**SEIMAS OF THE REPUBLIC OF LITHUANIA**

# RESOLUTION
# APPROVING THE NATIONAL STRATEGY FOR CLIMATE CHANGE MANAGEMENT POLICY

6 November 2012 No XI-2375
Vilnius

The Seimas of the Republic of Lithuania, in adhering to Article 3(3) of the Law of the Republic of Lithuania on Financial Instruments for Climate Change Management (Official Gazette, No 87-3662, 2009) and in implementing Directive 2003/87/EC of the European Parliament and of the Council of 13 October 2003 establishing a scheme for greenhouse gas emission allowance trading within the Community and amending Council Directive 96/61/EC (OJ 2004 special edition, Chapter 15, Volume 7, p. 631), as last amended by Directive 2009/29/EC of the European Parliament and of the Council of 23 April 2009 (OJ 2009 L 140, p. 63), Decision No 406/2009/EC of the European Parliament and of the Council of 23 April 2009 on the effort of Member States to reduce their greenhouse gas emissions to meet the Community's greenhouse gas emission reduction commitments up to 2020 (OJ 2009 L 140, p. 136), Directive 2009/31/EC of the European Parliament and of the Council of 23 April 2009 on the geological storage of carbon dioxide and amending Council Directive 85/337/EEC, European Parliament and Council Directives 2000/60/EC, 2001/80/EC, 2004/35/EC, 2006/12/EC, 2008/1/EC and Regulation (EC) No 1013/2006 (OJ 2009 L 140, p. 114), as last amended by Directive 2011/92/EU of the European Parliament and of the Council of 13 December 2011 (OJ 2011 L 26, p. 1), and Directive 2009/28/EC of the European Parliament and of the Council of 23 April 2009 on the promotion of the use of energy from renewable sources and amending and subsequently repealing Directives 2001/77/EC and 2003/30/EC (OJ 2009 L 140, p. 16), resolves:

**Article 1.**

To approve the National Strategy for Climate Change Management Policy (appended).

**Article 2.**

To propose that the Government of the Republic of Lithuania should, by 1 January 2013, approve the Implementation Plan of the National Strategy for Climate Change Management Policy.

**Article 3.**

This Resolution, except for Article 2 of this Resolution, shall enter into force on 1 January 2013.

SPEAKER OF THE SEIMAS IRENA DEGUTIENĖ

APPROVED BY
Resolution No XI-2375
of the Seimas of the Republic of Lithuania
of 6 November 2012

# NATIONAL STRATEGY FOR CLIMATE CHANGE MANAGEMENT POLICY

## I. GENERAL PROVISIONS

1. Climate change, which is becoming increasingly evident in recent decades, threatens the environment, economic activities and, at the same time, the development of the global economy. With reference to the best available scientific information provided in the Fourth Assessment Report of the Intergovernmental Panel on Climate Change (hereinafter: 'the IPCC') and other published scientific studies, it is stated that the climate system is worst affected by anthropogenic substances. Economic activities increase thermal pollution of the atmosphere, as rising concentration of greenhouse gas (hereinafter: 'GHG') emissions magnifies the natural greenhouse effect and has a decisive influence on the increase of the global average air temperature. GHGs are largely produced by burning fossil fuel, in industrial and agricultural production processes, significant volumes are also emitted by waste. GHG emissions mainly include carbon dioxide ($CO_2$), methane ($CH_4$), nitrous oxide ($N_2O$), hydrofluorocarbons (HFC), sulphur hexafluoride ($SF_6$) and perfluorocarbons (PFC). The rate at which temperature is increasing in different parts of the world ranges from low in tropics to higher in medium and polar latitudes. The Fourth Assessment Report of the IPCC notes that, since the beginning of the 20$^{th}$ century, the global air temperature and the air temperature in Europe has risen by 0.7 °C and approximately 1 °C respectively. In addition, as a result of a more intense water cycle and stronger atmospheric circulation in the medium to higher latitudes, warming is accompanied by a higher average precipitation rate, rising global sea level, melting mountain glacier and continuously decreasing areas of permafrost, seasonal snow cover and sea ice. The analysis of distribution of climate indicators, such as air temperature, precipitation, solar radiation and other meteorological elements and phenomena, and their annual progress highlights certain climate change indications.

2. To prevent irreversible effects of the global climate change, global warming must not rise by more than 2 °C above the pre-industrial temperature level. As described by the European Commission's (hereinafter: 'the Commission') document "Limiting Global Climate Change to 2

degrees Celsius − The way ahead for 2020 and beyond. Summary impact assessment", the most recent research that is currently in progress (*Projection of economic impacts of climate change in sectors of the European Union based on bottom-up analysis* − PESETA) and is coordinated by the Commission's Joint Research Centre confirms that stabilisation of GHG emissions at 450 ppmv in $CO_2$ equivalent (hereinafter: '$CO_2$e') would allow for the 50% probability of keeping the 2 °C limit. Already now, the GHG emissions concentration reaches 394 ppmv and keeps annually increasing by about 2 ppmv. This exceeding scenario is analogous to the 500 ppmv $CO_2$e scenario described in the review report 2006 of representative of the World Bank Nicholas Stern (Stern, 2006). According to the main scenario, in 2050 global GHG emissions, as compared to the level of 1990, should increase by 86%. In 2020, the GHG emissions by developing countries will exceed that of developed countries. The findings of the Commission's assessment of impact on the economic growth show that a wider scale of international cooperation might reduce the global GHG emissions to the level not exceeding the average temperature by more than 2 °C. All countries must improve their energy efficiency and reduce GHG emissions in the transport, residential and services sectors. Scientific evidence and the findings of the Fourth Assessment Report of the IPCC show that in order to keep the limitation of global average temperature growth to 2 °C, as compared to the pre-industrial temperature level, developed countries as a group should commit themselves to reducing the GHG emissions, as compared to 1990, by 25 to 40% and by 80 to 95% in 2020 and 2050 respectively. However, the most advanced developing countries, as a group, should commit themselves to taking actions that would reduce GHG emissions by 15 to 30% in 2020 as compared to regular activities.

3. Climate variability in Lithuania makes part of the processes within our planet's climate system. Lithuania has no protection against the global climate changes or their outcomes, which is why the goals of climate change mitigation and adaptation to the impacts of climate change as set forth in the United Nations Framework Convention on Climate Change (hereinafter: 'the UNFCCC') (Official Gazette, No 23-521, 1995) ratified by the Seimas of the Republic of Lithuania in 1995 and the Kyoto Protocol to the United Nations Framework Convention on Climate Change (hereinafter: 'the Kyoto Protocol') (Official Gazette, No 126-5735, 2002) adopted in Kyoto, Japan, in 1997, ratified by the Seimas of the Republic of Lithuania in 2002 and having taken effect on 16 February 2005, European Union (hereinafter: 'the EU') legal acts and other documents are relevant to Lithuania.

4. The Kyoto Protocol specifies the target GHG emissions reduction level to be achieved in the period from 2008 to 2012 by each EU member state and also other economically developed countries and economies in transition. The EU has adopted and implemented a number of important strategic documents and legal acts safeguarding the implementation of the

goals, objectives and measures set forth by the Kyoto Protocol to reduce GHG emissions. As compared to the emissions level of 1990 identified in the Kyoto Protocol, Lithuania undertook to reduce GHG emissions by 8%.

5. In safeguarding the continuity of the EU climate change policy, the European Council agreed, in March 2007, that an integrated approach needs to make part of the climate and energy policy in order to struggle with climate changes and its effects and also increase the EU energy security at the same time strengthening EU competitiveness. Heads of EU member states undertook to achieve that high energy efficiency and low GHG emission level become characteristic of the EU economy. With a view to ensuring the achievement of this goal and maintaining its international leadership in combating climate change, the EU approved, in December 2008, the Climate and Energy Package establishing goals to be achieved in 2013 to 2020 and consisting of four legal acts: Directive 2003/87/EC of the European Parliament and of the Council of 13 October 2003 establishing a scheme for greenhouse gas emission allowance trading within the Community and amending Council Directive 96/61/EC (OJ 2004 special edition, Chapter 15, Volume 7, p. 631), as last amended by Directive 2009/29/EC of the European Parliament and of the Council of 23 April 2009 (OJ 2009 L 140, p. 63) (hereinafter: 'Directive 2009/29/EC'); Decision No 406/2009/EC of the European Parliament and of the Council of 23 April 2009 on the effort of Member States to reduce their greenhouse gas emissions to meet the Community's greenhouse gas emission reduction commitments up to 2020 (OJ 2009 L 140, p. 136) (hereinafter: 'Decision 406/2009/EC'); Directive 2009/31/EC of the European Parliament and of the Council of 23 April 2009 on the geological storage of carbon dioxide and amending Council Directive 85/337/EEC, European Parliament and Council Directives 2000/60/EC, 2001/80/EC, 2004/35/EC, 2006/12/EC, 2008/1/EC and Regulation (EC) No 1013/2006 (OJ 2009 L 140, p. 114), as last amended by Directive 2011/92/EU of the European Parliament and of the Council of 13 December 2011 (OJ 2012 L 26, p. 1); and Directive 2009/28/EC of the European Parliament and of the Council of 23 April 2009 on the promotion of the use of energy from renewable sources and amending and subsequently repealing Directives 2001/77/EC and 2003/30/EC (OJ 2009 L 140, p. 16). This Package proposes comprehensive measures for developing the Energy Policy for Europe in order to deal with the issues of climate change and promote EU energy security and competitiveness. This Package sets forth ambitious goals in relation to the reduction of GHG emissions and use of renewable energy sources. This Package establishes EU goals to reduce GHG emissions by 20% in 2020, as compared to 1990, and proceed to the goal of reducing GHG emissions by 30% provided that other developed countries will also undertake to seek comparable GHG emissions reduction and that developing countries will adequately contribute, within the area of their

responsibility and depending on their possibilities, to the increase of the share of renewable energy sources (hereinafter: 'RES') and energy efficiency by 20% each.

6. One of the most recent documents defining the guidelines for the long-term EU climate change policy until 2050 is the Communication from the Commission of 8 March 2011 to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions "A Roadmap for moving to a competitive low carbon economy in 2050" (COM) (2011) 112) (hereinafter: 'A Roadmap for moving to a competitive low carbon economy in 2050'). This document establishes that EU policies should be developed in the nearest decade and beyond it in order to: 1) significantly reduce GHG emissions on the basis of scientific findings (by 40%, 60% and 80% in 2030, 2040 and 2050 respectively, as compared to the emissions level of 1990); 2) reduce vulnerability related to crude oil price peaks and other energy security problems; 3) make use of sustainable growth and long-term jobs (related to new low-carbon technology) through a wider, more sustainable and efficient use of resources. In implementing the long-term Europe's commitment to combating climate change and by planning to achieve the GHG emission reduction in 2050 by using internal measures, an economically effective and consistent reduction of GHG emissions is proposed to be achieved in stages. In 2010, the Commission carried out the analysis of the EU's moving beyond 20% GHG emission reduction "Analysis of options to move beyond 20% greenhouse emission reductions and assessing the risk of carbon leakage" on the EU level and, in 2012, conducted working analysis "Commission Staff Working Paper: Analysis of options beyond 20% GHG emission reductions: Member State results" (SWD(2012) 5 final)) on the EU member state level. These analyses assess the potential and costs of GHG emission reduction on the EU and member state levels. On the international level, agreements were made to provide a basis for international regulation of the climate change management policy after the expiry on 31 December 2012 of the period of 2008 to 2012, set in the Kyoto Protocol in respect of GHG emission reduction commitments. The 17$^{th}$ Conference of the Parties to the UNFCCC and the 7$^{th}$ Meeting of the Parties to the Kyoto Protocol, which took place in Durban, Republic of South Africa, on 28 November 2011 to 11 December 2011, agreed on setting the second commitment period of the Kyoto Protocol for developed countries that will start in 2013 and continue until 2017 or 2020. An agreement was also reached in relation to the adoption, by 2015, of a new international climate change management agreement, including mandatory GHG emission limitations for all countries in the world, which would come into effect in 2020 at the latest.

7. The National Strategy for Climate Change Management Policy 2013-2050 (hereinafter: 'the Strategy') is drafted according to Articles 3 and 4 of the Law of the Republic of Lithuania on Financial Instruments for Climate Change Management (Official

Gazette, No 87-3662, 2009). The Strategy implements the EU Climate Change and Energy Package and will take effect in 2013 after the expiry of the national strategy for the implementation of the UNFCCC until 2012, as approved by Resolution No 94 of 23 January 2008 of the Government of the Republic of Lithuania (Official Gazette, No 19-685, 2008).

8. The purpose of the Strategy is to develop and implement the Lithuanian climate change management policy and set short-term (by 2020), indicative medium-term (by 2030 and 2040) and long-term (by 2050) climate change mitigation and adaptation goals and objectives. The Strategy consists of sections accordingly dedicated to climate change mitigation and adaptation. Chapter I of the Strategy lays down general provisions; Chapter II provides the findings of the sector analysis, including the analysis of sectors related to the GHG emissions reduction, sectors related to climate change adaptation and sectors important to the climate change management policy-making; Chapter III presents the vision of the climate change management policy; Chapter IV defines climate change mitigation goals and objectives with particular focus on special climate change mitigation goals and objectives set individually for EU Emissions Trading System (hereinafter: 'ETS') sectors and non-ETS sectors; Chapter V defines special climate change adaptation goals and objectives, Chapter VI includes general climate change adaptation and mitigation goals and objectives and Chapter VII defines the implementation of the Strategy and reporting. Annex 1 to the Strategy outlines the structure of the Strategy and Annex 2 contains EU and national strategic documents on the basis of which special and general climate change mitigation and adaptation goals and objectives are formulated.

9. The climate change adaptation and mitigation goals and objectives laid down in Chapters IV to VI of the Strategy are consistent with the national interests of the Republic of Lithuania and the provisions of the National Security Strategy, as adopted by Resolution No IX-907 of 28 May 2002 of the Seimas of the Republic of Lithuania (Official Gazette, No 56-2233, 2002; No 76-3945, 2012), in relation to the implementation of the climate change policy, including ensuring sustainable and uninterrupted supply of energy and energy sources from the widest possible range of sources and integration of the domestic energy sector into the common European energy market, global and regional security and stability; development of an environmentally safe region; modernisation of energy infrastructure; building renovation and implementation of other measures of energy efficiency; promotion of the use of indigenous and renewable energy sources and ensuring operation of energy installations under emergency conditions, in the event of a significant decrease in or a disruption of supply of energy or energy sources.

## II. FINDINGS OF THE SECTOR ANALYSIS

10. Lithuania successfully fulfils the commitments set by the Kyoto Protocol in relation to the 8% GHG emission reduction target in 2008 to 2012, as compared to the emissions level of 1990. According to the National Greenhouse Gas Inventory Report 2012, the GHG emissions amounted to 20.809 million tons of $CO_2e$ (excluding the land use, land use change and forestry (hereinafter: 'LULUCF') sector) in 2010, i.e. by 58% less than the GHG emissions level in 1990, which equalled to 49.430 million tons of $CO_2e$. Figure 1 shows GHG emissions variations in the period from 1990 to 2010.

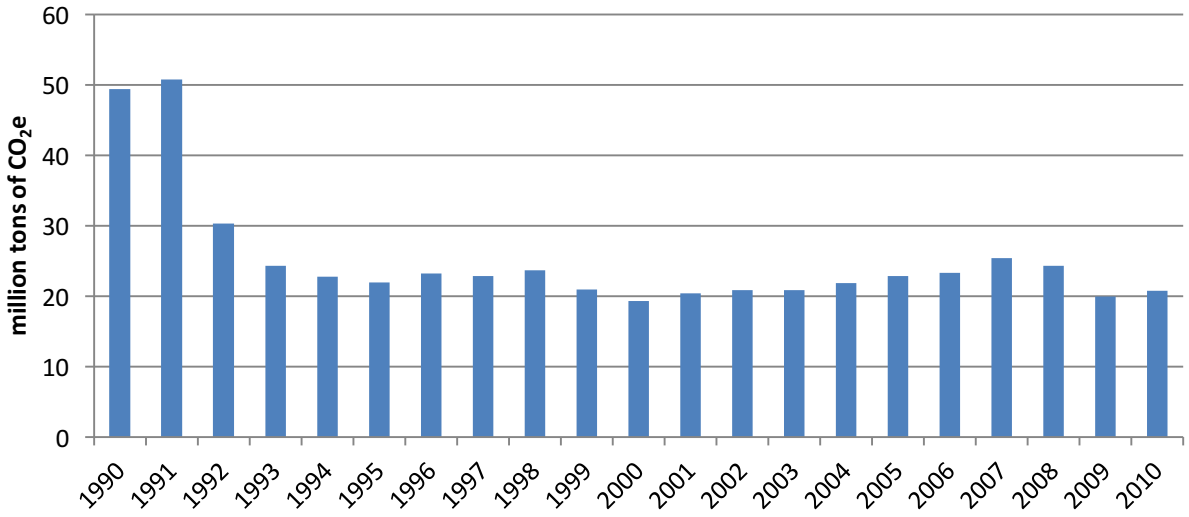



**Fig. 1** Lithuania's GHG emissions in $CO_2e$ in 1990-2010 (National Greenhouse Gas Inventory Report 2012)

11. This Chapter provides the analysis of the main sectors of Lithuania's economy the findings of which, along with the EU and national legal acts and strategic documents indicated in Annex 2 to the Strategy, serve as a basis for defining general and special climate change adaptation and mitigation goals and objectives. The analysis covers the following sectors: water resources; Baltic Sea region; landscape, ecosystems and biodiversity; ambient air quality; waste; forestry; agriculture; energy; transport; industry; public health; spatial planning and regional policy; research; education and public information; and international cooperation.

