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Information on LULUCF actions

SLOVENIA

Document based on Article 10 of Decision 529/2013/EU of the European Parliament and of the Council of 21 May 2013 on accounting rules on greenhouse gas emissions and removals resulting from activities relating to land use, land-use change and forestry and on information concerning actions relating to those activities

Ljubljana, January 2015

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Introduction

This document was prepared in accordance with the EU reporting requirements arising from Decision 529/2013/EU (hereinafter: Decision) of the European Parliament and of the Council of 21 May 2013 on accounting rules on greenhouse gas emissions and removals resulting from activities relating to land use, land-use change and forestry and on information concerning actions relating to those activities. According to Article 10 of the Decision, Member States shall draw up and transmit to the Commission information on their current and future LULUCF actions to limit or reduce emissions and maintain or increase removals resulting from the activities referred to in Article 3(1), (2) and (3) of the Decision. The activities are: Article 3(1) - afforestation, reforestation, deforestation and forest management; Article 3(2) - cropland management and grazing land management; Article 3(3) – revegetation and wetland drainage and rewetting. For each accounting period specified in the Decision, Member States shall or may prepare and maintain accounts that accurately reflect all emissions and removals resulting from the activities on their territory. Thus, the accounting period for activities falling within the categories referred to in Article 3(1) and Article 3(3) is from 1 January 2013 to 31 December 2020, but for those referred to in Article 3(2) the accounting period is from 1 January 2021, and thereafter. Concerning the annual accounts for emissions and removals resulting from cropland and grazing land management for the first accounting period, Member States shall also ensure information as requested by Article 3(2) (a-d) of the Decision. The accounts referred to in paragraphs 1, 2 and 3 shall cover emissions and removals of greenhouse gases (GHG), as follows; carbon dioxide (CO_2), methane (CH_4) and nitrous oxide (N_2O).

According to Article 10, paragraph 2 of the Decision, Member States shall include in their information on LULUCF actions the following information relating to each of the activities referred to in Article 3(1), (2) and (3):

(a) a description of past trends of emissions and removals including, where possible, historic trends, to the extent that they can reasonably be reconstructed;
(b) projections for emissions and removals for the accounting period;
(c) an analysis of the potential to limit or reduce emissions and to maintain or increase removals;
(d) a list of the most appropriate measures to take into account national circumstances, including, as appropriate, but not limited to the indicative measures specified in Annex IV of the Decision, that the Member State is planning or that are to be implemented in order to pursue the mitigation potential, where identified in accordance with the analysis referred to in point (c);
(e) existing and planned policies to implement the measures referred to in point (d), including a quantitative or qualitative description of the expected effect of those measures on emissions and removals, taking into account other policies relating to the LULUCF sector;
(f) indicative timetables for the adoption and implementation of the measures referred to in point (d).

This document was prepared by the Ministry of Agriculture, Forestry and Food in cooperation with the Slovenian Forestry Institute and the Agricultural Institute of Slovenia.

Executive Summary

This report was prepared in accordance with Decision No. 529/2013/EU, which requires Member States to provide the best possible information on current and future LULUCF actions. According to Article 10 of the Decision Member States shall draw up and transmit to the Commission information on their current and future LULUCF actions to limit or reduce emissions and maintain or increase removals resulting from the activities referred to in Article 3(1), (2) and (3) of the Decision. The activities are: Article 3(1) - afforestation, reforestation, deforestation and forest management; Article 3(2) - cropland management and grazing land management; Article 3(3) – revegetation and wetland drainage and rewetting. The report is divided into six chapters, which according to Article 10 (paragraph 2) of the Decision shall provide detailed information relating to each of the activities referred to in Article 3(1), (2) and (3), as follows; 1) a description of past emissions and removals, 2) projections for emissions and removals for the accounting period, 3) an analysis of the potential to limit or reduce emissions and to maintain or increase removals, 4) a list of the most appropriate measures to take into account national circumstances, 5) existing and planned policies to implement the measures, and 6) indicative timetables for the adoption and implementation of the measures. Besides this, a general overview of the national circumstances, including land use, land-use change, forestry and agriculture in Slovenia, is provided in the preliminary section of the report. The document was prepared by the Ministry of Agriculture, Forestry and Food in cooperation with the Slovenian Forestry Institute and the Agricultural Institute of Slovenia. Several bodies from different divisions of the Ministry also participated in the meetings and communications ensuring a higher quality and completeness of the data and information needed for the report.

Slovenia is a small country located in Central Europe covering a territory of 20,273 km^2. It is well known as a green country on the south side of the Alps, since forests are a predominant component of the landscape. It is very diverse in terms of biodiversity, which can be recognized through its preserved natural values and heritage. More than a third of the country is included in the Natura 2000 network, which is further proof of its floral and faunal diversity.

The prevailing land use in the country is forest land (60%), followed by grassland (21%), cropland (12%), settlements (5%), other and (1%) wetlands (1%) according to LULUCF land-use categories. By comparing land-use areas in 2012 with those in 1986, cropland, wetlands and other land showed negative trends, while forest land, grassland and settlements showed positive trends. It is quite obvious that forests and grasslands have the largest carbon sequestration potential, since wetlands represent less than 1% of the country's area. However, the most important source of sinks in Slovenia is provided by forests, which have a relatively high production capacity. All forest land in the country is considered managed, as for all forests regardless of ownership, forest management plans are being prepared. The current share of private forests is almost 78%, while others are owned by the state and local communities. Although Slovenian forestry has a long tradition, which directs forest management on the principles of sustainability, the close-to-nature concept, and multipurposeness, one of the biggest problems in this sector is lack of interest of private owners to manage their forest properly. This is mostly due to a large forest ownership fragmentation resulting in an average estate of less than 3 ha. The area of forests has been continuously increasing for more than 130 years, and growing stock for at least 50 years. According to the last forest inventory provided at the national level in 2012, the average growing stock of Slovenian forests amounts to 333 m^3/ha. In the last few years, felling in forests has increased from 3 to almost 4 million m^3 per year, which is around 70% of the allowable cut and 46% of the current increment. In the period 2008-2011 approximately 26

million EUR was spent per year on the tasks stipulated by the Forest Act. Yearly consumption of wood for energy purposes increased by 32% in the period 2007-2012 and reached almost 2 million tonnes or almost 1 tonne per inhabitant in 2012. Opposite to this, the consumption of total and domestic roundwood has been decreasing since 2007 due to the bad conditions in wood based industry and the general economic crisis in Slovenia. Although forests are the most important source of CO_2 removals, the share of gross value added of forestry in the GDP of Slovenia is currently below 1%. In the next 10 years the situation is expected to improve, since wood consumption should increase. Beside the current measures, further investments are needed, however, for the wood based industry to begin recovering in the near future.

Agricultural land covers less than one third of the country out of which about 75% is less suitable for crop production. This is due to various limiting factors, such as diverse relief with steep slopes and locally poor soil characteristics (shallow soils, stoniness, etc.), highly scattered land ownership, and Natura 2000 areas, which additionally limit more intense agricultural production. Although economic indices, such as agricultural output, gross value added and employment show quite a stable situation in the agriculture sector, the number of active farms has decreased in the last decade. According to land use structure on Slovenian farms there is 53% utilised agricultural land, 42% forest, 2.5% abandoned, non-cultivated agricultural land and 2% barren land. In recent years the area of all managed agricultural land has decreased a little, however this is more or less due to abandoned grasslands and pastures, where the process of spontaneous afforestation is the most intense. Contrary, there is an increasing trend of land use conversion from forest land to cropland, since about 70% of deforestation was for agricultural purposes. In Slovenia, agricultural production is largely compensated to allow profitable domestic production and survival for sustainable and multifunctional agriculture. It seems that Slovenia has adopted a suitable policy, by which the best quality land should be preserved for agricultural production. Moreover, the Resolution on Strategic Guidance on Development of the Slovenian Agriculture and Food Production Sector until 2020, as well as other documents, such as the draft Strategy for Transition of Slovenia to a Low Carbon Society by 2050, are predicting a significant rise in national food self-sufficiency, counting largely on abandoned agricultural and other overgrown land. Slovenia is committed to adopting several additional policy measures in the near future, which will make its agricultural sector more competitive as well as its practice and environmental and socio-economic aspects.

According to data based on the 2014 submission of the National Inventory Report (NIR), the LULUCF sector acted as a net source of CO_2 removals. The entire source of removals was in forest land, in which the removals due to forest management varied between 6,294 and 6,250 CO_2 eq in the first commitment period (CP1). Emissions due to ARD activity, which in the case of Slovenia means only deforestation (D), varied between 162 and 340 in the period 2008-2012. In CP1, a total of 2,644 ha were deforested or an average of 529 ha per year. Slovenia did not account for other emissions and removals resulting from the activities under Article 3.4 of the Kyoto Protocol, since no other activity was elected in CP1. Past emissions and removals accounted for under the Kyoto Protocol and those reported under the Convention are not fully consistent, since the source of activity data is not the same. This issue was addressed by ERT experts during the revisions and in ARR reports several times in the past few years. Slovenia is strongly aware of this issue, therefore the Ministry of Agriculture, Forestry and Food supported the Target Research Project, aiming at solving the problem related to the land use change matrix, which currently for certain changes in land use gives unrealistic estimates. The project was launched in July 2014 and it is expected that the results could be implemented in the 2016 submission of the NIR.

Future projections for emissions and removals are provided until 2040 and take into account only FM and ARD activities, namely D, because afforestation and reforestation (AR) are not

human-induced. Although some data and information related to cropland management (CM) and grazing land management are available from different data sources, such as annual submissions of the NIR, data from the Statistical Office of Republic of Slovenia, and the IACS system, several problems occur when applying the existing methodology of the IPCC guidelines, making projections impossible to develop. These main problems are: inadequate methodology to detect land-use changes over time, lack of data on management systems within the cropland and grassland categories to allow subcategorization, poor data on country-specific emission factors, etc. Therefore, two scenarios, namely "with measures (WM)" and "with additional measures (WAM)" of projections for FM and only one scenario for the ARD activity have been developed. The scenario of FM "WM" projection is based on data from the NIR 1990-2012 and predicts that all measures concerning the current Forest Act are implemented in the future. This scenario predicts that the felling rate (approximately 4 million m^3/year) will increase to 6.5 million m^3/year until 2020. The scenario predicts an increase in felling after 2016 resulting in net removal of approximately 6,500 Gg CO_2 eq in the period 2020-2040. The FM "WAM" scenario assumes that other measures besides those determined by the forest management plans are implemented in the future, which follows the guidelines in the existing and planned policies. According to the second scenario for FM, the felling rate is expected to increase rapidly after 2015, when FM will result in net emissions reaching the Reference Level in 2024 and becoming stable by 2040, when entire cut of the increment could be possible. Concerning ARD, namely D projections, the emissions are assumed to be 1.0 Mt CO_2 in 2040. This is about 4 times greater when compared to emissions in 2013, which could occur as Slovenia is planning to increase its food self-sufficiency (to at least 80% by 2060) that together with land-use conversions from forest land to settlements presents pressure on forests and consequently, higher deforestation rates in the future. That is why the agriculture sector will most probably act as a net source of emissions in long-term. However, the strategic vision of Slovenia is to decrease emissions in agriculture by up to 49% by 2050.

The LULUCF sector in Slovenia is the most important one outside the EU ETS scheme since it acts as a net sink and as such can greatly contribute to limiting or reducing GHG emissions and maintaining or increasing removals. However, forests have the exclusive role of providing the sinks, with a current amount of -6.5 Mt CO2 eq. Because the method of accounting for emissions and removals has changed, the estimated financial value of the sink in the second commitment period, if formally possible, would range between 3 and 20 million EUR per year or even more. The forest sink is largely due to the accumulation of growing stock that has shown an increasing trend over the last five decades. Although forests have a relatively good production potential, the current accumulation rate is not expected to continue to increase or stay at the same level, but is in fact predicted to decrease. This decrease is predicted because the present proportion of the development phases is far from optimal. An unbalanced forest structure would result in a reduction of the increment and resistance, which means the forests would be more prone to catastrophic events. The mitigation potential of forests and forestry as a whole can be recognised through the goals and priorities that are defined by the Forest Management and Wild Game Management Plans for the period 2011-2020. The most important mitigation potential activities to reduce CO2 emissions or increase removals include: sustainability of returns and all their functions, preservation of forest biodiversity at all spatial and biological levels, preservation of forest health and vitality, increasing the use of wood in forests for energy production, increasing openness with forest roads, and provision of CO2 sequestration in forests. These goals are consistent and should be achieved by the forestry-related measures and policies described below. Currently, there is not enough quality data on all carbon pools within agricultural land to allow the calculation of country-specific emission factors, since no inventory system for monitoring carbon pools, except on forest land, has been established yet. Although Slovenia established a monitoring

system, by which areas of land uses are covered throughout the entire country, the methodology to construct a reliable land-use change matrix needs improvement. This is also one of the key priorities of the Operational Programme for Reducing GHG Emissions until 2020 with a View to 2030 which is at present the main strategic document indicating different types of actions and measures to cope with GHG emissions in Slovenia. Nevertheless, the most important activities for limiting/reducing emissions and maintaining/increasing removals in the area of agriculture are those which are related to measures included in the new Rural Development Programme and CAP Direct Payments and mostly refer to soil management. On the one hand, GHG emissions should be decreased or limited through organic farming and maintenance of permanent grassland. On the other hand, Slovenia's long-term vision is to increase food self-sufficiency, meaning the extent of land use conversions to cropland will most probably increase in the future. In addition, with good cooperation and transfer of knowledge into practice, there will be co-benefits not only for agriculture, but also for other areas, such as biodiversity and water protection.

