and, on the other side, in the creation of favorable conditions for increasing the added value of transport activity with overall reduction of transport costs per unit of GDP. The expected results of its implementation are: • more efficient use of rail and water transport; • development of transport schemes and technologies meeting contemporary requirements with regard to environment and climate; • increased coordination and integration of different transport modes; • lower cost for passenger and cargo transport; • integration of the Bulgarian transport system with that of the EU and increasing its competitiveness.	2014	MF; MTITC; National Railway Infrastructure Company	406,9

5. Projections of greenhouse gas emissions

The most recent GHG projections were elaborated taking in consideration the trends of key macro-economic, technological, demographic and other indicators that determine the economic development of the country.

During the development of the projection scenario the available data from the National Statistics Institute, the Plan for development of the energy sector of Bulgaria for the period 2008-2030, Third National Action Plan on Climate Change for the period 2013-2020 (NAPCC 2013-2020), comments of analysts of the World Bank and publications in the press were used.

For the purposes of this report, the scenario presented is a "with existing measures" (WEM) scenario, incorporating all measures adopted, planned and implemented.

Table 5 presents key projection parameters as applied in the base year 2013 and cross years for projections.

Table 5 Summary of key variables and assumptions used in the projections analysis

Key underlying assumptions		Historical								Projected			
Assumption	Unit	1990	1995	2000	2005	2010	2011	2012	2013	2015	2020	2025	2030
GDP growth rate	%					0,4	1,8	0,6	0,5	0,8	1,40	1,1	1,10
Population	thousands					7,50	7,36	7,28	7,24	7,17	6,97	6,76	6,55
Population growth	%						-1,87	-1,09	-0,55	-0,38	-2,8	-3,1	-3,2
International oil price	USD / boe							111,49	108,66	59,85	88,50	89,20	93,10
International coal price	USD / boe									22,00	22,60	23,70	24,00
International gas price	USD / boe									53,80	61,50	58,90	64,50

The scenario **"with measures"** reflects all implemented and adopted policies and measures in order to reduce GHG emissions in the country by the end of 2014.

The "**with measures**" scenario the measures are more generally referring to environmentally friendly development, this scenario is more concentrated on the specific GHG mitigation measures and policies in the power sector and renewables.

These projections were compiled on the basis of 2015 inventory data for the 2013.

5.1. Sectoral forecast

5.1.1. Energy

5.1.1.1. Energy Industries

The GHG emissions projections for the energy industry sector are based on analysis of the country energy balance. This analysis is based on modelling with the use of the Long-term Assessment and Energy Planning software. The main scenario developed takes into account all existing measures for decreasing the greenhouse gas emissions. This projection is thus equivalent to the WEM scenario for the projection of the Bulgarian National Projection Report.

The Energy Sector covers the following activities:

- production and transmission of electricity, including cogeneration;
- production and transmission of heat for public needs;
- transmission of natural gas (maintenance of the pressure of compressor stations);

About 92% of the total aggregated greenhouse gas emissions in the sector are emitted in the production of electric energy due to the burning of fuels, approximately 7% come from the production of thermal energy and about 1% is emitted by the transmission of natural gas.

The analysis of GHG emissions by sources in the sector leads to the conclusion that the main reduction potential is concentrated in the generation of electric and thermal energy from coal as it is responsible for over 90% of the emitted greenhouse gases. On the other hand, about 70% of the total emissions from electricity generation (excluding factory plants) come from the three large power plants burning local lignite coal - TPP "AES Galabovo", TPP "Maritsa East 2", TPP "ContourGlobal Maritsa East 3". They are in the spotlight because their potential to reduce emissions by 2020 predetermines to a large extent the emissions trend for the sector as a whole.

The energy industry sector consists of the facilities for power and heat generation on large scale. This is the sector that is responsible for the largest quantity of GHG emissions. It is projected that this \ sector will continue to emit the biggest part of the emissions.

The power plants with the highest power generation are the NPP Kozloduy, the lignite and coal fired thermal power plants, and the district heating and power generation plants in the biggest cities. The number of newly commissioned renewable power plants has decreased significantly due to decrease in the feed-in tariffs for wind and solar PV power plants. The installed capacity of all the RES power plants has reached 25% of the total installed capacity in the country. By the end of 2013 the RES installed capacities are as follows:

- Hydro – 1751 MW
- Wind – 756 MW
- Solar – 1012 MW
- Biomass – 22 MW

In the renewable energy sources category the biomass, hydro, solar photovoltaic, wind and geothermal power plants are included.

As displayed in the above sections, on the basis of many forecasts, it is assumed that GDP will continuously increase in the projection period. This will lead to increase in the power consumption. In the model developed it is assumed that the electricity consumption increases by 20% by 2025 as a consequence of the increased economic activity and GDP. Another assumption of the energy balance forecast is that after 2025 the increase of electricity consumption due to increased activity will be contravened by increased energy efficiency.

The forecast electricity balance is displayed in the table 5.1.:

Table 5.1

Year	2015	2020	2025	2030	2035
Gross Electricity Consumption	29070	34169	35083	33956	33529
Electricity Export	7859	4872	2825	5321	5413
Losses in Distribution Networks	3488	4100	4210	4075	4024
Losses in Transmission Networks	1010	1079	1053	1084	1074
Losses in Pumping (HAPP)	1207	1573	1767	1999	2172
Electricity to Transmission Networks	42634	45793	44938	46435	46212
Power Plant Own Needs	4613	4794	4550	4599	4455
Generation Necessary	47247	50587	49488	51034	50667

The energy balance forecast envisages that the country will continue to be net exporter of electricity. Electricity generation will be more than the consumption within the boundaries of the electricity system. The net quantity of electricity will gradually decrease until 2025 as it is highly unlikely that new generation capacities be commissioned. After 2025 until the end of the projection period the electricity exports are expected to be 5 000 – 6 000 MWh a year.

Centralized heat generation

This subsector includes the district heating plants and the thermal power plants that are close to cities, where waste heat from electricity production can be utilized.

In the forecast from the model, it is expected that in the projection period the heat generation will increase by 70% by 2035 – from 5400 GWh to 9215 GWh. Despite the increase

in the absolute quantity of heat produced, the ecological effects are expected to be strongly reduced by the switch from coal to natural gas and biomass in some of the plants that have not yet performed that.

Table 5.2

Year	2013	2015	2020	2025	2030	2035
Heat production from:						
Coal	3350	2200	2200	2200	2200	2200
Biomass	10	10	45	85	120	130
Natural gas	1780	4030	5230	5500	5980	6530
Liquid fuels	0	60	70	70	70	70
Nuclear	270	345	345	345	345	345
Total	5400	6645	7890	8200	8715	9215

The measures aimed at reducing GHG emissions in the Energy sector are fully described in the Third National Action Plan on Climate Change.

Emission projections under the WEM Scenario in Energy Industries are presented in tables

Table ***Error! No text of specified style in document.****..3. Emission projections for the Energy Industries sub sector – WEM scenario, Gg CO_2 eq*

Year	1988	2005	2013	2015	2020
Aggregated emissions, CO2 eq	42 260,12	27 148,08	27390,27	30641,73	31539,34
Year	2025	2030	2035	Δ (2020 – 1988)	Δ(2035 - 1988)
Aggregated emissions, CO2 eq	27869,35	27010,66	26166,85	-25.02 %	-38.1%

5.1.1.2. Combustion in Manufacturing Industries and construction

The WEM scenario projection for this subsector is based on expectations and forecasts of the economic development, the share of the individual subsectors, the fuel use projections, as well as overall forecasts for the use of some of the main energy sources.

