SLOVENIA'S SIXTH NATIONAL COMMUNICATION AND FIRST BIANNUAL REPORT UNDER THE UNITED NATIONS FRAMEWORK CONVENTION ON CLIMATE CHANGE

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IJS-EEC:	Institute Jožef Stefan – Eneergy Efficiency Centre
IMAD:	Institute of Macroeconomic Analysis and Development
MAE:	Ministry of Agriculture and the Environment
MFA:	Ministry of Foreign Affairs
MISP:	Ministry of Infrastructure and Spatial Planning
SEA:	Slovenian Environment Agency

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FOREWARD

The sixth National Communication of Slovenia has been prepared after many economies had already recovered or are recovering from a large global economic crisis with Slovenia also still on its way out of the slump. The crisis can be detected in the emissions inventory where a drop in emissions after 2008 can be attributed largely to lower economic activity.

The main instrument for reducing emissions under the Kyoto Protocol in Slovenia has been the Operational Programme for Reducing Greenhouse Gas Emissions until 2012 that was adopted by the Government at the end of 2006. The majority of measures in various sectors have been implemented in accordance with the expectations of this programme with the main exception of the transport sector, where the emissions of carbon dioxide after the entry of Slovenia in the European Union have begun to rapidly increase, primarily due to the highly increased level of freight transit transport. The increasing trend has not been slowing down, even after five years. Therefore, in the summer 2009, the Government adopted a new operational programme which adapts the measures to reduce greenhouse gas emissions to the newly created circumstances. The Government is already now in the process of adopting an operational programme for the period until 2020, which already encompasses a longer-term outlook to 2030.

An important potential to reduce greenhouse gas emissions in Slovenia is an increase in efficiency of final energy consumption in all sectors. The implementation of energy efficiency measures is being promoted and facilitated by public awareness raising, informing and educating energy consumers, and encouraging investments in efficient energy consumption and renewable energy sources. Energy-saving building restoration has started, including hospitals and primary as well as secondary schools.

Slovenia is in favour of more ambitious greenhouse gas emission reduction targets, national and global, which would enable us to achieve the goal of limiting the growth of the mean global temperature at, or below, 2 ^{o}C compared to preindustrial levels, taking into account the principle of common but differentiated responsibility and respective capabilities. Slovenia is aware that this is necessary for the preservation of human and natural systems and biodiversity, and to avoid major catastrophes.

Dejan Židan, Minister of Agriculture and the Environment

1 EXECUTIVE SUMMARY

1.1 National Circumstances

In the period 2000–2013, the population of Slovenia increased slightly, from 1,990,272 to 2,058,821, primarily due to increasing migrations. The population density is moderate.

Slovenia is located in Central Europe. The surface area of the territory is 20,273 km^2. Its landscape and biosphere are very diverse. The majority of its surface is covered by forests (58.4%[1]).

Three climate types are found in the territory of Slovenia: sub Mediterranean, Alpine and continental. Average annual temperature in the sub Mediterranean climate type is 12 °C, in the lower regions of central Slovenia it is between 8 and 1 °C, while at the highest peaks it never exceeds 0 °C. In the majority of the country, the average temperature in the recent 30-year period increased by approximately 1.5 °C. Annual precipitation varies to a great extent; from 800 mm in the extreme north-eastern and 1000 mm in the extreme south-western part of the country, to over 3000 mm in the north-western part of the country.

Slovenia became a full member of the European Union on 1 May 2004; it joined the Euro zone on 1 January 2007.

The Ministry of Agriculture and the Environment is responsible for the preparation and implementation of environmental policies and legislation.

Slovenian economy went through a variety of shocks in the late 1990s caused by the transformation of political and economic systems. The crisis was intensified by the loss of former Yugoslav markets. All this resulted in a fall in GDP, a fall in the employment rate and investments, and a high inflation rate. As early as 1993, the Slovenian economy began to revive, on average exceeding an annual growth rate of 4% between 1993 and 2000.

Before the onset of the economic crisis, the Slovenian economy achieved relatively high growth rates. The average GDP growth rate was 4.3% between 1993 and 2003 and 4.9% between 2004 and 2008. The economic crisis caused a slowdown in GDP growth even in 2008 and a dramatic decline in 2009 (-7.9%). The rapid deterioration of economic conditions in the international environment was reflected in reduced exports and investments, which had been the key factors of economic growth in previous years. After modest GDP growth in 2010 and stagnation in 2011, Slovenia entered another period of negative growth rates in 2012, which has continued into the second year and is the result of weak domestic demand, especially the decline in investments.

In the period 1992-2012, the energy supply increased by 34%, whereas the energy supply intensity decreased by 25%. The highest proportion is accounted for by liquid fuels, followed

[1] Data for 2012 (source: Slovenia Forest Service). Forest coverage data does not include data on areas being reclaimed and therefore does not correspond to the data on forest coverage.

by nuclear energy, solid fuels, where coal is the only domestic fossil source of energy, renewable energy sources and natural gas. Renewable sources (mainly wood and hydroelectric energy) represent a 15% share. Since 1992, the share of final energy use increased because of the increased use of electricity, natural gas and liquid fuels, whereas the final energy use intensity improved similarly as with the energy supply intensity. The use of energy is growing fastest in traffic, which has a significant impact on transit transport.

The volume of road cargo and automobile traffic in Slovenia experienced sustained increase until the beginning of the crisis in 2009. The increase was the consequence of the growing number of vehicles and the increased number of cilometres dirven. The number of passenger kilometres (pkm) in public road transport was decreasing. Rail transport, with the volume of 1429 mio pkm in 1990, was strongly impacted by the disintegration of Yugoslavia and subsequent economic recession and shrunk by almost two thirds.

Due to the global financial crisis in 2009 emissions from the manufacturing industries started to decrease and consequently also from freight transport. In 2010 and 2011 emissions stayed almost the same as in 2009.

After the declines in 2008 and 2009, the value of sales of industrial products and services decreased again in 2012 (by 2.3%). Companies generated 72% of their revenue from the sale of industrial products and services in foreign markets. Manufacturing was at the forefront, followed by electricity, gas and water supply, and mining. The highest share of the sale of industrial products and services in the area of manufacturing activities was achieved by the production of motor vehicles, trailers and semi-trailers (12.6%), followed by electrical equipment manufacturing (12.1%). The smallest share of sales in manufacturing was achieved by producers of other vehicles and vessels (0.5%), which generated most of their income in foreign markets (90.8%); they are followed by manufacturers of motor vehicles, trailers and semi-trailers (88.7%) and textile manufacturers (86%).

Almost 4.4 million tonnes of waste were generated in Slovenia in 2012 or 33% less than in 2011. The large decrease is the result of the reduction in the generated construction waste and also of the reclassification of some waste into by-products. Compared to 2011, the amount of municipal waste decreased by 7% and the amount of hazardous waste by 13%. Most of the hazardous waste was generated in manufacturing, 59% of total hazardous waste.

Residential construction reached its peak in 2007 and decreased in subsequent years. In 2012, the number of residential units under construction was almost a fifth lower than in 2011 and almost a half lower than in 2007. At the same time the average size of a finished residential unit has increased in recent years, which also spurred an increase in the average residential unit size (to 80m2, which is 4m2 more than in 2005).

The decreasing trend of the proportion of agriculture in value added has been continuing. Since 2002 when it amounted to 2.9% of GDP it decreased to 2.1% in 2007 and further to 1.1% in 2012. The most important branch since 2004 has been crop production, which accounted for 53% of agricultural production value in 2007 as well as in 2012. Utilised agricultural area with organic farming increased in 2012 by almost 3,000 hectares compared to 2011; it amounted to 35,148 ha (7.3% of total utilised agricultural area). In the period

between 2003 and 2012 the share of gross value added of forestry in gross domestic product of Slovenia was below 1%. After 2003, when it reached 0.4% of GDP, it was slowly increasing. In 2012 it reached the highest value so far, i.e. 0.7% of GDP.

1.2 Greenhouse Gas Inventory Information

The total emissions of GHG in 2011, sinks not considered, amounted to 19,509.38 kt CO_2 eq, which represents a 3.4% decrease of emissions compared to the year 1986 and 4.0% decrease compared to the base year emissions. In the period 1986-1991, a reduction of emissions was recorded due to the economic conditions at that time and the Republic of Slovenia gaining its independence. In the late 1990s, the Slovenian economy faced a variety of shocks caused by the transformation of political and economic systems. The crisis was intensified by the loss of former Yugoslav markets. All this resulted in a fall in GDP, a fall in the employment rate and investments, and a high inflation rate. As early as 1993, the Slovenian economy began to revive, on average exceeding an annual growth rate of 4% between 1993 and 2000. Consequently, in the period 1992–1997, a strong increase in emissions was recorded. In the second half of that period, the increased emissions were a consequence of "gasoline tourism" (25% of the total sale of motor fuels in the Republic of Slovenia), since the prices of motor fuels in the Republic of Slovenia were appreciably lower than in the neighbouring countries.

In the period 1998-1999, emission decreased due to the measures undertaken by the neighbouring countries to curb the "gasoline tourism" and due to the increased supply of electrical energy from the Krško Nuclear Power Plant. In the period 2000-2002 emission kept increasing again due to the renewal of obligatory export of electrical energy from the Krško Nuclear Power Plant to the Republic of Croatia. After joining the EU in 2004 and after acceptance of Romania and Bulgaria into EU in 2007, emissions from road transport have increased drastically and has prevailed over decrease in other sectors which have happened due to the policies and measures in manufacturing industry, agriculture and waste sector.

Due to the global financial crisis in 2009 emissions from the manufacturing industries started to decrease and consequently also from freight transport. In 2010 and 2011 emissions stayed almost the same as in 2009.

1.3 Policies and Measures

- Slovenia has committed itself to pursuing the objective of sustainable growth by way of a number of documents and decision-making processes at EU and national levels.
- In the period until 2020, Slovenia has set itself the objective of reducing GHG emissions within the policy and legal order of the EU. Sources that are included in the GHG emissions trading scheme should, at the EU level, be reduced by 21% as compared to 2005. Other sources are subject to the national objective that emissions will not increase by more than 4% by 2020, as compared to 2005. Annual objectives in the period 2013–2019 are also defined.
- The Operational Programme for Reducing GHG Emissions (OP-TGP) until 2020 with a View to 2030 is under way. The OP GHG-2020 Programme in preparation is based

on the adopted sector and development programmes defining the activities for the reduction of GHG emissions.

- Environmental protection policies at the local level are important for the preparation and implementation of GHG emission reduction measures aimed particularly at the use and local supply of energy, waste management and sustainable mobility in urban regions.
- As an EU Member State, Slovenia has also undertaken to realise the European climate policy and implement the joint measures.
- The most important measures and instruments for reducing GHG emissions are the following:
    - GHG emission allowance trading (The objective of the measure is to reduce emissions where this is least costly.)
    - An environmental tax on the pollution of air due to CO_2 emissions (The objective is to internalise the external costs of air pollution due to CO_2.)
    - Kyoto flexible mechanisms (Slovenia does not envisage the use of the Kyoto flexible mechanisms.)
    - Taxes and charges (The state may influence the price ratios between energy products by means of taxes and charges.)
    - Awareness, informing, promotion and education (A high level of awareness, information and knowledge is necessary for the successful implementation of measures.)
    - An increase in the energy efficiency of power and heat generation in large combustion plants (A number of large thermal power plants are already nearing the end of their life expectancy; therefore, their replacement is being planned. This will also lead to a larger share of natural gas.)
    - Promotion of combined heat and power generation with high efficiency (CHP) (The promotion scheme is the basic instrument in this area, which is to be implemented also in the form of fixed feed-in tariffs of electricity and operation grants.)
    - The promotion of electricity production from RES (The same instrument as for CHP – see above.)
    - Promotion of efficient energy use in industry (Besides a reduction in production costs, the state is also promoting higher efficient energy use in industry by various programmes.)
    - Promotion of the use of RES as a heat source (The state is promoting higher RES use by subsidies and favourable loans and regulations. A strong motivating factor is also the high prices of fuel oil, which the state may influence by excise duties and taxes.)
    - Promotion of energy efficiency in the public sector (The public sector must set an example for the population in implementing the measures. The measures

will be promoted by financial incentives, while an important factor will be green public procurements.)

- Energy labelling and minimum standards for products and devices (The measure will lead to significantly lower use of electricity due to the awareness and limitation of the use of energy wasteful products.)
- Promotion of energy efficiency in households and the service sector (Higher efficiency will be achieved by promoting the renewal of the existing housing fund, renovating heating systems, promotion of behavioural change and strict legislation with regard to the thermal characteristics of buildings.)
- Reduction of the emissions of passenger vehicles, goods vehicles and buses (Specific use of vehicles will be reduced on the basis of EU legislation regulating the permitted emissions per km for new vehicles, fiscal pressures, increased awareness and information; the impact of green public procurement is also significant. Furthermore, there are financial incentives for cleaner vehicles available for buses.
- Promotion of the use of biofuels (Biofuels are CO_2 neutral, while their use is encouraged by an excise duty exemption and target shares with regard to the amount of biofuels placed on the market for distributors based on legislation.)
- Promotion of the use of public transport (The objective of this measure is to increase the number of passengers using public transport, which has been decreasing thus far.)
- Sustainable freight transport (The objective of the measure is to extend and modernise the railway network, which represents a precondition for the transition of freight transport from road to railway.)
- Greenhouse gas emissions from transit transport (Slovenia is highly exposed to transit transport. In 2008, fuels sold for transit transport represented at least 22% of the entire amount of fuel sold. The effect of the measure depends on the excise duty policy of the state.)
- Reduction of F-gas emissions from stationary equipment (Through enhanced supervision of leakage, management, etc. Additionally, the environmental tax on the use of fluorinated greenhouse gases encourages the reduction of F-gases.)
- Reduction of F-gas emissions from mobile air-conditioning in vehicles (The legislation lays down restrictions on the use of F-gases in air-conditioning systems in new cars.)
- Adaptation of aluminium production to the best available techniques (The IPPC Directive lays down the use of the best available techniques, which a part of aluminium production did not comply with and therefore was discontinued. This resulted in a considerable reduction of CO_2 and perfluorocarbon emissions from aluminium production.)
- Increase in the efficiency of domestic animal production (The objective of the measure is to reduce the amounts of released methane and nitrogen per unit of produced milk and meat.)

- The introduction of anaerobic digesters for the production of biogas from animal manure (Production of biogas from animal manure has a double effect, as the construction of biogas plants in the agricultural sector results in a reduction in methane emissions, while in the energy industry, the provision of renewable energy sources improves.)
- An increase in the range of grazing for cattle (Grazing is promoted by subsidising measures and education; it also produces lower emissions owing to the avoidance of emissions generated through the storage of animal fertilisers.)
- Rational fertilisation of agricultural land by nitrogen (Within the framework of the Rural Development Programme, numerous measures are implemented, directly contributing to a reduction in the use of mineral fertilisers.)
- A reduction in the quantity of deposited biodegradable waste and the capture of landfill gas (Slovenia has adopted several measures to reduce the amount of deposited biodegradable waste; for instance, separated collection of fractions, an environmental tax on waste disposal, etc., additionally, the mandatory capture of landfill gas is prescribed, while the reorganisation of the waste management system, where the local system will be upgraded to a system of regional centres, is also under way.)
- Sustainable forest management and CO_2 emission sinks (An increase in the wood supply simultaneously with an increase in CO_2 sinks are a result of the work planned by the Slovenian Forest Service based on the principles of sustainability, environmental friendliness and multi-purposeness.)

- Slovenia follows the principle of sustainable development; both Slovenia's Development Strategy 2005 and Slovenia's Development Strategy 2014-2020 in preparation are based on the principle of sustainable development and the integration of development policies. Consequently, national operational programmes define sustainable development as their horizontal principle that is followed by programmes within the framework of all their priority areas. Sectoral and regional development strategies, national programmes, and other development programmes must substantively comply with the general strategic policies of Slovenia's Development Strategy.
- The emission coupons registry started to operate in November 2005.
- One of the main objectives of the Resolution on the National Forest Programme (ReNFP), which is the successor to the National Forest Development Programme, is sustainable forest development as an ecosystem within the meaning of its biodiversity and all its ecological, economic and social functions.

1.4 Emission Projections and Assessment of the Total Impact of Policies and Measures

- Projections have been prepared for two scenarios, with measures and with additional measures. The two scenarios differ in terms of general use (households), transport and

agriculture sectors, where additional measures are foreseen. The projections are the same for all other sources.

- According to the projection with measures, emissions in 2020 will amount to 20,351 kt CO_2 eq, while they will be reduced to 19,087 kt CO_2 eq by 2030. According to the projection with additional measures, in 2020 emissions will amount to 18,650 kt CO_2 eq, while in 2030 they will amount to 17,388 kt CO_2 eq. In 2030, the difference in the projections amounts to 9%.
- The main sectoral sources of emissions are the energy supply and transport. In 2011, emissions from the energy supply were higher than emissions from transport, while they will significantly decrease by 2030. According to the projection with measures, in the entire period of the projection, emissions from transport will increase, while according to the projection with additional measures, emissions will decrease until 2015 and after that year they will increase very slowly. In 2030, according to both projections, the transport sector will be the sector with the most emissions. In industry, which includes emissions from the combustion of fuels in industry and industrial processes, emissions will increase until 2030 due to economic development. Because of the combustion of fuels in general use (other areas), emissions will decrease substantially in both projections. In agriculture, emissions will slightly increase due to an increase in the number of animals, while in the waste sector, emissions will decrease due to a decrease in deposited biodegradable waste.
- CO_2 sinks will decrease by 2020; however, in spite of that, in 2020 they will still significantly exceed the permitted quota that Slovenia may use in line with the Kyoto Protocol objective.
- According to both projections, actual sources of emissions included in the EU-ETS are the same, and in 2020 they will amount to 8,200 Gg CO_2 eq. According to the projection with measures, emissions of non-ETS sources will increase to 12,151 kt CO_2 eq by 2020, while according to the projection with additional measures, they will decrease to 10,450 kt CO_2 eq. Compared to 2005, the emissions are 5% higher according to the projection with measures, and 10% lower according to the projection with additional measures. By far, the largest share of emissions among non-ETS sources is from transport.
- The total effect of all measures (implemented, adopted and additional) will amount to 8.3 Tg CO_2 eq in 2020 and to 10.0 Tg CO_2 eq in 2030. The largest share is in the reduction of CO_2 emissions, and sectorally the energy supply.
- The largest uncertainty for Slovenia in the preparation of projections stems from the transport sector.

Figure 1.1: The existing levels of GHG emissions by sector until 2011, and future levels according to the projection with measures (dotted) and the projection with additional measures (dashed) until 2030.

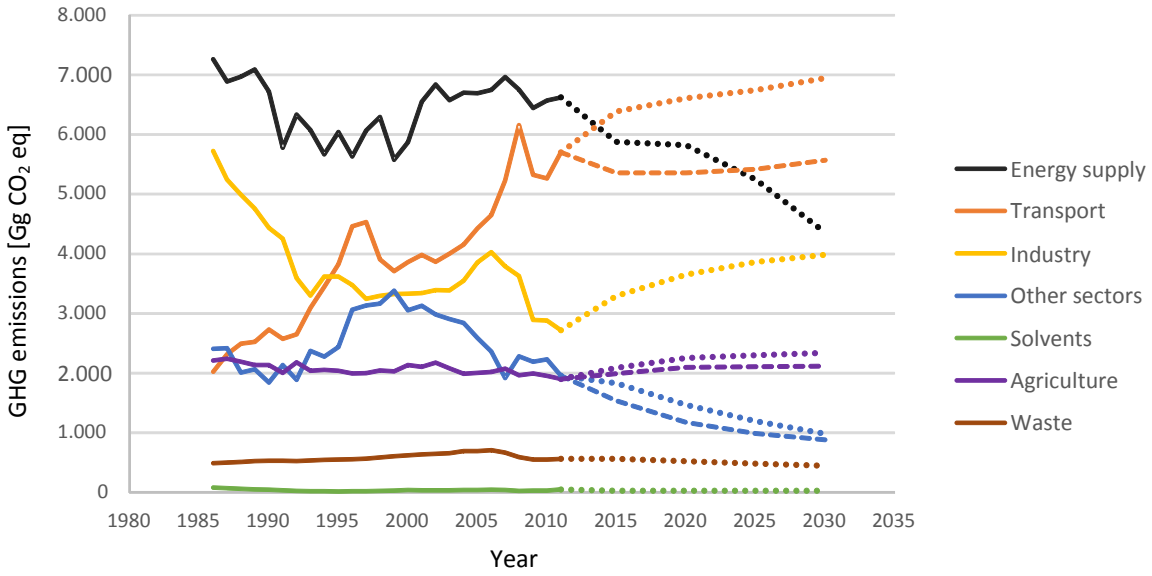
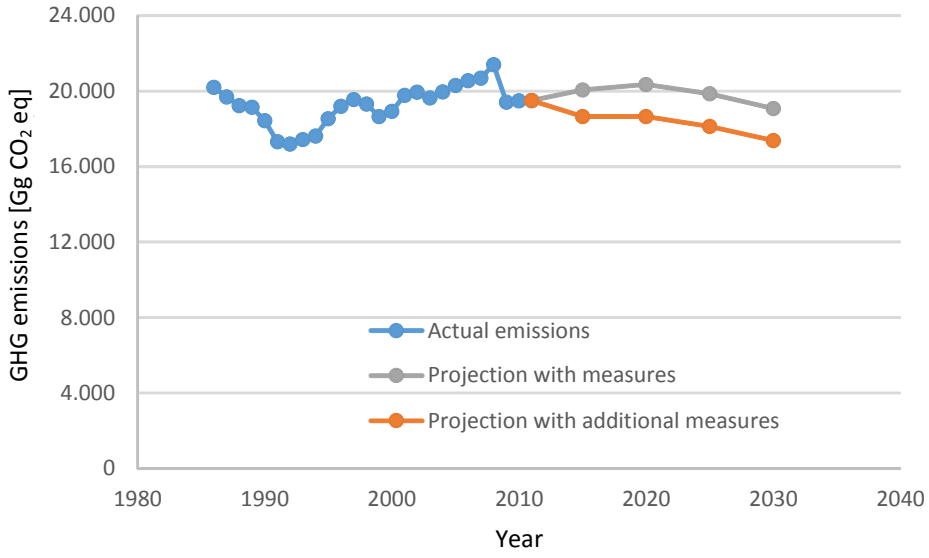


Figure 1.2: The development of GHG emissions until 2011 and development according to the projection with measures and the projection with additional measures until 2030.



1.5 Climate Change Impacts, Vulnerability and Adaptation

The increase of average temperature as a consequence of climate change is projected to be greater in Southern Europe than globally. As a country of this region, and having very vulnerable alpine, costal and carst regions and very rich biodiversity, Slovenia belongs to the more endangered countries due to climate change. Nevertheless, it has not yet adopted a comprehensive strategy for adaptation to climate change. In the coming period, it will focus on preparing a comprehensive cross-sectoral assessment of the risks and opportunities that climate change presents for Slovenia, which will be the basis for preparing measures for

adaptation and risk management and prevention (action plan for adaptation to climate change).

Agriculture and forestry have been assessed as the most vulnerable sectors in Slovenia; therefore, in June 2008, the Government of the Republic of Slovenia adopted the Strategy for the Adaptation of Slovenian Agriculture and Forestry to Climate Change. The strategy was followed by the Action Plan for 2010 and 2011, which the Government adopted in October 2010 and amended in March 2011. Measures to reduce risk and damage to agriculture and forestry were implemented under the Action Plan.

The short-term adaptation measures carried out by the Slovenian Environment Agency include warnings about dangerous weather and hydrological events, and regular publications of reviews of climate variability and monitoring in the Agency's bulletin.

1.6 Financial Resources and Transfer of Technology

The commitment to provide new and additional funding for the mitigation of and adaptation to climate change in developing countries was assumed by Slovenia at the 15th session of the Conference of the Parties to the United Nations Framework Convention on Climate Change held in Copenhagen in 2009.

On the basis of the Copenhagen Agreement, European Union leaders in December 2009 pledged a sum of EUR 7.2 billion for fast-start financing (FSF) in the period 2010–2012, a contribution to USD 30 billion globally. Slovenia's pledge for FSF was EUR 8 million. This commitment refers to new and additional funding, thus avoiding interference with the efforts aimed at reducing poverty and achieving the Millennium Development Goals.

Approximately two thirds of official development aid is allocated multilaterally, with the major part being disbursed through the EU budget. It follows from the FSF report that within the scope of multilateral official development aid, Slovenia directed a sum of EUR 1,619,543 to that end in the period 2010–2012. Among other contributions, the most important is the contribution to the Global Environment Facility (GEF). Slovenia's total contribution to FSF was EUR 5,031,869.

Of the total bilateral official development aid, two thirds were forwarded to the Western Balkan countries. The majority of the aid was earmarked for co-financing projects, with the beneficiary countries acting as co-financing parties. In the period 2011–2012, 12.6% of available bilateral aid was allocated to the financing of environmental infrastructure and access to drinking water. In the period 2010–2012, the two main beneficiaries within the Slovenian development co-operation framework were Macedonia and Montenegro, others were Bosnia-Herzegovina, Serbia and Albania. Besides, a smaller demonstration project in the amount of EUR 5,895 was implemented in Afghanistan involving the installation of solar cells on the roof of Kharokh Health Centre situated 60 km east of the town Herat. It follows from the FSF report that within the scope of bilateral official development aid, Slovenia directed to that end a sum of EUR 3,412,326 in the period 2010–2012.

1.7 Research and Systematic Observation

A large number of research and development and innovation projects in climate change and related fields which can be considered to fall within the common field of the "low-carbon society" are being or have been carried out in Slovenia.

The territory of Slovenia is occasionally exposed to various dangerous weather and climate phenomena and their consequences, e.g. drought, floods and water-logging, storms, high sea levels, landslides, heat waves, frost, heavy rain and hail, strong winds, and glaze ice. It is reasonable to expect that the intensity and frequency of these phenomena will also vary in the future, as current observations and data show. Detailed climate projection calculations for all Slovenian regions for selected periods should be made for at least the two extremes of the four IPCC scenarios on the basis of global and regional climate models, while taking account of actual data measured. This would allow the research conducted in Slovenia to yield more specific results and specific documents to be drafted, such as a strategy and action plans for climate change adaptation.

Systematic observation and measurement has been carried out by the Slovenian Environment Agency (SEA), within the framework of which the National Hydrological Service and National Meteorological Service are operating. SEA has been carrying out measurements of air pollution on permanent measuring stations, including background measurements, air quality measurements with mobile stations and diffusive samplers and precipitation quality measurements. The surface water programme includes the monitoring of rivers, lakes and sea conditions and programmes for the monitoring of the water quality in the areas of special regimes. The basic units to determine the water conditions with regard to environmental objectives are water bodies. In Slovenia, 155 water bodies were specified in surface water, and 21 in underground water.

Following a very time-consuming process of data verification and homogenisation, analyses began at the end of 2012. The variability of, and trends in, air temperature have already been calculated on the basis of homogenised data, and in the coming months similar analyses will be carried out for precipitation, the duration of solar radiation and snow cover.

Within the *Operational Programme for the Development of Environmental and Transport Infrastructure (OP ROPI)* for the 2007–2013 period, the Slovenian Environment Agency is carrying out a project to upgrade the system for monitoring and analysing the state of the water environment in Slovenia. The title of the project is BOBER, an abbreviation for *Better Observation for Better Response*.

The project *Supporting the Operation of the Drought Management Centre for Southeastern Europe*, which was carried out in 2013 by the Biotechnical faculty of the University of Ljubljana and financed from the funds of the Drought Management Centre for Southeastern Europe, comprised the preparation of the *National Action Programme for Drought Management in Slovenia*. Within the project, current drought management in Slovenia was examined and specific proposals for its improvement prepared.

In 2012, the international project *Climate Change and Impacts on Water Supply – CC-WaterS* was concluded, in which the Slovenian Environment Agency participated, mostly regarding water balancing and the simulation of impacts of foreseen climate change on drinking water supply.

Several projects and programmes concerning low-carbon society and technology have been launched, such as centres of excellence and competence centres, as well as projects for the preparation of expert bases for various policies (e.g. targeted research programme *Slovenia – Low-Carbon Society* - CRP Sinoda).

1.8 Education, Training and Public Awareness

Education and communication activities in the field of climate change and related issues (e.g. good practice in the fields of waste, water and energy) were implemented by government bodies – several ministries (among them, ministries, responsible for education and environment), offices (particularly Government Office of Climate Change and Government Communication Office) and agencies (e.g., Slovenian Environment Agency – SEA) as well as other entities (education and training organisations, non-governmental sector, media, business sector, local communities etc.). A part of these activities was implemented and monitored in the framework of the measure *5.22 Education, Training, Awareness Raising and Promotion* in the Operational Programme for Reducing Greenhouse Gas Emissions by 2012.

There is relevance for education about climate change in several subjects addressed in the context of environmental education (which has a long tradition in the educational system of Slovenia) and more recently introduced education for sustainable development. The curriculum review in the middle of the previous decade led to the introduction of environmental education and environmental studies at all levels of education within the national curriculum. The programme reform of vocational and professional education introduced the generic or key competences concerning environmental protection, efficient use of energy and safety at work in practically all education programmes. In the period from 2007 to 2009, several study programmes in the fields of the environment or environmental protection, ecology, environmental science, ecoremediation, were confirmed for implementation at undergraduate and postgraduate levels at 6 higher education institutions. Several school networks promoting goals and principles of sustainable development (SD) have been established, some secondary and higher education centres are developing holistic approaches towards sustainability.

In July 2007, the Ministry of Education and Sport adopted the **Guidelines on Education for Sustainable Development from Pre-school to Pre-university Education**. The main purpose of these guidelines is to underline the importance of education for sustainable development (ESD) and identify the possibilities for implementing sustainable development in the fields of formal, non-formal and informal learning. However, the 2011-12 comparative analysis for sustainability content revealed that SD is mainly included as an additional subject and/or topic in the curriculum and the text in the task books, instead of permeating other topics and being applied throughout the programme. In current subject curricula sustainable development topics are present, but mostly linked to natural environment/nature protection. The social component and even more the economy were neglected.

Current initiatives include proposals for the introduction of competence for sustainable development and for supporting green jobs.

Training for the implementation of measures to reduce greenhouse gas emissions (foreseen in the context of the Operational Programme for Reducing Greenhouse Gas Emissions by 2012, GHG OP-1) was carried out in several areas, primarily in the fields of energy, energy restoration of buildings and sustainable construction, green public procurement, transport, agriculture and forestry.

According to the overview conducted by the Government Office of Climate Change (GOCC) in 2011, projects and initiatives implemented in the fields of education and training, information, awareness-raising and communication about climate change and sustainable development were numerous, but insufficiently linked and systematic. Many of these projects are implemented in primary and secondary schools, and partly also in kindergartens and other educational institutions.

Among numerous projects and activities of public information and awareness, conducted, among others, by several NGOs, the projects with the common title **Slovenia is reducing CO_2** certainly had a significant impact. **Plan B - Initiative for a Sustainable Development** is a network of Slovenian environmental non-governmental organizations (NGOs) and experts, forming a broad civil society platform for sustainable development in Slovenia, along with other interested stakeholders, very active in the field of climate change and low-carbon society. Preparation of the**Draft Strategy for Slovenia's Transition to a Low-Carbon Society by 2060** is representative of a public participation process on climate change policy. It was drafted by the Government Office of Climate Change in cooperation and dialogue with experts and representatives of civil society, the corporate sector, local communities and public administration.

2 NATIONAL CIRCUMSTANCES

2.1 State Organisation

Slovenia is a parliamentary democracy. The president of the country is elected in direct elections to a maximum of two five-year terms. The National Assembly, the highest legislative body, is composed of 90 members , elected to a term of four years. The Government is formed by the Prime Minister; at present it is composed of 12 ministers. Since 1 May 2004, Slovenia has been a Member State of the European Union.

In June 2009, the Government established the Government Office of Climate Chang whose primary task was to provide for the guidance of sectoral policies in the area of climate change, while the Ministry of the Environment and Spatial Planning was responsible for the preparation and implementaion of the environmental and climate policies. The Office was cancelled in the beginning of 2011 due to restructuring of the government. The Slovenian Environment Agency (SEA) plays an important role in implementing environmental legislation and tasks in the field of environment protection and monitoring.

There are 210 municipalities in Slovenia with their own administrations and budgets, of which 11 have the status of urban municipality. Municipal competencies in the field of reduction of GHG emissions are related to spatial development planning, local and public traffic regulations, preparing local energy use plans and waste collection and disposal. Urban municipalities are obliged to provide monitoring for emissions and adopt environmental protection programmes as well as action plans.

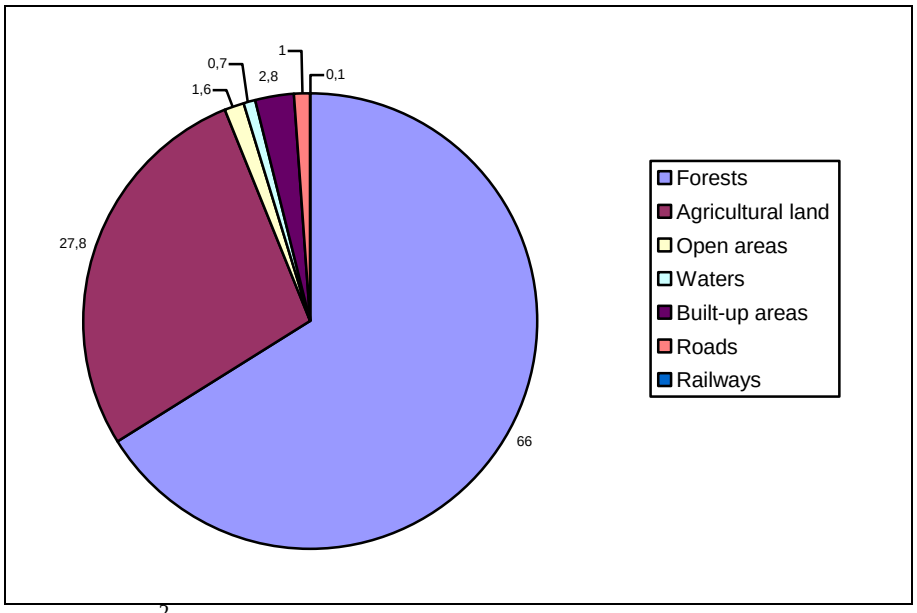
2.2 Population Profile

In the period 2000–2013, the population of Slovenia increased slightly, from 1,990,272 to 2,058,821, primarily due to increasing migrations. The population density is moderate. According to the Eurostat projections for Slovenia the population will increase to the year 2020, while after this year it will begin to drop, so that in 2060 it shall decrease to 1,778,600. In 2006, the population growth turned for the first time after nine years in the positive direction; in 2007, it amounted to 0.6 per 1000 people, in 2008 it dropped to 0.2 and in 2009 it reached a “local” maximum of 0.9; in 2012 it dropped again to 0.3 per 1000 people. Despite the higher population growth in some of the recent years, the number of population is increasing primarily due to an increasing net migration. The population of Slovenia is also getting older. In 1991, the average age was 35.9, and in 2006 it was 40.8 years. Life expectancy of the population in Slovenia in 2012 was 82.89 years for women and 76.96 years for men. Population density is moderate and amounts to 98 inhabitants per km2. A very dispersed type of settlement is characteristic for Slovenia, however the trend is moving towards settlements in the vicinity of larger cities. On the 1st of January 2012, Ljubljana, the capital of Slovenia, had 282,994 inhabitants (13.7% of the entire population), which is around 15,000 more than in 2008 (267,760).

2.3 Geographic Profile

Slovenia is located in central Europe with geographic coordinates of approximately 46° north latitude and 15° east longitude. The surface area of the territory is 20,273 km^2. It borders on Italy, Austria, Hungary and Croatia, with which it has the longest state border. Despite its small size, Slovenia is a very diverse country with three distinct types of landscape. To the north there are the mountain ranges of the Julian Alps, the Karavanke Mountains and the Kamniško-Savinjske Alps which gradually slope down to the Adriatic Sea towards the south. The hilly central part with its numerous valleys and basins, including the Ljubljana basin where the capital of Slovenia is located, is separated from the Adriatic Sea by the northernmost slopes of the Dinaric Mountain Range. In the northeast the country flattens out onto the Pannonian plain. The length of the coast is 46.6 kilometres. The variability of the terrain is illustrated by the average inclination of 25%. The average altitude is 550 m.

Figure 2.1: Shares of individual categories of ground cover (%) of the total surface, 2005.



Source: SORS[2]

Terrain diversity, climate and pedological variety, large forests and the preservation of traditional ways of managing parts of the cultural landscape are the reasons for the high biodiversity, which is endangered due to potential climate change.

About 3000 ferns and flowers grow in Slovenia, along with 50,000 different animal species. Concern for preserving biodiversity is also evident in the increased number of protected areas. In 2008, the following areas were protected: 1 national park, 3 regional parks, 44 landscape parks, 1 integral natural reserve, 56 natural reserves and 1191 natural monuments. 256.120

[2] Forests: Commercial forests, protective forests, tree nurseries, bush, arboreal parks in urban areas, reclaimed areas; Total agricultural land: meadows, pastures, permanent and annual plantations, grass surfaces not used for agricultural purposes, marshes; Open areas: rocks and scree, non-overgrown river banks, construction sites, landfi lls, quarries; Waters: rivers, lakes, reservoirs, industrial pools, saltpans; Developed areas: buildings with courtyards, gardens, parking lots, warehouses – defined by adding a circle with the radius of 20m around centroids, built-up areas between surfaces and by them defined with the assistance of centroids, determined by photo-interpretations of SPOT 1997 satellite data; Railways: – railways; Roads: national and main local roads.

hectares of land are protected, which represents 12.63% of Slovenia's territory. Since 2003, the protected areas increased by more than 1.5%.

Furthermore, 35.5% of Slovenia's territory was included in the Natura 2000 areas, of which 26.3% is already incorporated in the protected areas. Natura 2000 is a European network of Special Protection Areas declared in the Member States of the European Union with the main objective of preserving biodiversity for future generations. Special Protection Areas are intended for the preservation of animal and vegetation species and habitats which are rare or endangered at the level of Europe due to human activities.

2.4 Climate in Slovenia

As in other parts of the world, also in Slovenia changes in climate have been observed, as well as in water balance. That's why the main characteristics of these changes are presented below. Also the role of the Slovenian Environment Agency (SEA) related to observation of climate and water conditions. Besides, SEA is responsible also for preparing forecasts and issuing warnings in case of dangerous weather events, which is an important component of the short-time adaptation measures.

2.4.1 The Role of Slovenian Environment Agency (SEA)

The main task of the SEA is observation and forecasting of natural phenomena in the environment and providing high quality public environmental data. For this purpose the SEA has an adequate observation network and laboratories. It cares for environment protection, conservation of natural resources, protection of biodiversity, and sustainable development of the country. State meteorological and hydrological services are parts of the SEA.

On the basis of measurements and observations at meteorological stations and remote sensing ESA permanently follows the development of actual weather. By means of computer models for the simulation of the processes in the atmosphere, and experience of weather forecasters SEA strives to forecast weather as precisely as possible. The importance of the state meteorological service is particularly evident in cases of extreme weather events, when actual weather data, prognosis of near term weather development and timely warnings form the basis of measures for the protection of lives, property and environment.

Together with the Administration for Civil Protection and Disaster Relief, SEA is permanently improving early warning systems for cases of stormy weather. Warnings are being regularly sent to mass media, and are permanently refreshed on the website of the state meteorological service (www.meteo.si). All issued warnings are also forwarded to the unified European warning system MeteoAlarm (www.meteoalarm.eu). The system incorporates all important information on stormy weather, submitted by the meteorological services of European countries. Information are represented in a unified way, colour scale shows the degree of weather threat and potential consequences.

Slovenian state hydrological service is part of a large community of around 200 state organisation in the whole world, which are following their national goals and at the same time contribute to the world treasury of the knowledge on water. They all act in a coordinated way using the standards adopted by the World Meteorological Organisation (WMO). The tasks of the Slovenian hydrological service

comprise the whole process from acquisition of the data, analysis of underground and surface waters, to hydrological forecast. State hydrological service has a network of measuring stations for the continuous survey of surface and underground waters. Hydrological data have been collected for more than 100 years; the state hydrological data base consists of approximately 35 million data, whose value is increasing due to ever more demanding process of water management. For the improvement of the early warning system, the hydrological service has established a modern operational system for the prognosis of fluxes of rivers Sava and Soča, and has merged it with the existing international system for the prognosis of the flux of river Mura. In case of floods, early warnings prepared on the basis of meteorological and hydrological forecasts enable timely readiness and actions of the groups for civil protection and relief.

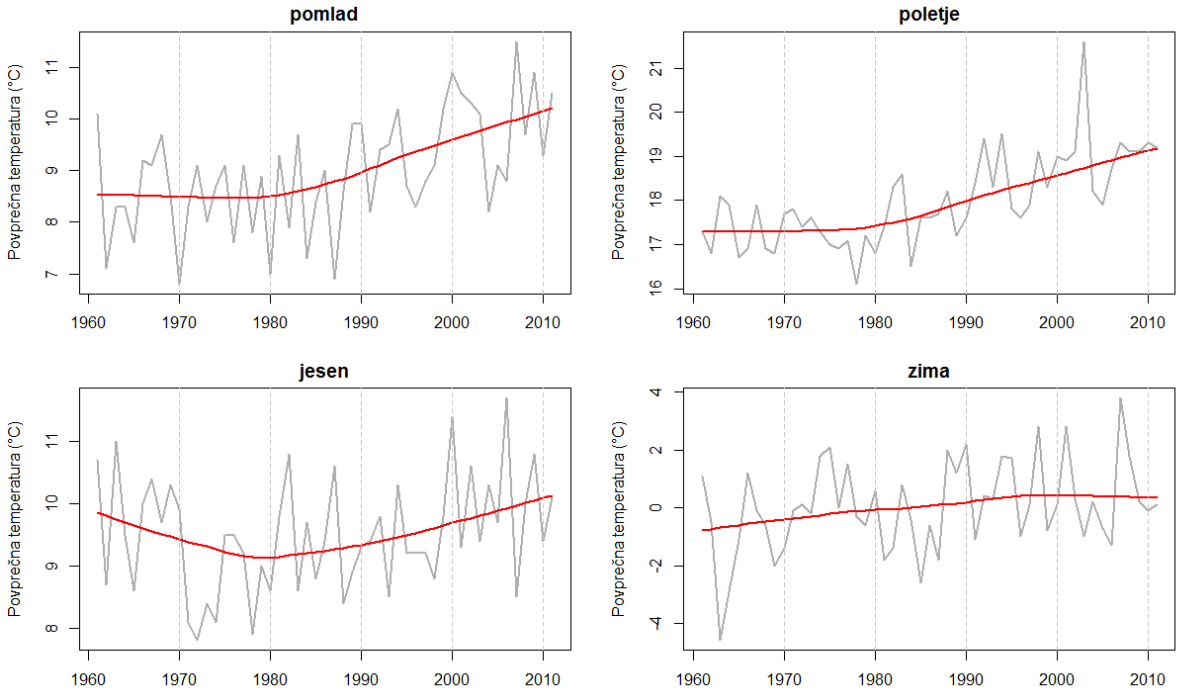
Due to more and more frequent problems with drought in Slovenia, and to the fact that SEA is also a seat of the Drought Management Centre for South-eastern Europe (DMCSEE, http://www.dmcsee.org/), one of the main focuses will be observation and forecasting of water balance on the territory of Slovenia and beyond also in the future. In accordance with the commitments deriving from the UN Convention on Combating Desertification, In 2013, SEA has prepared the National Action Plan for Drought Management and Soil Degradation.

The complete overview of the activities and results of observing the environment can be found on the SEA website: http://www.arso.gov.si/. In the bulletin Naše okolje (Our Environment), being accessible on the internet address http://www.arso.gov.si/o%20agenciji/knji%C5%BEnica/mese%C4%8Dni%20bilten/, monthly survey of meteorological, agro-meteorological, hydrological and seismological data are published.

2.4.2 Temperature

Climate change is most obvious in terms of temperature rise. Surface air temperature rise in Slovenia was in the recent decades irregular in time and space. That's why it is necessary to include in analyses, beside annual trends, also seasonal changes which can have substantially more pronounced consequences. Linear trend in the period 1961-2011, obtained by means of homogenised time series, a result of the project "Climate Variability in Slovenia", is approximately 0.34 ^{o}C per decade, which means that the average temperature in this period has risen by 1.7 ^{o}C. Similar change has been observed for daily minimum and maximum temperatures. Data and results of the project are accessible on the internet address http://meteo.arso.gov.si/met/sl/climate/pss-project/.

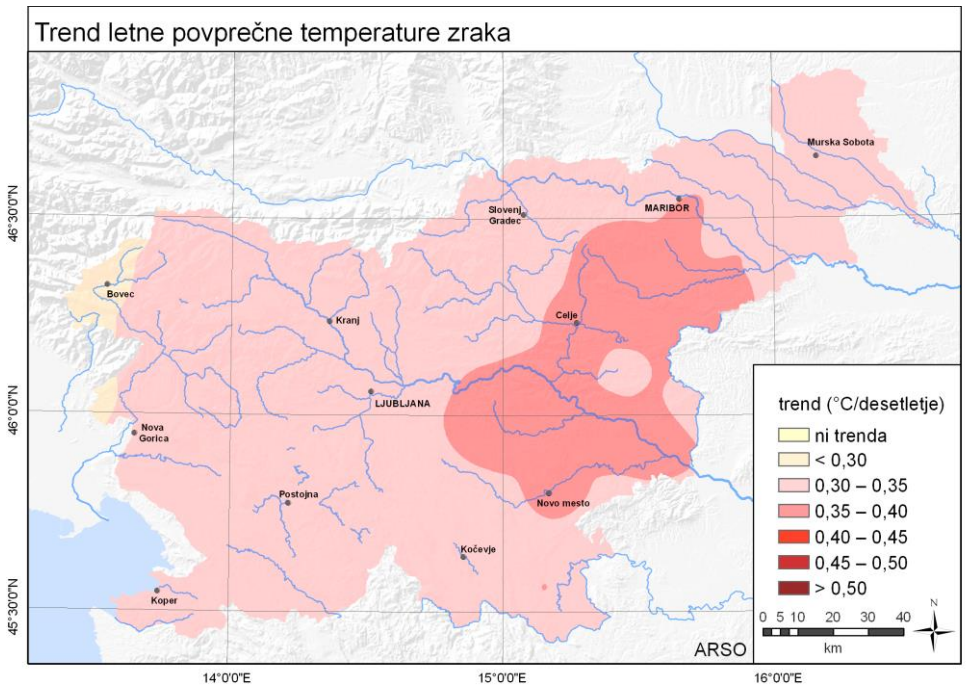
Figure 2.2 Average surface temperature in individual seasons of the year in the period 1961-2011 for Slovenia as a whole (grey line) and smoothed floating mean (read line). Presented values are averages of all homogenised data sets in Slovenia.



Source: http://meteo.arso.gov.si/met/sl/climate/pss-project/

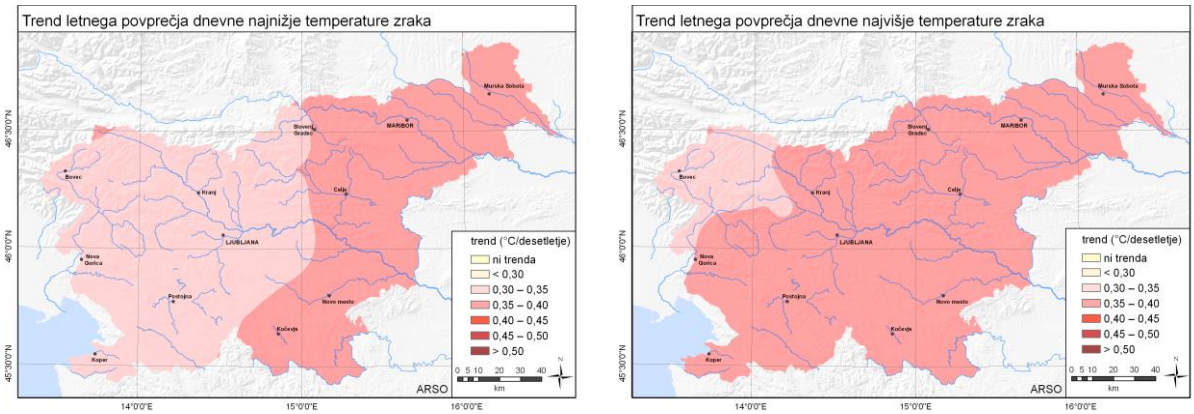
More warming was in the east of the country that in the west. Warming was largest in spring and summer. Inter-annual temperature variability was largest in winter, that's why is warming in this season less significant. Autumn time flow of the temperature is particular for cooling at the beginning and warming from the end of the seventies on. Taking into account the whole time period, there was no notable temperature change, however, if the last three decades are excluded, there is a clear growing trend also in autumn.

Figure 2.3 Trend of yearly average surface temperature in Slovenia in the period 1961-2011, based on homogenised data.



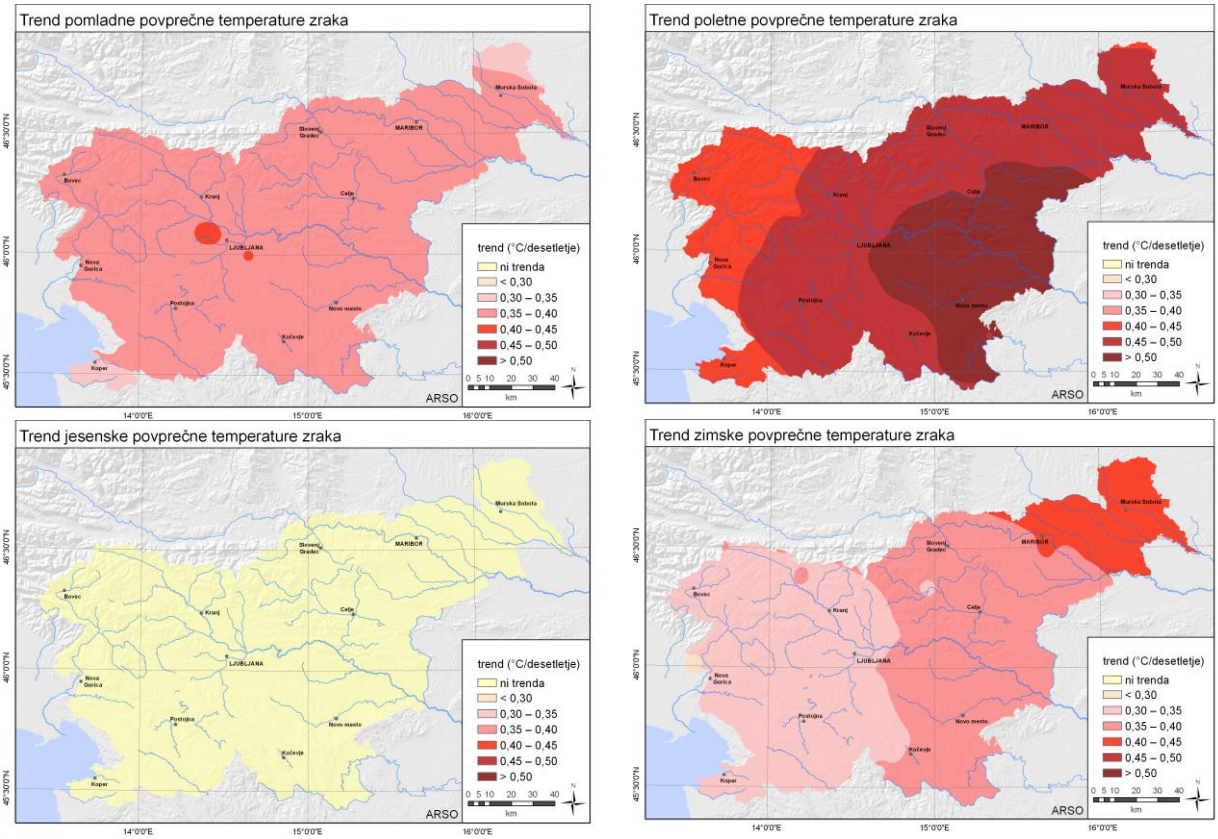
Source: http://meteo.arso.gov.si/met/sl/climate/pss-project/

Figure 2.4 Trends of yearly averages of daily minimum (left) and maximum (right) surface temperature in Slovenia in the period 1961-2011, based on homogenised data.



Source: http://meteo.arso.gov.si/met/sl/climate/pss-project/

Figure 2.5 Trends of average surface temperature in individual meteorological seasons in the period 1961-2011 in Slovenia (Spring: upper left; Summer: upper right; Autumn: lower left; Winter: lower right). Calculated autumn trend is not statistically significant at 5% confidence level anywhere in Slovenia.



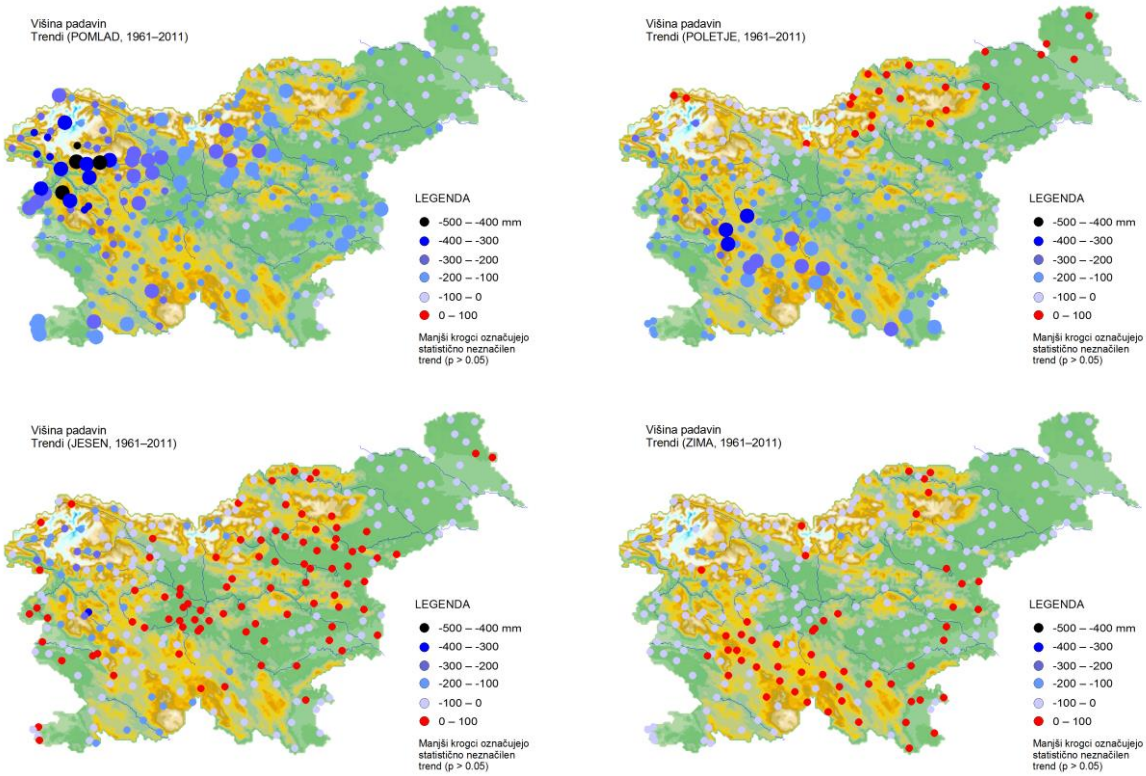
Source: http://meteo.arso.gov.si/met/sl/climate/pss-project/

Rise of the average temperature is reflected also in more frequent and more intense heat waves. The number of warm and hot days in summer months is increasing. In the second half of the 20th century there were less days with the temperature above 35 °C than in this century so far; this shows that heat waves are becoming more intense. During a heat wave in august 2013, all time record maximum temperatures were registered in many places, in some cases exceeding 40 °C.

2.4.3 Precipitation

Yearly average precipitation for the entire Slovenia decreased in the period 1961-2011 by approximately 160 mm. The decrease was large in western in southern Slovenia than elsewhere. About half of the decrease was in spring months, while the decrease in other seasons was substantially smaller. In contrast with temperature trends, precipitation trends are more variable, particularly spatial variability. In the same season, even opposite trends in different regions are possible. Precipitation data for Slovenia can be found at the website http://kazalci.arso.gov.si/?data=indicator&ind_id=555.

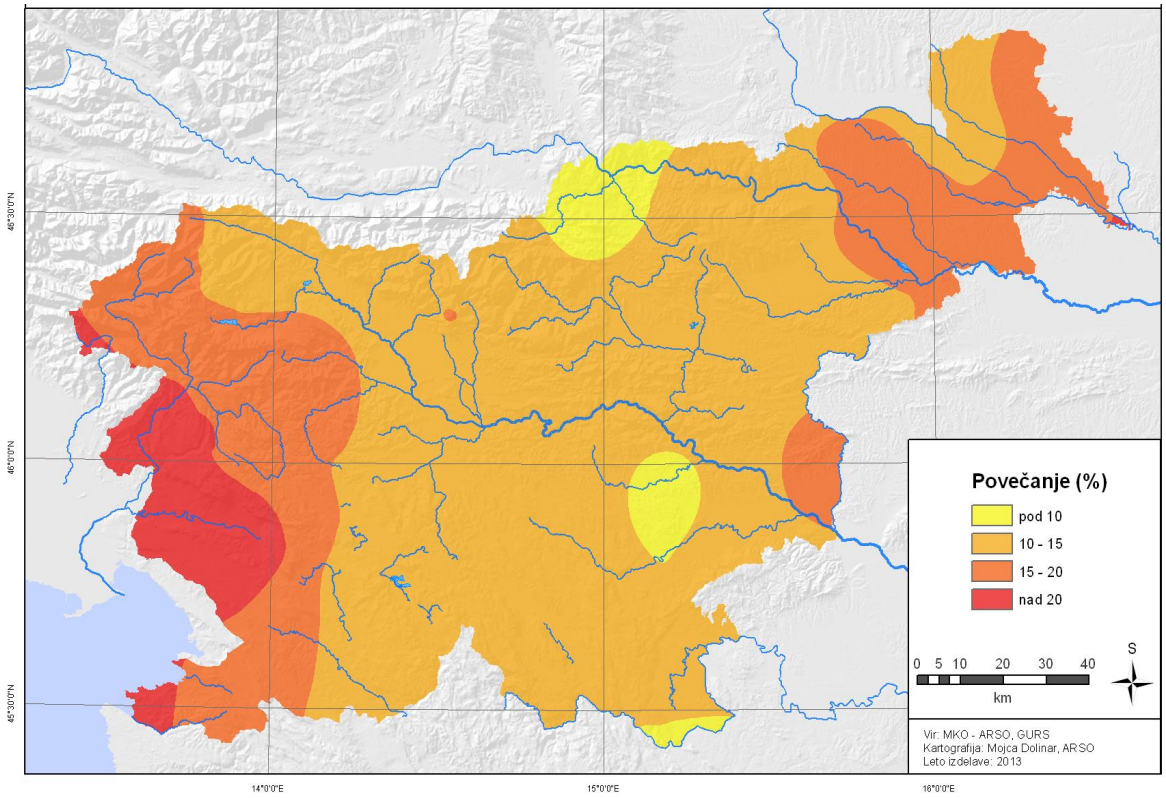
Figure 2.6 Linear trend of precipitation quantity in individual meteorological seasons in the period 1961-2011 in Slovenia (Spring: upper left; Summer: upper right; Autumn: lower left; Winter: lower right). Larger circles represent statistically significant trends at 95% confidence level.



Source: Archive of meteorological data, SEA, 2013

Main reason for increased evapotranspiration was the temperature rise. The combination of less precipitation in spring and summer and increased evapotranspiration increases the probability for agricultural and hydrological drought. At almost the whole territory of Slovenia, evapotranspiration increased in the recent 40 years by more than 10%. Most critical is the increase of potential evapotranspiration on the lands with least precipitation, and where intense agriculture is being practiced (south Primorska, north-eastern Slovenia). There, evapotranspiration has increased by more than 15% in the recent 40 years, in some parts of Primorska even by more than one fifth.

Figure 2.7 Change of average yearly potential evapotranspiration in the period 1971-2010 in Slovenia.