The most appropriate measures to take into account national circumstances are listed for each of relevant activities. For Slovenia these are: Measures related to forestry activities: Investments in forest area development and improvement of the viability of forests, Promotion of forest regeneration in forests damaged by natural disasters, Conservation of carbon in existing forests, Enhancing production in existing forests, Increasing the harvested wood products pool, Increasing forest openness with the forest roads and improving the equipment of forest owners for forest work, Enhancing forest management, including through optimised species composition, tending and thinning, and soil conservation. In Slovenia no particular action plan or programme defines measures related to preventing deforestation. Measures related to strengthening protection against natural disturbances such as fire, pests and storms are: Investments in forest area development and improvement of the viability of forests, all measures for strengthening prevention and protection against natural disturbances according to the Forest Act and the Programme of investments in forests. Measures to substitute greenhouse gas intensive energy feedstocks and materials with harvested wood products: Promotion of timber production in private forests for improving the market of harvested wood products and introduction of organization for forestry operations, Promotion of efficient use of woody biomass and its use to improve ambient air quality, support to energy advising and training and development, Promotion of the use of energy from the biomass, Green public procurement. Measures related to cropland and grazing land management: Knowledge transfer and information actions, Agri-environment-climate, Organic farming, Co-operation, Maintenance of permanent grassland. No particular measures related to activities under (c), (d), (e) and (f) listed in Annex IV of the Decision are planned in Slovenia.

The LULUCF sector joins a broad range of activities which can act as source of emissions or removals. With the appropriate strategies and actions plans the policy can have a great impact on carbon sequestration and emission reduction, provided that the measures are realised and properly implemented. There are several existing and planned policies to implement the abovementioned measures. The Operational Programme for Reducing GHG Emissions until 2020 with a View to 2030 (OP TGP-2020) is currently the main strategic document, which will be the basis for measures of actual reduction of GHG emissions in Slovenia outside the EU Emissions Trading System. The national targets to reduce GHG emissions over the period up to 2020 according to Decision 406/2009/EC do include emissions and removals related to agriculture, while those related to LULUCF do not. After this decision, however, at the proposal of the European Commission they will be included in EU obligations in the future. Although forestry has a relatively small contribution in economic terms, it does have the greatest potential for carbon sequestration and CO_2 emission reduction and is affected by

many policies. The Forest Act and the National Forest Programme (NFP) have the main influence on forestry, since the first is a basic legal document, which regulates the way of forest management on the basis of forest management plans, while the second is the most important strategic document aimed at determining the national policy of sustainable development of forest management. The NFP is of key importance, not only in adjusting forest management to climate change and promotion of use of wood, but it also presents the implementation of the Environmental Action Programme at the national level. There are also two action plans related to forestry, the National Renewable Energy Action Plan (NREAP 2010-2020) and the Action Plan to Increase Competitiveness of the Forest-Wood Chain in Slovenia by the year 2020, which were adopted by the Government on 8 July 2010 and 27 June 2012, respectively. The first defines sectoral goals and measures for achieving the national target share of gross final energy consumption from renewable energy sources in 2020, while goal of the second is to increase the competitiveness of the entire forest-wood value chain. The Slovenian Rural Development Programme (RDP 2014-2020) is another important policy because most of the measures relating to agriculture were transferred to it. Another policy relevant to agriculture is the "green component", a new obligatory scheme of Direct Payments under the EU Common Agricultural Policy (CAP), which introduces so called "greening" measures. In addition, there are several other strategic documents, such as the Strategy of Adaption of Slovenian Agriculture and Forestry to Climate Change, the Resolution on strategic guidance on development of Slovenian agriculture and food production sector until 2020, Base line for a debate on common EU agricultural policy after 2013, Action Plan for Organic Farming in Slovenia until 2015 (ANEK), the Strategy on the Use of Biomass from Forestry and Agriculture for Energy Purposes, and the Strategy for the implementation of the Resolution on the strategic orientation of Slovenian agriculture and agriculture-food sectors by 2020, which determine guidelines, strategic objectives and priorities serving the implementation of measures related to both forestry and agriculture.

Enhanced communication and stakeholder consultation

Coordination of activities, which enable the preparation of the report Information on LULUCF Actions, has been led by the Ministry of Agriculture, Forestry and Food (MAFF). MAFF organised all the meetings and had several communications with other relevant ministries and institutions to ensure that the best possible set of data and information are included in the report.

MAFF asked two institutions which have already been involved in providing data on GHG emissions under the reporting to United Framework Convention on Climate Change (UNFCCC) and to the European Commission. These are the Slovenian Forestry Institute (SFI) and the Agricultural Institute of Slovenia (AIS) which are responsible for making calculations and delivering data on GHG emissions for the LULUCF and Agriculture (now the joined AFOLU) sectors. The latter is part of the reporting for the purpose of the National Inventory Report (NIR) being prepared and compiled by the national authority, the Slovenian Environment Agency, which takes obligation and responsibility for that. The SFI and AIS prepared the general picture of the national circumstances and past trends of emissions and removals, developed projections and performed the analysis of the potential to limit or reduce emissions and to maintain or increase removals. The list of measures most relevant for LULUCF together with a detailed description of existing and planned policies was prepared by MAFF in close collaboration with all its important bodies in the Forestry, Hunting and Fisheries Directorate and the Agriculture Directorate, such as the Forestry Division, the Climate Change, NGOs, Education and Accounts Division, the Agricultural Markets Division, the Rural Development Division, and the Farm Register Service.

National circumstances

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]). In terms of relative forest cover Slovenia is third in the European Union, after Finland and Sweden.

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.

Three climate types are found in the territory of Slovenia: sub-Mediterranean, Alpine and continental. The average annual temperature in the sub-Mediterranean climate 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.

In the LULUCF sector, the CO_2 sink was estimated in 2012 at 4,356 Gg CO_2 eq, which is almost 3 times more than in 1986 (Figure 1). The increase in sinks was primarily the result of an increase in timber growing stock in existing forests.

The removals in forests varied between 3,624 and 6,732 Gg CO_2 eq in 1986 and 2012, respectively. Other land-use categories in the LULUCF sector act as a net source of CO_2 emissions. Therefore, the forests have an exclusive role in CO_2 sinks in Slovenia.

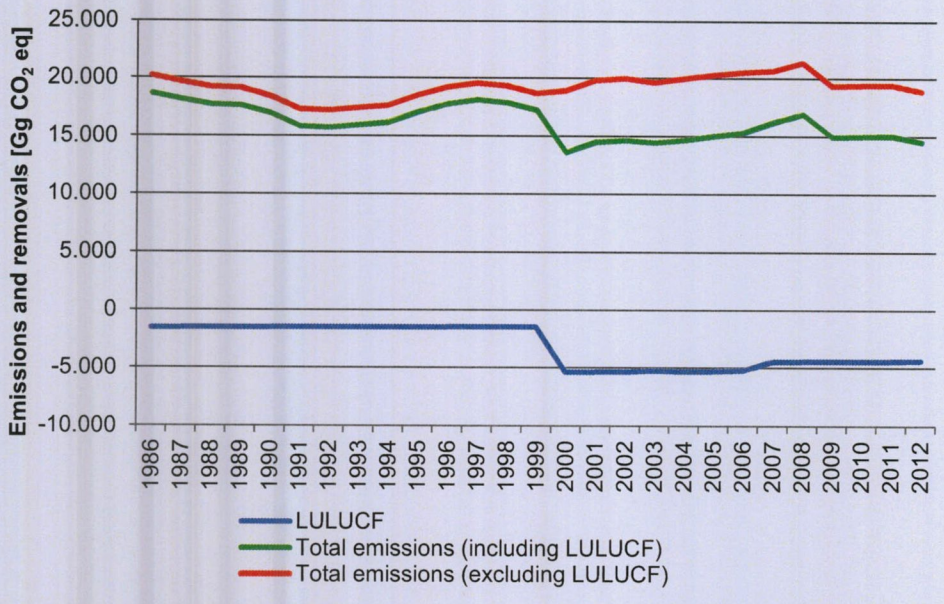

Figure 1: Emissions and removals of GHG in Slovenia in the period 1986-2012 (source: National Inventory Report, 2014 Submission under UNFCCC reporting)

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

Land use and land-use changes

The predominant land use in Slovenia is forest land, which covers almost 60% of the country's total area. Grassland and cropland are the second and the third largest land use by area, covering a total area of 690.1 kha or one-third of the country. Cropland, settlements and other land have been subjected to major changes over the past 27 years (Figure 2). The smallest changes have occurred on forest land and settlements and the largest on other land. In general, the area increased on forest land, grassland and settlements, while it decreased on cropland, wetlands and other land.

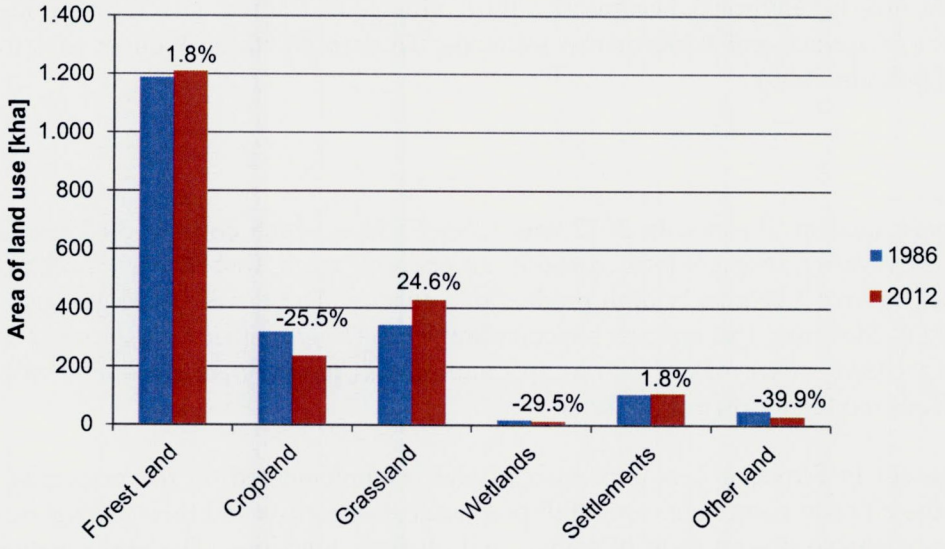

Figure 2: Land use according to top-level LULUCF land-use categories and percent changes from 1986 to 2012 (source: National Inventory Report, 2014 Submission under the UNFCCC reporting)

The most frequent land-use changes in the period 2002-2012 have occurred due to conversions from cropland to grassland, from grassland to forest land, and grassland to cropland according to the land-use change matrix which was developed for the reporting under UNFCCC/KP. The results show that an average of 1.3% of country area per year was subject to land-use change or 13.2% of the country area in 10 years (2002-2012). Although lots of changes took place in the nature during the period 2002-2012, the extent of conversions resulting from the land-use change matrix is non-realistic for Slovenia. The reason for this high percentage mainly lies in the methodology. For further information regarding this issue, please see the explanation in the National Inventory Report (pages 202-204, NIR 2014).

Furthermore, food security issues are just a part of the issues of most EU countries but are one of Slovenia's worst issues. The disadvantageous state of food security in Slovenia is mostly the consequence of unfavourable processes in land-use changes where the most dominant are the processes of intensification (intensive arable land changes into meadows, overgrown areas or forest) or the process of developing built-up areas. Between 2000 and 2012, we lost 5,000 ha of fields, more than 9,000 ha of meadows and a bit more than 2,000 ha of vineyards and orchards due to soil sealing alone. In other words: on 15% of developed land, in the year 2000, there was still arable land (Žiberna 2013).

There were 13.76 kha of wetlands, which covered almost 0.7% of Slovenia in 2012. This category includes fens and raised bogs. Vegetation is higher than on swamp pastures and meadows and there is no cutting of grass or grazing. There are areas overgrown with reeds and frequently flooded low lying areas. None of these areas is in agricultural use. This class also comprises inland water bodies, such as major rivers, lakes and water reservoirs (NIR 2014). Although the area of wetlands is relatively small, these ecosystems are very diverse and rich in biodiversity, and several of them are on the list of the Important Bird Area programme (IBA). Sečoveljske Soline (Sečovlje Salina) was the first wetland included in the List of Wetlands of International Importance. In 1999, Škocjanske Jame (Škocjan Caves) were added as a subterranean wetland site, and in January 2006, Cerkniško Jezero z okolico (Lake Cerknica and its environs) became the third Slovenian Ramsar site representing a complex system of surface and subterranean wetlands. To date, the three Ramsar sites total over 8,200 ha (Beltram 2009).

Forestry

The area of forest land in Slovenia in 2012 was 1,209.55 kha, which covered 59.7% of the country. Most Slovenian forests are located within the areas of beech, fir-beech and beech-oak sites (70%), which have a relatively high production capacity. There are 71 indigenous tree species growing in Slovenia. The main tree species are beech (*Fagus sylvatica*), spruce (*Picea abies*), silver fir (*Abies alba*), oak (*Quercus* sp.) and Scotch pine (*Pinus sylvestris*), which represent 80.0% of the total growing stock.

Forest management in Slovenia was implemented and is implemented on the principles of sustainability, the close-to-nature concept, multipurposeness of forests and their management, which ensure sustainable preservation of forests and all their functions. The major national policies related to forestry that include priorities, strategies and measures to meet the objectives of sustainable forest development are reflected in National Forest Programme (NFP), the Forest Act, the Rural Development Program, and are implemented through governmental and non-governmental forestry organisations.

The majority, 77.8% of forests in Slovenia, are private property, 22.2% of forests are public, owned by the state or local communities (Annual report on forests SFS 2012). Larger and undivided forest estates of state-owned forests enable good professional management. Private forest estates are small, with an average area of only 3 ha and even these are further fragmented into several separate plots. For the vast majority of these estates, forests are not of economic interest. Private forest property is becoming even more fragmented as the number of forest owners increases. According to the latest data, there are already 314,000 forest holdings and even more than 400,000 forest owners in Slovenia. The major fragmentation of forest property and the number of forest owners and co-owners present a serious obstacle to professional work in private forests, to optimal timber production and to the utilisation of forest potential (Slovenia Forest Service 2011).

The area covered by forests in Slovenia has been constantly increasing for more than 130 years. According to register of the actual use of lands, the area of forests increased from 737.0 to 1,209.5 kha in the period 1875-2012. This trend is not equally distributed across Slovenia. The area covered by forests is increasing in places where there is much forest from the aspect of landscape diversity, while the areas with intensive agriculture and suburban areas are asserting strong pressures on forests, which, despite efforts to preserve forests, are gradually leading to the clearance of already scarce remains of forests.