12. Climate change adaptation is the adaptation of natural and constructed systems to the existent or probable climate phenomena and their positive or negative effects (IPCC, 2007). Adaptation is intended to reduce the present and anticipated threats and damage of negative climate change effects at minimum cost. The Communication from the Commission of 6 April 2009 on White Paper − Adapting to climate change: Towards a European framework for action (COM(2009) 147 final) emphasises that climate change issues need to be tackled in two ways:

firstly and most importantly, through the GHG emissions reduction, and, secondly, by taking actions to adapt to the inevitable climate change effect. Climate change studies show that the most vulnerable part of Lithuania is the Baltic Sea region, therefore the implementation of adaptation measures in this region is highly relevant. Climate change will also affect other regions and such sectors as water resources, landscape, ecosystems and biodiversity, ambient air quality, public health, waste management, forestry and agriculture.

13. Climate change mitigation means the implementation or modification of technology reducing the use of resources and GHG emissions per unit of production, i.e. climate change mitigation promotes the reduction and increased absorption of GHG emissions (IPCC, 2007). Climate change mitigation is of particular importance to such sectors as energy, transport, industry, waste management, agriculture and forestry.

14. Sectors related to both climate change adaptation and climate change mitigation policy-making include transport, energy, industry, agriculture, waste management, territorial planning and regional policy, forestry, research, education and public information, and international cooperation.

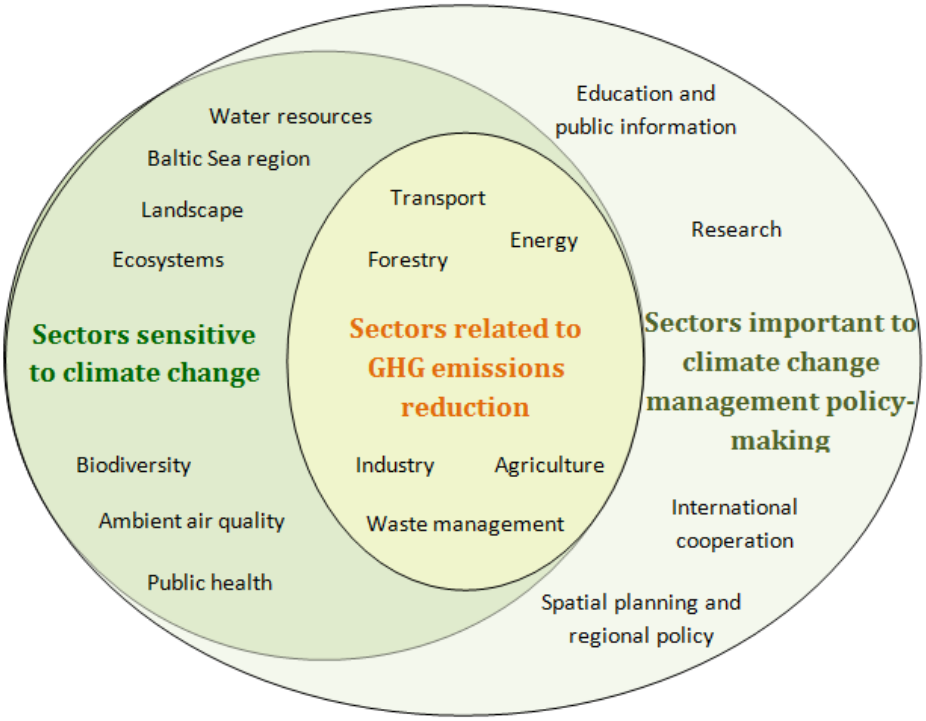



**Fig. 2** Sector distribution by impact on climate change and climate change management policy-making

15. The analysis refers to information given in the National Greenhouse Gas Inventory Report 2012 containing data of 2010. Fig. 3 shows Lithuania's GHG emissions in 2010 (excluding the LULUCF) by sectors.

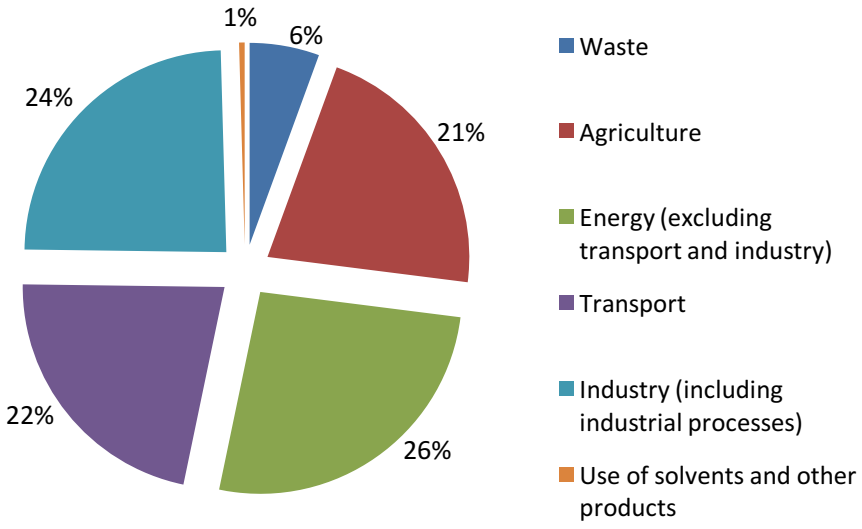



**Fig. 3** Lithuania's GHG emissions in $CO_2e$ in 2010 by sectors (National Greenhouse Gas Inventories Report 2012)

## Water Resources

16. One of the greatest challenges that the water resources sector will face in the nearest future is climate change adaptation. While the impact of climate change is becoming increasingly powerful, water resources are largely affected by an increasing number of floods and greater climate extremes. As a result of the impact of climate change on water resources, there may be changes as regards the quantity and quality of water resources and a higher number of accidents related to hydrotechnical structures or of flooded territories.

17. The major characteristics of the Lithuanian climate, directly related properties of the hydrographic network and surface water resources are determined by the geographical position of the territory. The parts of Lithuania's territory that are most sensitive to the rise of the global sea level caused by global warming are Lithuania's coastal area and the lower Nemunas River.

18. According to the report of 2011 by the Environmental Protection Agency and Lithuanian Hydrometeorological Service under the Ministry of Environment "Preliminary Flood Risk Assessment of Nemunas, Venta, Lielupe and Daugava River Basins" (hereinafter: 'the Risk Assessment Report'), the water level in Klaipėda channel has risen by approximately 14.7 cm since 1898. The highest water level growth scenario shows that throughout the 21th century the average water level in Lithuania's coastal area is likely to rise even up to 100 cm in winter time. The water level in the Curonian Lagoon is most likely to rise by 27 to 63 cm, and the wind and floods of the Nemunas River might bring it up to 217 cm.

19. According to the Risk Assessment Report, Lithuania suffered 154 sudden or catastrophic floods in the period from 1812 to 2010. Floods are mostly caused by melting snow and ice-drift (approximately 70-75% of cases) or heavy rain (approximately 15%). Other reasons, such as rise of the water level in the Baltic Sea, accidents related to hydrotechnical structures, etc., account for 15% of all cases. In Lithuania, floods mostly rise in spring and winter − 60% and 35% cases respectively. Floods threaten more than 5% (350,000 ha) of the territory of the Republic of Lithuania, including 193,000 ha of agricultural land, 97,000 ha of forests and 28,000 ha of urbanised areas. During floods there is a risk that pollutants from urbanised areas might be released into surface waters and affect the condition of water bodies.

20. The forecasts of Lithuanian river basins runoff for 2020 show shift of the spring flood time towards winter time. River waters starting to rise in autumn finally grow into increasingly earlier spring floods caused by midwinter thaws. It should be noted that floods not only are caused by climate change, but also are influenced by the expanding waterproof surface area (urbanisation).

21. Forecasted increase of climate extremity, which will be manifested as heavy rain, sudden thaws and severe frost, long-lasting droughts or fierce heat, will influence circulation of water masses in the Baltic Sea and the Curonian Lagoon and quality variations of surface water resources. Foreseeing and controlling of such variations will be much more difficult.

22. In 2020, the share of the underground runoff in the overall runoff in Lithuania will remain quite stable; there will be a minor change in its values and distribution over a year. The aquifer, from which groundwater is still extracted for individual provision of drinking water in a number of rural areas, is first to respond to climate changes. Notably, drinking water resources in riverside water extraction sites of Vilnius, Kaunas and other towns are less sensitive to variations of the groundwater level. At present, shortage of drinking water is not of relevance to Lithuania. Forecasted drought periods during the warm season mean that steps need to be taken to make sure that the population is provided with drinking water in the case of shallow groundwater and wells dry up. The provision of drinking water in the future should be focused on deeper confined aquifers, resources of which are less dependent on climate conditions.

23. Forecasted higher humidity levels, especially in winter and spring, coinciding with rising groundwater level imply possible extension of wet land areas. Rising groundwater level causes sensitivity to pollution, i.e. there is a higher risk of release of pollutants to the groundwater, therefore, focus should be given to the condition of land reclamation equipment.

## Baltic Sea Region

24. The coastal area is located in the western part of Lithuania. It encompasses Klaipėda City Municipality, Klaipėda District Municipality, Neringa Municipality, Palanga City Municipality, Kretinga District Municipality and Šilutė District Municipality. Lithuania's coastal region covers the area of 4.298 $km^2$ and has the 90.66 km coastline (Institute of Geology and Geography, Vilnius University, Public Institution Environmental Centre for Administration and Technology (hereinafter: 'ECAT-Lithuania'), 2007). Klaipėda as the largest city of the coastal region is a major Lithuanian transport node connecting sea, automotive, air and rail ways between the East and the West. The Lithuanian coast is one of the regions that are most sensitive to climate changes in Lithuania and belongs to the south-eastern Baltic region, which will be worst affected by climate change in the 21$^{st}$ century.

25. The Baltic Sea coast within the territory of Lithuania, coastal ecosystems, and local population will be mostly affected by the rising sea level, more frequent storms and violent winds, the sea and the Curonian Lagoon water warming and changing in salinity, increasing aridity and more frequent heat waves, rising air temperatures in summer and winter, increasing frequency of heavy rain resulting in high water and greater intensity of ultraviolet (UV) radiation (Institute of Geology and Geography, Vilnius University, ECAT-Lithuania, 2007). According to the publication "Climate Change: Adaptation to its Impact on the Lithuanian Coast" (*Klimato kaita: prisitaikymas prie jos poveikio Lietuvos pajūryje*) by Arūnas Bukantis et al., shallow and sandy coasts, which specifically prevail in Lithuania, are among the world's most changeable places that are sensitive to environmental changes. The main factors determining the condition of a coast are more frequent storms and repeated stormy winds (that cause sand drifting on the coast and rising sea swell), waves resulting in water rise and streams, sea level variations and man's economic activities.

26. Water level variations in oceans and seas are important climate change indicators. The analysis of multi-annual variation of the average annual sea level in Klaipėda has identified two periods distinctly differing in terms of the intensity of rising sea level. During the period from 1898 to 1975 a relatively slow rise of the average sea level (approximately 0.4 mm a year) occurred, while during the period from 1976 to 2005 a faster rise of the sea level (approximately 3.9 mm a year) occurred. Although such level rising caused no visible inundation of land areas on the Lithuanian coast, storm waves induce deeper coast erosion (Institute of Geology and Geography, Vilnius University, ECAT-Lithuania, 2007). More frequent storms and greater effects necessitate the development and improvement of early warning systems for adverse events.

27. Since the range of measures for the adaptation of the Baltic Sea Region to the climate change is very broad and covers a number of sectors, measures for handling the problems of the Baltic Sea Region are included among the measures implementing goals and objectives of relevant sectors.

## Landscape, Ecosystems and Biodiversity

28. Landscape is an important domestic territorial resource encompassing urban and rural areas, forests, waters and fields and allowing people to live and engage in activities there. Landscape provides a basis for a national identity and contributes to the quality of living. Preservation of landscape uniqueness, landscape management and formation to meet economic, social, cultural, environmental and aesthetic needs of the society is one of the key national goals set in the National Strategy for Sustainable Development approved by Resolution No 1160 of 11 September 2003 of the Government of the Republic of Lithuania (Official Gazette, No 89-4029, 2003; No 121-5215, 2009). According to the Description of Landscape Policies of the Republic of Lithuania approved by Resolution No 1526 of 1 December 2004 of the Government of the Republic of Lithuania (Official Gazette, No 174-6443, 2004), the main landscape policies include ensuring the social, economic and environmental functions of Lithuanian landscape formation; safeguarding landscape protection, use, management and planning and country specific characteristics; maintaining and increasing the country's biodiversity, the territorial spatial structure and potential of landscape; optimising targeted formation of cultural landscape; and harmonising the architectural spatial landscape design.

29. A rural landscape, which takes around 75% of the territory, is the predominant type of landscape in Lithuania. A rapidly extending urban or urbanised landscape accounts for approximately 10% of the territory. The most distinct valuable Lithuanian landscapes include the coastal area (the Curonian Spit, Nemunas delta and the shore of the Baltic Sea), the Samogitian, Aukštaitian, Dzūkian and Sudovian uplands and the valley in the middle Nemunas River.

30. Global climate change, more frequent violent storms, rising of the global sea level, reducing sand resources on the coast of the Baltic Sea and the littoral area and other natural and anthropogenic factors induce coastal erosion, and for this reason, coastal management and the protection of possibly inundated areas need an increased focus and proper funds for the systematic implementation of coastal management measures. The implementation of measures under coastal management programmes has led to the improvement of the condition of the Lithuanian coast in a number of littoral sections, e.g. the central beach section in Palanga,

however, the total length of degraded coastal sections is likely to increase from 25 km in 2008 to 32 km in 2023.

31. According to the data of 2007 of the Programme for the Preservation of Biodiversity and the Planning and Management of Protected Areas for 2007-2013 approved by Order No D1-509 of 4 October 2007 of the Minister of Environment of the Republic of Lithuania (Official Gazette, No 107-4391, 2007), natural and semi-natural ecosystems, including forests, swamps, grasslands, waters and sands, cover more than one third of Lithuania's territory. The majority of plant and animal species are found in forests, as Lithuania is situated in the natural mixed forest zone. According to the EU designation of biogeographical regions, Lithuania lies on the southern edge of the boreal (northern) biogeographical region. Only a minor part of Lithuania belongs to the terrestrial biogeographical region. These circumstances determine a wide diversity of species and natural habitats, which was formed under the influence of the both mentioned biogeographical regions. Lithuania still has natural or semi-natural areas inhabited by a number of plant, animal and fungi species that are extinct in Western European countries. In Lithuania, there are sites of Community importance that are included in the lists annexed to Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora (OJ 1992 L 206, p. 7), as last amended by Council Directive 2006/105/EC of 20 November 2006 adapting certain directives in the field of environment, by reason of the accession of Bulgaria and Romania (OJ 2006 L 363, p. 368).

32. According to the State Environmental Monitoring data of 2011, the biodiversity of natural ecosystems has been gradually improving in the recent years, however particular types of landscape and natural habitat undergo major changes as a result of both renaturalisation processes and spontaneous urbanisation.

33. As regards the fulfilment of environmental needs, Lithuania's forest cover of 33.2% is sufficient. Increasing forest areas does not solve environmental problems, however, it is important in terms of absorption of GHG emissions. Rational land use is an important economic factor. Although the number of unused land areas continues to decrease, the data of the National Land Service under the Ministry of Agriculture of 1 January 2010 show that there was 145,600 ha and 22,700 ha of unused and impaired land respectively. The majority of these land areas (72%) is state owned. Afforestation of such lands would increase forest cover by 3%.

34. Climate change might lead to the appearance of new species in Lithuanian forests or spread of formerly scarce and alien species in Lithuanian forest ecosystems which would affect established phytocenotic relationships. Diverse negative biotic and abiotic factors, such as pest outbreak, diseases, storms and other climatic factors, might affect forest vitality, productivity, its

protective and social functions. Likely climate change (hot and dry summers) might increase the risk of fire breakout.

35. From1995 to 2010, the area of protected natural territories increased by 292,300 ha and now accounts for 15.6% of the overall territory of the country. Implementation of the master plan of the territory of the Republic of Lithuania approved by Resolution No IX-1154 of 29 October 2002 of the Seimas of the Republic of Lithuania (Official Gazette, No 110-4852, 2002) involves the formation of a natural framework in the form of an integral system of natural environmental offset areas safeguarding environmental landscape balance, natural relations between protected areas, other areas or habitats of environmental importance, also plant and animal migration between them. This structure accounts for more than 60% of the territory of Lithuania. Protection and management of the natural framework and other protected areas and regulation of economic activities in such areas ensure preservation of the country's landscape and biodiversity.

36. The determination of the impact of climate change is hampered by evidently insufficient research of effects on ecosystems and biodiversity carried out in Lithuania. Seasonal variations related to the population abundance and migration time and routes of individual animal species that have been observed for a few recent decades may be associated with climate change. For this reason, in Lithuania, research and protection of biodiversity, flora and fauna, also designation of protected areas, and their management in particular, sometimes fail to fully take account of natural processes and climate change interrelationships. Until now, no comprehensive study of biodiversity has been carried out in Lithuania, and therefore it is difficult to answer what effects climate change has or specifically will have on the biodiversity of our country.

37. Climate change might facilitate spreading, reproduction and survival of genetically modified organisms (hereinafter: 'GMO'). Spreading of GMOs might have an irreversible effect on biodiversity and ecosystems.

**Ambient Air Quality**

38. In a few recent years, the ambient air quality in Lithuanian cities was quite good, i.e. the annual number of registered cases of non-compliance with the standard ambient air quality was not greater than the permitted number of days of exceeding the standard. In 2010, in some agglomerations of the country the levels of sulphur dioxide, nitrogen dioxide and carbon monoxide increased, at the same time there was a temporary increase of the concentration of

particulate matter observed mostly in relation to the decommissioning of the Ignalina Nuclear Power Plant.

39. Lithuania's anthropogenic contribution to the global $CO_2$ amount is estimated to account for 0.05%, however, such a low emission level, in fact, constantly contributes to the increasing greenhouse effect in the atmosphere.

40. Air quality in Lithuania depends on interaction between local sources of ambient air pollution and global atmospheric circulation processes. Pollutants emitted by vehicles, industrial and energy facilities in cities, increase of pollution from thermal power stations after the decommissioning of the Ignalina Nuclear Power Plant, pollution from other European regions, taking into account the synergistic effect of the increased GHG emissions in the atmosphere, preclude improvement of the ambient air quality in the long-term perspective.