The forecasts for the growth of the economy for the projection period are taken from the Ministry of Finance, Ministry of Economy, International Monetary Fund, as well as the European

Commission forecast. Based on the given shares of the different Industrial subsectors and forecasts for the development of these from the Ministry of Economy, a forecast has been prepared giving the shares and economic value for these Industrial subsectors for the Bulgarian economy. The current fuel shares have been used together with forecasts for the fuel consumption forecasts for the different sectors to form a forecast for the dynamics of fuels within those Industrial subsectors.

The forecast for development of the industrial sector reflects the expectations for gradual but limited growth. It is not envisaged that sharp structural changes take place in the projections period. It is expected that the total share of the industrial sector out of the economy will decrease gradually by about 1%. The forecast given here is based on the changes in the shares of the sub-sectors.

Emission projections under the WEM Scenario in Manufacturing Industries and construction are presented in table 5.4.

*Table **Error! No text of specified style in document.**.4. Emission projections for sub sector Manufacturing Industries and construction – WM scenario, Gg CO_2 eq*

Year	1988	2005	2013	2015	2020
Aggregated emissions, CO_2 eq	**18933,61**	**7 905,20**	**3185,89**	**3239,84**	**3294,70**
Year	2025	2030	2035	**Δ (2020 – 1988)**	**Δ(2035 - 1988)**
Aggregated emissions, CO_2 eq	**3350,49**	**3407,23**	**3464,94**	**-82.9%**	**-81.7%**

5.1.1.3. Transport

The forecast for the development of the Transport sector has been prepared in accordance with the given forecast for the use of fuels in the sector. In the scenario it is assumed that the goal to be met is the 10% share of biofuels by 2020. By the end of the projection period, the target set is 15% share.

The forecast reflects the tendency for decrease in the share of liquid fuels (oil products) as opposed to an increase in the usage of electricity and natural gas.
This can also be observed in the structure of the fuels used.

Table 5.5.

Year	2013	2015	2020	2025	2030	2035
Coal	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Fuels from Coal	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Natural gas	2.4%	2.6%	3.0%	6.0%	11.0%	11.0%
Oil Products	95.9%	92.2%	82.8%	73.5%	64.3%	63.0%
Renewables	0.5%	3.2%	10.0%	11.3%	14.8%	16.1%

Renewable (Heat)	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Heat	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Electricity	1.2%	2.1%	4.2%	9.2%	9.9%	9.9%
Fuels for final energy consumption	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**

The projections on carbon dioxide emissions from the transport sector are calculated on the basis of projections on energy use in the transport sector. The calculation of emissions of other greenhouse gases is based on the change in transport activity, number of vehicles in different vehicle types and emissions factors. The transport sector has been divided into four sub-sectors: road traffic, air traffic, rail traffic and shipping.

The projections for road transport are based on assessments on transport demand and on the development of the vehicle fleet. The demand for transport with passenger cars is expected to be mainly influenced by demography, fuel prices and in-come in households.

The development of the vehicle fleet is based on the assumptions on the allocations of fuels and existing instruments and historical trends. The projections for aviation, navigation and railways are based on assumptions on transport demand.

Emission projections under the WEM Scenario in Transport are presented in table

*Table **Error! No text of specified style in document.**..5.Emission projections for Transport sector - WEM scenario, Gg CO_2 eq*

Year	1988	2005	2013	2015	2020
Aggregated emissions, CO_2 eq	**7363,6395**	**7834,9888**	**7433,2993**	**7963,36**	**7104,43**
Year	2025	2030	2035	**Δ (2020 – 1988)**	**Δ(2035 - 1988)**
Aggregated emissions, CO_2 eq	**6609,47**	**6238,50**	**6255,50**	**-3.5%**	**-15.4%**

5.1.1.4. Commercial and Residential

The forecast is based on the separate forecasts for the usage of fuels in the Commercial and the Residential subsectors. The forecasts for the two are added together to create the overall expectations for this Energy subsector.

Commercial

It is expected that the sector will grow faster than the economy and a rate of growth of 3.5-4.0% is expected by 2020. Further in the projection (until 2035), the growth rate converges

to the growth rate of the overall economy. The structure of fuels used in the subsector is given below:

Table 5.6.

Year	2013	2015	2020	2025	2030	2035
Coal	0.4%	0.4%	0.3%	0.2%	0.1%	0.1%
Fuels from Coal	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Natural gas	8.1%	8.6%	10.0%	16.1%	18.6%	18.9%
Oil Products	4.5%	4.6%	5.0%	4.0%	3.0%	2.8%
Renewables	1.1%	1.4%	2.0%	4.3%	5.1%	7.6%
Renewable (Heat)	3.7%	6.1%	12.0%	14.0%	15.0%	16.0%
Heat	11.7%	10.9%	9.0%	9.0%	9.0%	9.3%
Electricity	70.5%	68.0%	61.7%	52.4%	49.2%	45.3%
Fuels for final energy consumption	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Residential

The forecast for the energy supply of the households is based on expectations for the following factors:

- Number of households
- Average number of people in the households
- Income of the population
- Prices of the energy sources and the energy supply

The expectation is that the number of households will increase in the projection period due to the decrease of the average number of people in a household and despite the decrease of the population. This is foreseen to be the major reason for the increase of the energy consumption for the Residential sector. The main reason for the increase of the energy consumption of the households is the increasing income of the population. This results into increase of the saturation of the households with home appliances. The increase of the energy prices affects negatively the consumption of energy but it is a major stimulus for the implementation of energy efficiency measures.

The analysis of the household energy consumption shows a higher dependency on the energy prices than on the income of population. When the increase of the energy prices is faster than the increase of the income, then the amount of energy consumed decreases. While the rates of increase of the energy prices and the income are on par, the energy consumption of the households increases.

The forecast of the final energy consumption of the Residential sector has been prepared by taking into account the number of the households and the average household consumption. The specific energy consumption of the Bulgarian households at present (0.30 toe/year) is

approximately two times smaller than the average household energy consumption in the European Union (0.61 toe/year). In the model, it is assumed that there will be gradual increase toward the average for the European Union. This parameter has been set to 0.39 toe/year in 2020 and 0.47 toe/year in the end of the projection period.

In terms of the energy sources to supply the household with energy, the following is assumed:

- Currently only a little more than 2% of the households in the country are gasified.
- The Energy Strategy of Bulgaria until 2020 envisages that this share reaches 30% by 2020, which however seems implausible and this suggested increase is not accounted for in the forecasts of Bulgartransgaz. That is why a share of 8% has been used in the model for the projection by 2020.
- It is expected that the given goal of 30% will be reached by 2030 and after that the share will converge more slowly to the average for the European Union (namely 40%). By 2035 the share of gasified households is set to 35%.
- The electricity used for space heating in the households is expected to decrease rapidly in the projection period with the main substitutes being the heat from renewable sources as well as natural gas.
- The rest of the fuels do not have significant shares in the fuel structure and are not expected to have big changes in absolute terms.

The structure of fuels used in the subsector is given below:

Table 5.7.

Year	2013	2015	2020	2025	2030	2035
Coal	8.3%	7.6%	6.0%	3.0%	2.0%	1.0%
Fuels from Coal	1.1%	1.1%	1.0%	1.0%	1.0%	0.0%
Natural gas	2.2%	4.4%	10.0%	20.0%	30.0%	36.0%
Oil Products	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%
Renewables	31.4%	28.1%	20.0%	19.0%	18.0%	17.0%
Renewable (Heat)	0.3%	2.2%	7.0%	9.0%	12.0%	12.5%
Heat	15.6%	15.9%	16.6%	16.0%	16.0%	16.0%
Electricity	40.1%	39.6%	38.4%	31.0%	20.0%	16.5%
Fuels for final energy consumption	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Emissions from the Energy sector include emissions from the production of electricity and district heating, refineries, manufacture of solid fuels, manufacturing industries, other sectors (including commercial/institutional, residential, agriculture, forestry and fisheries), other (military transports), and fugitive emissions. Table 5.8. and figure 12 are presented projection for total GHG emissions expressed in Gg CO_2 eq for Energy sector until 2035 under

scenario with measures. The applied until 2013 measures are accounted, as well as the emission from fuels combustion in transport, households, services and agriculture and forestry.