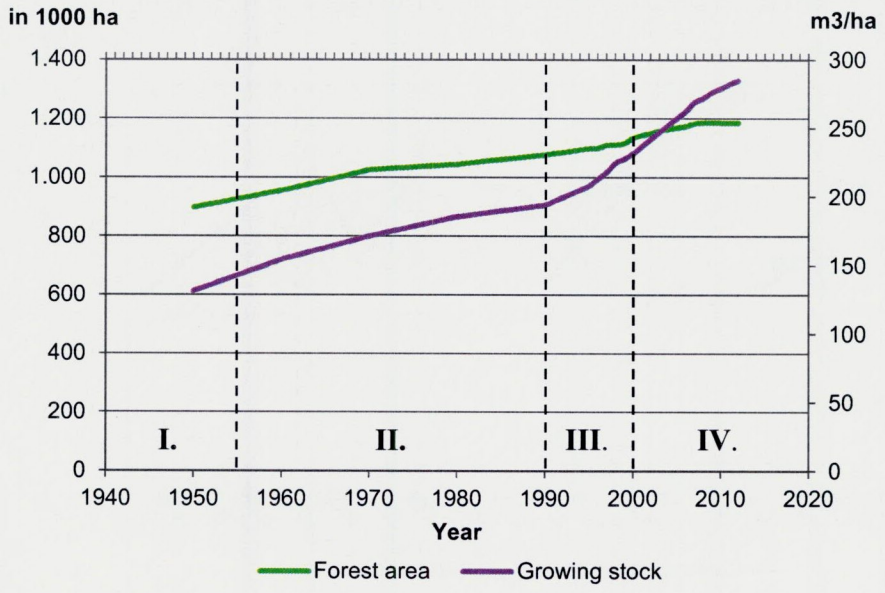

Figure 3: Trends in area and growing stock of Slovenian forests, 1950-2012 (source: Ministry of Agriculture and the Environment, Slovenia Forest Service)

Growing stock of Slovenian forests has been increasing for more than 50 years (Figure 3). According to the data from forest management plans of the Slovenia Forest Service, the share of growing stock of coniferous trees is 46.5% and 53.5% of deciduous trees. The realisation of the allowable cut in 2012 was 68% as recorded by the forest management plans. The growing stock was 333.7 m^3 per hectare in 2012 and the increment (gross growth including ingrowth) was 8.8 m^3 per hectare per year for the period 2007-2012 as inventoried by the Forest and Forest Ecosystem Condition Survey (FECS[2]).

In recent years, felling in Slovenian forests has increased from 3 to almost 4 million m^3 of wood annually, 60% of which have been conifers and 40% deciduous trees. According to forest management plans, felling could be higher. Currently, it amounts to 70% of allowable cut and 46% of the current increment.

In the period 2009-2013 approximately 26 million EUR was spent per year on tasks stipulated by the Forest Act (MAFF, AIS 2014). Consumption of budget appropriations includes all investments in field of forestry including the public forest service, the regeneration programme, silvicultural and forest protection measures, maintenance and construction of forest roads, support measures in forestry. Depending on the needs and planned investments in the forests as determined by the forest management plans, there is an evidenced deficit of available resources, particularly in terms of co-investments in forests and forest road maintenance.

Yearly consumption of wood of all sorts and forms for energy purposes increased by 32% in the period 2007-2012 and reached the value of 1.97 million tonnes respectively, 0.97 t per

[2] FECS is forest inventory at the national level being carried out by the Slovenian Forestry Institute on systematic grid of 4 x 4 km.

inhabitant in 2012 (Kovač 2014, after SORS / SFI 2013). Contrary to this, the consumption of total and domestic industrial roundwood has been decreasing since 2007 (Figure 4).

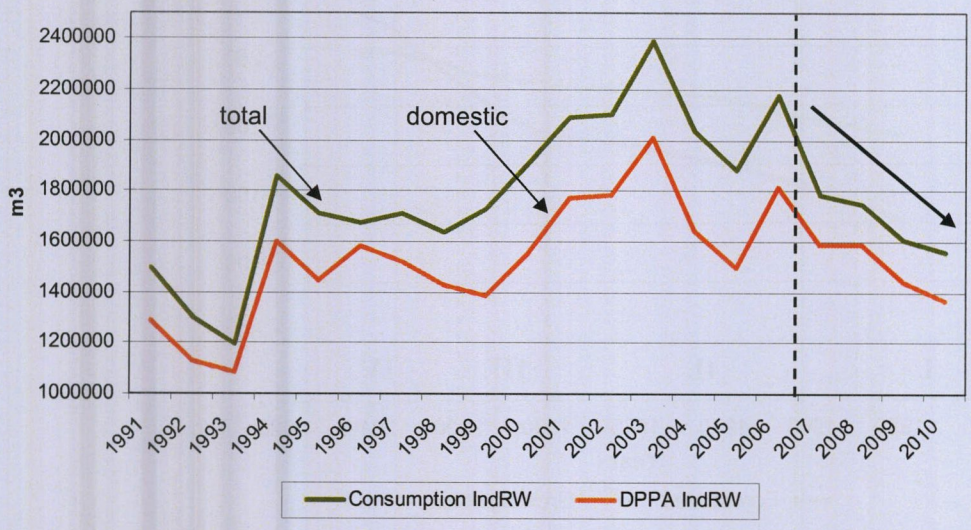

Figure 4: Total and domestic industrial roundwood consumption, 1991-2010 (source: SORS[3], SFI[4])

From the viewpoint of carbon sink, forests are the most important source of CO_2 removals. The removals in forests varied between 3,624 and 6,732 Gg CO_2 eq in 1986 and 2012, respectively. Thus, the removals in forests in Slovenia in 2012 account for 35.6% of total national GHG emissions.

The area intended for conservation of biodiversity has increased from 5,100 to 60,500 ha since 1990. Areas of the Natura 2000 forests plus the total area for biodiversity conservation amounts to 552.000 ha (Kovač 2014). About 60% of forests, which lie in Natura 2000 sites, are covered by forest management plans, in which nature conservation measures must be integrated.

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

Forestry goods output accounted for the majority share in the entire output of the 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 more than 2 times from 2003 to 2012 and came to 341 million EUR in 2012.

Agriculture

Slovenian agriculture and its policy are largely disadvantaged due to specific natural conditions. Agricultural land covers less than 30% of the country out of which approximately 75% is categorised as less suitable for agricultural production (LFA). Main limiting factors are the diverse relief (e.g. big inclinations), soil properties (e.g. shallow soil profiles with thin

[3] SORS: archive data of Statistical Office of the Republic of Slovenia
[4] SFI: data processing, interpolation and interpretation by Slovenian Forestry Institute

organic horizons) and high percentage of stoniness (outcrop). Highly scattered land ownership with typically small size individual fields/plots additionally limits the possibilities for intensive agricultural production (logistics, high cost for transport, limitations with mechanisation, etc.). The vast majority of areas categorised with favourable natural conditions for agriculture are no exception here. Approximately 37% of the country is under Natura 2000 which additionally limits the intensity and type of agricultural practices in these areas. In 2013 148,714 ha within Natura 2000 were under agricultural production. To this we have to add 12% (599,654 ha) of the country which comprises national parks and other protected areas.

In terms of demographic conditions a significant decrease in the number of active farms has been observed in the last decade. Most recently (between 2010 and 2013) the number of active farms decreased again by 3%. At the same time it was observed that the remaining farms were managing slightly larger plots of land (let land agreements) however agricultural land decreased by 2.3% in total compared to 2010.

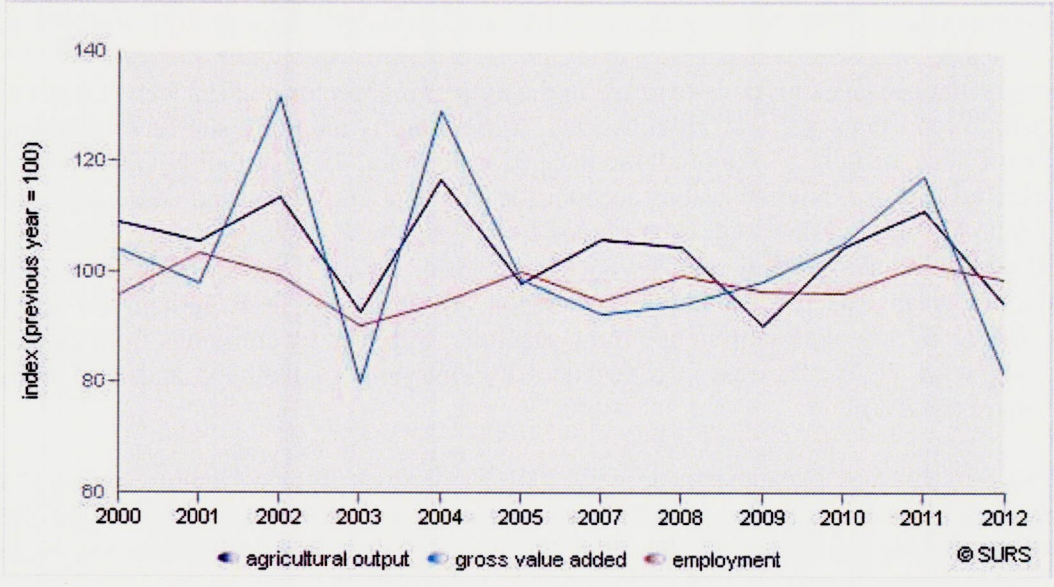

Figure 5: Agricultural output, gross value added and employment, Slovenia (Source: SORS)

In 2012, the agricultural sector employed 76,708 people or 2% less than in 2011 out of which 67,969 were self-employed (or 2% less than in the previous year). In addition 8,739 were paid employees, also involved in agricultural production or 2% more than in 2011.

According to the Report on the state of agriculture, food, forestry and fisheries in 2013 (MAFF, AIS 2014), the utilized agricultural area (cropland and grassland) has decreased from 617.0 kha in 2006 to 599.6 kha in 2013 (decrease of 2.8%). The most important national classes, which account for the largest share of the categories cropland and grassland, are fields and permanent meadows. In the period 2006-2013 fields showed a stable trend, while meadows have decreased by 6.3%. There was an increase of 16.6% in orchards, but a decrease of 12.1% in vineyards in the same period. Data source on land use structure is the same as reported in the NIR (Figure 6).

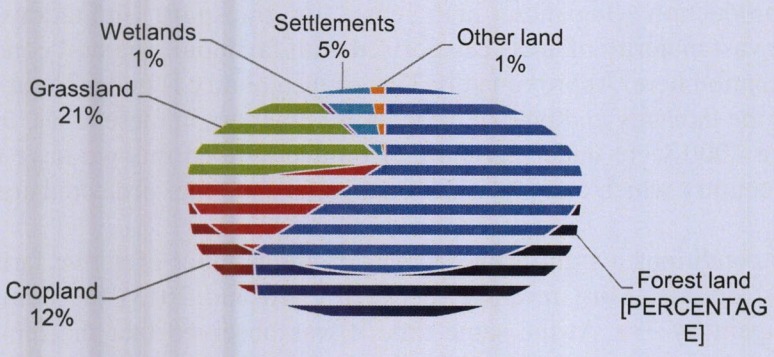

Figure 6: Land use structure of Slovenia according to LULUCF categories in 2012 (Source: MAFF, AIS 2014)

Slovenian greenhouse gas emissions reported in the agricultural sector in 2012 were 1,871 Gg CO_2 eq, which represents 9.9% of all emissions. Agriculture is the main source of methane and N_2O emissions, namely 55.7% of all methane emissions and 75.1% of all N_2O emissions. In the agricultural sector, N_2O emissions account for 44.4% of emissions, and CH_4 emissions account for 55.5% of emissions. GHG emissions from agriculture show small oscillations for individual years, but the general trend is on the decrease. In 2012, emissions were 15.4% below the base year. The most important sub-sector are emissions from agricultural soils, which contribute 37.1% of all emissions from agriculture, followed by emissions from enteric fermentation, with 34.7%; the rest is contributed by emissions of methane and N_2O from animal manure (28.2%).

Since 1990 Slovenia has managed to decrease GHG emissions from agriculture by 36.8% mainly through the controlled use of mineral fertilisers (new policies), decreasing of the number of large cattle and improving energy efficiency throughout the farm production cycle (national green loan schemes).

In Slovenia agricultural production is largely compensated to allow profitable domestic production and survival for sustainable and multifunctional agriculture. Beside the existing policies there are further scientific initiatives which stress the importance of preserving the best quality land. The Resolution on Strategic Guidance on Development of Slovenian Agriculture and Food Production Sector until 2020 predicts a significant rise in national self-sufficiency, counting largely on abandoned agricultural land and land that was overgrown due to poor or no management.

The majority of Slovenia's agricultural production is dependent on typical mineral soil types with relatively shallow depths and thin, organic-rich top horizons (typical soil organic matter (SOM) content around 4%). Larger SOM stocks are smaller moors and peat lands parts of which or as a whole are typically under grassland or arable land use. Through the centuries these ecosystems have accumulated large quantities of atmospheric carbon. Depending on the weather conditions these ecosystems naturally represent a net sink or a net source of emissions each year. Land use type and intensity (grazing, tillage, fertilisation...) decisively impact SOM equilibrium and hence speed up processes of mineralisation. It is estimated that each year tillage on Ljubljansko Barje moor causes the disappearance of 1 cm of top organic

matter-rich soil due to enhanced mineralisation of SOM. The lack of systematic inventory, soil monitoring and bulk density data makes it very difficult to project and holistically manage SOM content in agricultural land. Model-based input data are used to estimate the emissions from agricultural land.

Slovenia is committed to adopting several additional policy measures, which will improve the competitiveness of Slovenian agriculture and its practices and its environmental and socio-economic aspects. These measures will contribute significantly towards the sustainable and low emission goals Slovenia has set in the Resolution on Strategic Guidance on Development of Slovenian Agriculture and Food Production Sector until 2020. In addition these will also fulfil the measures proposed in the Common Agricultural Policy (CAP) by the EU Commission.