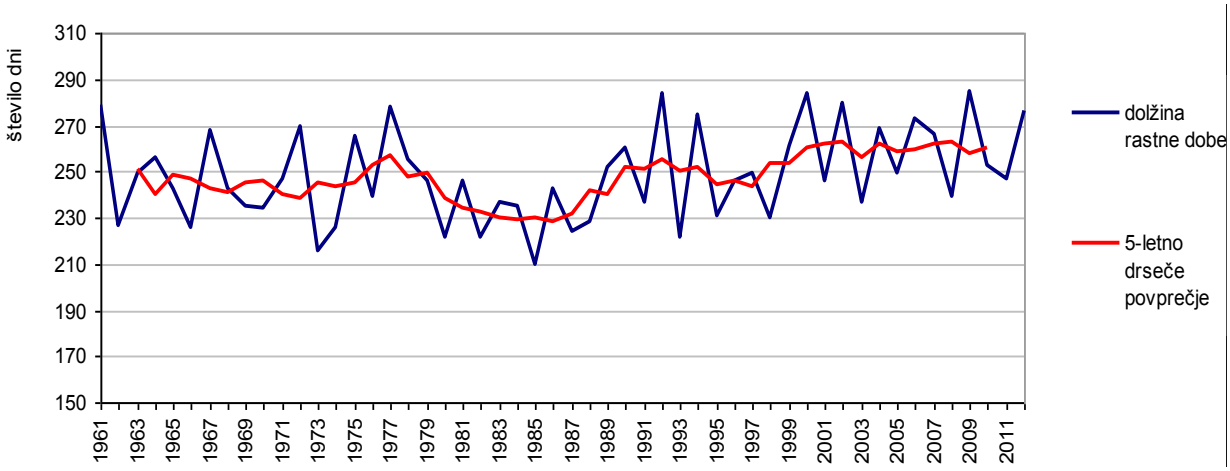


Source: Archive of meteorological data, SEA, 2013

2.4.4 Change of Length of Growth Period

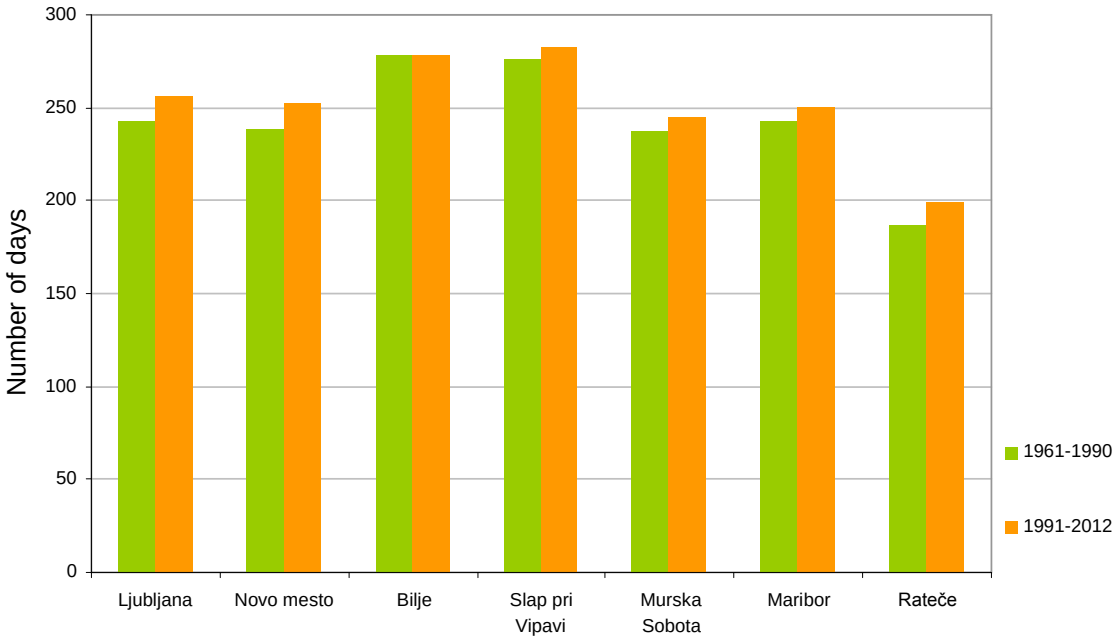
Increase of mean surface air temperature and higher frequency of days with temperature above vegetation threshold cause the prolongation of the yearly growth period. In the period 1961-2012, the length of the yearly growth period is inhomogeneous, with strong dissipation; more detailed analysis of floating 5-year means has shown fine cyclic oscillations. The last cycle of floating 5-year means indicates the extension of the yearly growth period from the nineties on, which can be seen from the comparison between the 1961-1990 and 1991-2012 means. These data have been taken from the Length of the Growth Period indicator, at http://kazalci.arso.gov.si/?data=indicator&ind_id=541.

Figure 2:8 Change of length of growth period in Ljubljana (blue line: length of growth period; red line: 5-year floating average; number of days).



Source: Archive of meteorological data, SEA, 2013

Figure 2:9 Average length of yearly growth period in selected places in Slovenia in the reference time periods 1961-1990 and 1991-2012.



Source: Archive of meteorological data, SEA, 2013

For the calculation of the length of the growth period in Slovenia, the number of days between spring and autumn vegetation threshold 5 ^{o}C is used.

2.4.5 Quantitative Situation of Water Sources

With the programme of hydrological analyses, SEA is providing yearly estimates of quantitative condition of underground water, which are the basis for the state management of this prevailing source of drinking water.

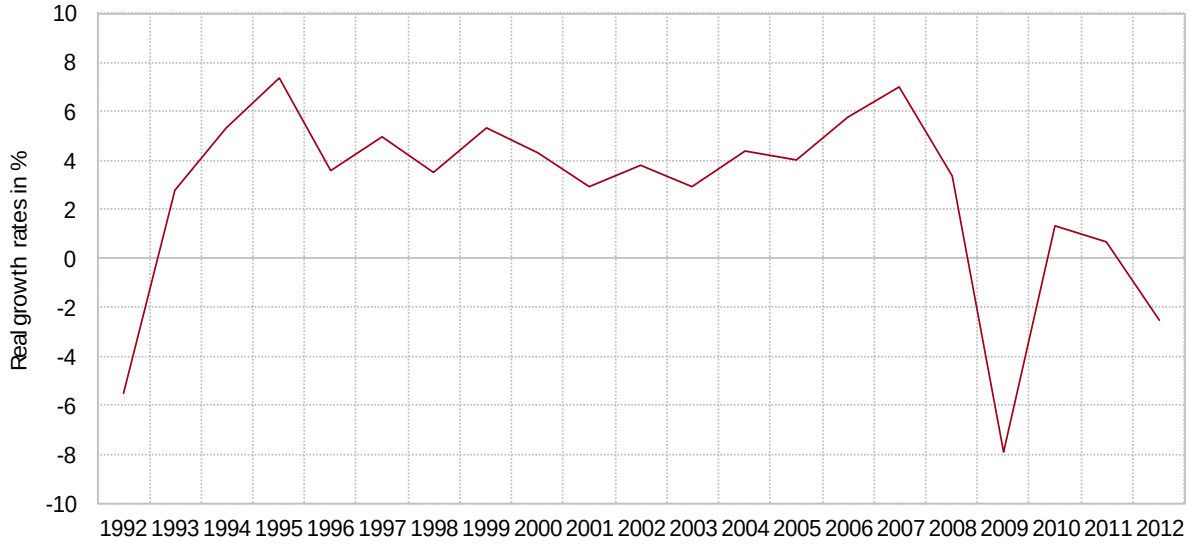
By means of hydrological monitoring of surface waters, hydrological conditions are being assessed and river flows regimes and water balance are being analysed. The impacts of climate change are reflected in increasing frequency of natural disasters, caused by too much or not enough water. In light of devastating floods and lengthy droughts in recent years, hydrologic analyses for detection of trends of long time series are extremely important. They show decreasing of water bodies in Slovenia, and prolongation of periods with small river flows. Negative trend of mean yearly flows is obvious particularly after 1980. The trend of the frequency of high water events has been observed especially in the central and eastern parts of the country. Higher temperatures of water have also been observed, particularly in summer months. More on hydrologic situation of waters and climate change can be found at http://meteo.arso.gov.si/met/sl/climate/non-periodic-publications/.

Reports on river fluxes and on unusual hydrologic events are published at http://www.arso.gov.si/vode/poročila in publikacije/. Data on yearly river balance are published also among the environment indicators at http://kazalci.arso.gov.si/?data=indicator&ind_id=536, and data on quantities of ground waters on http://kazalci.arso.gov.si/?data=indicator&ind_id=563.

2.5 Economic Development

Until the beginning of the economic crisis, the Slovenian economy achieved relatively high growth rates. The average GDP growth rate was 4.3% between 1993 and 2003 and 4.9% between 2004 and 2008. The economic crisis caused a considerable slowdown in GDP growth in 2008 and a dramatic decline in 2009 (-7.9%). The rapid deterioration of economic conditions in the international environment was reflected in reduced exports and investments, which had been the key factors of economic growth in previous years. After modest GDP growth in 2010 and stagnation in 2011, Slovenia entered another period of negative growth rates in 2012, which has continued into 2013 and is the result of weak domestic demand, especially the decline in investments.

Figure 2.10: Gross domestic product, real growth rates in %.

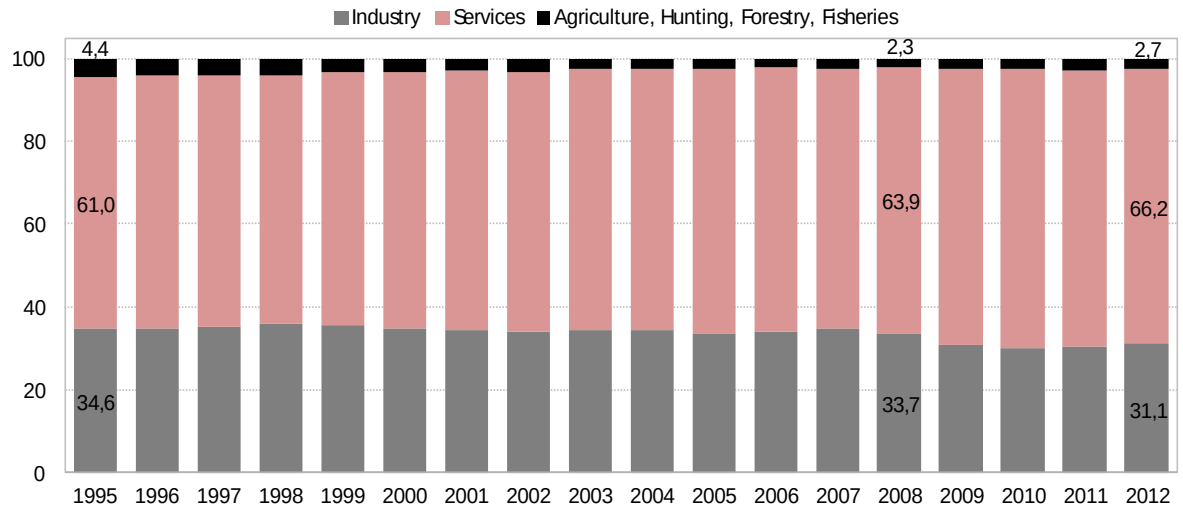


Source: Eurostat, Statistical Office of the Republic of Slovenia, November 2013

Achieving high economic growth rates before the crisis Slovenia was gradually approaching the EU average in terms of GDP per capita expressed in purchasing power standards; the difference to the EU average narrowed to 9 percentage points in 2008. Since the beginning of the economic crisis in 2008, Slovenia has belonged to the group of EU Member States with the biggest decline in GDP per capita expressed in purchasing power standards. In 2012, Slovenia's lag behind the EU average thus increased to 16 percentage points, which is similar to that in 2003.

The value added structure shows that the share of services has increased from year to year, as a result of the decline in the share of industry as well as agriculture; the latter has, however, recorded a slight growth since 2009. The share of industry, having accounted for 34% to 35% of added value in the period from 1995 to 2008, had fallen by 3 percentage points by 2013, mainly due to the large contraction of construction.

Figure 2.11: Shares of activities in value added, in %.



Source: Statistical Office of the Republic of Slovenia, November 2013

The foreign trade integration rate of the Slovenian economy in terms of the share of foreign trade in GDP, which had grown faster than the EU average until 2007, declined significantly in 2008 and 2009 due to economic and financial crisis, as the reduction in world trade affected Slovenia more than the EU as a whole. Since 2010, the average share of foreign trade relative to GDP has increased faster than the EU average (see table) as a result of a strong decline in domestic consumption.

Table 2.1: Average share of foreign trade (export and import)* in GDP.

	1995	2000	2005	2007	2008	2009	2010	2011	2012	2013
Slovenia	50.6	55.4	62.4	70.4	69.2	58.3	66.1	72.3	74.8	74.8
EU 28	28.7	35.7	36.8	39.8	41.1	36.4	40.4	43.3	43.9	43.4

Source: Eurostat Portal Page - Economy and Finance, March 2014; calculations by IMAD

Note: * ratio between the average value of total export and import based on the statistics of national accounts and GDP by current prices.

The economic crisis has had a strong impact on the labour market, too. Since 2009, employment has dropped by an average of 2.3% per year, resulting in an increase in unemployment (registered unemployment rate) from 6.7% in 2008 (63,200 unemployed persons registered) to 13.1% in 2013 (119,800 unemployed persons registered in 2012.

2.6 Energy

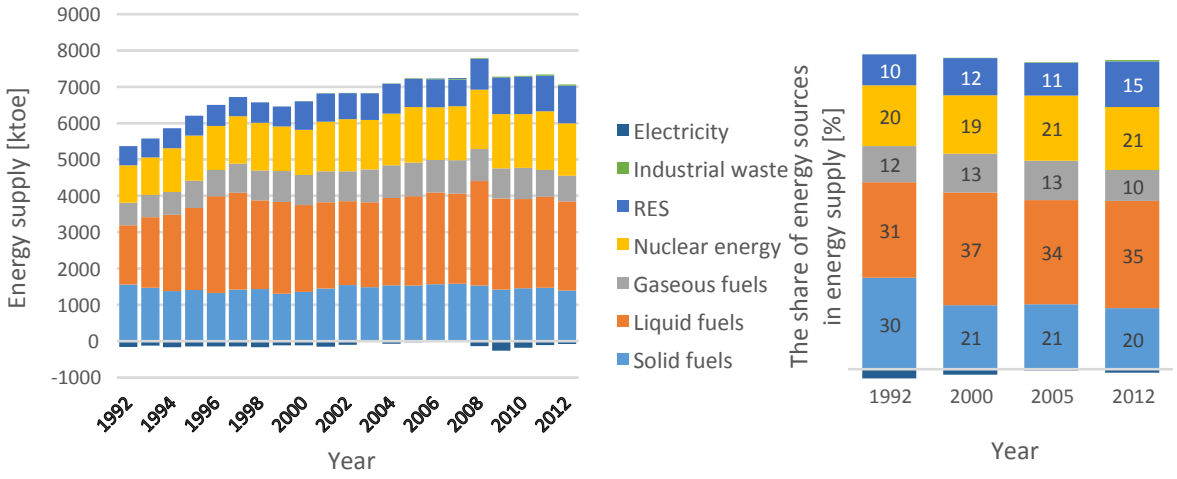
Energy use is the most important source of greenhouse gas emissions in Slovenia, since when fugitive emissions are taken into account it contributed 82% to the total emissions in 2011.

2.6.1 Energy Supply

The energy supply amounted to 6,988 ktoe in 2012. Compared to 2011, the supply was lower by 3.4% and higher by 34% compared to 1992. The highest use, totalling 7,650 ktoe, was reached in 2008. In 2012, in the structure of the energy supply, liquid fuels (35%) prevailed, followed by nuclear energy (21%), solid fuels had a 20% share, renewable energy sources (RES) represented 15%, with natural gas at 10%. The net import of electricity represented -1.1% of total use (more electricity was exported than imported). With regard to fossil fuels, Slovenia produces only solid fuels. The use of fossil fuels increased by 20% in the period 1992-2000. This was mainly due to a 94% increase in liquid fuels; the consumption of natural gas increased by 34%, while the consumption of solid fuels decreased by 13%. The use of nuclear energy increased by 20%, while the use of renewable energy sources increased by 49%, which is largely due to the improved assessment of the use of wood biomass in 2000. In this period, the energy supply increased by 25%. In the period 2000-2012, the consumption of natural gas decreased by 14%, which was primarily due to the economic crisis after 2008 and the termination of methanol production in 2011, which resulted in a strong decrease in the use of natural gas for energy purposes and non-energy purposes in industry. The supply of other energy products increased. The highest increase was recorded in renewable sources of energy (32%), which to a great extent contributed to the improved RES statistics and to the promotion of the use of energy from renewable sources, which had an influence on the 54% growth of the use of other RES (biomass, geothermal and solar energy). In 2012, the supply of hydropower increased slightly compared to 2000. The supply of liquid fuels increased by 11%, while the supply of solid fuels increased by 3%. In 2012, the use of fossil fuels increased by 8% compared to 2000. The net import of electricity decreased minimally (by 2%). The energy supply increased by 8%. In 2012, the use of energy products with the exception of RES decreased, most notably nuclear energy for the overhaul of the Krško nuclear power plant. Because of the differences in the growth of the consumption of individual energy products, the shares in the energy supply changed. In 2012, the share of liquid fuels decreased by 2 percentage points compared to 2000, while it increased by 4 percentage points compared to 1992. Nuclear energy increased its share by 1.5 percentage points compared to 2000 and by 0.8 of a percentage point compared to 1992. The share of liquid fuels decreased by 2.6 percentage points compared to 2000 and 1.7 percentage points compared to 1992. Solid fuels are only used in the production of electricity and heat and in

industry (paper and pulp production, cement production); their share decreased by 1 percentage point compared to 2000 and by 10 percentage points compared to 1992. In 2012, the share of renewable sources decreased by 3 percentage points compared to 2000, while it increased by 5 percentage points compared to 1992.

Figure 2.12: Energy supply by energy product in the period 1992–2012 and the share of energy products in the energy supply in 1992, 2000, 2005 and 2012.



Source: Statistical Office of the Republic of Slovenia (SORS), Jožef Stefan Institute (JSI) - Energy Efficiency Centre (EEC)

The CO_2 intensity of the energy supply changes because of changes in the proportions of the fuels in the energy supply, which has an impact on the total CO_2 emissions. In the period 1992–2011, CO_2 intensity decreased by 13%. On the other hand, the energy supply increased by 39% in the same period. The result is that CO_2 emissions from energy sources (CRF 1) increased by 20% in the period 1992–2011.

In 2012, the energy supply intensity of Slovenia amounted to 227 toe/million EUR 2005, which is 25% less than in 1992. In comparison with the EU-27, the energy supply intensity of Slovenia increased by 49% in 2011. In 2012, the final energy use intensity, at 159 toe/million EUR 2005, in Slovenia decreased by 16% compared to 1992. In 2011, the final energy use intensity of Slovenia increased by 67% compared to the EU-27, the influence of transit transport and the high share of industry in the value added accounted for a significant contribution thereto.

2.6.2 Final Energy Use

In the period 1992–2012, the final energy supply increased by 49.5%; the majority of the increase occurred before 1997.

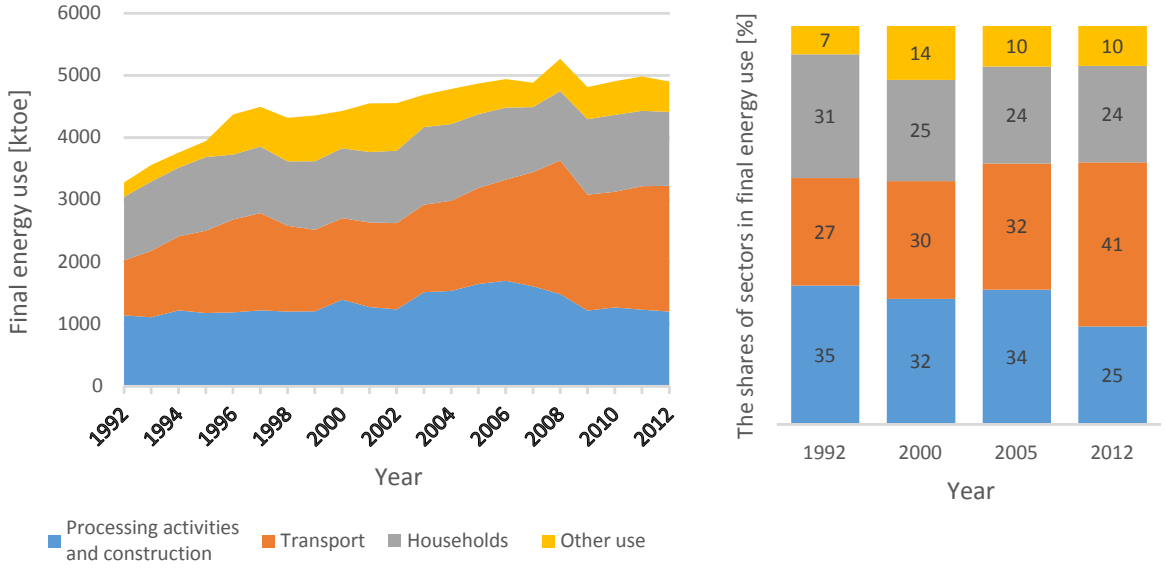
In the period 1992–2012, the largest increase in final energy use was recorded in the transport sector and the other use sector. In transport, 129% (for 1,137 ktoe) more energy was consumed in 2012 than in 1992 and 55% (714 ktoe) more than in 2000. The major part of the growth therefore occurred after 2000. In 1997, the first peak in use was reached as a

consequence of gasoline tourism. After the measures taken in neighbouring countries, such use was in decline until 2000. The use of energy in transport increased sharply in 2007 (by 12.8%) and 2008 (by 17.1%). In 2009, this decreased by 13.4%, and by 0.1% in 2010. In 2011 and 2012, use again increased by 6.8% and 1.9%, respectively. The high growth in final energy use in transport until 2008 was the result of the increased number of people who owned motorised vehicles, the increased number of kilometres travelled per personal vehicle, and following accession to the EU (in 2004), the main source of increased consumption of liquid fuels has been the increase in transit transport in combination with lower prices of motor fuels as compared to neighbouring countries. The decrease in the use of energy in 2009 was primarily the result of the economic crisis; equally important was the impact of the changed price relations regarding motor fuels among the countries, since the price of diesel fuel in Slovenia was higher than in neighbouring countries. Similar price relationships were established in 2010, whereas they changed again in 2011, since the price of diesel fuel in Slovenia was again lower than in neighbouring countries. In 2007, transport accounted for 38% of the use of final energy and became the most important consumer of energy, while this position further strengthened in 2008, when it accounted for 41%. After a reduction in this share in 2009 and 2010 to 39% and 38%, respectively, it increased again to 40% in 2011 and to 41% in 2012. In 1992, the transport sector was the third largest sector in terms of share, while in 2000 it was second. Because of the small size of Slovenia, fuel sold to vehicles in transit traffic has a considerable effect on its energy balance. Fuel sold to foreigners using energy for transport represented between 12% and 21% in the 2008–2012 period, while in the total use of final energy it represented between 4% and 8%.

In the other use sector (the service sector and agriculture), use was higher by 112% compared to 1992. The largest increase was recorded in 1996, when use increased by 150% due to methodological changes. Use in this sector has changed considerably several times since 2000. In 2012, the share in total final energy use amounted to 10%.

Energy use in processing activities and the construction industry grew gradually until 2002 followed by years of faster increase until 2007. Years of decrease, with the exception of 2010, followed as a result of improved efficient energy use and particularly as a result of the economic crisis. Compared to 1992, use in 2012 was 5.3% lower, while it was 13.8% lower compared to 2000. In 2012, processing activities and the construction industry represented a 25% share in total final energy use, which is 10 percentage points lower than the share in 1992.

Figure 2.13: Final energy use by sector in the period 1992–2012 and the proportion by sector of final energy use in 1992, 2000, 2005 and 2012.



Source: IJS-CEU, SORS

The use of final energy in households has decreased between 2004 and 2007, after a period of growth since 1998. In the period between 2008 and 2010 it rose again, and in 2011 it fell by 1.9%, while in 2012 it decreased by 2.1%. In the observed period, the use of energy reached its highest level in 2003, namely 1,250 ktoe. Compared to 1992, use was 16.3% higher in 2012, and compared to 2000 it was higher by 5.5%. In 2009, the increase in energy use was a result of the improved RES statistics. In 2012, the use of final energy in households represented 24%, i.e. 7 percentage points less than in 1992 and 1 percentage point less than in 2000.

Table 2.2: Shares of energy products in final energy use in 1992, 2000, 2005 and 2012.

	1992	2000	2005	2012
Solid fuels	6%	2%	2%	1%
Petroleum products	43%	51%	49%	49%
Natural gas	15%	13%	14%	11%
Renewable sources	8%	10%	9%	13%
Electric energy	23%	20%	22%	22%
Heat	6%	4%	4%	4%

Source: IJS-CEU, SORS

2.6.3 Electricity Generation

In 2012, total electricity generation amounted to 15,729 GWh. The largest share of electricity was generated from nuclear energy (35%), followed by generation from solid fuels (33%) and generation from renewable energy sources (27%). Compared to 1992, total generation was higher by 30%, and compared to 2000 it was higher by 15%.

In the shares of electricity generation according to fuel, there are oscillations as a result of climate conditions (due to river stage conditions – generation by hydropower plants, river temperatures – cooling of nuclear plants) and maintenance of nuclear power plants. Long-term generation trends in the period 1992–2012 show that the share of generation from solid fuels decreased and the share of generation from nuclear energy increased, while there was no trend in the share of generation from renewable energy sources.

2.6.4 The Price of Energy Products

The electricity and natural gas market in Slovenia is open to all users. Price regulation for the use of networks falls within the competence of the independent regulator (The Energy Agency of the Republic of Slovenia). Slovenia is among the rare EU Member States that fully regulate the prices of petroleum products. It prescribes a methodology for designing the basic fuel prices, whereas the state affects the final price by laying down the rate of excise duty. The main purpose of introducing control over petroleum product prices is to protect consumers from oligopolistic setting of final prices by fuel traders and the possibility to carry out preventive measures against the impact of world oil prices on inflation in Slovenia. Prices of district heating on the basis of the highest original price are set by the Government, since district heating is a monopoly activity. Major producers of electricity and heat are included in the European greenhouse gas emission trading scheme (EU-ETS).

In 2012, the price of electricity for households was 0.112 EUR 1995/kWh, representing 81% of the average EU-27 price. Since 2008, the price has increased nominally by 20%. In 2012, the price of electricity for industry was 0.061 EUR 1995/kWh (78% of the EU-27 weighted average) and since 2008 it has increased by 6%. Since 2008, the price of natural gas for households has increased nominally by 38% and at the end of the year amounted to 16.1 EUR1995/GJ (127% of the EU-27 average price), for industry it increased by 53% and amounted to 11.7 EUR1995/GJ (146% of the EU-27 average price). In 2012, liquefied petroleum gas was the most expensive energy product for heating households, with a price of 35.9 EUR 1995/GJ, followed by fuel oil at 19.9 EUR 1995/GJ. Wood fuels had the lowest price (wood pellets 10 EUR 1995/GJ, wood logs 8 EUR 1995/GJ and wood chips 7 EUR1995/GJ).

2.7 Transport

The volume of road cargo and automobile traffic in Slovenia experienced sustained increase until the beginning of the crisis in 2009. The increase was the consequence of the growing number of vehicles and the increased number of cilometres dirven. The number of passenger kilometres (pkm) in public road transport was decreasing. Due to its location, Slovenia is highly exposed to transit traffic, whose share is increasing especially in the cargo sector. Increasing emissions from transport have substantially contributed to increase of overall emissions.

The degree of motorisation of the residents of Slovenia was increasing quickly until 2008. The number of registered perosnal vehicles per 1000 inhabitants grew in the period 1990-2008 from 289 to 514, and afterwards, until 2011, it grew to only 519 (in 2012 it decreased slightly, to 518).

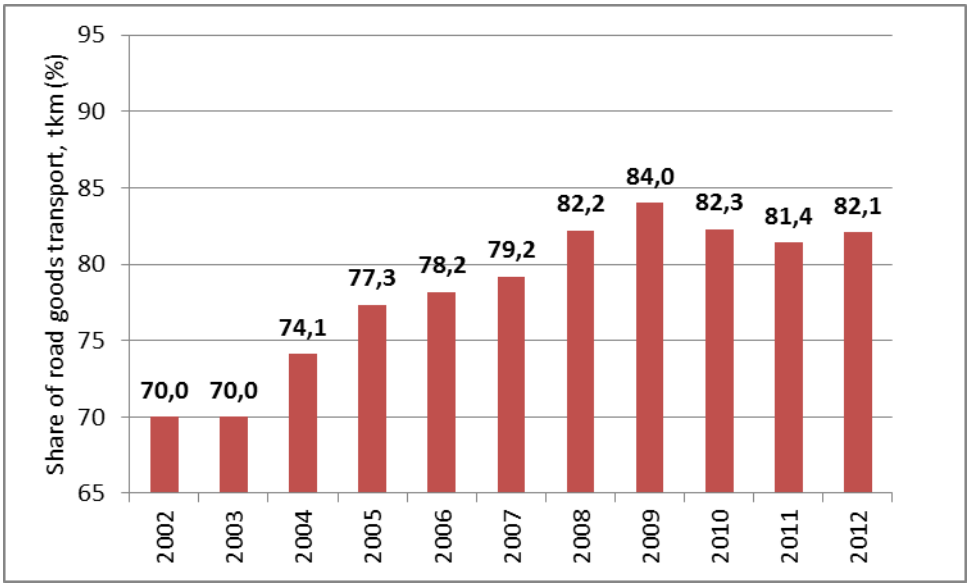
Due to low prices of motor fuels, low costs of parking and poorly developed or even cancelled lines, the number of passenger kilometres in road public transport decreased in the period 1990-2005 from 6440 to 862 mio pkm (not included private taxi and bus transportation). After 2005, the trend of decline of road public transport softened so that by 2011 its volume decreased by only 160 million pkm, to 702 million pkm (in 2012 it increased slightly to 714 million pkm). Rail transport, with the volume of 1429 mio pkm in 1990, was strongly impacted by the disintegration of Yugoslavia and subsequent economic recession and shrunk by almost two thirds. Its volume never reached previous levels again, however, it recovered slowly and in 1009 reached 840 mio pkm. After 2009 it is again decreasing quickly so that it fell in 2012 to 742 mio pkm (less than in 2002). The situation in air transport was similar to that in rail transport. Also here, a big loss of markets after Slovenia had gained independence caused a drop in its volume (in 1990 it was still 1554 mio pkm), while due to a rapid growth, particularly in in the middle of the previous decade, it reached 1349 mio pkm in 2008. In the following years it decreased sharply, reaching only 1060 mio pkm in 2012.

At the beginning of the last decade, the use of passenger cars compared with the use of public transport was approximately as frequent in Slovenia as in the EU. In after years the share of use of passenger cars increased in overall land passenger transport from 83.9% in 2002 to 86.8% in 2011.

As a consequence of the geographical position of Slovenia and openess of its economy, the high growth of goods traffic was further stimulated by the high international exchange of goods. The volume of road goods transport per person is among the highest in the EU. This is also a consequence of the favourable position of Slovenia at the crossroads of European corridorss V and X, where the traffic signifficantly increased after the last two EU enlargements. Further, with joining the EU, many administrative obstacles for driving in the EU Member States (particularly acquisition of the limited number of allowances) have been removed for Slovenian carriers. In Slovenia, a relatively small central European county, there is, as one could expect, a larger share of international and a smaller share of internal goods transport. Rapid growth of road and rail goods transport was additionally underpinned in the last decade, up to the crisis year 2009, by high economic growth, particularly in Eastern Europe. The growth of road transport in Slovenia was almost 3 times as high as the economic growth. In the period 2001-2008 the average annual GDP growth was 4.5%, while the average road goods transport growth was 12.7%; average growth of rail transport in the same period was 4.4%, almost equal to averageg GDP growth.

The share of road goods transport in the overall land goods transport in Slovenia surpassed the average share in the EU in the middle of the last decade; it was increasing until 2009 when it reached 84.0% (in 2009 the volume of rail goods transport in Slovenia shrumk more than the volume of road goods transport). In the following years this share has been around 82%.

Figure 2.14: Share of road goods transport in the overall land goods transport, tkm (%).



Source SORS[3]

Energy consumption in transport was increasing in the last decade up tu 2008. The average annual increase in the period 2001-2008 was 6.8%, with the maximum increase of 17.1% in 2008. In the "crisis year" 2009, energy consumption in transport fell sharply, and then increased slightly in 2011 and 2012 so that it reached the level 5.9% below 2008. Majority of the increase of eneergy consumption in transport before 2008 was linked to the increase in road goods transport. It was stimulated by the economic growth in Slovenia and in other countries, and it also contributed to the growth of transit goods transport across Slovenia.

A large share of road goods transport in Slovenia represents transport of foreign transporters, which is not included in the statistical data on goods transport. The analysis performed on toll stations on Slovenian motorways in 2008[4] showed that the share of foreign vehicles was about 53% of all crossings of customs stations, which is mostly transit transport. Due to the MCRS (Motorway Company in the Republic of Slovenia) data, similar counting was performed in 2012[5], on which basis it was estimated that the share of foreign trucks on Slovenian motorways increased to 68%. High increase of energy consumption in road (goods) transport[6] was additionally stimulated, up to 2008, by low motorway tolls and lower prices of motor

[3] The data on road goods transport relate only to the vehicles registered in Slovenia which can make a big share of volume in other countries; however, it does not include the transport of foreign vehicles in Slovenia. On the other hand, rail goods transport is dealt with on the basis of the territorial principle which includes the whole goods transport on the territory of a country, irrespective of the origin of the carrier. This different approach is a great deficiency of the indicator.

[4] Checked trucks in the periods 19.4.2008 -26.4.2008 and 4.5.2008-11.5.2008 crossing toll stations on the whole territory of Slovenia, MCRS 2009.

[5] Proposals of new pricing policy in the field of motorway tolls (explanation to the proposal of the new price list for tolls), MCRS 2013.

[6] Fuel consumption in a country is accounted for if the fuel was bought in that country. So energy consumption can be substantially changed even without the change of the volume of traffic in the country because lower fuel prices attract consumers from neighbouring countries, while higher prices divert consumers to countries with lower prices.

fuels, in comparison with neighbouring countries. In 2009, motorway tolls increased sharply (but are still considerably lower than in the neighbouring Austria), besides, the prices of motor fuels were relatively high in 2009 and 2010, and then, in 2011 and 2012, again relatively lower.

Greenhouse gas emissions from transport have been increasing hand in hand with the increase of energy consumption in transport and have substantially contributed to the growth of overall emissions in Slovenia in the middle of the past decade, up to 2008. Overall GHG emissions surpassed in the middle of the past decade, and were in 2008 5.9% higher than, those in the base year 1986. In 2009 emissions fell sharply and were in 2011 3.4% lower than base year emission. GHG emissions from transport sector grew much fastor from other sectors. In 2008 they were three times as high as in 1986, and only in the period 2001-2008 the grew by 54.6%. Despite the drop in 2009, transport emissions were in 2011 only 7.5% lower than in 2008 (the year before crisis). How serious problem transport emissions are shows the fact that their share in overall emissions is also growing. This share grew from 20.1% in 2001 to 29.2% in 2011.

2.8 Industry

After the declines in 2008 and 2009, the value of sales of industrial products and services decreased again in 2012 (by 2.3%). Companies generated 72% of their revenue from the sale of industrial products and services in foreign markets. Manufacturing was at the forefront, followed by electricity, gas and water supply, and mining. The highest share of the sale of industrial products and services in the area of manufacturing activities was achieved by the production of motor vehicles, trailers and semi-trailers (12.6%), followed by electrical equipment manufacturing (12.1%). The smallest share of sales in manufacturing was achieved by producers of other vehicles and vessels (0.5%), which generated most of their income in foreign markets (90.8%); they are followed by manufacturers of motor vehicles, trailers and semi-trailers (88.7%) and textile manufacturers (86%).

The growth of the scope of emission-intensive industries has again exceeded the growth in other industries since 2010. From 2000 until the onset of the economic crisis, the total production volume of emission-intensive industries grew faster than that of other manufacturing industries. This trend stopped in 2008 and 2009, especially as a result of the low output of the metal products industry. Although the growth of emission-intense manufacturing also exceeded the growth in other industries in 2011, the difference was less marked because of the slowdown in production growth. Thus the added value share of emission-intense industries in manufacturing as a whole increased further in 2011 (to 24.5%).

Energy consumption in manufacturing in 2011 was lower (by 6.1%) particularly because of the reduced energy intensity within individual industries as well as the reduction in the share of activities that consume more energy per unit of added value generated. There was a reduction in the share of the manufacture of non-metallic mineral products and the paper and rubber industry, which more than compensated for the high output and larger share of what is otherwise the most energy-intensive metal production. Consumption of final energy per added value unit decreased, especially in the 2006-2008 period (annually by 7.5% on average); the

favourable trends slowed down in 2009 and 2010 (average annual reduction by 1.6%). 2011 saw another considerable decline in the energy intensity of manufacturing.

The consumption of electricity in manufacturing and construction fell considerably in 2008 and 2009 (by 16% and 22%), especially as a result of the reduced production caused by the economic crisis. It rose in 2010 and 2011 because of the economic recovery (by 10% and 7%), but still remained lower in 2011, by 21% in comparison to 2007. Most electricity consumed in manufacturing in 2011 was consumed in metals, paper and paper products, chemicals and chemical products, non-metal mineral products, fabricated metal products, electrical equipment and rubber and plastic products manufacturing. All these industries consumed more than three quarters of all electricity consumed by manufacturing and construction.

2.9 Waste

Almost 4.4 million tonnes of waste were generated in Slovenia in 2012 or 33% less than in 2011. The large decrease is the result of the reduction in the generated construction waste and also of the reclassification of some waste into by-products. Compared to 2011, the amount of municipal waste decreased by 7% and the amount of hazardous waste by 13%. Most of the hazardous waste was generated in manufacturing, 59% of total hazardous waste.

Table 2.3: Waste in Slovenia in the years 2011 and 2012.

	2011	2012
	t	
Generated waste - total	6,051,969	4,393,995
- generated industrial non-hazardous waste	5,202,750	3,606,679
- generated municipal non-hazardous waste	717,651	666,529
- generated hazardous waste	131,568	120,787

Source: SORS

2.9.1 Municipal Waste

In 2012 a person in Slovenia generated on average 327 kg of municipal waste or almost 1 kg of municipal waste per day. This is 7% less than in 2011. As a result, public waste removal services collected 7% less municipal waste than a year before. 46% of municipal waste was separately collected, which is 6 percentage points more than in 2011.

Despite the upward trend of separate collection of municipal waste, in 2012 Slovenia still landfilled 46% of municipal waste. Most of the municipal waste was landfilled in Koroška (68%), Zasavska and Goriška (each 64%) statistical regions and the least in Savinjska (23%), Podravska (36%) and Gorenjska (40%) statistical regions.

Table 2.4: Municipal waste collected by public services in Slovenia in the years 2011 and 2012.

	2011	2012
	t	
Total	721,720	671,564
- separately collected fractions	81,346	86,937
- garden and park wastes	65,760	75,945
- other municipal wastes	487,441	407,402
- packaging waste	87,173	101,550

Source: SORS

2.9.2 Industrial Waste

In production activities around 2.8 million tonnes of waste were generated in 2012 or 32% less than in 2011, while in service activities almost 882,000 tonnes of waste were generated in 2012 or 27% less than in 2011. In 2012 the amount of construction waste decreased markedly (by 58%), followed by the amount of waste from waste management facilities (by 54%), of waste from inorganic chemical processes (by 32%) and of waste from thermal processes (by 22%).

2.9.3 Waste Management

In 2012, more than 5 million tonnes of waste were recovered (13% less than in 2011), and around 764,000 tonnes of waste were disposed (33% less than in 2011). Despite the large amount of recovered waste, 447,000 tonnes of waste were still landfilled on the landfill sites, of which 388,000 tonnes on municipal landfill sites. Compared to 2011, in 2012 the amount of landfilled waste decreased by 31%, but it is still above the EU average.

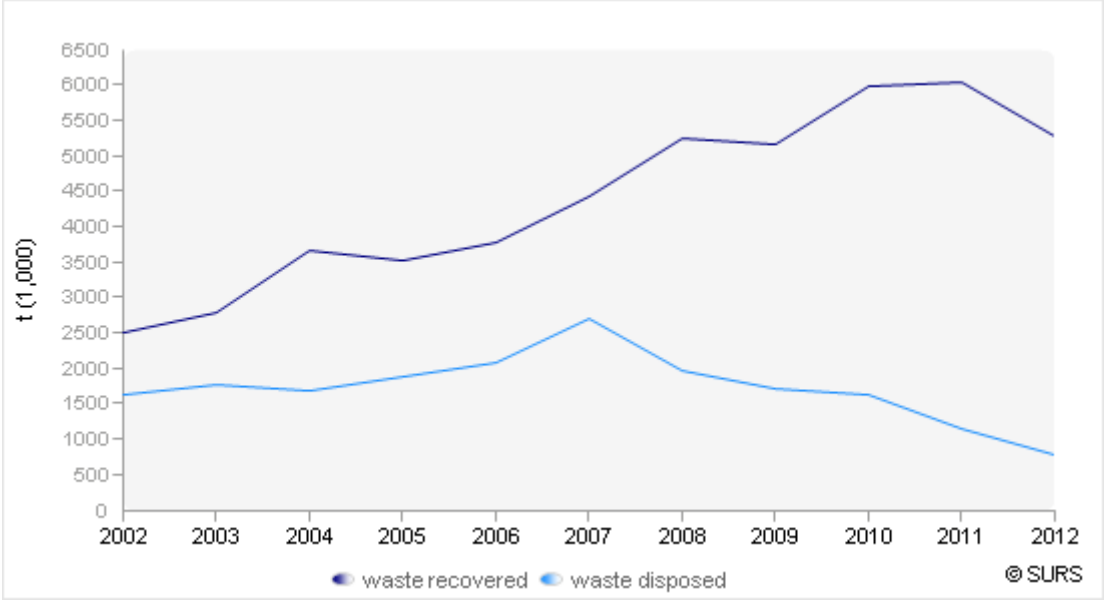
Year by year the amounts of recycled waste are increasing, but with 32% they are still under the recycling aims (50%) to be achieved by 2020.

Table 2.5: Waste treatment in Slovenia in the years 2011 and 2012.

	2011	2012
	t	
Recovered waste	6,044,391	5,256,939
Disposed waste	1,139,660	764,315
- landfilled waste	646,318	447,338
Export of waste	315,995	419,330
Import of waste	956,573	913,045

Source: SORS

Figure 2.15: Waste recovery and waste disposal in Slovenia in the period 2002-2012.

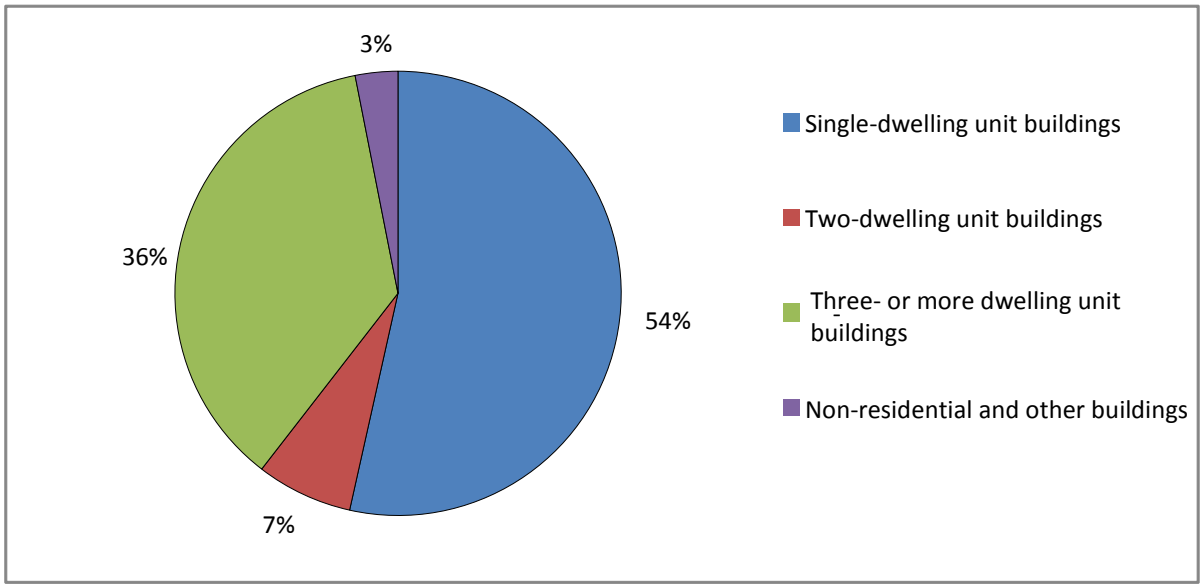


Source: SORS

2.10 Housing Stock and Urban Structure

According to the data of the register-based census of 2011, individual houses are the most common residential buildings in Slovenia, accounting for 60% of all residential floor area. In 2011, single household dwellings constituted 85% of the housing stock.

Figure 2.16: Inhabited housing according to building type in Slovenia, register-based population census 2011.



Source: SORS, Register-based Census 2011

Residential construction reached its peak in 2007 and decreased in subsequent years. In 2012, the number of residential units under construction was almost a fifth lower than in 2011 and almost a half lower than in 2007. At the same time the average size of a finished residential

unit has increased in recent years, which also spurred an increase in the average residential unit size (to 80 m^2, which is 4 m^2 more than in 2005). The average size of a finished residential unit in 2012 was 138 m2 (30 m^2 more than in 2005); the average size of a residential unit in single-dwelling unit buildings was 169 m^2, while the average size of a residential unit in multiple dwelling unit buildings was 76 m^2. Of finished residential units, 65% had four rooms or more. As in previous years, the majority of residential units finished in 2012 were obtained by new construction (99%).

Final energy consumption in households decreased in 2012 for the second year in a row (-2.1%) and, after some fluctuations in the interim period, reached the level from 2005 (+ 0.1%), which is 5.5% more than in 2000. Although the quantity of consumed final energy did not change significantly in the 2005-2012 period, its structure shifted considerably in favour of renewable sources. These largely replaced petroleum products, which represented less than a fifth of energy consumption in 2012 (a third in 2005). Although the increase in the use of renewable sources can be partly attributed to a more complete capture of data, their growth and the increased share in household consumption are confirmed by the data acquired after the introduction of statistical improvements. Such trends are probably a result of high prices of petroleum products as well as measures to promote renewable energy sources. At the same time the slower increase in the use of energy in households despite the rise in the average residential unit size could be partly attributed to the implementation of measures for more efficient energy use in buildings (additional insulation of buildings, change of windows, change of furnaces) and generally to the poor economic situation which requires the rationalisation of costs.

2.11 Agriculture and Forestry

2.11.1 Agriculture

Gross value added in agriculture amounted to EUR 387 million or 1.1% of gross domestic product in 2012; this is 0.2 of a percentage point less than in 2011.

In 2012 the value of all income categories in agriculture decreased. The main reason for the income decrease was lower value of the agricultural production due to lower volume, while the prices increased.

In 2012 the value of the agricultural production amounted to EUR 1,149 million, which is 7% lower than in 2011. The prices of agricultural products increased by 4%; the main reason for the lower production value was the 11% decrease in production volume.

Crop production in 2011 was estimated at EUR 593 million, which was 53% of agricultural production value. The crop production value decreased by 12% due to a 17% volume decrease and a 5% increase in crop product prices. The volume decreased in all fields of crop production. The main value decrease (by a third) was recorded in the field of wine, the main reason for that was the decreased quantities of grapes and the lower prices of wine. The value of fruit decreased by 24% as a result of a 30% volume decrease and an 8% price increase. The value of industrial crops decreased by 21% due to the volume decrease by 25% and the price

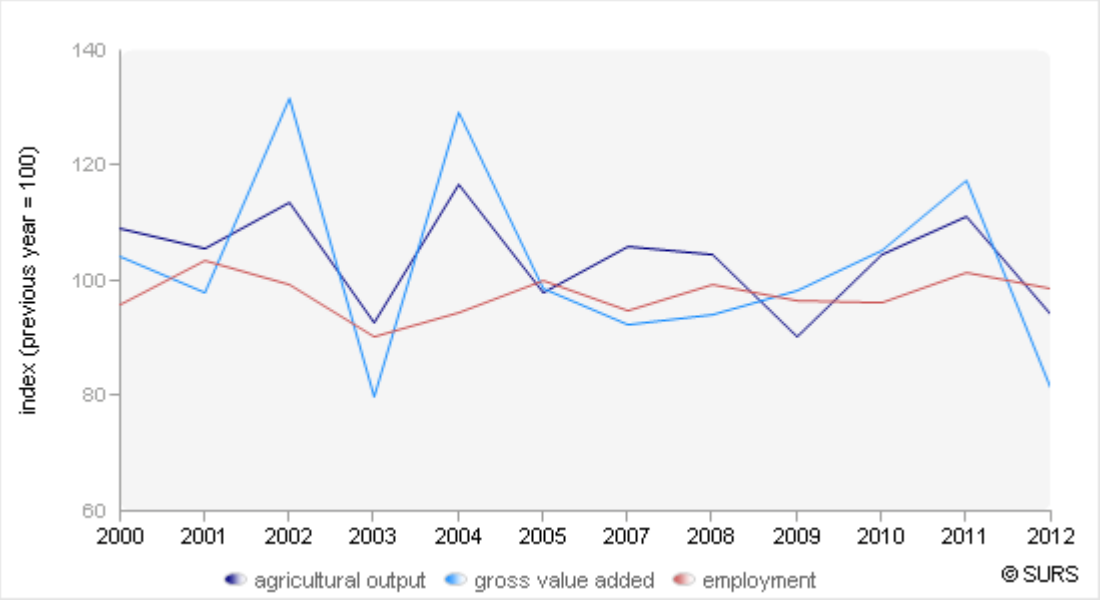
increase by 6%. The value of potatoes decreased by 18%, mainly due to an 18% volume decrease and a 1% price increase. The prices of cereals and vegetables increased by 9%, while the volume of both products decreased by 4% in comparison with the previous year.

Animal output for 2012 was estimated at EUR 535 million, the share of animal output in agricultural output was 44%. The value of the animal production, as well as the value of animals, remained at the previous year level due to a 3% volume decrease and a 3% price increase. Animal output was influenced by the loss of the direct support to cattle production, which amounted to EUR 11.2 million in 2011. The value of animal products decreased by 2% due to a 2% price increase and a 3% volume decrease.

The value of the intermediate consumption of EUR 762 million increased by 1% over the previous year. The main reason for the increase was the price increase by 6% and the volume decrease by 5%. The prices of fuels (by 9%), feeding stuffs (by 8%) and fertilisers (by 6%) increased the most in 2012.

In 2012, 76,708 employees were involved in the agricultural production, which was 2% less than in 2011. Most of them were self-employed (67,969 or 2% less than in the previous year). Besides the self-employed, 8,739 paid employees were also involved in the agricultural production. In comparison with the previous year that is an increase by 2%.

Figure 2.17: Agricultural output, gross value added and employment, Slovenia



Source: SORS

2.11.2 Organic Farming

Utilised agricultural area with organic farming increased in 2012 by almost 3,000 hectares compared to 2011.

The number of agricultural holdings in the system of control and certification was in 2012 by just over 13% higher than in 2011, while the number of new agricultural holdings in the

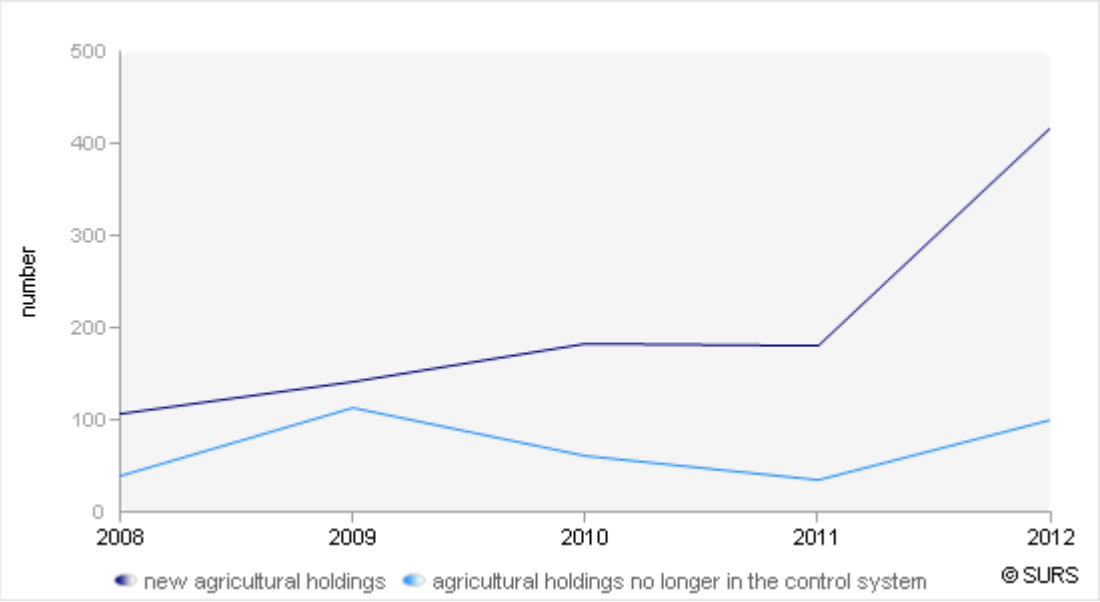
system grew from 179 in 2011 to 417. Municipalities Koper and Piran have the highest number of new agricultural holdings. However, each year there is a certain number of agricultural holdings that are no longer in the system. In 2012 there were 98 such agricultural holdings. The number of agricultural holdings that abandoned the system was the closest to the number of newcomers in 2009.

Utilised agricultural area with organic farming increased in 2012 by more than 9%. Of all land use categories only olive groves increased substantially, by 100%. They represented 21% of all olive groves, but in any case these areas are small compared to other land use categories. They are followed by permanent grassland and orchards with 11% share of the total area in each land use category. Arable land with organic farming represented just over 2% of the total area of arable land.

The largest share within utilised agricultural area with organic farming in 2012 remained more or less the same as in 2011. The largest share remains in the category grassland (85%). Arable land represented almost 11%, orchards represented slightly less than 3%, and the remaining land use categories occupied less than 1% each. Olive groves, the area of which doubled in 2012, still occupy only half a per cent of total organic farming area.

The biggest growth in organic farming in 2012 was in poultry farming, by 78%, followed by fish with 64% and rabbits with 38%. After the growth by 22% in 2011, the number of beehives decreased by 3% in 2012. The number of cattle and sheep remained more or less the same.

Figure 2.18: Agricultural holdings in the organic farming control system, Slovenia.



Sources: Ministry of Agriculture and the Environment, SORS

2.11.3 Forestry

In the period between 2003 and 2012 the share of gross value added of forestry in gross domestic product of Slovenia was below 1%. After 2003, when it reached 0,4% of GDP, it was slowly increasing. In 2012 it reached the highest value so far, i.e. 0,7% of GDP.

The forestry goods output accounted for the majority share in the whole output of forestry industry during the 2003-2012 period (93% in 2012), the remaining share was that of forestry services output. The value of forestry goods output increased by more than 2 times from 2003 to 2012 and it amounted to EUR 341 million in 2012.

The value of intermediate consumption increased during 2003-2012 period and reached the maximum value of EUR 135 million in 2012, which is almost two times as much as in 2003 (EUR 69 million). In the total value of intermediate counsumption, the value of standing timber dominated (EUR 81 million in 2012).

3 GREENHOUSE GAS INVENTORY INFORMATION

3.1 Summary Tables

CRF Summary tables for the period 1986-2011 and CRF trend tables can be found at:

http://unfccc.int/national_reports/annex_i_ghg_inventories/national_inventories_submissions/items/7383.php

then choose Slovenia, CRF (14 May 2013), tables SVN-2013-2011-v1.6.xls.

3.2 Descriptive Summary

The total emissions of GHG in 2011, sinks not considered, amounted to 19,509.38 kt CO_2 eq, which represents a 3.4% decrease of emissions compared to the year 1986 and 4.0% decrease compared to the base year emissions. In the period 1986-1991, a reduction of emissions was recorded due to the economic conditions at that time and the Republic of Slovenia gaining its independence. In the late 1990s, the Slovenian economy faced a variety of shocks caused by the transformation of political and economic systems. The crisis was intensified by the loss of former Yugoslav markets. All this resulted in a fall in GDP, a fall in the employment rate and investments. As early as 1993, the Slovenian economy began to revive, on average exceeding an annual growth rate of 4% between 1993 and 2000. Consequently, in the period 1992–1997, a strong increase in emissions was recorded. In the second half of that period, the increased emissions were a consequence of "gasoline tourism" (25% of the total sale of motor fuels in the Republic of Slovenia), since the prices of motor fuels in the Republic of Slovenia were appreciably lower than in the neighbouring countries.

In the period 1998-1999, emission decreased due to the measures undertaken by the neighbouring countries to curb the "gasoline tourism" and due to the increased supply of electricity from the Krško Nuclear Power Plant. In the period 2000-2002 emission kept increasing again due to the renewal of obligatory export of electricity from the Krško Nuclear Power Plant to the Republic of Croatia. After joining the EU in 2004 and after acceptance of Romania and Bulgaria into EU in 2007, emissions from road transport have increased drastically and has prevailed over decrease in other sectors which have happened due to the policies and measures in manufacturing industry, agriculture and waste sector.

Due to the global financial crisis in 2009 emissions from the manufacturing industries started to decrease and consequently also from freight transport. In 2010 and 2011 emissions stayed almost the same as in 2009.

Table 3.1: GHG emissions and removals in Slovenia by sector and sub-sector, 1986–2011.

GHG SOURCE AND SINK CATEGORIES	1986	1990	1995	2000	2005	2010	2011	Change (%)
TOTAL net emissions (with LULUCF) in Gg CO_2 eq	**11,011**	**9,387**	**9,559**	**9,019**	**10,536**	**9,830**	**9,891**	**-11.4**
1. Energy	**16,103**	**14,416**	**14,919**	**15,058**	**16,197**	**15,966**	**15,983**	**-0.7**
A. Fuel Combustion	15,567	13,957	14,506	14,684	15,827	15,607	15,619	**0.3**
1. Energy Industries	6,729	6,265	5,627	5,498	6,325	6,214	6,259	**-7.0**
2. Manufacturing Industries and Construction	4,404	3,119	2,615	2,269	2,486	1,900	1,704	**-61.3**
3. Transport	2,025	2,730	3,824	3,862	4,428	5,265	5,699	**181.4**
4. Other Sectors	2,367	1,811	2,439	3,053	2,585	2,226	1,954	**-17.5**
5. Other	41	32	1	3	3	3	3	**-91.9**
B. Fugitive Emissions from Fuels	536	459	413	374	370	359	364	**-32.0**
1. Solid Fuels	479	401	358	331	337	330	335	**-30.0**
2. Oil and Natural Gas	57	58	55	43	33	29	29	**-49.0**
2. Industrial Processes	**1,317**	**1,318**	**1,002**	**1,063**	**1,373**	**980**	**1.014**	**-23.0**
A. Mineral Products	795	725	609	682	761	629	585	**-26.3**
B. Chemical Industry	49	40	31	33	52	5	1	**-97.6**
C. Metal Production	463	542	318	291	408	123	194	**-58.1**
D. Other Production	NA	NA	NA	NA	NA	NA	NA	NA
E. Production of Halocarbons and SF_6	NA.NO	NA.NO	NA.NO	NA.NO	NA.NO	NA.NO	NA.NO	NA.NO
F. Consumption of Halocarbons and SF_6	10	10	44	57	152	224	234	**2,181.9**
G. Other	NA	NA	NA	NA	NA	NA	NA	NA
3. Solvent and Other Product Use	**82**	**43**	**17**	**43**	**43**	30	49	**-39.8**
4. Agriculture	**2,211**	**2,134**	**2,042**	**2,133**	**2,003**	**1,955**	**1,901**	**-14.0**
A. Enteric Fermentation	676	652	644	692	660	666	653	**-3.4**
B. Manure Management	741	734	636	629	594	563	538	**-27.3**
C. Rice Cultivation	NO	NO	NO	NO	NO	NO	NO	**NO**
D. Agricultural Soils	794	748	762	813	749	726	709	**-10.6**
E. Prescribed Burning of Savannas	NO	NO	NO	NO	NO	NO	NO	NO
F. Field Burning of Agricultural Residues	NO	NO	NO	NO	NO	NO	NO	NO
G. Other	NA	NA	NA	NA	NA	NA	NA	NA

GHG SOURCE AND SINK CATEGORIES	1986	1990	1995	2000	2005	2010	2011	Change (%)
5. Land Use, Land-Use Change and Forestry (LULUCF)	**-9,193**	**-9,056**	**-8,971**	**-9,901**	**-9,773**	**-9,652**	**-9,619**	**4.63**
A. Forest Land	-10,809	-10,796	-10,866	-11,952	-11,992	-12,040	-12,041	**11.4**
B. Cropland	377	386	397	407	419	431	433	**14.9**
C. Grassland	197	264	348	432	524	615	633	**221.4**
D. Wetlands	138	141	145	149	153	157	158	**14.5**
E. Settlements	625	643	666	689	714	739	745	**19.2**
F. Other Land	278	306	340	374	410	446	453	**62.8**
G. Other	NE	NE	NE	NE	NE	NE	NE	NE
6. Waste	**491**	**532**	**549**	**623**	**692**	**550**	**562**	**14.6**
A. Solid Waste Disposal on Land	299	345	376	439	486	356	366	**22.6**
B. Waste-water Handling	192	186	172	182	225	223	227	**-0.7**
C. Waste Incineration	NO	1	0	2	2	5	5	**NA**
D. Other	NA	NA	NA	NA	NA	NA	NA	NA
7. Other	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**
Memo Items:								
International Bunkers	**58**	**48**	**57**	**68**	**61**	**141**	**188**	**226.0**
Aviation	58	48	57	68	61	74	70	**21.5**
Marine	NA	NA	NA	NA	77	67	118	**NA**
Multilateral Operations	**NA**	**NA**	**NA**	**1**	**0**	0	0	**NA**
CO_2 Emissions from Biomass	**2,254**	**2,088**	**2,036**	**1,897**	**2,299**	2,808	2,548	**13.1**
Total CO_2 Equivalent Emissions with LULUCF	**11,011**	**9,387**	**9,559**	**9,019**	**10,536**	**9,830**	**9,891**	**-16.7**
Total CO_2 Equivalent Emissions without LULUCF	**20,204**	**18,443**	**18,529**	**18,920**	**20,309**	**19,482**	**19,509**	**-3.4**

3.2.1 Description and Interpretation of Emission Trends by Gas

CO_2 emissions in 2011 represented 82.9% of overall emissions of greenhouse gases. CO_2 emissions excluding LULUCF followed the consumption of energy and with regard to their fraction exerted a major influence on total emissions. Compared to 1986 in 2011 they decreased by 1.1%. CH_4 emissions represented 10.1% of total emissions in 2011 (10.8% in 1986) and were lower than in 1986 by 9.5%. N_2O emissions represented 5.7% of total emissions and were lower than N_2O emissions in 1986 by 20.5%. F-gases represented 1.3% of total emissions and some (HFCs and SF_6) have shown significant increases since 1995 (base year for F-gases) while PFCs decreased drastically in the same period.