*Table **Error! No text of specified style in document.**.8 Emission projections for sector Energy - scenario with measures, Gg CO_2 eq*

Year	1988	2005	2013	2015	2020
Aggregated emissions, CO2 eq	82 905,90	46 411,21	41122,51	45207,93	45703,36
Year	2025	2030	2035	Δ (2020 – 1988)	Δ(2035 - 1988)
Aggregated emissions, CO2 eq	42369,26	42320,49	41961,03	-44.9%	-49.4%

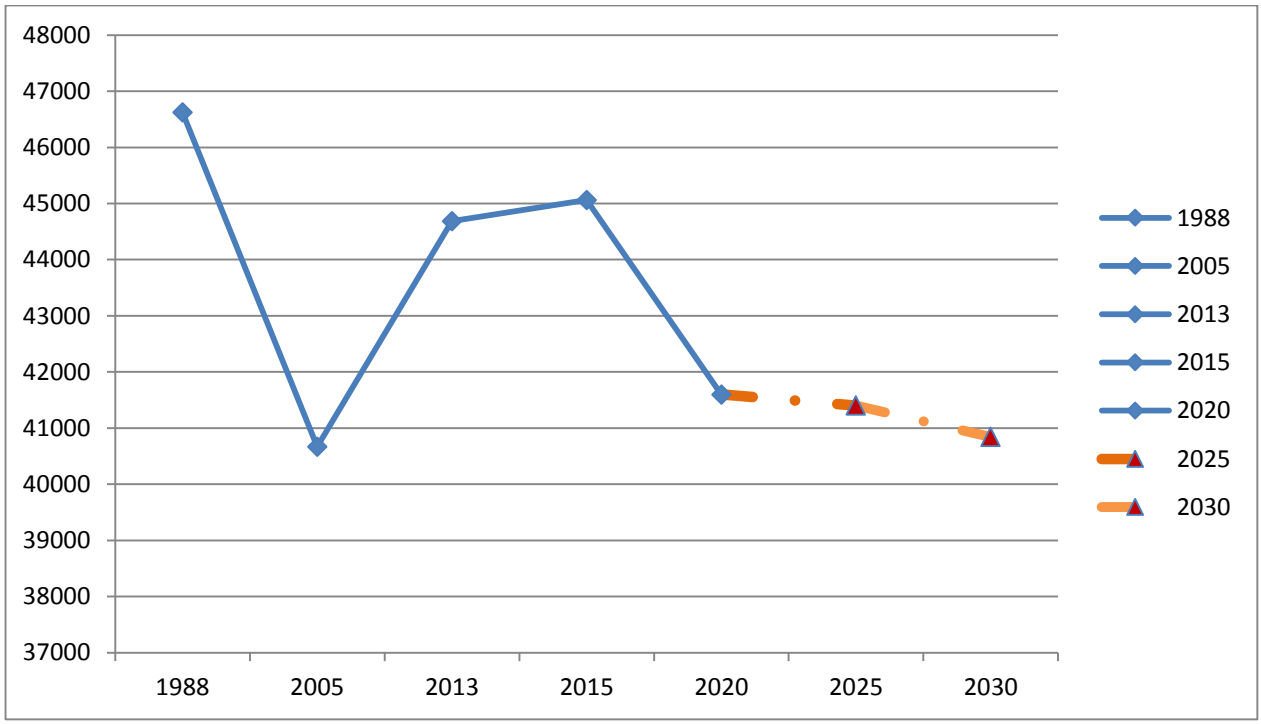


Fig.12 Emission projections for sector Energy - scenario with measures

5.1.2. Industrial Processes

in the total Industrial processes emissions is 47.5 **%.** The second category by share is Chemical In the past, the main industry sectors of Bulgaria were metallurgy, machine

manufacture, chemicals, and agriculture. Recently, however, the priority has shifted to sectors like energy, tourism, transportation, IT and telecommunications, food and beverage, pharmaceuticals, and textile and clothing.

The governmental policy of rapid privatization led to almost complete privatization of industrial installations. As a result, the most inefficient enterprises were closed. The new owners introduce various measures to save energy which are mainly of organizational nature and "no cost" or "low cost" measures.

The IP Sector's share as accounted in the 2015 NIR is about 7**% from the total emissions in 2013.** In 2013 the most important emitting category is Mineral Industries (mainly clinker production) which share Industry (ammonia and nitric acid production) with 28.2**%, %,** followed by Consumption of Halocarbons and SF6 with 22.8**%** share and finally Metal Production (steel) with 0.81%**.**

The emissions reduction during the whole time period from 1988 to 2013 is due to mainly economic reasons. The general reduction in the emissions in the later years of the time period is influenced also by the starting **introduction of better technologies on plant level**.

According to IPCC 2006, GHG emissions in Industrial processes result from non-energy industrial activities.

GHG emissions in non-energy sectors were calculated using models based on spreadsheets, considering the activity data and production structure of sub-sectors. The emission factors used are either specific for the sector (determined by analysing data from previous years) according to the IPCC guidelines. Emissions projections are based on following consideration:

- ✓ activity level of the sector, which is a source of GHG emissions;
- ✓ activity level of sub-sector, which is a source of GHG emissions;
- ✓ product or material used for whose manufacture or from whose use GHG emissions result;
- ✓ share of the product/quantity of material used in the activity data of the sub-sector;
- ✓ growth or decrease factor of the activity data at the activity sub-sector level;
- ✓ Implied emission factor for the greenhouse gas for the product or material used.

In addition to official statistics, data and other information from industry organizations and companies have been used to obtain better detailed knowledge on the industries and emissions concerned.

Mineral products and chemical industry are the main sources of CO_2 emissions in Industrial Processes sector. Data from 10 cement and lime producing companies is included in the projections.

In the Mineral Industry sector with the largest part of the emissions (about 46.8% in 2013) originates from cement production. Other sources of CO_2 emissions come from lime production, soda ash use, glass production, bricks production.

GHG emissions under chemical industry branch originated by ammonia, nitric acid, Carbide production, Calcium carbide production, Soda Ash and Methanol production but activity data

are confidential. This is the reason that emissions projections are made for the chemical industry as a hole.