1. Description of past emissions and removals

The LULUCF sector is, beside the energy sector, the most important in Slovenia because it acts as a net source of removals. In the period 1986-2012 the source of removals in the LULUCF sector was forest land. Among the other land-use categories, which were a source of emissions, grassland and settlements contributed the most (Figure 7). Emissions and removals increased in the period 1986-2012 in all categories, excluding cropland, where emissions slightly decreased. During this period there was an increase in the area of grassland, mainly on account of fields, as it is apparent from the land-use change matrix (NIR 2014), while the change in the area of the other categories was about 1% or less.

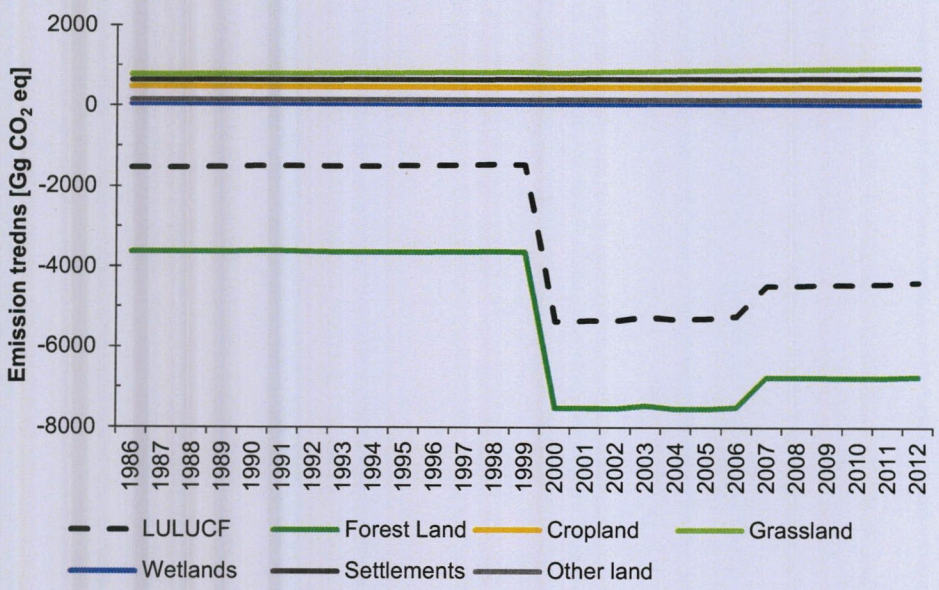

Figure 7: Emission trends in the LULUCF sector from 1986 to 2012 (Source: National Inventory Report, 2014 Submission under UNFCCC reporting)

In forests, there has been a noticeable increase in removals, which almost doubled in the period 1986-2012, mainly due to accumulation of growing stock. The growing stock trend in Slovenia can be divided into four periods (Bončina 2011). The first refers to time of planned management from end of the 2nd WW until the mid-1950s, when the cut was higher than the increment, because forests were exploited for rebuilding the country. The second lasted from the mid-1950s to the early 1990s, during which the accumulation of growing stock steadily proceeded, but there were also major disasters such as windbreaks and ice storms and silver fir (*Abies alba*) decline. The third, the period 1990-2000, was characterised by a dramatic reduction in harvest and therefore a rapid increase in growing stock (Figure 3), which was caused by several factors, such as the Amendments to the Forest Act, non-works in private forests because of the law on denationalisation, forest policy, which through the Forest Development Programme promoted the accumulation, collapse or decline in the wood industry, modifications of forest inventories, etc. In the last period, since 2000, there has been a gradual increase in harvest, however, due to the higher increment relative to the cut the accumulation of growing stock continues to rise.

With the adoption of the Act Ratifying the Kyoto Protocol to the United Nations Framework Convention on Climate Change, the limitation of GHG emissions in Slovenia received a legal

basis and a clear goal. The protocol defines the objectives of reducing greenhouse gas (GHG) emissions in terms of quantity and time. In the first commitment period 2008-2012 (hereinafter CP1), just like the EU-15 as a whole and most of the new Member States, Slovenia had to reduce its total combined aggregate GHG emissions by 8% relative to emissions in the base year (1986).

In CP1 of the Kyoto Protocol, Slovenia reported GHG resulting from deforestation, while emissions from afforestation and reforestation were not reported. Reporting is mandatory for the latter two activities, as required by Article 3.3 of the Kyoto Protocol, but they do not occur in practice in Slovenia. Among other activities under Article 3.4, for which reporting in CP1 was voluntary, Slovenia elected forest management (FM) in accordance with paragraph 6 of the annex to Decision 16/CMP.1. Slovenia has decided to account for the emissions and removals under Article 3, paragraphs 3 and 4 at the end of the commitment period.

The baseline emissions for Slovenia amounted for 20,354 Gg CO_2 eq. This means that the average annual GHG emissions in CP1 were not allowed to be larger than 18,725.719 Gg CO_2 eq. In achieving the Kyoto target, Slovenia may, in accordance with Decision 11/CP.7 of COP to the UNFCCC, enforce the sinks regarding forest management in the total amount of 6,600 Gg CO_2 eq in CP1, which is 1,320 Gg CO_2 eq per year.

All forests in Slovenia are considered managed, because forest management plans are prepared for all forests, regardless of ownership, conservation degree or natural conditions. Annual removals in CP1 due to forest management varied from between -6,250 and -6,295 Gg CO_2 eq. The average growing stock increased from 313.6 m^3 per hectare in 2007 to 333.7 m^3 per hectare in 2012, meaning the annual accumulation of aboveground living biomass, including increment, cut and mortality, was 4.0 m^3 per hectare. Compared to the previous inventory period (2000-2007) there was small decline in accumulation as a result of the progressive increase in harvest. A similar growing stock trend is also indicated by the data of SFS (Figure 3), although the growing stock is smaller than the one that is derived from the FECS.

Table 1: Emissions and removals in CO_2 eq in reporting under the Kyoto Protocol

Source of emissions and removals	2008	2009	2010	2011	2012	Total
Article 3.3						
Afforestation, Reforestation	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO
Deforestation	162	301	340	273	222	1,298
Article 3.4						
Forest management	-6,294	-6,294	-6,295	-6,284	-6,250	-31,418
Cropland management	NA	NA	NA	NA	NA	NA
Grazing Land management	NA	NA	NA	NA	NA	NA
Revegetation	NA	NA	NA	NA	NA	NA

Source: National Inventory Report, 2014 Submission under Kyoto Protocol reporting

Annual emissions from deforestation in the CP1 ranged from 162 to 340 Gg CO_2 eq per year (Table 1). In CP1, a total of 2,643.8 ha were deforested, meaning an average of 528.8 ha per year. Data on areas of deforestation are collected by the Slovenian Forest Service (SFS),

which approve deforestation activities for different purposes. Data on deforestation are published by SFS each year in its annual reports on forests.

Deforestation is categorised into six categories, which are urbanisation, infrastructure, agriculture, mining, energy and other. In recent years, there has been an increase in deforestation activities for agriculture, which, for example, in 2012 already accounted for 76% of all registered deforestation in the country. The increase in this share is due to the more stringent conditions for granting agricultural supports to landowners and amendments to the Forest Act of 2007, which enabled deforestation for agricultural purposes also for those forests, where land use is forest land on condition that the deforestation does not exceed 0.5 ha (Matijašić et al., 2013). Particularly in suburban areas and on intensive agricultural land, the pressure on forests is higher. Taking into account the legal consents and permissions for conversions of forest land and illegal forest operations, 2,405 deforestation cases recorded in 2012 with a total area of 415 hectares, which is about twice as much as in years 1995-2005 (SFS 2012).

2. Projections for emissions and removals for the accounting period and until 2040

For the second commitment period of the KP, 2013-2020 (hereinafter: CP2), forest management (FM) is treated as an activity, for which reporting is mandatory, since it was elected in CP1. The accounting approach is not the same as in CP1, but it is based on a reference level. Following the guidance in the LULUCF Cancun document, and basic data and decisions provided in the forest management plans, which define management of Slovenian forests in the future, the reference level for forest management (FMRL) – assuming instantaneous oxidation of HWP – is set as the difference between expected increase in carbon stocks due to living biomass growth and expected annual decrease in carbon stocks due to living biomass loss. In forestry terms it means the difference between expected increment and allowable cut, taking into account conversion factors as applied in the National Inventory Reports.

The FMRL for Slovenia for CP2 is -3,171 Gg CO2 eq when applying the first order decay function for HWP or -3,033 Gg CO2 eq when assuming instantaneous oxidation of HWP. The construction of FMRL was based on FM activities already undertaken, management activities under a business as usual scenario and continuity with the principles applied for FM in CP1.

Table 2: FMRL for the second commitment period 2013-2020 (Source: MAFF, SFI, SFS 2011)

	Projected Net Removals (-) or Net Emissions (+) from FM (1000 t CO_2 eq)							
	2013	2014	2015	2016	2017	2018	2019	2020
FM applying first order decay function for HWP	-3.179	-3.177	-3.175	-3.172	-3.170	-3.167	-3.164	-3.162
FM assuming instantaneous oxidation of HWP	-3.033(**)							
Disturbances in the context of force majeure (*)	Not applicable							

Source: SFI calculation

(*) Biomass loss due to disturbances is projected to be added to registered regular felling figures. The sum will represent total biomass loss.

(**) Average figure – net removals will gradually decrease, but the slope of the line is difficult to predict.

Future projections for emissions and removals are provided only for FM and ARD activities (Figure 8). In CP1 of KP, no activities other than FM were accounted under Article 3.4 of the KP. Although no information on cropland management (CM) and grazing land management (GM) is available from the reporting under the KP, some information in relation to CM and GM can be obtained from different data sources, such as annual submissions of the National Inventory Report in the reporting under the Convention, data from the Statistical Office of Republic of Slovenia, the IACS system, etc. Taking into account the IPCC guidelines (2006), which are requested for the second commitment period, one should be able to prepare the projection of GHG emission trends accordingly. However, several problems occur when applying the methodology, such as future land-use changes are highly uncertain if the existing methodology to detect changes over time is used, lack of data on management systems within categories cropland and grassland to allow the subcategorisation of land, poor data on country-specific emission factors.

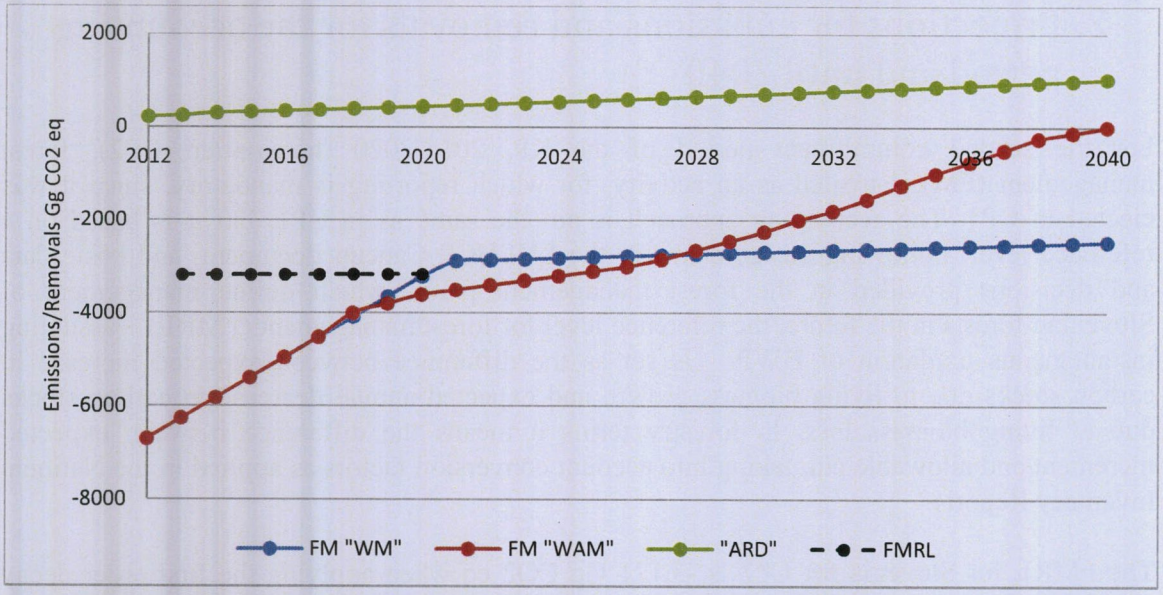

Figure 8: Future projections of GHG emissions and removals in LULUCF until 2040 (Note: for FM activities the emissions and removals are based only on living biomass data, which means the other carbon pools are excluded from the projections, while for ARD, namely D, all carbon pools are considered in the projections; contribution of HWP emissions/removals is not included in the projections; FMRL – forest management reference level as set by Decision 529/2013/EU for Slovenia).

Therefore, two scenarios, namely "with measures (WM)" and "with additional measures (WAM)" of projections for FM have been developed. For the ARD activity, only one scenario, namely "with measures" has been developed. Projections for FM with measures take into account existing guidelines and goals for forest management being determined by the National Forest Programme and the Forest Act and implemented through forest management plans at regional and local level. Following this scenario, it is assumed that the felling rate (around 4 million m^3/year) will increase to 6.5 million m^3/year until 2020. After 2020, it will depend on how forestry policy will regulate this issue and how concessions will be organised. Nevertheless, more than 75% of Slovenian forests are under private ownership meaning the effect of the regulation related to concessions in state forests will not be the most crucial for future forest management in Slovenia. With the FM "WM" scenario it is predicted that the felling rate will increase after 2020 since forest regeneration has to ensure stability and improve stand structure where it is critical or might become risky. It is expected that the increment will still be much larger than the allowable cut resulting in net removal of 3,200 to 2,500 Gg CO_2 eq in the period 2020-2040.