Tabela 3.2: GHG emissions by gas.

GREENHOUSE GAS EMISSIONS	1986	1990	1995	2000	2005	2010	2011	Change from 1986 to 2011
	CO_2 eq (Gg)	CO_2 eq (Gg)	CO_2 eq (Gg)	CO_2 eq (Gg)	CO_2 eq (Gg)	CO_2 eq (Gg)	CO_2 eq (Gg)	(%)
CO_2 emissions including net CO_2 from LULUCF	7,162	5,731	6,039	5,311	6,920	6,484	6,558	-8.45
CO_2 emissions excluding net CO_2 from LULUCF	16,356	14,792	15,011	15,213	16,694	16,136	16,178	-1.09
CH_4 emissions including net CH_4 from LULUCF	2,174	2,123	2,044	2,119	2,140	1,998	1,967	-9.48
CH_4 emissions excluding net CH_4 from LULUCF	2,174	2,118	2,043	2,118	2,139	1,998	1,966	-9.54
N_2O emissions including net N_2O from LULUCF	1,388	1,266	1,325	1,426	1,191	1,110	1,103	-20.51
N_2O emissions excluding net N_2O from LULUCF	1,388	1,265	1,325	1,426	1,191	1,110	1,103	-20.52
HFCs	NA,NO	NA,NO	32	41	133	207	217	100.00
PFCs	276	257	106	106	133	14	29	-89.64
SF_6	10	10	13	16	19	17	17	61.53
Total including LULUCF	**11,011**	**9,387**	**9,559**	**9,019**	**10,536**	**9,830**	**9,891**	**-10.17**
Total excluding LULUCF)	**20,204**	**18,443**	**18,529**	**18,920**	**20,309**	**19,482**	**19,509**	**-3.44**

Carbon dioxide – CO_2

CO_2 emissions in the period 1986–2011 arise mostly from Energy sector and may be split into five time periods. In the first period, 1986–1991, emissions decreased due to a reduction in industrial production and the war for independence in 1991. Emissions rose strongly in the 1991–1997 period, when emissions also increased due to gasoline tourism. Then came a short period of emission reduction as a consequence of a reduction in gasoline tourism and decreased consumption of fossil fuels for the production of electricity. After 1999, emissions again rose, mainly as a consequence of the production of electrical energy. CO_2 emissions in 2002 thus amounted to 16.28 Mt of CO_2, which is nearly the same as in the 1986 base year. In 2003, CO_2 emissions decreased by 1.5% (mainly due to lower emissions from Energy Industries); in 2004 a period of constant increase started (in 2004 by 2.2%, in 2005 by 1.8%, in 2006 by 1.1%, in 2007 by 0.8% and in 2008 by as much as 5.7%), mainly due to transport.

In 2009, CO_2 emissions decreased due to global financial crisis by 10.6% while in 2010 stayed almost the same (0.2% increase). In 2011 the emissions further increased by 0,3%. In entire period of time, the strongest increase of CO_2 emissions was in transport, by as much as 181%, from 2.0 Mt CO_2 eq in 1986 to 5.7 Mt CO_2 eq in 2011.

The Industrial Processes sector contributed 4.6% to total CO_2 emissions in 2011, while contributions of other sectors are negligible. The LULUCF sector represents sink for CO_2 emissions, in the 1986-2011 the level of sinks was rather constant and amounted to nearly half of CO_2 emissions.

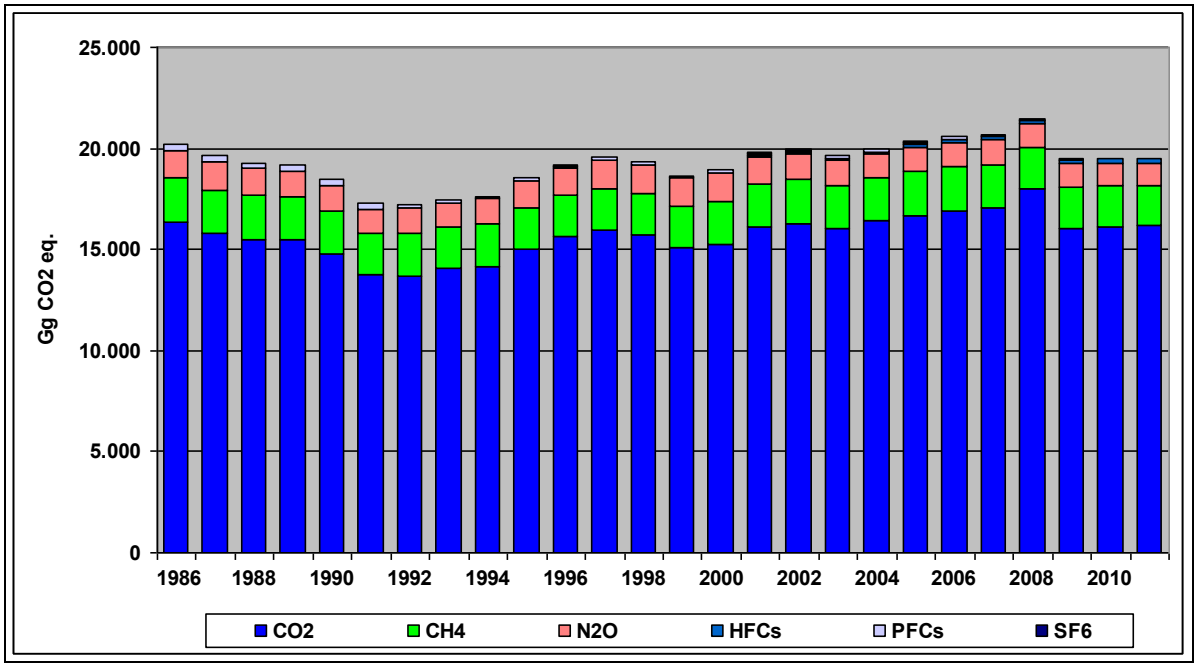
Methane – CH_4

Between 1986 and 2011, methane emissions decreased slightly, from 2.174 Mt CO_2 eq in 1986 to 1.966 Mt CO_2 eq in 2011. CH_4 emissions decreased by 8.5% in spite of increased emissions from solid waste (by 22.6%, compared to 1986). The larger contribution to decrease came mainly from agriculture (-7%) and energy sector (-31%).

Nitrous oxide – N_2O

N_2O emissions were down from 1.388 Mt CO_2 eq in 1986 to 1.103 Mt CO_2 eq in 2011. In Agriculture, which is the main source of N_2O, emissions diminished chiefly due to fewer animals and less crop production, particularly legumes and N-fixing plants. This reduction was partly due to a changed way of manure storage, since the fraction of straw-based systems was diminishing on account of the increasing use of slatted floors.

Figure 3.1: GHG emissions by gas.



Hydro-fluorocarbons – HFC

HFC emissions have grown from year to year. In 2011, emissions increased by 4.3% compared to the previous year, which was mostly the consequence of an increasing amount of HFC in refrigeration and AC sector.

Per-fluorocarbons – PFC

The only source of PFCs in Slovenia is the primary production of aluminium. Improving the technology of aluminium production since 1992 has more than halved the then emissions, which diminished from 276 kt CO_2 eq in 1986 to 106 kt in 1995 base year and finally to 21 kt in 2008. In 2009, emissions further decreased to as low as 7 kt CO_2 eq due to reduction in the aluminium production, while in 2011 increased to the level before crises.

Sulphur-hexafluoride – SF_6

The only source of SF_6 emissions is high-voltage gas-insulated switchgear and circuit breakers. SF_6 emissions represent only 0.1% of total GHG emissions.

3.2.2 Description and Interpretation of Emission Trends by Source

According to the UNFCCC Reporting Guidelines, emissions estimates are grouped into six IPCC categories: Energy, Industrial Processes, Solvent Use, Agriculture, Land Use, Land-Use Change and Forestry (LULUCF), and Waste.

Table 3.3: GHG emissions and removals by sector, 1986–2011

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	1986	1990	1995	2000	2005	2010	2011	Change from 1986 to 2011
	CO_2 eq (Gg)	CO_2 eq (Gg)	CO_2 eq (Gg)	CO_2 eq (Gg)	CO_2 eq (Gg)	CO_2 eq (Gg)	CO_2 eq (Gg)	(%)
1. Energy	16,103	14,416	14,919	15,058	16,197	15,966	15,983	-0.75
2. Industrial Processes	1,317	1,318	1,002	1,063	1,373	980	1,014	-22.98
3. Solvent and Other Product Use	82	43	17	43	43	30	49	-39,82
4. Agriculture	2,211	2,134	2,042	2,133	2,003	1,955	1,901	-14.03
5. Land Use, Land-Use Change and Forestry	-9,193	-9,056	-8,971	-9,901	-9,773	-9,652	-9,619	4.63
6. Waste	491	532	549	623	692	550	562	14.57
7. Other	NA	NA	NA	NA	NA	NA	NA	NA
Total (including LULUCF)	**11,011**	**9,387**	**9,559**	**9,019**	**10,536**	**9,830**	**9,891**	**-10.17**
Total (excluding net CO_2 from LULUCF)	**20,204**	**18,443**	**18,529**	**18,920**	**20,309**	**19,482**	**19,509**	**-3.44**

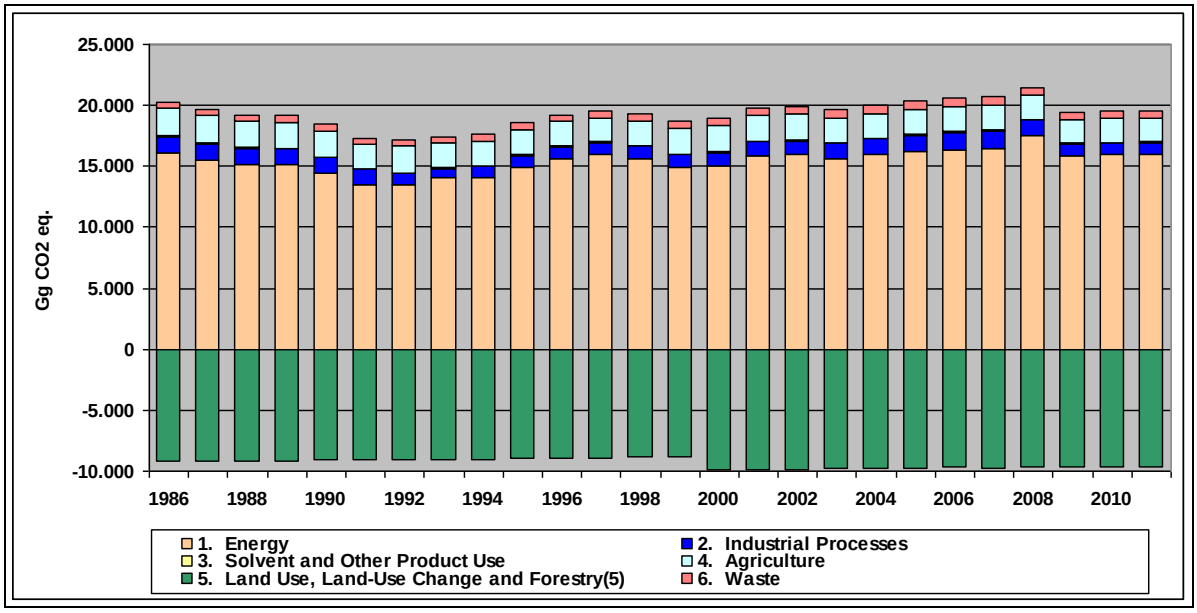
By far the most important sector is Energy, which in 2011 accounted for 81.9% of total GHG emissions. In this sector emissions have decreased by 0.7%, compared to the 1986. Within

this sector, in the period 1986–2011, GHG emissions from the Energy Industry, as the biggest sub-sector, decreased by 7.0%. In the most recent period, 1999–2007, steep growth (+27%) has been recorded due to the increased consumption of electrical energy, since then emissions are more constant due to the financial crisis and incising use of biomass. Undoubtedly the greatest increase in GHG emissions has been in the transport sector, by as much as 202% until 2008, due to an increase in road transportation, while emissions from other kinds of traffic have slightly declined. In 2009 GHG emissions from transport decreased by 13.2% compared to 2008 and decreased further by 1.2% in 2010 but increased again in 2011 by 8.2%. There was an appreciable reduction of GHGs from industry between 1986 and 2000 (-52%). After 2000 a stabilisation of emissions has been observed until 2008. Due to the global financial crisis emissions from Manufacturing industry and construction decreased in the period 2008-2011 by 26%.

Emissions from Industrial Processes in 2011 amounted to 1014 Gg CO_2 eq, which represents 5.2% of all emissions. Since 1986, GHG emissions from this sector at first fell sharply to reach their lowest value in 1993, but then started to rise again until 2007 when they were 10% higher than in 1986. Due to the global financial crises and lower industrial production emissions started to decrease already in 2008 but more in 2009 when they were 28.7% below the 1986 level. In 2010 and 2011 emissions stayed almost the same; in 2011 they were 23% lower than in 1986. The most important GHG of this sector was carbon dioxide, with 74.1% of emissions, followed by HFCs with 21.4%, PFCs with 2.8%, and SF_6 with 1.6%. In this sector N_2O emissions have not occurred since 2006 and CH_4 emissions have not occurred since 2010. The main source is Mineral Production, of which the production of cement and lime alone contributed almost a half of the emissions in this sector.

The Solvent and Other Product Use sector represents 0.3% of total emissions. Emissions in this sector have been reduced from 82 kt CO_2 eq to 49 kt CO_2 eq, only from N_2O emissions.

Figure 3.2: GHG emissions by sector



In Agriculture as the second most important sector, emissions in 2011 amounted to 1901 Gg CO_2 eq, which represents 9.7% of all emissions. Agriculture is the main source of CH_4 and N_2O emissions, namely 53.8% of all methane emissions and 76.4% of all N_2O emissions. In the agricultural sector, N_2O emissions account for 44.4% of emissions, and CH_4 emissions account for 55.6% of emissions.

GHG emissions from agriculture show small oscillations for individual years, but the general trend is on the decrease. In 2011, emissions were 14.0% below the base year. The most important sub-sector is agricultural soils, which contributed 37.3% of all emissions from agriculture, followed by emissions from enteric fermentation, with 34.4%; the rest was contributed by emissions of methane and N_2O from animal manure (28.3%).

In the LULUCF sector, the CO_2 sink was estimated in 2011 at 9,619 Gg CO_2 eq, which is 4.6% more than in 1986. The increase in sinks was primarily the result of an increase in timber growing stock in existing forests.

Methane emissions from the Waste sector are the second largest source of methane and represented 25.2% of all methane emissions in Slovenia in 2011. The share of methane emissions in this sector amounts to 88.3%, while the remaining part represents N_2O (10.7%), and CO_2 (0.9%). Solid waste handling contributed 65.1% to the total emissions from this sector, wastewater handling 33.9% and incineration of waste 0.9%. Compared to the base year, emissions have risen by 14.6%, which is mostly due to emissions from SWDSs, which show an increase of 22.6%. The increase in emissions from this source was mainly a consequence of the increase in the amount of disposed municipal waste in the past and the application of the FOD method for calculating emissions. Emissions from wastewaters were lower than in the base year by 0.7%, which was mostly due to recovery of gas in wastewater treatment plants and the decrease in industrial production.

3.3 National Inventory System

3.3.1 National Entity

In accordance with Slovenian legislation, the Environmental Agency of the Republic of Slovenia is charged with the overall coordination of activities necessary for the development of emission inventories, as well as with implementing inventories for the purpose of reporting to the UNFCCC and the European Commission.

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3.3.2 Description of Institutional Arrangements for Inventory Preparation

In Slovenia, the institution responsible for GHG inventories is the Environmental Agency of the Republic of Slovenia. In accordance with its tasks and obligations to international institutions, the Environmental Agency is charged with making inventories of GHG emissions, as well as emissions that are defined in the Convention on Long Range Transboundary Air Pollution. In making the inventories, the Environmental Agency cooperates with numerous other institutions and administrative bodies which relay the necessary activity data and other necessary data for the inventories.

Table 3.4: Inventory Institutional Arrangements and Data Sources

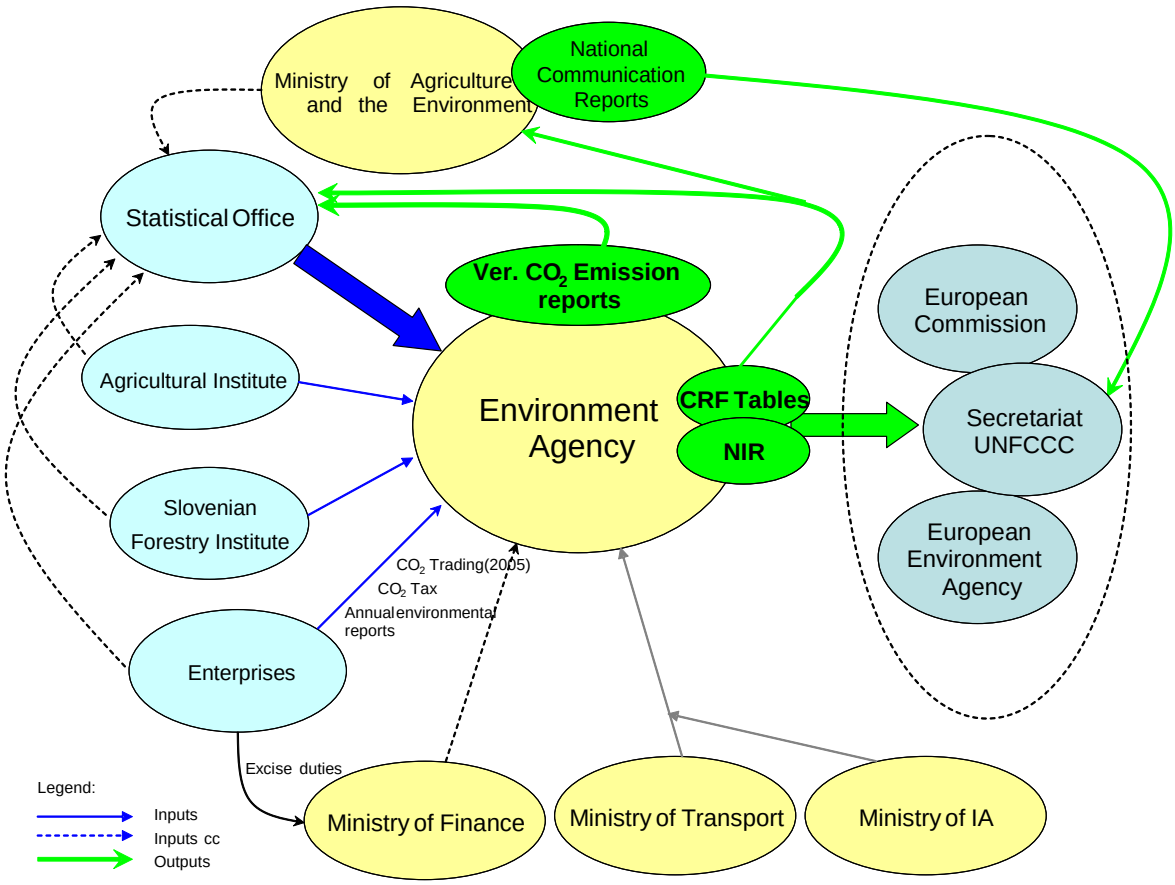
IPCC category	IPCC sub-category	Sources of data
CRF 1 A – Energy - Fuel Combustion	CRF 1A1 - Energy Industry	• Statistical Office of the Republic of Slovenia: Joint Questionnaires, Energy Balances, annual energy statistics • Slovenian Environment Agency: ETS data
	CRF 1A2 - Manufacturing Industries and Construction	• Statistical Office of the Republic of Slovenia: Joint Questionnaires, Energy Balances, annual energy statistics • Slovenian Environment Agency: ETS data
	CRF 1A3 – Transport	• Statistical Office of the Republic of Slovenia: Joint Questionnaires, Energy balances • Ministry of Infrastructure and Spatial Planning, Directorate for National Roads (DRSC) • Ministry of the Interior (vehicle stock)
	CRF 1A4 – Other Sectors	• Statistical Office of the Republic of Slovenia:
CRF 1 B – Fugitive Emissions from Fuels		• Statistical Office of the Republic of Slovenia: • natural gas distributors
CRF 2 – Industrial Processes	CRF 2A – Mineral Products	• Statistical Office of the Republic of Slovenia: • Slovenian Environment Agency: ETS data
	CRF 2B – Chemical Industry	• Statistical Office of the Republic of Slovenia: • Slovenian Environment Agency
	CRF 2C – Metal Production	• Statistical Office of the Republic of Slovenia: • Slovenian Environment Agency: ETS data
	CRF 2D – Other Production	• Statistical Office of the Republic of Slovenia: • Slovenian Environment Agency
	CRF 2F – Consumption of Halocarbons and SF_6	• Slovenian Environment Agency
CRF 3 – Solvent and Other Product Use		• Statistical Office of the Republic of Slovenia • Slovenian Environment Agency
CRF 4 – Agriculture		• Statistical Office of the Republic of Slovenia • Agricultural Institute of Slovenia
CRF 5 – LULUCF		• Slovenian Forestry Institute
CRF 6 – Waste	CRF 6A – Solid Waste Disposal on Land and & 6C Waste incineration	• Slovenian Environment Agency
	CRF 6B – Wastewater Handling	• Slovenian Environment Agency • Statistical Office of the Republic of Slovenia

The chief sources of data are the Statistical Office of the Republic of Slovenia (SORS); however, the Slovenian Environmental Agency obtains much of its data through other activities which it performs under the Environmental Protection Act. Emissions from Agriculture are calculated in cooperation with the Slovenian Agriculture Institute (KIS), and sinks in the LULUCF sector are calculated by the Slovenian Forestry Institute (GIS).

3.3.3 Brief Description of the Process of Inventory Preparation

Owing to the ever-increasing obligations of Slovenia with regard to reporting, the Environmental Agency of the Republic of Slovenia has decided to implement a unified system of data collection for the purposes of making inventories, as well as secure reliable financing in accordance with the annual program of its work. The ability to fulfil its obligations with regard to reporting was also improved by the participation of Environmental Agency in the GEF project "Capacity building for improving GHG inventories", which ended in June 2006.

Figure 3.3: Data flow in the Slovenian National Inventory System



A Memorandum of Understanding has been concluded with institutions that participate in inventory preparation, binding these institutions to submit quality and verified data to the Slovenian Environmental Agency in due time, because the time limits for inventories and the

NIR have shortened with the entry of Slovenia into the EU, since inventories and part of the NIR for the year before last must be made by 15 January, and with corrections and final submission of the NIR by 15 March. In view of this, an agreement has been reached with the participating institutions to shorten the time limits for submitting data. For reasons of complexity, attention was mostly focused on the Joint Questionnaires of the Statistical Office of the Republic of Slovenia, on the basis of which the Statistical Office produces the Energy Balance of the Republic of Slovenia, wherein the most important data on the energy sector are to be found.

The year 2003 saw the end of the process of harmonisation of data collection among the Directorate of Energy, Ministry of Environment, and the Statistical Office of the Republic of Slovenia. An end was put to previous parallel double collecting of data. The competence of collecting data has, by law, passed to the Statistical Office of the Republic of Slovenia, which checks the data and eliminates potential reporting errors, and submits consolidated data to the Directorate of Energy, which has been publishing data until 2005 in its Energy Yearbook of the Republic of Slovenia. In terms of content, the data were identical to those submitted in the Joint Questionnaires to the IEA.

At the beginning of 2007, the agreement between Statistical Office of the Republic of Slovenia and the Environmental Agency came into force. Accordingly, all statistical data which are necessary for preparing GHG inventories are available each year by October 30 at the latest. In exchange, ETS data and emission estimates are reported to the Statistical Office within a defined time frame.

Experts from the Slovenian Forestry Institute and the Agricultural Institute of Slovenia work on GHG inventories according to the standing rules of institutes (ordinance). Financing is assured by governmental institutions according to the yearly work plan. All data from external institutions are submitted to the Slovenian Environmental Agency, where they are archived. The detailed process from gathering data to emissions calculation and reporting is described in our Manual of Procedures, which was prepared in 2005 and has been further updated when needed. The QA/QC plan as part of the Manual was developed and mostly implemented in 2009.

For submitting reports to different institutions, various report formats have been devised, since the same data are used to report to the UNFCCC, EEA, EC, and CLRTAP. All external reports of the Slovenian Environment Agency are prepared in accordance with ISO 9001 via the Agency's reporting service, which keeps inventories of reports. Parallel to this, emissions data are submitted to the Statistical Office of the Republic of Slovenia, which makes this data available in its publications and submits them to EUROSTAT and the IEA.

In 2006 we have started to develop a joint database for GHGs and other pollutants: ISEE – Information system for emission inventories. In broad terms the application is completed and operational since 2011, but it is still necessary to conduct regular maintenance and improvements. The database contains activity data, emission factors and other parameters together with a description of sources from 1980 on for other pollutants, and from 1986 on for GHG emissions. It contains equations necessary for calculation of emissions and enables a

direct bulk import into the CRF Reporter.

Inventories of GHG emissions were presented on the basis of the IPCC (IPCC 1996, GPG 2000) methodology for all gases and sectors. Due to the importance of the source and accessibility of data, different approaches (tiers) from within the IPCC methodology were used.

In energy sector a national/plant specific CO_2 emission factors were used for assessment of emissions from coal and natural gas (Tier 2), while for other fuels, default IPCC emission factors were mainly used. The quantities of fuels and consumed fuel energy values were taken from the Statistical Office of the Republic of Slovenia. Additional data on the energy use of different types of waste (mostly waste tyres, oils and solvents) were acquired from verified ETS reports. Data on fuel consumption in agriculture and forestry refer to mobile sources only. GHG emissions in road transport were determined with the COPERT 4 model.

Emission factors for fugitive emissions of CO_2 and CH_4 in mining activities were determined on the basis of measurements of methane concentrations in ventilation shafts in mines and estimated quantities of released methane. The emission factor that was determined in this manner was lower than the default IPCC emission factor. CO_2 emissions in post-mining activities were not assessed, as no estimation method is available. The regional default IPCC emission factor for transmission and distribution of natural gas does not correspond to the conditions in Slovenia; consequently, in calculating CH_4 emissions from the distribution of natural gas, data from the companies that manage the distribution and transportation network were used. Losses were estimated according to the length of individual types of transmission or distribution pipelines with regard to the pipe type, applying specific losses per unit of length, as presented in the German Inventory, and this appears to be a sensible solution considering the level of maintenance and low average age of the distribution network.

Emissions from industrial processes were mostly determined on the basis of statistical data on production and consumption of raw materials and by applying country-specific emission factors. After 1997, the Statistical Office of the Republic of Slovenia partly changed the manner of collecting and presenting these data, and therefore most of the data were obtained directly from individual companies. These data have also been used for preparing our National Allocation Plan for the EU-ETS. Since 2005, data from verified reports have mostly been used. In some cases (aluminium and ferroalloy production), the plant data still have to be obtained. Emissions from primary aluminium production were estimated from anode consumption and from PFC emissions, which were determined on the basis of the number and duration of anode effects. In determining actual emissions caused by the use of HFCs, data were obtained from companies that use or sell these materials, as well as data on the export and import of refrigerators. For SF_6 emissions, the release of this gas from gas-insulated switchgear in the Energy sector was assessed.

Emissions from the consumption of solvents and diluents consisted only of N_2O, which arises from evaporation during the use of N_2O, mostly for anaesthesia.

In agriculture, methane emissions from enteric fermentation and manure management in bovine animals were determined using Tier 2 approach and the Tier 1 approach was used for other animals that represent a smaller fraction in methane emissions. Input data for N_2O emissions from manure handling and from indirect emissions from fertilisation with animal fertilisers were obtained in the process of estimating methane emissions. For N_2O emissions, default IPCC factors for determining the conversion of nitrogen into N_2O were used.

In 2013 emissions and removals from the LULUCF sector have been calculated for all types of land use for the first time. Reported calculations are based on the Good Practice Guidance for Land Use, Land-Use Change and Forestry (IPCC 2003) completed by country-specific methodologies. The land areas are represented by geographically explicit land-use data with a resolution of 0.25 ha. Study of land use by Slovenian Forestry institute enables to calculate spatially explicit land-use change matrices.

Methane emissions from solid waste handling were determined by the FOD method, which takes into account the time dynamics of methane release. Emissions of CH_4 and N_2O from wastewater were calculated with default method as well as GHG emissions from waste incineration.

Table 3.5: Summary report for methods and emission factor used

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	CO_2		CH_4		N_2O		HFCs		PFCs		SF_6	
	Method applied	Emission factor	Method applied	Emission factor	Method applied	Emission factor	Method applied	Emission factor	Method applied	Emission factor	Method applied	Emission factor
1. Energy	**M,T1**	**CS,D, M**	**M,T1**	**CS,D,M**	**M,T1**	**CS,D,M**						
A. Fuel Combustion	M,T1	CS,D	M,T1	CS,D	M,T1	CS,D						
1. Energy Industries	T1	CS,D	T1	D	T1	D						
2. Manufacturing Industries and Construction	T1	D	T1	D	T1	D						
3. Transport	M,T1	M,D	M,T1	M,D	M,T1	M,D						
4. Other Sectors	T1	CS,D	T1	D	T1	D						
5. Other	NA	NA	NA	NA	NA	NA						
B. Fugitive Emissions from Fuels	T1	D	T1	CS,D	NA	NA						
1. Solid Fuels	T1	D	T1	CS	NA	NA						
2. Oil and Natural Gas	NA	NA	T1	CS,D	NA	NA						
2. Industrial Processes	**CR,CS, D,T2**	**CS,D, OTH,PS**	**D**	**D**	**D**	**D**	**T2**	**D**	**T3**	**PS**	**T2**	**D**
A. Mineral Products	CR,CS,D,T2	CS,D,OTH	NA	NA	NA	NA						
B. Chemical Industry	CR,D	D,OTH	D	D	D	D	NA	NA	NA	NA	NA	NA
C. Metal Production	D,T2	PS	NA	NA	NA	NA	NA	NA	T3	PS	NA	NA
D. Other Production	NA	NA										
E. Production of Halocarbons and SF_6							NA	NA	NA	NA	NA	NA
F. Consumption of Halocarbons and SF_6							T2	D	NA	NA	T2	D
G. Other	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
3. Solvent and Other Product Use	**NA**	**NA**			**D**	**D**						
4. Agriculture			**T1,T2**	**CS,D**	**D, T1a,T1b**	**CS,D**						
A. Enteric Fermentation			T1,T2	CS,D								
B. Manure Management			T1,T2	CS,D	D	D						

C. Rice Cultivation			NA	NA								
D. Agricultural Soils			NA	NA	D,T1a, T1b	CS,D						
E. Prescribed Burning of Savannas			NA	NA	NA	NA						
F. Field Burning of Agricultural Residues			NA	NA	NA	NA						
G. Other			NA	NA	NA	NA						
5. Land Use, Land-Use Change and Forestry	**T2**	**CS,D**	**NA**	**NA**	**NA**	**NA**						
A. Forest Land	T2	CS,D	NA	NA	NA	NA						
B. Cropland	NA	NA	NA	NA	NA	NA						
C. Grassland	NA	NA	NA	NA	NA	NA						
D. Wetlands	NA	NA	NA	NA	NA	NA						
E. Settlements	NA	NA	NA	NA	NA	NA						
F. Other Land	NA	NA	NA	NA	NA	NA						
G. Other	NA	NA	NA	NA	NA	NA						
6. Waste	**NA**	**NA**	**T1,T2**	**D**	**T1**	**D**						
A. Solid Waste Disposal on Land	NA	NA	T2	D								
B. Waste-water Handling			T1	D	T1	D						
C. Waste Incineration	NA	NA	NA	NA	NA	NA						
D. Other	NA	NA	NA	NA	NA	NA						
7. Other (as specified in Summary 1.A)	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**

3.3.4 Brief Description of Key Source Categories

The analysis of key source categories was performed on the basis of sectoral distribution and using the Tier 1 approach. This approach was used both for the base year and for the year 2011. A level assessment was undertaken for 1986 and 2011, and a trend assessment was performed for 2011. The KCA has been performed with and without LULUCF sector.

On the basis of the tier 1 KCA including LULUCF, 26 categories were selected as a key, representing 95.0% of emissions in 2011 according to the level assessment, and 2 were chosen which are key categories according to the trend assessment only. As many as 19 categories are key sources according to level and trend key source analysis.

Table 3.6: IPCC Key Categories for 2011, Tier 1 with LULUCF.

Rank 2011	CRF	Sector	Category	Gas	GHG 1986	GHG 2011	KC trend	Rank 1986
1	5	**LULUCF/ A. Forest land**	1. Forest Land remaining Forest Land	CO_2	10343.796	11577.808	1	1
2	1A	**1. Energy Industries**	a. Public Electricity and Heat Production	CO_2	6533.755	6223.550	3	2
3	1A	**3. Transport**	b. Road Transportation	CO_2	1905.428	5592.846	2	3
4	1A	**4. Other Sectors**	b. Residential	CO_2	1100.185	1020.357	5	6
5	1A	**2. Manufacturing Ind. and Constr.**	f. Other	CO_2	1774.835	869.932		4
6	5	**LULUCF/ E. Settlements**	2. Land converted to Settlements	CO_2	624.727	744.520	6	8
7	5	**LULUCF/ C Grassland**	2. Land converted to Grassland	CO_2	197.072	633.397	4	27
8	1A	**4. Other Sectors**	a. Commercial/Institutional	CO_2	612.110	569.808	9	9
9	5	**LULUCF/ A. Forest land**	2. Land converted to Forest Land	CO_2	464.736	464.736	11	11

10	5	**LULUCF/ F. Other Land**	2. Land converted to Other Land	CO_2	278.392	453.185	8	20
11	4	**A. Enteric Fermentation**	1. Non-Dairy Cattle	CH_4	263.057	376.045	10	23
12	4	**D. Agricultural Soils**	1. Direct Soil Emissions	N_2O	435.343	373.619	15	13
13	5	**LULUCF/ B. Cropland**	2. Land converted to Cropland	CO_2	316.021	372.358	13	18
14	6	**A. Solid Waste Disposal on Land**	1. Managed Waste Disposal on Land	CH_4	298.801	366.372	12	19
15	1A	**2. Manufacturing Ind. and Constr.**	d. Pulp, Paper and Print	CO_2	649.556	348.448		7
16	2	**Industrial Processes**	1. Cement Production	CO_2	514.615	316.063		10
17	4	**D. Agricultural Soils**	3. Indirect Emissions	N_2O	334.663	284.738	19	17
18	1B	**Fugitive Emissions from fuels**	a. Coal Mining and Handling	CH_4	358.906	253.343	22	16
19	4	**A. Enteric Fermentation**	1. Dairy Cattle	CH_4	383.587	235.601		15
20	2	**Industrial Processes**	1. Refrigeration and AC Equipment	HFC		209.756	14	
21	1A	**4. Other Sectors**	c. Agriculture/Forestry/Fisheries	CO_2	428.364	200.726		14
22	1A	**2. Manufacturing Ind. and Constr.**	a. Iron and Steel	CO_2	1141.586	194.458	7	5
23	2	**Industrial Processes**	3. Limestone and Dolomite Use	CO_2	47.390	165.300	16	45
24	4	**B. Manure Management**	1. Non-Dairy Cattle	CH_4	66.046	164.190	18	38
25	5	**LULUCF/ D. Wetlands**	2. Land converted to Wetlands	CO_2	137.966	157.932		29
26	4	**B. Manure Management**	1. Dairy Cattle	CH_4	152.449	131.427		28
27	4	**B. Manure Management**	13. Solid Storage and Dry Lot	N_2O	267.309	123.028		22
29	1A	**4. Other Sectors**	b. Residential	CH_4	134.558	112.155		30
31	4	**B. Manure Management**	8. Swine	CH_4	228.267	100.800		25
32	1A	**2. Manufacturing Ind. and Constr.**	e. Food Processing, Beverages and Tob.	CO_2	247.754	99.212		24
33	2	**Industrial Processes**	2. Lime Production	CO_2	220.206	90.735		26
34	1A	**2. Manufacturing Ind. and Constr.**	b. Non-Ferrous Metals	CO_2	440.325	86.328	17	12
45	2	**Industrial Processes**	3. Aluminium Production	PFC	276.291	28.611	20	21

From 26 key categories the most are from Energy sector: 8 categories are CO_2 emissions from fuel combustion, and one is CH_4 emissions from Coal mining and handling, their contribution to the level is 45.0%. The second most representative sector is LULUCF with 7 key source categories and 42.4% to the level. Six KC are in the Agriculture sector; 4 are related to methane emissions and 2 to N_2O emissions. Their contribution to the total is only 4.6%. In the industrial processes there are 3 KC and in the Waste sector are only one, together they contribute 3.1% of GHG emissions.

Table 3.7: IPCC Key Categories for 2011, Tier 1 without LULUCF.

Rank 2011	CRF	Sector	Category	Gas	GHG 1986	GHG 2011	KS trend	Rank 1986
1	1A	**1. Energy Industries**	a. Public Electricity and Heat Prod.	CO_2	6533.755	6223.550	20	1
2	1A	**3. Transport**	b. Road Transportation	CO_2	1905.428	5592.846	1	2
3	1A	**4. Other Sectors**	b. Residential	CO_2	1100.185	1020.357	25	5
4	1A	**2. Manufacturing Ind. and Constr.**	f. Other	CO_2	1774.835	869.932	3	3
5	1A	**4. Other Sectors**	a. Commercial/Institutional	CO_2	612.110	569.808		7
6	4	**A. Enteric Fermentation**	1. Non-Dairy Cattle	CH_4	263.057	376.045	13	18
7	4	**D. Agricultural Soils**	1. Direct Soil Emissions	N_2O	435.343	373.619	23	10
8	6	**A. Solid Waste Disposal on Land**	1. Managed Waste Disposal on Land	CH_4	298.801	366.372	21	15
9	1A	**2. Manufacturing Ind. and Constr.**	d. Pulp, Paper and Print	CO_2	649.556	348.448	5	6
10	2	**Industrial Processes**	1. Cement Production	CO_2	514.615	316.063	9	8
11	4	**D. Agricultural Soils**	3. Indirect Emissions	N_2O	334.663	284.738	26	14
12	1B	**Fugitive Emissions from fuels**	a. Coal Mining and Handling	CH_4	358.906	253.343	19	13
13	4	**A. Enteric Fermentation**	1. Dairy Cattle	CH_4	383.587	235.601	12	12
14	2	**Industrial Processes**	1. Refrigeration and AC Equipment	HFC		209.756	8	

15	1A	**4. Other Sectors**	c. Agriculture/Forestry/Fisheries	CO_2	428.364	200.726	7	11
16	1A	**2. Manufacturing Ind. and Constr.**	a. Iron and Steel	CO_2	1141.586	194.458	2	4
17	2	**Industrial Processes**	3. Limestone and Dolomite Use	CO_2	47.390	165.300	16	
18	4	**B. Manure Management**	1. Non-Dairy Cattle	CH_4	66.046	164.190	17	
20	4	**B. Manure Management**	1. Dairy Cattle	CH_4	152.449	131.427		22
21	4	**B. Manure Management**	13. Solid Storage and Dry Lot	N_2O	267.309	123.028	11	17
19	6	**B. Waste Water Handling**	2. Domestic and Commercial W	CH_4	113.217	117.522		25
22	1A	**4. Other Sectors**	b. Residential	CH_4	134.558	112.155		23
23	2	**Industrial Processes**	3. Aluminium Production	CO_2	89.402	107.969		28
24	4	**B. Manure Management**	8. Swine	CH_4	228.267	100.800	15	20
25	1A	**2. Manufacturing Ind. and Constr.**	e. Food Processing, Beverages and Tob.	CO_2	247.754	99.212	10	19
26	2	**Industrial Processes**	2. Lime Production	CO_2	220.206	90.735	14	21
27	1A	**2. Manufacturing Ind. and Constr.**	b. Non-Ferrous Metals	CO_2	440.325	86.328	4	9
28	1A	**2. Manufacturing Ind. and Constr.**	c. Chemicals	CO_2	98.052	84.269		27
29	1B	**Fugitive Emissions from fuels**	a. Coal Mining and Handling	CO_2	120.238	81.847	28	24
37	2	**Industrial Processes**	3. Aluminium Production	PFC	276.291	28.611	6	16
54	1A	**1. Energy Industries**	b. Petroleum Refining	CO_2	62.225	4.239	22	
56	1A	**5. Other**	b. Mobile - Military use	CO_2	41.093	3.343	27	
68	2	**Industrial Processes**	4. Carbide Production	CO_2	44.985	1.178	24	
72	1A	**1. Energy Industries**	c. Manufacture of Sol. Fuels and Oth. En. Ind.	CO_2	104.728	0.771	18	26

On the basis of the tier 1 KC analysis excluding LULUCF, 25 categories were selected as a key, representing 95.2% of emissions in 2011 according to the level assessment, and 8 were chosen which are key categories according to the trend assessment only. As many as 20 categories are key sources according to level and trend key source analysis.

From 25 key categories the most (11) are from Energy sector: 9 categories are CO_2 emissions from fuel combustion, one is CH_4 emissions from fuel combustion, and one is CH_4 emissions from Coal mining and handling, their contribution to the level is 78.1%. The second most representative sector is Agriculture sector with 8 KC; 5 are related to methane emissions and 3 to N_2O emissions. Their contribution to the total is only 10.5%. In the industrial processes are 4 KC and in the Waste sector are 2, together they contribute 6.6% of GHG emissions.

3.3.5 Main Reasons for Recalculating GHG Estimates

Energy

The most recalculations were in energy sector, in the category road transport due to the transfer from COPERT III to the COPERT 4 model. In the last inventory the version 9.0 has been used.

Due to the research made by Statistical Office the improved data on biomass consumption and corresponding NCVs have become available since 2010. To assure time series consistency the emission estimates before this year have been interpolated.

Emissions from the jet kerosene used in the Slovenian Army and Police have been excluded from the international bunkers and reported in energy sector under 1.A.5. Other .

Industrial Processes

Emissions from Limestone and dolomite use have been improved due to obtaining additional activity data since 1986. Besides the emissions from limestone and dolomite use for SO2 scrubbing have been excluded from energy sector and included under process emissions.
PFC emissions from primary aluminium production have been improved following methodology described in 2006 IPCC Guidance.

GHG inventory of HFC emissions has been largely improved by including all relevant F gasses, while in the past only emissions of HFC-134a were included in the inventory. Besides the improved data become available on installations and from the service companies. The emissions have been improved since 1997. The potential emissions have been also reported and the data source is environmental tax on the use of F-gases.

Agriculture

Emissions from swine have been recalculated since 1986 due to the use of IPCC parameters and EF instead of CS which were not appropriate.

LULUCF

In the last few years Slovenia has largely improved LULUCF inventory by including all LU categories and due to the improvement of AD. However in 2012 the new forest inventory has been performed and we are expecting further changes of estimates in this sector in the submission 2014.

Waste

To ensure time series consistency emissions from industrial waste water for the period 1986-2003 have been recalculated using actual volumes of waste water.

3.3.6 Information on the QA/QC Plan and Verification

In 2009, Slovenia developed and mostly implemented a Quality Assurance and Quality Control plan as recommended by the IPCC Good Practice Guidelines (IPCC 2000). The QA/QC plan is part of the Manual of Procedures, elaborated in 2005 and updated in 2009.

Quality Control (QC) is a system of routine technical activities to measure and control the quality of the inventory as it is being developed. The QC system is designed to:
- provide routine and consistent checks to ensure data integrity, correctness and completeness;
- identify and address errors and omissions;
- document and archive inventory material and record all QC activities.

The final part of this system is incorporated in an Oracle database (ISEE – "Emission inventory" information system) established at the end of 2008. The main purpose of ISEE is:

- to enable collection and archiving of activity data, emission factors and other parameters including descriptions of sources from 1980 on for other pollutants, and from 1986 on for GHG emissions;
- to calculate GHG and other pollutant emissions;
- to automatically fill in reporting tables (CRF Reporter).

In late 2009, the first two stages of development of ISEE were finished, while the bulk importing into CRF Reporter have been finished in 2011. ISEE enables and ensures that all necessary built-in QA/QC checks have been performed before data and emission estimates are entered in the reporting format tables. It also keeps a record of all changes made to data in the database.

As all calculations are performed in the database with software generated for this purpose, no human errors are expected. But for QA/QC purpose all emissions are also calculated in the old way in Excel spreadsheets. Both estimates were then compared; all differences were carefully investigated, and corrected.

<u>During development of the database, the following QC was performed:</u>

Check of methodological and data changes resulting in recalculations

- Check for temporal consistency in time series input data for each source category.
- Check for consistency in the algorithm/method used for calculations throughout the time series.

Completeness checks

- Check if estimates are reported for all source categories and for all years from the appropriate base year to the period of the current inventory.
- Check if known data gaps that result in incomplete source category emissions estimates are documented.
- Compare estimates to previous estimates: for each source category, current inventory estimates should be compared to previous estimates. If there are significant changes or departures from expected trends, recheck estimates and explain any differences.

Check of activity data, emission factors and other parameters

- Cross-check all input data from each source category for transcription errors.
- Check if units are properly labelled in calculation sheets.
- Check if units are correctly carried through from beginning to end in calculations.
- Check if conversion factors are correct.
- Check if temporal and spatial adjustment factors are used correctly.

Check of emissions estimates

For the entire period 1986–2009, GHG emissions are also calculated in the old way using Excel spreadsheets and in the database using built-in formulas. Both estimates were compared and all differences carefully investigated.

The reasons for differences were the following:
- Formulas for calculation of emissions were not correct.
- Data field was not properly labelled.
- Data relationship was not correct.
- Emissions data were not correctly aggregated from lower reporting levels to higher reporting levels.

All errors were corrected and the accuracy of emissions calculations on all levels is now assured.

QA/QC checks not performed in the database:

Uncertainty

According to the QA/QC plan checks of uncertainty were performed in 2011. The checks consist of the following:
- Check if the qualifications of individuals providing expert judgement for uncertainty estimates are appropriate.
- Check if qualifications, assumptions and expert judgements are recorded.
- Check if calculated uncertainties are complete and calculated correctly.
- Check if there is detailed internal documentation to support the uncertainty estimates.

While first two QC have been performed the last QC shows that detailed documentation is not available for most of the uncertainty estimates. So we decided to use expert judgements, except for categories for which uncertainty estimates are available in GPG 2000.

Preparation of NIR
- Check if all chapters from annotated NIR are included in the NIR.
- Check if AD, EF and other numerical information mentioned in the text is correct.
- Check all AD data presented in the tables in the NIR.
- Check all EF and other parameters used in the tables in the NIR.
- Check if AD, EF and other numerical information mentioned in the text is correct.
- Check all graphs if they are accurate and for the whole period.
- Check all titles of tables and pictures.
- Check if all Annexes to the NIR are updated.

For 2012 the whole NIR have been cross-checked and errors, mostly in energy sector have been put off.

In 2006, an additional quality control check point was introduced by forwarding the assessment of verified emission reports from installations included in the National Allocation Plan to the Statistical Office of the Republic of Slovenia (SORS). The role of SORS is to compare data from installations included in the EU-ETS with data from their reporting system and to propose corrective measures, if necessary. The outcome of data consistency checks is used as preliminary information for the Ministry of Agriculture and the Environment to perform on-site inspections.

Documentation and archiving

All inventory data are now stored in a joint database. Supporting data and references are stored in electronic form and/or hard copy form. Inventory submissions are stored mostly in electronic form at various locations and on various media (network server, CD-ROM, computer hard disk). Access to files is limited in accordance with the security policy. Backup copies on the server are made at regular intervals in accordance with the requirements of the information system.

All relevant data from external institutions are also stored at the Environmental Agency in one place. In 2012 all studies have been scanned, transformed to PDF file and stored on network server, CD-ROM and computer hard disk. The studies are available in hard copies and also in electronic format.

QA/QC checks of documentation and archiving procedures:

- Check if inventory data, supporting data and inventory records are archived and stored to facilitate detailed review.
- Check if all supporting documentation on QA/QC procedures is archived.
- Check if results of QC analysis and uncertainty estimates are archived.
- Check if there is detailed internal documentation to support the estimates and enable duplication of the emissions estimates.
- Check if documentation of the database is adequate and archived.
- Check if bibliographical data references are properly cited in the internal documentation and archived.
- Check if inventory improvements plan is updated ad archived

QA

QA generally consists of independent third-party review activities to ensure that the inventory represents the best possible estimates of emissions and removals, and to support the effectiveness of the QC program. In the past we have performed only one peer review. In 2006, we received many useful comments from the team preparing our fourth National Communication Report. Although the comments were not presented as an official report, we accepted many of the suggestions and corrected a number of errors. We are planning a sectoral review of our inventory on a yearly basis – one sector per year.

In May 2009, a peer review of the Slovenian inventory was performed for the energy sector. Since then the Energy sector and Industrial processes sector is regularly checked by experts from Energy efficiency centre (CEU/IJS).

For Agriculture and LULUCF sector it is very hard to perform peer review as the main institutions (Slovenian Forestry Institute and Agricultural Institute of Slovenia) are already involved in the inventory preparation. Due to the lack of relevant independent expert for LULUCF sector in Slovenia this sector has been reviewed during the two days visit in JRC Ispra, which was in April 2012.

In 2011 the peer review for waste sector has been performed, no important errors have been found.

QA/QC procedures performed by other institutions (Slovenian Forestry Institute and Agricultural Institute of Slovenia) are described in the relevant chapters in the NIR (LULUCF, Agriculture). Data based on forest statistics are produced by the Slovenian Forestry Institute and SORS. Data based on agricultural statistics are mainly from SORS and the Agricultural Institute. All data were checked.

SORS is our main data provider. In 2005, the European Statistics Code of Practice was adopted, bringing considerable changes to the SORS QA/QC system. The main pillars (factors) of quality are defined and thoroughly described in the Medium-term Programme of Statistical Surveys 2013-2017 http://www.stat.si/doc/drzstat/MediumTerm_2013-2017.pdf .
The strategic directions of Quality in National Statistics are presented in detail at http://www.stat.si/eng/drz_stat_kakovost.asp .

3.3.7 Official Consideration and Approval of the Inventory

Before the inventory is reported to the EU, EEA or UNFCCC Secretariat, it goes through an approval process. The institution designated for approval is the Ministry of Environmental and Spatial Planning. The inventory is sent to the Ministry according the following plan:

- draft CRF tables on 3 January
- final CRF tables and draft NIR on 1 March
- final report on 1 April

3.3.8 Public Availability of the Inventory

The inventories are public available on the web. Every submission is accompanied with a short description in Slovene language. The estimates are presented in more simple way with the table similar to Table 3.2.1 in the NIR. GHG emissions are also presented as indicator. It is very common that yearly submission of GHG inventory is followed by press conference, where our last estimates are presented in connection with our Kyoto goal.

Web page address:
http://www.arso.gov.si/podnebne%20spremembe/emisije%20toplogrednih%20plinov/

3.4 National Registry

The changes that have occurred in the Slovenian National Registry, compared with information reported in NC last submission, was the transition from the national registry using the GRETA registry software to the Consolidated System of EU Registries (CSEUR).

Directive 2009/29/EC adopted in 2009, provides for the centralization of the EU ETS operations into a single European Union registry operated by the European Commission as well as for the inclusion of the aviation sector. At the same time, and with a view to

increasing efficiency in the operations of their respective national registries, the EU Member States who are also Parties to the Kyoto Protocol (25) plus Iceland, Liechtenstein and Norway decided to operate their registries in a consolidated manner in accordance with all relevant decisions applicable to the establishment of Party registries - in particular Decision 13/CMP.1 and decision 24/CP.8.

With a view to complying with the new requirements of Commission Regulation 920/2010 and Commission Regulation 1193/2011, in addition to implementing the platform shared by the consolidating Parties, the registry of EU has undergone a major re-development. The consolidated platform which implements the national registries in a consolidated manner (including the registry of EU) is called Consolidated System of EU registries (CSEUR) and was developed together with the new EU registry on the basis the following modalities:

- Each Party retains its organization designated as its registry administrator to maintain the national registry of that Party and remains responsible for all the obligations of Parties that are to be fulfilled through registries;
- Each Kyoto unit issued by the Parties in such a consolidated system is issued by one of the constituent Parties and continues to carry the Party of origin identifier in its unique serial number;
- Each Party retains its own set of national accounts as required by paragraph 21 of the Annex to Decision 15/CMP.1. Each account within a national registry keeps a unique account number comprising the identifier of the Party and a unique number within the Party where the account is maintained;
- Kyoto transactions continue to be forwarded to and checked by the UNFCCC Independent Transaction Log (ITL), which remains responsible for verifying the accuracy and validity of those transactions;
- The transaction log and registries continue to reconcile their data with each other in order to ensure data consistency and facilitate the automated checks of the ITL;
- The requirements of paragraphs 44 to 48 of the Annex to Decision 13/CMP.1 concerning making non-confidential information accessible to the public would be fulfilled by each Party individually;
- All registries reside on a consolidated IT platform sharing the same infrastructure technologies. The chosen architecture implements modalities to ensure that the consolidated national registries are uniquely identifiable, protected and distinguishable from each other, notably:
    - With regards to the data exchange, each national registry connects to the ITL directly and establishes a distinct and secure communication link through a consolidated communication channel (VPN tunnel);
    - The ITL remains responsible for authenticating the national registries and takes the full and final record of all transactions involving Kyoto units and other administrative processes such that those actions cannot be disputed or repudiated;
    - With regards to the data storage, the consolidated platform continues to guarantee that data is kept confidential and protected against unauthorized manipulation;

- The data storage architecture also ensures that the data pertaining to a national registry are distinguishable and uniquely identifiable from the data pertaining to other consolidated national registries;
- In addition, each consolidated national registry keeps a distinct user access entry point (URL) and a distinct set of authorisation and configuration rules.

Following the successful implementation of the CSEUR platform, the 28 national registries concerned were re-certified in June 2012 and switched over to their new national registry on 20 June 2012. During the go-live process, all relevant transaction and holdings data were migrated to the CSEUR platform and the individual connections to and from the ITL were re-established for each Party.

3.4.1 Registry Administrator

The name and contact information of the administrator designated by the Party to maintain the national registry

The administrator designated by Slovenia to maintain the national registry is:
Slovenian Environment Agency
Address: Vojkova 1b, SI-1000 Ljubljana
Phone: +386 1 478 40 00
Contact for registry - email: registerCO2.arso@gov.si

3.4.2 Consolidated System with Other Parties

The names of other Parties with which the Party cooperates by maintaining their respective registries in a consolidated system

The EU Member States who are also Parties to the Kyoto Protocol (25) plus Iceland, Liechtenstein and Norway have decided to operate their registries in a consolidated manner. The Consolidated System of EU registries was certified on 1 June 2012 and went to production on 20 June 2012.

A complete description of the consolidated registry was provided in the common readiness documentation and specific readiness documentation for the national registry of EU and all consolidating national registries. This description includes:

- Readiness questionnaire
- Application logging
- Change management procedure
- Disaster recovery
- Manual Intervention
- Operational Plan
- Roles and responsibilities
- Security Plan
- Time Validation Plan

- Version change Management

The documents above were submitted as appendix to the final NIR 2013 and shall in no case be published.

A new central service desk was also set up to support the registry administrators of the consolidated system. The new service desk acts as 2nd level of support to the local support provided by the Parties. It also plays a key communication role with the ITL Service Desk with regards notably to connectivity or reconciliation issues.

3.4.3 Database Structure and Capacity

A description of the database structure of the national registry

In 2012, the EU registry has undergone a major redevelopment with a view to comply with the new requirements of Commission Regulation 920/2010 and Commission Regulation 1193/2011 in addition to implementing the Consolidated System of EU registries (CSEUR).

The complete description of the consolidated registry was provided in the common readiness documentation and specific readiness documentation for the national registry of EU and all consolidating national registries. The documentation above is marked "ETS Limited" (not public documents and as such, must not be further transmitted or made publicly available) and was submitted separately to the NIR 2013.

During certification, the consolidated registry was notably subject to connectivity testing, connectivity reliability testing, distinctness testing and interoperability testing to demonstrate capacity and conformance to the Data Exchange Standard (DES). All tests were executed successfully and lead to successful certification on 1 June 2012.

3.4.4 Conformity with Data Exchange Standards (DES)

A description how the national registry conforms to the technical standards for data exchange between registry systems for the purpose of ensuring the accurate, transparent and efficient exchange of data between national registries, the clean development mechanism registry and the transaction log (Decision 19/CP.7, para. 1)

The overall change to a Consolidated System of EU Registries triggered changes in the registry software and required new conformance testing. The complete description of the consolidated registry was provided in the common readiness documentation and specific readiness documentation for the national registry of EU and all consolidating national registries. The documents above were submitted separately to the NIR 2013 (SIAR Supplementary Information to the NIR) and shall in no case be published.

During certification, the consolidated registry was notably subject to connectivity testing, connectivity reliability testing, distinctness testing and interoperability testing to demonstrate capacity and conformance to the DES. All tests were executed successfully and lead to successful certification on 1 June 2012.

3.4.5 Minimization of Discrepancies

A description of the procedures employed in the national registry to minimize discrepancies in the issuance, transfer, acquisition, cancellation and retirement of ERUs, CERs, tCERs, lCERs, AAUs and/or RMUs, and replacement of tCERs and lCERs, and of the steps taken to terminate transactions where a discrepancy is notified and to correct problems in the event of a failure in terminating the transactions

The overall change to a Consolidated System of EU Registries also triggered changes to discrepancies procedures, as reflected in the updated manual intervention document and the operational plan. The complete description of the consolidated registry was provided in the common readiness documentation and specific readiness documentation for the national registry of EU and all consolidating national registries. The documentation is marked "ETS Limited".

3.4.6 Overview of Security Measures

An overview of security measures employed in the national registry to prevent unauthorized manipulations and to prevent operator error and of how these measures are kept up to date.

The overall change to a Consolidated System of EU Registries also triggered changes to security, as reflected in the updated security plan. The complete description of the consolidated registry was provided in the common readiness documentation and specific readiness documentation for the national registry of EU and all consolidating national registries as part of NIR 2013 and shall in no case be published.

3.4.7 Publicly Accessible Information

A list of information publicly accessible by means of the user interface to the national registry

Slovenian Environment Agency (AGENCIJA REPUBLIKE SLOVENIJE ZA OKOLJE) maintains Slovenian publicly accessible information on its website (http://www.arso.gov.si/), **at part of the national registry website, named "Register emisijskih kuponov", which is** accessible from main page of SEA over icon ("Register emisijskih kuponov"): http://www.arso.gov.si/podnebne%20spremembe/Register%20emisijskih%20kuponov/.

Publicly available information of the Parties to the Kyoto Protocol pursuant to the decision 13/CMP.1 are available under title "Javno dostopna poročila", (http://www.arso.gov.si/podnebne%20spremembe/Register%20emisijskih%20kuponov/Javno%20dostopna%20poro%C4%8Dila/).

Additional up-to-date information concerning the Consolidated System of EU Registries is available at the EUTL website too, at http://ec.europa.eu/environment/ets/.