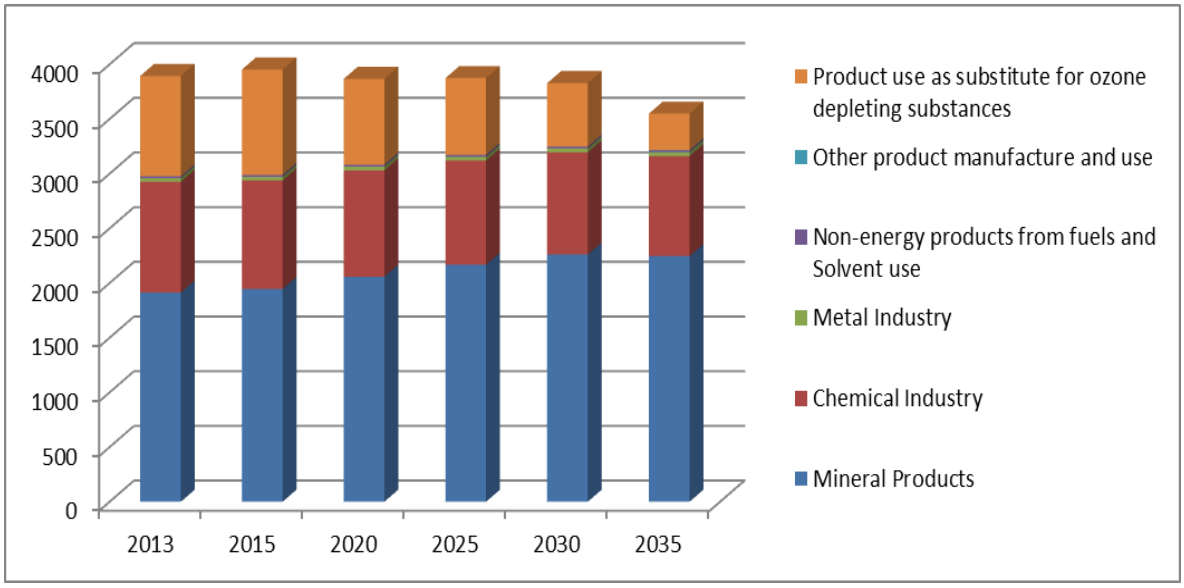
The third largest source of greenhouse gases under industrial processes sector is consumption of HFC-s as substitutes for ozone depleting substances. The consumption of HFCs in Bulgaria depends on industry for domestic productive consumption manufacturing) – filling of newly manufactured products, refilling of equipment – or in pre-charged equipment.
Smaller quantities of GHG-s originate from the sectors: Non-energy products from fuels (CO_2) and Solvent use (NMVOC-s) and other product manufacture and use (SF_6 and N_2O) Since there are no additional measures planned in the Industrial Processes sector.

Table 5.9. GHG emissions from Industrial Processes and Product Use sector, Gg

		2013	*2015*	*2020*	*2025*	*2030*	*2035*
Mineral Products	*CO_2*	**1913,62**	**1945,35**	**2057,08**	**2166,65**	**2260,54**	**2245,42**
Chemical Industry	*CO_2*	**1012,61**	**992,35**	**972,51**	**953,06**	**934,00**	**915,32**
Metal Industry	*CO_2*	**32,72**	**33,28**	**33,65**	**34,15**	**34,66**	**35,15**
Non-energy products from fuels and Solvent use	*CO_2 eq.*	**15,24**	**16,60**	**16,77**	**17,00**	**17,24**	**17,46**
Other product manufacture and use	*SF_6 and N_2O*	**1,10**	**1,10**	**1,10**	**1,10**	**1,10**	**1,10**
Product use as substitute for ozone depleting substances	*HFCs (CO_2eq.)*	**918,12**	**963,43**	**784,75**	**701,29**	**579,86**	**334,15**
Total	*CO_2eq*	**4021,69**	**4080,51**	**3994,47**	**4001,86**	**3955,90**	**3677,00**

CO_2 emissions from Mineral Industry are projected to increase until the year 2035 about 17.3% compared to 2013. A small decrease is expected in CO2 emissions from Chemical Industry about 11 % by 2035 compared to 2013 following the tendency in this sector. GHG emissions from Product (HFC) uses as substitutes for ozone depleting substances are projected to decrease almost 63% by 2035 compared to 2013, as a result of the Regulation (EU) No 517/2014.

The projected GHG emissions from Industrial Processes and Product Use sector are presented in Table 5.9. and Figure 13:



5.1.3. AGRICULTURE

This sector has not implemented significant measures to reduce emissions. The reduction is a direct consequence of the overall decline of farming since 1988. The reduction of emissions from stock-breeding follows the decrease in the number of livestock.

An important element of the governmental policy is the utilization of EU funds targeted to support rural organizations in order to increase their role in achieving market protection in the purchase of agricultural products. The technological restructuring and the new investment policy of the Ministry of Agriculture and Food and the Forestry Agency will ensure the food supply and a positive trade balance. This will increase the competitiveness of the Bulgarian agricultural producer. Special attention will be focused on the preservation of soil fertility through the introduction of anti-corrosion activities, new methods of soil cultivation and discontinuation of the practice of burning crop residues in the fields.

The agricultural holdings surveyed during the census in 2010 were 371 100, which is a decrease of 44% compared to the number of holdings surveyed during the census in 2003. A trend of decrease has been maintained over the recent years. Conducted sample surveys of the structure of agricultural holdings in 2005 and 2007 show that the number of holdings decreased by 19.7% in 2005 compared to 2003, by 7.8% in 2007 compared to 2005 and by 24.7% in 2010 compared to 2007.

The holdings owned by individuals are 363 700 or 98% of all agricultural holdings; followed by those owned by commercial companies – 1%, sole traders – 0.6%, cooperatives – about 0.3% and other holdings – about 0.1%.

357 900 agricultural holdings use agricultural area to the amount of 3 620 900 ha. An agricultural holding manages the average of 10.1 ha of utilized agricultural area (UAA), this

indicator being the highest in the Northeast region (17.6 ha) and lowest in the Southwest region (3.6 ha).

Natural persons manage 33.8% of the UAA. The commercial companies manage 31.6% of the UAA of the country, the cooperatives – 17.7%, sole traders – 14.9%, and the remaining holdings – 2%.

In the UAA of 3 620 900 ha of the agricultural holdings, the share of arable land of 86.5% is the highest, followed by permanent grassland – 10.4% of the UAA. Permanent crops occupy 2.8% of the UAA.

The arable land is 3 133 000 hectares and is divided into 250 900 agricultural holdings. Cereals are grown on 47.8% of the holdings, representing 58.1% of the arable land. Industrial crops occupy 33.9% of the arable land and are grown on 23.1% of the holdings possessing arable land. Most industrial plants are grown in the Northwest region – 250 300 ha or 23.6%. Vegetables occupy 1.2% of the arable land and are grown mainly in the South Central region - 44.6% of the land under vegetables. Fodder crops are grown in 30% of the holdings on an area of 106,300 ha. This area is only 3.4% of the arable land.

The agricultural holdings with UAA from 0.00 to 1.99 ha in 2010 were 83.2% of all holdings. Over 78.2% of the UAA is located in holdings with an area of 100.00 ha or more, the average UAA of these holdings was 534 ha.

Around 280 300 were the holdings that kept livestock, poultry and bees as of 31 August 2010. Of these 91.5% used agricultural area from 0.01 ha to 10 ha (the analysis of the UAA of the holdings does not include collectively used common land for grazing animals). In the holdings with UAA from 0.01 ha to 10 ha 86.6% of equidae species, 82.5% of goats and 65.8% of sheep were raised. Cattle were raised in 34.1% of the holdings. Of these 4.4% did not have UAA and raised 7.7% of cattle, and the holdings with UAA from 0.01 ha to 10 ha were 89.1% and they raised 51.0% of the cattle. In the holdings without UAA 45.1% of the pigs and 47.6% of the birds were raised. 66.2% of the livestock holdings raised poultry. Over 10 ha of UAA were owned by 3.8% of the livestock breeding holdings. 5% of the holdings that raised pigs farmed more than 10 ha of the UAA and they raised 23.9% of the pigs.

About 100 of the surveyed agricultural holdings were engaged in activities for the production of mushrooms, growing of silkworms, hatcheries and others.

Labour force in agriculture

371 100 agricultural holdings employed 751 700 persons in 2010, the proportion of family labour force was 92.8% or 697 400 employed persons. 54 300 persons were employed in agriculture as paid workers. The total reduction of the persons employed in agriculture compared to those in 2007 was 20.8%. The annual work units (AWU) of all employed were 394 100, of these 343 100 were family labour force and 51 000 were paid labour force.

The proportion of men employed in agricultural holdings in 2010 was 55.7%. Employed men were by 22.1% less compared to 2007. Total of 61.0% of employed persons were aged 35 to 64

years. In the agricultural holdings 9.8% of the persons employed were aged between 15 and 34 years, and 29.2% were persons over 65 years of age.