The FM "WAM" scenario assumes that other measures beside those determined by the forest management plans are also implemented in the future. It takes into account other policies, such as the Rural Development Programme 2014-2020, the Action Plan to Increase Competitiveness of the Forest-Wood Chain in Slovenia by the Year 2020, the National Renewable Energy Action Plan 2010-2020, and it follows the guidelines given in the National Forest Programme. According to the FM "WAM" scenario, the felling rate will increase after the 2020, when forest management activities will result in net emissions, but will remain at the same level by 2018 as the that one according to FM »WM« scenario, because forest management shall follow the forest management plans, adopted for the period 2011-2020. According to an expert analysis, which was prepared as part of the draft Strategy for Transition of Slovenia to a Low Carbon Society by 2050, it is expected that the entire cut of the increment in forests should be reached by 2040. The same conclusion was predicted also

from other experts (Golob 2007). Because of different factors that slowed down, hampered or disturbed timely regeneration, more and more forests, both private and state owned, have become old, leading to unbalanced diameter structure and proportion of the development phases. In addition, forests are becoming increasingly threatened by natural disasters, particularly windthrows, snow- and ice-breaks and landslides (Jakša and Kolšek 2009). The latter was also true in 2014, when 51% of Slovenian forests were affected by ice-break, which will require renovation of damaged forests on about 13,800 ha and a sanitary cut of 9.3 million m^3 (SFS 2014).

According to the scenario for ARD activities, which in fact only involves deforestation (D) as AR activities in Slovenia are not human-induced, emissions are projected to double by 2020, but it is assumed that they will also increase afterwards. The reason for that is because in the period 2015-2040, food self-sufficiency, which is currently low in Slovenia (around one-third for crop products), is expected to gradually increase. Thus, it is assumed that the extent of deforestation until 2040 will triple due to forest land conversions to cropland and settlements (from 500 in 2013 to around 1500 ha/year in 2040), but emissions, according to this scenario, would be 4 times greater than in 2013, reaching 1.0 Mt CO_2 eq in 2040. In agriculture, Slovenia's objective is to manage GHG emissions at up to 5% in 2020 and 6% in 2030 compared to 2005 while increasing food self-sufficiency (OP-TGP 2020). The long-term vision is to decrease emissions from agriculture by up to 49% by 2050.

3. Analysis of the potential to limit or reduce emissions and to maintain or increase removals

The LULUCF sector in Slovenia is the most important sector outside the EU ETS scheme since it acts as a net sink and as such can greatly contribute to limiting or reducing GHG emissions and maintain or increase removals. Within this sector, forests play a key role in carbon sequestration, which is also taken into account in the Kyoto Protocol. The carbon sink in Slovenia's forests is currently around -6.5 Mt CO_2 eq, which is around 2 times more than the forest management reference level (FMRL) in the second commitment period of the KP as set by the Decision.

The method of accounting for emissions and removals in the second commitment period of the KP is very different to the method used in the first commitment period, because it stipulates the use of the FMRL. Under Article 6 of the Decision, a country is allowed to benefit sink surpluses above the FMRL by no more than 3.5% of Member State's emissions in its base year or in case of Slovenia 712.4 kt CO_2 eq provided that the result of the calculation referred to in paragraph 1 for an accounting period is negative. Therefore, it is estimated that the financial value of the sink in the second commitment period, if formally possible, would be range from 3 to 20 million EUR per year or more depending on carbon emission trading trends. Sinks could also be contributed to in a smaller part by the use of wood, namely harvested wood products (HWP), if Slovenia chooses a higher level (Tier) of reporting method. Concerning the projections on emissions and removals, which were submitted together with the FMRL reporting (Submissions on information ... 2011), net removals of HWP in the period 2013-2020 would amount to -130 kt CO_2 eq per year. However, the projections are uncertain due to the nature of the methodology and dependency on the wood market trends and the state of the wood products industry in Slovenia.

The current National Forest Programme envisages a cut of 75% of the annual increment. However, according to the expert analysis entire cut of the increment in Slovenian forests should be reached by 2040. This would mean the growing stock in forests could be stabilised at close to 400 m^3/ha, also ensuring the achievement of the objectives in the fields of biodiversity, water protection and other ecosystem services.

The large sink in forests is due to the accumulation of growing stock, which has been increasing for the last 50 years. However, the increase of growing stocks in the long-term seems not sustainable, as there may be over-aging of forest structure, which may result in a reduction of increment and deterioration of forest resistance and related catastrophic events (fires, insects), which can lead to significant emissions of CO_2 in short-term.

According to the Forest Management and Wild Game Management Plans for the Period 2011-2020, the main guidelines and priorities concerning forest management that are expected to have positive impact on reducing GHG emissions or increasing removals are:

- to ensure the sustainability of returns and all their functions, by which a large-scale complex with prevailing old forests will be intensively regenerated, thus restoring balance to proportions of forest development phases,
- to preserve forest biodiversity at the landscape, ecosystem, species and genetic levels with particular emphasis on maintaining the forests in landscapes, where forests are lacking, to conserve the minority habitat types and ecosystems with special values, to maintain the natural composition of tree species, habitats of rare and threatened

species and conversions of artificially established forests to natural ones; therefore, particular attention will be paid to Natura 2000 sites and guidelines for achieving a favourable conservation status of forest habitats,

- to preserve forest health and vitality, with appropriate silvicultural measures and forest protection and forest health monitoring as well as using prognostic-diagnostic services, forest stands should be kept healthy and vital as much as possible; special attention will be given to the potential emergence of new pests in Slovenian forests and to monitoring the consistency between herbivorous wild game and forest environment in order to ensure the natural regeneration of all forests,
- to increase the utilisation of production potential of forest sites; by suitable accumulation of timber increment, tending of stands, timely regeneration and improvement of young forest stands the production potential of forest sites should be better exploited,
- to increase the utilisation of less valuable wood in forests for energy production; the advice to forest owners about the possibility of rational production and use of wood of lower quality for energy will continue to contribute to increasing utilisation of forest potentials in terms of lesser-quality wood,
- to increase the openness of forests with forest roads; by connecting forest owners and design activity and implementation of rural development programmes, the construction of forest roads will try to be accelerated as much as possible.

All these priorities in the field of forestry have good potential, not only to limit/reduce emissions and to maintain/increase removals, but also to preserve biological diversity in forest ecosystems and to maintain/enhance the favourable conservation status of forest habitat types within Natura 2000. They are consistent with the measures determined by the National Forest Programme and the Forest Act, as well as other action plans. For example, according to the National Renewable Energy Action Plan (NREAP 2010-2020), Slovenia plans to increase the share of renewable energy sources (RES) in final energy consumption up to 2030 and beyond. Since wood biomass is the most important renewable energy source in the country, several actions could reduce GHG emissions, such as replacing heating oil with wood biomass, generation of electricity from RES-like wood and support for establishing a wood biomass market. It is expected that the direct supply of wood biomass from forests and other wooded land for energy generation will amount to 1.338 million m^3 in 2020. It is thought that, given the criteria for achieving optimal growing stock in Slovenian forests, it would be possible to increase the yield of biomass from forests in a sustainable manner at least by as much as the existing amount of biomass used from forests. There are quite a few obstacles to implementing this measure to increase the use of a natural renewable resource, the main ones being poor forest road infrastructure and the unregulated system of sawing round logs, including the separation of poorer wood for use in the production of RES from high-quality wood suitable for making wood products. Improving forest management is a priority measure of sustainable economic development, resting on forest biomass as an important natural renewable resource. Awareness of the importance of sustainable use of forest biomass will stimulate primarily the use of wood to make products, mainly in construction, and indirectly this will facilitate the use of greater quantities of poorer quality wood for conversion into RES.

No inventory system for monitoring carbon pools on agricultural land has been established yet. In order to analyse the current situation in depth and propose scenarios, more detailed and organised data is needed. Slovenia lacks good quality, comparable and organised soil and general agricultural land data. No systematic, regular monitoring of agricultural land is in

place, which would regularly measure soil and land use properties, enabling effective follow-up and the timely application of suitable measures. Farm-scale management of emissions is partly based on expert judgment and dry implementation of measures and good practice from other countries, especially those quantifying emissions from soils. Current calculations used for reporting towards Kyoto and other international conventions are made using estimates, pedotransfer functions (PTF, e.g. soil bulk density) and results of different models. The initial data sources used are the result of non-harmonised methodologies and laboratory analysis standards, hence their comparability is often questionable. According to the current EC guidelines for LULUCF reporting (2013/2014), these practices will largely become insufficient and the current practice will have to be replaced by more reliable and organised methodology and data.

Slovenia has, however, made many steps in attempt to overcome these issues as part of various studies and expert assessments. The agricultural scientific community has proposed several solutions to limit or reduce emissions and maintain or increase removals. The issue of there being no national monitoring of agricultural land was highlighted. A study was conducted and methodology proposed based on current national as well as international best practice examples (Vernik 2014). There were also some efforts put forward to establish a nation fertility control scheme (KRT). These would enable farmers to more efficiently plan and execute necessary measures and maintain soil fertility as well as limiting unnecessary use of fertilisers and pesticides (Vrščaj et al. 2011). In addition, a web-based system was designed which would enable each land owner to visualize and retrieve updated data, in some cases also conduct spatial analysis (Vrščaj et al. 2011) to obtain correct measure.

For the purpose of LULUCF reporting activity data (areas) from a detailed Land Use layer (in the NIR known as Agricultural Land Use Map – ALUM), covering the whole territory was used. For the purpose of LULUCF reporting the use of a well-structured agricultural land parcel identification system (GERK) was also considered, but has not been used so far. Regardless of its detailed history and flawless management (constant updates and improvements), GERK only covers land use under payments of CAP and not all agricultural land but it has great potential, especially in providing insight into history of land use. Unfortunately, it does not feature suitable soil data (e.g. organic matter content or soil bulk density) which are essential inputs for the assessment of total emissions/removals from agricultural land. Possibilities to limit or reduce emissions and maintain or increase removals are at this point based on the described method could be improved with the application of GPG published by EC and the experience of other member states.

The development of methodology for monitoring GHG emissions and removals is one of the key priorities of the Operational Programme for Reducing GHG Emissions until 2020 with a View to 2030 (OP TGP-2020). Due to Slovenia's increasing obligations to different international commitments, as well as European ones (e.g., Regulation (EU) 525/2013) there is a need in the short term to improve the system for monitoring carbon stock changes, not only in forests but also on other land uses. Another, and perhaps the most important task in CP2 is to establish a system for delivering credible information on the status and changes in land use in a timely manner, since the activity data are the base for all other parameters.

As regards the actions which show good potential for limiting/reducing emissions and maintaining/increasing removals in the field of agriculture, the most important are those related to measures included in the new Rural Development Programme (RDP 2014-2020). The mitigation effect is expected to be reflected mostly through the agri-environment-climate

and organic farming (e.g. sustainable use of fertilizers and plant protection products, crop rotation, cultivation, etc.) measures. As the extent of conversions from grassland to cropland is relatively high in Slovenia, one of the important measures will be also maintenance of permanent grassland within CAP Direct Payments, which will result in reducing N_2O emissions. Because Slovenia aims to increase food self-sufficiency in the long-term, the latter looks like it will be a challenge for the agriculture sector in the future. However, with a fine selection of a suitable land uses corresponding to natural circumstances, a balance between the pros and cons can be achieved. With the co-operation and knowledge transfer and information actions measures also the quality of implementation of other measures will be enhanced as well as the goals of other directives, such as the Habitat Directive of the Natura 2000 and the Water Framework Directive. Through farmers education and training and collaboration among different stakeholders, the awareness in the field of biodiversity and water protection will be increased and the knowledge on the impacts (e.g. water pollution) of agricultural activities, improved.

4. List of the most appropriate measures to take into account national circumstances

Measures related to forestry activities

Measure: Investments in forest area development and improvement of the viability of forests

Legal basis: Articles 21, 24 and 26 of Regulation (EU) No 1305/2013

Policy: Rural Development Programme 2014-2020

Description: The measure relates to support for activities related to investments in the development of forest areas and the improvement of forest viability, which includes the area of regeneration of forest after the natural disaster (glaze ice) and investments in forest technologies and processing and mobilisation of wood.

Objective: The objective of the measure is to enhance the ecological function of the forest while regenerating forests damaged in the natural disaster.

GHGs affected: CO_2

Status of implementation: in the process of implementation

Cost of measure: not available

Scale: local

Mitigation effect: GHG emission reduction, carbon sequestration

The measure will contribute to the restoration of forests damaged in the natural disaster (glaze ice damage). Damaged trees will be removed and surfaces will be prepared for natural restoration. On surfaces where natural restoration is not successful, habitat-suitable tree varieties will be planted. Skid trails that are necessary for the rehabilitation of damaged forest will be constructed, reconstructed or prepared. The measure will increase the added value of wood products, stimulate the development of forest-wood chains and thus also of local markets, which will contribute to the creation of shorter distances and thus to the reduction of the carbon footprint. A forest restored after a natural disaster is a carbon sink which significantly contributes to the mitigation of climate change.

Non-GHG benefits: The sub-measure will have a long-term positive impact because it may preserve a sufficient quantity of dead biomass necessary for the preservation of species depending on forest habitats, and may reduce the possibility of spreading diseases and bark beetles.

Measure: Promotion of forest regeneration in forests damaged by natural disasters

Legal basis: Articles 23, 48 of Forest Act, Articles 12, 13 of the Rules on financing and co-financing the forest investments

Policy: Forest Act

Description: The measure includes activities for supporting the regeneration of forests through planting and seeding after natural disasters, such as windthrows, fires and storms.

Objective: The objective of the measure is to support the regeneration of forests in order to accelerate the restoration process after disasters when spontaneous (natural) afforestation is assumed to be unsuccessful or too slow.

GHGs affected: CO_2

Status of implementation: implemented

Cost of measure: not available

Scale: local

Mitigation effect: GHG emission reduction, carbon sequestration

The measure helps to increase the probability of successful recovery after natural disturbances, through which the time needed for the regeneration of damaged areas is shortened and further carbon sequestration is ensured.

Measure: Conservation of carbon in existing forests

Legal basis: Forest Act

Policy: National Forest Programme

Description: The measure relates to activities to achieve optimal growing stock from the economic, environmental and social aspects with sufficient accumulation of annual wood increment for maintaining the carbon sequestration in forests.

Objective: The objective of the measure is to provide CO_2 sink in forests.

GHGs affected: CO_2

Status of implementation: implemented

Cost of measure: not available

Scale: local

Mitigation effect: GHG emission reduction, carbon sequestration

According to the NFP, the accumulation of annual wood increment should amount to at least 1,000,000 m^3 per year considering the sink Slovenia can implement in the first commitment period of the Kyoto Protocol. In the NFP it is estimated that the sink of CO_2 in overgrowing areas can contribute an additional 5%.