3.4.8 The Internet Address of the Interface to its National Registry

No change of the Internet address of the national registry's website from where the Consolidated System of EU Registries can be accessed occurred during the reporting period.

The new direct interface to the Slovenian national registry is:
https://ets-registry.webgate.ec.europa.eu/euregistry/SI/index.xhtml
or from agency web page (see point 3.4.7 above) as direct link to EU ETS web page.

3.4.9 Disaster Recovery

A description of measures taken to safeguard, maintain and recover data in order to ensure the integrity of data storage and the recovery of registry services in the event of a disaster.

The overall change to a Consolidated System of EU Registries also triggered changes to data integrity measures, as reflected in the updated disaster recovery plan. The complete description of the consolidated registry was provided in the common readiness documentation and specific readiness documentation for the national registry of EU and all consolidating national registries. The documents above were submitted separately as part of NIR 2013 and shall in no case be published.

3.4.10 Tests Procedures

The results of any test procedures that might be available or developed with the aim of testing the performance, procedures and security measures of the national registry undertaken pursuant to the provisions of decision 19/CP.7 relating to the technical standards for data exchange between registry system

On 2 October 2012 a new software release (called V4) including functionalities enabling the auctioning of phase 3 and aviation allowances, a new EU ETS account type (trading account) and a trusted account list went into Production. The trusted account list adds to the set of security measures available in the CSEUR. This measure prevents any transfer from a holding account to an account that is not trusted.

4 POLICIES AND MEASURES

4.1 Policy Making Procedures

As an EU Member State, Slovenia actively participates in the formulation and implementation of common EU policies and measures. Under these processes, it develops its targets for reducing GHG emissions.

4.1.1 Development Strategies and Policies

For Slovenia, the current period is important, as the validity of umbrella national development documents has expired and the new Development Strategy of Slovenia for the period until 2020 is in preparation. The former strategy and the strategy in preparation result from the principles of sustainable development and the integration of development policies. Consequently, national operational programmes define sustainable development as their horizontal principle that is followed by programmes within the framework of all their priority areas. Within the framework of Slovenia's Development Strategy until 2020, which is in preparation, one of the priority development tasks is the transition to a resource-efficient, green and competitive low-carbon society.

With numerous documents and decision-making processes at the EU level, and in particular with the EU 2020 Strategy, Slovenia has committed itself to pursuing the objective of sustainable growth. The EU 2020 strategy[7] for smart, sustainable and inclusive growth creates a vision of Europe's social market economy for the 21st century, including three priority elements which connect, complement and reinforce each other:

- smart growth: the development of economy based on knowledge and innovation;
- sustainable growth: the promotion of a more competitive resource-efficient, green and low-carbon economy;
- inclusive growth: strengthening the economy with a level of high employment, which enhances social and territorial cohesion.

The strategy supports the transition to an economy that is efficient in the use of all materials, completely decouples economic growth from the use of sources and energy and their environmental impacts, reduces greenhouse gas emissions, improves competitiveness with effectiveness and innovation, and provides greater security of the energy supply. Slovenia implements its vision referred to in the Europe 2020 strategy in its national policies. Therefore, Slovenia' s preparation of the Action Plan for Reducing GHG Emissions (AP-GHG) until 2020 is one of the priority tasks of the state in the National Reform Programme as a measure for reducing GHG emissions and boosting economic growth.

[7] COM(2010) 2020 final.

4.1.2 Objectives for Reducing GHG Emissions

In 2002, the Republic of Slovenia ratified the Kyoto Protocol, and committed itself to emitting on an average yearly basis 8% less greenhouse gases (GHG) in the period 2008–2012 than in the base year, which were determined as the sum of CO_2, CH_4 and N_2O emissions in 1986 and F-gases in 1995. This results in average annual target emissions of 18,726 Gg CO_2 eq, which was Slovenia's target in the period 2008–2012. In the Accession Treaty, Slovenia also adopted the same objectives as EU Member States.

In the period until 2020, Slovenia has set itself the objective of reducing GHG emissions within the policy and legal order of the EU. Within the climate and energy legislation package adopted in 2009, Slovenia adopted new legally binding objectives for reducing greenhouse gas emissions by 2020. The EU objective until 2020 was to reduce GHG emissions by 20% compared to 2005. Within this objective, Slovenia is reducing GHG emissions. A part of the reduction will be attained within installations which are not included in the emissions trading scheme; the objective is determined at the EU level, i.e. to decrease GHG emissions by 21% by 2020 compared to 2005 emissions. The objective for the sectors outside the EU Emissions Trading Scheme is a 10% decrease in the amount of emissions by 2020 compared to 2005 emissions for the EU as a whole.

The national objective of Slovenia is defined in sectors outside the EU-ETS. According to Decision 406/2009/EC[8], the reduction of greenhouse gas emissions refers only to emissions from sectors which are not included in the European emission trading scheme with greenhouse gas emission allowances in accordance with Directive 2009/29/ES[9], and thus including emissions from fuel burning in households and in the service, transport, industry and energy sectors (only plants not included in the EU-ETS), fugitive emissions from the energy industry, process emissions from industrial processes (without EU-ETS), solvents and other product use, agriculture, and waste management. The objective of Slovenia until 2020 is to not increase greenhouse gas emissions by more than 4% compared to 2005 or to have a value that is less than 12,117 kt CO_2 eq in 2020[10]. In the above legal act, Slovenia defined legally binding annual objectives, as the greenhouse gas emissions in the period 2013-2020 should not exceed the target annual emissions determined by a linear trajectory to the target in 2020. With this aim in mind and these measures in the EU-ETS sectors, Slovenia will contribute to a decrease in GHG emissions at the EU level by 20% by 2020 compared to the 1990 level.

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8 Decision No 406/2009/EC of the European Parliament and of the Council of 23 April 2009 on the effort of Member States to reduce their greenhouse gas emissions to meet the Community's greenhouse gas emission reduction commitments.

9 Directive 2009/29/EC of the European Parliament and of the Council of 23 April 2009 amending Directive 2003/87/EC establishing a scheme for greenhouse gas emission allowance trading within the Community.

10 Commission implementing decision of 31 October 2013 on the adjustments to Member States' annual emission allocations for the period from 2013 to 2020 pursuant to Decision No. 406/2009/EC of the European Parliament and of the Council (2013/634/EU); for the purpose of calculating, the potential value of global warming referred to in the Second Assessment Report of the Intergovernmental Panel on Climate Change (IPCC) has been considered.

The Operational Programme for Reducing GHG Emissions until 2020 with a View to 2030 (OP GHG-2020) is in preparation and will define indicative sectoral objectives to reduce GHG emissions until 2020 and framework objectives until 2030.

Within the climate and energy legislation package, Slovenia undertook to achieve a 25% share of renewable energy sources of gross final energy use, a 10% per cent share of renewable energy sources in transport, and a 20% improvement in energy efficiency, all by 2020.

Policies and objectives are still being formulated for the period after 2020. Slovenia provides active support in developing a joint vision in order to prevent the dangerous consequences of climate change and to keep the growth of global temperature under 2 °C and its realisation within the framework of EU climate policy and agreements under the UNFCCC (from Copenhagen and Cancun) and with national climate policy and measures. In March 2010, the European Council took the political decision to decrease greenhouse gas emissions by 80-95% by 2050 compared to 1990; this reduction will be necessary according to the findings of the Intergovernmental Panel on Climate Change in developed countries in order to achieve the above-mentioned objective. Under the EU Plan for achieving a low-carbon economy by 2050,[11] there are debates on sectoral objectives at the EU level until 2050 and on necessary intermediate objectives until 2030 and until 2040. At the EU level, national objectives are set for 2030; a decision-making process is already under way: In spring 2013, public consultations on this matter took place.

A debate on the long-term objectives for reducing GHG emissions until 2050 and on intermediate objectives until 2050 took place in Slovenia when drawing up a proposal for the Strategy for the transition of Slovenia to a low-carbon society and a draft of the Climate Change Act. In the National Assembly, a decision was taken in 2009 by the Declaration on Slovenia's active role in formulating a new global policy on climate change, while tasks regarding the preparation of the necessary analyses and programmes were assigned to the Government of the Republic of Slovenia.

4.1.3 National Programme Documents Regarding the Reduction of Greenhouse Gas Emissions

The Operational Programme for Reducing GHG Emissions until 2020 with a View to 2030 (OP GHG-2020) in preparation is an implementing plan of measures for achieving Slovenia's legally binding objectives for reducing GHG emissions by 2020 under the energy and climate package in accordance with Decision 2009/406/EC and as such it is of key importance for changing Slovenia to a resource-efficient, green and competitive low-carbon economy and for attaining the objectives for reducing GHG emissions.

As mentioned above, the Operational Programme for Reducing GHG Emissions until 2020 follows the objectives of the National Reform Programme for overcoming the crisis, increasing added value and raising the employment rate.

[11] A plan for the transition to a competitive economy with low-carbon emissions up to 2050, COM (2011) 112.

In Slovenia, most of the measures are implemented by pursuing several objectives at the same time and in this respect, the costs of implementing measures decrease significantly and they maximise the benefits due to synergy and multiplicative effects. For example, the EEU and RES are measures that at the same time reduce air pollution due to the pollutants SO_2, NOx and dust particles and decrease GHG emissions. This orientation will additionally be strengthened in the implementation of climate policy until 2020. Therefore, the reduction of GHG emissions will mainly depend on the implementation of the adopted sectoral policies with integrated climate objectives and on the further integration of climate objectives and measures to mitigate climate change into the new sectoral programmes that are in the process of preparation.

The Programme OP GHG-2020 in preparation is based on adopted sectoral and development programs defining the activities for the reduction of GHG emissions. These are in particular the following:

- The Renewable Energy Sources Action Plan for the Period 2010–2020 (RES AP);
- The Energy Efficiency Action Plan for the Period 2011–2016 (EEAP 2). A new plan is in preparation for this area for the period until 2020 which will be completed in 2014 and will include the Long-term Strategy for Promoting Investments in the Renovation of Buildings;
- The Operational Programme for Municipal Waste Management from 2013;
- The Operational Programme for Environmental and Transport Infrastructure Development for 2007–2013. A new Operational Programme for the Implementation of the EU Cohesion Policy in the period 2014–2020 is in preparation.
- The Rural Development Programme for the period 2007–2020. A new programme for the period 2014–2020 is in preparation.

The new OP GHG-2020 is based to a large extent on the established instruments from the previous Operational Programme for Reducing Greenhouse Gas Emissions until 2012 (OP GHG-01). Based on the Operational Programme, the Government of the Republic of Slovenia assigns the implementation of measures to the ministries responsible for individual areas. With respect to the previous programme, the new programme provides clearer responsibilities for the implementation of activities by individual ministries, with time limits and defined sources of funding.

Table 4.1: Strategic documents of the Republic of Slovenia relevant to the mitigation of climate change.

Document title	Adoption	Implementation management	Monitoring and reports on implementation	Energy supply	Transport	General use	Industry	Agriculture	LULUCF	Waste
Operational Programme for Reducing GHG Emissions Limiting Greenhouse Gas Emissions until 2012 (OP GHG-1). New document in preparation: Operational Programme for Reducing GHG emissions until 2020 with a View to 2030.	2009, Government of the Republic of Slovenia	Ministry responsible for environmental protection	Annually, for the period 2007–2011	✓	✓	✓	✓	✓	✓	✓
Development Strategy of Slovenia New document in preparation: **Development Strategy of Slovenia 2014–2020**	2005, Government of the Republic of Slovenia	Ministry responsible for development	Annually	✓	✓	✓	✓	✓	✓	✓
Operational Programme of Environmental and Transport Infrastructure Development 2007–2013 (OP ETID) In preparation: Operational Programme for the Implementation of the EU Cohesion Policy in the period 2014–2020	2007, Government of the Republic of Slovenia	Ministry responsible for development	Annually 2007–2012	✓	✓	✓				✓
Second Energy Efficiency Action Plan for the Period 2010–2016 (EEAP 2). In preparation: Energy Efficiency Action Plan for the Period until 2020	2011, Ministry of the Economy	Ministry responsible for energy	Reports for the period 2008–2010	✓	✓	✓	✓			
Renewable Energy Sources Action Plan for the Period 2010–2020 (RES AP)	2010, Government of the Republic of Slovenia		Biennial: 2011, 2013	✓	✓	✓	✓			
Resolution on the National Forest Programme (ReNFP) In preparation: The Energy Concept of Slovenia)	2004, National Assembly		Annual: 2005–2008	✓		✓	✓			
National Plan for Increasing the Number of Nearly Zero-Energy Buildings	in preparation	Ministry responsible for energy				✓				
Long-term Strategy for promoting investments in the renovation of buildings	in preparation					✓				
National Housing Programme 2013-2022	in preparation	Ministry responsible for spatial planning				✓				

Document title	Adoption	Implementation management	Monitoring and reports on implementation	Energy supply	Transport	General use	Industry	Agriculture	LULUCF	Waste
Resolution on the National Programme of Public Transport Infrastructure Development in the Republic of Slovenia until 2020 with a View to 2030	in preparation	Ministry responsible for transportation			✓					
Resolution on Transport Policy of the Republic of Slovenia (RePPRS)	2006, National Assembly				✓					
Rural Development Programme of the Republic of Slovenia 2007–2013 (PRP). In preparation: Rural Development Programme for the Period 2014–2020	2007 (amendments in 2011), MAFF	Ministry responsible for agriculture	Annually 2007-2012					✓		
Strategy for using agricultural and forestry biomass for energy purposes	in preparation	Ministry responsible for agriculture and forestry						✓		
Forest-management and game-management plans for the period 2011-2020	2012, Government of the Republic of Slovenia	Ministry responsible for forestry								✓
"Wood is beautiful" – Action plan to enhance the competitiveness of the Slovenian forest-wood chain by 2020	2012, Government of the Republic of Slovenia	Ministries responsible for agriculture, forestry and the economy				(✓)	(✓)	(✓)		(✓)
Resolution on the National Forest Programme (ReNFP)	2007, National Assembly	Ministry responsible for forestry								✓
Operational Programme for Municipal Waste Management (OP MWM)	2013, Government of the Republic of Slovenia	Ministry responsible for environmental protection						✓		
Ordinance on the Spatial Planning Strategy (OdSPRS)	2004, National Assembly	Ministry responsible for spatial planning		✓	✓	✓	✓	✓	✓	✓

Document title	Adoption	Implementation and Monitoring reports management on implementation	Energy supply	Transport	General use	Industry	Agriculture	LULUCF	Waste
Operational programme for the protection of ambient air against pollution caused by PM10, (OP PM-10)	2009, Government of the Republic of Slovenia	Ministry responsible for environmental protection	✓	✓	✓	✓			
Action Plan for Green Public Procurement for the period 2009–2012, (ANZeJN)	2009, Government of the Republic of Slovenia	Ministry of Finance		✓	✓	(✓)	(✓)		
Recommendations for an Environmentally Efficient State Administration	2010, Government of the Republic of Slovenia	Ministry responsible for public administration							

4.1.4 Programmes at the Local Level

Administratively, Slovenia is divided into 210 municipalities, 11 of which have the status of urban municipality. There is no regional level of governance in Slovenia.

The environmental protection policies at the local level are important for the preparation and implementation of measures for reducing GHG emissions concerning in particular the areas of use and local supply of energy, waste management, sustainable mobility in urban regions, etc. Urban municipalities plan their climate policy within the environmental protection programmes. Pursuant to the Energy Act, all municipalities shall prepare a local energy concept to be approved by the ministry responsible for energy. The municipalities shall adopt important decisions to reduce GHG emission, also within the scope of drafting municipal spatial plans.

In the preparation of local energy concepts and the implementation of efficient energy use measures and exploiting renewable resources in municipalities, eight local energy agencies operate, which were set up by the municipalities with support provided by the state and European programmes in 2006. The agencies connect these municipalities in a wider geographical area.

Slovenian municipalities joined the European initiative "Covenant of Mayors Committed to Local Sustainable Energy". These municipalities aim to reduce GHG emissions by more than 20% by 2020, and this is defined in their sustainable energy action plans. The initiative includes 20 municipalities with a total of 709,926 inhabitants, which is more than one third of the population.

4.1.5 Monitoring of Climate Change Implementation

The Government of the Republic of Slovenia has been monitoring the Operational Programme for Reducing Greenhouse Gas Emissions[12] by drawing up reports on its implementation since 2008.[13]

In addition to measures, the OP GHG-1 and the OP GHG-2020 programme in preparation include plans for monitoring implementation based on annual reports with an analysis of the implementation of individual measures through the system of indicators included in the

[12] Operational Programme for Reducing Greenhouse Gas Emissions until 2012 (OP GHG-1), Government of the Republic of Slovenia, 35405-2/2009/9, 30 July 2009.

[13] Report on the Implementation of the OP GHG, MOP (Government of the Republic of Slovenia, 14 October 2008); Report on the Implementation of the OP GHG, MOP (Government of the Republic of Slovenia, 14 October 2008);
The first Report on the Implementation of the OP GHG-1, SVPS, (Government of the Republic of Slovenia, 2 September 2010); The Second Report on the Monitoring of Implementation of the Operational Programme for Reducing Greenhouse Gas Emissions until 2012 (OP GHG-1), No. 35405-2/2009/9, 30 July 2009); The Third Report on Monitoring the Implementation of the Operational Programme for Reducing Greenhouse Gas Emissions until 2012 (Government of the Republic of Slovenia, 8 November 2012).

operational programme. To monitor the implementation of the previous programmes, annual reports approved by the Government of the Republic of Slovenia have been prepared since 2008. Additionally, the reports monitor all relevant sectoral programmes: the Renewable Energy Sources Action Plan for the Period 2010−2020, the Energy Efficiency Action Plan for the period 20011–2016 and the Operational Programme for Environmental and Transport Infrastructure Development for 2007–2013.

Slovenia as an EU Member State has also undertaken to monitor the implementation of its climate policy within the mechanism for monitoring Community greenhouse gas emissions in accordance with Regulation No. 525/2013, on the basis of which Member States are obliged to annually submit recorded data, and every two years, prepare reports on measures and projections, while the Commission must annually prepare a report on the progress of the EU and individual Member States.

4.1.6 Policy Making Coordination

Guidance and harmonisation of activities for the implementation and possible changes and amendments were carried out by the ministry responsible for environmental protection, and in the period from June 2009 to March 2012 by a special government body: the Government Office for Climate Change. In 2012, this service rejoined the ministry responsible for protecting the environment due to a reduction in the number of ministries and government services with a view to reducing the costs of public administration.

In 2009, the Government of the Republic of Slovenia established the Office of Climate Change, the tasks of which in the area of measures include: guidance of sectoral and intersectoral policies in the areas of mitigation, adaptation and technological-developmental transition to a low-carbon society; guidance of development policy-making in order to achieve the objectives of mitigation and adaptation to climate change and the formation of the priorities of sectoral and intersectoral programmes for the mitigation of climate change and adaptation; participation in the preparation of the technological-development policy and the promotion of a low-carbon platform; on the basis of a Government decision, the preparation of draft acts and other acts referring to the area of climate change; participation in the preparation of the positions of line ministries for the preparation of regulations and other EU documents referring to the area of climate change; cooperation with the public and private sectors in the implementation of programmes and measures; promotion of and participation in the preparation of awareness, training and education programmes on climate change and monitoring the implementation of policies, programmes and measures in the area of climate change. In 2012, these tasks were transferred to the Ministry of Agriculture and Spatial Planning due to the reorganisation of the Government of the Republic of Slovenia.

4.2 GHG Emission Reduction Measures

4.2.1 Multi-sectoral Measures

(M-1) GHG EMISSION ALLOWANCE TRADING (EU-ETS)

Sectors influenced by the implementation of the measure: *power and heat generation, use of energy in industry and construction, industrial processes*

The objectives of GHG emission allowance trading are the following: to support the commitments to reduce emissions; to enable lower costs for corporate entities by enabling a decrease in emissions where this is the cheapest; to equalise the costs of the reduction of GHG emissions in the entire EU area by permitting intergovernmental trading – this will minimise the restriction of competition and discrimination of the position of corporate entities (operators of plants responsible for GHG emissions) in the common internal EU market, and facilitate the reduction of GHG emissions in the future by upgrading innovation regarding the reduction of GHG emissions.

94 operators of plants in Slovenia were included in the GHG emission allowance trading scheme for the period 2008–2012. In 2010, the plants included in the system represented 42% of total GHG emissions. Operators are distributed in three IPCC sectors: energy supply, where all operators are included in the EU-ETS; industry and construction, where 68% of GHG emissions of this sector are included in the EU-ETS; and industrial processes, where 70% of GHG emissions are included in the EU-ETS. In 2012, the EU-ETS included aviation, while in 2013, the EU-ETS included all emissions from aluminium production. In 2010, emissions from aviation amounted to 75 kt CO_2 eq, taking into consideration the fact that 98% of emissions resulted from international transport. In 2010, GHG emissions from primary aluminium production amounted to 72 kt CO_2 eq. In 2008, emissions were significantly higher, namely 109 kt CO_2 eq from aviation and 142 kt CO_2 eq from aluminium production.

In the period 2008–2012, 8,167,941 t CO_2 emission coupons annually or 40,839,705 t CO_2 for the entire period were allocated free-of-charge to existing operators of plants included in the system[14] on the basis of the National Plan for the Allocation of Emission Coupons for the Period 2008–2012. 130,996 t of CO_2 emission coupons annually or 654,980 t CO_2 for the entire period were planned for operators of new plants.

Emissions in the EU-ETS sector decreased by 10% until 2011 compared to 2008 and by 8% compared to 2005.

Emissions trading has continued since 2013. At the EU level, the legally binding objective of reducing GHG emissions from this sector by 21% by 2020 compared to the 2005 level has been adopted. For the period until 2030, the objective of reducing emissions by 43% was set. The impact on the installations in Slovenia included in the EU-ETS sector has been assessed. For the period 2013–2030, the impact is assessed as the difference between the projection of actual emissions and the indicative average annual quantity of emission coupons. The

[14] Ordinance on the National Plan for the Allocation of Emission Coupons for the period 2008–2012 (Ur. list RS (Official Gazette of the Republic of Slovenia), nos 42/2007 and 70/2007).

indicative amount was assessed in such a way that the amount of emission coupons for the period 2008–2012 increased by emissions from additional sectors in that period has decreased linearly by 1.74% annually since 2010. In 2015, the difference will amount to 283 kt CO_2, and in 2020 to 1.139 kt CO_2.

The Ministry of the Environment and Spatial Planning (MOP) is responsible for its implementation, while the tasks encompass implementation of the provisions of the Environmental Protection Act referring to trading with emission coupons. The establishment of the system falls within the competence of the EU.

(M-2) ENVIRONMENTAL TAX ON AIR POLLUTION DUE TO CO_2 EMISSIONS

Sectors influenced by the implementation of the measure: *energy use in industry and construction, energy use in households, the service sector, transport and agriculture*

- The environmental tax on air pollution due to CO_2 emissions (the CO_2 environmental tax) was already introduced on 1 January 1997, the current legal basis for the tax is provided in the Decree on environmental tax on carbon dioxide emissions[15] and the Environmental Protection Act[16]. The indicated instrument was introduced with the intention of internalising the external costs of air pollution due to CO_2 emissions, and influencing, as an economic instrument, the reduction of air pollution due to CO_2 emissions; in other words, reducing environmental pollution. The environmental tax is paid for the use of fuels and the incineration of combustible organic substances and, since 2008, for the use of fluorinated greenhouse gases. The basis for the calculation of the environmental tax for the pollution of air due to CO_2 emissions is the sum of the units of pollution of the purchased amount of fuels or units of pollution of the burnt combustible organic substances. With fluorinated greenhouse gases, this is pollution equalling 1 kg of CO_2 emissions. The price per unit of pollution is determined by the Government of the Republic of Slovenia and has amounted to 14.4 €/t CO_2 since 8 January 2013 (Decision laying down the price per unit of burden on environment with emission from carbon dioxide, Ur. l. RS, no. 102/2012), while prior to that it amounted to 12.5 €/t CO_2. The use of wood biomass, gas fuels and kerosene used as a propellant is exempt from the payment of the environmental tax; however, the exemption also applies to companies that are included in the EU-ETS system (holders of permits for the discharge of greenhouse gases). In order to promote the implementation of measures to reduce greenhouse gas emissions, until the end of 2008 the legal basis for the environmental tax included the possibility of an exemption from the payment of the tax in two cases: operators of plants for the co-generation of heat and power,

[15] Decree on environmental tax on carbon dioxide emissions (Ur. l. RS, nos 43/2005, 58/2005, 87/2005, 20/2006, 78/2008, 39/2010, 13/2011, 75/2011 and 1/2012)

[16] The Environmental Protection Act/ZVO-1 (Ur. l. RS, nos 41/2004, 17/2006, 20/2006, 28/2006 Constitutional Court Decision, 39/2006-UPB1, 49/2006-ZMetD, 66/2006 Constitutional Court Decision, 112/2006 Constitutional Court Decision, 33/2007-ZPNaèrt, 57/2008-ZFO-1A, 70/2008, 108/2009, 108/2009-ZPNaèrt-A, 48/2012, 57/2012 and 97/2012 Constitutional Court Decision).

- operators of plants that, in connection with the operation of plants, concluded an agreement on the reduction of the pollution of air due to CO_2 emissions for the period 2005–2010 with the ministry responsible for environmental protection.

The use of gasoline and gas oil used for powering vehicles was exempt from the payment of the environmental tax until 10 July 2012, while since that time it has been subject to the tax.

In the period 2005–2007, 167 companies concluded an agreement on the reduction of emissions, whereby the companies undertook to reduce specific annual emissions with regard to the referential emissions (the highest specific emissions in the period 1999–2002) by 2.5% by the end of 2008.

A new scheme of exemptions from the payment of the environmental tax when concluding an agreement on the reduction of air pollution due to CO_2 emissions has been planned.

(M-3) KYOTO FLEXIBLE MECHANISMS

According to the latest projections of greenhouse gas emissions, in order to meet the requirements under the Kyoto Protocol, Slovenia meets the Kyoto objective practically without the use of the Kyoto flexible mechanisms. This is the result of a significant reduction in transport emissions in 2009 due to lower emissions from transport, the economic crisis and partially due to higher motor fuel prices above the level of certain neighbouring countries. In 2010, transport emissions decreased further; they were 14% lower compared to the amount in 2008.

(M-4) TAXES AND CHARGES

Sectors influenced by the implementation of the measure: *energy use in industry and construction, energy use in households, the service and public sectors, and agriculture*

TAXATION POLICY

The reason for the tax on energy primarily stems from the nature of the budget, namely, to collect funds to finance national budgetary expenditures. The existing practice of determining taxes and tax policy in the area of energy and energy products indicates that taxes on energy products are determined by the state by its fiscal policy, while the influence of environmental and energy policy on the determination of taxes, which is one of the more important mechanisms used to achieve the set objectives, is still not prominent. Taxation of energy may be one of the most important instruments at the state's disposal that can influence the final price of individual energy products and assist in the fulfilment of the objectives of the environmental and energy policy. In 2010, the Slovenian government set up an inter-ministerial working group that has been headed by the ministry responsible for the environment since 2012 and whose purpose is to prepare a comprehensive programme of changes in policies required to implement the "green tax reform". The group will examine the following: The possibilities of increasing the taxation of energy products and electricity, appropriate valid exemptions and reliefs in connection with energy products and electricity pollution, the appropriate amount of other charges for environmental pollution, solutions for reducing the burden of labour taxation, an analysis of the situation in the area of so-called environmentally harmful subsidies, and proposals for their elimination or reduction. Green

tax reform is under discussion within the framework of the preparation of Slovenia's Development Strategy until 2020.

EXCISE DUTIES

In the Republic of Slovenia, the taxation of fuels is regulated by the Excise Duty Act,[17] which has been in force since 1 July 1999. Since 1 March 2007, the excise duty on electric power has been paid by end-users in the amount of EUR 1/MWh, while since 1 August 2010, it has amounted to EUR 3.05/MWh. For the taxation of natural gas, Slovenia negotiated a transitional period until 1 May 2014, since the immediate introduction of a minimum excise duty in the prescribed amount could endanger the implementation of the set objective (increased use of natural gas) and the fulfilment of commitments undertaken by Slovenia with the ratification of the Kyoto Protocol. The amount of excise duties for liquid fuels is determined by the Government of the RS by the harmonisation of the prices of oil derivatives with the movements of crude oil prices and the American dollar exchange rate. The results of the excise duty policy for liquid fuels are indicated in the change of the excise duty and the difference between the price of motor gasoline and gas oil and the approximation of the retail prices of motor fuels to the European average. The excise duty on motor fuels has increased in the period since 2000; in the period 2005–2010, the increase in excise duties ceased, since the Government of the Republic of Slovenia used the regulation of excise duties as an instrument for following the Maastricht criteria for entry into the ERM 2 and the adoption of the euro. Since 2011, the Government of the Republic of Slovenia has been increasing excise duties on liquid fuels with the objective of increasing the national budget. In 2010, the prices of liquid motor fuels rose above the level of neighbouring countries, with the exception of Italy, while in 2011 they were mostly lower than in neighbouring countries.

(M-5) EDUCATION, TRAINING, AWARENESS RAISING, INFORMING AND PROMOTION

Implemented by various actors carrying out activities (governmental and non-governmental sectors, media, the economy, professional institutions, etc.), there are a number of activities concerning education, training, informing and awareness raising in the area of climate change mitigation and related issues (e.g. good practice in the fields of waste, water and energy) in Slovenia. They are financed from different sources, including the state budget, EU funds and various international sources.

Studies show that education and training aimed at achieving a low carbon society include a great part of the population of the Republic of Slovenia. An even greater proportion is covered by various activities of awareness raising and communication. In Slovenia,[18] an analysis of the situation shows that basic information about the results and consequences of climate change is at a relatively high level; furthermore, a high proportion of the population carry out actions to mitigate climate change.

(M-5A) AWARENESS RAISING, INFORMING AND PROMOTION

[17] Ur. l. RS, nos 97/2010-UPB8, 48/2012 and 109/2012

[18] Eurobarometer, Climate Change Report, 2011.

OP GHG-1 defined the basic measures in the area of **awareness raising, informing and promotion**[19]:

- The preparation of national guidelines to proactively include the essential public in the implementation of the environmental policy in the area of climate change. The draft Strategy of communication and education on climate change and sustainable development until 2050 was published in February 2012;
- Preparation of national guidelines to proactively include the essential public in the implementation of the environmental policy in the area of waste management and a training programme for appropriate stakeholders in the field of waste management.
- A study on the possibilities of establishing a broad and dispersed network of information centres for assistance in the implementation of measures to reduce emissions and adaptation to climate change.

  The "Energy advisory network for households – ENSVET" programme has been in operation since 1993; it offers basic information and consulting services on the implementation of measures for efficient use of energy and renewable energy sources in residential buildings. The programme has been carried out through a network of energy-counselling offices based on a partnership between the state and local communities. Use of the energy advisory network is free of charge, the service is provided by approximately 60 authorised persons in 36 energy advisory offices under the authority and control of the Gradbeni inštitut ZRMK (the Construction Institute of ZRMK). An analysis of the impact of the operation of the energy advisory network carried out in 2009 on the basis of interviewing citizens who visited the energy advisory network showed that citizens who after being advised changed individual building envelope elements or carried out energy saving building retrofits, reduced the consumption of heat for heating by approximately 25%. In the National Action Plan for Energy Efficiency for the Period 2008–2010, it was assessed that on the basis of the ENSVET programme , energy savings amounting to 51.6 GWh or 8.8 eq CO_2 was achieved between 2006 and 2010, and 99.2 GWh or 16.9 kt CO_2 eq in the period 1993–2005.

  For other target groups, except for households, energy advisory networks have not been set up.

- In order to promote low-carbon technologies, the responsible ministries carried out the following activities:
  - Co-financing of projects covering awareness-raising, promotional and educational activities in the area of efficient energy use and renewable energy sources in the amount of EUR 60,000 for 2007, EUR 80,000 EUR for 2008, and EUR 80,000 for 2009. In 2010 and 2011, in order to reduce expenditures, the ministry responsible for EEU and RES did not publish an invitation to tender for co-financing these projects.

[19] Sources: The Third Report on Monitoring the Implementation of the Operational Programme for Reducing Greenhouse Gas Emissions until 2012 (Government of the Republic of Slovenia, 8 November 2012).

- From February 2005 until March 2012, the ministry responsible for efficient energy use published an *"Efficient Energy Management"* bulletin, which is the central communication tool for providing information to different target groups, in addition to the website of the ministry[20]. From 1999 to and including 2011, the ministry participated in the Energy Efficiency Competition. It co-financed international projects to promote the EEU and RES. In 2010 and 2011, it co-financed the REUS study (energy efficiency in Slovenian households). In connection therewith, the *Communication Plan of the Introduction of Heat Dividers in Buildings by Actual Consumption (2011)* was prepared and the *Information Campaign of the Introduction of Heat Dividers by Actual Consumption (2011 and 2012)* was conducted.
- From 2011 to mid-2013, tasks in the field of education, informing and raising the awareness of the public regarding the importance of public passenger transportation, entitled "See You at the Station", was carried out in the area of transport. The value of the project was EUR 534,900; it was carried out on the basis of a public contract by a consortium of seven organisations and was financed by the EU Cohesion Fund. A number of projects to promote sustainable mobility are carried out within the framework of EU programmes, such as CIVITAS, Intelligent Energy for EUROPE (22 projects) INTERREG, and others.

- In 2010 and 2012, the non-profit organisation Ecologists Without Borders carried out the biggest environmental protection project in the history of the country "Let's Clean Slovenia", in which 270,000 volunteers or 13.5% of the Slovenian population participated in 2010. They were regionally connected and worked in close cooperation with the municipalities, municipal utility companies and other public companies, and various associations and institutions. The action was also extremely important in terms of raising awareness and education regarding sustainable use.
- The plan for monitoring awareness-promotional activities. The introduction of systematic monitoring of awareness-promotional activities has been planned.

The results of the Eurobarometer surveys consducted in 2008, 2009 and 2011 show a high level of awareness of the climate change issue in Slovenia. In Slovenia, the view prevails that the climate change issue is a serious issue (89% in 2008, 78% in 2009 and 75% in 2011), which is considerably above the EU average (75%, 64% and 68%, respectively). Respondents in Slovenia are more critical than the EU average with regard to the efforts of those responsible for the fight against climate change and they believe that they do not do enough: residents themselves (86% in 2008 and 82% in 2009), the Government (84% and 81%), the EU (75% and 72%) and industry (93% and 92%). 79% of respondents in 2008 and 74% in 2011 (EU: 61% and 53%) carry out various measures to reduce GHG emissions. Other

[20] The bulletin presented information on innovation in the area of energy and environmental policies, regulations and standards, as well as programmes, projects and invitations to tender by ministries, the European Commission and other current content related to the EEU and RES. The bulletin published information on the development of the energy market, international and bilateral programmes and projects, energy efficient technologies, the activities of energy users, energy supply companies, local communities, local energy agencies, financial institutions, and others.

Eurobarometer analyses indicate that a considerable number of consumers pay attention to energy use. In 2008, 27% of the respondents did not carry out measures because of a lack of knowledge of such measures. In 2008, 95% of the respondents in Slovenia deemed that the problem requires an urgent response, which was seven percentage points more than the average in the EU. In 2009, 66% of the Slovenian population and 63% of the EU were of the opinion that combating climate change could have a positive effect on the EU economy. When the effect on jobs was added (on the economy and jobs) in 2011, an affirmative answer was given to the question by 81% of respondents in Slovenia and 78% in the EU. According to the responses, Slovenia ranks among the countries whose populations are the most sensitive to the climate change issue.

Raising awareness and information measures are also planned in specific, already adopted sectoral programmes. These activities are summarised and upgraded in the proposed OP GHG-2020. A number of activities were carried out by integrating Slovenian participants into European projects within programmes that will continue in a similar manner in the future in the context of EU programmes: Horizont 2020, LIFE, COSME 2020 and interregional programmes INTERREG VI, cross-border cooperation programmes with all neighbouring countries, transnational cooperation programmes for the area of the Alpine Space, Central Europe, the Adriatic-Ionian region, the Mediterranean, and the Danube region.

(M-5B) EDUCATION

The basic activities in the area of **education** include the following:

- inclusion and integration of content on the problems of climate change, sustainable development and relevant behavioural patterns in the curriculum of kindergartens, elementary and secondary schools, as well as higher education, including programmes for lifelong education;
- inclusion and integration of content on the problems of climate change, sustainable development and relevant behavioural patterns in the curriculum of higher education institutions; strengthening undergraduate education in this area;
- a content-harmonised and quality programme on external educational activities for youth on the issues of climate change;
- incentives to strengthen undergraduate education.

The measures are being carried out and are under preparation. The 2011 White Paper on Education in the Republic of Slovenia deals with climate issues in the context of education for sustainable development.

The issue of climate change has been dealt with in the context of environmental education for a long time and has been introduced into the national curriculum at all levels of education in various ways:

- Environmental education is included in the primary school curriculum as an interdisciplinary area, a subject (especially natural science) of activity days and 'school in nature'.
- In *gimnazija* (general upper secondary schools), environmental education is primarily carried out in the context of natural science subjects, geography and sociology, and as a part of the available electives (one or more of which must be selected) in the form of the optional subject Environmental Studies.
- In the field of vocational and specialised education, environmental education is integrated into the general education part in the subject Natural Sciences, in professional and technical subjects, and in practical education, interest activities, and extracurricular activities.
- A number of textbooks for secondary schools have been published[21].
- From 2006 to 2008, the programmatic reform of vocational and specialised education was co-financed by ESF funds. The generic or key competences concerning environmental protection, rational energy use, and safety at work were introduced in practically all educational and training programmes. In most educational and training programmes, especially those in the field of technology, these elements were integrated into the subject Environmental Protection and Safety at Work and occasionally into the subject Sustainable Development. In the period from 2008 to 2013, new educational and training programmes were gradually introduced at schools (the process was supported by ESF funds), which were accompanied by the training of management and all professional staff at secondary and higher specialised schools. Under the new education and training programmes, a certain part of the curriculum (an open curriculum – up to 20%) is left to schools at all vocational and specialised education and training levels. This enables possibilities for continuous updating of education in the field of climate change prevention as well.

Under extra-curricular activities, primary schools participate autonomously in various projects (e.g. "eco", "healthy" and "Unesco School" projects, as well as in youth research activities. *Gimnazije* (general upper secondary schools) and vocational and specialised schools are independently included in various "healthy" and "eco" school projects and in youth research projects.

In recent years, schools and partially kindergartens have been offered new projects, actions, and networks carried out primarily by non-governmental organisations: The Environmentally-Friendly Kindergarten and School campaign (Planet *Zemlja* [Earth] Association), the Caritas Slovenia project "Live simply and show solidarity – towards environmental justice", and participation in the U4energy pan-European youth competition

[21] Curricula with a strong environmental component, including the secondary and higher education Nature Protection programmes, were prepared within the framework of the Biotechnology Education Consortium, which featured 11 secondary agricultural schools in Slovenia in connection with the Maribor Biotechnical Faculty (e.g. for the environmental technician and nature protection technician programmes, which also cover climate change), including a professional education manual (*Razmišljamo in delujemo trajnostno* [Thinking and Acting Sustainably], CPI, 2010).

for higher energy efficiency (since autumn 2010). Schools participate in the School Energy Network of the Velenje Inter-Company Education Centre (in connection with the energy management of schools and online energy bookkeeping); activities are also performed within the "Eco-School as a Way of Life" project. Practical projects are also carried out by the NGO Slovenian E-forum.

In the 2007–2009 period, several study programmes were confirmed for implementation at undergraduate and postgraduate levels at six higher education institutions; these programmes are in the fields of the environment or environmental protection, ecology, environmental science, environmental protection, eco-remediation (1 higher education study programme, 3 university study programmes, 4 master's programmes, and 3 doctoral programmes). In addition, the "Bologna reform" introduced new subjects whose contents are relevant to the development of a low-carbon society (e.g. sustainable use of energy and the environment) in the study programmes of different fields.

(M -5C) TRAINING

The basic activities in the area of training include the following training programmes for:

- decision makers in public administration;
- measures in the field of energy;
- measures in the field of transport;
- measures in the field of agriculture and forestry;
- measures in the field of waste management; and
- management-administrative structures on technical and management-administrative issues with regard to reducing greenhouse gas emissions for the implementation of individual measures.

- A number of training programmes are being carried out, *inter alia*:
  - The "European Energy Manager – EUREM" training programme is carried out in accordance with the certified programme in 21 European countries[22]; in Slovenia, it is organised by Jožef Štefan Institute.
  - Additional professional training for energy surveyors is performed by Gradbeni inštitut ZRMK (the Construction Institute of the ZRMK) within the ENFORCE project. Training for independent experts who can issue building energy performance certificates is carried out by the Construction Institute of the ZRMK in accordance with the public authority of the competent ministry (6 training

[22] In Slovenia, 5 EUREM trainings programmes attended by 121 European energy managers were carried out. The first education programme took place in 2008 within the framework of EUREM.NET, which was co-financed in the context of the "Intelligent Energy – Europe" programme of the European Commission; a fifth group finished the educational programme in June 2012. The total potential to reduce the use of energy due to the implementation of efficient energy use measures that the programme participants envisaged in their project tasks was estimated at 175.7 GWh or EUR 13.9 million per year, when taking into account investment amounting to EUR 56.9 million, whereas the reduction in CO_2 emissions amounted to 110.7 kt per year. Slovenian energy managers have been successful in their tasks at the European level and have been awarded four prizes at the regular annual conference of European energy managers.

programmes per year over the three-year period, 2011-2014, www.energetskaizkaznica.si).

- Training for green professions in the construction sector takes place within the European project BUILD UP SKILLS Slovenia (preparation of the programme and action plan to better qualify builders of nearly zero-energy buildings, which cover formal and non-formal forms of lifelong learning) (http://buildupskills.si).
- Regular training programmes for engineers and architects on sustainable construction, energy efficiency, and green public procurement are held by the Slovenian Chamber of Engineers and Slovenian Chamber of Architecture and Spatial Planning (www.izs.si; www.zaps.si).
- Training in the area of sustainable construction and green public procurement is carried out by the Green Building Council Slovenia (http://www.gbc-slovenia.si/).
- Programmes for training installers of RES technologies (in accordance with Directive 2009/28/EC on the promotion of the use of energy from renewable sources, the rules are under public discussion) are in preparation. Training for air-conditioning system inspectors (in accordance with the Directive on the energy performance of buildings (31/2010/EU); the Slovenian Chamber of Engineers was selected.
- Training activities take place as a part of fair events, such as the International Trade Fair, the DOM fair, the MEGRA fair, and others; they are organised by various organisations; target groups are private and public investors, design engineers, and industry.
- Training in the area of green technologies for EEU and RES in buildings is carried out by industry (e.g.: GIZ PFSTI, Viessman Academy, MIK, etc.).
- Training for unemployed persons in the field of efficient energy use and renewable energy sources has been carried out by Slovenian E-forum.
- Within the Environmentally Efficient State Administration programme adopted in 2010, consultation was organised that included general training on climate change. In 2012, a seminar on green public procurement was organised by the Administrative Academy.
- There are several training activities available via EU project websites, e.g. www.buy-smart.info.
- Courses on economical driving for drivers of personal vehicles are organised by the Automobile Association of Slovenia.

EUR 3.33 million annually is planned for this measure in the NEEAP.

Table 4.2: Summary description of multi-sectoral measures.

Designation	Measure and/or policy	Objective	Gas influenced by the measure	Type of measure	Implementation phase	Implementer	Effect of the measure [Gg CO_2 eq]		Connection to the measure from the previous National Report
							2015	2020	
M-1	GHG EMISSION ALLOWANCE TRADING (EU-ETS)	To reduce GHG emissions where this is most cost efficient	CO_2, PFC	Economic, other	Carried out	MAE	2,187	3,242	M-1 GHG EMISSION ALLOWANCE TRADING (EU-ETS)
M-2	ENVIRONMENTAL TAX ON AIR POLLUTION DUE TO CO_2 EMISSIONS	To internalise the external costs of air pollution due to CO_2 emissions	CO_2	Fiscal	Carried out	MAE	-	-	M-2 ENVIRONMENTAL TAX ON AIR POLLUTION DUE TO CO_2EMISSIONS
M-3	KYOTO FLEXIBLE MECHANISMS	Cost efficient reduction of GHG emissions	CO_2	Economic, voluntary agreement	Adopted	MAE	-	-	M-3 KYOTO FLEXIBLE MECHANISMS
M-4	TAXES AND CHARGES	To iinfluence the price of fossil fuels to create an environment that encourages higher use of environmentally-friendly fuels	CO_2	Fiscal	Carried out	MF	-	-	M-4 TAXES AND CHARGES
M-5	EDUCATION, TRAINING, AWARENESS RAISING, INFORMING AND PROMOTION	To create an environment favourable to the implementation of GHG emission reduction measures	CO_2, N_2O, CH_4	Informing, educational	Carried out	Various ministries	-	-	EDUCATION, TRAINING, AWARENESS RAISING, INFORMING AND PROMOTION

4.2.2 Energy Supply

(M-6) INCREASE IN THE ENVIRONMENTAL EFFICIENCY OF ELECTRICITY AND HEAT GENERATION IN LARGE COMBUSTION PLANTS

Sectors influenced by the implementation of the measure: *power and heat generation*

Due to the expiry of the life-expectancy of a number of large combustion plants and the requirements of the Directive on industrial emissions (integrated pollution prevention and control) (2010/75/EC) or directives prior to this one, it is necessary to replace the majority of the large power generating units in Slovenia with modern and environmentally acceptable units with substantially higher efficiency, increase the power generation from CHP with high

efficiency and carry out, where necessary, a partial change in fuel – primarily the partial transition to natural gas[23] and higher use of wood biomass in co-firing.

The following facilities will be constructed by 2020:

- Šoštanj Thermal Power Plant: construction of a new coal unit – TEŠ 6, by 2016 (units 1 and 2 were permanently closed in 2010 and 2008, respectively, units 3 and 4 are to cease operations in 2015, planned operation of unit 5 in reserve from 2016 onwards); In the Contract on the Arrangement of Mutual Relations between the Government of Republic of Slovenia and the Šoštanj Thermal Power Plant, an emissions ceiling of annual CO_2 emissions from the existing units and unit 6 for the period 2016–2054 is defined;
- Trbovlje Thermal Power Plant: Construction of a gas steam unit – a final decision has not been adopted yet;
- Ljubljana Heat and Power Plant:
- Investment in the co-incineration of wood biomass in unit 3 (replacement of 20% of coal by wood biomass in this unit) was realised in 2008.
- Partial transition to natural gas – construction of a gas turbine (107-134 MWel) in unit 2 by 2015 and an increase in generated electricity in CHP with high efficiency by 500 GWh (first phase) and the construction of a gas steam unit by 2020 (second phase);
- Brestanica Thermal Power Plant: Construction of a new gas turbine by 2015, which is intended for reserve capacities.

The main mechanisms for achieving the implementation of the measure are: **Trading in GHG emission allowances.** (All large combustion plants are included in the trading scheme, which significantly influences their competitiveness with regard to the price of emission coupons and consequently encourages modernisation, particularly after 2012, when the operators of power generation plants will have to purchase all necessary coupons at auctions), **efficient operation of energy markets** (environmental inefficiency reduces the competitiveness of plants in the open market), **the requirements of environmental protection permits** (according to a new directive on industrial emissions, Directive 2010/75/EC, the requirements for achieving the emission limit values will become significantly stricter in 2016, which will severely restrict the operation of inappropriate plants after that year), the **new support scheme for electricity generated by co-generation of heat and electricity with high efficiency** (the inclusion of production plants with a power output of up to 200 MW in a support scheme represents significant developmental encouragement for the technological modernisation of older plants and primarily a significant increase of the amount of power generation in CHP with high efficiency), the **new support scheme for electricity generated from renewable energy sources** (support for the highly-efficient use of wood biomass and other renewable sources also provides a stimulative framework for the use of such in large combustion plants), **protection of domestic sources** (EU legislation provides subsidies for electricity supply from domestic energy sources of up to 15% of the use of electricity on the basis of annual invitations to tender; this instrument was used until 2012, after which it was not envisaged that it would be further used), **measures to safeguard the security of the electricity supply** (Directive 2005/89/EC, [24] additional promotion by the

[23] Data source: Indicative development plan of energy sector, data submitted by investors.

[24] Directive 2005/89/EC of the European Parliament and of the Council of 18 January 2006 concerning measures to safeguard the security of electricity supply and infrastructure.

state to encourage the construction of necessary, new, efficient and environmentally-friendly production capacities under transparent conditions and non-discriminatory procedures. This instrument is currently not in use in Slovenia). **The provision of funds** (Energy companies concentrate their own resources in new investments; through guarantees, the state ensures long-term loans for priority investments in large power generation plants – the companies pay the state a premium for assuming the risk in accordance with the regulations on EU state aid; for the implementation of investments it is necessary to study the possibility of strategic partnerships, etc.).

(M-7) PROMOTION OF CO-GENERATION OF ELECTRICITY AND HEAT WITH HIGH EFFICIENCY

Sectors influenced by the implementation of the measure: *power and heat generation, energy use in industry and construction, energy use in the service and public sectors, agriculture and households*

In 2009, the promotion scheme for co-generation of power and heat (CHP) was renewed. The renewal is a result of the low level of support for CHP in the industry and service sectors and therefore Slovenia lagged behind the objectives in this area and the necessary notifications regarding state aid to the European Commission. The Government confirmed the legislative framework for the scheme[25] on 7 May 2009, while the implementation of the support scheme began on 1 November 2009 after approval by the European Commission.

The measures include a new system of supporting electricity produced in CHP plants in two forms:

- the guaranteed purchase of electricity which is purchased by the Borzen centre for support at the applicable purchase price, which is not dependent on the price of electricity on the market;
- operating support for electricity generated by CHP which is sold by producers on the market on their own or used for their own consumption.

CHP plants with a nominal electric power of 1 MW may select between the aforementioned forms of support. CHP plants with a nominal electric power higher than 1 MW may apply for financial assistance only for operating support. CHP plants with a high efficiency of up to 200 MW of electric power in all sectors will be eligible for support. New and largely new CHP production plants [26] with high efficiency having a valid declaration for the production plant will be eligible to obtain support. Support is to be provided for 10 years or, for largely new plants, also for a shorter period.

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[25] Decree on support for electricity produced in high efficiency cogeneration of heat and power (Ur. l. RS, no. 37/2009), Decree on determination of the amount of electricity from co-generation of heat and electricity which is generated with high efficiency and determination of efficiency of transformation of energy from biomass power (Ur. l. RS, no. 37/2009).

[26] New and largely new plants are also considered CHP production plants which have been restored in the last 10 years and where the investment value of restoration is more than 50% of investments in the same new plant.

In order to support the development of CHP, there is an appropriate tax and price policy with gradual internalisation of external costs, as well as appropriate treatment of CHP within the framework of the GHG emission allowance trading scheme (EU-ETS). CHP in the household, service and public sectors has been promoted through the new Rules on the energy performance of buildings (Ur. l. RS, no. 52/2010), where achievement of a 25% share of RES in final energy for the operation of the systems in the building is prescribed, where the requirement is also met if at least 50% of final energy for the heating and cooling of buildings and providing hot water is obtained from CHP plants with high efficiency or at least 50% of a building is supplied from an energy efficient district heating or cooling system.

The installation of CHP units is also encouraged by the public Eco Fund by providing loans for investments with favourable interest rates.

In order to promote the production of electricity in CHP units with high efficiency, the Energy Agency of the Republic of Slovenia has been granting guarantees of origin.

(M-8) PROMOTION OF ELECTRICITY GENERATION FROM RENEWABLE ENERGY SOURCES

Sectors influenced by the implementation of the measure: *power and heat generation, industry and construction, the service and public sectors, households*

This measure was designed in a similar way as the promotion of CHP. This measure refers to the generation of electricity in plants using the following renewable energy sources: the energy potential of watercourses, wind energy on land-based production plants, solar energy from photovoltaic power plants, geothermal energy, energy obtained from wood biomass, energy obtained from biogas derived from biomass and biologically degradable waste, energy obtained from landfill gas, energy obtained from gas from sludge from the treatment of wastewater, energy obtained from biologically degradable waste and other sources that comply with the definition of RES referred to in the Energy Act.

When determining the support for which RES power plants are eligible, it is also considered to what extent the renewable energy sources are utilised sustainably and if the produced heat is used in a beneficial manner (e.g. CHP from RES). RES power plants with a nominal electric power of 5 MW may select between guaranteed purchase or financial aid for current operations. RES power plants with a nominal electric power higher than 5 MW may apply for financial assistance only for current operations. Under the new regulation, RES power plants with an electric power of up to 125 MWel are eligible for support as well. The old support scheme ceased to apply in 2011.

Supports are provided for a period of 15 years for new plants or also for a shorter period for largely new plants.

The production of electricity from RES is also encouraged by the public Eco Fund by providing loans for investments with favourable interest rates.

The new Rules on Efficient Use of Energy in Buildings (52/2010), which prescribe a mandatory 25% share of RES in the total use of final energy in buildings, encourage the use of RES in general use, also for electricity generation. The Rules apply to new and renovated buildings.

Furthermore, the construction of hydroelectric power plants continued in Slovenia. On the lower branch of the Sava, a chain of five hydroelectric power plants is being built; three hydroelectric power plants have already been completed (HPP Boštanj in 2006, HHP Blanca in 2009 and HHP Krško in 2012), the remaining two electric power plants are planned to be completed by 2018. The total annual production is estimated to be 721 GWh. Additionally, the procedure for siting three hydroelectric power plants on the middle branch of the Sava is being carried out: HPP Suhadol, HPP Trbovlje and HPP Renke. In 2010, the Avče pumping hydroelectric power plant was completed; by 2018, the construction of the Kozjek pumping hydroelectric power plant is to be completed. This will allow an increase in the share of renewable energy sources in the electricity supply.

4.2.3 Energy Use

(M-9) PROMOTION OF EFFICIENT ENERGY USE IN INDUSTRY

Sectors influenced by the implementation of the measure: *energy use in industry and construction*

The promotion of efficient energy use in industry has been implemented as a priority in the field of electricity due to the high growth in the use of electricity until 2007. The economic crisis slowed the growth; average annual growth in the use of electricity in this sector amounted to only 0.6% annually in the period 2000–2011, while there are significant differences between the years. The largest increase in electricity amounted to 13% in 2003 and the largest decrease amounted to -21.3% in 2009. The largest share of electricity in this sector is used for electric motor drives (around 50%, almost half of this for pumps and ventilators), the production of compressed air (around 10%), lighting (around 8%), cooling (around 5%), ventilation and air conditioning (around 5%), and for various other purposes (e.g. for technological processes).

The promotion of the efficient use of electricity is also stipulated in the Energy Efficiency Action Plan (EEAP), which earmarks EUR 15 million in public funds in the period 2009–2013 for this purpose. A part of these incentives are financed from the EU Cohesion Fund under the Operational programme of environmental and transport infrastructure development for the period 2007–2013. The measure for improving energy efficiency in industry by means of direct financial incentives amounting to 30-50% of the eligible costs of the investment promotes the use of energy efficient technologies, such as the following: energy efficient electric motors, frequency control of electric motors, energy efficient pumps and ventilators, energy efficient systems for the preparation of compressed air, and energy-efficient lighting. The amount of the incentives depends on the size of the company.

A part of the implementation of the EEAP is also represented by the invitation to tender published by the public Eco Fund for providing loans with favourable interest rates for environmental investments by legal persons and sole proprietors regarding efficient energy use measures in production and business facilities.[27]

[27] Investments in the reconstruction or replacement of lighting, hydraulic and pneumatic aggregates, electrical drives and their control systems, heating and cooling systems, ventilation with heat

Potential for improving efficient energy use in industry also lies in the use of heat and fuel. Encouraging the introduction of energy management (energy management systems) is planned among the key measures for improving the efficient energy use in industry within the EEAP.

Measures in industry are supported by energy supply companies under the efficient energy use programmes for end users (DSM). In 2012, grants were available to companies for the following measures:the installation of natural gas or wood biomass boilers, the installation of energy-saving motors, systems for the exploitation of waste heat, improving the efficiency of systems for the preparation of compressed air, installation of heating stations, retrofitting or installation of energy-efficient lighting, the introduction of systems for energy management, energy surveys, etc. In 2012, the total amount of funds available was EUR 15 million, of which EUR 6.5 million was earmarked solely for companies, while EUR 5.3 million was intended for companies as well as the public sector. Invitations to tender intended for the efficient use of thermal energy were predominant, while some measures were intended to promote efficient use of electricity.

The promotion of increased energy efficiency is implemented through horizontal measures: environmental taxes for air pollution due to CO_2 emissions, other taxes and education, training and promotion. Until the end of 2008, the direct incentive for improving efficiency was represented by the exemption from the payment of the environmental CO_2 tax for liable persons who concluded an agreement with the competent authorities by which they undertook to reduce emissions by at least 2.5% by the end of 2008 with regard to the reference year.

(M-10) PROMOTION OF THE USE OF RENEWABLE ENERGY SOURCES AS A HEAT SOURCE

Sectors influenced by the implementation of the measure: *energy use in industry and construction, energy use in households, the service and public sectors, and agriculture.*

In addition to financial incentives for investments (subsidies and soft loans) in environmentally-friendly heat generation from renewable energy sources, state programmes also include regulations and energy counselling as well as awareness raising, informing and education with regard to energy users and other target groups.

Measures for promoting the use of RES for heat generation are planned within the framework of two priority policies of the Operational Programme for Environmental and Transport Infrastructure Development (OP ROPI): energy-saving retrofitting and sustainable construction of buildings and innovative systems for local energy supply. The first policy includes the following measures: the retrofitting of heating systems (installation of wood biomass boilers), the installation of solar heating systems, the installation of heat pumps and the preparation of sanitary warm water, as well as the installation of systems for combined heat and power generation. The second policy includes promotion of the following technological areas: wood biomass district heating systems, group and micro district heating systems, including systems for combined heat and electricity generation from wood biomass; modern boilers and systems for combined heat and power generation from wood biomass in industry; systems for heat and power generation from biogases, and heat and power

recovery by which a 25% energy savings is achieved or investments in the replacement of technological lines, machines and equipment.

generation from geothermal energy. In the period 2008−2012, within the framework of energy-saving retrofittings and the sustainable construction of buildings, EUR 15 million were available for RES (individual heating systems using wood biomass) and EUR 27 million within the framework of the priority policy regarding innovative systems for local energy supply. The Eco Fund finances the installation of devices for heat generation from renewable sources in accordance with the Decree on Energy Savings at End-Users (114/2009). Funding for the promotion of the use of RES for heat generation is collected via the additional payment charged within the price for heat from the distribution network and gas and liquid fuels. The Eco Fund promotes the installation of solar heating systems, boilers using wood biomass and heat pumps. In the period 2008−2012, the Eco fund awarded EUR 21 million in grants to citizens for this purpose. In addition to the Eco Fund, calls for grant applications are also published by energy supply companies under the efficient energy use programmes for end users and are, through the implementation of the programmes, obliged to ensure energy savings totalling at least 1% annually, considering the energy or fuel supplied to the end users in the previous year. In 2012, under the above-mentioned programmes, grants were available for the installation of solar collectors, heat pumps and wood biomass boilers. In 2012, funds for grants available from energy suppliers totalled EUR 15.1 million, of which half of the available funds were intended, among other measures, also for RES grants.

Regulations are also an important instrument for the promotion of heating with renewable energy sources. Increased use of renewable sources in buildings will be achieved through the Rules on the Energy Performance of Buildings, which stipulate a mandatory 25% share of RES in the supply provided to buildings, applying to new and restored buildings. In addition to regulations and financial incentives, in order to achieve better results, other complementary instruments will be necessary, such as an appropriate tax and price policy, as well as education and promotion programmes.

The use of RES is also promoted in district heating systems under the Operational Programme for Environmental and Transport Infrastructure Development (OP ROPI) for the period 2007–2013; wood biomass district heating systems and geothermal energy district heating systems are co-financed, as mentioned above. Increased use of RES will be mandatory in district heating systems since the Energy Act will stipulate the share of RES in these systems.

The measures will also continue in the period 2014–2020, as stipulated in the Renewable Energy Sources Action Plan for the Period 2010−2020, with the objective being to achieve a 25% share of RES in gross final energy use.