41. In implementing the 1979 Convention on Long-range Transboundary Air Pollution (Official Gazette, No 29-919, 2001) and the 1999 Protocol to the 1979 Convention on Long-range Transboundary Air Pollution to Abate Acidification, Eutrophication and Ground-level Ozone ratified by Law No IX-2008 of 5 February 2004 of the Republic of Lithuania (Official Gazette, No 44-1438, 2004) (hereinafter: 'the Gothenburg Protocol'), Lithuania committed to ensuring that in 2010 and each successive year, sulphur dioxide, nitrogen oxide, non-methane volatile organic compounds and ammonia emissions to the atmosphere do not exceed 145,000 tons, 110,000 tons, 92,000 tons and 84,000 tons respectively.

42. Lithuanian and EU legal acts and action plans regulate emissions released to the ambient air and facilitate control of the ambient air quality. The Environmental Protection Agency collects data using the ambient air monitoring system and provides objective information about variations in emissions and concentration in the ambient air of atmospheric pollutants regulated by the Protocols to the Convention on Long-range Transboundary Air Pollution − sulphur dioxide, nitrogen oxides, volatile organic compounds, ammonia and particulate matter, also heavy metals, persistent organic and other pollutants, GHG emissions and ozone-depleting substances − and other factors causing climate change, acidification and eutrophication.

43. The measures being implemented to reduce GHG emissions will contribute to the existent and planned measures intended for the improvement of the ambient air quality and effectively reduce ambient air pollution.

**Waste**

44. In 2010, GHG emissions of the waste management sector amounted to 1.161 million tons of $CO_2e$, i.e. about 5.58% of the overall national GHG emissions, excluding the absorption of GHG emissions by the LULUCF sector.

45. The main GHG produced by the waste sector is methane ($CH_4$). In 2010, the waste sector emitted 1.079 million tons of methane in $CO_2e$. The major source of methane emissions in the waste sector is biodegradable waste disposed in landfills (produced 88% of methane in 2010) and methane generated by the wastewater sector (accounted for 12% in 2010). Notably, gases produced in landfills may be burned in a gas flare or used in production of heat or electricity. In 2011, municipal waste was not burned in Lithuania. Lithuania has great potential to reduce GHG emissions in the waste sector. For this purpose, waste incineration facilities need to be built to produce heating and electricity by incinerating non-recyclable waste with energy content and reduce the volume of waste in landfills, which reduce GHG emissions by landfills.

46. According to municipal administrations, 94% of the population were provided with the municipal waste management service from 2010 to 2011. Since 2009, all waste has been disposed in landfills that fulfil EU requirements. Industrial biodegradable waste is disposed in landfills together with municipal waste. Waste disposal in landfills remains the cheapest waste management method, and, as a result, landfills receive even 91% of municipal waste and 62% of industrial waste. In 2010, landfills accepted 86% of municipal waste and 55% of industrial waste. This shows a drop in the volume of municipal and industrial waste disposed in landfills. In 2010, as compared to 2009, there was an increase in both generated (3,647,000 tons in 2009 and 3,992,000 tons in 2010) and managed industrial waste or waste from other economic activities. In 2009 and 2010, annual municipal waste generation per capita was 361 kg and 381 kg respectively, while the forecast annual municipal waste generation per capita in 2010 and 2050 amounts to 464 kg and 600 kg respectively.

47. Biodegradable waste accounts for 60% of the municipal waste flow. In the recent years, Lithuania has rapidly equipped green waste composting sites, however collected and managed green waste accounts only for a few per cent of the biodegradable waste share in municipal waste.

48. Projects are implemented in Lithuanian regions to extend the municipal and industrial waste management system and at the same time to ensure biodegradable waste management. Waste treatment facilities are planned to be built in the biggest Lithuania's cities by 2014 to process biodegradable waste. In 2020, the maximum permitted volume of biodegradable waste to be disposed must not exceed 253,900 tons a year.

49. Due to the insufficient capacity of installed sludge treatment facilities, the excess of sludge accumulated in municipal wastewater treatment plants has negative effect on climate

change. The National Strategic Waste Management Plan approved by Resolution No 519 of 12 April 2002 of the Government of the Republic of Lithuania (Official Gazette, No 40-1499, 2002; No 122-5003, 2007) establishes that the disposal of sewage sludge in landfills, sludge storage sites or other reservoirs must be terminated no later than by 2013, therefore at least 50% of accumulated sludge is likely to be treated since 2013.

50. The implementation of measures defined in the National Strategic Waste Management Plan is expected to reduce GHG emissions in the waste sector by more than a half. The main threat to the reduction of GHG emissions in the waste sector is posed by the delayed implementation of planned measures.

## Forestry

51. In the last decade, the country's forest cover was increasing. According to the Lithuanian Department of Statistics, on 1 January 2011 the forest area occupied around 2.17 million ha, or 33.2% of the territory of the country. Since 1 January 2003, the forest area and the country's forest cover have increased accordingly by 125,000 ha and 1.9%. According to the national forest inventory, on 1 January 2011 the overall volume of timber amounted to 489.480 million $m^3$. The largest forest area is occupied by coniferous stands (56.3%, while deciduous stands take 43.7%) Forest resources (areas and volumes of timber) and gradually increasing forest cover enable meeting the society's needs in a balanced manner, developing forestry activities and decreasing the negative effects of climate change.

52. Due to their geographical location, meteorological factors and stand structure, Lithuanian forests are slightly more flammable than average, therefore a few hundred fires break out every year, but owing to organised fire safety, are usually prevented from spreading and burning large areas.

53. As a result of organised sanitary forest protection, the overall condition of stands is quite good, though during particular periods, wide spread of pests and diseases caused considerable damage.

54. The National Programme of Forestry Development for 2012-2020 approved by Resolution No 569 of 23 May 2012 of the Government of the Republic of Lithuania (Official Gazette, No 61-3058, 2012) aims at implementing Lithuania's long-term forestry policy which would be in harmony with policies of other related areas based on the country's traditions, EU rules of law, international conventions, resolutions, agreements and programmes, and defining forestry development goals and objectives for the period until 2020. The Programme includes the strategic forestry development goal, other forestry development goals, objectives to reach these

goals and assessment criteria. The Annex to the Programme lays down assessment criteria for the implementation of the Programme and their values for 2011, 2015 and 2020. One of the goals of the strategy is to increase forest cover by afforesting unused land or land that is barely suitable for agriculture. According to the data of the National Land Service under the Ministry of Agriculture of 1 January 2010, the country had 168,300 ha of land not used or unsuitable for agriculture, including 145,600 ha of land not used for agriculture and 22,700 ha of impaired land. Afforestation of the entire area would increase forest cover in the country by approximately 3%. The Programme envisages a sevenfold annual increase in the collection of logging waste for biofuel production – from 70,000 $m^3$ to 500,000 $m^3$.

## Agriculture

55. In the recent decades, Lithuania's agriculture has become one of the most stable Lithuanian sectors of economy. Formation of private property relations and creation of legal conditions for restitution of citizens' ownership rights to land, forest and water bodies has facilitated the development of the land market, however, the goal of the Lithuanian agricultural policy to strengthen production and economic capacity of family farms, as the basis of agricultural production, has not been achieved yet, therefore farm structure should be improved by creating incentives to encourage the development of medium-sized family-owned commodity farms and establishing favourable social and economic conditions for sustainable development of rural areas. Targeted agricultural policy of Lithuania has been beneficial for the uniform development of the network of agricultural scientific, training and consulting institutions which enables professional training of farmers and rural residents, while the huge intellectual potential allows developing agricultural production technology and innovations; successful development of self-government by rural population; preservation of the scenic landscape which facilitates the development of recreational possibilities and new services. These strengths of agriculture and special focus on the agri-environmental protection, production efficiency and improvement of the farm structure create conditions for the stable growth of the sector and wealth creation in Lithuanian rural areas.

56. According to the data of the publication "Stock of Land of the Republic of Lithuania on 1 January 2012" prepared by the National Land Service under the Ministry of Agriculture in cooperation with the State Enterprise Centre of Registers, agricultural areas cover 3.46 million ha, including arable land taking 2.93 million ha and grassland and pastures taking 0.48 million ha. Such structure of land enables sustainable and balanced development of agricultural production. According to the data of the Registry of the State Enterprise Agricultural

Information and Rural Business Centre of 1 January 2012, holdings less than 10 ha of area were prevailing in Lithuania and accounted for 78.55% of all holdings (85.7% on 1 January 2011). On 1 January 2012, large farms with more than 100 ha of agricultural area accounted for 1.38% (0.93% on 1 January 2011), farms with 10 to 50 ha of agricultural area accounted for 17.56% (12.03% on 1 January 2011), farms with 50 to 100 ha of agricultural area accounted for 2.13% (1.34% on 1 January 2011) of all holdings. After the decrease of the overall number of holdings, the percentage of medium-sized and larger holdings increased.

57. In the northern, central and south-western part of Lithuania, the natural productive capacity of land allows successful development of mixed farms (dairy and meat, growing wheat, rye, fruit and vegetables, rape, sugar beet or other plants and animals specific to these latitudes). These areas are favourable for developing environmentally friendly and organic agricultural production.

58. In 2010, value added generated by agriculture and related activities accounted for 2.7% of the gross value added. The gross value added generated by agriculture and related types of activity has been recently decreasing. The decrease of the gross value added could have been determined by the decline of the volume of agricultural production caused by unfavourable climate conditions and poorer yield of agricultural plants as a result of soil erosion and degradation spurred by intensified use of chemicals-based technologies in agriculture and faster growth of other industries. Soil degradation, loss of biodiversity and intense extreme weather phenomena increasing as a result of climate change and seasonal changes in precipitation patterns affect crop yield, livestock farming management and production places. In this respect, there is the need to develop and implement measures for crisis prevention and crisis management.

59. The concept of the Long-term Livestock Farming Development Strategy of the Republic of Lithuania for 2020 establishes that livestock farming is an important area of Lithuanian agriculture. The country has favourable natural conditions for the development of this area, livestock raising traditions and experience. Livestock farming, especially cattle breeding, is significant in providing Lithuanian population with a variety of foods and is an important source of Lithuanian export. Livestock farming products account for approximately half of the agricultural production (52.5% in 2010). Global warming and increasing number of extreme phenomena will directly affect livestock health, growth and production, also their reproduction. Indirect effects are predicted as a result of changed yield of pastures and fodder crops and distribution of livestock diseases.

60. The main measures in the area of climate change adaptation are related to the development of plant species best suited to the new conditions and the creation of new breeds,

which require research and monitoring. Raising awareness of economic entities engaged in agriculture in the areas of recovery and maintenance of soil quality and climate change would facilitate the implementation of effective innovations friendly to biodiversity and natural resources.

61. In 2010, agriculture accounted for approximately 21.4% of the GHG emissions of the country (excluding the LULUCF), or 4.458 million tons of $CO_2e$. In 2010, as compared to 1990, GHG emissions from agriculture decreased by 55.36%, mostly as a result of the decline in the number of livestock. For Lithuania to achieve compulsory annual GHG emissions reduction goals by 2020, non-ETS sectors are allowed maximum 2% annual increase in GHG emissions in the agricultural sector, as compared to the emissions level of this sector in 2010.

62. In the Lithuanian agricultural sector, sources of GHG emissions include nitrous oxide ($N_2O$) from the soil used for agricultural purposes (accounted for 56.27% of agricultural emissions in 2010), methane emissions from the fermentation process in livestock and poultry intestines (accordingly 26.8%) and methane and nitrous oxide gases produced during manure management (accordingly 16.9%). Nitrous oxide and methane gases account for about 63% and 37% of all GHG agricultural emissions respectively.

63. Soil in forests and agricultural areas is a natural $CO_2$ sink. The European Soil Charter of 1972 approved by Resolution No (72) 19 of the Committee of Ministers of the Council of Europe and reviewed in 2003 demonstrates that the importance of soil protection is increasingly recognised on the international level. The Kyoto Protocol underlines that soil contains main $CO_2$ reserves which need to be protected and maximised. The Convention on Biological Diversity ratified by Lithuania in 1995 (Official Gazette, No 69-1662, 1995) defines biological diversity of soil as the area requiring special attention.

64. In Lithuania, the most serious threats posed to the soil, as a natural and economic resource, include, in agricultural areas, farming methods that are inappropriate in terms of soil fertility maintenance and, in urbanised areas and their environment, reduction of areas through building on them and more active surface erosion.

65. Rising temperature and extreme air phenomena cause high GHG emissions from the soil at the same time posing the risk of reduction of organic matter. This leads to the assumption that soil degradation will continue, probably, at a higher rate.

66. The main measures for the reduction of GHG emissions are the development of sustainable and efficient agricultural practice and alternation of activities, for example, grassland farming where no agriculture takes place, alternation of animal species, organic and environmentally friendly agriculture, change of time of pasture, replacement of manure management systems or implementation of biogas facilities. Major obstacles to the development

of biogas facilities in Lithuania include lack of funds, limited use of thermal energy generated, size of farms and restricted connection to natural gas, electricity and heat supply infrastructure.

**Energy sector**

67. Increase of energy efficiency and promotion of energy generation from renewable energy sources (RES) and nuclear power are planned as major measures targeted at reducing GHG emissions in the energy sector.

68. Within the last decade, Lithuania's energy dependency on import, compared to the EU average, varied from a slight excess to decline. According to the Department of Statistics (Statistics Lithuania), Lithuania's dependency on imported organic fuel, after the decommissioning of the Ignalina Nuclear Power Plant in 2009, significantly increased from 48.8% in 2009 to 79.4% in 2010 and remarkably exceeded the EU average. In 2010, as compared to 2009, the import of fuel and energy increased by 15.3%, including the rise in import of natural gas and coal by 13.5% and even 48.8% respectively.

69. By comparison with 2009, energy consumption increased in 2010 by 3.7%; according to Statistics Lithuania, final energy consumption was distributed among sectors in 2005-2010 as follows: 40-47% for households and services sector; 32-38% for transport; 17-21% for industry; 2.3% for agriculture; 0.8-1.2% for construction and 0.1% for fishing.

70. Although energy efficiency is gradually increasing in all sectors, its potential has not been fully realised. According to the study conducted for the Commission in 2009 − *Fraunhofer-Institute for Systems and Innovation Research, ENERDATA, Institute of Studies for the Integration of Systems ISIS. Energy Savings Potentials in EU Member States, Candidate Countries and EEA Countries commissioned by the European Commission; Directorate-General Energy and Transport. Report 2009* − the overall country's economic potential of the final energy savings in 2020 will amount to 537 kilotonnes of oil equivalent (ktoe) in the case of low promotion (hereinafter: 'LP') and 759 ktoe in the case of high promotion (hereinafter: 'HP'). The greatest potential for final energy savings in the transport sector is 44% of the overall potential of final energy savings in the LP case and 41% in the HP case. In industry, the potential amounts to 27% and 20% respectively, while in the case of households it accordingly equals 15% and 24%. The biggest fuel savings potential for heating by households in 2020 is 44% in the LP case and 56% in the HP case. The biggest electricity savings potential in industry is 54% in the LP case and 55% in the HP case. In the services sector, the potential amounts to 38% and 35% respectively, while in the case of households it accordingly equals 8% and 10%.

71. In 2010, the total GHG emissions in the energy sector, including transport, amounted to 12.848 million tons of $CO_2e$, i.e. approximately 61.7% of the total volume of the country's GHG emissions (excluding the LULUCF). Therefore, implementation of measures in the energy sector will allow for the achievement of maximum efficiency in the nationwide reduction of GHG emissions.

72. The major sources of GHG emissions in the Lithuanian energy sector include fuel combustion for energy production (carbon dioxide emissions account for the largest portion) and outages of volatile emissions, for example, in natural gas transmission networks (carbon dioxide and methane gas emissions account for the largest portion).

73. It is predicted that the increase of the country's GHG emissions will be mostly influenced by increased electricity demand and energy consumption in the transport sector. After the decommissioning of the Ignalina Nuclear Power Plant, the GHG emissions in the Lithuanian electricity sector particularly depend on the scope of import of electricity, use of RES for electricity production and implementation of measures increasing electricity efficiency.

74. To reduce dependence on the imported fuel and the impact of organic fuel on the environment, it is highly important that RES are deployed as wide as possible. Wider use of RES for electricity and heat energy production and transport facilitates reduced use of imported fossil fuels, especially natural gas and oil products, which are becoming increasingly expensive. In 2011, RES accounted for 20% of Lithuanian energy sources, while 78% of energy was imported from a single supplier and the remaining 2% were left for other import alternatives.

75. In terms of GDP growth, domestic energy production from environmentally friendly sources would imply decrease in fuel import, creation of jobs and GDP, increase of salary, social insurance contributions and tax revenue.

76. Taking into consideration the increasing extremity of climate conditions and seeking climate change adaptation in the energy sector, it is planned to assess possibilities of implementing a number of solutions and engineering infrastructure, including electricity supply, with a view to ensuring uninterrupted use of electricity, such as building of underground networks, implementation of smart grids, etc.

**Transport**

77. During a few recent years the share of the transport, storage and communications sector in Lithuania's GDP was increasing and accounted for 13.6% in 2010. The growth of the sector also led to the increase in final energy consumption. The transport sector consumes 32-38% of final energy, where 91% of this volume is consumed by road transport. The transport

sector mainly consumed petroleum products, while the household sector predominantly consumed energy from RES and centralised heat energy. In 2010, compared to 2009, the consumption of fuel by all types of road transport was by 2.6% higher, however, the increase was observed only in the consumption of diesel fuel (13.7%), while the consumed volume of petrol and liquefied gas was decreasing (19.5% and 1.6% respectively). By type of energy, diesel fuel takes the largest share of the energy consumption, which in 2010 accounted for 61%. In 2007-2010, transport biofuel and electricity accordingly accounted for approximately 3% and 0.5% of the final energy consumption in the transport sector.

78. According to the statistics of 2009, there were 506 passenger cars per 1,000 inhabitants. This number is higher than EU average and has the tendency to continue growing. The vehicle fleet predominantly consists of cars of the Western European, Japanese and South Korean origin. In 2009, vehicles older than 10 years accounted for 84% of passenger cars and 79% of buses, motor coaches and trolleybuses.