Measure: Enhancing production in existing forests

Legal basis: Forest Act

Policy: National Forest Programme

Description: The measure includes activities which improve the utilisation of the production potential in forests, with emphasis on increasing the growing stock and forest increment, increasing the realisation of possible timber removal, increasing the quality of wood assortments with cultivation of forests and the timely renewal of forest stand, providing the cultivation works to accelerate the development of overgrowing land and its transformation into profitable commercial forests and increasing the economic value of forests of the Slovenian coast by accelerating site-adequate and economically interesting tree species.

Objective: The objective of the measure is to increase utilisation of the production potential of forest sites.

GHGs affected: CO_2

Status of implementation: implemented

Cost of measure: not available

Scale: local

Mitigation effect: GHG emission reduction, carbon sequestration

Improvement of timber production in existing forests through increased utilisation of their potential, which in turn leads to better accumulation of wood increment and higher growing stock, and therefore to carbon sequestration and reduction of GHG emissions.

Measure: Increasing the harvested wood products pool

Legal basis: Forest Act

Policy: National Forest Programme

Description: The measure includes activities to promote the use of wood in further processing, use of harvested wood products, to stimulate the use of wood with a longer lifetime, as well as use of wood of a lower quality.

Objective: The objective of the measure is to ensure further increase in the use of wood as material and fuel.

GHGs affected: CO_2

Status of implementation: implemented

Cost of measure: not available

Scale: local

Mitigation effect: GHG emission reduction, carbon sequestration

Increase in the use of HWP and substitution of other non-wood materials and fuels, which reduce GHG emissions and maintain carbon storage.

Measure: Increasing forest openness with forest roads and improving the equipment of forest owners for forest work

Legal basis: Forest Act

Policy: Action Plan to Increase Competitiveness of the Forest-Wood Chain in Slovenia by the Year 2020

Description: The measure includes the promotion of investments in the purchase of new machinery for the implementation of timber harvesting and improvement of forest openness through financing of forest infrastructure.

Objective: The objective of the measure is to increase timber production and implementation of tending operations in Slovenian forests.

GHGs affected: CO_2

Status of implementation: implemented

Cost of measure: 4 million EUR per year

Scale: local

Mitigation effect: GHG emission reduction, carbon sequestration

Improvement of forest infrastructure, such as a better network of forest roads and skidding trails, and equipment with modern forest machinery, which increase the realisation of timber harvesting and promote improved management practice in private forests.

Non-GHG benefits: The improved forest infrastructure and modern forest equipment provide more secure and easier forest work, which is expected to be more productive than conventional forest operations.

Measure: Enhancing forest management, including through optimised species composition, tending and thinning, and soil conservation

Legal basis: Forest Act

Policy: National Forest Programme

Description: The measure supports activities through which the ability of the key tree species and stands to adjust to climate change should be studied, resistance of forests to extreme climate conditions should be provided with adequate structure of species and stands, and frequency of storms should be taken into account in order to optimise construction of forest roads.

Objective: The objective of the measure is to adjust forest management to climate change.

GHGs affected: CO_2

Status of implementation: implemented

Cost of measure: not available

Scale: local

Mitigation effect: GHG emission reduction, carbon sequestration

Improvement of stand structure and composition by means of adaptive forest management provides forests with higher resistance in the areas characterised by extreme climate conditions, such as strong winds or storms. The higher the resistance of forests, the higher preservation of the potential to maintain or increase sinks there is.

Non-GHG benefits:

Preventing deforestation

In Slovenia no particular action plan or programme defines measures related to preventing deforestation. Nevertheless, the national legislation on deforestation is relatively strict. Therefore, there are several legal acts that regulate issues relating to deforestation activities in the country. According to the Forest Act, any deforestation activity has to be approved by the Slovenia Forest Service. Deforestation for agricultural purposes is not allowed if the forest has special status, such as forest reserve, protection forest or forest with special purpose. Deforestation of forest stand and shrubby vegetation is not allowed on steep slopes due to the danger of landslide (Water Act). Moreover, according to the Regulation on the Spatial Order of Slovenia, deforestation is also generally prohibited in the areas of cultural landscape, where forest cover is low (less than 10%).

Strengthening protection against natural disturbance such as fire, pests and storms

Regarding the measure *Investments in forest area development and improvement of the viability of forests* specified in the RDP 2014-2020 and based on the State Administration Act and the Rules on the protection of forests, the Minister of Agriculture and the Environment issued a decision on restoration of forests damaged by an ice storm, which occurred between 30th January and 10th February 2014. The decision confirms the Plan for the restoration of forests and defines activities for its implementation, such as adaptations of forest silvicultural plans needed for the execution of the restoration measures. In order to execute the restoration plan a total of 1.156 million EUR are to be provided by the integral national budget fund of

the Republic of Slovenia for the period 2014-2020, while measures in the plan are complementary to those of the RDP.

Several measures for strengthening prevention and protection against natural disturbances are also ensured by the national budget continuously (each year) in accordance with Article 48 of the Forest Act, while activities in the Programme of investment in forests are defined by the Order on the financing and co-financing of investments in forests from the budget of the Republic of Slovenia. Thus, in the year 2014 an additional 1.1 million EUR was provided for forest prevention and protection measures, namely 0.43 million EUR for restoration of forests damaged by natural disasters, 0.28 million EUR for enhancement of forest prevention and protection, 0.15 million EUR for fire prevention in the Karst region and 0.22 million EUR for other prevention measures in private forests. The budget is assured by the Ministry of Agriculture and the Environment, while the Slovenia Forest Service as the contractor is responsible for the implementation of the programme, which is carried out via the public forest service under law.

Measures to substitute greenhouse gas intensive energy feedstocks and materials with harvested wood products

Measure: Promotion of timber production in private forests for improving the market of harvested wood products and introduction of organisation for forestry operations

Legal basis: Forest Act

Policy: Action Plan to Increase the Competitiveness of Forest-Wood Chain in Slovenia by 2020

Description: The measure includes the promotion of establishment of organisations which produce forest wood products with activities related to organising forest production, purchase and sale of forest wood products from private forests, and networking into the production chain with a primary processing.

Objective: The objective of the measure is to increase timber production and implementation of tending operations in Slovenian forests, particularly in private forests in accordance with the existing forest management plans.

GHGs affected: CO_2

Status of implementation: implemented

Cost of measure: 3 million EUR

Scale: local

Mitigation effect: GHG emission reduction, carbon sequestration

Measure: Promotion of efficient use of woody biomass and its use to improve ambient air quality, support to energy advising and training and development

Legal basis: Forest Act

Policy: Action Plan to Increase Competitiveness of Forest-Wood Chain in Slovenia by 2020

Description: The measure includes promotion of energy advising and increasing information for and awareness of citizens regarding sound energy management and the utilisation of renewable energy resources. Support for the promotion of the efficient use of woody biomass for energy purposes.

Objective: The objective of the measure is to increase public information and awareness regarding the efficient use of woody biomass for energy.

GHGs affected: CO_2

Status of implementation: implemented

Cost of measure: 0.6 million EUR

Scale: local

Mitigation effect: GHG emission reduction

Efficient use of energy reduces GHG emissions since other non-renewable energy sources are substituted by renewable woody biomass.

Measure: Promotion of the use of energy from biomass

Legal basis: Resolution on the National Energy Programme, Directive 2009/28/EC

Policy: National Renewable Energy Action Plan 2010-2020

Description: Alongside water energy, biomass is the most important renewable energy source in Slovenia. Increased biomass use in modern individual, communal and industrial heating appliances for heating, process heat and generating electricity is important for Slovenia in order to be able to improve the reliability and competitiveness of its energy supply, to reduce greenhouse gas emissions and to protect the environment.

Objective: The objective of the measure is to increase the use of the renewable biomass for energy.

GHGs affected: CO_2

Status of implementation: implemented

Cost of measure: not available

Scale: local

Mitigation effect: GHG emission reduction

The measure supports the reduction of GHG emissions by using renewable biomass from agriculture and forestry instead of non-renewable sources, such as fossil fuels.

Non-GHG benefits: Increased use of forest wood biomass for renewable energy sources is planned alongside increased use of high-quality wood to manufacture wood products. Greater extraction of biomass from forests is planned chiefly owing to the greater production of wood products, which will have a significant impact on the use of renewable energy sources. The use of energy from forest biomass, together with the use of high-quality wood to produce wood products, will contribute significantly to the development of certain activities in forestry and in the processing of round logs at sawmills. The growth in energy from forest wood biomass will be based reciprocally on the growth of other sectors tied to the exploitation of forest biomass, such that no negative impacts are envisaged on other sectors based on farming and forestry.

Measure: Green public procurement

Legal basis: Decree on green public procurement (Official Gazette of the RS 102/11, 18/12, 24/12, 64/12, 2/13 in 89/14)

Policy: Public procurement

Description: The Decree regulates green public procurement and present requirements for inclusion of green criteria into public procurement proceedings. Appendices to the decree were intended to provide basic and additional requirements for certain public procurement procedures for the following product groups: electricity, personal and transport vehicles, office IT, office paper, appliances and other energy labelled products, construction and renovation of buildings, construction and renovation of public lighting systems, furniture, cleaning products and services, and food and catering.

Objective: The use of 20% of construction wood is required in public building construction and renovation.

GHGs affected: CO_2

Status of implementation: implemented

Cost of measure: not available

Scale: local

Mitigation effect: GHG emission reduction

The measure supports the reduction of GHG emissions by using construction wood in public building construction and renovation.

Measures related to cropland and grazing land management

Measure: Knowledge transfer and information actions

Legal basis: Article 14 of Regulation (EU) No 1305/2013

Policy: Rural Development Programme 2014-2020

Description: The measure aims to increase the level of competence of target groups through different forms of knowledge transfer. With improved competence, the target groups will be able to enhance their competitiveness, use resources more efficiently, improve environmental efficiency and contribute to sustainable development in rural areas.

Objective: To increase the level of competence of target groups through different forms of knowledge transfer.

GHGs affected: CO_2

Status of implementation: in the process of implementation

Scale: local / regional

Mitigation effect:

The measure will increase competence in agriculture, the food industry and forestry.

Knowledge transfer will be primarily intended for structural adjustments the objective of which is the more optimal use of production factors to achieve higher productivity, more efficient and sustainable use of resources, mitigating, and adapting to climate change, more successful adjustment to the market situation, better market orientation and specialisation, and sustainable forest management and safe work in forests. Training will also improve digital skills and the transition to a low-carbon society.

The training will focus on farmers who wish to be, or who are already, involved in the agri-environment-climate payments and organic farming measures. The farmers will become acquainted with the purpose and objectives of agri-environment-climate payments and

organic farming, and the commitments they have to adhere to and the reasons for them. One of the significant objectives of the training is to reduce the error rate, i.e. violations and sanctions, which in the 2007–2013 programming period resulted in the reimbursement of funds. Special emphasis will be put on training in biodiversity conservation in species-rich grasslands within Natura 2000 sites.

The implemented activities will contribute to increasing competence and awareness of the impact of agricultural activities on the quality of water and land. Within this measure, special emphasis will be put on training which contributes to reducing dispersed pollution of agricultural origin in the areas referred to in the Water Management Plan where objectives from the Water Framework Directive will not be attained due to these impacts.

The emphasis during training will be on presenting production technologies which contribute to the sustainable and rational use of land, and prevent erosion and negative changes in the properties of soil. Information and knowledge acquired during training will enable farmers to improve their soil management methods. The training of forest owners and contractors of forest works will contribute to the enhancement of awareness and better forest management in torrential areas in forests and to improving the efficiency of biotechnical measures in the hinterland of torrents.

Non-GHG benefits:

Improvement of state of Natura 2000 sites and catchment areas of surface and groundwater referred to in the Water Management Plan.

Measure: Agri-environment-climate

Legal basis: Article 28 (1-8) of Regulation (EU) No 1305/2013

Policy: Rural Development Programme 2014-2020

Description: The agri-environment-climate measure (AEC) aims to support agriculture in its environmental function and is intended to encourage above standard sustainable agricultural practices which are aimed at the following focus areas of measures:

- preserving biodiversity and landscape;
- appropriate water and soil management;
- mitigating and adapting farming to climate change.

Objective: To establish a balance between the need to produce food and environmental protection and encourage above standard sustainable agricultural practice, adopted to changing environment and protecting natural resources, biodiversity and natural heritage.

GHGs affected: CO_2

Status of implementation: in the process of implementation

Scale: local / regional

Mitigation effect:

The measure proposes sustainable use of fertilisers and plant protection products, crop rotation, cultivation, approaches and timing for mowing or pasturing, mountain pasturing, breeding of indigenous breeds of domestic animals and cultivation of indigenous and traditional agricultural plant varieties to improve and preserve biodiversity and agricultural landscapes.

The AEC measure reduces water and soil pollution through scientifically justified use of fertilisers and plant protection products hence reducing their emissions into the environment or prohibiting their use. Additionally it proposes requirements regarding crop rotation and suitable crop cultivation.

The AEC measure encourages production technologies which contribute to the sustainability and rational use of land, preserve and improve biological activity, biodiversity and soil fertility by suitable soil use, prevention of erosion and loss of soil organic matter, and the improvement of physical, chemical and biological properties of soil.

Non-GHG benefits:

The preservation of traditional rural landscapes, the improvement of surface and groundwater and the preservation of the genetic pool of traditionally grown crops. Certain operations can be implemented throughout Slovenia and contribute to environmental protection in general, while certain operations can be implemented in limited areas which are problematic from the aspect of pollution of agricultural origin (the catchment areas of surface waters and groundwater referred to in the Water Management Plan) and areas which are important for the preservation of biodiversity (ecologically important areas of special grassland habitats, grassland habitats of butterflies and litter meadows, areas of the occurrence of birds of humid extensive meadows, the most vulnerable areas within the Natura 2000 network, and areas where bears and wolves are present).

Measure: Organic farming

Legal basis: Article 29 of Regulation (EU) No 1305/2013

Policy: Rural Development Programme 2014-2020

Description: The purpose of the organic farming measure is to encourage farmers to implement environmentally-friendly farming, which does not only mean prohibiting the use of chemically synthesised plant protection products and mineral fertilisers, but also to a) preserve soil fertility, b) improve nutrient cycle within the farm, c) improve soil quality and health of plants, animals and humans, d) adjust animal breeding technologies to the needs of specific species and categories, e) produce healthy, quality and safe food products, f) protect natural living resources (soil-water-air), g) actively protect the environment and biodiversity and sustainably manage non-renewable natural resources.