(M-11) PROMOTION OF ENERGY EFFICIENCY IN THE PUBLIC SECTOR

Sectors influenced by the implementation of the measure: *energy use in the public sector*

The selection of instruments for the improvement of energy efficiency in the public sector planned in the EEAP includes financial incentives for investments in energy efficient retrofitting and sustainable construction of buildings, energy efficient heating and ventilation systems, and efficient electricity use. To this end, in the period 2010−2012, grants were available totalling EUR 147.8 million under the Operational Programme for Environmental

and Transport Infrastructure Development, providing a basis for drawing funds from the Cohesion Fund, within the framework of an invitation to tender for the energy-saving retrofitting of hospitals amounting to EUR 51.6 million[28], secondary schools and student halls amounting to EUR 17.8 million[28], residential homes for the elderly amounting to EUR 19.4 million[28], buildings owned by local communities amounting to EUR 52.0 million[29], and higher education institutions amounting to EUR 7 million[28]. In 2011, EUR 14 million in funding was available for the energy efficient renovation of public lighting. In addition to the above-mentioned, in 2012, funds were available for the public and non-profit sector from energy supply companies within the framework of DSM (Demand Side Management) execution of EEU programmes for consumers. Solely for the public sector, EUR 3.2 million in incentives were available, while EUR 5.3 million in incentives were available to the public sector and companies. The issued measures included the promotion of the installation of solar thermal collectors, heat pumps, wood biomass boilers, heat stations, energy efficient internal and external lightning, energy audits, energy management systems, energy-saving retrofitting of buildings, connection to district heating systems, renovation of public lightning systems, and other measures. In 2011, grants totalling EUR 1 million were available from the Eco Fund for passive and low-energy construction works in buildings owned by local communities.

In addition to these instruments, green public procurements were introduced for the public sector. The Green Public Procurement Action Plan (AN ZeJN) was prepared. In compliance with the Decree on Green Public Procurement (Ur. l. RS, nos 102/11, 18/12 and 24/12), all public contracting authorities (bodies of the Republic of Slovenia, bodies of self-governing local communities, public funds, public agencies, public institutes, public utility institutes, and other subjects that are bodies governed by public law according to the legislation regulating public procurement) were obliged to respect the environmental aspects in public procurement. The Decree stipulates energy efficiency requirements for the following: electronic office equipment (computers, displays, printers, optical scanners, telefaxes, copying machines), TV sets, refrigerators, freezers and various combinations thereof, washing machines, dishwashers, air-conditioners, buildings including project engineering, constructions, regular and investment maintenance of buildings and the installation of individual devices and products in buildings, personal, passenger, and bus transport, and tyres. The environmental requirements regarding energy stipulated by the Decree are based on European Commission legislation (Directive No 2009/33/EC, Regulation (EC) No 106/2008, Delegated Regulations Nos. 626/2011, 1059/2010, 1060/2010, 1061/2010, 1062/2010, and 1222/2009), and, as a rule, apply to the highest energy class, unless such efficient products are not yet available on the market.[30] In connection with buildings, an important role is played by the Rules on Efficient Energy Use in Buildings, which stipulate energy efficiency requirements for new and renovated buildings, which prescribe stricter requirements for public buildings than for other buildings.

[28] Allocated funds.

[29] Funds available.

[30] Source: Report on Monitoring the Implementation of the Operational Programme for Limiting Greenhouse Gas Emissions until 2012, Appendix 1: Substantive Report on the Implementation of the OP TGP-1 measures, Government of the Republic of Slovenia, 8 November 2012.

An important instrument in the public sector will be setting up an energy management system in public buildings. In accordance with the Energy Act (EZ-D) (Ur. l. RS, no. 22/2010), building operators must carry out energy audits for public buildings with floor space exceeding 500 m^2. Other instruments include the following: promotion of the implementation of energy reviews and feasibility studies for investments in RES, an increase in the provision of information, raising the awareness and education of potential investors, building designers and other groups, and the introduction of contractual reductions of energy costs.

(M-12) ENERGY LABELLING AND MINIMUM STANDARDS FOR PRODUCTS AND EQUIPMENT

Sectors influenced by the implementation of the measure: *energy use in the public sector, service sector and households, energy use in transport*

In 2009, Directive 2009/125/EC establishing a framework for the setting of ecodesign requirements for energy-related products (the EuP Directive) was adopted, which is a recast of the 2005 Directive. The main difference lies in the expanded range of products covered.

The requirements have been prepared or are under preparation for the following products: hot-water boilers using liquid or gas fuel, warm water heaters using liquid or gas fuel or electricity, computers and monitors, printers, scanners, photocopiers, television sets, chargers or adapters, lighting in offices, street lighting and lighting in households, air-conditioners in households, electrical motors, fans, pumps in buildings refrigerators and freezers for the service sector and households, household washing machines and dishwashers, TV-communicators, solid fuel boilers, dryers, vacuum cleaners, transformers, etc. In 2009, a new working plan was adopted containing products for which minimum standards will be prepared as a priority.

The system of energy labelling of products was renewed and expanded.
The new framework directive was adopted in 2010 (2010/30/EC), and in September 2010 four Regulations were adopted renewing the system of energy labelling for household dishwashers, washing machines and refrigerating appliances and introduced the labelling of televisions. In 2009, a Regulation was adopted introducing the labelling of tyres with respect to fuel consumption efficiency. The expansion of the energy labelling system also envisages the labelling of construction products (for instance, windows).
Purchasing energy efficient appliances (class A or higher) is also promoted by the Eco Fund through favourable loans.

These measures will have a significant influence on achieving electricity savings.

(M-13) PROMOTION OF THE ENERGY EFFICIENCY OF BUILDINGS IN THE HOUSEHOLD AND SERVICE SECTORS

Sectors influenced by the implementation of the measure: *energy use in the public sector, service sector, and households*

In 2010, the Government of the Republic of Slovenia adopted the new Rules on Efficient Energy Use in Buildings (PURES)[31], which stipulate ambitious requirements in the area of the energy efficiency of buildings and the use of renewable energy sources reflected in the requirements for improving buildings' heat insulation envelope and the installation of energy-efficient equipment and systems, as well as mandatory use of renewable energy sources to the extent of at least 25% of the required power.

The Rules replace the 2008 Rules, since the need for an overhaul of such was established in order to carry out harmonisation with the revised Directive on the Energy Performance of Buildings and to ensure application of a single methodology in the Rules and preparation of energy performance certificates.

The Rules stipulate minimum requirements for efficient energy use in buildings regarding the building's heat insulation envelope, heating, cooling, ventilation or their combination, preparation of hot water and lighting in buildings and ensuring their own sources of energy for the operation of systems. The Rules apply to new and renovated buildings. The requirements are similar to those stipulated in the 2008 Rules.

In 2009, the Rules on the methodology for issuing energy performance certificates (77/2009), was adopted, which, together with the rules on training, licencing and registering independent experts for the issuance of building energy performance certificates dated 2010 (6/2010), establishes a system of issuing energy performance certificates. Energy performance certificates will be mandatory for buildings with a total useful floor space exceeding 1000 m^2, and buildings owned by the state or local communities and used by public authorities or local community authorities.

Direct promotion of investments in energy efficient retrofitting and sustainable construction of buildings, as well as energy efficient heating systems under the EEAP, is implemented by the Eco Fund. In the period 2008–2012, based on public tenders, grants were awarded to 56,475 households for 43,000 investments totalling EUR 59.9 million for the following: the heat insulation envelope of buildings (28.1% of the funds), replacement of external joinery components (24.1%), installation of solar heating systems, (15.0%), installation of equipment for wood biomass central heating (12.6%), construction or purchase of residential buildings or dwellings with low-energy or passive technology (9.0%), installation of heat pumps (7.9%), ventilation systems (2.4%), thermostatic valves, regulation and hydraulic balancing in heating systems, heat meters, or heat distributors (0.7%), etc. Furthermore, the Eco Fund also provides favourable loans for investments in efficient energy use measures. Since 2010, the Eco fund has promoted measures for increasing the energy efficiency of buildings in accordance with the Decree on energy savings at end-users and has granted, via its tenders, most of the grants intended for citizens and/or households. The Decree directs programmes carried out by energy suppliers towards measures carried out with end users in industry and service activities, including measures carried out in the public sector.

[31] Ur. l. RS, no. 93/2008

Table 4.3: Summary of the description of energy measures.

	Measure and/or policy	Objective	Gas influenced by the measure	Type of measure	Implementation phase	Implementer	Effect of the measure [Gg CO_2 eq]		Connection to the measure from the previous National Report
							2015	2020	
M-6	INCREASE IN THE ENVIRNMENTAL EFFICIENCY OF ELECTRICITY AND HEAT GENERATION IN LARGE COMBUSTION PLANTS	Reduction of CO_2 and other emissions (air pollutants) in electricity generation	CO_2	Legislative Economic	Adopted	Holding Slovenske elektrarne TE-TOL	1897	2210	M-6 INCREASE IN THE ENVIRONMENTAL EFFICIENCY OF ELECTRICITY AND HEAT GENERATION IN LARGE COMBUSTION PLANTS
M-7	PROMOTION OF CO-GENERATION OF ELECTRICITY AND HEAT WITH HIGH EFFICIENCY	Increase in electricity and heat generation in CHP units	CO_2	Economic, Legislative	Implemented	MISP, Borzen, AGEN-RS	107	233	M-7 PROMOTION OF CO-GENERATION OF ELECTRICITY AND HEAT WITH HIGH EFFICIENCY
M-8	PROMOTION OF ELECTRICITY GENERATION FROM RENEWABLE ENERGY SOURCES	Increasing electricity production from RES	CO_2	Economic, Legislative, Planning	Implemented	MG, HSE, AGEN-RS[32], Borzen	490	890	M-8 PROMOTION OF ELECTRICITY GENERATION FROM RENEWABLE ENERGY SOURCES
M-9	PROMOTION OF EFFICIENT ENERGY USE IN INDUSTRY	Efficient energy use in industry	CO_2	Economic, Legislative	Implemented	MISP	80	164	M-9 PROMOTION OF EFFICIENT ENERGY USE IN INDUSTRY
M-10	PROMOTION OF THE USE OF RENEWABLE ENERGY SOURCES AS A HEAT SOURCE	Increasing the use of RES as a heat source	CO_2	Economic, Legislative, Planning	Implemented	MISP, Eco Fund, local energy agencies	210	304	M-10 PROMOTION OF THE USE OF RENEWABLE ENERGY SOURCES AS A HEAT SOURCE

[32] Energy Agency of the Republic of Slovenia

Table 4.3: Summary of the description of energy measures – continued.

	Measure and/or policy	Objective	Gas influenced by the measure	Type of measure	Implementation phase	Implementer	Effect of the measure [Gg CO_2 eq]		Connection to the measure from the previous National Report
							2015	2020	
M-11	PROMOTION OF ENERGY EFFICIENCY IN THE PUBLIC SECTOR	Increasing energy efficiency in the public sector	CO_2	Economic, Legislative, Educational, Informative	Implemented	MISP, Government, MI, MF	45	72	M-11 PROMOTION OF ENERGY EFFICIENCY IN THE PUBLIC SECTOR
M-12	ENERGY LABELLING AND MINIMUM STANDARDS FOR PRODUCTS AND EQUIPMENT	Higher energy efficiency of energy use with an emphasis on electricity	CO_2	Informative, Economic	Implemented	MISP, MAE	-	-	M-12 ENERGY LABELLING AND MINIMUM STANDARDS FOR PRODUCTS AND EQUIPMENT
M-13	PROMOTION OF THE ENERGY EFFICIENCY OF BUILDINGS IN THE HOUSEHOLD AND SERVICE SECTORS	Better energy performance of buildings	CO_2	Legislative, Economic	Implemented, adopted	MAE, MISP, Eco Fund	134	185	M-13 PROMOTION OF THE ENERGY PERFORMANCE OF BUILDINGS IN THE HOUSEHOLD AND SERVICE SECTORS

4.2.4 Transport

(M-14) REDUCTION IN EMISSIONS FROM MOTOR VEHICLES

(M-14A) PASSENGER VEHICLES

The measure is based on three pillars:

- The obligations of the car industry regarding improving fuel consumption efficiency,
- Awareness raising regarding fuel consumption and vehicle emissions,
- Promotion of the fuel consumption efficiency of vehicles through tax measures.

In 2009, the European Commission adopted obligatory goals regarding emissions from new cars. In accordance with Regulation 443/2009[33], the average emissions of new passenger vehicles after 2015 will not be allowed to exceed 130 g of CO_2/km, while an additional reduction in emissions of 10 g CO_2/km will be achieved by improving tyres and the use of biofuels. In Slovenia, the average emissions from new vehicles in 2008 amounted to 155.9 g CO_2/km and in 2011 to 139.7 g CO_2/km, or 10.4% less.[34]

Informing and awareness raising is mostly carried out through labelling the fuel consumption of passenger vehicles. Slovenia transposed Directive 1999/94/EC[35] relating to the availability of consumer information on efficient fuel consumption and CO_2 emissions into the Slovenian legal order through the Decree on consumer information on efficient fuel consumption and CO_2 emissions in respect of new passenger vehicles (Ur. l. RS, no. 81/2010), which replaced the rules previously in force. In accordance with the Regulation, the suppliers of passenger vehicles must provide data on fuel consumption and vehicle emissions at the point of sale and in promotional leaflets. In addition to the above-mentioned, they must prepare a manual on efficient fuel consumption and CO_2 emissions.

With the Decree on Green Public Procurement (Ur. l. RS, nos 102/11, 18/12 and 24/12) the stipulations of Directive 2009/33/EC on the promotion of clean and energy-efficient road transport vehicles were transposed into the Slovenian legal order. According to the Regulation, in public procurements, the costs of CO_2 emissions will be taken into account in the mandatory vehicle life-cycle cost estimate. As a recommendation, the Regulation lays down the EURO emission standards. The Regulation also defines environmental criteria for public procurement of tyres.

The purchase of electric or hybrid vehicles is also encouraged by the Eco Fund through favourable loans to legal persons, sole proprietors and citizens. In addition to the above-mentioned, the Eco Fund co-finances the purchase of battery-powered electric vehicles by citizens and legal persons in accordance with the Decree amending the Decree on energy

[33] Regulation (EC) No 443/2009 setting emission performance standards for new passenger vehicles as part of the Community's integrated approach to reduce CO_2 emissions from light goods vehicles.
[34] Monitoring CO_2 emissions from new passenger vehicles in the EU: summary of data for 2011, EEA, 2012. The data for 2011 are preliminary.
[35] Directive 1999/94/EC of the European Parliament and of the Council of 13 December 1999 relating to the availability of consumer information on fuel economy and CO_2 emissions in respect of the marketing of new passenger cars.

savings at end-users (Ur. l. RS, no. 57/2011). To this end, in the period 2011−2013, grants totalling EUR 0.5 million per year were available, of which EUR 0.2 million was available to citizens and EUR 0.3 million to legal persons.

The third pillar is tax measures. In 2010, the Act amending the Motor Vehicles Tax Act entered into force (Ur. l. RS, no. 9/2010), which introduced progressive tax rates for motor vehicles with regard to CO_2 emissions.[36, 37] Under OP GHG-1, the Ministry of Transport is obliged to change the calculation of the amount of the annual tax for the use of vehicles in road traffic so that the amount should also depend on the CO_2 emissions of the vehicles and EURO emission rates. The draft amendment of the legislative acts was prepared already in 2010; however, it has not yet been submitted for deciding.

(M-14B) GOODS VEHICLES

In 2011, mandatory goals applying to light goods vehicles regarding emission reductions were adopted in the EU. A related Regulation on passenger vehicles[38] set the objectives of the average emissions of new light goods vehicles, which in 2017 will not be allowed to exceed 175 g of CO_2/km, and not more than 147 g CO_2/km in 2020.

The Decree on Green Public Procurement (Ur. l. RS, nos. 102/11, 18/12 and 24/12) defines criteria for the public procurement of light and heavy goods vehicles and transposes Directive 2009/33/EC on the promotion of clean and energy-efficient road transport vehicles into the legal order of Slovenia. According to the Directive, the costs of emissions of carbon dioxide, nitrogen oxides, non-methane hydrocarbons and solid particles must be taken into account in the vehicle life-cycle cost estimate.

In 2008, the Annual Fee for the Use of Motor Vehicles Act (Ur. l. RS, no. 57/2008) and the Decree on the method of determining the amount of the annual fee for the use of motor vehicles (Ur. l. RS, no. 100/2008) were issued or adopted. Regarding goods vehicles and buses, the Decree lays down the annual tax level depending on the emissions level of the engine, which, however, does not take into account CO_2 emissions.

(M-14B) BUSES

In 2012 and 2013, grants totalling EUR 0.3 million per year were available from the Eco Fund for the purchase of buses driven by compressed natural gas and biogas. The legal basis for the above-mentioned grants is provided by the Decree amending the Decree on energy savings at end-users (Ur. l. RS, no. 57/2011).

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[36] New tax rates entered into force with the coming into force of the Act, with the exception of personal motor vehicles with CO_2 emissions between 150-210 g/km, for which a transitional period was in force until 1 January 2011. An additional tax was imposed on diesel engine vehicles with solid particle emissions exceeding 0.005 g/km and motor vehicles with a lower emissions level than Euro 4, and since 1 January 2010, a lower emissions level than Euro 5.

[37] Taxation applies to vehicles designed principally for the transport of people (up to 10 persons).

[38] Regulation (EC) No 510/2011 setting emission performance standards for new light commercial vehicles as part of the Community's integrated approach to reducing CO_2 emissions from light goods vehicles.

The Decree on green public procurement also defines the criteria used in public procurement for the purchase of buses and hiring bus transport services. In accordance with Directive 2009/33/EC, the vehicle life-cycle cost estimate must take into account the costs of the emissions of carbon dioxide, nitrogen oxides, non-methane hydrocarbons and solid particles.

(M-15) PROMOTION OF THE USE OF BIOFUELS

The use of biofuels is encouraged by two instruments: exemption of the entire excise duty for motor fuels in purified form, and a maximum 5% exemption in the case of standardised fuels with biofuel content, and target shares for biofuels in the total energy of motor fuels placed on the market for an individual calendar year for distributors of fuel for motor vehicles. If the distributor does not achieve the target share in an individual year, the difference is transferred to the following year. By the end of March each year, distributors must report the amount of biofuels placed on the market to the Slovenian Environment Agency. The effect of the instrument on business activities was reduced with a new measure intended to alleviate the crisis[39], i.e. excise duty refunds for the purchase of diesel fuel.

The Decree on the promotion of the use of biofuels and other renewable fuels for the propulsion of motor vehicles 2008–2012 stipulates the following minimum target shares for biofuels in the overall consumption of energy for motor vehicles: 3.0% in 2008, 4.0% in 2009, 5.0% in 2010, 5.5% in 2011 and 6.0% in 2012. The implementation of this measure lags behind the objectives, as the following shares were achieved in the respective years: 0.4% in 2005, 0.3% in 2006, 0.8% in 2007, 1.2% in 2008, 1.7% in 2009, 2.5% in 2010 and 1.9% in 2011. The difficulties in achieving the target shares are also a result of the fact that Slovenia does not have any significant biofuel production capacities.

The Ministry of Agriculture, Forestry and Food promotes the production of energy plants (vegetation) by means of grants per hectare.

In order to achieve the share set as the 2020 objective, it will be necessary to carry out the additional measures mentioned in the Renewable Sources Action Plan.

(M-16) PROMOTION OF THE USE OF PUBLIC TRANSPORT

Within the framework of the Resolution on National Development Projects, the Ministry of Transport is carrying out the project Integrated Public Passenger Transport, the objective of which is to connect various types of public transport. The project will be completed in 2014, and includes the following steps: preparation of the zone and tariff systems, harmonisation of bases at the local and state levels, monitoring and supervision systems and the provision of information to users. The new concession system, which will change the financing conditions and specify the conditions and obligations of the state and transport operators, is also connected with the project. Within the project, a pilot project is under preparation, which is to be implemented together with the Regional Development Agency of the Ljubljana Urban Region.

[39] Rules on the return of the excise duty for commercial use (Ur. l. RS, no. 52/09).

The objective of the project is to stop the decreasing trend regarding public passenger transport use.

Public passenger transport is regulated by the Road Transport Act.[40] The Government of the Republic of Slovenia is responsible for the introduction of a multi-modal ticket.

In the area of public transport, the NE EAP stipulates the implementation of the following measures:

- Financial incentives and stimulative subsidisation of public passenger transport (dependent on the number of passenger kilometres and not depending on the number of kilometres of transport service made along an individual line);
- Promotion, awareness raising and providing information on the advantages of public passenger transport (see measure M-5);
- Financial instruments for reducing the use of vehicles in city centres (selective parking fees, congestion charges and vignettes).

Furthermore, also important are the measures for the promotion of cycling, where the EEAP stipulates financial incentives for the construction of bicycle lanes and supporting facilities, the removal of obstacles to taking bicycles onto trains/buses, and the financing of promotional and educational activities. Technical designs for implementing the national cycle connections have been implemented within the framework of the budgetary funds allocated by the Republic of Slovenia to the Slovenian Roads Agency. Funds earmarked for carrying out cycling projects have been continually increasing since 2008.

In 2011, under the budget of the Slovenian Roads Agency, nineteen (19) exclusively cycling projects were being carried out. Of these, six projects concerning the construction of the national cycle network are financed from the Cohesion Fund under the Operational programme of environmental and transport infrastructure development for the period 2007–2013. For these projects, funds totalling EUR 5.5 million were approved from the EU Cohesion Fund until 2012. In addition to the above-mentioned, cycle connections may also be constructed by local communities under the Operational Programme for strengthening regional development potential in the period 2007–2013.

Under the OP GHG-01, the Ministry of Transport, in cooperation with the Ministry of the Environment and Spatial Planning and municipalities, is tasked with drafting an action plan for the development of public passenger transport.

(M-17) SUSTAINABLE GOODS TRANSPORT

The basis for the implementation of the measure of sustainable goods transport, which is possible only with a high share of railways in goods transport, is a modern railway infrastructure. To that end, the modernisation of the railway infrastructure is in progress in Slovenia. Within the framework of the project, the construction of the following new tracks is being implemented: Trst-Divača, Koper-Divača, Divača-Ljubljana, and Ljubljana-Zidani Most, and modernisation and upgrading for speeds of up to 160 km/h on the existing

[40] Ur. l. RS, nos 131/2006, 5/2007, 123/2008, 28/2010, 49/2011, 40/2012-ZUJF, 57/2012.

Pragersko-Ormož-Hodoš line. The results of the project are to be the increased capabilities of the railway infrastructure. The projects will be completed by 2023.

Furthermore, among its measures for the promotion of sustainable goods transport, the OP GHG-01 also includes free-flow tolling and the preparation of tolls for goods vehicles for the use of toll roads that will also consider external costs.

(M-18) GREENHOUSE GAS EMISSIONS FROM TRANSIT TRANSPORT

Due to its geographical location at the crossing of the European V and X corridors, Slovenia is highly exposed to transit transport; to a large extent, this crossing will also represent a part of the future core TEN-T Network and the corridors of the core network. In addition, due to Slovenia's small size, the increase in transit transport, along with the changes in the prices of oil derivatives in neighbouring countries, has a strong influence on the sale of liquid motor fuels in the Republic of Slovenia, and thereby on GHG emissions.

A long-term solution to the problem is possible only by redirecting goods transport by road to railways; however, a precondition for this is a modern and reliable railway, the construction of which has commenced.

In 2008, fuels sold to transit traffic represented 22% of the entire amount of fuels sold and in 2011 such accounted for 16%. In 2009, the amount of fuels sold in Slovenia decreased considerably, i.e. by 13%, which was a result of the economic crisis; in 2010 it was, owing to the continued crisis, merely 0.5% higher than in the preceding year, while in 2011 it increased considerably, by 8%. In that year, diesel fuel consumption increased by 11%. The increase resulted, in particular, from the difference in the fuel prices in the neighbouring countries.

The effect of the measure depends on the excise duty policy of the government. When the excise duty policy of the government is oriented towards higher motor fuel prices than exist in the neighbouring countries, the emissions from transit transport decrease, and vice versa. In the projection, the above-mentioned measure is, due to the uncertainty of its implementation, considered together with additional measures, since it does not entirely depend on the policy of the government, but also on the excise duty policy of the neighbouring countries.

Table 4.4: Summary of the description of transport measures.

	Measure and/or policy	Objective	Gas influenced by the measure	Type of measure	Implementation phase	Implementer	Effect of the measure [Gg CO_2 eq]		Connection to the measure from the previous National Report
							2015	2020	
M-14	REDUCTION IN EMISSIONS FROM MOTOR VEHICLES	Reduction in specific emissions of trucks and buses	CO_2	Fiscal, Legislative, informative	Implemented	MAE, Vehicle traders, Vehicle manufacturers	130	197	M-14 REDUCTION IN EMISSIONS FROM PASSENGER MOTOR VEHICLES
M-15	PROMOTION OF THE USE OF BIOFUELS	Increase in the share of biofuels in transport and thereby a reduction in emissions	CO_2	Legislative, fiscal	Implemented	MAE, MF, Motor fuel distributers	165	507	M-15 PROMOTION OF THE USE OF BIOFUELS
M-16	PROMOTION OF THE USE OF PUBLIC TRANSPORT	Increase in the share of public transport and thereby a reduction in the use of cars	CO_2	Economic, legislative, planning, other	Implemented	MISP, Slovenian Railways, Local communities	66	157	M-16 PROMOTION OF THE USE OF PUBLIC TRANSPORT
M-17	SUSTAINABLE GOODS TRANSPORT	Increase in the share of railways in goods transport and thereby a reduction in fuel consumption	CO_2	Other	Implemented	MISP	12	54	M-17 SUSTAINABLE GOODS TRANSPORT
M-18	GHG EMISSIONS FROM TRANSIT TRANSPORT	Reduction in emissions from transit transport	CO_2	Fiscal, other	Planned	MF, MISP	1031	1252	M-18 GHG EMISSIONS FROM TRANSIT TRANSPORT

4.2.5 Industrial Processes

(M-19) REDUCTION IN THE EMISSION OF F-GASES FROM STATIONARY EQUIPMENT

The implementation of the provisions of Regulation (EC) No. 842/2006 of the European Parliament and of the Council relating to fluorinated greenhouse gases (Official Journal L No. 161 of 14 June 2006) and implementing regulations of the Commission that represent a measure addressing F-gas emissions from stationary sources is regulated in Slovenia by the Decree on the implementation of the regulation (EC) on certain fluorinated greenhouse gases (designation of a competent authority, supervisory authority, and the definition of offences) and the Decree on the use of products and equipment containing ozone depleting substances or fluorinated greenhouse gases (41/2010), replacing the Decree passed in 2008 and the Rules on the professional training of personnel regarding equipment containing ozone depleting substances or fluorinated greenhouse gases, adopted in 2009.

In addition to the indicated measures for reducing emissions of fluorinated greenhouse gases in Slovenia, of great significance is also the implementation of the Decree amending the Decree on the tax on the pollution of air due to emissions of carbon dioxide, the objective of which is to reduce F-gas emissions by introducing the payment of an environmental tax for the use of fluorinated greenhouse gases (manufacturing, installation and maintenance of equipment containing F-gases), and maintaining records on placing fluorinated greenhouse gases on the market in the Republic of Slovenia; namely, keeping records on the amount of fluorinated greenhouse gases by type of fluorinated greenhouse gas and their intended use. Through different levels of taxation, the Decree encourages a decrease in the leakage of fluorinated gases from equipment, depending on whether it is a case of a first filling with such gases or their manufacture, or a refilling. For the first filling or manufacture, only a 5% tax is paid, while for a refilling a 100% tax is paid. The tax is paid per unit of pollution equivalent to 1 kg CO_2.[41] In the calculation of the environmental tax imposed on the use of fluorinated greenhouse gases, five times lower price is calculated per unit of pollution than it is the price of a unit of pollution in the calculation of the environmental tax imposed on fuel combustion. The full tax amounted to 12.5 €/t CO_2.

(M-20) REDUCTION IN THE EMISSION OF F-GASES FROM MOBILE AIR-CONDITIONING SYSTEMS

Directive 2006/40/EC of the European Parliament and of the Council relating to emissions from air-conditioning systems in motor vehicles and amending Council Directive 70/156/EEC (Official Journal L No. 161 of 14 June 2006) was transposed into the Slovenian legal order by the technical specification 161 (issue 01) on air-conditioning systems in motor vehicles regulating the area of emissions from air-conditioning systems in vehicles of category M1 and N1 (passenger motor vehicles and goods vehicles up to a total mass of 3.5t). After 21 June 2009, the specification prohibits the registration of vehicles with installed air-conditioning systems containing fluorinated greenhouse gases with a global heating potential over 150, except if the discharge level does not exceed 40 or 60 g/year. After 1 January 2017,

[41] The gas quantity must be multiplied by the global warming potential of the substance.

the specification prohibits the registration of all vehicles with installed air-conditioning systems containing fluorinated greenhouse gases with a global heating potential over 150.

(M-21) ADAPTATION OF ALUMINIUM PRODUCTION TO THE BEST AVAILABLE TECHNOLOGIES

In 2006, the process of shutting down electrolysis unit B started and was concluded by the end of 2007. The electrolysis unit was shut down, since it did not meet the standards of the best available technology, as stipulated in the reference documents for obtaining environmental permits in accordance with the IPPC Directive. In 2005, when electrolysis unit B was in full operation, 120,000 tons of primary aluminium were produced in Slovenia. In 2008, when only electrolysis unit C was in operation, 85,000 tons of primary aluminium were produced. The electrolysis unit B shutdown had a direct effect on reducing CO_2 and PFC emissions from the process and on reducing electricity use, which has an indirect impact on reducing CO_2 emissions from electricity generation.

Table 4.5: Summary of the description of measures in industrial process.

	Measure and/or policy	Objective	Gas influenced by the measure	Type of measure	Implementation phase	Implementer	Effect of the measure [Gg CO_2 eq]		Connection to the measure from the previous National Report
							2015	2020	
M-19	REDUCTION IN THE EMISSION OF F-GASES FROM STATIONARY EQUIPMENT	Reduction in the emission of F-gases through a reduction in leakage and replacement, and diligent operation of equipment	F-gases	Legislative, educational, economic	Implemented	MAE	71	113	M-19 F-GASES
M-2	ENVIRONMENTAL TAX ON AIR POLLUTION DUE TO CO_2 EMISSIONS	Reduction in the use of F-gases	F-gases	Fiscal	Implemented	MAE	-	-	M-19 F-GASES
M-20	REDUCTION IN THE EMISSION OF F-GASES FROM MOBILE AIR-CONDITIONING SYSTEMS	Reduction in the emission of F-gases from mobile air-conditioning systems	F-gases	Legislative	Implemented	MISP, Car manufacturers	76	122	M-19 F-GASES
M-21	ADAPTATION OF ALUMINIUM PRODUCTION TO THE BEST AVAILABLE TECHNOLOGIES	Reduction in emissions from aluminium production	CO_2, F-gases	Legislative	Implemented	MAE	159	159	

4.2.6 Agriculture

In 2011, the National Assembly adopted the Resolution on the Slovenian Agriculture and Food Industry Strategic Guidelines until 2020 – "Let's secure food for tomorrow", which among the strategic goals places food security ensured through stable food production and the provision of quality and affordable food to consumers, sustainable use of production potentials and the provision of public goods related to agriculture. In view of the adopted strategic objectives, it is reasonable to look for solutions that will reduce greenhouse gas emissions that are not oriented towards reducing the physical extent of agricultural and domestic animal production, but towards a decrease in emissions per unit of produced food.

(M-22) INCREASE IN THE EFFICIENCY OF DOMESTIC ANIMAL PRODUCTION

An improvement in the efficiency of animal production can significantly contribute to a reduction in the amount of released methane and released nitrogen per unit of milk and meat produced. Since methane and nitrous oxide emissions represent a loss of energy and nitrogen, animal producers have a direct economic interest in the reduction of emissions. There are still many reserves in this area, which can be used only by educating producers regarding improving the efficiency of animal production. One instrument for increasing the efficiency of domestic animal production is the upgrading and maintenance of the existing 'GOVEDO' information system, which will provide support to dairy cow producers in decision-making, leading to a reduction in GHG emissions and inform them of the status of their farms. The implementation of professional tasks in cattle production within the framework of the Common Basic Breeding Programme contributes to an increase in efficiency, as does carrying out public advisory services with regard to growing home fodder, animal nutrition and general cattle raising.

(M-23) INTRODUCTION OF ANAEROBIC DIGESTERS FOR BIOGAS PRODUCTION FROM CATTLE MANURE

The production of biogas from cattle manure has a double effect since the construction of biogas plants in the agricultural sector results in a reduction in methane emissions, while it improves the provision of sources of renewable energy in the energy sector. The main handicap in the implementation of the measure is the fragmentation of Slovenian cattle raising, since the construction of biogas plants is economical only on large farms. The technical potential for biogas production from animal manure has been estimated, and in the draft of the implementing document of the Resolution on the Slovenian agriculture and food industry strategic guidelines until 2020 – 'Let's secure food for tomorrow', investments in small scale and micro biogas plants are planned.

(M-24) INCREASE IN CATTLE PASTURE GRAZING

By cattle pasture grazing, emissions of methane generated by the storage of cattle manure are avoided. Pasture grazing also contributes to a reduction in emissions due to the use of fossil gases in the harvesting and transport of foodstuffs for animals in indoor animal production. The Ministry of Agriculture, Forestry and Food contributes to increasing cattle pasture grazing by financing the public agricultural advisory service, financing special education within the Rural Development Programme (RDP), promoting the implementation of the measure entitled the Modernisation of Agricultural Holdings (within the framework of the RDP), which among other things stipulates investments in the establishment of pastures for controlled grazing of domestic animals, through the measure Improvement and Development of Infrastructure Connected with Agricultural Development and Adaptation, which supports land consolidation and simpler implementation of grazing, and the measure Mountain Grazing (within the framework of the RDP), which directly encourages grazing. It will also be necessary to suitably solve the problem of the spread of large carnivores to areas suitable for grazing; therefore, the measure entitled the Production of Domestic Animals in the Central Area where Large Carnivores Appear is implemented within the framework of the RDP.

(M-25) RATIONAL FERTILISATION OF AGRICULTURAL PLANTS WITH NITROGEN

Within the framework of the Rural Development Programme, numerous measures are being implemented that contribute to a reduction in the use of mineral fertilisers. These are primarily the following measures: crop rotation, the greening of arable land, integrated agriculture, integrated fruit cultivation, integrated viticulture, integrated vegetable cultivation, and ecological farming, which, in addition to fertilisation requirements based on soil analysis and fertilisation plans, also directly limit fertilisation with nitrogen from mineral fertilisers. All other agricultural environmental measures also contribute to a reduction in the use of mineral fertilisers, since all payment recipients must undergo additional training lasting at least 4 hours/year, and fertilise with mineral fertilisers in accordance with a fertilisation plan that takes into account the results of a soil analysis. All farmers included in the agricultural environmental measures (in total, 21) are subject to a special restriction with regard to burdening agricultural land with cattle.

The Ministry of Agriculture, Forestry and Food has been encouraging a more efficient nitrogen cycle by financing the public advisory service. The public advisory service in the area of plant nutrition and agricultural environmental measures is oriented primarily towards increasing the competitiveness of environmentally-friendly agriculture and the protection of water from pollution due to nitrates. Only a small portion refers to a reduction in GHG emissions. In the past, the use of nitrogen from mineral fertilisers decreased significantly due to efficient use; therefore, we expect that progress in this area will be slower.

Table 4.6: Summary of the description of agriculture measures.

	Measure and/or policy	Objective	Gas influenced by the measure	Type of measure	Implementation phase	Implementer	Effect of the measure [Gg CO_2 eq]		Connection to the measure from the previous National Report
							2015	2020	
M-22	INCREASING IN THE EFFICIENCY OF DOMESTIC ANIMAL PRODUCTION	Increase in the efficiency of cattle production to reduce GHG emissions per unit of milk and meat produced	CH_4, N_2O	Educational, informative	Implemented	MAE	55	61	M-20 INCREASE IN THE EFFICIENCY OF DOMESTIC ANIMAL PRODUCTION
M-23	INTRODUCTION OF ANAEROBIC DIGESTERS FOR BIOGAS PRODUCTION FROM CATTLE MANURE	Reduction in methane emissions from animal manure	CH_4	Fiscal, economic	Planned	MAE	2	4	M-8 PROMOTION OF ELECTRICITY PRODUCTION FROM RENEWABLE ENERGY SOURCES
M-24	INCREASE IN CATTLE PASTURE GRAZING	By increasing the extent of cattle grazing, the emission of methane generated by storage of cattle manure will be reduced	CH_4	Educational	Implemented	MAE	18	43	M-21 INCREASE IN CATTLE PASTURE GRAZING
M-25	RATIONAL FERTILISATION OF AGRICULTURAL PLANTS WITH NITROGEN	Improvement in the effectiveness of the nitrogen cycle on farms and thereby a reduction in the need for nitrogen from mineral fertilisers	N_2O	Educational	Implemented	MAE	19	52	M-22 RATIONAL FERTILISATION OF AGRICULTURAL PLANTS WITH NITROGEN

4.2.7 Waste

(M-26) REDUCTION IN EMISSIONS FROM WASTE TREATMENT

In the future, a further decrease in emissions from waste treatment will be achieved through a continued decrease in deposited biodegradable waste. A plan for achieving this objective is determined in the Operational Programme for Municipal Waste Management, dated March 2013. Through the implementation of this operational programme, Slovenia will get closer to being a society that endeavours to avoid the production of waste and uses the generated waste as an exploitable source. The share of the collected mixed municipal waste will decrease from 50% in 2011 to 36% by 2020, while the share of waste paper, plastic, glass and metal collected by separate collection will increase from 34% to 47%. The above-mentioned will be achieved by an improvement in the separate collection of waste within the door-to-door system of collection and by the construction of additional collection points and collection centres. At the same time, it will be necessary to increase the capacities for recycling household waste, since the quantity of this waste will increase through improved coverage. An important element in reducing the quantity of deposited biologically degradable waste is the construction of infrastructure for the treatment of mixed municipal waste (regional centres). The programme provides for a redefinition of the calculation of the environmental tax in the area of municipal waste treatment; this tax should gradually become an allocated revenue of the national budget and should be oriented towards financing the measures for the addressing the burdens from the past resulting from waste depositing and burdens from illegal waste dumping or treatment, and towards consideration of the introduction of a municipal tax on the collection of mixed municipal waste, the payment of which should encourage citizens to reduce mixed municipal waste and/or to increase the separated fraction of municipal waste.

An important measure to decrease waste emissions is also the construction of landfill gas capture facilities, which all landfill operators were obliged to install by the end of 2005.

The following legislation provides for the implementation of the measures:

1. Decree on the landfill of waste, Ur. l. RS, no. 61/2011 (Council Directive 1999/31/EC of 26 April 1999 on the landfill of waste);
2. Decree on the environmental tax on pollution for the landfilling of waste, Ur. l. RS, no. 70/2010;
3. Decree on biodegradable household waste management and garden waste, Ur. l. RS, no. 39/2010 (Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste and repealing certain Directives);
4. Decree on waste, Ur. l. RS, no. 103/2011 (Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste and repealing certain Directives).

4.2.8 Forestry

(M-27) SUSTAINABLE FOREST MANAGEMENT AND CO_2 EMISSION SINKS

Sectors influenced by the implementation of the measure: *sinks/forestry*

The accumulation of wood supply in the previous period is a result of the long-term planned work of the Slovenian Forest Service based on the principles of sustainability, environmental friendliness and multi-purposeness. In 2007, the Resolution on the National Forest Programme (ReNFP) was adopted, wherein one of the fundamental objectives was sustainable forest development as an ecosystem within the meaning of its biodiversity and all its ecological, economic and social functions. ReNFP is the successor of the National Forest Development Programme (NFDP) of 1996. In 2012, the Action Plan for increasing the competitiveness of the forest-wood chain in Slovenia by 2020[42] was adopted, which stipulated measures to promote the felling of trees in accordance with the forest management plans in force. The Slovenian Forest Service also plays an important role in the management and restriction of the felling of trees in forests; namely, it prepares forest management plans, and issues decisions on the felling of trees and authorisations for other interventions in forests. The Slovenian Forest Service directs the management of all forests in Slovenia – irrespective of ownership. The largest permitted felling of trees in Slovenia is defined in the Forest Management Plans for Forest Management Areas, with a validity of 10 years (the recent plans are valid for the period 2011–2020). According to these plans and in order to follow sustainable and environment friendly forest management, which has been carried out in Slovenia for more than 50 years, 6.5 million cubic metres of wood may be felled (75% forest growth per year), without endangering the stability of the forests and their habitats.[43, 42] Therefore, Slovenia **will implement Tier 3 in order to show the increase in the wood supply**. **For this purpose, the national inventory of the condition of forests was revised in 2012.**

The current data indicate that forests actually accumulate 8 times more CO_2 than Slovenia can use for the fulfilment of the Kyoto Protocol commitments under decision 11/CP.7 (1.32 Mt CO_2).

[42] Action Plan for increasing the competitiveness of the forest-wood chain in Slovenia by 2020, adopted by the Government of the Republic of Slovenia in July 2012.

[43] Forest-management and game-management plans for the period 2011–2020, Summary for Slovenia prepared by the Slovenian Forest Service, adopted by the Government of the Republic of Slovenia in August 2012.

Table 4.7: Summary of the description of waste measures.

	Measure and/or policy	Objective	Gas influenced by the measure	Type of measure	Implementation phase	Implementer	Effect of the measure [Gg CO_2 eq]		Connection to the measure from the previous National Report
							2015	2020	
M-26	REDUCTION IN EMISSIONS FROM WASTE TREATMENT	Establishing a waste collection and management system ensuring minimum influences on the soil and air	CH_4	Legislative, fiscal, informative	Implemented	MAE, Municipalities	284	352	M-23 REDUCTION IN THE QUANTITY OF DEPOSITED BIODEGRADABLE WASTE AND THE CAPTURE OF LANDFILL GAS

Table 4.8: Summary of the description of forestry measures.

	Measure and/or policy	Objective	Gas influenced by the measure	Type of measure	Implementation phase	Implementer	Effect of the measure [Gg CO_2 eq]		Connection to the measure from the previous National Report
							2015	2020	
M-27	SUSTAINABLE FOREST MANAGEMENT AND CO_2 EMISSION SINKS	Ensuring the permanent accumulation of wood supply	CO_2	Legislative, planned	Implemented	MAE, SFS	-12,064	-12,105	M-24 SUSTAINABLE FOREST MANAGEMENT AND CO_2 EMISSION SINKS

4.3 How Measures and Policies Influence the Long-term Trends of GHG Emissions

The majority of the measures presented in this chapter are long-term measures, which means that their results and implementation are not planned to end by 2020. On the contrary, in accordance with the national and EU policies, the implementation of measures will even strengthen in this area.

The total effect of the measures in 2015, 2020, 2025 and 2030 is indicated in the following chapter. A series of measures are long-term measures and will have an impact on reducing emissions even after 2030; among others, they include the construction of hydropower plants, energy retrofitting of buildings, the development of district heating systems using renewable sources of energy, waste treatment systems, and, in particular, measures in the areas of technological development, innovation, providing information, raising awareness, and education.

4.4 Measures no Longer Applicable

The majority of measures was planned to be implemented over a long-term period and the necessary changes were introduced over the years, as presented in Chapter 1.2 by individual measures.

In accordance with the requirements of the rules regulating environmental state support, a scheme of exemptions from taxes for pollution due to CO_2 emissions implemented on the basis of contracts concluded for the period 2005−2010 between the facility operators and the ministry responsible for the protection of the environment, has expired. The implementation of a new scheme of exemptions was planned, and adopted by the Government of the Republic of Slovenia under the 2008 and 2011 Action Plans for Energy Efficiency.

4.5 Implementation of Mechanisms Defined in Articles 6, 12 and 17 of the Kyoto Protocol

Slovenia has reduced its GHG emissions exclusively through domestic measures. Among the OP GHG-01 measures, Slovenia envisaged the possibility of implementing the Kyoto Protocol mechanisms to achieve GHG emissions reduction objectives. The reason was a rapid increase in emissions from transport, to a large extent resulting from Slovenia's sale of fuel in road transport, regarding which, however, the fuel was used outside the territory of Slovenia. Since the above-mentioned growth stopped in 2009, the implementation of the Kyoto Protocol mechanisms was not necessary for the achievement of the national objectives.

4.6 Measures and Policies Under Article 2 of the Kyoto Protocol

4.6.1 Promotion of Sustainable Development

As an EU Member State, Slovenia actively participates in the formulation and implementation of common EU policies and measures in this area. With numerous documents and decision-making processes at the EU level, and in particular with the EU 2020 Strategy, Slovenia has committed itself to pursuing the objective of sustainable growth.

The EU also adopted a strategy of sustainable development; both strategies contribute to the attainment of the objective of sustainable development and are mutually complementary.

In its development policy, Slovenia follows the principle of sustainable development and Slovenia's Development Strategy 2005 and Slovenia's Development Strategy 2014−2020, which is under preparation, stem from the principle of sustainable development and the integration of development policies. Consequently, national operational programmes define sustainable development as their horizontal principle that is followed by programmes within the framework of all their priority areas.
The partial, sectoral and regional development strategies, national programmes, and other development programmes must be, in terms of substance, in line with the general strategic guidelines of Slovenia's Development Strategy. In accordance with Slovenia's Development Strategy, the sectoral programmes follow the policy of sustainable development, e.g. the Resolution on the National Energy Programme, the Resolution on Traffic Policy and the Resolution on the National Environmental Protection Programme.

4.6.2 Reduction of International GHG Emissions in Aviation and Shipping

In the area of international GHG emissions in aviation and shipping transport, the Resolution on Traffic Policy[44] defines the policy of the Republic of Slovenia and directs it towards the objective in order to ensure development of the area following the principles of sustainable and balanced regional development.

As an EU Member State, Slovenia has achieved a reduction in international emissions in aviation through the inclusion of aircraft operators in the GHG emissions allowance trading scheme. The measure entered into force on 1 January 2012 for all flights. Within the framework of the scheme, for 2012, aircraft operators received coupons in the amount of 97% of average emissions in the period 2004–2006, and for every year, in the amount of 95% for the period 2013−2020.

Slovenia supports EU efforts to reduce GHG emissions from international shipping transport. The EU adopted a strategy for gradual inclusion of GHG emissions from shipping transport and, as the first step, proposed legislation which is in the process of

[44] Resolution on the Transport Policy of the Republic of Slovenia (RePPRS) (Intermodality: Time for Synergy), Ur. l. RS, no. 58/2006.

being decided on, for monitoring, reporting and verification of emissions from large vessels.

4.6.3 Minimising Harmful Effects

Slovenia acts in accordance with the provisions of the Kyoto Protocol and implements measures regarding climate change so that the negative impacts of climate change as well as the results of the measures for reducing GHG emissions would be as low as possible for all countries, in particular, for the most vulnerable developing countries. Measures regarding this area are described in detail in Chapter 7.

The Kyoto Protocol considers all these factors; namely, its objective is to reduce emissions, the result of which is a direct reduction in the harmful influences of climate change. Furthermore, activities for the reduction of emissions are not restricted to one gas or sector, but include six gases an/or groups of gases and various sectors, which is why the burden can be transferred between them. The Kyoto Protocol additionally introduces flexible mechanisms that also additionally allocate the burden outside individual countries. The Protocol also promotes technology and knowledge transfer.

As an EU Member State, Slovenia performs additional activities in this area. The EU adopted an action plan regarding climate change and development, the objective of which is to provide aid to developing countries to achieve economic progress.

4.7 State Programmes and/or Legislative or Administrative Measures

Subchapter 1, Measures and Policies, presents the Operational Programme for Reducing GHG Emissions and the monitoring system for the implementation of the operational programme, through which Slovenia ensured achievement of the Kyoto objective and will ensure implementation of the objective of reduced GHG emissions by 2020.

The Environmental Protection Act plays an important legislative role in achieving the climate objectives. The Environmental Protection Act provides a legal basis for all other legislation in the area of environmental protection that indirectly or directly influences GHG emissions; for instance, in the areas of waste, environmental certificates, comprehensive assessment of environmental influences, ecolabels, environmental management of organisations, economic and financial environmental instruments (e.g. the environmental tax on environmental pollution, GHG emissions allowance trading), etc.

The environmental inspection service is responsible for supervision of the implementation of the Environmental Protection Act and all relevant implementing regulations; the competences of the environmental inspection service also include authorisation to prohibit the operation of plants or equipment, the revocation of environmental certificates, etc. In case of infringement, the Act stipulates the payment of fines.

Other important legislative frameworks for the implementation of the measures for the reduction of GHG emissions include the Construction Act, the Energy Act and the Agriculture Act; the latter two Acts provide the basis for the preparation, adoption and implementation of sectoral policies for the two above-mentioned areas. The area of transport is regulated by many Acts.

4.7.1 Procedures for Public Participation

The Environmental Protection Act (ZVO) provides for the participation of the public in the preparation of all programmes regarding environmental protection. In compliance with the international conventions (Espoo and Aarhus), the participation of the public in the decision-making process regarding plans (within the framework of a comprehensive environmental impact assessment) is provided for all plans and projects with known environmental impacts, among others, for spatial planning, water management, forest management, agriculture, energy, industry, transport, waste treatment and wastewater treatment. Owing to their size, extent, location or other characteristics that may have an impact on the environment, the environmental impact assessment is obligatory for projects which include certain types of spatial planning.

Implementation of the principle of partnership with social and regional partners and civil society and the inclusion of the expert public in document preparation procedures is mandatory for the preparation of all planning documents.[45]

The Environmental Protection Act (ZVO) provides for access to environmental information by all interested persons. In accordance with the Environmental Protection Act, the Ministry will prepare a report on the state of the environment every four years. Environmental data are available on the websites of the Environmental Agency of the Republic of Slovenia and the programmes and legislation are available on the websites of the competent ministries.

4.7.2 Participation in Kyoto Flexible Mechanisms

The national coordination point for mechanisms of joint investments (JI and CDM) is the Ministry of Agriculture and the Environment.

For additional information, see the chapter Implementation of Mechanisms under Articles 6, 12 and 17 of the Kyoto Protocol.

4.7.3 Description of the National Registry

The Environmental Agency of the Republic of Slovenia is stipulated as the operator of the emissions coupons registry, which started to operate in November 2005 for the needs of the Kyoto Protocol and the EU Directive relating to the CO_2 emissions trading scheme, on the basis of the Environmental Protection Act, the Rules on the general terms and conditions for the operation of the emissions coupon registry, and

[45] Decree on development planning documents and procedures for the preparation of the draft national budget.

the Decree on detailed criteria and conditions for establishing and operating the emissions allowance registry.

The registry was developed for the needs of the EU-ETS, while the transition to ITL was carried out in October 2008. A review was carried out in October 2007 by ITL trustees.

The registry is accessible on the website http://arso.gov.si/.

Detailed information on the registry can be found in Chapter 8 of Slovenia's Initial Report under the Kyoto Protocol, sent to the Secretariat in July 2007.

4.7.4 Procedures in Connection with the Implementation of Articles 3.3 and 3.4 of the Kyoto Protocol Preserving Biodiversity

In 2007, the Resolution on the National Forest Programme, Forests for the Future, (ReNFP) was adopted, where one of the fundamental objectives was sustainable forest development as an ecosystem within the meaning of its biodiversity and all its ecological, economic and social functions.

The tag line of the ReNFP – Forest for the Future – shows the efforts on the basis of which forests will permanently ensure the preservation of the health of Slovenia's inhabitants and enable economic development and employment in line with the sustainable management and consumption of wood and the preservation of the environment and biodiversity. ReNFP is the successor to the National Forest Development Programme (NFDP) of 1996. The National Forest Programme also presents the implementation of the Environmental Action Plan at the national level, defining four priority tasks: climate change, nature and biodiversity, the environment, and health, as well as living quality, natural resources and waste.

The Slovenian Forest Service also plays an important role in the management and restriction of the felling of trees in forests; namely, it prepares forest management plans, and issues decisions on felling and authorisations for other interventions in forests. The Slovenian Forest Service directs the management of all forests in Slovenia – irrespective of ownership. The largest permitted felling in Slovenia is defined in forest management plans for forest management areas with a validity of 10 years (according to the ReNFP, the most recent are valid for the period 2011−2020). According to these plans, sustainable and environmentally friendly forest management, which has been carried out in Slovenia for more than 50 years, is followed in order to not endanger the stability of forests and their habitats.[46] In 2012, the Action Plan to increase the competitiveness of the forest-wood chain in Slovenia by 2020[47] was adopted, stipulating measures to promote felling in accordance with the forest management plans in force.

[46] Forest-management and game-management plans for the period 2011–2020, the Summary for Slovenia prepared by the Slovenian Forest Service, adopted by the Government of the Republic of Slovenia in August 2012.

[47] Action Plan to increase the competitiveness of the forest-wood chain in Slovenia by 2020, adopted by Government of the Republic of Slovenia in July 2012.

5 PROJECTIONS OF GHG EMISSIONS AND THE OVERALL IMPACT OF MEASURES

Emission projections are an important element of the policy for reducing GHG emissions, since they enable a comprehensive review of the implementation of various measures for the reduction of emissions, and an assessment of the adequacy of these measures. The following are the results of projections produced in the period 2010–2013, which to the greatest extent possible take into consideration the latest projections resulting from such measures. Projections were produced for 2015, 2020, 2025 and 2030.

5.1 Definition of Scenarios

The projection with measures and the projection with additional measures differ in sectors of general use (households), transport, and agriculture. For all other sources, the projections are equal. The differences in general energy use arise from the different extent of the replacement of boilers fuelled by fuel oil in households. Owing to different stimulative measures, faster replacement of boilers fuelled by fuel oil, even before the expiry of their life spans, is envisaged in the projection with additional measures. In the transport sector, the difference arises from an assumption regarding the ratio between the prices of motor fuel in Slovenia and the neighbouring countries. In the projection with measures, it is envisaged that motor fuels prices will be lower in Slovenia than in the neighbouring countries and for this reason the majority of vehicles will purchase fuel in Slovenia; in the projection with additional measures, it is envisaged that Slovenia, through its tax policy, will keep the price of fuel above the price levels of the neighbouring countries, which will cause the majority of vehicles to purchase fuel in the neighbouring countries. In the agriculture sector, the difference in projections arises from the measures indicated for this sector in the chapter Measures and Policies.

5.2 Results of the Projections

5.2.1 Carbon Dioxide

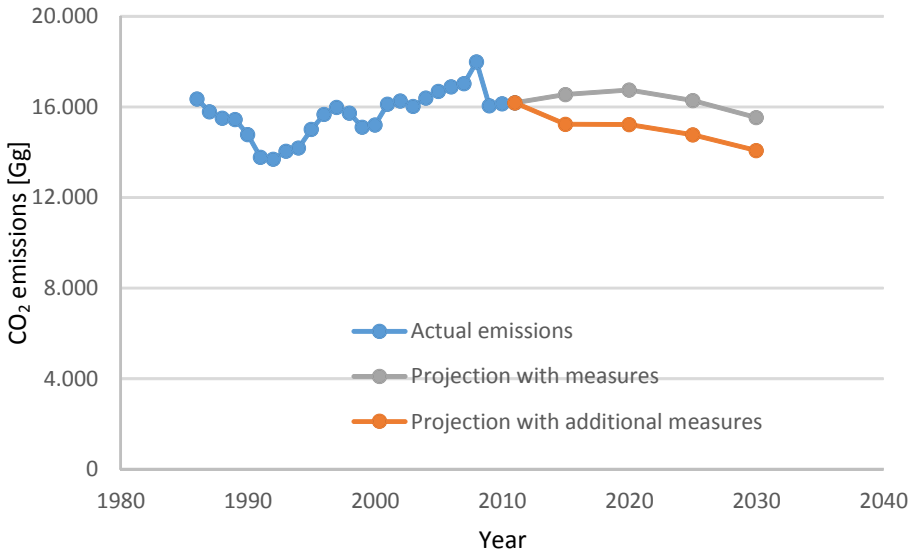
According to the projection with measures, in comparison with 2011, CO_2 emissions will increase by 2% by 2015 and by an additional 1% by 2020, totalling 16,755 Gg CO_2 eq. After the above-mentioned year, emissions will decrease, totalling 15,541 Gg CO_2 eq, which is 7% less than in 2020. According to the projection with measures, emissions will decrease over the whole period of 2015–2030. In comparison with 2011, emissions will decrease by 6% by 2015, which primarily results from reduced emissions from transport, electricity and heat generation. Until 2020, emissions will not change noticeably, and after the mentioned year they will decrease again, totalling 14,084 Gg CO_2 eq by 2030, which is 7% less than in 2020.

According to the projections with measures and in comparison with the projection with additional measures, the 2020 emissions are 10%higher and the same applies for 2030 emissions.

According to the projection with measures and the projection with additional measures, CO_2 emissions will represent 82% of all emissions in 2020 and 81% in 2030.

The main source of CO_2 emissions, totalling 93% in 2020 and 92% in 2030, stems from fuel combustion and within this sector, the most important source of emissions comes from the transport subsector, with the exception of the projection with additional measures in 2020, when the most important source of emissions is accounted for by the energy supply. The remaining CO_2 emissions, for the most part, result from industrial processes.

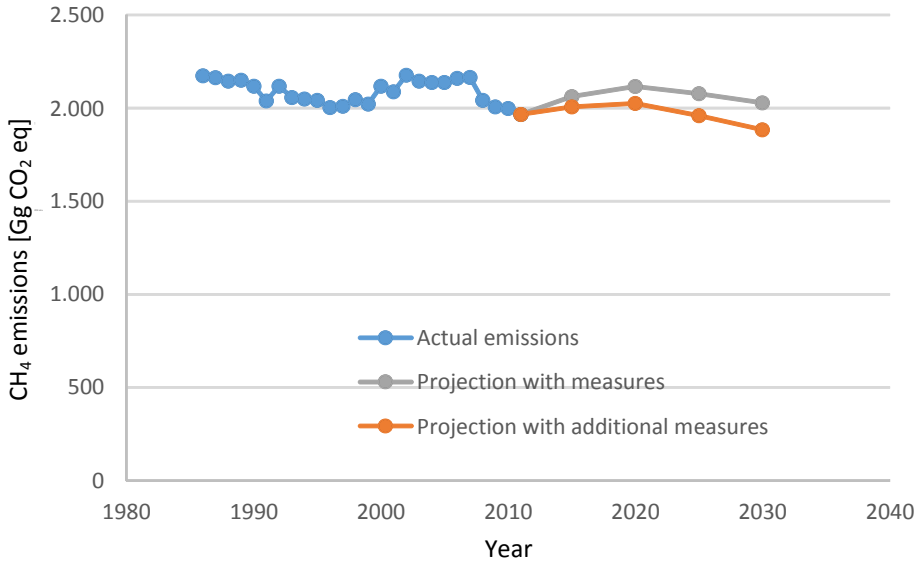
Figure 5.1: Actual CO_2 emissions without sinks until 2011 and development according to the projection with measures and the projection with additional measures until 2030.



5.2.2 Methane

According to the two projections, methane emissions will increase until 2020. According to the projection with measures, in 2020 emissions will be 8% higher compared to 2011, and according to the projection with additional measures, they will be 3% higher. According to the two projections, emissions will decrease from 2020 onwards. According to the projection with measures, in 2030, compared to 2020, emissions will be 4% lower, and according to the projection with additional measures 7% lower. The main source of methane emissions is agriculture, followed by waste and fugitive emissions. In 2020, according to the projection with measures, methane will represent 10% of the total GHG emissions; whereas in 2030, according to the projection with measures, and in 2020 and 2030, according to the projection with additional measures, methane will represent 11%.

Figure 5.2: Actual CH_4 emissions until 2011 and development according to the projection with measures and the projection with additional measures until 2030.

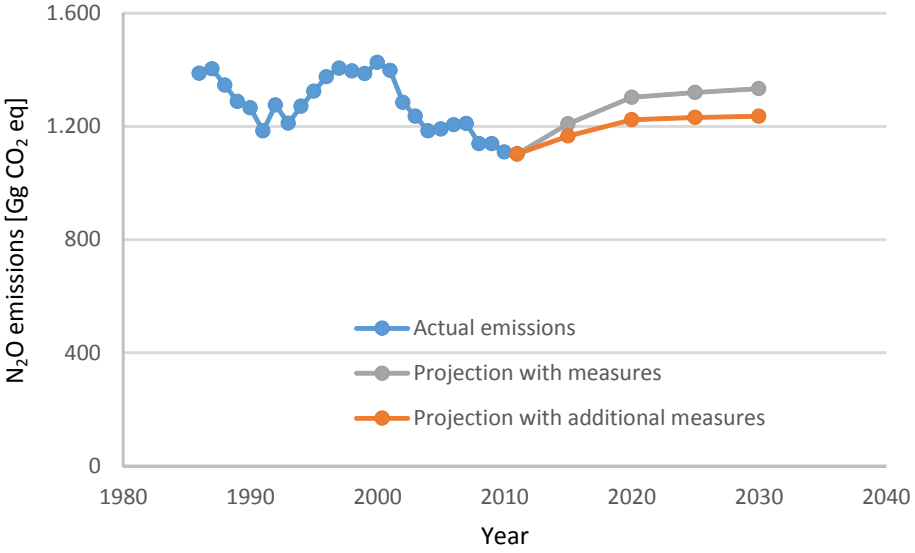


5.2.3 Nitrous Oxide

N_2O emissions are the only emission that, according to the two projections, will decrease over the whole period. According to the projection with measures, by 2020, compared to 2011, they will increase by 18% and by 2030 by an additional 2%. According to the projection with additional measures, until 2020, compared to 2011, emissions will increase by 11%, and until 2030, by an additional 1%. The main source of N_2O emissions is agriculture, which produces three quarters of such emissions. Furthermore, it is this source that is primarily responsible for the increase in N_2O emissions.