Overview of the sub-categories in the agriculture sector:

GHG emissions from the Agriculture sector for 2014 are mainly due to several sources as follows:

- Agricultural soils (60.2%);

Emissions from agricultural soils include the following main categories that produced N_2O emissions:

- Direct emissions – these emissions are result from Soil fertilization with synthetic nitrogenous fertilizers; Nitrogen input from manure applied to soils (excluding manure from pasture animals); Decomposition of waste from N-fixing crops; Decomposition of vegetable waste from other cultures; Cultivation of histosols.
- Emissions from pasture animals – emissions from the excretion on pasture range and paddock.
- Indirect emissions – these emissions are result from ammonia and nitrous oxides release in the ambient air after nitrogen fertilization; Emissions from drawing of water.

- Enteric fermentation (20.8%);

Emissions from enteric fermentation are result from fermentation in ruminant animals' digestive system (e.g., cattle, sheep, and goats). Non – ruminant livestock (horses, mules and asses) and monogastric livestock (swine) produce lower methane emissions. The amount of methane that is released depends on age, weight of the animal, and the quality and quantity of the feed consumed. All domestic animals are bred in Bulgaria.

- Manure management (17.1%);

The category manure management produced methane and nitrous oxide emissions during the storage and treatment of manure, and from manure deposited on pasture (CH_4), and treatment of manure before it is applied to land (N_2O). In accordance with the IPCC guidelines, the term "manure" is used collectively to include both dung and urine produced by livestock.

- Agricultural residue burning (0.6 %);

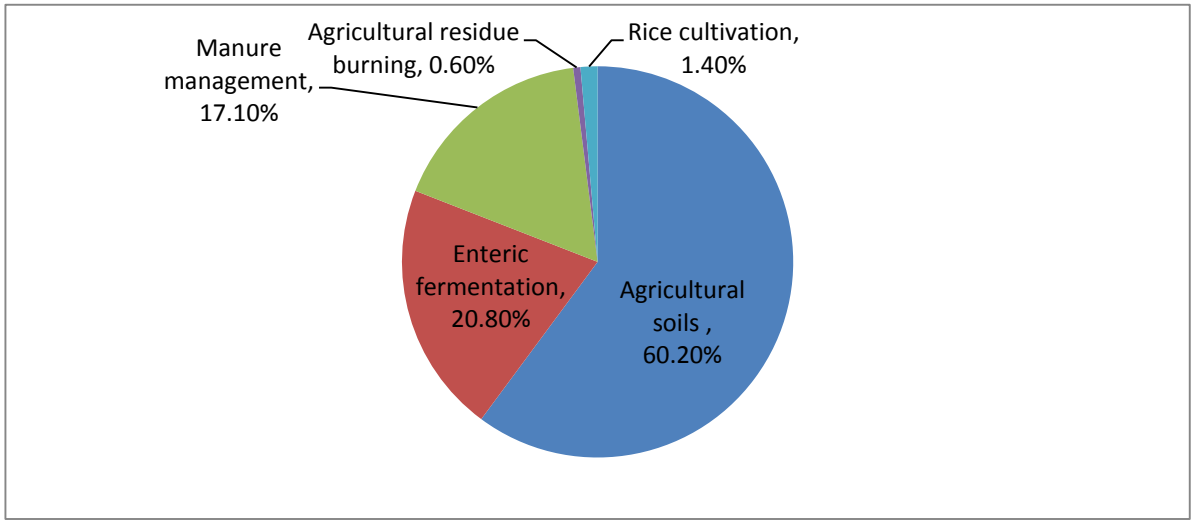
Despite field burning is prohibited by the Bulgarian law, this "tradition" continues and is emission source not only of main GHGs but also of GHGs-precursors.

- Rice cultivation (1.4 %)

Rice cultivation is a traditional Bulgarian agricultural activity. During the structural reforms, rice crop areas decreased from 14 100 ha in 1988 to 1 417 ha in 1999. There has been a restoration of rice crop areas after 1999, reaching 10 214 ha in 2013.

In Bulgaria rice is produced under the continuously flooded water regime with season length of 103 days and one harvest per year.

Figure 14 Agricultural GHG emmisions by sub-categories



Forecasts

There are recalculations for the entire time series (1988 – 2013) of the GHG emissions, due to new methodology of estimation and new emission factors, according the 2006 IPCC Guidelines for National Greenhouse Gas Inventories.

According to the Third National Action Plan on Climate Change and the last Report on GHG Projections, Bulgaria provisions grow of 8% for the first period of the projections 2015 - 2020 for the sector of agriculture, due to governmental policy for utilization of EU funds targeting to support rural organizations. For the next periods, emissions will grow at an annual rate of 0.80% (according Third National Action Plan on Climate Change and the last Report on GHG Projections). This projections are used for the whole Agriculture categories, because there is no such information in the National Strategy for Sustainable Development of Bulgaria for livestock population and crops production development during 2013÷2035. Bulgaria used Grade 1 according to the GHG projection guidelines. Livestock population and crops characteristic are the main parameters used for projections, so it is not surprise that the used rates are similar.

In the future Bulgaria will try to make efforts to reach Grade 2 for key categories.

Planned investment

After Bulgaria joined the EU the major structural changes in this sector consisted in reducing the number of farms and increasing their average area.

Table 5.10. Planned investment in the sector of agriculture:

TOTAL PLANNED INVESTMENT	**411.8 mln. BGN**
DIRECT MEASURES	372.3 mln. BGN
Organic farming Biological recultivation Anti-erosion measures	6.7 mln. BGN
Construction of the necessary storage installations	130 mln. BGN
Optimization of the use of crop residues/waste in agriculture	225 mln. BGN
INDIRECT MEASURES	39.5 miln BGN
Enhancement of the competencies and skills of farmers	4.1 mln. BGN
Encouragement of intensive grassland husbandry	34.190 miln BGN
OTHER TRAINING MEASURES	6.81 miln BGN

Table 5.10 gives an overview of the planned investment in Agricultural sector. The total planned investment is 411.8 mln. BGN, which corresponds to the scenario of economic development. The main sources of investment financing are the RDP and the state budget. The direct measures are worth 372.3 mln. BGN, the expected emission savings are 30 tonnes at an average cost above 12000 BGN per tonne thus making the measures relatively expensive. This is mainly due to the need for significant capital investment for restructuring and mechanization of farms, for building new installations and facilities and for purchase of equipment.

The direct measures under the priority axis for reducing emissions from agricultural soils include organic farming (12000 ha by 2020) and scientifically justified crop rotation (on 8000 ha by 2020); biological recultivation (2500 ha) and anti-erosion measures (2500 ha), with total investment of 6.7 million BGN. These measures will cover less than 1% of the arable land in the country. The expected effects are associated with the preservation of organic carbon in the soil, improvement of the quality of arable land and production and modernization of technologies and competitiveness. The expected amount of saved emissions is 26000 tonnes at an average cost of 258 BGN/tonne.

The indirect measures related to soils include enhancement of the competencies and skills of farmers to improve soil quality and to use energy and water saving irrigation technologies, which will increase the quality of human capital, the productivity and the efficiency of the used resources. The required investment amounts to 4.1 million BGN.

One indirect measure is planned under the priority axis for reduction of methane emissions in stock-breeding – encouragement of intensive grassland husbandry. Training of farmers is envisaged with the view of increasing the quality of human resources and permanent pastures are to be maintained with payment per hectare. The financial resources required for the measure are estimated at 34 190 000 BGN.

The direct measures related to management of manure include construction of the necessary storage installations. The investments required for that purpose are the most significant amounting to 130 million BGN. These installations will cover 16% of the number of cows (over 2 years old) by 2030. Trainings will be conducted and model farms will be built to

process manure that will cost 1.4 million BGN. The direct measures are expected to save 1924 tonnes which in terms of cost means 68400 BGN per tonne. The indirect measures involve building a resource centre for scientific research, and development of training methods and practices. This would boost R&D expenses and improve the quality of human capital and technologies.