79. The level of the Lithuanian railway electrification is low, as 122 km of electrified railways account for approximately 7% of the total length of railways operated in 2010 (1,767.7 km). The level of the Lithuanian double track electrification reaches 30.8% (117 km out of 380.4 km are electrified). As a result of the financial crisis, passenger transport by domestic routes declined, but started growing again in 2011. In the future, electrification of viable passenger traffic routes would have a positive effect on the reduction of emissions per passenger kilometre.

80. According to the Ministry of Agriculture of the Republic of Lithuania, in 2010 the country produced 88,800 tons of biodiesel and 39,300 tons of bioethanol. The total production of transport biofuel by caloric density amounted to 103,100 tons, which exceeds by 26% the assessment criteria set in the Programme for the Promotion of Biofuel Production and Consumption for 2004-2010 approved by Resolution No 1056 of 26 August 2004 of the Government of the Republic of Lithuania (Official Gazette, No 133-4786, 2004).

81. The need to raise energy consumers' awareness and increase energy efficiency in the transport sector led to supplementing of the Procedure for Primary Training of Drivers approved by Order No 3-493 of 12 August 2010 of the Minister of Transport and Communications of the Republic of Lithuania (Official Gazette, No 99-5151, 2010). The Procedure includes requirements for providing basic training to a would-be driver in relation to economical car driving, emphasising that this mode of driving is the safest and most environmentally friendly. According to the data of the State Enterprise "Regitra", 43,804 Lithuanian residents received the beginner driving licences in 2010 (43,329 persons in 2011).

82. In 2010, GHG emissions of the transport sector amounted to 4,565,000 tons of $CO_2e$ (as compared to 4,435,000 tons of $CO_2e$ in 2011). This accounts for about 22% of the total GHG

emissions of the country, about 36% of GHG emissions produced by fuel combustion and around 31.6% of GHG emissions of the non-ETS sector. In 2010, GHG emissions produced by road transport (4,100,000 tons of $CO_2$e), inland water and sea transport (17,000 tons of $CO_2$e), railway transport (190,000 tons of $CO_2$e) and aviation (1,600 tons of $CO_2$e) accordingly accounted for 90%, around 0.38%, 4.2% and 0.036% of the GHG emissions of the transport sector. For Lithuania to achieve compulsory annual GHG emissions reduction goals by 2020, non-ETS sectors are allowed maximum 1% annual increase in GHG emissions in the transport sector compared to the emissions level of this sector in 2010.

83. In 2010, Lithuania used 392.5 km of inland waterways. From 2005 to 2010, the share of inland water transportation of goods increased from 0.54% to 0.86% of the total volume of carried goods. In the same period, the share of the total volume of goods carried by inland water and sea transport increased from 4.37% to 6.74%

84. According to the data of Statistics Lithuania of 2010, air transport accounted for 0.08% of the country's GDP. In 2010, 735 aircraft (271 aeroplanes, including 32 commercial aeroplanes) were registered with the Civil Aircraft Register of the Republic of Lithuania, which is the largest number since 2000. In 2010, as compared to 2005, the share of goods carried by air transport decreased more than by half (5.55% in 2005 as opposed to 2.5% in 2010). In recent years, the share of passengers carried in Lithuania by air transport remained unchanged and accounted for 0.2% of the total number of passengers carried. According to the data of the "Study of Lithuanian Air Transport Development for the Preparation of the Lithuanian Air Transport Programme" of 2010 conducted for the Ministry of Transport and Communications of the Republic of Lithuania, the number of air passengers in the Republic of Lithuania per capita, excluding passengers of the local air transport market, was 0.8 per capita in 2008 (as compared to 1.9 in 15 EU continental countries). The forecast is that in 2025 each Lithuanian resident will have 1.84 flights per year, and the total number of passengers at the airports of the Republic of Lithuania will reach 6.24 million passengers per year. It should be noted that the growth of air passenger flow leads to the increase in GHG emissions.

85. The main measure for the reduction of GHG emissions in the transport sector is the development of a multimodal and intermodal system and combination of transition to alternative and less polluting energy sources, such as electricity and biofuel. In that case, passengers and goods may be carried by modes of transport which is most effective in terms of energy efficiency, while the use of alternative fuels will contribute to the reduction of emissions.

**Industry**

86. Before 2008, value added generated by the industrial sector continued to grow and, according to the data of Statistics Lithuania, in 2008 amounted to 21.6% of the total value added (at the prices of the time). Economic downturn and decline in production led to a significant reduction of not only value added (17.5% in 2009, compared to 2008), but also energy consumption in the industrial sector (12.6% in 2009, compared to 2008). In 2010, the share of the industrial sector in Lithuania's GDP increased and accounted for 23.3%, however, even with the increase of the final energy consumption by 9.4%, compared to 2009, the annual pre-crisis consumption level has never been reached. By type of energy, natural gas takes the largest share of fuel consumption, which in the balance of 2010 amounted to 32%. From 2006 to 2010, biofuel, such as wood, wood and agricultural waste, biogas and liquid biofuel, electricity and heat energy accordingly accounted for 8-9% 24-25.5% and 18-21% of the final energy consumption in the industrial sector. According to the data of 2010, the industrial sector employs 17.7% of workers.

87. Compared to 1990, in 2010 GHG emissions of the industrial sector dropped by around 60% mainly as a result of a decline in production. In 2010, GHG emissions of the industrial sector accounted for 24.3% of the total volume of the country's GHG emissions (excluding the LULUCF). The implementation of measures in the industrial sector is important in terms of the achievement of goals of GHG emissions reduction in EU ETS sectors and non-ETS sectors.

88. The new EU ETS period after 2013 and tightened rules for the free allocation of emission allowances to take effect will, no doubt, affect EU ETS industrial installations. Installation will have to invest in low-carbon technologies, otherwise they will need funds to obtain additional emission allowances. Due to the economic conditions, not all Lithuanian undertakings are able, in the short term, to make investments in reduction of pollution or allocate funds for obtaining additional emission allowances. One of the reasons for increased production costs of industrial undertakings is a possible growth of the price of emission allowances. This may be decisive when considering moving of companies' production to the countries with no or smaller commitments to reduce GHG emissions. To solve this issue, the Commission approved Commission Decision No 2010/2/EU of 24 December 2009 determining, pursuant to Directive 2003/87/EC of the European Parliament and of the Council, a list of sectors and subsectors which are deemed to be exposed to a significant risk of carbon leakage (OJ 2010 L 1, p. 10), as last amended by Commission Decision 2011/745/EU of 11 November 2011 (OJ 2011 L 299, p. 9) containing the list of undertakings subject to additional exemptions related to free allocation of emission allowances. The list includes cement and lime production, petroleum product processing, ammonia and nitric acid production and other installations. Application of state aid

measures in the transition of industrial installations to the use of low-carbon technologies in production would contribute to the development of low-carbon economy.

89. The development of carbon capture and storage (hereinafter: 'CCS') technologies provided by Directive 2009/31/EC of the European Parliament and of the Council of 23 April 2009 on the geological storage of carbon dioxide and a Roadmap for moving to a competitive low carbon economy in 2050 is relevant to the industrial sector and beneficial to the achievement of international emission reduction goals. In order to achieve a significant reduction in carbon dioxide emissions into the atmosphere, released carbon dioxide may be separated at the place of production (for example, industrial installations), compressed and transported to the final storage place. In Lithuania, these activities are regulated by the Law of the Republic of Lithuania on the Geological Storage of Carbon Dioxide (Official Gazette, No 91-4325, 2011). This Law establishes the rights, duties and liability of persons in relation to the exploration, use and closing of geological carbon dioxide storage sites, national management of the geological storage of carbon dioxide, conditions of issue, extension and cancellation of permits for exploration of geological carbon dioxide storage complexes and conditions of issue, renewal and cancellation of permits for carbon oxide storage on the territory of the Republic of Lithuania, its special economic area and continental shelf, provisions related to the operation and closing of a carbon dioxide geological storage site and the period after closing of the carbon dioxide geological storage site, and the procedure of dispute settlement and international cooperation. Practical application of CCS technologies in Lithuania in the near future is quite unlikely due to high cost of technology and absence of storage sites on the territory of the country.

90. Fluorinated greenhouse gases (hereinafter: 'F-gases') are quite widely used in different installations and processes. F-gases are mostly emitted as a result of maintenance, use and disposal of refrigeration and air-conditioning equipment or fire fighting systems, also the use of solvents and aerosols and during certain industrial processes. Due to a quite high global warming potential, F-gases have a significant impact on climate change and their management is regulated by both international and EU legal acts. Regulation (EC) No 842/2006 of the European Parliament and of the Council of 17 May 2006 on certain fluorinated greenhouse gases (OJ 2006 L 161, p. 1), as last amended by Regulation (EC) No 1137/2008 of the European Parliament and of the Council of 22 October 2008 (OJ 2008 L 311, p. 1), aims at reducing emissions of F-gases that fall within the scope of the Kyoto Protocol. F-gases management undertakings are certified in Lithuania in accordance with the procedure established by the Law of the Republic of Lithuania on Financial Instruments for Climate Change Management.

91. According to the data of the National greenhouse gas inventories report of 1990-2010, Lithuania started using F-gases in newly implemented systems in 2003. Experts estimate

that the volume of F-gases used in refrigeration systems grew, on the average, by 30% per year and between 2003 and 2004 reached the 45% growth. In 2010, F-gases amounted to 39,000 tonnes of $CO_2e$, or 0.19% of Lithuania's GHG emissions, while in the EU F-gases account for 2% of the overall EU GHG emissions.

92. In September 2011, the Commission submitted a report on the application, impact and suitability of certain fluorinated greenhouse gases (Regulation (EC) No 842/2006) (COM (2011) 581 final), which aims at assessing the application, impact and adequacy of Regulation (EC) No 842/2006 of the European Parliament and of the Council. The report showed a great potential on the EU level for the replacement of F-gases with other substances in relevant sectors and the possibility of avoiding up to two thirds of emissions of F-gases, as compared to the current F-gases policy. When establishing new requirements for the use of F-gases and improving the current ones, it is important to ensure cost-efficiency of the implementation of the new requirements and assess the environmental, economic and social impact and analyse the impact in the case of presence and absence of global efforts in this area.

**Public Health**

93. The currently observed global climate warming has a direct and indirect impact on human health. Based on the reviews of World Health Organisation Regional Office for Europe, it is assumed that ageing trends and increasing climate extremity may be observed in the period before 2020, and in the long run, may pose further risks to public health.

94. Climate change is projected to cause the increase in the rate of communicable diseases and risk of outbreaks, increasingly frequent occurrence of heat waves, sudden frosts and daily variations in weather conditions will threaten human health. People who react to weather changes are particularly sensitive to such variations; this will also affect the sick and the elderly and may have an impact on the newborns, which might cause the increase of morbidity or even higher mortality rates. Increased mortality was observed during the last heat waves, while sudden rush of Arctic air during the last warm winter caused a significant growth of the number of cold injured and frostbitten persons. The increasingly frequent occurrence of stronger natural disasters also has a negative impact on human mental health. Depletion of the ozone layer and increase in the amount of UV radiation reaching the Earth's surface cause various diseases, such as cataract or skin cancer. Already today there are a greater number of cases of skin cancer and related deaths in Lithuania. The change of the groundwater level and floods will have an impact on the quality of water, which might lead to the higher risk of diseases related to the quality of water. Variations in the length of the vegetation period and high pollen times bring new problems for

the prevention and treatment of allergic diseases. Increase of air pollution, which is associated with climate change, also negatively affects public health. Recently, spread of ticks carrying such diseases as tick-borne encephalitis or Lyme disease has been observed across all territory of Lithuania, Eastern Baltic region and Scandinavia. Global warming will allow further spread of ticks and bloodsucking insects.

95. In implementing national strategy measures for the implementation of the United Nations Framework Convention on Climate Change until 2012, Vilnius University carries out research aimed at determining the impact of pollen on persons suffering from hay fever in relation to climate change. For a number of years, Šiauliai University has been engaged in aerobiological monitoring, however, as a result of short sequence of observations and limited scope on the country level, data obtained and published show interrelations among weather conditions, phenological phenomena and human allergic reactions rather than the trends of occurrence of allergic diseases caused by climate change. Scientists from Vilnius University, Šiauliai University and Institute of Agriculture, Lithuanian Research Centre for Agriculture and Forestry, are involved in the national aerobiological research infrastructure creation project in order to define methods of prevention, diagnostic and treatment of allergic diseases caused by plant pollen and fungi spores, including allergic diseases the incidence of which is growing with climate change.

96. Lithuania does not have a separate programme for public health management and financing which would provide a basis for carrying out and coordination of target activities in relation to the prevention of diseases among the population caused by climate change. As a result, insufficient attention is devoted to the protection of human health under climate change conditions. There is a lack of specialised studies to determine the extent of climate impact (prevention of diseases and certain illnesses), also for the purposes of education and training.

97. A system, the implementation of which is coordinated by the Centre for Health Training and Disease Prevention, has been developed to inform the public of climate change and their threats to human health.

## Spatial Planning and Regional Policy

98. EU documents providing climate change management policy guidelines note that paths of development should be more integrated in the regional policy and territorial aspects should be taken into consideration. For example, guidelines on the implementation of “A Roadmap for moving to a competitive low carbon economy in 2050” establish that one of the possible methods of implementation of development priorities is to revise legal acts on spatial

planning in order to ensure their full conformity to climate change goals. Spatial planning documents are used as an instrument for the implementation of planning of spatial organisation, management and use of territories and protection measures. The main function of spatial planning, which is to harmonise different interests at the planning stage, encompasses the achievement of both the reduction of GHG emissions and climate change adaptation goals.

99. The role of spatial planning will be of particular significance during the implementation of goals related to the development of engineering infrastructure and industry and adaptation measures in forestry, landscape management sectors and other important areas. On the municipality level, spatial planning must be long-term to enable business and industry concentration on the territories with as well-developed infrastructure as possible. Concentrated industry with an infrastructure developed on the territorial level would not only contribute to the achievement of GHG emissions reduction goals, but also have positive effects on the improvement of the quality of the environment.

100. In order to ensure integrated maritime spatial planning of the country, also consistency of maritime and land territory solutions, including solutions related to climate change adaptation in the Baltic Sea Region and implementation of climate change mitigation measures, such as preparation of a scheme for the arrangement of wind power plant construction, etc., the master plan of the territory of the Republic of Lithuania is being supplemented with the maritime plan covering the territorial waters of the country and the economic exclusive zone.

101. The coastline of the Republic of Lithuania has been determined in order to better organise the conservation, use and management of coastal areas that are most vulnerable to climate change. This state-owned land on the territory of approximately 100 m wide coastline and an offshore area of up to 20 m isobath is an exclusive property of the State. A special continental coastline management plan has been approved by Order No D1-601 of the Minister of Environment of the Republic of Lithuania of 28 July 2011 (Official Gazette, No 98-4628, 2011).

102. On 16 October 2009, at the meeting in Vilnius, the countries of the Baltic Sea Region (BSR) cooperating in the area of spatial planning (cooperation of 11 ministers from the BSR countries responsible for spatial planning − VASAB) chaired by Lithuania endorsed the Vilnius Declaration and the Long Term Perspective for the Territorial Development of the Baltic Sea Region. One of the six challenges of the Vilnius Declaration concerning the territorial integration of the entire region defined by the ministers is strengthening of the marine spatial planning. They also referred to the need to develop maritime spatial planning, its instruments and methods. One of the three thematic areas of the Long Term Perspective for the Territorial Development of the BSR is strengthening of maritime spatial planning and management.

103. By using available measures and regional support instruments, EU supported such BSR projects as the *BaltSeaPlan*, which seeks to implement an integrated approach to maritime spatial planning and create a common vision for the maritime strategies of the countries of the Baltic Sea Region; the recommendations of the commission on the 1992 Helsinki Convention on the Protection of the Marine Environment of the Baltic Sea Area (Official Gazette, No 21-499,1997) and of VASAB are being implemented, reference is also made to the results of the previous *BaltCoast*, *Balance*, *Coastman*, *EWW* and *PlanCoast* maritime projects supported by the EU. Integrated land and maritime spatial planning and management must support the sustainable use of resources of the Baltic Sea environment and of the sea. The issue of climate change is included in all EU regional policies and determines the functioning and interaction among the programmes. Various networks and programmes encompass different aspects of the regional policy, enable people to share their knowledge and develop relations among different types of investment. Such framework programmes include ESPON, INTERREG IVC, URBACT and the Baltic Sea Region Programme 2007-2013. Major projects related to regional climate change are *BalticClimate*, *BALTADAPT* and *FUTUREforest*.

103.1. Research, studies and monitoring of development trends in three main directions under the ESPON 2013 Programme (*European Spatial Planning Observation Network*) focus on such climate change related aspects as climate change, natural resources of the environment, threat and risk prevention; river basin management, renewable energy and energy efficiency. As part of the EU-wide considerations of the possible impact of climate change on regions, the aggregate potential impact on the territory of Lithuania was assessed as “none or marginal”, while in the case of Vilnius County it was distinguished as “low level negative”. Lithuania has also been assessed in terms of its possible vulnerability to climate change. Similarly, impact and possible vulnerability to climate change is also expected in the case of a number of territories of the Baltic Sea countries. However, Western European countries, especially the Netherlands, Spain, Italy and Ireland are expected to be exposed to the average or even highest negative impact. In terms of its capacity to adapt to the impact of climate change, Lithuania, as, for instance, Latvia, Estonia, Austria or Hungary, has been evaluated as having low capacity to adapt to such impact. In this context, Scandinavian countries have been assessed as having the highest adaptation capacity. The imbalance between the north and south, which is likely to occur, where some EU regions will not be affected or even benefit from climate change, and some regions will be exposed to a highly negative impact, may pose difficulties in ensuring territorial cohesion in the EU. Research distinguishes the following regions as most vulnerable: (1) densely populated territories of coastal regions heavily relying on summer tourism; (2) mountain regions

heavily relying on winter and summer tourism; and (3) densely populated agglomerations for which the urban heat island problem may become highly relevant.