According to the projection with measures, of total GHG emissions, nitrous oxide will represent 6% in 2020 and 7% in 2030, whereas according to the projection with additional measures, it will represent 7% in 2020 and 2030.

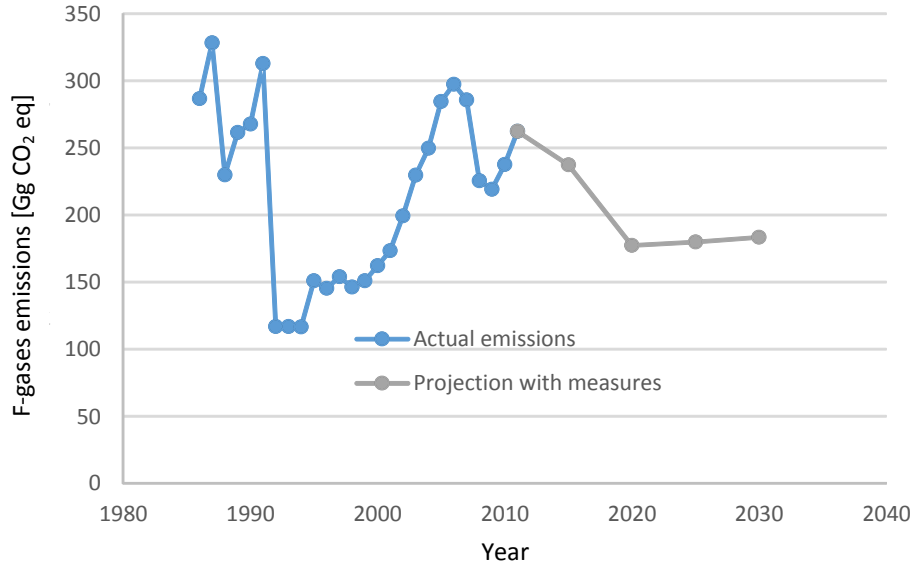
Figure 5.3: Actual N_2O emissions until 2011 and development according to the projection with measures and the projection with additional measures until 2030.



5.2.4 F-gases

According to the projection, F-gases emissions will significantly decrease by 2020 (by 32% compared to 2011) and after the mentioned year they will slowly increase. In 2030, emissions will be, at 183 Gg CO_2 eq, 30% lower than in 2011. The reduction in emissions will result from the measures described in the chapter on measures. F-gases represent 1% of total GHG emissions.

Figure 5.4: Actual F-gases emissions until 2011 and development according to the projection with measures until 2030.



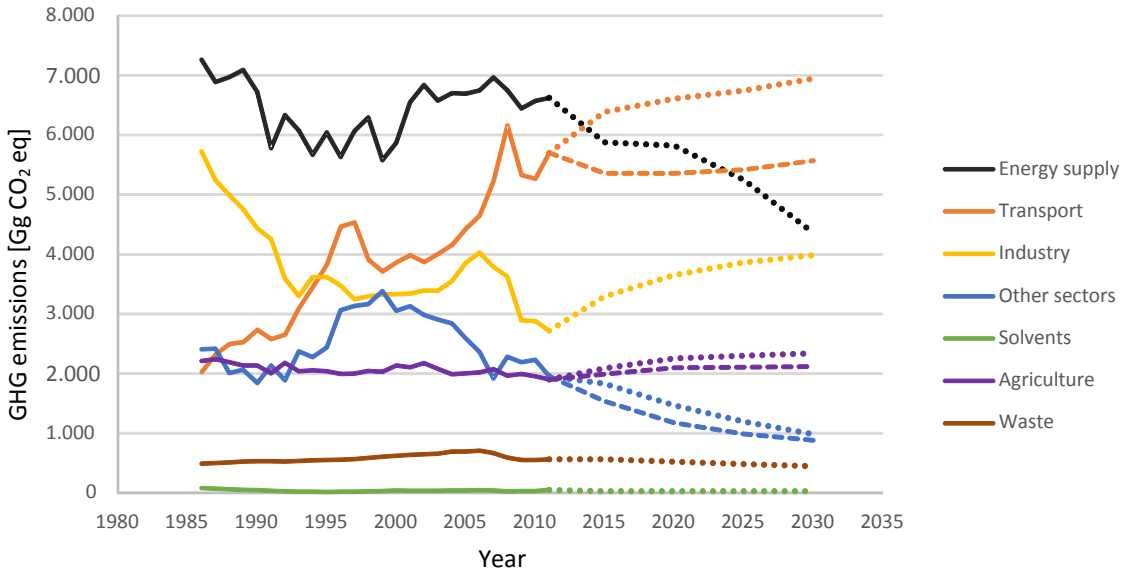
5.2.5 Emissions by Sector

The main sources of emissions are the energy supply sector[48] and the transport sector. In 2011, emissions from the energy supply are higher than emissions from transport, while they will significantly decrease by 2030. After 2011, emissions trends are impacted by the cessation of the operation of the coal units of the thermal power plants TEŠ 1–4, to be replaced by TEŠ 6, TET by 2015, TEŠ 5 by 202, and TE-TOL by 2020. Electricity generation in the coal unit TEŠ 5 will gradually decrease between 2010 and 2025. On the other hand, the production of electric energy from renewable sources will increase (mostly from hydropower), from natural gas (TET and TE-TOL replacement units), and nuclear power (the 2 JEK unit). According to the projection with measures, in the entire period of the projection, emissions from transport will increase, while according to the projection with additional measures, emissions will decrease until 2015 and after the mentioned year they will increase very slowly. In 2020, the difference between the two projections amounts to 1.3 Tg CO_2 eq and in 2030 it amounts to 1.4 Tg CO_2 eq. Under the two projections, the implementation of a sustainable transport policy is envisaged (the promotion of public passenger transport and the transition of goods transport from road to railway) and improvements in the efficiency of vehicles powered by fossil fuels. The two projections envisage that in 2020 the achieved share of biofuels in the consumption of transport fuels will be 10%, as required by Directive 2009/28/EC on the basis of the energy and climate package. The same share is also envisaged after 2020. The difference between the two projections arises from the assumption regarding the share of the transit transport vehicles filling up their fuel tanks in Slovenia. In the projection with measures, it is envisaged that all vehicles in transit transport through Slovenia will fill up their fuel tanks in Slovenia, whereas in the projection with additional measures, it is envisaged that slightly more than 40% of all vehicles in transit transport through Slovenia will fill up their fuel tanks in Slovenia. In industry, which includes emissions from the combustion of fuels in industry and industrial processes, by 2030 emissions will increase by an average annual rate of 2.0% owing to economic development. Due to the combustion of fuels, emissions in other sectors will decrease substantially in both projections. According to the projection with measures, compared to 2011, emissions in 2020 will be 25% lower, while according to the projection with additional measures, emissions will be 40% lower. According to the projection with measures, emissions will additionally decrease by 2030 and will be 50% lower compared to 2011, while according to the projection with additional measures, emissions will be 55% lower. The two projections envisage a very ambitious implementation of measures (the replacement of boilers fuelled by fuel oil, a large share of boilers fuelled by wood biomass and heat pumps in newly purchased boilers, a considerable increase in installed solar collectors, a change in behaviour, and also a higher level of energy-saving retrofitting of residential and non-residential buildings). Compared to 2011, emissions from agriculture will increase by 23% and/or by 12% by 2030, resulting from an increase in the number of livestock (bovine and porcine animals) and a minimal increase in fertilisation. Emissions from waste and wastewaters will

[48] IPCC sectors Energy Supply and Fugitive Emissions.

decrease. In 2030, they will amount to 445 Gg CO_2 eq, which is 21% less than in 2011. The reduction will result from a decrease in deposited biodegradable waste, which will be achieved through a reduction in waste at the source (the separate collection of waste and packaging) and sorting in waste collection centres.

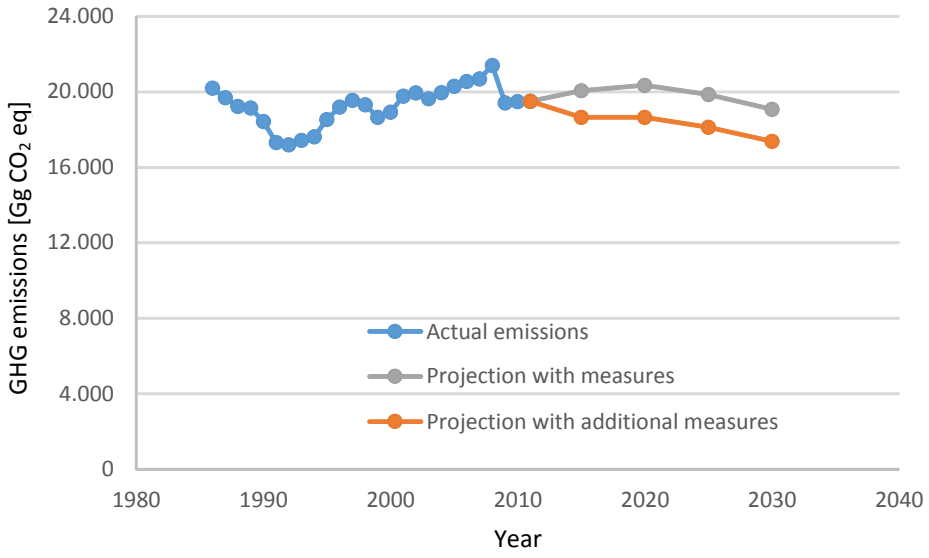
Figure 5.5: Actual GHG emissions by sector until 2011, and future development according to the projection with measures (dotted) and the projection with additional measures (dashed) until 2030.



5.2.6 Total Emissions of Greenhouse Gases

According to the projection with measures, by 2015, emissions will total 20,063 Gg CO_2 eq. By 2020, they will increase to 20,351 Gg CO_2 eq, and by 2030 they will decrease to 19,087 Gg CO_2 eq. According to the projection with additional measures, emissions in 2015, totalling 18,649 Gg CO_2 eq, will be 7.0% lower than in the projection with measures, while the difference will slowly increase after 2015, reaching 9% by 2030. According to the projection with additional measures, emissions in 2020 will total 18,650 Gg CO_2 eq, and in 2030 they will total 17,388 Gg CO_2 eq.

Figure 5.6: Actual GHG emissions until 2011 and development according to the projection with measures and the projection with additional measures until 2030.



5.2.7 Emissisons from International Bunkers

Fuels for shipping and air transport are not included in the projections. In 2011, the emissions from bunker fuels represented 0.9% of emissions in the Republic of Slovenia. Emissions from international air transport, for which projections were produced, represented 0.4% or 69 Gg CO_2 eq, and emissions from international shipping represented 0.5% or 105 Gg CO_2 eq. International air transport projections are presented in the table below.

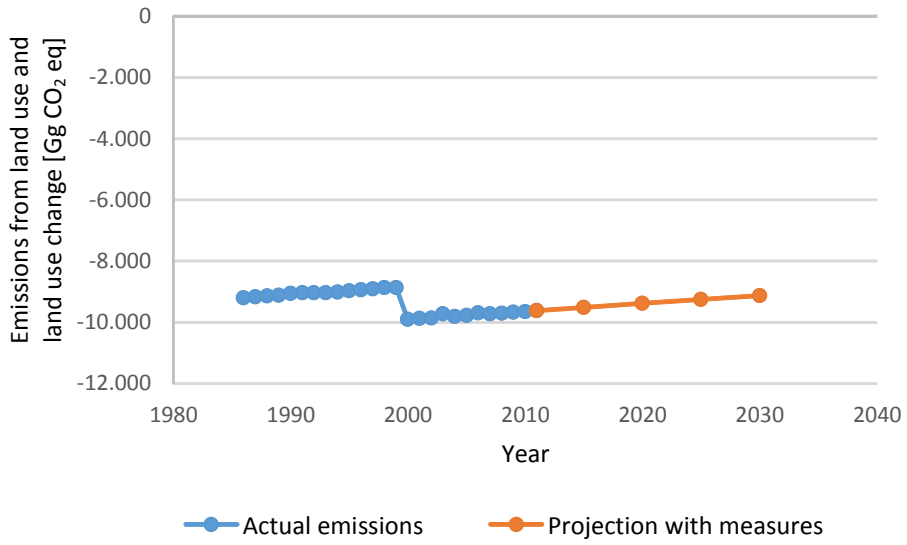
Table 5.1: Projections of emissions from the sales of fuels to international aviation.

Year		*2011*	*2015*	*2020*	*2025*	*2030*
International aviation	[Gg CO_2 eq]	69	96	104	110	119

5.2.8 Projections of CO_2 Sinks

CO_2 sinks resulting from land use and land use change will decrease by 2030; however, they will still be very high. Sinks occur due to wood biomass growth, amounting to 12.0 Tg CO_2 in 2011. By 2030, according to the projection, sinks resulting from an increase in forest area will increase to 12.2 Tg CO_2. On the other hand, emissions will occur due to changes in land use. For 2011, the above-mentioned emissions were estimated to total 2.4 Tg CO_2 eq and according to the projection with measures, to increase by 2030 to 3.1 Tg CO_2 eq.

Figure 5.7: Actual emissions from land use and land use change and the projection with measures until 2030.



5.3 EU-ETS in the Projections

As mentioned under the subchapter Objectives of Reducing Greenhouse Gas Emissions (MOP) within the chapter Measures and Policies, for the period 2013–2020, Slovenia defined objectives separately for sources which are included in the greenhouse gas emissions trading scheme (EU-ETS) and other sources (non-ETS sources). Therefore, in addition to the separation of emissions projections by sector, the separation of projections according to ETS and non-ETS sources is also important to Slovenia. ETS sources are in the sector of energy supply, where almost all emissions are from electricity and heat generation, the combustion of fuels in industry, where ETS sources in 2011 represented two thirds of emissions, and industrial processes, where ETS sources in 2011 represented slightly more than 60% of emissions. In 2013, the ETS scope changed, in particular, additional sources were included (in the case of Slovenia, this means primary aluminium production and air transport) and in addition to the aforementioned, certain small-scale installations were excluded.

In the period 2008–2012, the emissions in the EU-ETS system were defined by the quantity of GHG emission allowances according to the National Plan for the Allocation of Emission Coupons for the Period 2008–2012. Within the above-mentioned period, the average annual quantity of emission allowances allocated to the existing facilities amounted to 8,168 Gg CO_2, and 131 Gg CO_2 of allowances were reserved for the new inclusions. In the EU-ETS period, emissions totalled 8,299 Gg CO_2.

On the basis of the 2012 projection and considering the actual emissions in the period 2008–2011, emissions from sources in the EU-ETS period 2008–2012 were estimated to be 8,422 Gg CO_2; however, taking into account the economic situation in 2012, the projections for industry are too optimistic. It was envisaged that after 2012 the EU-

ETS would include all sources as in the period 2008–2012[49] and aluminium production. To determine the emission allowances after 2012, the annual quantity of allowances in the period 2008–2012 was increased by emissions from aluminium production and decreased by 1.74% every year, starting with 2010.

Table 5.2: Comparison of actual emissions and the projection of emission sources in the EU-ETS and the allocated allowances in accordance with the National Plan for the Allocation of Emission Coupons and the indicative decrease in the allowances available.

						Projection			
		2008	2009	2010	2011	2012	2015	2020	2008-2012
						with measures = with additional measures			
Electricity and heat generation	[$GgCO_2$ eq]	6,449	6,141	6,249	6,246	6,233	5,443	5,262	6,264
Industry	[$GgCO_2$ eq]	1,544	1,225	1,201	1,138	1,605	1,764	1,876	1,343
Industrial processes[50]	[$GgCO_2$ eq]	867	701	680	611	603	783	1,062	692
TOTAL	[$GgCO_2$ eq]	**8,860**	**8,067**	**8,130**	**7,995**	**8,442**	**7,991**	**8,200**	**8,299**
Allocated EU-ETS allowances									
Electricity and heat generation	[$GgCO_2$ eq]	6,089	6,089	6,089	6,089	6,089			6,089
Industry	[$GgCO_2$ eq]	1,555	1,555	1,555	1,555	1,555			1,555
Industrial processes	[$GgCO_2$ eq]	656	656	656	656	656			656
TOTAL	[$GgCO_2$ eq]	**8,299**	**8,299**	**8,299**	**8,299**	**8,299**	**7,708**	**7,060**	**8,299**

5.4 Non-ETS in the Projections

Taking into account that the emissions of sources which are under the EU-ETS in accordance with the allocated allowances for the GHG already defined, we can, on the basis of the common objective, calculate the objective for the period 2008–2012 for sources of emissions that are not included in the EU-ETS (non-ETS). Fulfilment of the Kyoto obligation even depends on these sources. Taking into account the CO_2 sinks, and in order to fulfil the Kyoto obligation, in the period 2008–2012 the average annual emissions from other sources should be lower or equal to 11,747 Gg CO_2 eq.

In the non-ETS sector, the largest source of emissions is transport, which in 2009 constituted 49% of all non-ETS emissions; in 2010 this share decreased to 46%, and

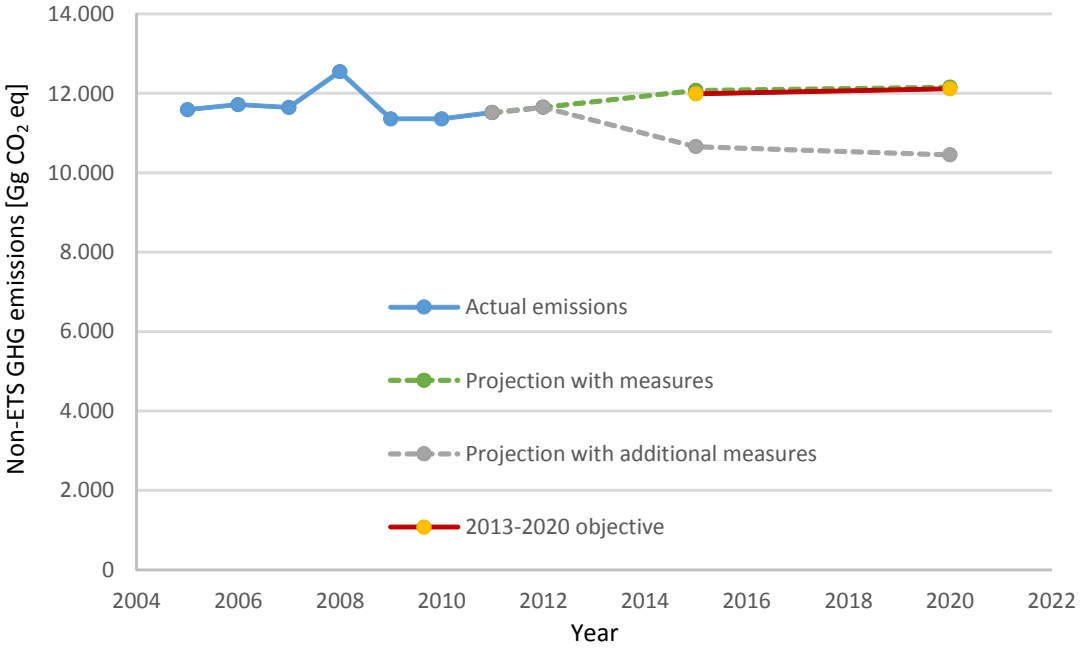
[49] Currently, in Slovenia the EU-ETS includes many small sources, which will probably withdraw from the scheme; however, these sources have to achieve an equal decrease with equivalent measures. This will most probably be achieved within the framework of the environmental tax on the pollution of air due to CO_2 emissions.

[50] Also including CO_2 emissions from flue gas desulphurisation.

in 2011 increased to 50%. According to the projection with measures, by 2020 its share will increase to 54%, and according to the projection with additional measures, it will increase to 51%.

In 2011, non-ETS emissions totalled 11,515 Gg CO_2 eq. According to the projection with measures, they will increase to 12,151 Gg CO_2 eq by 2020, while according to the projection with additional measures, they will decrease to 10,450 Gg CO_2 eq.

Figure 5.8: Actual non-ETS emissions in the period 2005–2011 and the development of emissions according to the projection with measures and the projection with additional measures until 2020, compared to the objective for the period 2013–2020.



In the Kyoto period, according to the estimation based on the available statistical data for 2012 and according to actual emissions in the period 2008–2011, non-ETS emissions totalled 11,685 kt CO_2 eq. According to the above-mentioned, the emissions are lower than the Kyoto objective.

Within the EU objective of reducing GHG emissions by 20% by 2020, Slovenia's 2020 non-ETS objective permits an increase in emissions to 12,117 Gg CO_2 eq and, in addition to the above-mentioned, annual emissions for the period 2013–2019 are also defined. According to the projection with measures, emissions in 2015 and 2020 will be slightly higher than the objective, namely 0.7% higher in 2015 and 0.3% higher in 2020, whereas according to the projection with additional measures, the emissions are considerably lower. In 2015, 11.1% lower, and 13.8% lower in 2020. The significant difference between the two projections shows the high sensitivity of projections to external circumstances (transit transport, EU enlargement to the South-East Balkans, etc.).

Table 5.3*:* Emissions of sources which are not included in the EU-ETS, in 2005 and in the period 2007-2011 and the projection with measures and the projection with additional measures until 2020.

GHG [Gg CO_2 eq]							Projection with measures		
Sector \ Year	**2005**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2015**	**2020**
Electricity and heat generation and fugitive emissions	365	342	305	304	324	377	461	434	558
Industry and construction	860	761	760	693	699	566	499	536	563
Transport	4,431	5,232	6,161	5,329	5,268	5,702	5,664	6,386	6,610
Other sectors	2,585	1,915	2,277	2,186	2,226	1,954	2,035	1,829	1,465
Industrial processes	608	605	461	272	291	387	404	209	149
Agriculture	2,006	2,078	1,965	1,996	1,963	1,900	1,970	2,087	2,255
Waste	713	691	618	583	584	599	587	562	522
Use of solvents	43	42	28	31	30	49	30	30	30
TOTAL	**11,612**	**11,666**	**12,575**	**11,394**	**11,385**	**11,534**	**11,650**	**12,072**	**12,151**
GHG [Gg CO_2 eq]							**Projection with additional measures**		
Sector \ Year	**2005**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2015**	**2020**
Electricity and heat generation and fugitive emissions	365	342	305	304	324	377	461	434	558
Industry and construction	860	761	760	693	699	566	499	536	563
Transport	4,431	5,232	6,161	5,329	5,268	5,702	5,251	5,356	5,359
Other sectors	2,585	1,915	2,277	2,186	2,226	1,954	1,918	1,538	1,175
Industrial processes	608	605	461	272	291	387	404	209	149
Agriculture	2,006	2,078	1,965	1,996	1,963	1,900	1,924	1,993	2,095
Waste	713	691	618	583	584	599	587	562	522
Use of solvents	43	42	28	31	30	49	30	30	30
TOTAL	**11,612**	**11,666**	**12,575**	**11,394**	**11,385**	**11,534**	**11,076**	**10,658**	**10,450**
Objective trajectories and 2020 OBJECTIVE								11,988	12,117

5.5 The overall Impact of Measures

The overall impact of the measures was determined as the sum of the impacts of individual measures. The impact of individual measures was determined with the help of the models used for projections, which ensured that there was no double counting of impacts. For the implemented and adopted measures, the impact was calculated by taking into account the scenario without measures, and for the planned measures, the impact was calculated by taking into account the scenario with measures.

In 2020, the overall impact will total 8,287 Gg CO_2 eq and in 2030 it will total 10,015 Gg CO_2 eq. The largest factor is the impact of CO_2 emissions, followed by CH_4. The impact of measures by sector is even more interesting. In the scenario with measures, by far the greatest impact of the measures is in the energy supply sector resulting from overhauling thermal power plants and enlarging the RES share in electricity generation. According to their order of importance, the GHG emissions trading measure follows, the impact of which was calculated as the difference between emissions according to the projection and the indicative quota of emissions; following closely behind is the impact of the measures taken in the transport sector. The impact of the measures in other sectors is also important; the only exception in the projection with measures is the agriculture sector, where there are no measures planned that would have an impact on greenhouse gas emissions. In the projection with additional measures, by far the largest impact is in the transport sector, followed by the impact of measures taken in other sectors and in the agriculture sector.

Table 5.4: Total impact of measures by gas for the scenario with measures and the scenario with additional measures.

Impact of implemented and adopted measures		2015	2020	2025	2030
CO_2	[Gg CO_2 eq]	3,397	5,897	6,974	7,489
CH_4	[Gg CO_2 eq]	292	360	415	465
N_2O	[Gg CO_2 eq]	12	17	20	20
F-gases	[Gg CO_2 eq]	242	329	348	362
TOTAL	[Gg CO_2 eq]	**3,943**	**6,604**	**7,757**	**8,336**
Impact of additional measures		2015	2020	2025	2030
CO_2	[Gg CO_2 eq]	1,316	1,531	1,522	1,457
CH_4	[Gg CO_2 eq]	55	91	118	145
N_2O	[Gg CO_2 eq]	31	62	69	77
F-gases	[Gg CO_2 eq]	0	0	0	0
TOTAL	[Gg CO_2 eq]	**1,403**	**1,684**	**1,708**	**1,679**

Table 5.5: Total impact of measures by sector for the scenario with measures and the scenario with additional measures.

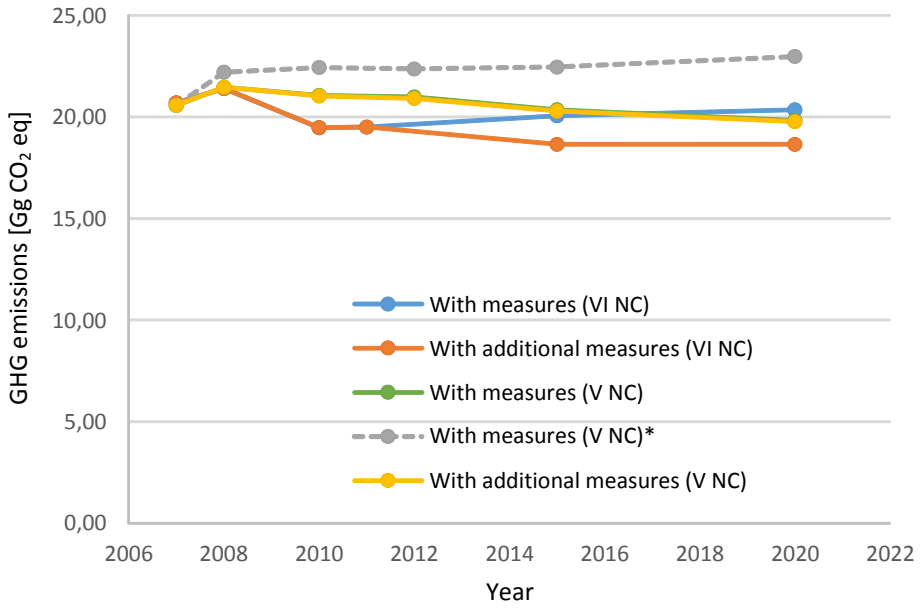
Impact of implemented and adopted measures		2015	2020	2025	2030
EU-ETS	[Gg CO_2 eq]	283	1,139	1,381	1,177
Energy supply	[Gg CO_2 eq]	2,494	3,333	3,746	4,070
Industry (with industrial processes)	[Gg CO_2 eq]	393	569	682	820
Transport	[Gg CO_2 eq]	373	914	1,086	1,236
Other sectors	[Gg CO_2 eq]	92	261	413	529
Waste	[Gg CO_2 eq]	308	388	450	504
Agriculture	[Gg CO_2 eq]	0	0	0	0
TOTAL	[Gg CO_2 eq]	**3,943**	**6,604**	**7,757**	**8,336**
Impact of additional measures		2015	2020	2025	2030
EU-ETS	[Gg CO_2 eq]	0	0	0	0
Energy supply	[Gg CO_2 eq]	0	0	0	0
Industry (with industrial processes)	[Gg CO_2 eq]	0	0	0	0
Transport	[Gg CO_2 eq]	1,031	1,252	1,327	1,375
Other sectors	[Gg CO_2 eq]	290	290	209	101
Waste	[Gg CO_2 eq]	0	0	0	0
Agriculture	[Gg CO_2 eq]	82	142	172	203
TOTAL	[Gg CO_2 eq]	**1,403**	**1,684**	**1,708**	**1,679**

5.6 Comparison with the Projections in Previous Reports

For the period 2010–2015, the projections cited in the Fifth National Communication are higher than the two projections mentioned in this Communication, and in 2020, they are between the two projections of this National Communication. The main reason for the lower projections in 2010–2015 in this report is the economic crisis, which resulted in lower emissions in the industry and transport sectors and faster replacement of fuel oil with, in particular, wood biomass in households and the service sector. In the transport sector, the impact of the changed ratio between the prices of motor fuel in Slovenia and the neighbouring countries is also important. In addition to the above-mentioned, the lower emissions also stem from agriculture, in particular owing to a lower number of animals and with regard to waste, due to faster implementation of measures than envisaged. In addition, one should note the difference in the methodologies of the two projections, when taking into account the EU-ETS in the projections. In the Fifth National Communication, the projection for the sources included in the EU ETS represented the envisaged quantity of allowances, whereas the Fourth National Communication presented the actual emissions. If

the EU-ETS emission of sources were presented in the Fifth National Communication in the same manner as in the Fourth National Communication, the projections in the Fifth National Communication over the whole period would be higher than the projections in this Communication (with measures (V NC)*).

Figure 5.9: Comparison of the Fifth National Communication projections with the projections in this Communication.



5.7 The Uncertainty of the Projections

The uncertainty of the projections arises from the uncertainty of the statistical data used as a basis for the projections (statistical data, emission factors), the models used for the projections, which present a simplified picture of the actual events, the uncertainty of the scenarios for the implementation of policies and measures since they change over time; furthermore, it is difficult to envisage the actual impact of measures, since they are influenced by many factors as well as the uncertainties of future economic, technological and social developments, including the uncertainty of energy prices, growth in the energy supply and demand, the behaviour of the main players in the energy market, etc.

The results of the emission projections in the energy sector are largely dependent on the realisation of the considered measures in the area of RES and URE, which will be largely dependent on the available budgetary funds, where the gap between plans and realisation has been widening in recent years. The dynamics of the transition to natural gas in electricity production are largely dependent on future market movements and social problems as regards reducing the production of coal. Fugitive emission projections are also uncertain as a result of the uncertainty of the future development of the coal mining industry. Uncertainties in this sector have no impact on the attainment of the Kyoto commitment of Slovenia, since this sector is included in the EU-ETS.

Other sources of uncertainty include the scenarios for the future development of the gross domestic product, which has a strong impact on energy use and consequently on emissions from industry. The scenarios presented in the projections were designed after the first wave of the recession. In the period 2010–2012, growth in the average added value totals 3.8%, which is considerably too optimistic. Between 2012 and 2030, an average annual growth rate of 2.1% is envisaged.

For Slovenia, the transport sector represents the largest uncertainty in the preparation of projections. In Slovenia, no projections of transport volume are prepared that could be later indirectly used in the preparation of the energy use projections. The existing transport projections focus on the issues of the construction of the road network. One large uncertainty with regard to projections in transport is represented by transit transport, which cannot be captured by models covering Slovenia only, since the transit flows originate elsewhere. A better solution would be a European model. A significant influence on the impact of transit transport and the sale of fuel in Slovenia is represented by fuel prices in Slovenia in comparison to the fuel prices in the neighbouring countries, since vehicles in transit transport fill their tanks where fuel is the cheapest. The estimation of the share of fuels sold to transit transport in 2008 amounts to 21%, and in 2011 to 16%.

Uncertainties in estimating emissions in agriculture arise in particular from the uncertainty regarding the fluctuation in the number of animals. The above-mentioned number changed considerably over recent years and for the future the policy of the Government of the Republic of Slovenia as regards increasing self-sufficiency in food was taken into account.

5.8 The Sensitivity of Projections

Considering the fact that in Slovenia the development of the transport sector is most uncertain and, in addition to this, that it represents the most important source of emissions from non-ETS sectors, a sensitivity analysis was performed for the transport sector. A sensitivity analysis of the projections with regard to the price of fuels in comparison with the neighbouring countries and to the implementation of measures in this sector was carried out. Sensitivity to the price of fuels was estimated on the basis of the assumption that 100% of vehicles in transit transport decide to purchase fuel in Slovenia when the fuel price is lower in Slovenia than in the neighbouring countries. The projection with additional measures envisages that Slovenia covers 42% of the energy needs of transit transport vehicles. In order to estimate sensitivity to the implementation of measures, a projection was prepared envisaging the continuation of the current intensity of the implementation of the sustainable transport policy measures.

Table 5.6: The sensitivity of the GHG emission projection with additional measures in the transport sector to higher fuel prices in comparison with the prices in the neighbouring countries and to the implementation of the sustainable transport policy measures.

[%]	2010	2015	2020	2025	2030
The projection with additional measures	100	100	100	100	100
All vehicles in transit transport purchase fuel in Slovenia = the projection with measures	100	119	123	124	125
Transport policy not carried out and all vehicles in transit transport purchase fuel in Slovenia	100	120	126	131	131
Transport policy not carried out, all vehicles in transit transport purchase fuel in Slovenia and a lower share of biofuels	100	120	130	135	135

5.9 Methodology

THE ENERGY INDUSTRY

In order to prepare emissions projections for the energy sector as defined by IPCC guidelines, a system of models was used in which the main tool is a reference energy ecological model called REES-SLO2, made in the MESAP environment. The technology-orientated "Reference Energy-Ecological Model for Slovenia (REES-SLO2)" was developed in the MESAP environment in the form of a linear network model for processes and connections (a reference energy system), which enables consistent modelling of energy use based on the needs of energy services and energy supply according to the Integrated Resource Planning method. The tools, models and methodology were verified in a series of preliminary studies and have been used as a basis for many strategic documents for the development of the energy sector and the reduction of greenhouse gas emissions. The set of models for analysis of energy strategies includes the following submodels:

- Firstly, with the help of a model for the assessment the market penetration of energy saving technologies (PET SLO), the market shares of individual EEU technologies with final users are calculated as a response to changing price signals, financial incentives and information campaigns. Technologies established as a result of regulations on the minimum requirements regarding energy efficiency (of buildings, equipment, products) are modelled separately. Efficient use of energy measures in the energy-intensive fields of the processing industry are also modelled separately. The assessment of the market shares of certain technologies and their costs serve as input data in the basic model of the reference energy system (REES-SLO2).

- REES-SLO2 (implemented in MESAP) calculates the envisaged final energy use balances and assesses the local production of electricity based on the proportions of different technologies in the final use structure and connections with influential parameters (the levels of economic activity by sector, the number of households, etc.). The final use of electricity divided by sector, purpose, and production in local supply systems (in industrial, distribution, and private units) is transferred for processing by the program in order to analyse the load shape.
- With the help of a model for the optimisation of electricity production in free market conditions, the total production and use of electricity and system prices are calculated, as well as the quantities to be provided by individual producers. The calculation is based on the optimisation of all supply offers from producers considering prices on international markets, taking into account the technical limitations of individual facilities and the objectives regarding the stability of the system.
- The proportions of electricity production in individual units calculated in Point 3 and related costs are transferred to the MESAP/REES-SLO2 model. Other balances are calculated for the whole planning period in the MESAP model: primary and secondary energies, balances of emissions (CO_2, CH_4, N_2O, SO_2 and NO_X) and total costs.

TRANSPORT

Two models were used for transport emissions. For the assessment of the movements of fuel consumption, an energy model for transport was prepared. The basis for the calculation of energy use in transport was an estimation of the development of the extent of transport volume. However, due to the lack of quality projections of this variable in Slovenia, the small size of Slovenia, and its exposure to transit flows, this assessment is very uncertain. The results of the European energy model PRIMES were also used for the preparation of the assessment. Another model calculates the vehicle fleet structure for passenger vehicles on the basis of assumptions regarding vehicle life-cycle and the structure of newly-purchased vehicles. From the assumption of the shares of various types of transport and the technical characteristics of vehicle fleets, the model calculates the energy use.

Transport emissions were determined by means of the emissions factors of the GAINS model of the IIASA institute.

INDUSTRIAL PROCESSES

The projections of CO_2 emissions in industrial processes were made on the basis of an industrial production growth projection, taking different emission factors for different activities into account. Also considered were the projections of participants in emissions trading obtained in the preparation process of the national plan for the allocation of emission coupons for the period 2008–2012. CH_4 emissions are constant, as their only source is ethanol production, which was considered to be constant. In the projection of PFC emissions, a study of the Talum company, which is the only primary aluminium producer in Slovenia and also the only source of CF_4 and C_2F_6 emissions, was taken into account. HFC projections were produced with a simplified model that included all sources of HFC emissions. The

model assumed the most likely development of equipment in the area of cooling techniques and heat pumps and the further development of the vehicle fleet of personal motor vehicles equipped with air-conditioning. In CRF sectors F.2 through F.4 , a continuation of the 2010 and 2011 trends was envisaged for HFC emissions. Emission factors were defined on the basis of instructions for the preparation of IPCC 2006 records, the preparation study for a review of the EU Regulation on F-gases (Schwarz, W., et al., Preparatory study for a review of Regulation (EC) No 842/2006 on certain fluorinated greenhouse gases – final report) – the model AnaFGas, and on the basis of the legislation regulating this area. Until 2020, for the SF_6 emissions from electrical equipment for the installation of new equipment, the 2000–2011 average was assumed, and subsequently a tenth of the average, while the gas emission factor decreased by 1% until 2020 on the basis of the ECOFYS study (Rhiemeier J. M., et al.; Update on global SF_6 emissions trends from electrical equipment – Edition 1.1).

WASTE

Solid waste emission projections were made using the IPCC methodology. Emissions for waste deposited before 1977 that were mainly in a disorganised or badly compressed condition, where covering the landfill was only realised after they were closed, were estimated according to the simplified IPCC methodology. When assessing landfill emissions with waste dumped after 1977, which was partly compressed and compacted, where most landfills were covered at the time, a more accurate IPCC methodology, using time series, was applied. In the calculation, a reduction in the depositing of biodegradable waste was envisaged. The composition of the biologically degradable part was constant and summarised according to the results of screening analyses in Slovenia.

For the wastewater emissions calculation, an IPCC methodology was used. The following input data were used to assess CH_4 emissions:

- planned biological treatment of municipal and industrial organically loaded wastewater until 2015 in the Republic of Slovenia,
- the organic burden,
- the proportion of actually decomposed organic substances,
- the conversion factor and the use of produced gas.

N_2O emissions were assessed according to the IPCC methodology with the assumption that all wastewater nitrogen ends up in the water environment.

AGRICULTURE

Agriculture emission projections were carried out according to the methodology prescribed by the IPCC. The IPCC methodology anticipates agriculture emission projections based on statistical data on the physical volume of crop and animal production, taking into account specific procedures characteristic of particular countries or areas. Data on the extent of crop production and domestic animal production is treated separately, despite their interdependence. The model based on the IPCC methodology therefore does not enable optimisation at the level of the agriculture sector as a whole, but only with regard to separate segments. SORS statistical data and information obtained from experts in the agricultural sector were used for the assessment.

5.10 The Bases for the Preparation of the Projections

For the preparation of emission projections from energy sources, the results of long-term energy balances prepared as a basis for the Renewable Energy Sources Action Plan were used. Within the framework of balances, several scenarios were used, composed of a scenario of economic development, three strategies for the implementation of measures, two scenarios for the implementation of sustainable transport policy measures, and three scenarios involving the development of the electricity sector. The projection with additional measures in the use of final energy equals the reference scenario of the implementation of measures; in the transformation, it equals the nuclear reference scenario of electricity supply; and in transport, it equals the scenario with a high level of implementation of the measures of the sustainable transport policy. The base year for the preparation of long-term balances was 2008.

Forecasts of gross domestic production growth/decrease in Romania, Bulgaria, Poland, Hungary and Slovakia were used for transit transport.

The basis for the preparation of projections in agriculture was the agriculture development strategy.

Table 5.7: Added value indexes for the target scenario of economic growth.

	2010	2015	2020	2025	2030
Agriculture, forestry and fishery	100	105	110	115	121
Industry	100	122	141	161	184
The construction industry	100	122	146	171	207
Services	100	117	141	162	188
TOTAL	100	118	140	161	186

The basis year for waste, industrial processes, and agriculture was 2011. Many assumptions are presented in the appendices.

6 CLIMATE CHANGE IMPACTS, VULNERABILITY AND ADAPTATION

6.1 Introduction

Climate change impacts concern all sectors and economic activities and require comprehensive consideration, inter-ministerial cooperation and coordination, with adequate staff capacity. Sectoral policies (agriculture, forestry, water, energy, health, natural disaster response, etc.) need appropriate guidelines for the long-term sustainable planning of policies and measures. Such guidelines defining impact, impact area and possibilities for adaptation measures could be provided by a strategy or action plan for climate change adaptation. Slovenia has not yet adopted a comprehensive strategy for climate change adaptation. In the coming period, it will focus on preparing a comprehensive cross-sectoral assessment of the risks and opportunities that climate change presents for Slovenia, which will be the basis for preparing measures for adaptation and risk prevention and management (action plan for climate change adaptation).

6.2 Measures

Agriculture and forestry have been assessed as the most vulnerable sectors in Slovenia; therefore, in June 2008, the Government of the Republic of Slovenia adopted the Strategy for the Adaptation of Slovenian Agriculture and Forestry to Climate Change. The strategy was followed by the Action Plan for 2010 and 2011, which the Government adopted in October 2010 and amended in March 2011. Measures to reduce risk and damage to agriculture and forestry were implemented under the Action Plan. Most of the measures (15 of 22) have been implemented; their total value is 1 436 298.26 euros; for some measures, only expert groundwork was prepared within the means available. The Action Plan included a review of measures already implemented or being implemented with regard to climate change adaptation in agriculture and forestry. Some measures urgently need to be continued and monitored over a longer period, but their implementation was postponed owing to the lack of funds. New measures are planned, most with the support of European funds within the Rural Development Programme and the Common Agricultural Policy.

In the period between October 2009 and April 2012, Slovenia had a Government Office of Climate Change, which prepared and submitted to public discussion a draft of a long-term climate change strategy which also provides strategic guidelines for climate change adaptation. The strategy provided the guidelines for sectors, to be followed by an action plan; however, when the office was closed, the work was suspended. It is planned to establish an inter-ministerial working group for adaptation to climate change to coordinate work in this field. The first step will be to prepare a comprehensive cross-sectoral assessment of the risks and opportunities that climate change presents for Slovenia, as a basis for preparing measures for adaptation and risk prevention and management.

The short-term adaptation measures carried out by the Slovenian Environment Agency include warnings about dangerous weather and hydrological events, and regular publications of reviews of climate variability and monitoring in the Agency's bulletin.

6.3 Action Areas

In the period 2010–2013, Slovenia took action in the following areas:

- Sustainable and integrated management of water resources – the Water Management Plan for the Danube and Adriatic See Basins for the 2009–2015 Period was adopted, which also defines measures for climate change adaptations;

- Reduction of flood risk: areas of significant flood impact in Slovenia were identified (on the basis of a prior flood risk assessment) and river basins selected in which comprehensive anti-flood measures are to be carried out within the new financial perspective.

- Drought management: since 2006, Slovenia has been the host of the Drought Management Centre for Southeastern Europe – DMCSEE (under the United Nations Convention to Combat Desertification – UNCCD and the World Meteorological Organisation – WMO). The groundwork for the national action plan for drought management was prepared. It is vital that an operational programme for drought management also be adopted.

- Spatial planning: the research project Adaptation to Climate Change with Spatial Planning Tools was prepared. The Strategy for Spatial Planning in Slovenia envisaged that regional development programmes would also include an assessment of the impact of climate strategies.

- Biodiversity conservation: Slovenia has designated special protection areas and carried out a few projects, including climate change impact analyses. The preparation of a programme for the management of NATURA 2000 areas under the new financial perspective is underway.

- Natural disasters: Slovenia did some risk assessments for particular natural disasters (e.g. fire in the natural environment). It is preparing a methodological and substantive upgrading of risk assessments and a national risk assessment, which will include climate change impacts on particular risks and facilitate the planning of preventive measures.

- Provision of information and raising awareness: the Slovenian Environment Agency regularly informs the public of dangerous weather and hydrological events. With regard to raising awareness, climate change adaptation was included in good practice examples in three consecutive years under the *Slovenia Reduces* CO_2 project, and various events, consultations and guidelines for decision-makers were prepared.

6.4 Information Flow

Slovenia does not have a special information portal for climate change adaptation. Information on national activities is provided at the European portal ClimateADAPT (http://climate-adapt.eea.europa.eu/).

7 FINANCIAL RESOURCES AND TRANSFER OF TECHNOLOGY

Slovenia is not one of the developed country Parties listed in Annex II of the UN Framework Convention on Climate Change with the commitments to (i) provide new and additional funding for mitigation of and adaptation to climate change in developing countries, and (ii) promote the transfer of and access to environmentally sound technologies in developing countries and countries with economies in transition.

The commitment to provide new and additional funding for the mitigation of and adaptation to climate change in developing countries was assumed by Slovenia at the 15th session of the Conference of the Parties to the United Nations Framework Convention on Climate Change held in Copenhagen in 2009 (Decision 2/CP.15, paragraph 8 and Decision 1/CP.16, paragraph 40), where the developed countries pledged to provide USD 30 billion to developing countries in the period 2010-2012 for the fast-start financing (FSF) for mitigation and adaptation activities. Further, developed countries pledged to provide for the same purpose USD 100 billion annually by 2020 from different sources.

On the basis of the Copenhagen Agreement, European Union leaders in December 2009 pledged a sum of EUR 7.2 billion for FSF in the period 2010–2012. Slovenia's contribution was fixed at EUR 8 million. This commitment refers to new and additional funding, thus avoiding interference with the efforts aimed at reducing poverty and achieving the Millennium Development Goals. A more precise definition[51] of the new and additional funding has not been agreed.

7.1 Official Development Aid

Under the International Development Co-operation of the Republic of Slovenia Act (Ur. l. RS, 70/06), efforts in the area of official development aid in Slovenia are coordinated and monitored by the Ministry of Foreign Affairs, which collects data on relevant financing from the budget users, including official development aid funds earmarked for the mitigation of and adaptation to climate change in developing countries. Pursuant to the provisions of Article 16 of the Regulation (EU) No 525/2013 of the European Parliament and of the Council (Official Journal of the European Union, L 165/13), data in the area of official development aid is collected using the OECD methodology by means of the use of so-called 'Rio markers'. Under the OECD methodology, any official development aid financing is evaluated in respect of its impact on the mitigation and adaptation activities, involving a description in three categories: absence of impact, strong impact and the activity's main objective. Since this methodology of reporting on the official development aid has only recently been introduced into the Slovenian reporting system, data for the period 2010–2012

[51] Under OECD methodology for reporting on the official development aid, financing used within the clean development mechanism (using CER units as a confirmation of reduced greenhouse gas emissions), which does not fall within the scope of new and additional funding, must not be accounted for as official development aid.

is incomplete. It follows from the FSF report on the mitigation of and adaptation to climate change that within the scope of official development aid, Slovenia directed a sum of EUR 5,031,869 to that end in the period 2010–2012. Other official and private flows are not monitored.

In accordance with the EU Council Conclusions (May 2005) and with the European Consensus on Development (December 2005), Slovenia is striving to increase its official development aid share to 0.33% of its GDP by 2015. In the period 2010–2012, these funds amounted to approx. EUR 45 million or 0.13% of GDP. A similar level is also expected in the period up to 2015.

Approximately two thirds of official development aid is allocated multilaterally, with the major part being disbursed via the EU budget. It follows from the FSF report that within the scope of multilateral official development aid, Slovenia directed a sum of EUR 1,619,543 to that end in the period 2010–2012. Among other contributions, the most important is the contribution to the Global Environment Facility (GEF). Slovenia has been a member of the GEF since 1994. It first participated as a donor by contributing to the second replenishment (1998–2001). It will fulfil its obligations from the fifth replenishment (4 million SDR[52]) by issuing four Notes each in the amount of EUR 1.2 million to be called on by the World Bank in the period 2011–2020. Slovenia's contribution to the implementation of the UN Framework Convention on Climate Change accounts for 60% of its GEF contribution, which in the period 2010–2012 amounted to EUR 1,467,300. The remaining part of the GEF contribution is counted by Slovenia as a contribution to implementation of the Convention on Biological Diversity.

Of the total bilateral official development aid, two thirds were forwarded to the Western Balkan countries. The majority of the aid was earmarked for co-financing projects, with the beneficiary countries acting as co-financing parties. In the period 2011–2012, 12.6% of available bilateral aid was allocated to the financing of environmental infrastructure and access to drinking water. In the period 2010–2012, the two main beneficiaries within the Slovenian development co-operation framework were Macedonia and Montenegro. It follows from the FSF report that within the scope of bilateral official development aid, Slovenia directed to that end a sum of EUR 3,412,326 in the period 2010–2012.

In the period 2010–2012, Slovenia financially supported in Macedonia the construction of the following:

- A public waste water treatment plant with the capacity of 19,500 population equivalent at Novo Selo in the Skopje municipality of Gjorče Petrov. The project included: drafting of technical documents, acquisition of the construction permit, construction of the system of pools, water tanks and branch-pipes, supply of water treatment equipment, and test operation. The plant will contribute to the reduction of underground water pollution and pollution of the River Vardar, and enhance public health. By the end of the project, Slovenia's support will amount to EUR 1,500,000; the overall project value is EUR 5,841,000. The rest of the funding will be provided

[52] Special Drawing Rights.

by Macedonia. In the period 2010–2012, Slovenia's contribution amounted to EUR 629,610.

- Modular schools for 250 pupils at Ilinden municipality. The project was completed in February 2012. It helped to increase school capacity and to enhance the quality of school lessons. With this project, the local community's wish was to highlight the possibility of introducing new technologies capable of contributing to the protection of the living environment and to energy efficiency. Slovenia's support to the project amounted to EUR 500,000; its overall value was EUR 1,622,654. The rest of the funding was provided by Macedonia. In the period 2010–2012, Slovenia's contribution amounted to EUR 500,000.

- Waste water treatment plant at Probištip municipality which, hand in hand with the infrastructure already constructed, will constitute a sustainable source of high-quality drinking water for the population. The water treatment process includes pre-ozonation, sedimentation and deposition, ozonation, active coal-filtering of water, and sludge-processing. In addition to ensuring sustainable water use and high-quality drinking water, the project is aimed at preventing adverse effects on the population's health and at encouraging social and economic development in a degraded environment. By the end of the project, Slovenia's support to the project will amount to EUR 480,000; the overall project value is EUR 1,652,000. The rest of the funding will be provided by Macedonia. In the period 2010–2012, Slovenia's contribution amounted to EUR 480,000.

In Montenegro, Slovenia financially supported:

- The setting-up of municipal infrastructure in the town Žabljak, namely the construction of a receiving canal and the regulation of waste water treatment. The project is aimed at reducing the pollution of underground water and the drinking water catchments, which will contribute to enhanced public health safety. The improved infrastructure is a precondition for the construction of tourist facilities, which will make possible for the creation of new jobs and positively influence economic development in the region. By the end of the project, Slovenia's support will amount to EUR 510,000; the overall project value is EUR 1,000,000. The rest of the funding will be provided by Montenegro. In the period 2010–2012, Slovenia's contribution amounted to EUR 484,500.

- The installation of an up-to-date and efficient information system for the Energy Agency. The information system includes hardware and software, with the applications adapted for use in Montenegro. This system will provide operators with an efficient tool that enables them to automate their work processes, thus ensuring openness, predictability, flexibility and transparency in the energy sector. Slovenia's support to the project amounted to EUR 400,000; its overall value is EUR 766,577. The rest of the funding was provided by Montenegro. In the period 2010–2012, Slovenia's contribution amounted to EUR 400,000.

- An eco-remediation project by which it is possible to renew or preventively protect degraded natural resources. The project will identify the most pressing environmental problems, prepare a choice of possible eco-remediation possibilities, define priority

areas and expert foundations for the implementation of eco-remediation, and put in place two demonstration eco-remediation water purification plants. The project will make a considerable contribution to the efficient protection of natural resources. By the end of the project, Slovenia's support will amount to EUR 126,000; the overall project value is EUR 206,000. The rest of the funding will be provided by Montenegro. In the period 2010–2012, Slovenia's contribution amounted to EUR 126,000.

- Preparation of a feasibility study for the mechanical, biological and thermal processing of municipal waste at the town of Berane and a feasibility study for teleheating at Berane. The two studies presented the technological, economic and ecological aspects relevant for the investment decision. The project's aim was to provide the basis for an investment in the system of municipal waste processing and teleheating of the town. Slovenia's support to the project amounted to EUR 100,000; its overall value is EUR 200,000. The rest of the funding was provided by Montenegro. In the period 2010–2012, Slovenia's contribution amounted to EUR 100,000.

- Elaboration of a detailed spatial plan as part of the multi-purpose accumulation project encompassing the entire basin of the River Morača at the outfall of Zeta into the Morača. The spatial plan will include the areas for four hydroenergy locations, which will constitute the basis for exploitation of the Morača midstream potential at the: Zlatica, Milunovići, Raslovići and Andrijevo hydropower plants. By the end of the project, Slovenia's support to the project will amount to EUR 90,000; the overall project value is EUR 519,000. The rest of the funding will be provided by Montenegro. In the period 2010–2012, Slovenia's contribution amounted to EUR 90,000.

- A three-year (2011–2013) awareness-raising campaign for young people from Northern Montenegro with respect to environmental protection, waste treatment, family violence and gender equality. The value of the project, which ends in 2013, is EUR 100,000. In the 2010–2012, Slovenia's contribution amounted to EUR 68,257.

- Feasibility study for a demonstration project regarding the energy rehabilitation of buildings and the introduction of renewable energy sources for heating at Mojkovac municipality in the amount of EUR 33,000.

In Serbia, Slovenia financially supported:

- Erecting the facility and equipment for the production of wood briquettes from wood biomass. The project's aim is to bolster economic development in the region, reducing unemployment and developing the accompanying economic infrastructure. The region of Medvedja is densely forested, which has lately resulted in the development of the wood-processing industry. The production of briquettes (expected total capacity estimated at 8,000 tons/year) will also make use of wood residues from the wood-processing industry. The new plant will employ between 13 and 15 workers; the new project is expected to encourage employment in support businesses. By the end of the project, Slovenia's support will amount to EUR 290,000; the overall

project value worth is EUR 830,950. The rest of the funding will be provided by Serbia. In the period 2010–2012, Slovenia's contribution amounted to EUR 290,000.

- A three-year (2011–2013) project of sustainable co-existence, cultural development and proper waste management for young people and the general public in the towns Niš, Aleksinac and Leskovac. The value of the project, which ends in 2013, is EUR 100,000. In the period 2010–2012, Slovenia's contribution amounted to EUR 70,000.

In Bosnia-Herzegovina, Slovenia financially supported a three-year (2011–2013) project to raise public awareness of the problem of irresponsible waste handling and the negative impact of such handling on the environment. The value of the project, which ends in 2013, is EUR 100,000. The main activities are intended, in particular, for school staff, children n, young people and volunteers, with the aim of achieving a better level of awareness among the local population, institutionalising the programme and the education of young people towards more responsible conduct. In the period 2010–2012, Slovenia's contribution amounted to EUR 69,619.

In Albania, Slovenia financially supported a two-year (2010–2011) water-water heat pump demonstration project (20 KW) for a school in the Korca municipality in the amount of EUR 32,000. In the period 2010–2011, training and education were organised in Bosnia-Herzegovina, Macedonia and Ukraine on sustainable energy use in schools and on the elaboration and implementation of energy plans for schools in the amount of EUR 28,450. A smaller demonstration project in the amount of EUR 5,895 was implemented in Afghanistan involving the installation of solar cells on the roof of Kharokh Health Centre situated 60 km east of the town Herat.

8 RESEARCH, DEVELOPMENT AND INNOVATION, AND SYSTEMATIC OBSERVATION

8.1 Introduction

A large number of research and development and innovation projects in climate change and related fields which can be considered to fall within the common field of the "low-carbon society" are being or have been carried out in Slovenia. However, the problem is their fragmentation and inadequate information flow on research subjects and results. There is a lack of systematic monitoring and evaluation of their results and effects. Since the cancellation of the Government Office for Climate Change, Slovenia does not have a single website to publish a catalogue of information on climate change research. In addition to the catalogue, study summaries should also be available to decision-makers, particularly in cases when a study is partly financed from public funds.

Slovenia also does not have a specialised climate change portal, where relevant information and guidelines concerning climate change could be collected, and where the information needs of decision-makers and the necessary research would be specified.

A great disadvantage for research is the lack of climate projections for different future time windows for Slovenia that take into account the great climatic variability in its territory. The territory of Slovenia is occasionally exposed to various dangerous weather and climate phenomena and their consequences, e.g. drought, floods and water-logging, storms, high sea levels, landslides, heat waves, frost, heavy rain and hail, strong winds, and glaze ice. It is reasonable to expect that the intensity and frequency of these phenomena will also vary in the future, as current observations and data show. Detailed climate projection calculations for all Slovenian regions for selected periods should be made for at least the two extremes of the four IPCC scenarios on the basis of global and regional climate models, while taking account of actual data measured. This would allow the research conducted in Slovenia to yield more specific results and specific documents to be drafted, such as a strategy and action plans for climate change adaptation.

Various programmes and projects concerning this field have been, or still are, (co)financed within the ministries responsible for science and technology and for different fields concerning the low-carbon society, such as centres of excellence and competence centres for the development of low-carbon technologies or projects for the preparation of expert bases for various policies (e.g. targeted research programme *Slovenia – Low-Carbon Society* (CRP Sinoda), projects for supporting energy and transport policies, etc.) The Operational Programme for the Reduction of Greenhouse Gas Emissions by 2012 (OP TGP-1) envisaged two measures concerning technology research and development and other issues related to the transition to a low-carbon society. The first systematic review and synthesis of research concerning the transition to a low-carbon society was carried out during the preparation of the draft strategy for the transition of Slovenia to a low-carbon society by 2050/2060

(climate strategy). In February 2013, the Slovenian Government adopted the Slovenian Industrial Policy, a document defining priority technology fields as a response to social challenges, which are also related to climate change.

Systematic observation and measurement has been carried out by the Slovenian Environment Agency (SEA), within the framework of which the National Hydrological Service and National Meteorological Service are operating.

SEA has been carrying out measurements of air pollution on permanent measuring stations, including background measurements, air quality measurements with mobile stations and diffusive samplers and precipitation quality measurements. Measuring points are located in larger towns and in areas of larger air pollution sources. In 12 permanent measuring stations for the monitoring of external air quality, the measurement of sulphur dioxide, nitric oxides, carbon monoxide, ozone, volatile hydrocarbons, PM_{10} and $PM_{2,5}$ particles and meteorological parameters is carried out. The selection of parameters in individual stations is dependent on the problems in individual locations; for instance, the ozone concentration is monitored in all locations in Primorska region. In Ljubljana (Bežigrad), Maribor and Iskrba pri Kočevski Reki, measurements of individual metals in particles are carried out. Sampling for these analyses is conducted by referential gauges. The stations Iskrba pri Kočevski Reki and Krvavec are located in areas remote from large sources of pollutants. In these stations, background measurements of air pollution are carried out; the stations are also included in the international network EMEP (European Monitoring and Evaluation Programme) and WMO-GAW (World Meteorological Organisation – Global Atmosphere Watch).

The surface water programme includes the monitoring of rivers, lakes and sea conditions and programmes for the monitoring of the water quality in the areas of special regimes. The basic units to determine the water conditions with regard to environmental objectives are water bodies. In Slovenia, 155 water bodies were specified in surface water, and 21 in underground water. The water quality monitoring programmes are divided into the supervisory and operational monitoring of conditions. The supervisory monitoring of conditions is carried out in order to provide an assessment of the total conditions of waters in the water area, and contains all the quality elements for the definition of ecological and chemical condition. It is repeated at least every six years. The operational monitoring of conditions is intended for the assessment of the water condition of water bodies, for which a risk exists that they shall not achieve a good condition status by 2015; it also enables an assessment of the effects of measures for the reduction of pollution. It has been implemented annually in places, where over-pollution is determined on the basis of the analysis of influences and pressures or by the supervisory monitoring of conditions. The operational monitoring of conditions includes only those biological, physical-chemical and hydro-morphological elements that are mostly sensitive to the pollution of water bodies. For the assessment of chemical conditions, analyses of basic physical-chemical parameters, priority substances and national relevant substances are carried out. The ecological condition is evaluated on the basis of biological elements of quality (phytoplankton, aquatic flora and benthic invertebrate fauna) as well as supporting physical-chemical and hydro-morphological elements.