Objective: By introducing organic farming this measure aims to: improve production capacity and use of agricultural land, sustainable use and protection of natural resources, better quality crops and food products.

GHGs affected: CO_2

Status of implementation: in the process of implementation

Scale: local

Mitigation effect:

Restoring, preserving and enhancing biodiversity within Natura 2000 sites, and high nature value farming systems, and the state of European landscapes. Environmentally-friendly agricultural practices assist preservation or improvements of biodiversity, preserving the cultural farming landscape and environmental protection.

Improving water and land management, and contributing to the fulfilment of the objectives of the Water Framework Directive. The measure supports the use of organic fertilisers and plant protection products which contribute to the preservation of drinking water resources,

especially nitrates which are better balanced and controlled within organic farm nutrient cycle. Organic farming significantly reduces the risk of water pollution with the residues of plant protection products.

Improved soil and erosion management and the use of fertilisers and pesticides. The measure supports sustainable technologies which balance soil–plant–human systems and closed circulation of nutrients in this system. Chemically synthesised plant protection products and readily soluble mineral fertilisers, growth regulators, genetically modified organisms, etc. are not allowed. Sustainable tillage technologies improve soil properties, conserve or increase soil organic matter content and prevent erosion.

The measure will be implemented through two sub-measures:

- Payments to convert to organic farming practices and methods (sub-measure 11.1)
- Payments to maintain organic farming practices and methods ((sub-measure 11.2).

Non-GHG benefits:
Securing public goods, primarily for preserving or improving biodiversity, preserving sources of drinking water, the cultural farming landscape and environmental protection in general. The measure also represents a great opportunity for the creation of new jobs and revitalisation of rural communities, to increase demand for locally produced organic products.

Measure: Co-operation

Legal basis: Article 35 of Regulation (EU) No 1305/2013

Policy: Rural Development Programme 2014-2020

Description: This measure supports various forms of cooperation with stakeholders overcoming economic, environmental and other constraints caused by fragmentation and poor connectivity. The measure aims to promote cooperation projects whose objectives are focused on better productivity and sustainability in agriculture. It focuses on the promotion of technological development and reduction of negative environmental impacts of agriculture, particularly biodiversity and quality of surface and groundwater.

Objective: Better connect all stakeholders and improve their cooperation and productivity within various projects.

GHGs affected: CO_2

Status of implementation: in the process of implementation

Scale: local

Mitigation effect:

Restoring, preserving and enhancing biodiversity, including the Natura 2000 sites, and agricultural systems of high natural value and the condition of landscapes in Europe. The measure contributes to enhancing efficient forms of cooperation among various entities in preserving biodiversity, achieving Natura 2000 goals, maintaining farming systems with high natural value and landscape diversity and strengthening innovative approaches and forms of cooperation in the field of sustainable farming. The measure focuses on species-rich grassland areas important for preserving biodiversity: Special grassland habitats, grassland habitats of butterflies and litter-raking forests, main areas of presence of birds of humid extensive meadows and the most vulnerable areas within Natura 2000, including species-rich grasslands in poor conservation state.

Improving water and land management, and contributing to the fulfilment of the objectives of the Water Framework Directive. The measure contributes to enhancing efficient forms of cooperation among various entities in water protection activities implementing innovative approaches and cooperation and improving surface and groundwater conditions. The measure focuses on cooperation projects aimed to increase sustainability of agriculture in areas with dispersed pollution from agriculture.

Non-GHG benefits: In the context of increasing the environmental efficiency of agriculture and investments in infrastructure, this will significantly contribute to productivity, hence quantity and (where applicable also) quality of crops, and competitiveness of home grown agricultural products on the market in general.

Measure: Maintenance of permanent grassland

Legal basis: Regulation (EU) No 1307/2013

Policy: CAP Direct Payments 2015-2020

Description: The maintenance of permanent grassland at the level of agricultural holding is implemented by protecting permanent grassland through a ban on ploughing and conversion in the environmentally most sensitive areas in Natura 2000 covered by Directives 92/43/EEC and 2009/147/EC. The measure is furthermore applied at a national or regional level as a more general safeguard, based on a ratio of permanent grassland, against conversion of permanent grassland to other uses.

Objective: The measure aims at providing environmental benefits, in particular carbon sequestration.

GHGs affected: CO_2

Status of implementation: will be implemented in 2015 and onwards

Cost of measure: not available

Scale: local

Mitigation effect: GHG emission reduction, carbon sequestration

Non-GHG benefits: The main non-GHG benefits of this measure are preservation of the grassland habitats and its biodiversity.

Measures related to activities under (c), (d), (e) and (f) listed in the Annex IV of the Decision

No particular measures related to activities under (c), (d), (e) and (f) listed in the Annex IV of the Decision are planned in Slovenia.

5. Existing and planned policies to implement the measures

Existing policies

Operational Programme for Reducing GHG Emissions until 2020 with a View to 2030 (OP TGP-2020)

The OP GHG-2020 is an implementing plan of measures for achieving Slovenia's legally binding obligations to reduce 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 achieving the objectives relating to reducing GHG emissions. The programme was adopted on 17 December 2014 by the Ministry of Agriculture, Forestry and Food. This is currently the main strategic document, which will be the basis for measures of actual reduction of GHG emissions in Slovenia outside the EU Emissions Trading System.

In the context of the climate and energy package, EU Member States have adopted legally binding targets for reducing GHG emissions by 2020. According to Decision 2009/406/EC, GHG emissions in Slovenia should not increase by more than 4% compared to 2005 meaning that GHG emissions in 2020 should be smaller than the target value of 12,076,171 t CO_2 eq. The subject of the Decision and national targets are solely emissions from sources outside the EU ETS scheme. Yet, the national targets to reduce GHG emissions over the period up to 2020 according to Decision 406/2009/EC do not include emissions and removals related to Land use, land-use change and forestry (LULUCF). After this decision, however, on the proposal of the European Commission they will be included in EU obligations in the future.

The legal basis for the OP TGP-2020 is the Environmental Protection Act. The document is determined by the Decree on the documents of development planning bases and procedures for the preparation of the central and local government budgets. As mentioned above, OP TGP-2020 follows the objectives of the National Reform Programme for overcoming the crisis, increasing added value and raising the employment rate. Priorities for funding measures to promote the transition to a low-carbon economy while laying down EU regulations are governed by the structural and investment funds (European Regional Development Fund, the European Social Fund and the Cohesion Fund and the European Agricultural Fund for Rural Development). OP TGP-2020 was prepared in line with EC reporting (Regulation (EU) No 525/2013) and UNFCCC guidelines on policies and measures.

National Forest Programme (NFP)

The National Forest Programme (Resolution on National Forest Programme) was adopted by National Assembly of the Republic of Slovenia in session on 20 November 2007. The NFP is a fundamental strategic document aimed at determining the national policy of sustainable development of forest management. The National Forest Programme also presents the implementation of the Environmental Action Programme at the national level, which defines four priorities: climate change, nature and biodiversity, environment and health, and quality of life, natural resources and waste. The EU's Thematic Strategy on Sustainable Use of Natural Resources is a reference point for the National Forest Programme, which is based on regional characteristics and the ecosystem approach.

The NFP is defined by the Forest Act, which represents the legal basis for its implementation. Article 7 of the Forest Act states that the NFP is to be adapted and supplemented in accordance with the changes in forests and changing management conditions. The ministry responsible for forestry prepares a draft of the NFP, for which professional bases are provided by the Slovenia Forest Service, after a preliminary public hearing. The ministry is responsible for the implementation of the NFP, which is ensured by 5-year operative programmes, which are adopted by the Government.

In addition to the development of a narrow focus of the forest sector, the NFP defines the role of forests in climate change, through the provision of GHG sinks and consequently to a more favourable national balance of carbon in three ways:

- CO_2 is accumulated in the organic matter (surface and subterranean) in forests,
- use of wood as an energy source reduces consumption of fossil fuels,
- use of wood as material (carbon sequestration during the lifetime of wood product).

The processes which influence a more favourable balance of carbon in Slovenia are the increase of growing stock in forests and overgrowing of abandoned cultivated lands. The Kyoto Protocol implements mechanisms which recognise only restricted CO_2 sink for forests. Due to an increase of growing stock as a result of systematic forest management, Slovenia implemented an annual sink of 1.32 Mt CO_2 or 0.36 Mt C in CP1. For the annual evidencing of the recognised sink of 1.32 Mt CO_2 due to forest management, the NFP states that at least 1 million m^3 of wood a year has to be accumulated in forests, while the current (in 2012) estimate of the accumulation of wood increment is 4.8 million m^3/year.

The NFP aimed to increase the use of wood as material and fuel and to adjust forest management to climate change. In this view, the NFP promotes the use of wood in further processing and the production of HWPs and it encourages the use of wood with a longer lifetime and the replacement of materials the production of which causes GHG emissions with wood.

Another objective of the NFP is to adjust forest management to climate change. It encourages research studies to analyse the capacities of the key tree species and stands to adjust to climate change, guidelines the resistance of the forest to extreme climate conditions through the provision of an adequate structure of species and stands, and draws attention to the frequency of storms to be taken into account by ensuring the construction and maintenance of forest roads and growing guidelines in forests with an emphasised protective function.

Forest Act

The Forest Act is a basic legal document, which regulates the rights and duties of forest owners, forest visitors, users and others. It regulates protection, silviculture, exploitation and use of forests on the basis of forest management plans. In particular, it defines forest management and planning, forest marketing, financing of works and services associated with forests, the public forestry service, the organisation and work of the Slovenia Forest Service, and professional and scientific research. The Forest Act was adopted by the National Assembly of the Republic of Slovenia and it came into force in 1993.

The objective of the act is to ensure sustainable close-to-nature and multipurpose forest management in line with the principles of environmental protection and natural values,

permanent and optimal functioning of forest ecosystems as well as fulfilment of their functions.

One of the important goals of the silvicultural measures, particularly in private forests, is to provide timely regeneration. The latter is of key importance after disasters, such as windthrows, snow breaks and other similar natural disturbances. To ensure stability of forest stands, continuous implementation of silvicultural measures has to be provided not only in private forest but also in the rest of the forests.

National Renewable Energy Action Plan 2010-2020 (NREAP)

The National Energy Programme sets out the long-term developmental goals and trajectories of energy systems and energy supply in Slovenia. It defines the goals of the energy policy and the strategic measures that the Slovenian Government will implement to achieve these goals. The National Renewable Energy Action Plan 2010-2020 (NREAP) is an implementing act that defines sectoral goals and measures for achieving the national target share of gross final energy consumption from renewable energy sources in 2020. The NREAP was adopted by Government in session on 8 July 2010.

In accordance with Directive 2009/28/EC, the measures in the NREAP are formulated on the basis of targets regarding the share of energy from renewable sources for 2020 in the following sectors: heating and cooling, electricity and transport. The total value of all three sectoral targets, including the planned use of flexibility mechanisms, must be at least equal to the expected quantity of energy from renewable sources, the share of which for Slovenia in 2020 is equal to 25%.

Among all renewably energy in Slovenia more than a half of the energy is contributed by wood, followed by hydropower with almost 40%. Other sources altogether contribute less than 10% of the energy from renewable sources (Figure 9).

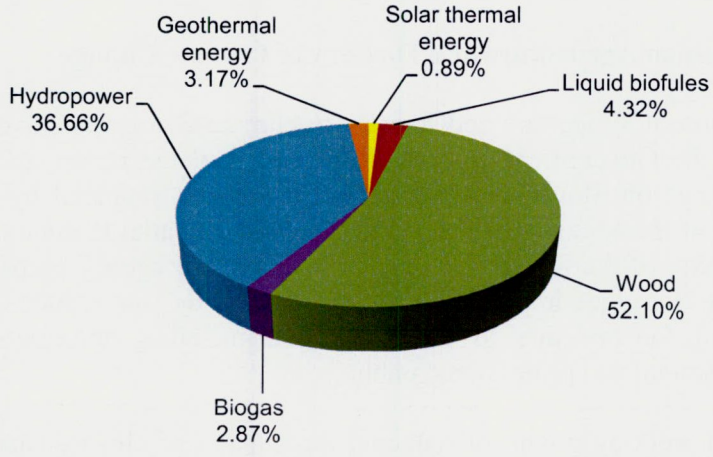

Figure 9: Shares of renewable sources in total energy consumption for 2011 (source: Statistical Office of RS 2012, Jožef Stefan Institute 2012)

Although the objective of the NREAP is not directly related to the LULUCF, several measures that are included in the document could contribute to decreasing GHG emissions in

the LULUCF sector, particularly the efficient use of the wood biomass from forestry and agriculture for energy, which in turn would reduce consumption of fossil fuels. According to official data (SORS 2009), the consumption of wood for the production of electricity and heat amounted to 177,000 tons of wood in 2009. In industry (mainly the wood industry) the consumption of wood for energy was 202,000 tonnes. The Slovenian Forestry Institute estimated that the use of wood for the energy supply of households was the greatest with consumption of more than a million tons, which is 76% of all wood for energy purposes.

Action Plan to Increase the Competitiveness of the Forest-Wood Chain in Slovenia by the year 2020

The Action Plan to Increase the Competitiveness of the Forest-Wood Chain in Slovenia by the year 2020, with the promotional slogan "Wood is Beautiful", is an operational document aimed at increasing the competitiveness of the entire forest-wood value chain, adopted by the Government at its 20th regular session on 27 June 2012. The document defines wood as a strategic raw material of Slovenia, which has a lot of untapped potential.

The main goals of the action plan are:

- creating a market for wood products and services,
- increasing the harvest and tending of forests in accordance with forest management plans,
- increasing the volume and wood processing at higher difficulty levels with new technologies,
- new jobs and growth in value added per employee in the wood products industry.