103.2. The INTERREG IVC programmes promote mutual cooperation among regions and Member States, which forms part of the EU's commitment to create added value for taxpayers. The INTERREG IVC programme for innovation and the environment in the period from 2007 to 2013 is closely related to the revised Lisbon Strategy, i.e. EU's focus on sustainable development, innovation and employment. Some achievements have been made through reciprocal knowledge exchange or by matching less experienced regions with the more advanced ones. Most importantly, this cooperation introduces best practice into the management of major development programmes. The INTERREG IVC projects are characterised by two broad topics: some projects relate to innovation and knowledge-based economy, while other projects are associated with environmental protection and protection from risk. The second category deals with a number of innovative issues, including the state-of-the-art forestry and energy sources. The *FUTUREforest* project funded under the programme brings together experts from eight forestry regions to share information on a number of practical issues, such as the preservation of biodiversity, improvement of the balance of aquatic ecosystems and the soil structure and generating proceeds from forestry. The INTERREG IVC project F:ACTS! (Adapting to Climate Change through Territorial Strategies) carried out in 2010-2012 was aimed at creating effective opportunities for the implementation of integrated territorial approach on the regional and local level in order to reduce the impact of climate change and adapt to the outcomes of climate change in suburban and rural areas (including the risks of flood and forest fire or the loss of biodiversity). The project covered the discussion of experience of all countries involved in the project in relation to climate change adaptation through the use of certain measures for the management of suburban and rural areas.

103.3. The aim of the URBACT programme in the field of urban development is to make sure that managing project partners are able to communicate and exchange information in their specialised projects when putting innovative ideas into practice. All activities are concentrated in cities that are financed by the EU, while priorities are set by local communities and businesses. By financing 28 networks that create communication opportunities for 181 cities and 5,000 participants across the EU, in Norway and Switzerland, URBACT plays part in a higher level policy. Every network managed by the managing partner organisation and the managing expert deals with economic, social and environmental issues.

103.4. The Baltic Sea Region Programme 2007-2013 aims at enforcing the development of the Baltic Sea, as a balanced, competitive and territorially integrated region, through the

consolidation of the human and physical potential of various countries. This programme finances the following climate change related projects:

103.4.1. In the period from 2009 to 2012, the Ministry of Agriculture of the Republic of Lithuania and Lithuanian Institute of Agrarian Economics, in cooperation with international partners, implemented the project "BalticClimate – Baltic Challenges and Chances for regional and development generated by Climate Change". The aim of the project is to achieve that the phenomenon of climate change is understood as a challenge and an opportunity for the common and sustainable development of the economic, environmental and social sectors of all countries in the Baltic Sea Region. The challenges and possibilities of climate change were assessed in selected territories of Germany, Sweden, Finland, Lithuania, Latvia, Estonia and Russia as part of the analysis of the agricultural, energy, transport and housing sectors.

103.4.2. In the period from 2010 to 2013, the project "Baltic Sea Region Climate Change Adaptation Strategy" (BALTADAPT) is being implemented. The goal of the project is to prepare an international strategy for regional adaptation to climate change with special focus on the Baltic Sea and coastline and provide a basis for its endorsement. The project aims at enforcing institutional capacities through information exchange among policy-makers and scientists and developing an action plan which could serve as a basis for the implementation of the Baltic Sea Region Climate Change Adaptation Strategy and setting of policies, programmes and regulation. It is also planned to draw up recommendations for funding climate change adaptation initiatives.

**Research**

104. In the Republic of Lithuania research is carried out by research institutes and higher education institutions. According to the data of July 2012, Lithuania had 11 research institutes, 23 universities and 24 colleges. The majority of these institutions carry out studies under particular categories of research of climate change, such as climate change, factors, impact of and sensitivity to climate change, climate change adaptation and mitigation.

105. Information about research conducted in Lithuania in the area of climate change is not systematically collected for the purpose of public administration, therefore, there is a need for systematisation of information in the area of climate change.

106. In Lithuania, research and experimental (social and cultural) development are underfunded: in 2010, the total expenditure amounted to 0.79% of GDP, i.e. the 3% GDP indicator set in the Lisbon Strategy endorsed by the meeting of the European Council of 23-24 March 2000 has not been achieved. According to the Europe 2020 strategy and National Reform

Agenda approved by Resolution No 491 of the Government of the Republic of Lithuania of 27 April 2011 (Official Gazette, No 54-2596, 2011), in 2020 expenditure on research and experimental (social and cultural) development in Lithuania must reach 1.9% of the country's GDP. Expenditure on research and experimental development is particularly low in the business sector. In Lithuania, research in the area of climate change receives attention in proportion to the overall country's support for research. As a result of the lack of funding allocated for research and experimental (social and cultural) development, climate change research is also underfunded from national funds, however, funding may be obtained for such research under EU research programmes, for instance, the "Environment (including climate change)" theme of the specific "Cooperation" programme of the Seventh Framework Programme (FP7) or the Framework Programme for Research and Innovation "Horizon 2020" under the multiannual financial framework 2014-2020.

107. In the recent years, Lithuania has been making changes also in the area of research funding to ensure that a greater portion of research funding is allocated by way of competition, i.e. under national research and national integrated programmes and other competition-based research programmes. The scheme of programme and competition-based support for research allows concentrating research funding in relevant areas and thus provides conditions for promoting research and experimental (social and cultural) development in the area of climate change.

108. Climate change research is promoted under two out of six national research programmes approved by the Minister of Education and Science of the Republic of Lithuania for the period 2010-2011: the programme "Lithuanian Ecosystems: Climate Change and Human Impact" focusing on biological invasions, and the programme "Future Energy" aimed at reducing anthropogenic factors causing climate change. Among national integrated programmes, the national integrated programme "Sustainable Use of the Natural Environment" is most closely related to climate change research.

109. The present national research programmes and national integrated programmes fail to ensure consistency in the chain of development and introduction to the market of technologies dealing with climate change problems; neither there is balanced funding secured for fundamental research or introduction to the market of demonstration projects and innovation. Due to fragmented funding of research and experimental (social and cultural) development, the results of fundamental research are often left not put into practice.

**Education of and Provision of Information to the Public**

110. According to the data of the published Eurobarometer 2011 survey, the opinion that climate change is a relevant issue is getting stronger in Lithuania, as the average assessment of the relevance of the issue among Lithuanian population was 7.1 points out of 10, as compared to 6.5 points in 2009. In 2011, Europeans assessed the relevance of the climate change issue with 7.4 points on average. However, by comparison with residents of other member states, Lithuanians are less inclined to take personal actions contributing to the handling of climate change issues − only 32% of the Lithuanian population, as opposed to 53% as the average of all EU member states, gave a positive answer to the question whether they personally took any action to struggle against climate change within the recent six months.

111. Education of the public, also including environmental education and promotion of environmentally friendly lifestyles, is one of the sustainable development priorities. A system was developed to inform the public of climate changes and their threats to human health.

112. Guidelines on climate change education developed under the project "Raising Public Climate Change Awareness" coordinated by ECAT-Lithuania focus on training of educated, independent, proactive and responsible members of the society who are knowledgeable about and able to handle climate change issues. Education must engage all interest groups, including public administration institutions and bodies, education and training institutions of all levels, higher education institutions and research institutions, non-governmental organisations, business, communities and mass media. Education must be continuous and lifelong, as information about climate change keeps changing with the appearance of state-of-the-art technology.

113. In Lithuania, climate change issues are included in general curricula of the primary and basic education and of the secondary education. Curricula emphasise not only the provision of information on climate change issues and development of skills, but also fostering of relevant values. However, teachers have no systematic knowledge of climate change, there are no targeted professional trainings for teachers in this area, and there is also a lack of available reference material.

114. Climate change topics make an important part of curricula and training programmes that make scientific achievements relevant. The popularity of the climate change topic has the potential to arouse students' interest in research issues.

115. Provision of climate change information to the public has recently received major funding in Lithuania. Funds for the provision of information to the public and education projects are mostly allocated from EU structural funds of 2007-2013 under the Operational Programme for Promotion of Cohesion approved by Commission Decision No K (2007) 3738 of 30 July 2007 adopting Operational Programme for Promotion of Cohesion concerning the Community support from the European Regional Development Fund and Cohesion Fund within the

framework of the Convergence objective in the Republic of Lithuania. However, there is a lack of clear and reasoned indicators which could be used to assess the effectiveness of the programmes being implemented, monitoring of the programmes is insufficient and no assessment is made of the effectiveness of the use of allocated funds.

**International Cooperation**

116. Projections of impact of climate change show that the effects of climate change are likely to be most severely felt by the least developed countries and small island developing states. Developing countries will need greater support to help them adapt to climate change and mitigate its effects. At the 15th session of the Conference of the Parties to the UNFCCC and the fifth session of the Conference of the Parties serving as the Meeting of the Parties to the Kyoto Protocol which took place in Copenhagen in 2009, the EU committed to allocate for developing countries EUR 7.2 billion in 2010-2012 to fund climate change mitigation and adaptation projects (Fast Start). At the 16th session of the Cancun Conference of the Parties to the UNFCCC and the sixth session of the Conference of the Parties serving as the Meeting of the Parties to the Kyoto Protocol, developed countries also committed by 2020 to mobilise for this purpose different sources, including public, private, bilateral, multilateral and innovative, to obtain up to USD 100 billion every year. The issue of the long-term financing will remain one of the key issues of international climate change negotiations also in the future. The Commission proposes using part of revenues generated from the auctioning of allowances for funding climate change mitigation and adaptation measures of developing countries. Article 10(3) of Directive 2003/87/EC of the European Parliament and of the Council of 13 October 2003 establishing a scheme for greenhouse gas emission allowance trading within the Community and amending Council Directive 96/61/EC (OJ 2004, Special Edition, Chapter 15, Volume 7, p. 631), as last amended by Directive 2009/29/EC of the European Parliament and of the Council of 23 April 2009 (OJ 2009 L 140, p. 63), provides that by 2020 member states should annually use 50% of the revenues generated from the auctioning of allowances to fund not only domestic climate change mitigation and adaptation measures, but also measures implemented by developing countries. The Commission notes that funding of developing countries in 2013 to 2020 will also depend on international negotiations on the path of a new climate change agreement setting GHG emissions limits obligatory since 2020 for all countries in the world and also on the actions of developing countries to combat climate change.

117. Article 10 of the Law of the Republic of Lithuania on Financial Instruments for Climate Change Management establishes that funds of the Special Programme for Climate

Change shall be used for the implementation of measures of climate change adaptation and mitigation on the territory of the Republic of Lithuania and in other countries as stipulated under legal acts of the European Union, UNFCCC, the Kyoto Protocol and other international agreements.

## III. VISION OF THE CLIMATE CHANGE MANAGEMENT POLICY UNTIL 2050

118. By 2050, Lithuania will have ensured adaptation of the sectors of the domestic economy to environmental changes caused by climate change and climate change mitigation (reduction of GHG emissions), developed competitive low-carbon economy, implemented eco-innovative technology, achieved energy generation and consumption efficiency and use of renewable energy sources in all sectors of the domestic economy, including energy, industry, transport, agriculture, etc.

## IV. CLIMATE CHANGE MITIGATION GOALS AND OBJECTIVES

119. The strategic goal of Lithuania's climate change mitigation policy is to make sure that the growth of the country's economy is much faster than the increase of GHG emissions. For the purpose of monitoring of the implementation of this strategic goal, an assessment criterion has been set in the form of GHG emissions per GDP unit (ton of $CO_2$e/LTL 1 million GDP).

120. The implementation of the strategic goal will aim at:

120.1 ensuring the implementation of short-term EU climate change mitigation goals by 2020:

120.1.1. reducing GHG emissions by at least 20% or 30%, as compared to the GHG emission levels in 1990, provided that other developed countries also commit to achieve comparable emission reduction and that developing countries adequately contribute depending on their own commitments and relevant capabilities;

120.1.2. increasing the use of RES by up to 20% in respect of final energy consumption;

120.1.3. increasing energy efficiency by 20%;

120.2. ensuring attainment of short-term climate change mitigation goals by 2020:

120.2.1. achieving that GHG emissions of EU ETS sectors do not exceed 8.530 million tons of $CO_2$e;

120.2.2. achieving that GHG emissions by non-ETS sectors do not exceed 18.338 million tons of $CO_2$e and 16.584 million tons of $CO_2$e in the case of the 20% and 30% EU target respectively (target annual values are given in Tables 1 and 2);

120.2.3. achieving that the share of RES, by comparison with the overall final energy consumption of the country, accounts for minimum 23%;

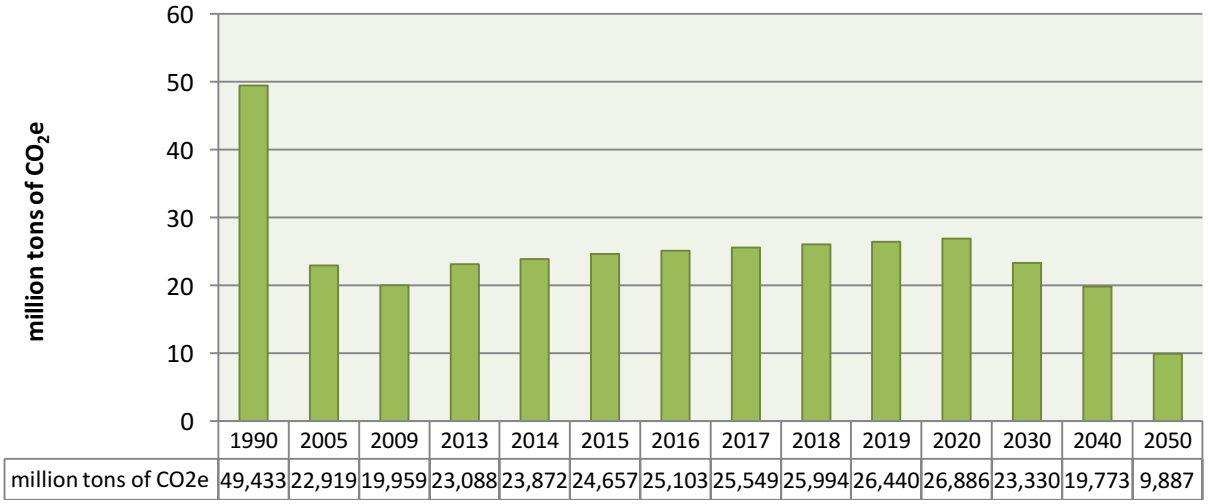
120.2.4. reducing energy consumption by 1.5% every year (reducing energy consumption in 2020 by 17% as compared to 2009);

120.2.5. reaching, in 2020, no less than 0.38% of the country's GDP in allocations for the implementation of short-term climate change mitigation goals;

120.3. ensuring the implementation of Lithuania's major indicative medium-term and long-term climate change mitigation goals by achieving indicative EU GHG emission reduction goals set forth in "A Roadmap for moving to a competitive low carbon economy in 2050":

120.3.1. in the medium term, reducing GHG emissions by 40% in 2030 and 60% in 2040, as compared to the levels in 1990;

120.3.2. in the long term, reducing GHG emissions by 80% in 2050, as compared to the levels in 1990 (see Figure 4).




| | 1990 | 2005 | 2009 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2030 | 2040 | 2050 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| million tons of CO2e | 49,433 | 22,919 | 19,959 | 23,088 | 23,872 | 24,657 | 25,103 | 25,549 | 25,994 | 26,440 | 26,886 | 23,330 | 19,773 | 9,887 |

**Fig. 4** Factual levels of Lithuania's GHG emissions and indicative goals in 2050

## Special Short-term (By 2020) Climate Change Mitigation Goals and Objectives

121. In view of the requirements of the Climate Change and Energy Package − Directive 2009/29/EC and Decision No 406/2009/EC − climate change mitigation goals will be sought in two directions: through the attainment of the goals and objectives set in paragraphs 128 and 129 of this Strategy in EU ETS sectors and of the goals and objectives set in paragraphs 141 and 142 of the Strategy in non-ETS sectors.

122. The majority of the goals laid down in strategic documents of the Republic of Lithuania in relation to fuel combustion, for example, RES in the final energy balance,

increasing of energy efficiency, RES in the production of centralised heating, etc., have been set in respect of both EU ETS sectors and non-ETS sectors. Therefore, despite the fact that the overall impact of these goals on the reduction of the country's GHG emissions may possibly be determined, it is difficult to assess the impact of the objectives by sector. In this context, future sectoral strategies should be developed for both the EU ETS sectors and non-ETS sectors.

123. A number of different projections have been prepared in relation to Lithuania's GHG emissions. Figure 5 provides projections of various publications for GHG emissions in 2020, excluding the LULUCF.