8.2 Climate Conditions Research Conducted at the Slovenian Environment Agency

8.2.1 Climate Variability in Slovenia

The Slovenian Environment Agency has been carrying out the *Climate Variability in Slovenia* project since 2008. The aim of the project is to make a comprehensive temporal and spatial analysis of the variability of, and trends in, climate variables in Slovenia on the basis of homogeneous series. The quality of measurements conducted in Slovenia since 1961 has been systematically verified. The selected multi-annual series of all important climate variables have been homogenised. In this process, the recommendations of the European project for climate data homogenisation, COST – HOME, were taken into account.

Following a very time-consuming process of data verification and homogenisation, analyses began at the end of 2012. The variability of, and trends in, air temperature have already been calculated on the basis of homogenised data, and in the coming months similar analyses will be carried out for precipitation, the duration of solar radiation and snow cover.

There is a long way from measuring temperature with conventional thermometers to monitoring climate conditions. Verified individual measurements are the basis for on-going weather monitoring. However, when we wish to fit a measurement within a long period, we have to verify the consistency of measurements in a time series. Because of the movement of measuring stations, changes in measuring devices, land development and many other factors, a data series reflects not only variations in the climate conditions of a place or area. By comparing it to the time series in neighbouring areas, the climate signal can partly be separated from artificial influences at a particular station. The process of excluding unwanted artificial influences on a time series is called homogenisation. Homogenised time series are the basis for studying past climate changes.

All meteorological measurements contain a measurement error. Many factors affect an error in an air temperature measurement, such as the type of shelter where the thermometer is placed, the type of thermometer and the time of thermometer reading. Data calculated from a plurality of measurements (e.g. annual temperature average) also depend on the calculation method. In a long time series, uncertainty due to homogenisation, which only partly eliminates the unwanted artificial signal for a time series, is also important. All the above-mentioned sources of error in the calculation of time trends at individual measuring stations in Slovenia in the 1961–2011 period contribute less than 0.05°C/decade to the total uncertainty of results. This uncertainty is not very significant for climate change estimates or the rate of temperature rise, which is approximately 0.34°C/decade for the average temperature. Weather variability is much more important for trend estimates. Because weather conditions vary from month to month and from year to year, the climate signal representing climate change can be determined from measurements with only a certain degree of precision. Thus the atmosphere warming signal can be determined only from data gathered at Slovenian measuring stations after a series of at least 25 years.

Interim reports with results are published on the meteo.si portal (http://meteo.arso.gov.si/met/sl/climate/pss-project/) and in the following publications:

- Gregor Vertačnik, Mojca Dolinar, Renato Bertalanič, Matija Klančar, Damjan Dvoršek, Mateja Nadbath: Podnebna spremenljivost Slovenije, Glavne značilnosti gibanja temperature zraka v obdobju 1961-2011, Ministrstvo za kmetijstvo in okolje, Agencija RS za okolje (Ministry of Agriculture and the Environment, Slovenian Environment Agency), Ljubljana 2013.

- Gregor Vertačnik, Mojca Dolinar, Mateja Nadbath, Matija Klančar, Boris Pavčič: Okolje, v katerem živimo, articles on pages 3-24, Ministrstvo za kmetijstvo in okolje, Agencija Republike Slovenije za okolje (Ministry of Agriculture and the Environment, Slovenian Environment Agency), Ljubljana 2012, ISBN 978-961-6024-59-4

8.2.2 BOBER Project

Within the *Operational Programme for the Development of Environmental and Transport Infrastructure (OP ROPI)* for the 2007–2013 period, the Slovenian Environment Agency is carrying out a project to upgrade the system for monitoring and analysing the state of the water environment in Slovenia. The title of the project is BOBER, an abbreviation for *Better Observation for Better Response*.

The wider purpose of the project is to increase the capacity to study and monitor water cycle factors comprehensively from various aspects. Balanced spatial planning (better water management) and the construction of representative measuring networks that will support the assessment of the status of water bodies are particularly important. From the point of view of environmental protection and the efficient and sustainable use of natural sources, the protection of drinking water is particularly important – the determination of hazardous substances in the environment – and, of course, the protection of human health, lives and property from the consequences of natural disasters (protection against flood and drought), which must be based on accurate and timely meteorological and hydrological forecasts and the provision of data in real time.

The objectives of the project are:

- to improve the monitoring of water environment status;
- to improve the knowledge and assessment of the water environment's status in Slovenia; and
- to make high-quality hydrological and meteorological forecasts, which in the long term will facilitate more accurate forecasts of extreme hydrological conditions and more comprehensive protection and conservation of water resources.

The anticipated results are:

- 248 upgraded and new measuring stations throughout Slovenia;
- replacement of equipment at 33 measuring points;
- installation of one additional weather radar;
- new equipment for periodic hydrological measurements and marine dynamics measurements;

- provision of conditions for the operation of the Maritime Meteorological and Oceanographic Service;
- upgrading of computer infrastructure in the Computer Centre of the Slovenian Environment Agency;
- modernisation and enlargement of chemical analysis, biological and calibration laboratories;
- setting up systems to forecast the hydrological state of the Sava and Soča rivers, marine dynamics, state of groundwater in alluvial aquifers and drought monitoring.

The project was approved within the OP ROPI in August 2007; since then, individual activities for the implementation of the project have been carried out. The Commission Decision was issued on 25 May 2010. The project will be concluded on 30 June 2015. Its cost is estimated at 32,962,821 euros. The project is partly (85%) financed by the European Union through the European Cohesion Fund.

Information on the project is published on the Slovenian Environment Agency's website: http://www.arso.gov.si/o%20agenciji/EU%20sofinancira/

8.2.3 Supporting the Operation of the Drought Management Centre for Southeastern Europe

The project *Supporting the Operation of the Drought Management Centre for Southeastern Europe*, which was carried out in 2013 by the Biotechnical faculty of the University of Ljubljana and financed from the funds of the Drought Management Centre for Southeastern Europe, comprised the preparation of the *National Action Programme for Drought Management in Slovenia*. Within the project, current drought management in Slovenia was examined and specific proposals for its improvement prepared. The project report includes a review of good drought management practices in Europe and worldwide and will be used in the preparation of an administrative and legislative proposal for drought management in Slovenia. This document will serve as a basis for an operational programme for drought management.

8.2.4 Quantitative Assessment of Water Resources in Slovenia

The results of hydrological analyses conducted by the Slovenian Environment Agency are used in many expert studies and opinions and as a basis for the implementation of European directives (Water Framework Directive, Drought Directive, Marine Strategy Framework Directive, etc.). Hydrological analyses are indispensable to the BOBER project in developing hydrological prognostic models for the Sava and Soča rivers and model tools for marine dynamics prognosis and setting up measuring points on surface waters.

In 2012, the international project *Climate Change and Impacts on Water Supply – CC-WaterS* was concluded, in which the Slovenian Environment Agency participated, mostly regarding water balancing and the simulation of impacts of foreseen climate change on drinking water supply. On the basis of climate change projections made by applying the ALADIN and RegCM3 regional climate models and GROWA-SI water balance model, the

impact of this change on the recharge of underground water for individual water bodies for the 2071–2100 period was also estimated. According to the results of the ALADIN climate model, the recharge of Slovenian aquifers is estimated to decline by 18% in comparison to the 1971–2000 period, while the water balance of the GROWA-SI model and the results of the RegCM3 climate model show only a 2% reduction in recharging for the said period. Despite some uncertainties in climate development estimates, the results of the CC-WaterS project can be an important and internationally verified expert basis for water management planning in the next water planning period.

8.3 Research and Development for the Transition to a Low-Carbon Society, in Particular in Relation to Low-Carbon Technologies

The following two measures were envisaged under the OP TGP-1 for research and development regarding the low-carbon society:

5.23.1 (Implementation deadline: first half of 2010) – To prepare, submit to the Government of the Republic of Slovenia for approval and implement a programme of research and development in technologies relevant to the transition to a low-carbon society.

The Resolution on the National Research and Development Programme 2006-2010 (Uradni list RS (Official Gazette of the Republic of Slovenia), no. 3/2006 – ReNRRP) determined as priority areas for investments in research and development those areas that facilitate the improvement of knowledge, scientific drive and economic efficiency based on the values of a humane society and those that indirectly support the faster development of key economic sectors where we can follow the example of Central European priorities, such as: information and communication technology (ICT), modern (new) synthetic metal and non-metal materials and nanotechnology, complex systems and innovative technology, technologies for sustainable economy, health and life sciences. The area of sustainable economy technologies included energy and environmental protection technologies, and technologies for the efficient use of energy, for the use of new and renewable energy sources, for safe and healthy environment, for sustainable building, for quality assurance and control of the environment (soil, forest, water, air), food, health and products, etc., which means that it has already supported the issues relevant to the transition to a low-carbon society. In 2008 and 2009, the Ministry of Higher Education, Science and Technology, in cooperation with the Ministry of the Economy, the Ministry of the Environment and Spatial Planning, the Ministry of Transport and the Chamber of Commerce and Industry of Slovenia, prepared a draft programme for the promotion of research and development concerning energy efficiency and renewable energy sources in Slovenia for the 2008–2016 period, which was not adopted; however, the priorities it determined should be taken into account in the preparation of national programmes for energy and research and development.

5.23.2 (Implementation deadline: end of 2009) – To set research areas for key issues related to the transition to a low-carbon society during the preparation of the NRRP.

A programme framework for a multidisciplinary and interdisciplinary approach supporting research contributing to both key objectives of climate change policy (to reduce greenhouse gas emissions and to effectively adapt to climate change effects) has already been established:

- centres of excellence as a comprehensive, interdisciplinary research and development programme with a focus on the horizontal objective of promoting the transition to an energy-efficient economy with low greenhouse gas emissions or encouraging the transition to a low-carbon society in all priority areas of research and technology development, as determined in the *Programme of Reforms for the Implementation of the Lisbon Strategy in Slovenia for the 2008–2010 period* (established in the 2009–2010 period as three-year research and development programmes);
- competence centres intended for the development and introduction of technologies for a sustainable economy;
- development centres of the Slovenian economy, which began operations in 2011.

The centres of excellence were established on the basis of the public tender for the development of centres of excellence for the 2009–2013 period (OP RR, PU 1.1, ERDF funds) published and implemented by the Ministry of Higher Education, Science and Technology in 2009. Following the evaluation procedure, eight four-year programmes for centres of excellence were selected, their total value reaching 77,553,986.35 euros. One is dedicated to developing technologies for sustainable energy use – the development of lithium and hydrogen technologies on the basis of primary solar energy, i.e. the Centre of Excellence for Low Carbon Technologies – CE NOT (at the National Institute of Chemistry; co-financing in the amount of 9,989,739 euros). Results of some other centres of excellence in the field of low-carbon technologies are also remarkable, e.g. Centre of Excellence for Polymer Materials and Technologies (CE PoliMaT) developed polymer materials for advanced applications in line with sustainable development and low-carbon society policies.

Several projects and programmes concerning low-carbon society technology have been co-financed. A detailed list is provided in the original 2009 report on the monitoring of the implementation of OP TGP-1.

During the preparation of climate strategy, data on budget investments in research and development related to low-carbon society were collected.

Table 8.1: The most important existing budget expenditure and EU funds for research and development with regard to climate strategy (approximate annual amount).

Instrument	Description	Approximate annual amounts in 2010–2011
Centres of excellence and competence centres	The Ministry of Higher Education, Science and Technology finances the work of the Centre of Excellence for Low-Carbon Technologies (CO NOT) and another seven centres for excellence with the horizontal priority of low-carbon technology and two competence centres in the field of low-carbon technologies (KC SURE and KC TIGR).	EU: EUR 8 million Slovenia: EUR 2 million
Development centres	The Ministry of the Economy finances several	EU: EUR 18 million

of the economy	development centres of Slovenian economy in the field of low-carbon technologies.	Slovenia: EUR 3 million

Source: The Second Report on the Monitoring of Implementation of the Operational Programme for the Reduction of Greenhouse Gas Emissions by 2012, the Action Plan for the Strategy for the Adaptation of Slovenian Agriculture and Forestry to Climate Change for 2010 and 2011, reports of different ministries

A detailed review of these and other development instruments that include the field of low-carbon society (particularly technology) is presented in the document on industrial policy[53] (Annex 4). The guidelines for the 2014–2020 period define priority technology areas as a response to social challenges, which are also related to climate change, and links them to key industry sectors, as shown in the table below.

Table 8.2: Identified challenges and opportunities and focus on priority technological and industrial areas. (SIP, p. 39; in greater detail in sub-chapters 3.3.1.-3.3.4.)

Challenge	Priority technology areas*	Key industrial sectors*
Environmental-energy challenge and efficient use of natural resources, based on sustainable production and consumption	Environmental technologies (technologies for the efficient use of energy, including the economical use of energy, renewable energy technologies, technologies for increasing material efficiency etc.)	Energetics / 'Smart' systems
		Sustainable construction
		Manufacturing (especially wood-processing, metal and electrical industry and electronics)
		Chemical and process industry
Sustainable mobility	Technologies for sustainable mobility	Automotive industry
Food, health and ageing population	Biotechnology and other challenge-related technologies	Pharmaceutical industry
		Food-processing industry and sustainable food production
		Sustainable tourism
Potential KET - Key Enabling Technologies	Nanotechnology, micro- and nano-electronics, photonics, biotechnology, advanced materials, advanced manufacturing and process technologies	ICT
		Electrical industry and electronics
		New materials
		Metal-processing industry, engineering and tool-making

NOTES:
* All areas of technology and industrial sectors are interconnected and there is no clear division between them. These technologies also support other industrial sectors; therefore, only key sectors of applications are stated within the framework of specific technologies. Industrial sectors do not relate to the definitions according to the SKD, but are implicit in a broader view.
Source: Ministry of Economic Development and Technology

8.4 Analyses and Expert Bases for Climate and Energy Policies

8.4.1 Analyses and Expert Bases Concerning the Approach to Reducing Emissions, Proposed in the Climate Strategy

[53] SLOVENIAN INDUSTRIAL POLICY – SIP, 6 February 2013, available at: http://www.google.si/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&ved=0CCcQFjAA&url=http%3A%2F%2Fwww.mgrt.gov.si%2Ffileadmin%2Fmgrt.gov.si%2Fpageuploads%2FDPK%2FSIP%2FSIP_-_vladni_dokument_EN.doc&ei=2B_lUunYA6eGywPOoYLACw&usg=AFQjCNHQrUjCL0aYh9Q9Ajd6Ln4YnhuBcQ&sig2=bBwqYFdX9Bi-7pt4pCjQ7Q&bvm=bv.59930103,d.bGQ

A three-year project, *Slovenia – A low-carbon society (SINODA)*, was financed within the targeted research programme *Competitiveness of Slovenia 2006–2013* and yielded important scientific and research bases for the preparation of the Strategy for Slovenia's Transition to Low-Carbon Society by 2050. In the years from 2008 to 2011, it was carried out by an interdisciplinary and inter-institutional research group led by Dr Stanko Hočevar of the National Institute of Chemistry. Detailed information:

Carried out by: Consortium of research organisations. Lead partner: National Institute of Chemistry, Ljubljana, Slovenia. Other partners: **IJS-CEU, IER, SICENTER, Elaphe d.o.o., Dr Metod Škarja.**

Purpose: Strategic study and analysis of how to replace the existing paradigm of technologies based on carbon-containing fuels (phasing out) with a new paradigm and new low-carbon technologies (phasing in), following a reasonable socially sustainable and politically acceptable scenario.

Theme of analysis - Keywords: system dynamics, carbon cycle, greenhouse gases, emissions, renewable resources, energy, transformation, accumulation, limits to growth, energy modelling, socio-economic modelling, sustainable development, electric vehicles, new technologies, hydrogen economy, alternative drives

Key methodology: Scenario creation **using** complex model - ***International Futures (Ifs), a* global model of system dynamics and g**lobal scenarios GEO4, UNEP 2007.

Key output: UNEP GEO4 scenarios applied to Slovenia show suitable carbon emissions reductions only in the case of **a sustainability** scenario. Proposal for a comprehensive policy mix to achieve the -80% target by 2050 or 2060.
Contacts: Dr Stanko Hočevar, Head (stanko.hocevar@ki.si)
Project report (in Slovenian) available at:
http://www.arhiv.svps.gov.si/si/podnebni_ukrepi/podnebna_politika_v_sloveniji/podnebna_strategija/

Within the research project *Slovenia – Low-Carbon Society*, the Institute for Economic Research, by using the GEM-E3 model, assessed the macroeconomic consequences of a reduction in CO_2 emissions by 6% and 16% by 2020, three possible options for reducing emissions for 2050, and some macroeconomic results obtained through the International Features model.

8.4.2 Analyses and Expert Bases for the National Energy Programme

The most important analytical and research document in this area was the *Long-term Energy Balances of the National Energy Programme until 2030 – Basis*, which was also used in preparing a climate strategy. The study was conducted in 2011 by the Energy Efficiency Centre (EEC) at the Jožef Stefan Institute in Ljubljana, (Andreja Urbančič at al.). Within the expert bases for the National Energy Programme, a series of possible strategy variants for

developing the energy sector were analysed and assessed. Three strategies for the use and dispersed supply of energy and three scenarios for electricity supply were analysed and their effects verified within one target scenario of economic development. The report is available at: http://www.energetika-portal.si/fileadmin/dokumenti/publikacije/NEP/NEP__DB_izh.pdf

9 EDUCATION, TRAINING AND PUBLIC AWARENESS

9.1 General Characteristics

According to the **Eurobarometer opinion polls** in 2009 and 2011 (compared to the opinion poll in spring 2008), 78% and 75% respectively (89% in 2008) of the Slovenian respondents think that climate change is a very serious problem, and is according to the perception of the severity of the problem classified in the top of EU 27 and above the EU average of 64% and 68% (75%). Only 5% in 2009 and 2011 (3% in 2008) of the Slovenians think that climate change isn't a serious problem. 70% and 67% (80%) of the Slovenian respondents think that climate change is one of the largest problems in the world. Almost an equal percentage is devoted to poverty, lack of food and drinking water – 69% and 69% (79%). In connection with the responsibility of various players and their activities in reducing emissions, 92% in 2009 (93% in 2008) of the Slovenian respondents think that corporations and industry are not doing enough with regard to climate change, while 82% (86%) think that the citizens are also not doing enough. Questions related to the responsibility for tackling climate change in the 2011 survey were altered in a sense that respondents only had to point who were the responsible actors within the EU. 40% (slightly above the EU average of 35%) of Slovenians see business and industry as being responsible, whereas they are less likely to express personal responsibility for climate action (18% as compared to the EU average of 21%).

The 79% in 2009 (79% in 2008) who said that they have already commenced with activities with regard to fighting climate change have exposed the following activities: waste separation, reduction of energy and water consumption in their households. In the 2011 survey, however, a time period of six months was stipulated and the list of personal actions changed: the proportion saying they have taken action over the previous six months was 74%, and most commonly taken actions were reducing and recycling household waste, reducing the consumption of disposable items, and buying local and seasonal products. Reduction of energy and water consumption in households were not offered as options. The majority of Slovenians - 81% in 2009 (68% in 2008) - agree that tackling climate change can have a positive impact on the European economy, and in 2011 66% respondents agreed that fighting climate change and using energy more efficiently can boost the economy and jobs in the EU.

There is no detailed analysis of the reasons for the discrepancies between the replies of respondents in Slovenia and the EU, or for the trends observed in the replies. It can be assumed in the context of the first poll that 2007 was a turning point for several reasons: the fourth IPCC report, the screening of the film *An Inconvenient Truth* and related activities in Slovenia (Umanotera, the *Podnebno sporočilo* (The Climate Message) lecture, SEF natural science days organised in the context of film screenings and attended by about 8000 persons), agreement about the EU objectives as a part of the EU Council conclusions in March 2007 during Germany's Presidency, publication of the Stern Report, the UNFCCC decision in Bali etc. As climate change became a prominent global topic, the number and

quality of media items rose. A variety of other activities took place in Slovenia, mostly organised by NGOs and professional institutions supported by EU funds. Two possible reasons for the lower response rate in 2009 could be the occurrence of the financial and economic crisis and the strong impact of climate scepticism in the media.

The results of the Eurobarometer poll, according to which Slovenia ranks among countries with the most sensitive population to the climate change issue, correspond to the results of the public opinion **survey** **Climate change knowledge among Slovene residents** carried out in 2009 and 2010 by Mediana, Institute of Market and Media Research, according to the CATI method. The poll showed that the respondents pointed out climate change as the most burning issue of the 21st century, but also indicated a trend of reduced climate change perception. Among other things, this trend was attributed to the decline in media interest in the issue after the end of the conference in Copenhagen. As many as three quarters of respondents agreed with the statements that humans are the principal cause of climate change and that the climate change issue should be tackled immediately.

The questions about the perception of the gravity of climate change were also a part of the field **Research on energy efficiency in Slovenia – REUS 2011** conducted in June 2011 by InformaEcho Agency. The climate change issue is serious in the opinion of the majority (73%) of respondents. The replies to other questions in the REUS 2011 survey and in earlier surveys are also important from the aspects of planning awareness-raising and education measures and setting realistic, achievable goals in the field of climate change. One remarkable finding is that of a large gap between the conviction of the respondents that they behave responsibly towards the environment and act in an energy-efficient manner, and their actual behaviour (the first question has about 80% affirmative replies, while the other has only 30%). Thus only every fifth household ranks in the group of enthusiasts whose environmental awareness is highest and whose behaviour is environmentally friendly in their everyday life, too.

The **key players** in the area of Kyoto Protocol implementation with regard to public awareness of the problem of climate change, causes and consequences as well as activities to fight climate change are at the governmental level the Ministry of Agriculture and the Environment (MAE), Ministry of Economic Development and Technology (MEDT), Ministry of Infrastructure and Spatial Planning (MISP), and the Ministry of Finance (MF) (until April 2012 the Ministry of the Environment and Spatial Planning - MESP, the Ministry of the Economy - ME, the Ministry of Transport - MT, the Ministry of Agriculture, Forestry and Food – MAFF, and the Ministry of Finance - MF), and the Government Communication Office - GCO. The above mentioned ministries are also active in the areas of education and training on climate change, where the lead government bodies are the ministry, responsible for education (currently the Ministry of Education, Science and Sport – MESS, previously Ministry of Education, Science, Culture and Sport, Ministry of Education and Sport - MES, etc.) and the ministry, responsible for employment policy and lifelong learning (currently the Ministry of Labour, Family, Social Affairs and Equal Opportunities). In the period November 2009 – March 2012, the Government Office of Climate Change (GOCC) as the central body of state administration for interdepartmental guidance and coordination of policies and measures of the Government of the Republic of Slovenia related to climate

change, also took care of the promotion and participation in the preparation of public awareness, training and education programmes with regard to climate change.

Education and communication activities in the field of climate change and related issues (e.g. good practice in the fields of waste, water and energy) were also implemented by government agencies (e.g., Slovenian Environment Agency – SAE) as well as other entities (education and training organisations, non-governmental sector, media, business sector, local communities etc.). A part of these activities was implemented and monitored in the framework of the measure *5.22 Education, Training, Awareness Raising and Promotion* in the Operational Programme for Reducing Greenhouse Gas Emissions by 2012 (GHG OP-1). They were financed from different sources, including the state budget, EU funds and various international sources.

GOCC made an overview in the fields of education and training, information, awareness-raising and communication about climate change and sustainable development in 2011. This analysis showed that projects and initiatives implemented in climate change and related subject fields were numerous, but insufficiently linked and systematic. The objectives, principles and orientations for the subject fields of measure 5.22 have been integrated into the **first and second drafts of the Strategy for the Transition of Slovenia to a Low-Carbon Society by 2050/2060** (Climate Strategy, September 2011 and March 2012), especially in the framework of two horizontal strategies: Innovation and Education, and Awareness and Communication. In relation to the Climate Strategy and in compliance with the provisions of the **Declaration on the active role of Slovenia in the creation of a new global policy on climate change** (Official Gazette RS, no. 95/2009) GOCC drafted the Strategy of communication and education about climate change and sustainable development in February 2012 and submitted it for public debate. After the merger of GOCC with the Ministry of Agriculture and the Environment, the drafting of both strategies did not continue and the Ministry attempted to integrate the orientations for education and communication about climate change into national and sectoral development planning documents for the 2014-2020 programming period.

9.2 Education

Responsibilities and powers relating to the development and operation of an education and training system have been allocated to the Ministry of Education, Science and Sport, local communities (municipalities), expert panels appointed by the Government of the Republic of Slovenia, and institutions established to develop and provide advice on education (National Education Institute of the Republic of Slovenia, Institute of the Republic of Slovenia for Vocational Education and Training, Slovenian Institute for Adult Education, and National Examinations Centre).

There is relevance for education about climate change in several subjects addressed in the context of environmental education (which has a long tradition in the educational system of Slovenia) and more recently introduced education for sustainable development – e.g. in the framework of energy efficiency, renewable energy sources, sustainable consumption and

sustainable transport. Learning about climate change was also integrated into global education projects in Slovenia, especially as part of programmes of the Ministry of Foreign Affairs.

In the middle of the previous decade, Slovenia carried out a **curriculum review** whose baselines led to the introduction of **environmental education and environmental studies** at all levels of education within the national curriculum:

- Environmental education is included in the curriculum of the nine-year basic education as a cross-curicular area, an elective and subject of activity (especially natural science) days, outdoor school and out-of-school classes, in various projects in which schools participate autonomously (e.g. "eco", "healthy" and "Unesco-school" projects) and in the framework of youth research activities. Elements of environmental education are integrated into all three 3-year cycles of elementary school, and environmental education itself is an elective in the last cycle.
- In *gimnazija* (general upper secondary school), environmental education is primarily carried out in the context of natural science subjects, geography, and sociology, and as a part of the compulsory electives in the form of the optional subject Environmental Studies. In addition, Environmental Education has been confirmed as a cross-curricular subject area.
- In the field of secondary vocational and professional education, environmental education is integrated into the general education part in the subject Natural Sciences, in professional and technical subjects and in practical education, interest activities and extracurricular and out of-school activities.
- In addition, general upper secondary schools (*gimnazija)* and professional and vocational schools autonomously participate in various projects (e.g. the "healthy" and "eco" school projects) and in research activities carried out by youth.
- In adult education (lifelong learning) educational programmes and textbooks have been developed with an emphasis on non-formal learning, which aims to raise awareness on the basis of experiential learning and reflection of Slovenian cases on diverse levels.

The primary and secondary school curricula include climate change mitigation in the following subjects: environmental education, biology, physics, chemistry, society, philosophy, psychology, geography, art history and history, music, musical education, arts, visual arts, Italian as a foreign language and as a second language, German, physical education and sports, technical studies and technology. Climate change mitigation is integrated into the listed subjects at the level of general objectives, objectives and contents for individual grades, knowledge standards, cross-curicular connections and didactic recommendations for teachers.

Environmental studies are also a bridge to connect natural-science and social-science area in a functional whole. The subject Environmental Studies is an upgrade of the existing subjects dealing with abiotic and biotic nature and human society. These subjects are primarily biology, chemistry, physics, geography, sociology and history, as well as other subjects to a lesser extent. The syllabus for this selective subject is planned to enable high school pupils to find out about new content and to link it to content they study in other subjects. Emphasized

is the role of interdisciplinarity in solving environmental problems, since these problems are usually too complex to be controlled only by one field. The basic message of the subject is that environmental problems do not just require technical or technological solutions, but urgently require a change in behaviour. Environmentally-friendly and sustainable development requires responsible decision-making that will not endanger the satisfaction of the needs of future generations. In 2011, the National Education Institute issued the teachers manual for high schools Environmental Education**.**

From 2006 to 2008, the programme reform of **vocational and professional education** was co-financed from ESF (European Social Fund) funds. The reform tackled programmes at the level of lower vocational, secondary vocational, secondary professional and higher professional education. The generic or key competences concerning environmental protection, efficient use of energy and safety at work were introduced in practically all education programmes. In most education programmes, especially those from the field of technology, these elements were integrated into the subject Environmental Protection and Safety at Work and occasionally into the subject Sustainable Development. In the period from 2008 to 2013, new education programmes were gradually introduced at schools (the process was supported by ESF funds), which was accompanied by training of management and all professional staff at secondary and higher professional schools. Under the new education and training programmes, a certain part of the curriculum (open curriculum – up to 20%) is left to schools at all vocational and professional education levels. Schools must define this part in cooperation with social partners from their local area or branch of industry. This opens the possibilities for continuous updating and actualisation of education in the field of climate change mitigation, too.

Curricula with a strong environmental component, including the secondary and higher education programme of Nature Protection, were prepared in the framework of the *Consortium of Biotechnology Schools* of *Slovenia*, which featured 11 secondary agricultural schools in Slovenia in connection with the Maribor Faculty of Agriculture and Life Sciences. Several textbook materials were produced in the secondary education field (e.g. for the environmental technician and nature conservation technician programmes, which also cover climate change), including a professional education manual (*Razmišljamo in delujemo trajnostno* [Sustainable thinking and acting], CPI, 2010).

In the period from 2007 to 2009, several study programmes were confirmed for implementation at undergraduate and postgraduate levels at 6 higher education institutions; these programmes are in the fields of the environment or environmental protection, ecology, environmental science, ecoremediation (1 higher education professional programme, 3 university study programmes, 4 master's and 3 doctoral programmes). In addition, the Bologna reform introduced new subjects whose contents are relevant to the development of a low-carbon society (e.g. sustainable use of energy and the environment) in study programmes of different fields.

Special attention needs to be devoted to the School of Environmental Sciences in Nova Gorica and the Environmental Protection College in Velenje; the environmental protection study programmes of these two institutions cover all major environmental subject areas, such

as the pollution of water, air and ground, ecotoxicology, health ecology, waste management, nature protection, environmental impact assessment, environmental economics and environmental law. The education of specific segments of the environment and environmental protection within a range of different study streams within different subject areas cover climate change, environmental protection, EEU (efficient energy use) and RES (renewable energy sources), and also includes an interdisciplinary approach (e.g. the connections between health and ecology, or management and ecology). School of Environmental Sciences of the University of Nova Gorica offers also Master's study programme Environment, and University of Ljubljana the Interdisciplinary Doctoral Programme in Environmental Protection. The studies are organised to ensure that it provides as wide an overview of the environmental protection issue as possible. Special attention also needs to be devoted to the postgraduate studies known as Ecotechnology at the Jožef Stefan International Postgraduate School (IPS).

In July 2007, the Ministry of Education and Sport adopted the **Guidelines for Education for Sustainable Development from Preschool to Pre-university Education**. The main purpose of these guidelines is to underline the importance of education for sustainable development (ESD) and identify the possibilities for implementing sustainable development in the fields of formal, non-formal and informal learning. The guidelines apply to preschool institutions and schools, the MES and public institutions, NGOs and local communities. ESD is not considered only as an addition to the existing general education and its purpose isn't only to protect nature – this is a comprehensive, integral and coherent pedagogic process, including the relationship between humans and nature as well as relationships between people. Furthermore, it leads to an understanding of a versatile connection between the natural, economic, social and political system and the interdependence of people living in different parts of the world; namely, it tries to solve the current and future environmental and social issues of humanity in an active and coherent manner.

In the first decade of the 21st century, the Ministry of Education and Sport has been implementing a programme known as "**Hidden Treasure**", which is used to encourage innovative and developmental activities in kindergartens, elementary and secondary schools at the national and international level, with environmental education one of the central thematic areas. The National Education Institute also issues the **journal "Sustainable Education in School and Kindergarten"** (Trajnostni razvoj v šoli in vrtcu).

Adult education is represented by IVET (initial education and learning) learning materials and SIAE (Slovenian Institute for Adult Education) engagement in research since 2007, leading into non-formal interdisciplinary programme development, supported by two textbooks, including vocabulary. The programme has been tested with three target groups.

Several **analyses of the integration of education for sustainable development (ESD) in the curricula** have been elaborated in recent years:

- Primary school: Analysis and promotion of including education and upbringing for sustainable development into primary school (Zavod Sv. Ignacija za izobraževanje in razvoj, 2008), Education for Sustainable Development – Slovenia (Focus, 2011, in the framework of ENjoinED comparative analysis),

- Secondary school: Ethics in Education for Sustainable Development - SS (Zavod Sv. Ignacija za izobraževanje in razvoj, 2010),
- Primary school and *gimnazija*: Integration of Elements of Sustainable Consumption and Sustainable Development in the School Curriculum (University of Primorska, Koper, Faculty of Management, 2008),
- Higher education: Ethics in Education for Sustainable Development - HE (Science and Research Centre of University of Primorska, Koper, 2010).

These analyses were mostly financed as projects of a target research programme, as were some other relevant research studies in the field of ESD – for example Didactic Approaches to ESD (University of Primorska, Koper Faculty of Management, 2008).

The comparative analysis for sustainability content in 9 European countries ENjoinED (http://enjoined.edupolicy.net/) revealed also for Slovenia that SD is mainly included as an additional subject and /or topic in the curriculum and the text in the task books, instead of permeating other topics and being applied throughout the programme. In current subject curricula sustainable development topics are present, but mostly linked to natural environment/nature protection. The social component and even more the economy were neglected.

The implementation of **global education** (or global learning, a frequently used term) in Slovenia has been a focus of the activities of the Ministry of Foreign Affairs (MFA), the ministry competent for education, and SLOGA, the Slovenian platform of non-governmental organisation, for several years. From 2010 to 2012, an interministerial working group was active under the auspices of the MFA, whose aim was to implement a more systematic approach to global learning. The aim of global learning as it develops in Slovenia is to encourage individuals and the community towards commitment and action in resolving key common challenges of mankind, which leads to globally responsible and active individuals and communities. It stresses the co-dependency and involvement of an individual in the global situation, and includes both formal and informal education. In terms of content, global learning encompasses the following fields: environmental awareness, sustainable development, intercultural and intergenerational communication, human rights (and the fight against racism), democracy, social justice, peace, active citizenship and conflict prevention.

In the period from 2011 to 2013, the proposal for the introduction of **competence for sustainable development** was elaborated in the framework of the Institute of the Republic of Slovenia for Vocational Education and Training (CPI), and based on the principle that all jobs in the country can be "made green". Therefore it is important that competence for the management of sustainable development combining the environmental, social and economic responsibility of organisations and individual jobs can be integrated into all forms of education and training. CPI also organised a **conference "Education and Training for Green Jobs"** in July 2013. The consultation focused on the following: How can the education system and labour market respond to the need for new knowledge and skills required by green jobs?

Education and training for international cooperation: GOCC issued two manuals for the implementation of the Kyoto Protocol mechanisms – for carrying out Joint Implementation (JI) projects and Clean Development Mechanism (CDM) projects.

9.3 Training for the Implementation of Measures to Reduce Greenhouse Gas Emissions (foreseen in the context of GHG OP-1)

In the context of the National Energy Efficiency Action Plan 2008–2016 and the Operational Programme of Environmental and Transport Infrastructure Development, respectively, the ministries responsible for energy (ME, MISP) funded the programmes of training and information in the fields of energy, energy restoration of buildings and sustainable construction, such as:

• **Energy Consulting for Citizens – ENSVET** project, which provides individual specific advice in the form of written reports as well as information and education of citizens and professional training of counsellors. Achievements in 2010:

- information and education of citizens: 700 expert articles, 500 radio and television contributions, 300 lectures;
- counsellor training: 200 participations at professional seminars.

• Publication of the Efficient Energy Use bulletin, which is the central EEU and RES communication tool for providing information to different target groups. The main target groups of the bulletin are as follows: energy consumers in industry, in the service and public sectors, and in multi-dwelling buildings; state administration, local communities, energy supply companies, consulting, architectural and engineering organisations, energy equipment suppliers, financial institutions, development, research and education institutions, non-governmental organisations and others. Annually 2 to 6 issues of the bulletin were issued in the period from 2010 to 2013, each consisting of 8 pages and available on the Ministry website.

• Participation in the Energy Efficiency Contest in 2010 and 2011.

• Co-financing of international EEU (efficient energy use) and RES (renewable energy sources) projects. In 2010, ME co-financed international projects implemented in the context of the "Intelligent Energy – Europe" programme. The principal objective of the "Intelligent Energy – Europe" (IEE) programme, which is one of the three pillars of the Competitiveness and Innovation Framework Programme for the period 2007-2013, is to eliminate non-technological hindrances for EEU and RES with stress on the promotion and dissemination of information. ME co-financed the implementation of 19 international projects that were completed in 2011.

• Co-financing of the REUS study (energy efficiency in Slovenian households) 2010, 2011; among others, this was the framework for the implementation of the Communication Plan of the Introduction of Dividers (2011) and the Information Campaign of the Introduction of Heat Dividers by Actual Consumption (2011 and 2012).

NEP Slovenia – diverse examples of good practice: **National Energy Path of Slovenia (NEP)** is a publicly accessible base of 340 residential, business and public buildings from Slovenia. Web portal http://nep.vitra.si is an ICT tool for good practice of efficient use of

energy (EUE) and renewable energy sources (RES) searching and new household's registration. Examples of good practice (740 measures of EUE and RES) are described simply and transparently, intended for private and public investors to make informed implementation of quality measures in new buildings or refurbishments. It is simple to find and visit the buildings and gain first-hand experience. An important part of the NEP idea is the experience of study clubs (SC) that originate in the Scandinavian countries. SC's offer "ordinary" citizens education primarily through mutual transfer of knowledge, skills and experience. Thus citizens find it easier to make decisions themselves instead of leaving them to others (counsellors, architects, traders, manufacturers).

NEP was designed by Slovenian energy counsellors with the help of VITRA, Cerknica Centre for Sustainable Development. The project has been subsidised by Iceland, Liechtenstein and Norway through the EEA Financial Mechanism and the Norwegian Financial Mechanism. The most important actors, however, are the Slovenian households that open doors of their energy-efficient buildings or attractive energy-related solutions voluntarily and free of charge.

Training in the **green public procurement** field: In the field of sustainable development and environmental legislation, the Ministry of Public Administration (MPA), in cooperation with the Government Office for Development and European Affairs (GODEA), MF and the civil society (Umanotera), gave presentations of the Government Action Plan for Green Public Procurement for the Period 2009–2012 (adopted in May 2009) in 2009 and 2010 with particular emphasis on the outline of the basic concepts and issues in the field of climate change. The Ministry of Finance provides several free presentations upon each amendment to public procurement legislation. It regularly participates at training sessions organised by other institutions, especially if they are free, and responds to every invitation to participate at a seminar, consultation session or conference whenever the obligations of the Ministry of Finance staff allow. Thus Ministry of Finance employees participate in training sessions in the field of public procurement at least once a month on average. Most training sessions referred to green public procurement in conjunction with the Decree on Green Public Procurement adopted at the end of 2011.

Information, awareness-raising and training for measures in the field of **transport** (MISP): The public tender for implementation of the task "Education, information and raising the awareness of the public about the importance of public passenger transport" was carried out in 2010 on the basis of the previously drafted programme, for the implementation to take place in 2011-13.

Training for the measures of reducing GHG emissions in the field of **agriculture and forestry** (MAFF/ MAE): A part of the training was implemented through the Work Programme of the Chamber of Agriculture and Forestry of Slovenia, in the framework of the agricultural advisory service, through advice and training in soil cultivation that preserves organic carbon, through advice and training in the preservation and management of permanent grassland and through the promotion of climate-friendly forest management. As the importance of wood biomass is of strategic importance for Slovenia from the aspect of self-sufficiency in fuels and GHG reduction, most activities under the Operational

Programme for Reducing GHG Emissions and related energy programmes were oriented towards the subsidising of biomass heating and advice in the framework of ENSVET offices. The activities of the Forestry Advisory Service mostly focused on advice to reduce cost of procurement of wood, advice to all interested parties upon the purchase and introduction of appropriate modern technology and the rational channelling of funds earmarked for co-financing measures for the extraction and exploitation of biomass. In 2010, individual institutes devoted over 800 hours to public promotion of the use of biomass, advice on the extraction of biomass for forest owners and the use of biomass extraction technologies and transition to biomass heating. In 2011, training was also carried out through the EU projects Wood E3 (wood biomass) and Efficient 20 (fuel savings in agriculture).

According to the Recommendations for an **Environmentally Efficient State Administration** (EESA) adopted in July 2011 by the Government, with the aim of introducing environmental activities in the entire public administration, GOCC drew up a training programme that was harmonised with the Administration Academy at the Ministry of Public Administration. The first training session attended by 85 representatives of ministries, administrative units, government services and other public authorities was carried out in November 2010. This session also marked the start of implementation of the Environmentally Efficient State Administration initiative. Some ministries as well as the National Assembly presented their efforts in the field of environmentally efficient work. The session continued through the presentation of the planned Online Energy Bookkeeping measure and the exchange of experience and problems encountered by authorities in the implementation of desired activities. The event concluded with the agreement that ministries would complete the survey forms and individual meetings for the implementation of activities would be organised by ministries or other public administration authorities. The evaluations showed that the consultation was fully successful, however, after the abolishment of GOCC training activities didn't continue.

9.4 Education and Training: Programmes, Projects and Good Practices

The last decade saw an increase in the number of bodies that implement various projects and education and training actions. Many of these projects are implemented in primary and secondary schools, and partly also in kindergartens and other educational institutions. Several school networks have been established. The activities are carried out by the Slovenian E-forum (SEF), the Focus association, Umanotera foundation, CIPRA Slovenia - Association for the Protection of the Alps, both scout associations in Slovenia, the Slovenian Environmental Agency, the Ministry of Agriculture and the Environment, Eco Fund, energy companies and many others. **Examples of good practices** and **didactic materials:**

- Caritas Slovenia (in partnership with Caritas Slovakia) project 'Towards the climate justice in developing countries with focus on sub-Saharan Africa' (2010 – 2012)
- **School Energy Network** (Inter-company Education Centre Velenje) – in connection with energy management of schools and online energy bookkeeping
- participation in the pan-European youth competition for higher energy efficiency organised by the European Commission **U4energy**
- **Koledar prof. Gamsa o podnebnih spremembah** in druge zgodbe (The Calendar of

Professor Chamois on Climate Change, and other stories), Brezovica pri Ljubljani Primary School and SEF, 2007

- introduction of **school eco-gardens** (Institute for Sustainable Development)
- **Youth Xchange** – educational manual for responsible consumption – GUIDE ((MAE)) http://www.youthxchange.net/main/slovenia.asp
- **Environmentally-Friendly Kindergarten and School** action (Planet Zemlja / Planet Earth association)
- Fit media with the **Green Slovenia** trademark
- **Uskladi interese** (Harmonise your Interests). Didactic nature protection game, Institute of the Republic of Slovenia for Nature Conservation, June 2010 (NATREG project)
- youth manual **WTF is Sustainable Development** (No Excuse Slovenia, 2011)
- **materials on global learning**, such as *Pri(po)ročnik za soočanje z globalnimi izzivi* (Manual and Recommendations for Facing Global Challenges, publication as part of the TUDI JAZ /ME TOO/ project. Focus association, Humanitas association, African Centre association, Ekvilib institute, Studio Poper, 2010) and Uči se brati svet skozi oči drugega (translation of the manual Through Other Eyes by Vanessa Andreotti and Lynn Mario T.M. de Souza, HUMANITAS, 2012)
- contributions in the **field of arts** – for example ECO books by Alenka Klopčič, music, multivision (Lado Jakša), plays, dances, visual art, …

The most widespread of the programmes based on the objectives of documents on environmental education and ESD is *Program Ekošola*[54] (**Eco-School Programme**), which has been active since 1995 and is developing also with the support of the European Commission and the United Nations. It is also in line with the National Environment Protection Action Programme. Eco-schools endeavour to promote environmental education and awareness-raising among youth, especially in the field of environmental protection and human health. In all their years of activity, eco-schools made an immense contribution to the environmental awareness of the population and especially youth, and Slovenia ranks among the very best participants in the international programme. Thus 628 eco-schools were registered in the 2010/11 academic year, 423 of which – including several dozen secondary schools – won the eco flag (which means that they completed the set environmental programme). As many as 717 eco-schools were registered in the 2012/13 academic year. More than 2,000 projects of eco-schools involved over 150,000 eco-pupils and 2,000 teachers and childcare workers (eco-coordinators or project heads).

Slovenia was among the first countries, which in 1993 joined the SHE network (the **Schools for Health** in Europe network) with only 12 pilot schools in the beginning. The purpose is to promote, facilitate and strengthen the physical, mental, social and environmental health of pupils, teachers and parents. The Slovenian Network – *Zdrave šole* – is supported by the Ministry of Education, Science and Sport as well as the Ministry of Health and lead by the National Institute of Public Health.

[54] The »Eco-Schools« international programme is one of the programmes of the Foundation for Environmental Education - FEE International.

After the pilot phase (the network was initially called the European Network of Health Promoting Schools) several schools proposed to extend the network because they considered it is useful and stimulating for their school practice. Since then, four extensions were carried out and now 324 schools are participating in the Network (257 primary schools – 57% of all Slovenian PS, 60 secondary schools - 45% of all Slovenian SS, 7 student residencies - 16% of all Slovenian student residencies). In the year 2015 they are planning to extend the network for the fifth time.

The third major international project that Slovenian schools are involved in is the **UNESCO schools project** (ASPnet – Associated Schools Project Network). UNESCO schools are committed to four basic themes, one of which is "environmental problems and their resolving interdisciplinary". The "environmental problems theme" allows pupils to link international issues affecting the global environment to their local or national situation. Activities in this field include studying environmental pollution, energy use, the preservation of forests, ocean and atmosphere research, erosion and the preservation of natural resources, impact of global warming, sustainable development, Agenda 21, etc. Slovenian UNESCO ASP network consists of 84 educational institutions, which are included in 10 centers.

Development and didactic energy test centre in Velenje: Operating in the framework of Velenje School Centre is the Inter-Company Education Centre, which designed one of the technologically most advanced European energy test centres for all fields of renewable sources. The development and didactic energy test centre constitutes a basic and specialised functional educational and training environment for professions in the field of energy and sustainable development, such as: environmental technician, fitter of modern energy installations for the exploitation of RES, and heating and photovoltaic systems specialist. The centre also offers requalification training in the field of RES-based energy on the modular principle. The centre integrates laboratory and field work by means of state-of-the-art didactic equipment for training personnel to use technologies in all fields of renewable energy sources. It enables the implementation of informative and education programmes for kindergartens and primary schools, workshops of efficient energy use for secondary and university students and adults, as well as research and development and demonstration work in the entire field of RES and EEU.
The energy test centre consists of five separate segments (external energy devices, combined energy co-generation system, passive house, laboratory and energy monitoring system) and covers different expert fields. The main fields are:

- use of renewable energy sources (RES) in the physical and laboratory environment (thermo-solar, photovoltaic, geothermal energy generated by heat pumps, wind and bio-waste energy),
- use and implementation of the teaching system for the co-generation of electricity and thermal energy in combination with a heat pump,
- construction of a passive energy building with self-sufficient energy supply and the use of modern construction, energy and information and communication technologies,
- implementation and use of energy monitoring system with modern supervision and communication technologies.

Šentrupert kindergarten is the first kindergarten in Slovenia to be energy-efficient and made entirely of wood; its biomass-fired boiler room will also provide heating to the nearby school, gym and business centre built in a public-private partnership between the Jelovica company and Šentrupert municipality. As a rule, the educational influence of energy-efficient schools and kindergarten buildings is broader.

Organic agriculture reduces CO_2 emissions and improves food safety: pioneering work at the University of Maribor: the Chair of Organic Agriculture, Field Crop, Vegetable and Ornamental Plants of the Faculty of Agriculture and Life Science of the University of Maribor is the leading Slovenian institution for education, research and development in the field of organic agriculture. The chair has at its disposal scientific findings and data according to which organic agriculture contributes to the reduced use of fossil energy (a ban on the use of fertilisers containing nitrogen), reduced CO_2 emissions (with the exception of growing highly intensive plants), NO_2 emissions and erosion, and to smaller crop shortfall in drought periods. It points out the recent studies according to which a 100% transition to organic farming in the developed world with intensive farming would reduce crop yield to 96% of conventional production while increasing the yield in the developing countries to 213% of conventional production; this would also ensure food safety to a considerably higher number of people than today.

Safely with the sun programme: The objective of the Safely with the sun (*Varno s soncem)* programme is a long-term improvement of the situation with skin cancer in Slovenia, whose prevalence is growing and which is strongly related to exposure to UV radiation and the frequency of sunburn. The programme attempts to change people's attitude towards the sun and to achieve consistent observation and practice of self-protection measures in the broadest circle of the population. The programme has been implemented in kindergartens since 2007 and in primary schools since 2010. The evaluation showed a positive reception of the contents and the way it is implemented, and considerable progress in the knowledge of the rules of natural protection in children and their parents. Since 2010, the programme has been a part of the Annual Work Programme in the Field of Public Health, which is implemented in all health care regions of Slovenia and confirmed by the Ministry of Health.

Energy-saving restoration of public institute buildings in the field of education and training (public tenders in the framework of the Operational Programme of Environmental and Transport Infrastructure Development, MES/MESS since 2011): the education and communication component (introduction of energy management including e-info points and energy bookkeeping), possible integration with other sets.

The all-Slovenian project **Traditional Slovenian breakfast** is implemented jointly by the Ministry of Agriculture and the Environment with a variety of partners in order to raise awareness of the objectives and reasons for **local self-sufficiency, domestic production and processing** and to promote the activities of locally produced food supply in the framework of the public procurement system. MAE also issued orientations and recommendations for the planning and implementation of extracurricular education activities, which support the basic objective and intention of the project. The aim is to make sure that as many children in Slovenia as possible are included in the programme at the time of this event (one day in

November), on activity days (e.g. natural science day) and in the course of the school year in general.

Training for the unemployed:
The following two short pilot programmes that could serve as a model for broader introduction of "climate" and "low-carbon" programmes for job seekers and for green jobs were implemented with the help of GOCC resources at the end of 2009 and at the beginning of 2010, respectively:

- training for the unemployed population in the field of efficient energy use and renewable energy sources - Slovenian E-forum;
- information and training in organic farming for the unemployed in Pomurje – Faculty of Agriculture and Life Science, University of Maribor.
-

The European project ACHIEVE (Focus is the partner from Slovenia) for practical and structural solutions that will help people in the EU reduce the risk of energy poverty included a one-week training programme for energy consultants (mostly selected from the unemployed) and the visits of these consultants to households with a high poverty risk.

In 2013 and 2014, Umanotera is implementing the **Supporting Green Jobs** project within the framework of the management partnership in EU affairs communication between the European Commission, the Slovenian Government and the European Parliament. The aim of the project is:

- to improve the understanding and knowledge of green jobs and to raise awareness of what green jobs are and what opportunities they bring;
- to provide a comprehensive presentation of green jobs in connection with the green economy;
- to promote the linking of different actors in the field of green jobs with the aim of promoting the creation of conditions for green jobs.

Slovenian E-forum, Society for Energy Economics and Environment, is a partner to the project CLIPMA ("**Training Course for Local Climate Protection Managers in Central Europe**") aimed at the training of municipal officials, local level policy-makers and experts active at the municipal level. The project is being implemented in Austria, where such training was initiated more than three years ago, in Hungary, Slovakia and Slovenia. The CLIPMA project, which is co-financed by the European Commission, is a part of the Lifelong Learning Programme and the Leonardo da Vinci sub-programme. A part of the project is the implementation of the "Climate Protection Organiser" training programme for efficient management of local projects in the field of promotion of the use of renewable energy sources and energy efficiency.

9.5 Public Information and Awareness

Activities of public information and awareness are often connected to educational and training activities in the same projects or programmes – therefore several are already mentioned in the previous sections.

The Ministry of the Environment and Spatial Planning (MESP) played the most important role in public information and awareness relating to climate change for several years, whereas in November 2009 the Government Office of Climate Change undertook the coordinating role. In April 2012, the Ministry of Agriculture and the Environment resumed the previous role of MESP. Sectoral communication campaigns (i.e., on sustainable mobility and energy) are carried out by responsible ministries as well.

Activities conducted or initiated by MESP / (MAE) andSAE:
• **Publications**: Environmental Indicators (SAE), Climate Change Day leaflet (SAE), Take Less, Get More – Tips on Less Harmful Living (MESP), Hydrogen leads to pure energy future (MESP), Environment in your hands – Step forward in environmental management (SAE), Where with the old? – publication at the time of the national public awareness campaign (MESP), You have the power. Show some wisdom. On climate change (MESP).
• **Bulletin**: SAE monthly bulletin (containing reviews of monthly data on meteorology, agrometeorology, hydrology, air pollution and water course and underground water quality) (SAE),
• **Web pages**: www.arso.gov.si (meteorological data, climatological data, publications), http://eionet-si.arso.gov. si/Dokumenti/GIS/zrak in http://eionetsi. arso.gov.si/kazalci/index_html?Sku_ naziv=UVOD&tip_skup=1&Sku_id=12 (data and information used to assess air quality, the impact of climate change, defining efficiency indicators for implementing environmental policy, and for the purposes of international data exchange based on ratified international agreements, protocols, and EU legislative obligations; http://www.mko.gov.si/si/ (Ministry of Agriculture and the Environment website);

In 2007, prior to the presidency of Slovenia over the EU, the MESP had organised, in cooperation with the British Embassy in Slovenia, an international conference entitled **»Climate Change: Opportunity for Development«**. This was one of the largest conferences in the region, opening questions on how to promote the transition to a low-carbon economy and change the environmental challenge into a developmental opportunity. Before the meeting of parties to the UN Framework Convention on Climate Change and the Kyoto Protocol in Bali, Slovenia as the next presiding country of the EU Council had taken over with this international event the initiative to implement European climate and energy objectives. Participants, numerous high representatives of EU member states and countries from South-Eastern Europe as well as managers, were addressed by the president of the Government of the Republic of Slovenia.

Slovenia is reducing CO_2. The Ministry of the Environment and Spatial Planning has in 2006 together with the British Embassy in the Republic of Slovenia and the British Council prepared the project »Slovenia is Reducing CO_2«. The purpose of the project was to encourage people to contribute as much as possible to the reduction of CO_2 emissions. The message of the joint campaign was primarily intended for those who can largely act and change the current increasing trend of emissions. »Slovenia is Reducing CO_2« addressed politicians, managers, directors of various institutes and institutions, mayors, farmers, experts, transport and energy managers and others who can influence climate change.

A series of six climate consultations took place throughout Slovenia as part of the "Slovenia is Reducing CO_2: Climate Consultations" from May 2010 to January 2011 (www.slovenija-co2). The consultations were one of the actions within the framework of the partnership in EU affairs communication between the European Commission and the Slovenian Government and intended for discussions about challenges and orientations for implementation of the commitments under the climate and energy package. They provided the basis for drafting recommendations to decision-makers.

The "Slovenia is Reducing CO_2: Good Practices" projects were carried out within the framework of the partnership in EU affairs communication between the European Commission, the Slovenian Government and the European Parliament, and implemented by Umanotera, the Slovenian Foundation for Sustainable Development. As part of the project, Umanotera selected and presented to the public 15 Slovenian and 5 foreign good practices in 2011/2012; these practices are listed in the 2012 Catalogue, on the website www.slovenija-co2.si and in short cartoons The presentations served as the basis for drafting the recommendations to decision makers for further dissemination and application of good practices.

The continuation of the *Slovenia is Reducing CO_2: Good Practices* project in 2013 yielded the selection and promotion of good practices (15 Slovenian and 5 foreign examples), knowledge dissemination and incentives and recommendations for changes. The good practices of 2013 are also illustrated in short films.

The good practice examples have been selected from the following priority areas: (1) energy efficiency, renewable energy sources and energy-saving restoration of buildings, (2) sustainable mobility, (3) sustainable forest management, wood processing in crafts and industry, wood as construction material and wood fuel supply, (4) organic farming, supply networks with sustainably produced food, (5) sustainable rural development, (6) sustainable production and consumption, (7) adaptation to climate change. The selected good practices were presented to the interested public in more detail at workshops, at site visits and at the websites www.slovenija-co2.si. The project was aimed especially at local communities and companies and at the self-employed.

European Mobility Week and **European Car Free Day:** The objective of the initiative is to inform the public of the consequences of the excess use of cars and road transport in general, and changes in mobility habits. The campaign warns of climate change and of everything that creates a »climate« of cities: living quality, air quality, noise, traffic safety, quality of public surfaces, social integration of the population and general atmosphere in cities. The key players in this campaign are the municipalities, since they know best the traffic problems in individual cities and can also define traffic regimes in cities in the fastest possible manner, which also contributes to permanent mobility.

The European Mobility Week has been organised every year since 2002 between 16 and 22 September. Slovenia joined the project in the first year. In the beginning years, from 20 to 26 municipalities with a population of app. 500.000 have been participating. The MESP

prepared for them and for the wider public a web page as well as awareness material. Several national and local radio stations have participated, also carrying out event-related contests. Non-governmental organisations (e.g., Focus) participate as well, conducting public awareness-educational activities. In 2011, 30 Slovenian municipalities took part in the initiative "Travel differently", organising over two hundred events and activities, ranging from free bicycle servicing and public transport to various events for children and the professional public. The objective was to improve the quality of urban life by encouraging citizens to try out alternatives to car use, including public transport, cycling and walking, as well as spatial planning that takes into account sustainable mobility.

In 2013, the European Mobility Week took place under the slogan "Clean Air – It's Your Move". The last day of this week was the "In Town Without My Car" day, which is the initiative from which the mobility week was developed. 31 local communities in Slovenia were involved in the project. The Ministry of Infrastructure and Spatial Planning is now the national body authorised to coordinate the European Mobility Week in Slovenia.

NGOs have an important role to play in public information and awareness. Some of the most active ones are: Focus (Sustainable Development project; Change Your Habits, Not the Climate - web portal on climate change: http://www. focus-go.org/index.php?node=15; One tonne heavy challenge; Also Me, Sustainable Energy for Sustainable Development, Big Ask, Development with Climate Protection? Yes, possible!, All in one, one for all!, Public Transport is Cool« Bye, bye stand-by! etc.), Umanotera (Rituali green office; Calculate your own carbon footprint; Elections 2008 – Change the Climate; Plan B 1.0 – 4.0: 2007 - 2012, Mirror to the Government etc., Slovenia is Reducing CO_2), Institute for Sustainable Development (projects in the area of organic farming), Slovenian E- forum (FEEDU + Energy detectives, Energy Path, IUSES, AGENTS, …).

Numerous examples of good practices in information and communication about climate change are presented at national and international selections, web portals, presentations and visits (e.g. the **National Energy Path of Slovenia** and more recent projects **Slovenia is Reducing CO_2: Good Practices**); there is also a separate presentation in the Draft Climate Strategy. A special section containing links to good practice examples has been added to the GOCC website[55]. Some outstanding projects are briefly outlined below.

The Solar Mobility Project: Slovenian innovator Andrej Pečjak (http://www.ad-pecjak.si/ECO/EcarSLO1.htm) undertook a project of converting an old Renault Espace into an electric vehicle in 2006. His aim was to demonstrate that technologies are already in place and that if three hobbyists can assemble such a car in their home garage, car manufacturers could do the same much better and more cheaply. After the conversion of the Renault Espace they modernised (with LiPo batteries) the first Slovenian electric car – R5 by Zorič – which attracted attention at the Auto Salon Geneva 1993. One major project was the conversion of a Mazda RX-8 sports car with components taken from an Espace; this car, too, has been on the road since 2009. Their four electric cars are now connected to a photovoltaic power generator that annually generates enough clean energy to cover 30,000 km, and thus

[55] http://www.svps.gov.si/si/podnebne_spremembe/kaj_pa_jaz/dobre_prakse/.

practically proves that the idea of solar mobility is feasible. The project was concluded in May 2009 with the connection of the power generator to the grid.

Andrej Pečjak has cooperated with the Slovenian companies Elaphe, Stoja, Iskra AE and ANET, in the development of a hybrid boat http://www.greenlinehybrid.com/ and in the project of the Slovenian electric city car, Chebela (Oprema Ravne). In 2010 he converted cars around the world – BYD F0 in China in the spring and a Smart in Belgium in the autumn. In 2011 he undertook the electrification of an existing Italian vehicle by fitting the Iskra propulsion system for the purpose of mass production. Nowadays he works mostly within the Metron Institute. In March 2013, the Metron team driving their converted Dacia Sandero won Rallye Monte Carlo des energies nouvelles in two categories: consumption overall and rally in classification electric vehicles. In November 2013, they started working on project METRON 7 - making a 7 seat electric car with range of 700 km by 70 km/h. The project has started in November 2013, propulsion is Letrika PM motor and controller, nominal voltage 350V, batteries 85 kWh, top speed 160 km/h, acceleration 11 s from 0 to 100 km/h. Many new technologies and innovations will be used for the first time.

Andrej Pečjak works towards awareness-raising and training through websites and training programmes, conferences, participation at international rallies and other activities.

Some other projects aimed at sustainable mobility: **Public transport is cool!**, **See you at the station, Mobilisation for public passenger transport** (Focus Association for Sustainable Development); objective: to establish a platform between transport providers, municipalities, civil society and decision-makers at the national level.