Based on forest management plans it is estimated that the gross volume of the allowable cut should increase to at least 6.5 million m^3 by 2020. Consequently, the volume of domestic roundwood in wood processing could therefore increase from 1.7 million m^3 in 2010 to 3.3 million m^3 in 2020. The headline goal is also to increase the added value per employee within the wood products industry to a comparable level to reach the EU 27.

Strategy of Adaptation of Slovenian Agriculture and Forestry to Climate Change

Activities related to the adaptation of agriculture and forestry to climate change in Slovenia started in January 2004, when the Government considered and adopted the report on the predicted impact of climate change on Slovenian agriculture and forestry, prepared by the Slovenian Environment Agency of the Ministry of the Environment and Spatial Planning. In close cooperation with the Ministry of Agriculture, Forestry and Food, the agency prepared methodologies and procedures for the implementation of adaptation to reduce the vulnerability of agriculture and forestry due to these changes, including information, awareness and education of the general and professional public.

To this end, the inter-ministerial working group for reducing the impacts of climate change was set up with the aim of producing the Strategy of Adaptation of Slovenian Agriculture and Forestry to Climate Change, which was adopted by the Government in session on 18 June 2008. The Government also prepared the Action Plan as an operational part of the strategy needed for its successful implementation. However, limited financial resources mean that the actions and measures of the Action Plan were only supported for a two-year period (2010 and 2011).

According to the predictions of experts, air and soil temperatures are projected to increase and changes in rainfall regime, lack of water resources and higher intensity and frequency of extreme weather events are expected in the future. Therefore, the primary goal of the strategy is to reduce the risk of damage to agriculture and forestry and, consequently, also to environment and public health due to present and future adverse impacts of climate change in a way that is cost-effective or takes into account the potential benefits. In order to achieve the goal the measures of the strategy are divided into the following five pillars:

- I. Strengthening management capacity for adaptation of agriculture and forestry;
- II. Education, awareness and counselling;
- III. Maintenance and acquisition of new knowledge on climate change and adaptation;
- IV. Agricultural and forestry policy measures and changes to existing rules;
- V. Strengthening of international cooperation and partnership in the adaptation of agriculture and forestry to climate change, particularly within the EU.

Regarding LULUCF, the most important measures of the strategy are defined under Pillar IV, namely Promotion of agricultural and forestry practices that reduce GHG emissions and at the same time represent adaptation to climate change. The latter includes measures, such as compliance of good agricultural practice in manure application and increasing the share of legumes, which reduces the emissions of nitrogen compounds in the atmosphere, maintenance of green cover in fields to prevent nitrogen leaching from agricultural land, increasing the energy in feed for ruminants and construction of manure facilities to mitigate drought stress, promotion of good forestry practice, namely maintenance of high growing stocks, utilisation of site potential through giving priority to site-specific and indigenous tree species, ensuring regeneration of forest stands, prevention of forest fires, maintenance of suitable plant cover and prevention of litter gathering, fast intervention in forests damaged by biotic or abiotic factors, but also other important measures such as construction of water reservoirs and irrigation systems, improvements in spatial planning etc.

The strategy is also important since it is the legal basis for research, particularly the projects within the Target Research Programmes (https://www.arrs.gov.si/en/progproj/crp/predstavitev.asp) tendered in 2011 and 2014 (https://www.arrs.gov.si/sl/progproj/crp/razpisi/14/razp-crp-hrana-14.asp), contributing to new knowledge related to adaptation of agriculture and forestry to climate change (measures under Pillar III), by which it can be easier to steer policy and develop guidelines in the agricultural and forestry sector to better cope with the climate change in the future.

Resolution on strategic guidance on development of Slovenian agriculture and food production sector until 2020

This document was adopted by the National Assembly of the Republic of Slovenia on 29 March 2011. It specifies the contextual framework for the preparation of various Agricultural Policy development and implementation documents. It also declares specific commitments while drafting and implementing various development documents, ensuring consistency of implementation of resolution through various documents and their coherence with other public policies and strategies. These should also include the mandatory components that are described within the regulations on development planning documents and procedures for preparation of the draft state budget. Special attention is paid to consistency between measures of income and development aid under the common agricultural policy and state aid in accordance with national legislation. The main purpose of the strategy is to identify key

actions and activities that will enable the successful implementation of the set resolution objectives.
The resolution recognises the current environmental and socio-economic situation in Slovenian agriculture production sector projecting its future needs and its development direction.
The strategic development goals of agriculture and food industry specify:

- Ensuring food security through stable production of safe and high quality and consumer accessible food.
- Increasing the competitiveness of agriculture and food production
- Sustainable use of productive potentials and provision of agriculture-related public goods
- Provision of coherent and socially sustainable rural development (in collaboration with other policies)

Based on socio-economic and climate changes, it further more foresees several measures to assist farmers and the agricultural production sector. Identifying the vulnerable areas, this document defines the hotspots which should be considered carefully when new and more sustainable land management approaches are planned and applied.
In the context of food security, it recognises the huge potential of abandoned and overgrown plots of land which could be easily re-cultivated and returned to a production role. Additionally it predicts an increase in crop production through more efficient production and puts great importance on sustainability and preservation of agro-ecosystems as they are.

Base line for a debate on common EU agricultural policy after 2013

This document was adopted by National Assembly of the Republic of Slovenia on 1 August 2010. It represents Slovenian efforts to contribute to the future development of the CAP especially in relation to the objectives of the Europe 2020 strategy. It focuses on food security with stable local production of safe, high-quality, diverse and affordable food, hence, adequate level of self-sufficiency and sustainable supply for local population, increasing the competitive agricultural and food industry products, sustainable use of agricultural productive potential, by protecting the environment and conserving biodiversity and lastly, coherent and socially sustainable rural development (in collaboration with other policies) and the preservation of agriculture and population density in areas that are less suitable for agriculture.

In the national endeavour to successfully implement CAP, the following strategic pillars were designed:
Income and market price policy (pillar I):

- *Direct payments*
  The current system of direct payments needs to be adapted to the changed situation and current/future challenges. The system of direct payments should be implemented as a systemic and targeted income support for agriculture providing stable in the long term income for farmers.
- *Market regulation measures*
  According to current practices, additional measures are needed to somehow reinsure the income risk insurance and enable farmers to sell their crops at competitive prices.

Rural development policy (pillar II):

The rural development policy indicates the mechanism for the promotion of specific micro-endogenous potentials and the elimination of specific delays in the development of rural areas. Additionally, it enables an integrated approach to rural development.

Action Plan for Organic Farming in Slovenia until 2015 - ANEK

The Action Plan for Organic Farming in Slovenia until 2015 (ANEK) was adopted by the Government of the Republic of Slovenia on 24 November 2005. It was prepared by the Ministry of Agriculture, Forestry and Food under the special working group which included the non-agricultural sectors (environment, health), experts, researchers, traders, representatives of NGOs and consumers.

The document was designed strategically and contains analysis, proposals and actions by individual stakeholder groups, to encourage sustainable development of organic farming in Slovenia.

The main strategic directions of the Action Plan are divided into several sections:

- Support for organic farming;
- Production, processing and marketing of organic crops;
- Organic agriculture and tourism;
- System control;
- Certification and labelling;
- Education, consulting and promotion;
- Scientific research;
- Genetically modified organisms (GMOs) and
- The priorities and agricultural policy measures up until 2015.

The content is closely associated with the European Action Plan for organic food and farming, which Slovenia is also implementing in all 21 actions and which was previously adopted by the Council of Ministers on 18 October 2004.

The main aims of the Action Plan are to:

- describe and evaluate the situation of organic farming in Slovenia
- identify the current role of organic farming in Slovenia and its possible role in the future,
- identify the main strategic objectives of the development of organic farming up until 2015
- identify the most important areas of organic agricultural sector and food
- identify priorities for action in individual sectors,
- identify priority activities for individual measures and evaluate them in time, financially and operationally.

Planned policies

Rural Development Programme 2014-2020

The Rural Development Programme of the Republic of Slovenia 2014-2020 (waiting for confirmation) follows six priorities of rural development including four national strategic emphases:

- Fostering knowledge transfer and innovation in agriculture, forestry and rural areas

- Enhancing competitiveness of all types of agriculture and farm viability;
- Promoting food chain organisation and risk management in agriculture;
- Restoring, preserving and enhancing ecosystems dependent on agriculture and forestry;
- Promoting resource efficiency and supporting the shift towards a low carbon and climate resilient economy in agriculture, food and forestry sectors;
- Promoting social inclusion, poverty reduction and economic development in rural areas.

The Rural Development Programme (RDP) is designed to also contribute to cross-cutting objectives of innovation, environment and climate change mitigation and adaptation. It accommodates the identified national needs for higher productivity and added value, market organisation and strengthening of agro-food and forest-wood chains, maintenance of natural resources and adaptation to climate change, new green jobs and socially sustainable and balanced development of rural areas and promotion of knowledge and innovation.

The RDP 2007-2013 was designed as an instrument to draw funds from the *Cohesion Policy funds in the framework of EU agricultural funds for rural development* by foreseeing several measures:

- Transfer of knowledge and innovation
- Increasing productivity, sustainable use of natural resources, mitigation and adaptation to climate changes
- Development of short supply chains and forest-wood chains and improving their quality
- Development of endogenous potentials of rural areas and employment

The RDP 2014-2020 reconsiders current and common guidelines, taking into account the environmental specifics of Slovenian agriculture practices and setting new or redesigning the existing guidelines.

Direct Payments 2015-2020

Effects on agriculture in conjunction with the reduction of GHG emissions are expected from the "green component", a new statutory and obligatory scheme of direct payments, which introduces permanent grassland conservation as one of the three agricultural practices conducive to the climate and the environment, in particular carbon sequestration. The preventive effect will result mainly from grassland conservation in areas of "Environmentally sensitive permanent grassland" within the context of Natura 2000. Maintenance of grassland will have to be respected at the holding level, subject to prohibition of changing or ploughing protected areas. On this extent of permanent grassland, the need for nitrogen is lower than for arable crops, so the consumption of mineral fertilisers and, consequently, emissions of N_2O will be lower.

Important objectives of the new CAP is the improvement of environmental performance, which we will achieve with the "green" component of direct payments across the EU in order to support the use of agricultural practices with a favourable impact on the climate and the environment:

Strategy on the Use of Biomass from Forestry and Agriculture for Energy Purposes

Strategy on the Use of Biomass from Forestry and Agriculture for Energy Purposes defines the vision and role of agriculture and forestry in efforts to increase the provision of renewable energy sources in Slovenia up to 2020. The starting point of the strategy is the need to fully exploit the potential for producing energy from agricultural and forest biomass, taking into account the social, economic and environmental acceptability of the use of these sources, with an emphasis on knowing that the primary role of agriculture is food production and the primary role of forestry is the provision of raw materials for wood products.

Strategy for the implementation of the Resolution on the strategic orientation of Slovenian agriculture and agriculture-food sectors by 2020

This document was adopted in July 2014. The strategy closely relates to the already adopted resolution on strategic guidance on development of Slovenian agriculture and food production sector until 2020 (resolution) and defines several measures which will ensure the goals set by the resolution will be achieved. The strategy in its first part covers the analysis of the status, objectives and actions which are of a horizontal nature and in its second part covers the analysis of the status, objectives and actions by individual agricultural industry. The document ends with an indicative financial evaluation of measures according to the structure of liabilities.

The document aims to serve directly the implementation of measures as well as to help the preparation of other documents related to the EU common agricultural policy (e.g. direct payment scheme, the Rural Development Programme 2014-2020), and was compiled in collaboration with experts, representatives of agricultural holdings and NGOs. It is envisaged that the programme includes a key set of measures and activities which reflect the development needs of Slovenian agriculture and food industry. The strategic objectives and priorities of the resolution are at the same time designed as a basis for positioning of agricultural policy in the strategic development planning of the Republic of Slovenia until 2020 (National development strategy, Slovenian industrial policy, National programme of development priorities and investments, partnership agreement).

6. Indicative timetables for the adoption and implementation of measures

Nr	Measure	Source	Adoption	Implementation
1	Investments in forest area development and improvement of the viability of forests	Rural Development Programme 2014-2020	2014	2014-2020
2	Promotion of forest regeneration in forests damaged by natural disasters	Forest Act	1993	continuously
3	Conservation of carbon in existing forests	National Forest Programme	2007	continuously
4	Enhancing production in existing forests	National Forest Programme	2007	continuously
5	Increasing the harvested wood products pool	National Forest Programme	2007	continuously
6	Increasing forest openness and improving the equipment of forest owners for forest work	Action Plan to Increase the Competitiveness of the Forest-Wood Chain in Slovenia by the Year 2020	2012	2014-2020
7	Enhancing forest management, including through optimised species composition, tending and thinning, and soil conservation	National Forest Programme	2007	continuously
8	Promotion of timber production in private forests for improving the market of harvested wood products and introduction of the organisation for forestry operations	Action Plan to Increase the Competitiveness of the Forest-Wood Chain in Slovenia by the Year 2020	2012	2012-2020
9	Promotion of efficient use of woody biomass and its use to improve ambient air quality, support to energy advising and training and development	Action Plan to Increase the Competitiveness of the Forest-Wood Chain in Slovenia by the Year 2020	2013	continuously from 2013 onwards
10	Promotion of the use of energy from biomass	National Renewable Energy Action	2010	2010-2020

		Plan 2010-2020		
11	Knowledge transfer and information actions	Rural Development Programme 2014-2020	2014	2014-2020
12	Agri-environment-climate	Rural Development Programme 2014-2020	2014	2014-2020
13	Organic farming	Rural Development Programme 2014-2020	2014	2014-2020
14	Co-operation	Rural Development Programme 2014-2020	2014	2014-2020
15	Maintenance of permanent grassland	CAP Direct Payments 2015-2020	2014	2015-2020
16	Green public procurement	Public procurement	2014	continuously

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Resolution on strategic guidance on development of Slovenian agriculture and food production sector until 2020

Rural Development Programme 2014-2020

Strategy of Adaptation of Slovenian Agriculture and Forestry to Climate Change

Strategy on the Use of Biomass from Forestry and Agriculture for Energy Purposes

Strategy for the implementation of the Resolution on the strategic orientation of Slovenian agriculture and agriculture-food sectors by 2020

Draft Strategy for Transition of Slovenia to a Low Carbon Society by 2050