Substantial financial resources amounting to 230 million BGN are planned for the optimization of the use of crop residues/waste in agriculture. The direct measures are worth 225 million BGN and will save 655 tonnes of emissions at an average cost of 343 000 BGN per tonne which makes the measure the most expensive one in relative terms. Its implementation will address the problems with stubble burning. Investments are foreseen for equipment and machinery as well as for changes and adaptation of the production process. 5000 farms will be covered which is about 1.4% of their total number. The indirect measures are aimed at improving the awareness and knowledge of farmers and at strengthening the prevention of stubble burning. The resource efficiency will be enhanced and the technologies, as well as the human capital will improve as a result of the measures.

Other training measures besides those specified above are also envisaged for the farms and their staff in order to improve the quality of human capital, resource efficiency and productivity.

Scenario with existing measures – WEM

Table 5.11. Aggregated GHG emissions from the Agriculture Sector, Gg CO_2 eq. – scenario with existing measures

Year	2013	2015	2020	2025	2030	2035	Δ (2035 - 2013)
Aggregated emissions, CO_2 eq.	**5939,35**	**6069,44**	**6349,68**	**6758,92**	**7196,92**	**7665,84**	**22.6%**

5.1.4. LULUCF

Bulgaria in its GHG Inventory preparation uses a mix of the IPCC approaches to get a consistent and complete historic area statistic of the country. Therefore, in its LULUCF emission/removal projections, Bulgaria follows the grade 1 methods which represent a statistical treatment of historical data. The projections have been made first for those LUC subcategories with more accurate historic data and then have continued stepwise through the other LUC subcategories corresponding to the decreasing quality of the historic data. The level of stratification is the same as that used in the national inventory. In its estimates Bulgaria has used both alternatives of grade 1 projections – the use of average historic annual rate or the use of trend value/trend function. The projections of activity data have

been made up to 2030 taking into account the objectives set out in the following strategic document:

- Third National Action Plan on Climate Change (2013 – 2020)
- National Strategy for Development of the Forestry Sector in the Republic of Bulgaria for the period 2013-2020 (NSDFSRB).
- Strategic Development Plan for the Forestry Sector (SDPFS) 2014-2023
- EU agricultural policy for 2014-2020

With existing measures (WEM)

The estimates of LULUCF projections of emissions/removals with WEM (with existing measures) scenario reflects all adopted policies and measures set out in strategic documents for development of Forestry and Agricultural sector approved after 2013.

Table 5.12 LULUCF emission/removal projections by categories - WEM scenario

	projection base year 2013	2015	2020	2025	2030	2035
4. Land Use, Land-Use Change and Forestry	-9303,42	-10140,72	-11053,39	-12048,20	-13132,53	-14314,46
4.A. Forest land	-11042,47	-12036,29	-13119,56	-14300,32	-15587,35	-16990,21
4.B. Cropland	1490,14	1624,25	1770,43	1929,77	2103,45	2292,76
4.C. Grassland	-465,98	-507,92	-553,63	-603,46	-657,77	-716,97
4.D. Wetlands	281,62	306,97	334,59	364,71	397,53	433,31
4.E. Settlements	978,29	1066,34	1162,31	1266,92	1380,94	1505,23
4.F. Other Land	0,00	0,00	0,00	0,00	0,00	0,00
4.G. Harvested wood products	-545,01	-594,06	-647,53	-705,81	-769,33	-838,57
4.H. Other	0,00	0,00	0,00	0,00	0,00	0,00

5.1.5. Waste

GHG emissions emitted from the Waste Sector are CO_2, CH_4 and N_2O. CO_2 is emitted from the Waste Incineration category. The main share of CH_4 from the Waste sector comes from Solid Waste Disposal on Land. N_2O is emitted from Wastewater treatment and discharge, Biological Treatment and Waste Incineration. The sector is one of the major sources of GHGs. The main GHGs emitted into the atmosphere as a result of waste treatment are methane and nitrous oxide emitted during the process of waste disposal and wastewater treatment. Worldwide, about 5-20% of the total methane is released during the anaerobic processes of waste decomposition.

Emissions from the waste sector in 2013 are about 4425.74 Gg CO_2 eq, and they are around 9% including LULUCF and around 8% excluding LULUCF of the total national GHGs emissions.

During the 1988-2013 period, the share of emissions from the Waste sector has grown from 5% to 9%. In absolute terms the GHG emissions from the Waste sector has decreased by 27.8% compared to the base year. The reduction is significant in view of the fact that changes in the quantities of municipal waste and wastewater is a conservative value, a function of the number of inhabitants, the living standards and the public attitudes towards measures to reduce waste generation. Sudden changes in input values from year to year cannot be expected.

In the Waste projection estimates Bulgaria follows the methods used in its last GHG Inventory report in accordance with the IPCC 2006 Guidelines. In order to calculate the emission projections, basic parameters on which base emissions from the waste sector are estimated in the National Inventory of Greenhouse Gases Emissions were used as a starting point. The projections are based on existing policies and measures for reduction of waste generation and estimates of future quantities of landfilled waste.

Projections in the subcategory Solid Waste Disposal on Land are based on the 2006 IPCC Waste Model. Calculating the amount of municipal waste, human population projection from NSI and the annual real GDP growth rate from "Recommended parameters for reporting on GHG projections in 2015", is used. Projections in the subcategory Waste Incineration and Open Burning are based on past trend and are forecasted using historical data. For the projections in the Wastewater Treatment and Discharge subcategory, projections on population and historical data are used.

The WEM scenario takes into account the current status of waste management in conformity with the effective legislation and the estimates development of waste management according to effective National Waste management plan 2009-2014. The governmental programmes have set targets and have already achieved tangible reduction of waste generation. The planned measures for reduction of GHG emissions in the sector are related, mostly to the management of solid municipal waste.

The analysis of the GHG inventories over the past few years indicates that the landfills for solid municipal waste are the largest source of methane (CH_4) among all other sources of CH_4 that are reported in the national inventory. The capture and recovery of landfill gas is not a common practice in Bulgaria and the whole amount of gas from the landfills is emitted into the atmosphere or (in rare cases) it is burnt.

The use of landfills is widespread in the country. The policy in this area foresees building of a system of 54 regional landfills and closing of all landfills that are not compliant with the legal requirements. The construction of these regional landfills will ensure environmentally sound waste disposal in the country.

The projected emissions from the sector in the scenario with measures suggest implementation of programs for reduction of the amount of biodegradable waste for landfilling, as well as capture and flaring of the landfill methane. The best practices can ensure capture and flaring of only about 50% of the generated gas.

Electricity can be generated from landfills where methane is captured and the amount of the generated methane is sufficient. It is seen as a supplementary measure to the scenario with measures.

It is technologically feasible and economically viable to produce thermal and electric energy from the biogas emitted during the stabilization of sludge in methane tanks of the large wastewater treatment plants (for more than 50 000 PE) in order to cover the main share of the installations' energy needs. Currently, this is performed only in 4 WWTP in the country.