Synergistic Business Model: Informa Echo (http://www.informa-echo.si/eng/), agency for integrated communications, won the first Horus - Slovenian Award for Social Responsibility in 2009 for the Synergistic Business Model in the field of efficient energy use implemented as part of three programmes:

- **Synergy – Network of Social Utility**, which currently integrates over 40 companies,
- **Be Energy, Be Efficient**, a multi-annual all-Slovenian campaign initiated by HSE Group whose actions have so far stimulated 37% Slovenians to introduce measures of efficient energy use in their homes, in
- **REUS – Research on Energy Efficiency in Slovenia**.
-

Each programme is focused on efficient energy use, which is basically oriented towards socially responsible behaviour. Informa Echo developed the Synergistic Business Model on the basis of its own know-how – the book *9K - 9Korakov učinkovitega komuniciranja* (9 Keys of Effecient Communication). The Agency members see their challenge especially in the fields of energy, efficient energy use and environmental topics, while their vision is to promote understanding and cooperation for sustainable development.

Exploring the Future: Exhibition SLOVENIA, 50+

Umanotera, the Slovenian Foundation for Sustainable Development, organised in 2010 the "Exhibition SLOVENIA, 50+"[56] about the possible consequences of climate change; the exhibition, supported by several fund providers**,** was hosted by Mercator shopping centres in different towns of Slovenia. Images that convincingly show the condition of some typical locations of Slovenia and scenes from the life of people in the second half of this century that are easy to imagine if climate change is left unaddressed are supplemented by clear explanations and incentives to act: changing one's habits, forcing politicians to act, convincing others. The preparation of the exhibition involved several experts who built on the forecasts that the temperature growth in Slovenia will be faster than the global average.

The biggest environmental protection project in the history of Slovenia: In 2010, the non-profit organisation Ecologists Without Borders Association (http://ebm.si/o/en/) carried out the biggest environmental protection project in the history of the country »Let's Clean up Slovenia in a day!«, which earned it an Order for Services conferred by the President of Slovenia. This all-Slovenian action involved 270,000 volunteers (more than 13% of the population) who were regionally connected and working in close cooperation with municipalities, municipal utility companies and other public companies, different associations and institutions that contributed to the organisation of the action and the recording of illegal dumping sites. The action led to the establishment of the first all-Slovenian register of illegal dumping sites. The action was also extremely important in terms of raising awareness and education for sustainable consumption. In 2012 it was repeated with even better results as part of the World Cleanup 2012 project.

Umanotera is the Slovenian partner in the project **EGO – European Green Office**, whose aim is to contribute to environmental and human friendly way of transformation of offices and enhance skill and knowledge development of employees. Partners from six countries designed different training tools for companies and organisations: a website (www.eugreenoffice.eu/si) that offers the Green Office Handbook, Office Ecological Footprint Calculator, Green Office Virtual House and Green Office Checklist. All tools are also available in Slovenian translation.

In the framework of the **Pure Victory** project (http://www.cistazmaga.si/), Umanotera published the first Slovenian manual containing the criteria for organising sustainable sporting events. In addition, it drew up the criteria for sustainable sporting events as an autonomous tool intended for the evaluation of sporting events in terms of sustainable elements and used as a source of ideas in the process of planning or as a self-evaluation tool. The aim of the project PURE VICTORY – Sustainable Sporting Events is to achieve a change in the behaviour and actions of the shareholders of these events (individuals and organisations) and thus contribute to the achievement of sustainable development.

The establishment of so-called "**short chains**" between suppliers and consumers is one of the priorities of the Ministry of Agriculture and the Environment. The Ministry carried out several promotion projects as a part of the campaign to boost the consumption of local food,

[56] Available at: www.slovenija50plus.si/

one of the reasons being the fact that long transport routes have a highly negative impact on the environment.

LIFE+ Information and Communication projects disseminate information and raise the profile of environmental issues and provide training and awareness-raising for the prevention of forest fires. In the framework of the 2010 call, three Slovenian projects on environmental issues have been selected:

- SEPARATE COLLECTION (SLOPAK D.O.O): The SEPARATE COLLECTION project's overall objective is to raise awareness that the separate collection of municipal waste creates environmental benefits; increase the amount of separately collected household packaging and biodegradable waste, electric and electronic equipment waste, waste tires, waste phytopharmaceuticals, waste medicines and batteries; and disseminate information on the infrastructure for separate collection of municipal waste. The beneficiary will do this through communication campaigns, demonstration activities, contests involving prizes and debates.
- REBIRTH (Slovenian National Building and Civil Engineering Institute (ZAG)): The REBIRTH project will contribute to the increased and better recycling of industrial waste and construction/demolition waste in the construction sector. This will be promoted through communication and open dialogue activities and emphasis will be placed on: disseminating best practice through practical demonstrations of existing technical possibilities; information on successful administrative measures and tools, such as green public procurement, environmental taxes and charges from other EU countries; and through channels of communication open to professionals, national and local authorities and the general public.
- Slovenia WEEE campaign (ZEOS, ravnanje z električno in elektronsko opremo, d.o.o.): The Slovenia Waste Electrical and Electronic Equipment (WEEE) campaign project aims to raise awareness concerning the manufacture and use of WEEE and WEEE handling, treatment and recovery (including reuse and recycling), with a special emphasis on households and school children in Slovenia.

9.6 Consulting

Since 1993, the project **»Energy Consulting for Citizens – ENSVET«** has been carried out continually in Slovenia, intended for consulting and the increase of information and awareness of citizens for rational energy use and the use of RES. The project incorporates a network of more than 40 consulting offices. So far, a few hundred consultants have been educated for consulting work within the project. On an annual basis is advised between 6,000 and 7,000 owners or tenants of residential buildings for energy efficiency measures in renovations of existing buildings (about 90% of cases) and measures for efficient design of new residential buildings (about 10% of cases of counseling). The project is entirely financed by the Ministry of Infrastructure and Spatial Planning, so that consulting for citizens is free-of-charge. The coordinator of the project is the Gradbeni inštitut ZRMK (Building and Civil Engineering Institute ZRMK). In consulting offices, citizens are provided with professional, free and independent consulting on the selection of heating systems and heating equipment, the replacement of heating equipment, reduction of fuel consumption, selection of

appropriate fuel, insulation of buildings, selection of appropriate windows and glazing, restoration of buildings with the purpose of reducing energy use, use of efficient household equipment and on other issues referring to energy consumption.

Operations of the consulting network ENSVET are also supplemented by the informal association of consultants **»LesEnSvet«** operating within four institutions: the Slovenia Forest Service, the Chamber of Agriculture and Forestry of Slovenia, the Building and Civil Engineering Institute ZRMK and the Slovenian Forestry Institute. Consulting of consultants in the LesEnSvet network includes the transmission of information on wood biomass potentials (wood, wood residues, other wood biomass), modern technologies of wood biomass production (logging, bringing, transport), modern technologies of wood biomass processing (choppers, processors for log production, drying, storage), modern technologies of wood biomass use (boilers for central heating, heating of sanitary water).

9.7 Non-Governmental Organisations and Public Participation

Around 200 environmental non-governmental organisations (NGOs) operate in Slovenia, from local to national level, several of them also tackling climate change issues. About 20 NGOs are dealing with climate change (including energy, transport, agriculture) on national level and are also involved in processes of policy making. NGOs that systematically address the climate issue include Slovenski E Forum, Focus (the association for sustainable development), and Umanotera (The Slovenian Foundation for Sustainable Development). In 2007, the indicated NGOs have together with CIPRA Slovenije and the Institute for Sustainable Development founded with the financial assistance of the MESP the Environmental Centre as the framework for operations of environmental non-governmental organisations. The Environmental Centre has become the centre for the integration of interested members of the public, while enabling access for the wider public to information and publications of environmental protection and sustainable development. Simultaneously with better organisation and cooperation of environmental non-governmental organisations, the Environmental Centre has been increasing its importance in decision-making processes. The Environmental Centre also provides the basic infrastructure and assistance to non-established or newly-established environmental non-governmental organisations and civil initiatives.

The Government NGO Cooperation Strategy includes a cooperation programme involving both sides. The Government used this document to emphasise the importance of NGOs and to establish a lasting foundation for resolving problems appearing in their work and development. It is important to point out that NGOs had representatives in the Slovenian Climate Change Committee, Project Steering Committee »Removing Barriers to the Increased Use of Biomass as an Energy Source«, Sustainable Development Council. Moreover, one NGO representative has been participating for several years as a member of the national delegation in negotiations within the framework of the UNFCCC.

Plan B - Initiative for a Sustainable Development: *Project Plan B* is a network of Slovenian environmental non-governmental organizations (NGOs) and experts, forming a

broad civil society platform for sustainable development in Slovenia, along with other interested stakeholders. It has been established in 2007 and is financed by the European Social Fund. The primary objective of the NGO network within Plan B is to support long-term sustainable operation of environmental NGOs and to strengthen the qualification of environmental NGOs in Slovenia in two ways: by encouraging their active role in the democratic processes of policy formulation and in monitoring implementation of policies, and also by encouraging their participation and partnership. A secondary objective of the project is to improve the awareness of citizens and to encourage their engagement in environmentally-oriented public matters.

The initiative presented to the Government for 7 priority programmes of Green Development Breakthrough is derived from the expert bases of version 4.0 of Plan B for Slovenia[57] and includes the programmes of food self-reliance with the emphasis on organic production, value chain of wood, energy renovation of buildings, transition to renewable energy sources, modernisation of the railway network and public transport, efficient use of natural resources (incl. waste) and green tourism. At the end of April 2013, the *Tretji člen* (Third Article) community submitted to Ms Alenka Bratušek, Prime Minister of Slovenia, 10,358 signatures (including personal messages) and the list of 195 organisations, businesses, municipalities, and associations that joined the initiative. As stated by the proposers themselves, effective implementation of all proposed programmes requires horizontal, supporting programmes such as education and training, innovation and entrepreneurship, green budget reform, stimulus measures of green public procurement and others (that are partly already implemented). To support climate measures and broader measures for the transition to a low-carbon society and sustainable development society, the civil society prepared a range of other public initiatives.

The Draft Strategy for Slovenia's Transition to a Low-Carbon Society by 2060 (also called the Climate Strategy, 2011-2012) was drafted by the Government Office of the Republic of Slovenia of Climate Change in cooperation and dialogue with experts and representatives of civil society, the corporate sector, local communities and public administration. At eleven workshops for the drafting of the Strategy held in 2011, over 250 experts contributed their rich practical experience and broad professional knowledge, confronted different views and participated in lively discussions that led to harmonised answers about the analyses and orientations for key sectors of the transition to a low-carbon society. The possible scenarios of this transition were based on the results of the target-oriented research project Slovenia - Low-Carbon Society (2008-2011), the analytical basis and draft of the National Energy Programme (NEP) up to 2030, the non-governmental organisations' proposals Plan B for Slovenia (since 2007), the findings of the project Development Scenarios for Slovenia to 2035 (Government Office of the Republic of Slovenia for Development, 2008), as well as on several expert studies published in the GOCC archive website. Several proposals were contributed by the non-governmental organisations' project about the implementation of climate and energy-related objectives **Slovenia is Reducing CO_2** (2010-2011), while the promoters of the campaign **"Act Now!"**

[57] The first Plan B for Slovenia was prepared in 2007 by the coalition of environmental NGOs with the same name and coordinated by Umanotera, as an alternative to "classical" development philosophy and to the Slovenia's Development Strategy for the period 2005 – 2013.

were actively involved in drafting the strategy. The draft climate strategy also reflected the results of the public debate about the draft climate act conducted by GOCC in 2010 and 2011.

Sustainable Development Council: The inclusion of civil society and corporate sector representatives in discussions about important issues of sustainable development was facilitated by the reformed Sustainable Development Council as a consulting body of the Slovenian Government for the field of sustainable development, which was active from April 2011 to the spring of 2012 and consisted of nine prominent representatives of science, civil society, the corporate sector and local communities. Following the proposal of GOCC, the Slovenian Government adopted at its 100th regular session held on 23 September 2010 the Decision on the Establishment, Composition, Organisation and Tasks of the Sustainable Development Council (Official Gazette of the Republic of Slovenia, No. 79/2010) which transferred the secretariat of the Sustainable Development Council (SDC) to GOCC and reformed this consulting body of the Government. The SDC met at several regular sessions open to the public and made several proposals and recommendations for sustainable development based policy-making at all levels.

Annex A

List of Abbreviations and Units of Measurement

Abbreviations:

AGEN-RS	Energy Agency of the Republic of Slovenia
ARSO	Environmental Agency of the Republic of Slovenia
CH_4	Methane
CLRTAP	Convention on Long-Range Transboundary Air Pollution
CO_2 eq	CO_2 equivalent (greenhouse gas emissions expressed in a common unit; calculations are based on the global warming potential (GWP) of specific gases, as prepared by the IPCC. The following values are used in line with UN FCCC instructions to prepare national reports and greenhouse gas emission inventories: GWP CO_2 1, GWP CH_4 21, GWP N_2O 310, GWP HFC134a 3800, GWP CF_4 6500, GWP C_2F_6 9200
COST	European Co–operation in the field of Scientific and Technical Research
CRF	Common Reporting Format
DSM	Demand Side Management – Execution of EEU programmes for consumers by energy supply companies
DURS	Tax Administration of the Republic of Slovenia
EMAS	Eco-Management and Audit Scheme
EMEP	European Monitoring and Evaluation Programme
ENSVET	Citizens' energy advice
F–Gases	Fluorinated gases: Hydrofluorocarbons (HFC), perfluorocarbons (PFC) and sulphur hexafluoride (SF_6)
FOD	First order decay method for calculating CH_4 emissions from waste
FSF	Fast-start Finance
GAW	Global Atmosphere Watch
GDP	Gross Domestic Product
GEF	Global Environment Facility
GHG	Greenhouse gases, see also TGP
GHG OP-1	Operational Programme for Reducing Greenhouse Gas Emissions by 2012
GOCC	Government Office of Climate Change
GPG 2000	Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories, IPCC 2000
HFC	Hydrofluorocarbons
HSE	Holding Slovenske elektrarne – Slovenian Power Plants Holding Company
IJS-EEC:	Institute Jožef Stefan – Eneergy Efficiency Centre
IMAD	Institute of Macroeconomic Analysis and Development
IPCC	Intergovernmental Panel on Climate Change
IPPC	Integrated Pollution Prevention and Control
MAE	Ministry of Agriculture and the Environment
MCRS	Motorway Company in the Republic of Slovenia
ME	Ministry of the Economy
MF	Ministry of Finance
MFA	Ministry of Foreign Affairs
mio	million
MISP:	Ministry of Infrastructure and Spatial Planning
MT	Ministry of Transport
N_2O	Nitrous oxide
NEP	National Energy Programme; also: National Energy Path
NO_x	Nitrogen oxides
OP-TGP	Operational Programme for Limiting Greenhouse Gas Emissions (July 2004)

OP-TGP1	Operational Programme for Limiting Greenhouse Gas Emissions until 2012 (July 2009)
PFC	Perfluorocarbons (CF_4 and C_2F_6)
pkm	passenger kilometre
RS	Republic of Slovenia
SAVE	EU energy efficiency programme
SEA	Slovenian Environment Agency
SF_6	Sulphur hexafluoride
SFS	Slovenia Forest Service
SO_2	Sulphur dioxide
SORS	Statistical Office of the Republic of Slovenia
TE–TOL	Ljubljana heat and power plant
TEŠ	Šoštanj thermo power plant
TET	Trbovlje thermo power plant
TGP	Greenhouse gases, see also GHG
tkm	tonne kilometre
TOE	Tonne of oil equivalent
WMO	World Meteorological Organization
ZRMK	Building and Civil Engieneering Institute

Units of measurement:

k… kilo (10^3)
M… Mega (10^6)
G… Giga (10^9)
T… Tera (10^{12})
P… Peta (10^{15})
g... gram
t... tonne
J… joule
ha… hectare
/a… per annum

Annex B

Greenhouse Gas Inventories

Please follow the link:

http://unfccc.int/national_reports/annex_i_ghg_inventories/national_inventories_submissions/items/7383.php

then choose Slovenia, CRF (14 May 2013), tables SVN-2013-2011-v1.6.xls.

Annex C

Greenhouse Gas Emissions Inventories for the Years 1986, 2000, 2005 and 2011, and Projection with Measures and Projection with Additional Measures for the Years 2015, 2020, 2025 and 2030

1986	CO_2 eq (inventory)						
Sector	CO_2	CH_4	N_2O	HFCs	PFCs	SF_6	TOTAL
Energy supply[58]	6.821	417	26				7.265
Transport	1.974	19	32				2.025
Industry	5.379	14	42	0	276	10	5.721
Fuel combustion in industry	4.352	10	42				4.404
Industrial processes	1.027	4	0	0	276	10	1.317
Other sectors	2.182	151	76				2.409
Solvent and other product use	0	0	82				82
Agriculture	0	1.140	1.071				2.211
LULUCF	-9.193	0	0				-9.193
Waste	0	432	59				491
TOTAL	**16.356**	**2.174**	**1.388**	**0**	**276**	**10**	**20.204**

2000	CO_2 eq (inventory)						
Sector	CO_2	CH_4	N_2O	HFCs	PFCs	SF_6	TOTAL
Energy supply	5.589	297	23				5.909
Transport	3.631	20	211				3.862
Industry	3.099	10	24	41	106	16	3.295
Fuel combustion in industry	2.240	5	24				2.269
Industrial processes	858	5	0	41	106	16	1.026
Other sectors	2.892	110	53				3.056
Solvent and other product use	0	0	43				43
Agriculture	0	1.121	1.012				2.133
LULUCF	-9.902	1	0				-9.901
Waste	2	560	60				623
TOTAL	**15.213**	**2.118**	**1.426**	**41**	**106**	**16**	**18.920**

2005	CO_2 eq (inventory)						
Sector	CO_2	CH_4	N_2O	HFCs	PFCs	SF_6	TOTAL
Energy supply	6.460	290	27				6.777
Transport	4.346	12	69				4.428
Industry	3.450	14	28	133	133	19	3.776
Fuel combustion in industry	2.450	8	28				2.486
Industrial processes	1.000	6	0	133	133	19	1.291
Other sectors	2.435	102	51				2.589
Solvent and other product use	0	0	43				43
Agriculture	0	1.089	915				2.003
LULUCF	-9.774	1	0				-9.773
Waste	2	632	58				692
TOTAL	**16.694**	**2.139**	**1.191**	**133**	**133**	**19**	**20.309**

[58] Emissions from Energy industries (CRF 1.A.1) and Fugitive emissions (1.B) are included in Energy supply

2011	CO_2 eq (inventory)						
Sector	CO_2	CH_4	N_2O	HFCs	PFCs	SF_6	TOTAL
Energy supply	6.413	285	28				6.726
Transport	5.633	8	57				5.699
Industry	2.332	5	17	217	29	17	2.616
Fuel combustion in industry	1.683	5	17				1.704
Industrial processes	649	0	0	217	29	17	912
Other sectors	1.794	114	49				1.957
Solvent and other product use	0	0	49				49
Agriculture	0	1.058	843				1.901
LULUCF	-9.620	1	0				-9.619
Waste	5	497	60				562
TOTAL	**16.178**	**1.966**	**1.103**	**217**	**29**	**17**	**19.509**

2015	CO_2 eq (with measures projection)						
Sector	CO_2	CH_4	N_2O	HFCs	PFCs	SF_6	TOTAL
Energy supply	5.577	274	26				5.877
Transport	6.258	21	107				6.386
Industry	3.019	7	29	191	32	14	3.292
Fuel combustion in industry	2.265	7	29				2.301
Industrial processes	755			191	32	14	992
Other sectors	1.695	86	48				1.829
Solvent and other product use			30				30
Agriculture		1.178	908				2.087
LULUCF	-9.507						-9.507
Waste	6	496	60				562
TOTAL	**16.555**	**2.062**	**1.209**	**191**	**32**	**14**	**20.063**

2020	CO_2 eq (with measures projection)						
Sector	CO_2	CH_4	N_2O	HFCs	PFCs	SF_6	TOTAL
Energy supply	5.511	282	27				5.820
Transport	6.466	22	122				6.610
Industry	3.432	8	33	136	32	8	3.650
Fuel combustion in industry	2.399	8	33				2.439
Industrial processes	1.034			136	32	8	1.211
Other sectors	1.339	80	46				1.465
Solvent and other product use			30				30
Agriculture		1.269	985				2.255
LULUCF	-9.380						-9.380
Waste	7	454	60				522
TOTAL	**16.755**	**2.116**	**1.303**	**136**	**32**	**8**	**20.351**

2025	CO_2 eq (with measures projection)						
Sector	CO_2	CH_4	N_2O	HFCs	PFCs	SF_6	TOTAL
Energy supply	4.966	257	25				5.248
Transport	6.596	23	126				6.745

Industry	3.642	8	36	139	32	9	3.866
Fuel combustion in industry	2.513	8	36				2.558
Industrial processes	1.128			139	32	9	1.308
Other sectors	1.076	75	44				1.195
Solvent and other product use			30				30
Agriculture		1.301	998				2.299
LULUCF	-9.254						-9.254
Waste	8	415	60				483
TOTAL	**16.287**	**2.078**	**1.320**	**139**	**32**	**9**	**19.865**

2030	CO_2 eq (with measures projection)						
Sector	CO_2	CH_4	N_2O	HFCs	PFCs	SF_6	TOTAL
Energy supply	4.118	218	21				4.357
Transport	6.791	24	130				6.945
Industry	3.755	9	39	142	32	9	3.987
Fuel combustion in industry	2.623	9	39				2.671
Industrial processes	1.132			142	32	9	1.316
Other sectors	868	70	43				981
Solvent and other product use			30				30
Agriculture		1.331	1.011				2.342
LULUCF	-9.127						-9.127
Waste	9	377	59				445
TOTAL	**15.541**	**2.029**	**1.333**	**142**	**32**	**9**	**19.087**

2015	CO_2 eq (with additional measures projection)						
Sector	CO_2	CH_4	N_2O	HFCs	PFCs	SF_6	TOTAL
Energy supply	5.577	274	26				5.877
Transport	5.245	16	94				5.356
Industry	3.019	7	29	191	32	14	3.292
Fuel combustion in industry	2.265	7	29				2.301
Industrial processes	755			191	32	14	992
Other sectors	1.392	98	49				1.538
Solvent and other product use			30				30
Agriculture		1.116	877				1.993
LULUCF	-9.507						-9.507
Waste	6	496	60				562
TOTAL	**15.239**	**2.007**	**1.166**	**191**	**32**	**14**	**18.649**

2020	CO_2 eq (with additional measures projection)						
Sector	CO_2	CH_4	N_2O	HFCs	PFCs	SF_6	TOTAL
Energy supply	5.511	282	27				5.820
Transport	5.238	17	104				5.359
Industry	3.432	8	33	136	32	8	3.650
Fuel combustion in industry	2.399	8	33				2.439
Industrial processes	1.034			136	32	8	1.211

Other sectors	1.036	92	47				1.175
Solvent and other product use			30				30
Agriculture		1.173	923				2.095
LULUCF	-9.380						-9.380
Waste	7	454	60				522
TOTAL	**15.223**	**2.026**	**1.224**	**136**	**32**	**8**	**18.650**

2025	CO_2 eq (with additional measures projection)						
Sector	CO_2	CH_4	N_2O	HFCs	PFCs	SF_6	TOTAL
Energy supply	4.966	257	25				5.248
Transport	5.294	17	106				5.418
Industry	3.642	8	36	139	32	9	3.866
Fuel combustion in industry	2.513	8	36				2.558
Industrial processes	1.128			139	32	9	1.308
Other sectors	856	84	46				986
Solvent and other product use			30				30
Agriculture		1.179	928				2.107
LULUCF	-9.254						-9.254
Waste	8	415	60				483
TOTAL	**14.766**	**1.960**	**1.231**	**139**	**32**	**9**	**18.137**

2030	CO_2 eq (with additional measures projection)						
Sector	CO_2	CH_4	N_2O	HFCs	PFCs	SF_6	TOTAL
Energy supply	4.118	218	21				4.357
Transport	5.443	18	109				5.570
Industry	3.755	9	39	142	32	9	3.987
Fuel combustion in industry	2.623	9	39				2.671
Industrial processes	1.132			142	32	9	1.316
Other sectors	758	77	44				880
Solvent and other product use			30				30
Agriculture		1.186	934				2.119
LULUCF	-9.127						-9.127
Waste	9	377	59				445
TOTAL	**14.084**	**1.885**	**1.237**	**142**	**32**	**9**	**17.388**

Annex D

Relations Between National Measures/Policies and Common European Measures/Policies

Name of the measure	European policy/measure 1	European policy/measure 1	European policy/measure 1
(M-1) GHG EMISSION ALLOWANCE TRADING (EU-ETS)	Cross-cutting: EU ETS directive 2003/87/EC as amended by Directive 2008/101/EC and Directive 2009/29/EC		
(M-2) ENVIRONMENTAL TAX ON AIR POLLUTION DUE TO CO_2 EMISSIONS	Non-CCPM National Policy		
(M-3) KYOTO FLEXIBLE MECHANISMS	Cross-cutting: Kyoto Protocol project mechanisms 2004/101/EC	Cross-cutting: Effort Sharing Decision (406/2009/EC)	
(M-4) TAXES AND CHARGES	Energy supply: Taxation of energy products 2003/96/EC		
(M-5) EDUCATION, TRAINING, AWARENESS RAISING, INFORMING AND PROMOTION	Energy consumption: Recast of the Energy performance of buildings (Directive 2010/31/EC) amending 2002/91/EC	Energy supply: RES Directive 2009/28/EC (repealing RES-E Directive 2001/77/EC and Biofuel Directive 2003/30/EC)	Energy consumption: End-use efficiency and energy services 2006/32/EC repealing SAVE Directive (Directive 93/76/EEC)
(M-6) INCREASE IN THE ENVIRONMENTAL EFFICIENCY OF ELECTRICITY AND HEAT GENERATION IN LARGE COMBUSTION PLANTS	Cross-cutting: Integrated pollution prevention and control 2008/1/EC (amending 96/61/EC)	Energy supply: Internal electricity market 2009/72/EC (repealing 2003/54/EC)	Cross-cutting: National Emission Ceilings for certain pollutants (Directive 2001/81/EC)
(M-7) PROMOTION OF CO-GENERATION OF ELECTRICITY AND HEAT WITH HIGH EFFICIENCY	Energy supply: Combined Heat and Power (CHP) Directive on the Promotion of Cogeneration 2004/8/EC		
(M-8) PROMOTION OF ELECTRICITY GENERATION FROM RENEWABLE ENERGY SOURCES	Energy supply: RES Directive 2009/28/EC (repealing RES-E Directive 2001/77/EC and Biofuel Directive 2003/30/EC)		
(M-9) PROMOTION OF EFFICIENT ENERGY USE IN INDUSTRY	Energy consumption: End-use efficiency and energy services 2006/32/EC repealing SAVE Directive (Directive 93/76/EEC)	Cross-cutting: Integrated pollution prevention and control 2008/1/EC (amending 96/61/EC)	Energy consumption: Eco-management & audit scheme (EMAS) EC 761/2001
(M-10) PROMOTION OF THE USE OF RENEWABLE ENERGY SOURCES AS A HEAT SOURCE	Energy supply: RES Directive 2009/28/EC (repealing RES-E Directive 2001/77/EC and Biofuel Directive 2003/30/EC)	Energy consumption: Recast of the Energy performance of buildings (Directive 2010/31/EC) amending 2002/91/EC	Energy supply: Biomass Action Plan COM(2005) 628 final

Name of the measure	European policy/measure 1	European policy/measure 1	European policy/measure 1
(M-11) PROMOTION OF ENERGY EFFICIENCY IN THE PUBLIC SECTOR	Energy consumption: End-use efficiency and energy services 2006/32/EC repealing SAVE Directive (Directive 93/76/EEC)	Energy consumption: Recast of the Energy performance of buildings (Directive 2010/31/EC) amending 2002/91/EC	Energy consumption: Energy labelling for office equipment 2422/2001 (Energy Star Program)
(M-12) ENERGY LABELLING AND MINIMUM STANDARDS FOR PRODUCTS AND EQUIPMENT	Energy consumption: Eco design Directive 2009/125/EC (amending 2005/32/EC)	Energy consumption: Directives on energy labelling of household appliances	
(M-13) PROMOTION IN THE ENERGY EFFICIENCY OF BUILDINGS IN THE HOUSEHOLD AND SERVICE SECTOR	Energy consumption: Recast of the Energy performance of buildings (Directive 2010/31/EC) amending 2002/91/EC	Energy consumption: End-use efficiency and energy services 2006/32/EC repealing SAVE Directive (Directive 93/76/EEC)	
(M-14A) REDUCTION IN EMISSIONS FROM PASSENGER MOTOR VEHICLES	Transport: Regulation on CO_2 from cars 2009/443/EC	Transport: New Passenger Car Labelling on fuel economy rating 1999/94/EC	Transport: Energy labelling for tyres with respect to fuel efficiency and other essential parameters (Regulation 1222/2009)
(M-14B) REDUCTION IN EMISSIONS FROM GOODS VEHICLES	Transport: Regulation on CO_2 from vans No 510/2011	Transport: Clean and Energy efficient road transport Directive 2009/33/EC	Transport: Energy labelling for tyres with respect to fuel efficiency and other essential parameters (Regulation 1222/2009)
(M-14C) REDUCTION IN EMISSIONS FROM BUSES	Transport: Clean and Energy efficient road transport Directive 2009/33/EC		
(M-15) PROMOTION OF THE USE OF BIOFUELS	Energy supply: RES Directive 2009/28/EC (repealing RES-E Directive 2001/77/EC and Biofuel Directive 2003/30/EC)	Transport: Fuel Quality Directive 2009/30/EC amending 1998/70/EC	Transport: Biofuels Directive (Directive 2003/30/EC)
(M-16) PROMOTION OF THE USE OF PUBLIC TRANSPORT	Non-CCPM National Policy		
(M-17) SUSTAINABLE GOODS TRANSPORT	Transport: Infrastructure charging for heavy goods (revised Eurovignette) 2006/38/EC	Transport: Allocation of railway infrastructure capacity and charging for the use of infrastructure, Directive 2007/58/EC amending Directive 91/440/EEC and Directive 2001/14/EC.	Transport: The interoperability of the rail system within the Community (Directive 2008/57/EC) recast of Directive 2004/50/EC amending Council Directive 1996/48/EC (high-speed rail system) and Directive 2001/16/EC

Name of the measure	European policy/measure 1	European policy/measure 1	European policy/measure 1
			(conventional system)
(M-18) GHG EMISSIONS FROM TRANSIT TRANSPORT	Non CCPM National Policy		
(M-19) REDUCTION IN THE EMISSION OF F-GASES FROM STATIONARY EQUIPMENT	Industrial Process: F-gas regulation (Regulation 842/2006)	Waste: Directives on waste electrical and electronic equipment (WEEE) 2002/95/EC	
(M-20) REDUCTION IN THE EMISSION OF F-GASES FROM MOBILE AIR-CONDITIONING SYSTEMS	Industrial Process: HFCs in mobile air conditioning Directive 2006/40/EC		
(M-21) ADAPTATION OF ALUMINIUM PRODUCTION TO THE BEST AVAILABLE TECHNOLOGIES	Cross-cutting: Integrated pollution prevention and control 2008/1/EC (amending 96/61/EC)		
(M-26) REDUCTION IN EMISSIONS FROM WASTE TREATMENT – reduction of the quantity of the deposited (biodegradable) waste	Waste: Waste Framework Directive (2008/98/EC) amending Directive on waste 2006/12/EE	Waste: Landfill directive 1999/31/EC	Waste: Packaging and packaging waste (94/62/EC, 2004/12/EC, 2005/20/EC)
(M-26) REDUCTION IN EMISSIONS FROM WASTE TREATMENT – capture of landfill gas	Waste: Landfill Directive 1999/31/EC	Energy supply: RES Directive 2009/28/EC (repealing RES-E Directive 2001/77/EC and Biofuel Directive 2003/30/EC)	
(M-27) SUSTAINABLE FOREST MANAGEMENT AND CO_2 EMISSION SINKS	Non CCPM National Policy		
(M-22) INCREASE IN THE EFFICIENCY OF DOMESTIC ANIMAL PRODUCTION	Agriculture: Common Agricultural Policy (CAP) related regulations		
(M-23) INTRODUCTION OF ANAEROBIC DIGESTERS FOR BIOGAS PRODUCTION FROM CATTLE MANURE	Agriculture: Common Agricultural Policy (CAP) related regulations		
(M-24) INCREASE IN CATTLE PASTURE GRAZING	Agriculture: Common Agricultural Policy (CAP) related regulations		
(M-25) RATIONAL FERTILISATION OF AGRICULTURAL PLANTS WITH NITROGEN	Agriculture: Common Agricultural Policy (CAP) related regulations		

Annex E

Table of Parameters for the Projection with Measures and the Projection with Additional Measures

Table E-1: Projection parameters.

Projection parameters used				HISTORICAL VALUES			PROJECTION WITH MEASURES				PROJECTION WITH ADDITIONAL MEASURES			
				2005	2010	2011	2015	2020	2025	2030	2015	2020	2025	2030
GDP			MEUR[00]/a	21,533	28,065	28,264	33,164	38,986	44,672	51,381	33,164	38,986	44,672	51,381
POPULATION			[1000 inhabitants]	1,998	2,047	2,050	2,053	2,058	2,047	2,023	2,053	2,058	2,047	2,023
INTERNATIONAL PRICES	COAL		EUR[08]/GJ		2.2		2.6	3.0	3.0	3.1	2.6	3.0	3.0	3.1
	PETROLEUM OIL		EUR[08]/GJ		8.8		10.5	12.1	13.1	14.0	10.5	12.1	13.1	14.0
	GASES		EUR[08]/GJ		5.3		6.7	7.8	8.4	9.0	6.7	7.8	8.4	9.0
PRICE OF CO_2 COUPONS			EUR[08]/t CO_2		18.1		15.0	20.0	29.1	35.0	15.0	20.0	29.1	35.0
ENERGY INDUSTRY				2005	2010		2015	2020	2025	2030	2015	2020	2025	2030
ENERGY SUPPLY	TOTAL		[PJ]	301.73	298.18	302.94	313.9	325.6	382.3	381.1	298.5	306.2	362.3	360.9
	LIQUID FUELS		[PJ]	64.16	60.87	61.50	113.6	111.1	109.1	110.0	96.0	90.6	89.0	90.4
	SOLID FUELS		[PJ]	102.72	102.93	104.77	49.8	45.6	40.7	33.3	49.8	45.6	40.7	33.3
	NATURAL GAS		[PJ]	38.90	36.10	30.89	48.0	55.4	57.1	57.3	49.0	56.3	57.8	57.9
	RES		[PJ]	32.40	43.13	41.30	48.3	60.0	66.0	69.3	49.6	60.1	65.4	68.0
	NUCLEAR ENERGY		[PJ]	64.19	61.71	67.80	63.1	63.1	146.1	146.1	63.1	63.1	146.1	146.1
	WASTE		[PJ]	0.54	0.97	1.23	0.9	2.3	2.4	2.6	0.9	2.3	2.4	2.6
	NET IMPORT OF ELECTRICITY		[PJ]	-1.17	-7.53	-4.54	-9.8	-11.7	-39.1	-37.4	-9.8	-11.7	-39.1	-37.4
ELECTRICITY PRODUCTION BY FUEL	TRANSFORMATIONS	TOTAL	[GWh]	15,117.00	16,433.00	16,056.00	18,182.2	19,486.1	27,689.6	27,676.7	18,182.2	19,486.1	27,689.6	27,676.7
		LIQUID FUELS	[GWh]	37.00	9.00	17.00	32.5	26.0	15.4	20.2	32.5	26.0	15.4	20.2
		NATURAL GAS	[GWh]	340.00	548.00	489.00	5,380.1	5,167.8	4,562.4	3,847.9	5,380.1	5,167.8	4,562.4	3,847.9
		COAL	[GWh]	5,275.00	5,289.00	5,308.00	1,624.6	2,355.8	2,593.1	2,597.6	1,624.6	2,355.8	2,593.1	2,597.6
		RES	[GWh]	3,575.38	4,740.44	3,875.44	5,350.8	6,117.2	6,867.5	7,559.4	5,350.8	6,117.2	6,867.5	7,559.4
		NUCLEAR ENERGY	[GWh]	5,884.00	5,657.00	6,215.00	5,783.0	5,783.0	13,615.0	13,615.4	5,783.0	5,783.0	13,615.0	13,615.4
		WASTE	[GWh]	5.62	189.56	151.56	11.3	36.3	36.3	36.3	11.3	36.3	36.3	36.3
FINAL ENERGY USE		TOTAL	[PJ]	203.9	205.5	208.6	223.2	232.0	233.2	237.1	208.0	212.8	213.2	216.9
	INDUSTRY	TOTAL	[PJ]	69.0	53.2	51.7	61.2	64.6	67.0	70.1	61.2	64.6	67.0	70.1
		LIQUID FUELS	[PJ]	9.3	5.2	4.7	7.1	7.5	7.8	7.9	7.1	7.5	7.8	7.9
		NATURAL GAS	[PJ]	22.6	20.2	17.8	21.4	22.4	22.7	23.9	21.4	22.4	22.7	23.9

Table E-1: Projection parameters – continued.

Projection parameters used				HISTORICAL VALUES			PROJECTION WITH MEASURES				PROJECTION WITH ADDITIONAL MEASURES			
				2005	2010	2011	2015	2020	2025	2030	2015	2020	2025	2030
		COAL	[PJ]	3.3	2.0	2.2	2.8	2.3	2.2	2.0	2.8	2.3	2.2	2.0
		RES	[PJ]	4.7	2.8	2.4	3.5	4.1	4.6	5.0	3.5	4.1	4.6	5.0
		ELECTRICITY	[PJ]	25.8	19.8	21.1	22.9	24.5	25.8	27.2	22.9	24.5	25.8	27.2
		DISTRICT HEATING		2.6	2.2	2.4	2.9	3.0	3.0	3.1	2.9	3.0	3.0	3.1
		WASTE		0.5	1.0	1.0	0.6	0.8	1.0	1.2	0.6	0.8	1.0	1.2
	TRANSPORT	TOTAL	[PJ]	64.6	77.8	83.1	92.3	101.4	103.8	107.3	77.7	82.6	83.9	86.9
		GASOLINE	[PJ]	28.6	24.8	25.0	24.7	22.1	20.0	20.5	24.3	21.9	19.7	20.3
		DIESEL	[PJ]	34.3	49.2	54.8	61.1	66.3	70.1	72.1	47.7	49.8	52.6	54.0
		AVIATION FUEL (JET)	[PJ]	1.0	1.1	1.0	1.4	1.5	1.6	1.7	1.4	1.5	1.6	1.7
		OTHER LIQUID FUELS (UNP)	[PJ]	0.0	0.2	0.3	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1
		NATURAL GAS	[PJ]	0.0	0.0	0.0	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1
		RES	[PJ]	0.0	1.9	1.5	3.9	9.8	10.0	10.3	3.3	8.0	8.0	8.2
		ELECTRICITY	[PJ]	0.7	0.6	0.6	0.9	1.3	1.7	2.1	0.9	1.3	1.7	2.1
		HYDROGEN	[PJ]	0.0	0.0	0.0	0.0	0.0	0.1	0.4	0.0	0.0	0.1	0.4
	HOUSEHOLDS	TOTAL	[PJ]	49.6	51.8	50.8	45.4	43.0	40.3	38.2	44.8	42.5	40.3	38.4
		LIQUID FUELS	[PJ]	16.8	12.9	10.6	9.0	6.2	4.0	2.5	5.4	2.7	1.8	1.3
		NATURAL GAS	[PJ]	4.1	4.8	4.7	5.7	6.0	5.8	5.3	6.7	7.0	6.5	5.8
		COAL	[PJ]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		RES	[PJ]	13.6	18.3	20.2	13.9	14.0	13.9	13.9	15.8	15.9	15.2	14.6
		ELECTRICITY	[PJ]	10.6	11.6	11.6	12.6	12.6	12.5	12.4	12.8	12.8	12.6	12.4
		DISTRICT HEATING		4.6	4.2	3.7	4.2	4.2	4.1	4.2	4.2	4.2	4.2	4.2
	SERVICES and AGRICULTURE	TOTAL	[PJ]	20.7	22.7	23.1	24.3	23.0	22.0	21.5	24.3	23.0	22.0	21.5
		LIQUID FUELS	[PJ]	9.7	8.2	6.7	7.5	4.5	2.7	2.1	7.5	4.5	2.7	2.1
		NATURAL GAS	[PJ]	1.1	1.0	1.7	1.7	2.0	2.1	2.0	1.7	2.0	2.1	2.0
		COAL	[PJ]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		RES	[PJ]	0.1	0.8	0.8	2.5	3.8	4.5	4.9	2.5	3.8	4.5	4.9
		ELECTRICITY	[PJ]	8.7	11.1	12.1	11.5	11.4	11.2	10.9	11.5	11.4	11.2	10.9
		DISTRICT HEATING		1.0	1.5	1.8	1.2	1.4	1.5	1.6	1.2	1.4	1.5	1.6

Table E-1: Projection parameters – continued.

Projection parameters used				HISTORICAL VALUES			PROJECTION WITH MEASURES				PROJECTION WITH ADDITIONAL MEASURES			
				2005	2010	2011	2015	2020	2025	2030	2015	2020	2025	2030
TEMPERATURE DEFICIT			[°C day]	3,278	3,069	2,964	3,172	3,172	3,172	3,172	3,172	3,172	3,172	3,172
ADDED VALUE IN INDUSTRY			MEUR[00]/a	6,504	6,861	7,064	7,876	9,122	10,384	11,843	7,876	9,122	10,384	11,843
				2000-2005	2005-2010	2010-2011	2010-2015	2015-2020	2020-2025	2025-2030	2010-2015	2015-2020	2020-2025	2025-2030
VALUE ADDED BEFORE ACTIVITY	Real growth rate		[%]	4.3	1.1	3.0	2.8	3.0	2.6	2.7	2.8	3.0	2.6	2.7
Passenger transport			[million pkm]	24,517	27,487	27,868	34,500	36,800	39,000	41,000	32,519	34,644	36,693	38,812
Goods transport			[million tkm]	17,088	31,765		41,762	53,130	59,304	66,317	30,094	37,391	42,293	48,140
Number of vehicles			[million of vehicles]	0.96	1.08	1.09	1.08	1.14	1.20	1.29	1.08	1.14	1.21	1.29
			[vehicle/inhabitant]	0.483	0.529	0.531	0.525	0.554	0.589	0.637	0.525	0.554	0.589	0.639
RESIDENTIAL FLOOR AREA			[1000 m2]	57,693	62,185	62,878	67,072	74,568	74,568	74,568	67,072	74,568	74,568	74,568
NUMBER OF HOUSEHOLDS			[1000]	710	742	748	771	796	816	832	771	796	816	832
SERVICE SECTOR FLOOR AREA			[1000 m2]		24,216		25,697	26,933	27,963	28,934	25,697	26,933	27,963	28,934
NUMBER OF ANIMALS														
BOVINE ANIMALS	Dairy cows		[1000 head]	120	109	109	115	121	121	121	102	104	100	96
	Other bovine animals		[1000 head]	332	361	353	381	385	396	406	380	402	406	410
PIGS			[1000 head]	547	396	347	415	500	500	500	415	500	500	500
POULTRY			[1000 head]	3,177	4,618	4,007	4,448	5,000	5,000	5,000	4,448	5,000	5,000	5,000
HORSES			[1000 head]	25	23	23	17	17	17	17	17	17	17	17
SHEEP			[1000 head]	129	130	120	130	130	130	130	130	130	130	130
FERTILISER AND MANURE CONSUMPTION			[kt of nitrogen]	56.3	54.1	52.8	58.2	64.1	64.7	65.4	54.1	54.4	53.9	54.5

Table E-1: Projection parameters – continued.

Projection parameters used				HISTORICAL VALUES			PROJECTION WITH MEASURES				PROJECTION WITH ADDITIONAL MEASURES			
				2005	2010	2011	2015	2020	2025	2030	2015	2020	2025	2030
SOLID MUNICIPAL WASTE - formation			[kt]	845	802	853	887	929	924	914	887	929	924	914
PROPORTION OF ORGANIC WASTE (DOC)			[%]	44	30	19	22	36	36	36	22	36	36	36
WASTE MANAGEMENT	DEPOSITED		[%]	94	51	48	53	25	19	13	53	25	19	13
	THERMALLY TREATED		[%]	0	0	0	0	1	1	1	0	1	1	1
	SEPARATE COLLECTION, COMPOSTING		[%]	6	49	52	46	74	80	86	46	74	80	86

Annex F

Slovenia's First Biennial Report

Slovenia's 1st Biennial Report

BR-1. Introduction

Slovenia is pleased to submit its First Biennial Report (BR1). It has been elaborated in accordance with the UNFCCC biennial reporting guidelines for developed country Parties (Decision 2/CP.17) and it forms a part of the Slovenia's 6th National Communication (NC6) under the UNFCCC.

Slovenia's obligation in the first commitment period (2008-2012) of the Kyoto Protocol was to reduce its greenhouse gas emissions by 8% relative to its base year (1986). For the second commitment period Slovenia decided to fulfil its commitment jointly with other EU Member States and Island. EU's quantified economy-wide emission reduction target in the period 2013-2020 is -20%, compared to 1990 levels.

This biennial report contains Slovenia's summary information on GHG emissions and emission trends for the time period 1986-2011, summary information on its quantified economy-wide emission reduction target, information on mitigation actions and their effects, emission projections until 2030 under "with measures" and "with additional measures" scenarios, and information on the provision of public financial support provided to developing countries.

BR-2. Information on GHG Emissions and Trends

In this chapter, information on the Slovenia's GHG emissions and emission trends for the period 1986-2011 is summarised. Summary tables are presented in CTF Table 1.

Broader information is presented in the Chapter 3 of the NC6. The chapter presents data on direct greenhouse gases: carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulphur hexafluoride (SF_6).

For more information see Chapter 3 of NC6 and Common Tabular Format (CTF) Table 1.

BR-2.1 Summary Information on Greenhouse Gas Emissions and Trends

The base year of Slovenia is 1986 for the greenhouse gases CO_2, CH_4, N_2O and 1995 for the F-gases HFCs, PFCs and SF_6.

Slovenia's total greenhouse gas emissions (without LULUCF) amounted in 2011 to 19,509.38 kt CO_2 eq, which is 3.4% less than in the year 1986. With LULUCF included, Slovenia's net greenhouse gas emissions amounted in 2011 to 9,891 kt CO_2 eq, a reduction by 11.4% compared with 1990 levels. This means that LULUCF, particularly forests, represent a sink of almost 10 Mt CO_2 eq per year.

In 2011, CO_2 had the largest share of Slovenia's GHG emissions (82.9%), followed by CH_4 (10.1%) and N_2O (5.7%). F-gases represented the remaining 1.3% of Slovenia's total GHG emissions.

In terms of GHG emissions in Slovenia, Energy is by far the most important sector; in 2011 it accounted for 81.9% of total GHG emissions. In this sector emissions have decreased by 0.7%, compared to the 1986. Within this sector, in the period 1986–2011, GHG emissions from the Energy Industry, as the biggest sub-sector, decreased by 7.0%. The greatest increase in GHG emissions has been in the Transport Sector, by as much as 202% until 2008, due to an increase in road transport, while emissions from other kinds of transport have slightly declined. There was a considerable reduction of GHG emissions from industry between 1986 and 2000 (-52%). After 2000 a stabilisation of emissions has been observed until 2008. Due to the global financial crisis, emissions from manufacturing industry and construction decreased in the period 2008-2011 by 26%.

Emissions from Industrial Processes represented in 2011 5.2% of all GHG emissions. The most important GHG in this sector was CO_2, with 74.1% of emissions, followed by HFCs with 21.4%, PFCs with 2.8%, and SF_6 with 1.6%. The main source was Mineral Production, of which the production of cement and lime alone contributed almost a half of the emissions in this sector.

In Agriculture as the second most important sector, emissions in 2011 represented 9.7% of all emissions. It is the main source of CH_4 and N_2O.

In the LULUCF sector, the CO_2 sink was estimated in 2011 at 9,619 Gg CO_2 eq, which is 4.6% more than in 1986. The increase in sink was primarily the result of an increase in timber growing stock in existing forests.

CH_4 emissions from the Waste sector were the second largest source of CH_4 and represented 25.2% of all CH_4 emissions in Slovenia in 2011. The share of CH_4 emissions in this sector amounted to 88.3%, while the remaining part was contributed by N_2O (10.7%), and CO_2 (0.9%).

BR-2.2 National Inventory Arrangements

In Slovenia, the institution responsible for GHG inventories is the Environmental Agency of the Republic of Slovenia. In accordance with its tasks and obligations to international institutions, the Environmental Agency is charged with making inventories of GHG emissions, as well as emissions that are defined in the Convention on Long Range Transboundary Air Pollution. In making the inventories, the Environmental Agency cooperates with numerous other institutions and administrative bodies which relay the necessary activity data and other necessary data for the inventories.

In accordance with Slovenian legislation, the Environmental Agency of the Republic of Slovenia is charged with the overall coordination of activities necessary for the development of emission inventories, as well as with implementing inventories for the purpose of reporting to the UNFCCC and the European Commission.

The main source of data is the Statistical Office of the Republic of Slovenia (SORS); however, the Slovenian Environmental Agency obtains much of its data through other activities which it performs under the Environmental Protection Act.

BR-3. Quantified Economy-wide Emission Reduction Target (QEERT)

As an EU Member State, Slovenia agreed to contribute to the joint EU target, which is to reduce its GHG emissions in the period 2013-2020 by 20% compared to the 1990 level. It is supposed to be achieved by the implementation of the so called EU Climate and Energy Package, which binds Member States to do their shares. Roughly, 40% of Slovenia's GHG emissions are included in the EU Emissions Trading Scheme (EU ETS) and 60% are covered by the Effort Sharing Decision (ESD); the latter are the responsibility of the Government. Due to national circumstances, Slovenian non-ETS sectors are allowed to increase their emissions by 4% by 2020 while ETS sectors have to significantly reduce emissions.

The most difficult of the non-ETS sectors is transport, responsible for 50% of all emissions in these sectors in 2011. Emissions in transport sector grew in Slovenia by 181% in the period from the base year to 2011, which is the highest growth of all Annex I Parties. Emissions from transit transport are a particularly difficult problem; its share in the total emissions is rapidly growing.

To help Slovenia achieve its GHG emission reduction targets under the Kyoto Protocol and under the EU Climate and Energy Package, the Government has adopted an "Operational Programme for the Reduction of GHG Emissions by 2020". It is being regularly updated; the draft of the latest version is now in the inter-sectoral and public discussion. The legal basis for this programme is the Environment Protection Act.

BR-4. Progress in Achievement of QEERT

The main long term document for the development planning is the Development Strategy of Slovenia. The previous one for the period 2006-2013 has just expired, and a new one for the period 2014-2020 is under preparation. Reducing of GHG emissions will depend on the implementation of the already adopted sectoral policies with integrated climate goals, as well as on further inclusion of climate goals in the new sectoral programmes under preparation.

The above mentioned "Operational Programme for the Reduction of GHG Emissions by 2020" contains a list of policies and measures which are included in 24 groups, such as: Emissions trading, Carbon tax, Stimulation of combined heat and power (CHP) production, Promotion of renewable energy use for heating, Stimulation of energy efficiency in public sector, Energy efficiency of buildings, Stimulation of public transport, Measures in agriculture, Reducing emissions from waste management, etc. The effects of these groups are being evaluated every year and the report is submitted to the Government; they are labelled by the labels satisfactory, partly satisfactory and unsatisfactory. In recent four years (2009-2012), most satisfactory were the groups: Emissions trading, Enhancement of environmental effectiveness of the power and heat production in large plants, Stimulation of combined heat and power production, Measures in agriculture, while most unsatisfactory were: Carbon tax, Stimulation of public transport, and Emissions from transit transport.

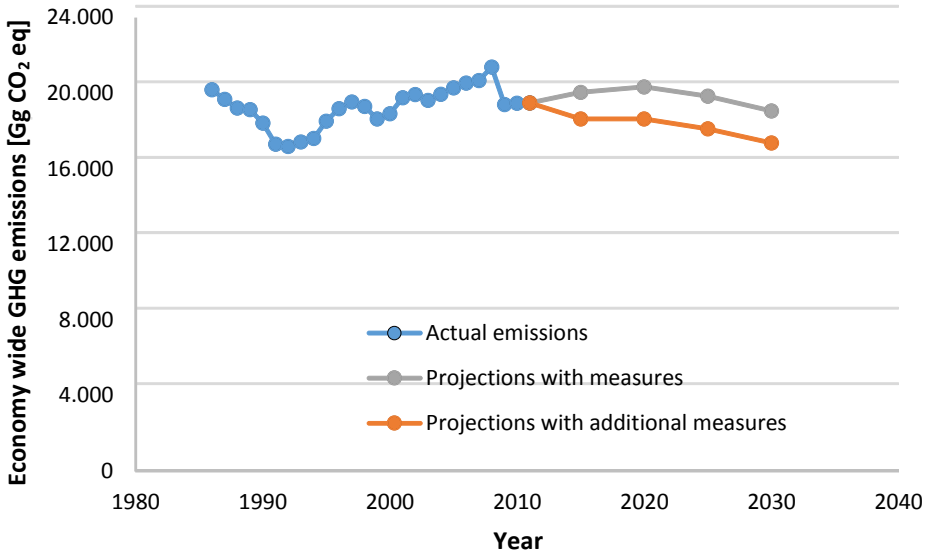
On the basis of these reports the Government decides what action is needed to improve the performance of the groups which were unsatisfactory. Previous versions of this programme have been in use for the first KP Commitment Period, and new, updated and improved versions will be in use also for the second.

BR-5. Projections

Emissions projections are an important element of the emissions reduction policies. They help estimate the effectiveness and adequacy of the implemented policies and measures. The following are the results of projections produced in the period 2010–2013. Projections are for the years 2015, 2020, 2025 and 2030, with measures and with additional measures.

Under the "with measures" scenario Slovenian economy wide emissions are projected to be 20,063 kt CO_2 eq in 2015, 20,351 CO_2 eq in 2020 and 19,087 CO_2 eq in 2030. Under the "with additional measures" scenario, they are projected to be as follows: 18,649 CO_2 eq in 2015, 18,650 CO_2 eq in 2020, and 17,388 CO_2 eq in 2030, which is 7.0%, 8.4% and 8.9%, respectively, lower than with measures. These projections are shown in Figure BR-1.

Figure BR-1: Actual GHG emissions in the period 1986–2011 (blue line) and projected emission with measures (grey line) and with additional measures (orange line), from 2012 to 2030 (source: SEA, IJS-CEU, KIS)



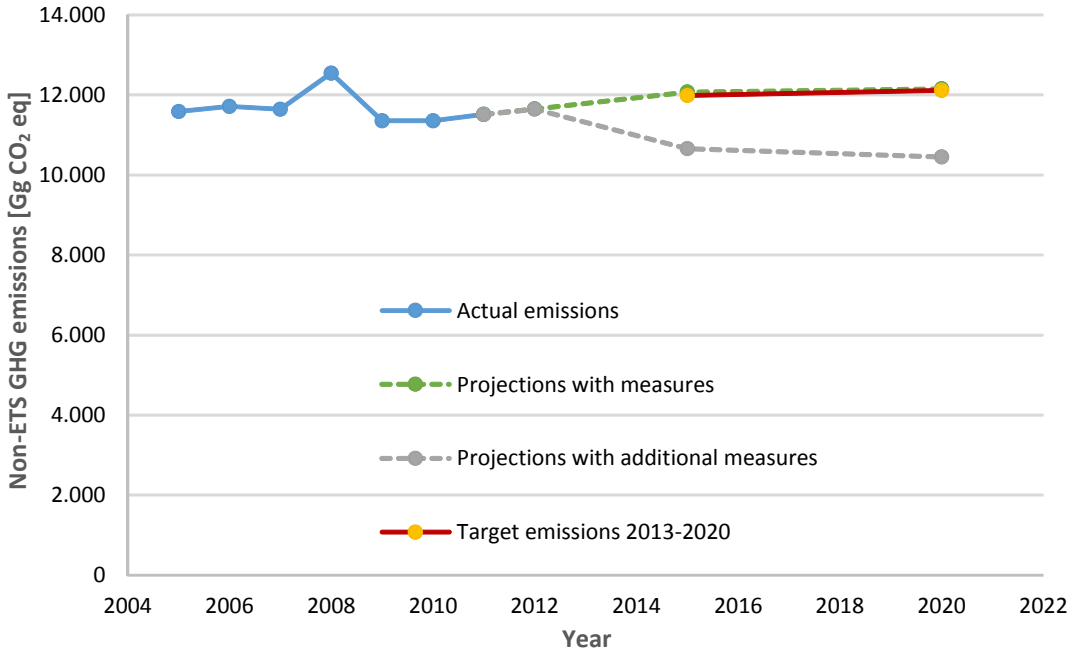
In the frame of the EU Climate and Energy Package, Slovenia is allowed to increase its non-ETS emissions by 4% relative to 2005 by 2020; however, the yearly emissions should not be above the linear trajectory, which is shown in the Table BR-1.

Table BR-1: Target trajectory for non-ETS emissions in the period 2013–2020 (source: European Commission)

		2013	2014	2015	2016	2017	2018	2019	2020
Slovenia	[kt CO_2 eq]	11,937	11,963	11,988	12,014	12,040	12,066	12,091	12,117

Under the "with measures" and "with additional measures" scenarios the emissions in non-ETS sectors are lower than the allowed trajectory. They are calculated as a difference between the economy wide emissions and emissions from the ETS sectors. Projections of the non-ETS emissions are shown in Figure BR-2.

Figure BR-2: Past non-ETS emissions in the period 2005–2011 (blue line) and projected non-ETS emissions with measures (green line) and with additional measures (grey line), from 2012 to 2030, compared with the target trajectory 2013-2020 (red line) (source: IJS-CEU, KIS)



Projected non-ETS emissions for the years 2015 and 2020 are under "with measures" scenario 11,424 CO_2 eq and 11,397 CO_2 eq, respectively, which is 5% and 6% less than on target trajectory, and under the "with additional measures" scenario 10,937 CO_2 eq and 10,772 CO_2 eq, which is 9% and 11% less than on target trajectory. So there are good prospects that Slovenia will over-fulfil its 2013-2020 target.

BR-6. Provision of Financial, Technological and Capacity-Building Support to Developing Country Parties

The commitment to provide new and additional funding for the prevention and adaptation of climate change in developing countries was assumed by Slovenia at the 15th session of the parties to the United Nations Framework Convention on Climate Change held in Copenhagen in 2009 (Decision 2/CP.15, paragraph 8 and Decision 1/CP.16, paragraph 40), where the developed countries pledged to provide USD 30 billion to developing countries for the fast-start financing (FSF) of prevention and adaptation activities regarding climate change in the period 2010–2012. To this end, USD 100 billion is to be provided annually from different sources by 2020.

On the basis of the Copenhagen Agreement, European Union leaders in December 2009 pledged a sum of EUR 7.2 billion for FSF in the period 2010–2012. Slovenia's contribution was fixed at EUR 8 million.

Under the International Development Co-operation of the Republic of Slovenia Act (Ur. l. RS, 70/06), efforts in the area of official development aid in Slovenia are coordinated and monitored by the Ministry of Foreign Affairs, which collects data on relevant financing from the budget users, including official development aid funds earmarked for the mitigation of and adaptation to climate change in developing countries.

Under the OECD methodology, any official development aid financing is evaluated in respect of its impact on the mitigation and adaptation activities, involving a description in three categories: absence of impact, strong impact and the activity's main objective. Since this methodology of reporting on official development aid has only recently been introduced into the Slovenian reporting system, data for the period 2010–2012 is incomplete. It follows from the FSF report that within the scope of official development aid, Slovenia directed a sum of EUR 5,031,869 to that end in the period 2010–2012. Other official and private flows are not monitored.

Approximately two thirds of official development aid is allocated multilaterally, with the major part being disbursed via the EU budget. It follows from the FSF report that within the scope of multilateral official development aid, Slovenia directed a sum of EUR 1,619,543 to that end in the 2010–2012 period. Among other contributions, the most important is the contribution to the Global Environment Facility (GEF). Slovenia has been a GEF member since 1994. Slovenia's contribution to the implementation of the United Nations Framework Convention on Climate Change accounts for 60% of its GEF contribution, which in the period 2010–2012 amounted to EUR 1,467,300. The remaining part of the GEF contribution is counted by Slovenia as a contribution to implementation of the Convention on Biological Diversity.

Of the total bilateral official development aid, two thirds was forwarded to the Western Balkan countries. The majority of the aid was earmarked for co-financing projects, with the beneficiary countries acting as co-financing parties. In the period 2011–2012, 12.6% of available bilateral aid was allocated to the financing of environmental infrastructure and access to drinking water. In the period 2010–2012, the two main beneficiaries within the Slovenian development co-operation framework were Macedonia and Montenegro. It follows from the FSF report that within the scope of bilateral official development aid, Slovenia directed a sum of EUR 3,412,326 to that end in the period 2010–2012. Slovenia also supported projects in Serbia, Bosnia-Herzegovina and Albania.

Lake Bled, Slovenia