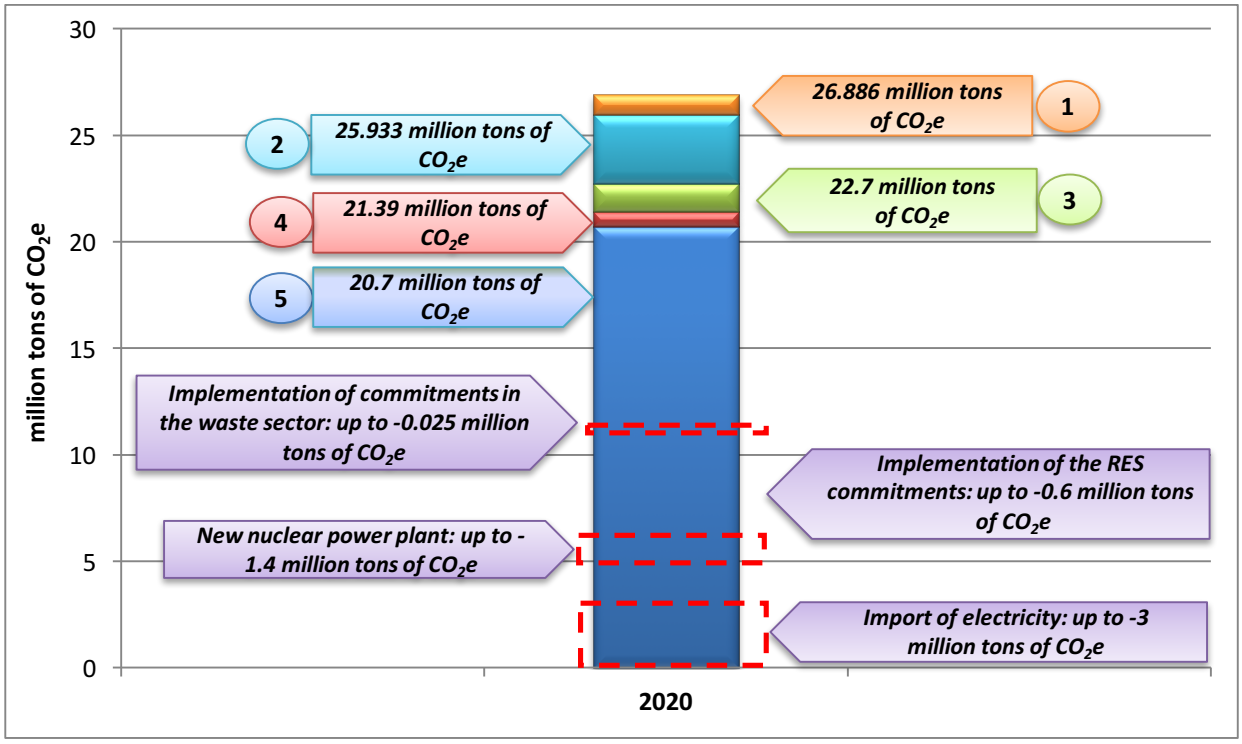



**Fig. 5** Projections of GHG emissions in 2020 in various publications

Notes:

1. 26.886 million tons of $CO_2e$ is the GHG emission level projection in the 2011 report of the Ministry of Environment of the Republic of Lithuania "Policies & Measures and Projections of Greenhouse Gas Emissions in Lithuania". Report pursuant to Article 3(2) of the European Parliament and Council Decision No 280/2004/EC concerning a mechanism for monitoring Community GHG emissions and for implementing the Kyoto Protocol. This strategy is further based on this projection (see Fig. 4).

2. 25.933 million tons of $CO_2e$ is the baseline GHG emission level projection provided in the study prepared for the Ministry of Foreign Affairs of the Republic of Lithuania "Cost of the Implementation of Lithuania's Commitments in Relation to the EU Transition to 30% GHG Emission Reduction Target" (2011).

3. 22.7 million tons of $CO_2e$ is the GHG emissions level projection provided for Lithuania in the EU report "EU Energy Trends to 2030" published in August 2010.

4. 21.39 million tons of $CO_2e$ is the GHG emissions level projection provided for Lithuania in 2020. Commission Staff Working Paper "Analysis of options beyond 20% GHG emission reductions: Member State results" (SWD(2012) 5 final – 3 February 2012).

5. 20.7 million tons of $CO_2e$ is the GHG emissions level projection for Lithuania in 2020 provided that the 30% GHG emission reduction goal is achieved EU wide. Commission Staff Working Paper "Analysis of options beyond 20% GHG emission reductions: Member State results" (SWD(2012) 5 final – 3 February 2012).

124. The GHG emission forecast specifically depend on assumptions made. Both general assumptions, such as variations in GDP, electricity consumption or population, and assumptions about the impact of the implementation of current measures on the GHG emission levels may differ. For example, where a new nuclear power plant is planned after 2021, the GHG emission level may be higher even up to 1.4 million tons of $CO_2e$ per year. In the case of any delay of the implementation of commitments in the waste sector or in respect of RES in the final energy balance, the GHG emissions level might rise up to 25 million tons of $CO_2e$ and accordingly differ by 0.6 million tons of $CO_2e$ per year. The GHG emission forecast specifically relies on the assumption about the import of electricity and might result in the annual difference of 3 million tons of $CO_2e$.

### *Background for Setting Special Short-term (in 2020) Climate Change Mitigation Goals and Objectives in EU ETS sectors*

125. The EU ETS applies to combustion plants of more than 20 MW (in boilers and power plants, cement and lime, crude oil processing, ceramics, glass, wood and paper, bricks and tiles and rock wool production plants). Since 2012, the EU ETS includes aviation, chemical production plants, etc.

126. The third emission allowance trading period will last from 2013 to 2020. By comparison with the periods of 2005-2007 and 2008-2012, the EU ETS is planned to become more rigorous, as nearly all emission allowances will be allocated through auctioning, while the rate of free allocation of emission allowances will be gradually reduced according to the tightened rules. In 2013, the total number of freely allocated emission allowances will account for up to 80% of the set number of allowances. Afterwards, in order to achieve the 0% level in 2027, the number of freely granted allowances will keep annually decreasing in equal portions until the 30% level is reached for free emission allowances in 2020. Free emission allowances are not made available to the electricity production sector, except for possible reservations related to the production modernisation in this sector.

127. Since 2013, all emission allowances, except those granted free of charge, must be acquired by entities operating stationary plants and aircraft users through auctioning. Proceeds from emission allowance auctioning by the auction rights of member states will go to the budgets of member states, and no less than 50% of the proceeds received annually will have to be used

for the implementation of climate change measures not only in member states, but also in developing countries.

### *Special Short-term (in 2020) Climate Change Mitigation Goals and Objectives in EU ETS sectors*

128. A special short-term climate change mitigation goal in EU ETS sectors is to achieve that the GHG emissions in EU ETS sectors in 2020 does not exceed 8.53 million tons of $CO_2e$, ensuring the implementation of the goals of the use of RES and increase of energy efficiency.

129. Objectives set to attain the goal of paragraph 128 are the following:

129.1. achieving efficient and cost-effective reduction of GHG emissions in industrial installations;

129.2. achieving that district heating from RES in district heating installations within the EU ETS scheme accounts for no less than 60% in 2020;

129.3. increasing the share of electricity from RES to 21% of the overall country's electricity consumption in 2020;

129.4. ensuring a sustainable process of spatial planning and planning of territorial energy infrastructure;

129.5. preparing for and implementing modernisation of electricity production, transmission and distribution infrastructure by maximising possibilities for effective response to demand and production distribution.

### *Background for Setting Special Short-term (in 2020) Climate Change Mitigation Goals and Objectives in non-ETS sectors*

130. Non-ETS sectors are all other sectors except for those indicated in paragraph 125. These include transport, agricultural, waste management or industrial installations engaged in other types of activities or combustion plants with installed boiler power of less than 20 MW (small district heating installations), public sector buildings, households, agriculture, transport, fishing, construction, services and other sectors.

131. According to Article 3(2) of Decision No 406/2009/EC each member state with a positive GHG emission reduction limit (Lithuania is one of such member states) shall ensure, also by using the flexibilities provided for in Decision No 406/2009/EC, that its GHG emissions in 2013 do not exceed the limit defined by a linear trajectory. The trajectory starts with 2009 and is determined as the average of verified GHG emissions for the years 2008, 2009 and 2010. The

end of the trajectory, i.e. emissions level in 2020, is determined by percentage limit defined for a given member state. Every year, a member state must gradually reduce its emissions to ensure the attainment of the goal set for 2020. The final GHG emission reduction goals for EU member states will be endorsed by a Commission decision.

132. Decision No 406/2009/EC sets a target for Lithuania to ensure that GHG emissions in 2020, by comparison with GHG emissions in 2005, in non-ETS sectors do not exceed 15%.

133. From 2013 to 2019, a member state may carry forward to the following year a quantity of up to 5% of its annual allowed GHG emissions. If GHG emissions of the member state are less than its annual GHG emissions allocation, taking into account the use of flexibilities, it may, until 2020, carry forward to the following year, a portion of the annual GHG emissions allowed in a relevant year which exceeds actual member state's GHG emissions in that year.

134. A member state may, according to the established procedure, transfer up to 5% of its annual GHG emissions to other member states provided that its GHG emissions are less than its annual GHG emissions allocation. The recipient member state may use this amount in order to meet its commitment for the relevant year or any following year before 2020.

135. For the purpose of the fulfilment of their commitments, member states will be able to make use of GHG emission reduction units − Certified Emission Reductions (CERs) and Emission Reduction Units (ERUs) − under the Clean Development Mechanism (CDM) or Joint Implementation (JI) projects, which may account for up to 3% of GHG emissions of a relevant member state in 2005.

136. Every year, each member state may transfer to another member state its unused 3% of annual credits from the Clean Development Mechanism and Joint Implementation projects (CERs and ERUs) provided that these credits are not used for its annual GHG emission set-off or the member state may carry forward the unused credits to the following year.

137. The removed GHG emissions in the LULUCF sector is not included in the EU GHG reduction goals. Decision No 406/2009/EC establishes that, if the international climate change agreement is not endorsed, the LULUCF sector could be included in the register of EU member state goals for non-ETS sectors. The 17$^{th}$ Conference of the Parties to the UNFCCC and the 7$^{th}$ Meeting of the Parties to the Kyoto Protocol which took place in Durban in 2011 endorsed the Decision concerning greenhouse gas emissions and removals inventories in the LULUCF sector in 2013 and beyond. In line with the provisions of Decision No 406/2009/EC, the Commission prepared and, on 12 March 2012, presented a proposal for a Decision of the European Parliament and of the Council on accounting rules and action plans on greenhouse gas emissions and removals resulting from activities related to land use, land use change and forestry (COM(2012)

final 93) aimed at ensuring precise and consistent accounting by member states of GHG emissions from different sources and their removals in the LULUCF sector. However, in view of tightened rules, GHG emission reductions by the LULUCF sector, which could be accounted in 2013 and beyond, will be very limited and account for no more than 3.5% of the GHG emissions and removals of the forestry sector, as compared to the GHG emissions of the member state in 1990.

138. For each EU member state, including Lithuania, the Commission has determined the GHG emission reductions in non-ETS sectors. The total of GHG emissions in 2005 excludes carbon dioxide emissions in 2005 confirmed by EU ETS installations, carbon dioxide emissions from aviation and GHG emissions resulting from variations that arise under Order No D1-686 of the Minister of Environment of the Republic of Lithuania of 27 December 2004 "Approving the National Plan for the Allocation of Emission Allowances 2005-2007" (Official Gazette, No 6-166, 2005) and Order No D1-609/4-477 of the Minister of Environment and Minister of Economy of the Republic of Lithuania of 19 November 2007 "Approving the National Plan for the Allocation of Emission Allowances 2008-2012" (Official Gazette, No 120-4946, 2007). Taking into account Lithuania's GDP, its GHG emission allocation in 2005 in the non-ETS sector was increased by 15% and the quantitative target for GHG emissions in 2020 was set at 18.338 million tons of $CO_2e$ (see Table 1).

139. On 30 January 2012, the Commission announced "Commission Staff Working Paper: Analysis of options beyond 20% GHG emission reductions: Member State results" ((SWD(2012) 5 final – 3 February 2012)), which analyses the possibility of moving from 20% to 30% EU-wide GHG emission reductions. This document estimates that Lithuania's target in non-ETS sectors for the period of 2013-2020 would increase by no more than 4%, as compared to that in 2005. Quantitative annual GHG emission reduction targets for non-ETS sectors, in the case of the EU 30% target, were estimated for the period of 2013-2020 using the same assumptions as described in paragraph 131 and are provided in Table 2.

140. The overall GHG emission reduction target in non-ETS sectors is proportionally allocated among sectors. Monitoring of GHG emissions and control of the achievement of GHG emission targets set for individual non-ETS sectors, including transport, agriculture, waste management and non-ETS industries, will be carried out according to the annual National Greenhouse Gas Inventory, in which data about GHG emissions are accounted by individual sectors. The remaining part of the overall target is attributed to other sectors.

***Special Short-term (By 2020) Climate Change Mitigation Goals and Objectives in non-ETS sectors***

141. Special short-term climate change mitigation targets in non-ETS sectors are the following:

141.1. ensuring that GHG emissions in non-ETS sectors do not exceed annual GHG emission targets set in Table 1, and the overall amount in 2020 increases by no more than 15%, as compared to 2005, and does not exceed 18.338 million tons of $CO_2e$;

**Table 1:** Quantitative annual GHG emission reduction targets, in the case of 20% target, in non-ETS sectors in the period from 2013-2020, million tons of $CO_2e$

| | **2013** | **2014** | **2015** | **2016** | **2017** | **2018** | **2019** | **2020** |
|---|---|---|---|---|---|---|---|---|
| Transport | 5.241 | 5.290 | 5.338 | 5.386 | 5.435 | 5.483 | 5.532 | 5.58 |
| Agriculture | 5.494 | 5.545 | 5.595 | 5.646 | 5.697 | 5.748 | 5.798 | 5.849 |
| Industry | 2.639 | 2.663 | 2.687 | 2.712 | 2.736 | 2.76 | 2.785 | 2.809 |
| Waste management | 1.699 | 1.715 | 1.73 | 1.746 | 1.762 | 1.777 | 1.793 | 1.809 |
| Other sectors | 2.153 | 2.173 | 2.192 | 2.212 | 2.232 | 2.252 | 2.272 | 2.292 |
| **Total** | 17.225 | 17.384 | 17.543 | 17.702 | 17.861 | 18.02 | 18.179 | 18.338 |

141.2. where Member States move to the 30% Europe-wide GHG emission reduction target, ensuring that GHG emissions in non-ETS sectors do not exceed annual GHG emission targets set in Table 2, and the overall amount in 2020 increases by no more than 4%, as compared to 2005, and does not exceed 16.584 million tons of $CO_2e$;

**Table 2:** Quantitative annual GHG emission reduction targets, in the case of 30% target, in non-ETS sectors in the period from 2013-2020, million tons of $CO_2e$

| | **2013** | **2014** | **2015** | **2016** | **2017** | **2018** | **2019** | **2020** |
|---|---|---|---|---|---|---|---|---|
| Transport | 5.047 | 5.047 | 5.047 | 5.047 | 5.047 | 5.046 | 5.046 | 5.046 |
| Agriculture | 5.29 | 5.29 | 5.29 | 5.29 | 5.29 | 5.29 | 5.29 | 5.289 |
| Industry | 2.541 | 2.541 | 2.541 | 2.541 | 2.541 | 2.541 | 2.540 | 2.54 |
| Waste management | 1.636 | 1.636 | 1.636 | 1.636 | 1.636 | 1.636 | 1.636 | 1.636 |
| Other sectors | 2.073 | 2.073 | 2.073 | 2.073 | 2.073 | 2.073 | 2.073 | 2.073 |
| **Total** | 16.587 | 16.587 | 16.587 | 16.586 | 16.586 | 16.585 | 16.585 | 16.584 |

141.3. increasing GHG removal by sinks by expanding the forest area and enforcing the natural framework (the total annual GHG removal by sinks should be no less than 3.7 million tons of $CO_2e$ in 2020).

142. Objectives of non-ETS sectors in achieving special short-term climate change mitigation goals:

142.1. in achieving the GHG emission reduction target set in paragraph 141.1 or, in the case of EU-wide shift to the 30% GHG reduction, the GHG emission reduction target set in paragraph 141.2:

142.1.1. monitoring GHG emissions in individual non-ETS sectors, including transport, agriculture, industry, waste management and other sectors;

*Transport sector*

142.1.2. implementing measures increasing energy efficiency in the transport sector;

142.1.3. ensuring growth in numbers of travels by bicycles, public road transport and public rail transport;

142.1.4. ensuring increase in alternative energy sources and greener fuels in the energy balance of the transport sector;

*Agricultural sector*

142.1.5. implementing measures for the cost-effective decrease of methane emissions from manure management systems;

142.1.6. implementing measures decreasing direct and indirect nitrogen compounds emissions in the environment resulting from agricultural activities;

*Waste management sector*

142.1.7. implementing measures for the cost-effective decrease in methane emissions from biodegradable waste and wastewater sludge;

142.1.8. using no less than 30% of the annual volume of waste in energy production;

*Industry sector*

142.1.9. implementing eco-innovative measures increasing energy efficiency and using RES in order to achieve cost-effective GHG emissions reduction in non-ETS industrial installations;

*Other sectors*

142.1.10. identifying and implementing measures for cost-effective GHG emissions reduction in other non-ETS sectors;

142.1.11. ensuring continuous increase of energy efficiency in household and services sectors;

142.1.12. ensuring that the annual decrease in heat consumption in multi-apartment buildings built according to regulatory technical construction documents valid until 1993 is no less than 1,000 GWh in 2020, as compared to that in 2005;

142.1.13. ensuring continuous increase of energy efficiency in public buildings;

142.2. in achieving the goal set in paragraph 141.3:

142.2.1. implementing measures expanding wooded area by afforesting unused land or land that is barely suitable for agriculture;

142.2.2. implementing sustainable forestry policy by extending the scale of logging waste collection for biofuel production.

## Special Indicative Medium-term (By 2030 and 2040) and Long-term (By 2050) Climate Change Mitigation Goals and Objectives

143. Special indicative medium-term and long-term climate change mitigation goals include:

143.1. promoting efficient and cost-effective GHG emission reduction in all sectors in order to contribute to the implementation of the proposed EU medium-term indicative targets – GHG emission reduction by 40% in 2030, 60% in 2040 and 80% in 2050, as the long-term perspective, by comparison with the level in 1990;

143.2. envisaging prospects of the CCS sector and considering the development of the transport infrastructure;

143.3. achieving sustainable development of the energy sector by moving to the low-carbon economy;

143.4. reducing GHG emissions in the transport sector by developing clean urban logistics and moving to low-emitting long-distance logistics.