Table 5.13 GHG emissions from Waste sector (WEM scenario), Gg

		2013	2015	2020	2025	2030	2035
Solid Waste Disposal on Land	CH_4	140.63	136.00	115.97	106.19	101.47	99.78
	Total CO_2 eq.	3515.75	3400.00	2988.26	2654.76	2536.87	2494.57
Biological treatment of Solid Waste	CH_4	0.43	0.43	0.43	0.43	0.43	0.43
	N_2O	0.03	0.03	0.03	0.03	0.03	0.03
	Total CO_2 eq.	20.17	20.17	20.17	20.17	20.17	20.17
Waste Incineration and Open Burning	CO_2	38.90	38.12	30.50	21.35	11.74	8.22
	CH_4	0.00	0.00	0.00	0.00	0.00	0.00
	N_2O	0.00	0.00	0.00	0.00	0.00	0.00
	Total CO_2 eq.	38.90	38.12	30.50	21.35	11.74	8.22
Waste Water Treatment and Discharge	CH_4	22.37	22.40	22.03	21.61	21.24	20.90
	N_2O	0.98	0.98	0.88	0.80	0.79	0.79
	Total CO_2 eq.	850,91	851,74	813,77	778,74	766,34	757,83
Waste total	CO_2	38.90	38.12	30.50	21.35	11.74	8.22
	CH_4	163,43	158,83	138,42	128,26	123,14	121,11
	N_2O	1,01	1,01	0,91	0,83	0,82	0,82
	Total CO_2 eq.	4425,74	4310,05	3763,70	3475,02	3335,13	3280,80

Solid Waste Disposal on Land contributes over 79.43%, Wastewater Handling about 19.22%, Waste Incineration about 0.88% and compost production about 0.45% sector's total emissions. Emissions from the waste sector in 2013 decreased by 27.8 % (4425.74 Gg CO_2-eq in 2013 compared to 6 129.73 Gg CO_2-eq in 1988) compared to the base year.

Projected GHG emissions from waste sector in WEM scenario are presented in table 5.13 and figure 15

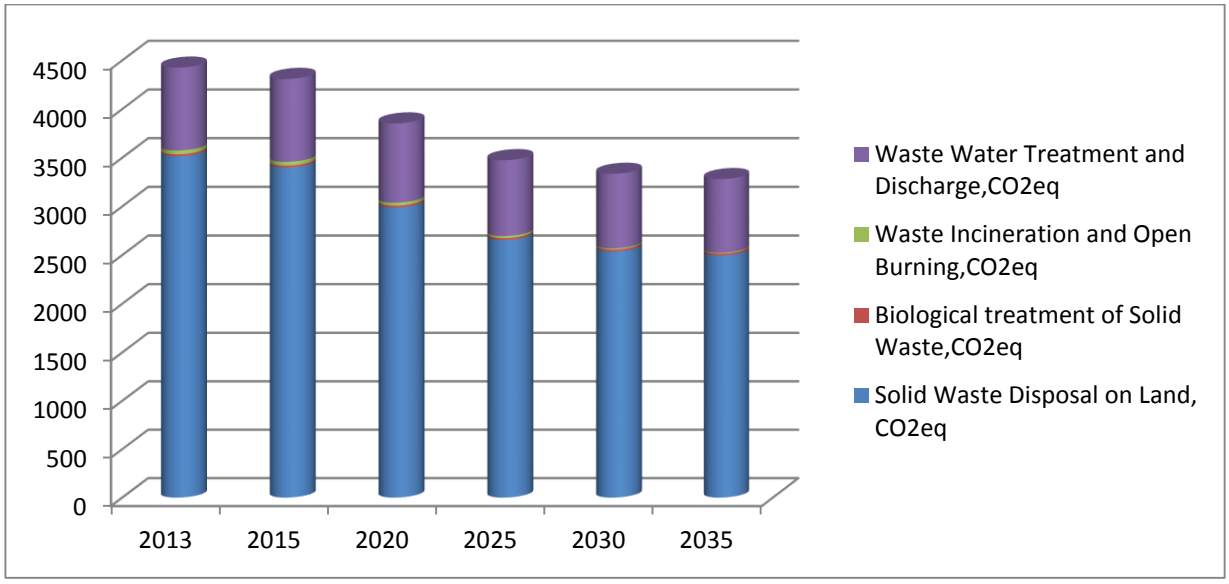


Figure 15 Projected *GHG emissions from waste sector in WEM scenario*

Reduction of GHG emissions from Solid Waste Disposal on Land is expected to be around 29% by 2035 compared to 2013 under the WEM scenario. The total reduction of GHG emissions in Waste sector is projected to be 26 % by 2035 compared to 2013.

The scenario with additional measures reflects all adopted policies and measures to reduce GHG emissions in the country in this sector and includes the impact of policies and measures presented in Third National Action Plan on Climate Change. Taking into account the share of the these sub-sectors in the emitted GHG it is evident that a substantial amount of the emissions from the Waste sector can be reduced primarily by implementing measures in subsector Solid Waste Disposal on Land and to a lesser extent in subsector Wastewater treatment.

The measures to reduce GHG emissions from **Solid Waste Disposal on Land** include:

- Prevention of waste for disposal by promoting the efficient use of resources, further development of the collective systems for separate waste collection , linking the amount of the municipal waste charge to the quantities of generated waste, creation of stable conditions for marketing of materials obtained from recycled waste, reducing the amount of biodegradable waste going to landfills;
- Reducing biogas emitted from landfilled waste by: introducing capture and flaring of biogas in all new and existing regional landfills for waste, as well as in the old municipal landfills that are to be closed; studying the energy potential of biogas generated in landfills that are to be closed; measuring the amount (flow) of the captured biogas in the combustion systems in order to meet the requirement for measuring and recording for the purpose of recognizing the recovery of methane.

The measures for reduction of GHG emissions in **Wastewater treatment** subsector envisage introduction of capture and treatment of biogas from urban wastewater treatment plants for over 20 000 PE by introducing anaerobic stabilization of sludge with capture and combustion of biogas in new and renovated plants, repair, reconstruction and commissioning of methane tanks in existing plants completed with an installation for controlled combustion of

the gas and for measuring the quantity (flow) of the captured biogas in the combustion systems in order to meet the requirement for measuring and recording the recovery of methane for recognition purposes.

Waste incineration subsector includes only emissions from combustion processes without energy recovery while the emissions from waste incineration with energy recovery are included in the Energy sector. Incineration of waste is seen as a source of emissions of CO_2, CH_4 and N_2O. Currently, the GHG inventory includes emissions from incineration of hospital waste and hazardous waste. No substantial changes in the amount of emissions from this sector are expected and no special measures for their reduction are planned.

5.2. Total projections

Figure 16 shows historical and projected data for total aggregate GHG emissions according to the "with existing measures" scenario for period 1988 – 2030. Trends of curves indicate our reduction of GHG emissions.