144. Objectives in achieving special indicative medium-term and long-term climate change mitigation goals:

144.1. in achieving the goal set in paragraph 143.1:

144.1.1. determining, on a regular basis, the GHG emissions reduction potential in all economic sectors taking account of economic possibilities and technological development;

144.1.2. setting GHG emission reduction targets and implementing measures within sectoral strategies taking account of the economic GHG emissions reduction potential;

144.1.3. assessing, on a regular basis, the attainment of the GHG emissions reduction targets and, subject to the technological or economic situation, planning other or additional measures for GHG emissions reduction;

144.2. in achieving the goal set in paragraph 143.2:

144.2.1. assessing and planning options for geological storage of carbon dioxide in storage sites of other countries;

144.2.2. assessing possibilities for implementation of the transport infrastructure and implementation costs and planning stages of implementation of the transport infrastructure taking account of options for geological storage of carbon dioxide in other countries;

144.3. in achieving the goal set in paragraph 143.3:

144.3.1. achieving, in view of the current situation and general trends, that in 2050 RES, nuclear power and fossil fuel with CCS technology account for 40-100%, 0-30% and 0-30% respectively in the fuel balance of the domestic energy sector;

144.3.2. implementing measures increasing energy efficiency and ensuring no less than 1.5-2% annual increase in energy efficiency; ensuring increase in the number of low-energy buildings;

144.3.3. implementing measures increasing the efficiency of energy transmission and distribution by ensuring that loss of energy (heat and electricity) in networks is reduced to the economically reasonable level and, if possible, technically feasible level;

144.4. in achieving the goal set in paragraph 143.4:

144.4.1. ensuring that in 2030 the use of fossil fuel powered vehicles in urban areas, as compared to 1990, is halved and in 2050 fossil fuel powered vehicles are not used in urban areas;

144.4.2. ensuring that in 2050 sustainable and low-carbon fuel in aviation accounts for no less than 40%;

144.4.3. ensuring that in 2050, as compared to 2005, $CO_2$ emissions in the maritime transport sector, including bunker fuel, are reduced by no less than 40%;

144.4.4. ensuring that no less than 30% and 50% of the goods transported by road more than 300 km in 2030 and 2050 respectively are transported by other modes of transport, rail or waterborne transport;

144.4.5. ensuring that in 2050 the majority of passengers are carried over medium distances by trains.

## V. CLIMATE CHANGE ADAPTATION GOALS AND OBJECTIVES

145. The strategic goal of Lithuania’s climate change adaptation policy is to reduce vulnerability of natural ecosystems and domestic economic sectors by implementing measures for maintaining and increasing their resilience to climate change and ensuring favourable conditions for social life and economic activities. The implementation of this strategic goal will be assessed in relation to the achievement of special climate change adaptation goals in most sensitive domestic economic sectors, such as agriculture, forestry and protection of biodiversity, management of water resources, energy, transport, industry, public health, etc.

146. The implementation of the strategic goal will take the following directions:

146.1. integrated approach to the impact of climate change on specific territories at the regional level. Such an approach encourages compromises among different needs, integrates other regional processes of change (e.g. demographic changes) and may optimise the interaction between sectoral and cross-sectoral adaptation measures relevant to a given region;

146.2. synergy of climate change mitigation measures and climate change adaptation measures and avoidance of their conflict. Chosen climate change adaptation measures should contribute to climate change mitigation efforts rather than be in conflict with them;

146.3. contribution of national research to climate change adaptation. Mutually beneficial cooperation of the state, municipalities and financial institutions, funds, universities, other countries and EU projects must be promoted in the area of climate research. Climate change adaptation must become a separate component of climate research;

146.4. solid base for knowledge about the impact and effects of climate change consisting of regular and systematic collection, transfer and cross-country exchange of research methods and results, data, projections, experience and information.

## Background and Planned Results of Setting of Special Climate Change Adaptation Goals and Objectives

147. The priority sectors are distinguished in the strategy based on the Law of the Republic of Lithuania on Financial Instruments for Climate Change Management, analyses performed during the project carried out by the countries of the Baltic Sea Region to prepare the Baltic Sea Region Climate Change Adaptation Strategy, principles set for the preparation of the EU Climate Change Adaptation Strategy and information gathered in this relation, also sectors indicated in the EU Strategy for the Baltic Sea Region 2009 and samples of climate change adaptation strategies of other countries, e.g. Denmark, Finland or Germany, and taking into account different level and relevance of current research in sectors. Research is planned to be done in sectors in which areas affected by climate change have not been identified or research is inadequate, it is also planned to determine most vulnerable sectors and propose necessary, effective and relevant measures. In sectors with the adequate number of studies, measures have been chosen taking into consideration current studies. It is important for the country to identify sectors for which climate change opens up wider possibilities than before and take timely, adequate and effective measures to gain maximum benefit. This provides conditions for preservation and achievement of the result by future generations at lower cost as compared to the expenses covering damage caused by climate change effects.

148. The following assessment criteria directly related to climate change adaptation goals and objectives in 2020 have been set for the purpose of monitoring of the implementation of the national climate change management policy:

148.1. fully functioning national information coordination mechanism linked to the EU information coordination system concerning climate change adaptation and operated by trained staff of the Ministry of Environment and/or its subordinate institutions (target: implemented information coordination mechanism);

148.2. defined risk and crisis management instruments developed to respond to economic effects of climate phenomena, flood risk maps, flood risk management plans and early warning system (emergency management plan, insurance and compensation mechanism for damage to agriculture caused by natural disasters) (target: flood risk map with full coverage of the territory of Lithuania and fully and effectively functioning system of insurance against natural disasters in 2020);

148.3. number of studies carried out and recommendations prepared in specific sectors (target: minimum 20 climate change related studies by 2020).

## Special Short-term (By 2020) Climate Change Adaptation Goals and Objectives

149. Short-term (by 2020) climate change adaptation goals and objectives are categorised by the following sectors: agriculture, soil; forestry, ecosystems, biodiversity, landscape; water resources; energy, transport, industry; and public health, and also include cross-sectoral goals and objectives. Among all Lithuanian regions, the Baltic Sea Region is most sensitive to climate change in terms of forecasted rise in water level and the risk of flood. Climate change adaptation goals and objectives in the Baltic Sea Region are integrated in cross-sectoral goals and objectives, also goals and objectives of such sectors as forestry, ecosystems, biodiversity, landscape and water resources.

*Cross-sectoral Goals and Objectives*

150. Cross-sectoral short-term goals set in relation to the impact of climate change are as follows:

150.1. achieving mainstreaming of climate change adaptation goals, objectives and measures in the country's economic sectors that are most sensitive to the impact of climate change, as indicated in paragraph 149, and implementing climate change adaptation measures;

150.2. implementing eco-innovative measures for increase in the efficiency of energy production and use and for the use of RES, allowing most effective climate change adaptation at lowest cost in the key economic sectors of the country, including energy, industry, agriculture, transport, etc.;

150.3. monitoring, analysing and assessing the impact of climate change on the territory of Lithuania and individual regions;

150.4. strengthening coordination and dissemination of information about climate change adaptation by way of qualified and systemic keeping, management and provision to different interest groups, such as scientists, public institutions and the public, of GIS-based information about climate change.

151. Objectives in achieving special cross-sectoral short-term climate change adaptation goals:

151.1. in achieving the goal set in paragraph 150.1:

151.1.1. making the analysis of the situation of Lithuanian economic sectors and, if needed, defining new priority climate change adaptation sectors and ensuring the implementation of effective measures in these sectors;

151.1.2. ensuring consistency of legal acts in relation to climate change adaptation;

151.2. in achieving the goal set in paragraph 150.2, ensuring the implementation and functioning of the mechanism for the promotion of the implementation of eco-innovative technologies of energy production and use and RES deployment in the major economic sectors of the country;

151.3. in achieving the goal set in paragraph 150.3:

151.3.1. ensuring continuous improvement and updating of the meteorological and hydrological observation system;

151.3.2. engaging in global and regional climate monitoring programmes (GCOS, Baltic Sea Region climate change research programmes *BALTEX, Baltic Sea Region Programme 2007-2013*, etc.);

151.4. in achieving the goal set in paragraph 150.4:

151.4.1. preparing and implementing measures ensuring timely provision, collection, systematisation and keeping of information in the country's economic sectors, such as agriculture, forestry and protection of biodiversity, water resources management, energy, transport, industry, public health, etc., and regions that are most vulnerable to climate change;

151.4.2. preparing and implementing measures ensuring effective informing of interest groups, including officers from state and municipal institutions and bodies and representatives of industrial and research institutions and associations, on the issues of climate change adaptation;

151.4.3. creating a geographical climate change database.

*Agriculture and Soil*

152. The short-term goal is to increase resistance of the agricultural sector to climate change.

153. The key objectives in attaining this goal are as follows:

153.1. ensuring sparing use of such natural resources as water and soil;

153.2. ensuring selection of climate change-resistant agricultural plant species and breeding;

153.3. developing risk and crisis management instruments to respond to economic effects of climate phenomena;

153.4. implementing a continuous monitoring system to monitor soil condition and improve farming methods ensuring reduction in useful soil loss;

153.5. developing farmers' skills and increasing awareness and motivation to adapt to climate change.

*Forestry, Ecosystems, Biodiversity and Landscape*

154. The short-term goals are as follows:

154.1. reducing negative impact of climate change on natural ecosystems;

154.2. preserving and improving sustainability of forest ecosystems and strengthening their environmental and social role in the context of the influence of climate change.

155. Key objectives set to attain the goal of paragraph 154.1 are as follows:

155.1. reducing the rise of water level and negative effects of extreme weather phenomena on the coastline area of the Baltic Sea and flood affected areas of the Curonian Lagoon and the lower Nemunas River and other areas of the country;

155.2. stabilising the loss of biodiversity caused by climate change in Lithuania and in the Baltic biogeographical region;

155.3. preserving and forming a unique landscape diversity resistant to climate change effects;

155.4. developing the system of protected areas and natural framework and recovering and proliferating natural landscape elements in these areas;

155.5. ensuring that GMO are prevented from spreading in the environment and affecting biodiversity and ecosystems.

156. Objectives set to attain the goal of paragraph 154.2 are as follows:

156.1. promoting major logging in state-owned and private forests based on the principles of sustainable development;

156.2. increasing environmental and landscape stability of forest ecosystems;

156.3. reducing the use of and replacing chemical control for plant protection in forests with biological or mechanical measures;

156.4. ensuring that the increasing number of forest owners and managers assume environmental restrictions or engage in economic activities aimed at maintaining and preserving biodiversity elements and support preservation of natural ecosystems and viable populations;

156.5. making forest management plans with a view to preserving small forests, spring areas, small rivers, mires, glades and other forest ecosystem elements that are important for fostering biodiversity;

156.6. seeking recovery of endangered or degraded forest ecosystems.

*Water Resources*

157. The short-term goals are as follows:

157.1. reducing the negative effects of the rising water level and of extreme weather phenomena on the quality of the surface water and groundwater;

157.2. developing an effective flood risk assessment and management system taking into account social, economic and environmental aspects.

158. Objectives set to attain the goal of paragraph 157.1 are as follows:

158.1. improving water resources management and enhancement of water quality;

158.2. modernising the run-off rain water treatment infrastructure and ensuring its development in urbanised areas in order to protect urbanised areas against risks posed by excess water and prevent release of pollutants into the environment (surface waters).

159. Objectives set to attain the goal of paragraph 157.2 are as follows:

159.1. ensuring implementation of the flood risk assessment and management system;

159.2. identifying the most vulnerable hydrotechnical structures and planning and implementing consistent measures for climate change adaptation.

*Energy, Transport and Industry*

160. The short-term goals are as follows:

160.1. enhancing adaptation of the most climate change sensitive areas of energy, transport and industrial sectors to climate change;

160.2. improving the resilience of the engineering infrastructure to climate change.

161. Objectives set to attain the goal of paragraph 160.1 are as follows:

161.1. identifying the most climate change sensitive areas of energy, transport and industrial sectors and planning of effective climate change adaptation measures;

161.2. ensuring legal and economic conditions for the implementation of the planned effective climate change adaptation measures.

162. Objectives set to attain the goal of paragraph 160.2 are as follows:

162.1. ensuring that the engineering infrastructure is developed taking into account the projected impact of climate change;

162.2. assessing the sensitivity of different regions and major risks in terms of climate change and accordingly adjusting legal acts regulating spatial planning and constructions;

162.3. preparing spatial planning documents for regions that relatively often suffer from interruptions of power supply caused by climate factors taking into account possibilities of laying new underground electricity transmission networks.

*Public Health*

163. The short-term goal is to reduce negative impact of climate change on human health.

164. Objectives set to attain the goal of paragraph 163 are as follows:

164.1. ensuring protection of the health of the population by reducing risks posed by climate change;

164.2. developing an effective system for the prevention of climate change related diseases.

## Special Indicative Medium-term (By 2030 and 2040) and Long-term (By 2050) Climate Change Adaptation Goals and Objectives

165. Special indicative medium-term and long-term climate change adaptation goals include:

165.1. continuous monitoring and survey of the most vulnerable economic sectors and ensuring resilience of such sectors, especially agriculture, to climate change;

165.2. promotion of cooperation with other countries in relation to climate change adaptation.

166. Objectives set to attain special indicative medium-term and long-term climate change adaptation goals:

166.1. in order to attain the goal of paragraph165.1:

166.1.1. ensuring continuous monitoring of climate change sensitive sectors and effective implementation of measures reducing climate change effects;

166.1.2. ensuring the resilience of the engineering infrastructure to climate change;

166.1.3. monitoring, investigating and assessing the impact of climate change on the agricultural sector and, in the context of changes, adapting agricultural production to climate change;

166.1.4. organising proper selection and implementation of measures increasing resilience of agricultural and other sensitive sectors to climate change;

166.1.5. ensuring sparing use of such natural resources as water, biodiversity and soil;

166.2. in order to attain the goal of paragraph 165.2:

166.2.1. ensuring long-term effective management of financial and technical resources and implementation of measures in third countries;

166.2.2. continuous support for preparation and implementation of pilot climate change adaptation projects in developing countries in order to increase their resilience to climate change.

## VI. GENERAL CLIMATE CHANGE MITIGATION AND ADAPTATION GOALS AND OBJECTIVES

### General Short-term (By 2020) Climate Change Mitigation and Adaptation Goals and Objectives

167. General short-term climate change adaptation and mitigation goals are as follows:

167.1. mainstreaming of climate change adaptation and mitigation goals, objectives and measures in the strategies and plans of the country's economic sectors, including energy, industry, development of residential areas, agriculture, transport, etc.;

167.2. promotion of efficient use of EU funds and national budget funds and other financial instruments in the implementation of climate change adaptation and mitigation projects/measures;

167.3. promotion of the implementation of economic measures, including tax reliefs, state aid measures and other instruments;

167.4. improvement of GHG emissions and removals inventories by sinks and reporting for the territory of the Republic of Lithuania;

167.5. promotion of research and experimental development and innovation in the area of climate change ensuring efficient use of allocated funds;

167.6. increasing environmental proactivity and climate change awareness of the general public;

167.7. promotion of coordination and dissemination of climate change information;

167.8. promotion of training of professionals qualified to tackle climate change related issues and regular upgrading of their qualification;

167.9. contribution to international cooperation on climate change.

168. Objectives set to attain general short-term climate change adaptation and mitigation goals:

168.1. in order to attain the goal of paragraph 167.1:

168.1.1. ensuring close interinstitutional cooperation in implementing measures defined in the National Strategy for Climate Change Management Policy, sectoral strategies and strategy implementation plans;

168.1.2. ensuring that the climate change aspect is included in sectoral strategies and their implementation plans and programmes;

168.1.3. ensuring that decisions related to the implementation of climate change adaptation and mitigation measures are taken on the regional level rather than the local level;

168.2. in order to attain the goal of paragraph 167.2:

168.2.1. ensuring efficient use of EU structural, cohesion and other funds under the Multiannual Financial Framework 2014-2020 and use of the state budget funds in implementing infrastructural development and other projects related to climate change mitigation and adaptation;

168.2.2. ensuring long-term effective management of financial and technical resources and use of low-carbon technology for industrial development;

168.2.3. improving the legal framework of the Green Investment Scheme (GIS) and implementing projects funded under this scheme;

168.2.4. ensuring the implementation of measures promoting the implementation of flexible market-based mechanisms for climate change;

168.3. in order to attain the goal of paragraph 167.3:

168.3.1. ensuring efficient use of funds for the implementation of adaptation and effective GHG emissions reduction projects and measures;

168.3.2. improving the insurance scheme for extreme natural disasters and ensuring its effective functioning;

168.3.3. ensuring information of the general public of the possibilities of making use of economic instruments;

168.4. in order to attain the goal of paragraph 167.4:

168.4.1. ensuring GHG emissions monitoring and reporting;

168.4.2. ensuring of making the projections of GHG emissions;

168.5. in order to attain the goal of paragraph 167.5:

168.5.1. ensuring that the impact on climate change is assessed through research and experimental development programmes in technological sciences;

168.5.2. ensuring that climate change mitigation and adaptation aspects are assessed through related research work;

168.5.3. extending the scope of climate change studies; ensuring research and experimental development and innovation in the area of climate change; attracting funds from the business sector for research and experimental development and innovation in the area of climate change;

168.6. in order to attain the goal of paragraph 167.6:

168.6.1. ensuring efficient use of funds through systematically increased environmental proactivity and climate change awareness of the general public;

168.6.2. ensuring education on climate change issues across all levels of education;

168.7. in order to attain the goal of paragraph 167.7:

168.7.1. ensuring continuous collection and dissemination of information about Lithuanian research in the area of climate change;

168.7.2. ensuring qualified and continuous collection, keeping, processing and provision of information about climate change to various interests groups, such as researchers, public institutions and the general public;

168.8. in order to attain the goal of paragraph 167.8:

168.8.1. ensuring that professionals trained to practise or practising in sectors having major effect on climate change, such as energy, construction, transport and industry, acquire necessary knowledge and skills in the area of climate change mitigation;

168.8.2. ensuring that professionals trained to practise in climate change sensitive sectors, such as agriculture, health, forestry, etc., acquire necessary knowledge and skills in the area of climate change adaptation;

168.9. in order to attain the goal of paragraph 167.9:

168.9.1. ensuring adequate representation of Lithuania’s interests in international negotiations on climate change issues;

168.9.2. ensuring financial and technological support for the implementation of climate change mitigation and adaptation measures in other countries and cooperation with other countries in developing climate change projects.