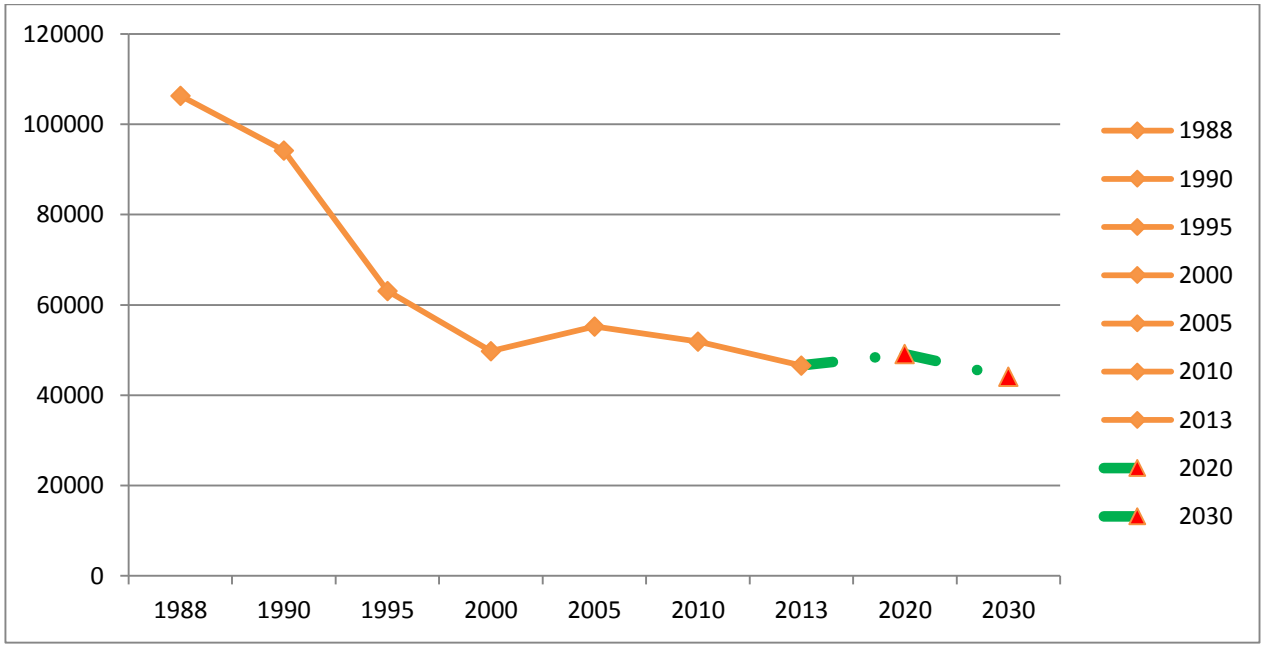


Figure 16 Total aggregate GHG emission projections (Gg CO2 eq.)

Table 6 Information on updated greenhouse gas projections under a 'with measures' scenario

	GHG emissions and removals (kt CO2 eq)							GHG emission projections (kt CO2 eq)	
	Base year	1990	1995	2000	2005	2010	2013	2020	2030
Sector									
Energy	82 905,90	75 111,91	52 204,33	41 933,60	46 411,21	46 500,47	41 122,51	45703,35887	42320,49062
Transport	7363,6395	6782,6706	4577,2894	5696,8543	7834,9888	7972,7809	7433,2993	7104,428762	6238,498388
Industry/industrial processes	13311,9034	10114,1974	9859,1340	6602,8920	6966,5717	3941,3217	4324,5107	4264,28704	4212,917989
Agriculture	17451,9651	15995,7863	7228,9822	5676,2859	5663,5491	5546,6512	5939,3500	6349,684723	7196,921344
Forestry/LULUCF	-14 401,44	-14 141,41	-12 166,41	-9 859,27	-8 866,81	-8 702,29	-9 303,42	-11053,39	-13132,53266
Waste management/waste	7 072,25	7 143,24	5 930,54	5 433,39	5 045,91	4 584,92	4 506,85	3850,037593	3438,105205
Other (specify)	NO	NO	NO	NO	NO	NO	NO	NO	NO
Gas									
CO2 emissions including net CO2 from LULUCF	76 379,23	66 140,41	45 725,87	35 569,08	41 758,48	39 095,47	33 438,54	35941,51494	30349,12929
CO2 emissions excluding net CO2 from LULUCF	90 782,60	80 286,15	57 894,57	45 669,46	50 631,31	47 824,94	42 755,77	47011,31404	43501,15759
CH4 emissions including CH4 from LULUCF	19 503,79	19 230,53	12 499,34	10 283,58	9 235,25	8 609,45	12 499,34	8325,437694	8253,331342
CH4 emissions excluding CH4 from LULUCF	19 502,17	19 226,87	12 497,41	10 080,06	9 230,17	8 586,51	12 497,41	8311,586573	8413,734899
N2O emissions including N2O from LULUCF	10 454,25	8 849,10	4 823,49	3 902,13	4 060,06	3 553,45	4 823,49	4071,657943	4676,129382
N2O emissions excluding N2O from LULUCF	10 453,95	8 848,43	4 823,13	3 864,55	4 061,00	3 549,21	4 823,13	4071,657943	4676,129382
HFCs	NO	NO	2,99	25,62	157,54	600,18	898,35	763,6018991	557,4303868
PFCs	NO	NO	NO	NO	NO	0,06	0,05	0,051593357	0,054490557
SF6	3,3	3,69	4,9	6,49	8,16	12,47	19,72	21,10578046	22,38768246
Other (specify, e.g. NF3)	NO	NO	NO	NO	NO	NO	NO	NO	NO
Total with LULUCF	106 340,58	94 223,73	63 056,58	49 786,90	55 220,44	51 871,07	46 589,80	49113,97822	44035,90249
Total without LULUCF	120742,0201	108365,1359	75222,99082	59646,17326	64087,24367	60573,35979	55893,22215	60167,36822	57168,43515

6. Provisions of financial, technological and capacity-building support to developing country Parties

Despite the fact that Bulgaria is an Annex I Party to the Convention, as a country with economy in transition status under the Convention, it has no commitments to provide financial resources and technology transfer to developing country Parties . Nevertheless, in its first biennial report, Bulgaria did report information on provision of financial support to developing country Parties, in particular in the Former Yugoslav Republic of Macedonia (FYROM).

Republic of Bulgaria's Roadmap for participation in the international development assistance delineates the country's closely situated States that are identifying as the most appropriate beneficiaries for financial, technological and capacity-building support with regards to Bulgarian geographic priorities for projects sponsorship – Former Yugoslav Republic of Macedonia, Armenia, Moldova, Kosovo, Serbia and Georgia.

Taking into consideration Bulgarian foreign policy priorities and a proposal by the Ministry of Finance, the Ministry of Environment and Water contacted United Nations Development program (UNDP) with the goal of identifying a project which fulfills the aims of EU Fast Start Finance initiative.

As a part of the EU Fast Start Finance initiative, the country provided support in 2011 and 2012 to a project on capacity-building in the FYROM on monitoring, reporting and verification systems for GHG inventories and emissions trading. In 2012 Bulgaria provided financial support in the amount of 20 000 euros in the FYORM regarding to Bulgarian contribution to the short-term financing 2011-2012: sharing Bulgarian experience of monitoring, reporting and verification of greenhouse gas in the former Yugoslav Republic of Macedonia for participation in the European Union Emission Trading Scheme of greenhouse gases.

This is achieved through direct interaction between the Ministers of Environment in the two countries as the main aim of the project is to support the implementation process of the EU Directives 2003/87/EC and 2009/29/EC in FYROM by utilizing Bulgarian expertise and capitalizing on best practices and lessons learned of Republic of Bulgaria in the field of monitoring, reporting and verification of greenhouse gas emissions and emissions trading.

As Bulgaria significantly overachieved the emissions reduction target, Bulgaria concluded two Assigned Amount Units (AAUs) Purchase Agreements (in October 2011 and April 2012). The proceeds from the sale of AAUs are being spent through the National Green Investment Scheme, supporting projects on energy efficiency. Around 100 projects for financing the improvement of public buildings, including educational institutions, kindergartens, cultural institutions, medical centers and administrative buildings have been implemented. All measures result in a significant decrease of emissions.

Other reporting matters

No other reporting matters supplied in this submission

ANNEX 1: CTF TABLES FOR THE SECOND BIENNIAL REPORT OF BULGARIA

CTF Table 1: Emission trends

CTF Table 1 (a): Emission trends (CO_2)

CTF Table 1 (b): Emission trends (CH_4)

CTF Table 1 (c): Emission trends (N_2O)

CTF Table 1 (d): Emission trends (HFCs, PFCs and SF_6)

CTF Table 2(a) Description of quantified economy-wide emission reduction target: base year

CTF Table 2(b) Description of quantified economy-wide emission reduction target: gases and sectors covered

CTF Table 2(c) Description of quantified economy-wide emission reduction target: global warming potential values (GWP)

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 5: Summary of key variables and assumptions used in the projections analysis

CTF Table 6(a): Information on updated greenhouse gas projections under a 'with measures' scenario