**General Indicative Medium-term (By 2030 and 2040) and Long-term (By 2050) Climate Change Mitigation and Adaptation Goals and Objectives**

169. According to “A Roadmap for moving to a competitive low carbon economy in 2050”, indicative medium-term and long-term goals are set as follows:

169.1. achievement of production of the major share of energy from low GHG emission sources by promoting investments in eco-innovative technologies for energy production, supply and use, including CCS technology;

169.2. achievement of the increasing efficiency of agricultural production;

169.3. achievement of renovation of no less than 3% of buildings in the public sector annually and the inclusion of higher energy efficiency requirements in public procurement procedures;

169.4. implementation of requirements of efficient electricity and heat production and energy saving schemes in installations to increase competitiveness of industry and setting higher obligatory energy efficiency requirements for industrial and household equipment;

169.5. increasing of the use of all modes of greener transport by implementing $CO_2$ emission standards and more advanced taxation systems and by promoting the $2^{nd}$ and $3^{rd}$ generation sustainable biofuel production and use;

169.6. promotion of research and experimental development in major climate change mitigation areas, including energy production and efficiency and the increase of the share of renewable resources in the primary energy balance;

169.7. ensuring of community-driven launch of initiatives for GHG emission reduction campaigns by increasing environmental proactivity and awareness of the public in terms of climate change;

169.8. achievement of correspondence of education on climate change to the most recent scientific knowledge in this area by ensuring continuous collection and dissemination of information about most advanced technology, current research and experimental development in the area of climate change;

169.9. continuing support for preparation and implementation of climate change mitigation and adaptation projects in developing countries in order to increase their resilience to climate change and reduce the gap among them.

170. Objectives set to attain general indicative medium-term and short-term climate change adaptation and mitigation goals:

170.1. in order to attain the goal of paragraph 169.1:

170.1.1. setting quantitative targets for electricity production from low GHG emission sources and stage-by-stage planning of smart grids implementation, taking into account current

technologies and economic situation, when preparing and revising strategic documents for the energy sector;

170.1.2. envisaging measures promoting the implementation of eco-innovative technology for energy production and use and deployment of RES, when developing sectoral strategies;

170.2. in order to attain the goal of paragraph 169.2:

170.2.1. ensuring the implementation of measures promoting increase in agricultural production efficiency;

170.2.2. ensuring that, based on the best available practice, the latest and effective agriculture management methods are used for the optimisation of agricultural activities taking into account the effects of climate change;

170.3. in order to attain the goal of paragraph 169.3:

170.3.1. ensuring development and implementation of measures for renovation of buildings in the public sector;

170.3.2. ensuring that higher energy efficiency requirements are included in legal acts regulating public procurement procedures;

170.4. in order to attain the goal of paragraph 169.4:

170.4.1. ensuring assessment of possibilities and development of measures increasing energy efficiency in installations taking into account the competitiveness of industry;

170.4.2. assessing possibilities and, taking into account possible technologies, setting higher obligatory energy efficiency requirements for industrial and household equipment, when preparing technical construction regulations and other legal acts;

170.5. in order to attain the goal of paragraph 169.5:

170.5.1. ensuring that sectoral strategies assess possibilities of and provide for measures enhancing the development of all modes of greener transport, including plug-in hybrid and electric vehicles;

170.5.2. assessing possibilities of starting production and use of the 2$^{nd}$ and 3$^{rd}$ generation sustainable production biofuel and planning corresponding measures, when developing or revising development strategies for agricultural, transport and communication sectors;

170.6. to attain the goal of paragraph169.6, outlining and implementing research and experimental development programme in relation to climate change mitigation and adaptation by identifying priority research areas of importance to Lithuania and by planning adequate funding;

170.7. in order to attain the goal of paragraph 169.7:

170.7.1. ensuring information of the public about climate change using various measures and methods;

170.7.2. ensuring provision of legal and economic conditions for the implementation of the public initiatives;

170.8. in order to attain the goal of paragraph 169.8:

170.8.1. regularly revising education programmes so that education on the issues of climate change would correspond to the most recent scientific knowledge in this area at all levels of education;

170.8.2. ensuring that professionals are trained to tackle climate change issues in a qualified manner according to the best professional training practice in Europe and acquire knowledge about the cutting-edge technology;

170.9. to attain the goal of paragraph 169.9, supporting preparation and implementation of climate change mitigation and adaptation plans and projects in developing countries.

## VII. IMPLEMENTATION OF THE STRATEGY AND ACCOUNTABILITY

171. This Strategy is implemented by the Ministry of Environment, Ministry of Energy, Ministry of Finance, Ministry of Transport and Communications, Ministry of Health, Ministry of Education and Science, Ministry of Foreign Affairs, Ministry of Economy, Ministry of the Interior, Ministry of Agriculture and municipal and other institutions within their remit.

172. The implementation of the Strategy is coordinated by the Ministry of Environment.

173. Strategy implementation plans are prepared to be endorsed by the Government of the Republic of Lithuania. In addition, the goals and objectives of the Strategy are implemented by planning documents for the country's specific economic sectors, such as the National Progress Programme, development programmes or short-term planning documents.

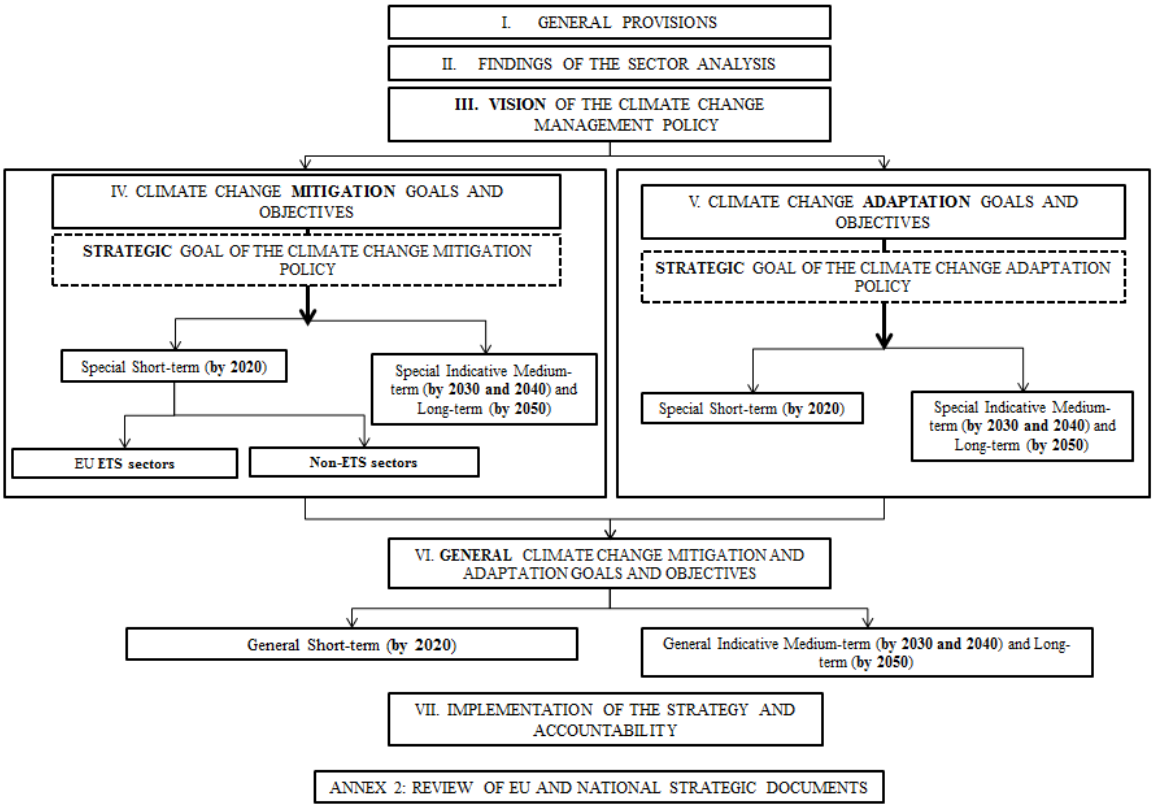
174. The implementation of the Strategy is funded from the funds of the state budget of the Republic of Lithuania, municipal budgets, EU and international organisations and other sources.

175. State and municipal institutions engaged in the implementation of the Strategy provide the Ministry of Environment with information about the progress in implementing the Strategy and its implementation plan by submitting annual activity reports.

176. Every two years, the Government of the Republic of Lithuania accounts for the implementation of the Strategy to the Seimas of the Republic of Lithuania by preparing and presenting a report on the implementation of the Strategy.

Annex 1 to the National Strategy
for Climate Change Management Policy

## STRUCTURE OF THE NATIONAL STRATEGY FOR CLIMATE CHANGE MANAGEMENT POLICY



Annex 2 to
the National Strategy
for Climate Change
Management Policy

## REVIEW OF EU AND NATIONAL STRATEGIC DOCUMENTS

Agriculture, energy (including industry) and transport are the main sectors, where legal acts endorsed at the EU level and drafted strategic documents will have a significant impact on the climate change mitigation policy at the national level. In this regard, the review covers basic national and EU strategic documents for agriculture, energy and transport sectors that provided a basis for general and special climate change mitigation and adaptation goals and objectives formulated in Chapters IV to VI of the Strategy.

### 1. Agriculture

*Basic Strategic Documents of the Republic of Lithuania*
*and Measures Provided Thereby*

1.1. **Main provisions of Lithuanian Rural Development Strategy 2007-2013 and its programme** approved by the EU Committee on Rural Development on 19 September 2007 envisage:

1.1.1. enhancing competitiveness of agriculture and forestry through the support for restructuring, development and innovation implementation processes;

1.1.2. increasing environmental and landscape value through the support to environmentally friendly land use planning methods;

1.1.3. improving quality of life in rural areas and promoting diversification of economic activities.

The implementation of the main provisions and the programme of the Strategy is planned to include preservation of biodiversity (support annually provided for 54,000 ha and 91,500 ha of NATURA 2000 areas in agriculture and forestry respectively), natural landscape and safe environment, afforestation of deserted land (to reach 3% of forest area in 2020), which will contribute to the reduction of climate change. Efforts are also focused on handling problems related to environmental risks posed by intensive agricultural

activities, promotion of organic farming targeted at organic products production, reclamation of deserted areas, reduction of soil acidity and erosion and improvement of water protection.

*Main EU Documents Describing the Development of the Agricultural Sector*

1.2. **Communication from the Commission of 6 April 2009 on White Paper − Adapting to climate change: Towards a European framework for action** (COM(2009) 147 final) (hereinafter: 'the White Paper'). The White Paper establishes a programme facilitating greater resilience of the EU to climate change, summarises major effects of climate change on EU agriculture, discusses adaptation needs, describes the importance of climate change to the common agricultural policy and analyses possible paths for future actions.

1.2.1. Main issues related to EU agriculture:

1.2.1.1. *Impact on agricultural products*. Higher $CO_2$ concentrations in the atmosphere, rising air temperature, variations in annual and seasonal precipitation regimes and frequency of extreme weather phenomena will affect the volume, quality and stability of foods production and natural agricultural environment. Climate change will affect possibilities of water resources use, have influence on pests, trigger diseases and contribute to the spread of dirt, which will lead to significant change of conditions for agriculture and livestock rearing. In extreme cases, the decline in the quality of agricultural systems might lead to desertification, which would make such land absolutely barren;

1.2.1.2. *Impact of climate change related risks on economy*. Extreme climate conditions might not only derange annual production, but also significantly affect farm infrastructure and, as a result, cause major economic losses: increasingly frequent extreme phenomena will lead to the lack of stocks, which, in turn, will cause greater variations in agricultural production, prices and farmers' income, production disruptions are more likely to occur eventually causing instability of farmers' economic situation.

1.2.1.3. *Higher climate risks in rural areas*. Such risks include floods, greater water demand for different purposes, storms, fire, increasing pest and disease outbreaks;

1.2.1.4. *Ability to adapt, resilience and regional differences.* As a result of varied climate change effects, regional and economic differences are expected to grow among European rural areas. In the long run, the impact of climate change might further minimise

the role of agriculture in some EU regions, and, in extreme cases, agricultural land might become deserted; on the other hand, in other regions, agricultural conditions might improve and farm income might increase. This might have a significant impact on the landscape and biodiversity and generally affect European regional development;

1.2.1.5. *General impact on agriculture and food safety*. Variations in agricultural production capacity and increasingly frequent occurrence of extreme phenomena in various world's regions might increase volatility of production, which might lead to price fluctuations and changes in trade flows.

1.2.2. The White Paper sets the following directions of the strategy for the adaptation of agriculture:

1.2.2.1. *Priority to harmless revocable measures*. This option allows adapting to a number of probable changes and promotes general social and economic welfare and environmental benefit. In terms of the agricultural sector, this suggests that more efficient use of natural resources, primarily water and soil, increases resilience of agricultural ecosystems;

1.2.2.2. *Strengthening the role of agriculture as the preserver of ecosystems*. As part of the management of agricultural land, ecosystems need to be taken care of to increase overall resilience to climate change. The role of agriculture as the green infrastructure should be further strengthened;

1.2.2.3. *Improving resilience of agricultural infrastructure*. Preventive activities and region-specific measures need to be developed to handle the issues related to eventual damage caused by extreme phenomena;

1.2.2.4. *Developing synergy between adaptation and impact mitigation*. To solve the twofold problem − reduction of GHG emissions and simultaneous climate change adaptation − adaptation and mitigation must be as closely related as possible. The EU agricultural sector can contribute to climate change mitigation by reducing GHG emissions, producing renewable energy and biomass products and preserving carbon compounds in agricultural land;

1.2.2.5. *Improved farmers' ability to adapt*. More successful sustainable agricultural development requires increased farmers' information and ability to apply cutting-edge farming methods and new technology, i.e. provision of climate-related information and consultative support;

1.2.2.6. *Promotion of cooperation among member states.* Exchange of views, experience and best practice among member states in relation to adaptation possibilities in

agriculture may identify farming activities and production systems that are best adapted to anticipated climate change;

1.2.2.7. *Enhancement of climate and agricultural research.*

1.2.2.8. *Determination of resilience indicators*.

1.2.3. The White Paper establishes that the following actions need to be taken to ensure climate change adaptation in agriculture:

1.2.3.1. determining resilient areas and sectors and assessing needs and possibilities of changing crops and their types in the context of climate change tendencies;

1.2.3.2. supporting agricultural research and experimental growth with a view to selecting crops and developing species best adapted to the new conditions;

1.2.3.3. developing adaptation skills and, for this purpose, increasing awareness and provision of basic information and consultations on the issues of farm management;

1.2.3.4. increasing investment in irrigation infrastructure and improvement of the efficiency of water-efficient technologies and management of water resources;

1.2.3.5. developing irrigation plans based on detailed impact assessment and taking into account prospective water resources, water requirements of different consumers and adjustment of demand and supply;

1.2.3.6. development of risk and crisis management instruments to respond to economic effects of climate phenomena;

1.3. **Communication of 18 November 2010 from the European Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions 'The CAP towards 2020: meeting the food, natural resources and territorial challenges of the future'** (COM(2010) 672 final). Such aspects as climate change, water condition, biodiversity, energy from renewable sources and innovations are planned to be brought into strong focus before 2020. This Communication describes major policy options in responding to future challenges that will be faced by agriculture and rural areas and sets strategic goals:

1.3.1. preserving sustainable capacity of the food industry across EU to ensure provision of European citizens with food in the long run and contribute in meeting the globally increased demand for food. Europe's capacity to ensure provision of food is an important long-term goal of Europe the attainment of which requires taking actions;

1.3.2. supporting farmers communities which provide European citizens with a valuable variety of foodstuffs of good quality produced in a sustainable manner, taking into consideration our aspirations related to requirements for environment, water, animal

health and welfare, plant health and public health. Active management of natural resources in farming is one important measure that may be helpful in preserving rural landscape, preventing loss of biodiversity and mitigating and adapting to climate change. This provides the basis for territorial dynamics and long-term economic viability;

1.3.3. maintaining viable rural communities for which farming is an important economic activity ensuring employment of local residents; this offers manifold economic, social, environmental and territorial benefit. Significant reduction in the scale of local production might inhibit attainment of goals in relation to the reduction of GHG emissions, specific aspects of the local landscape and ensuring of a wide choice for consumers;

1.3.4. it is important to further unlock the agricultural sector's potential to mitigate, adapt and make a positive contribution through GHG emission reduction, production efficiency measures including:

1.3.4.1. improvements in energy efficiency;

1.3.4.2. biomass and renewable energy production;

1.3.4.3. carbon sequestration;

1.3.4.4. protection of carbon in soils based on innovation;

1.3.5. a common theme that has emerged is the need to promote resource efficiency with a view to smart, sustainable and inclusive growth for EU agriculture and rural areas in line with the Europe 2020 strategy, keeping the structure of the CAP around two pillars that use complementary instruments in pursuit of the same objectives:

1.3.5.1. pillar I covers direct payments and market measures providing a basic annual income support to EU farmers and support in case of specific market disturbances;

1.3.5.2. pillar II covers rural development where member states draw up and co-finance multiannual programmes under a common framework.

## 2. Energy Sector (Including Industry)

*Basic Strategic Documents of the Republic of Lithuania and Measures Provided Thereby*

2.1. **National Energy Independence Strategy** approved by Resolution No XI-2133 of the Seimas of the Republic of Lithuania of 26 June 2012 (Official Gazette, No 80-

4149, 2012) sets the goals of the energy sector by 2020 and defines the paths of development by 2050:

2.1.1. this Strategy specifies initiatives by 2020 that directly contribute to climate change mitigation by reducing GHG emissions:

2.1.1.1. construction of a new nuclear power plant;

2.1.1.2. electricity production from renewable energy sources (no less than 20%). The focus is on the use of biomass in combined heat and power plants and wind energy. Wind turbines of 500 MW total capacity are planned to be installed by 2020. Priority is also planned to be given to the use of the potential of hydroelectric power;

2.1.1.3. improvement of energy efficiency in buildings by means of renovation;

2.1.1.4. reduction of import of old vehicles to achieve energy efficiency in the transport sector;

2.1.1.5. increase in heat production and transmission efficiency to achieve that renewable energy sources account for no less than 60% of the district heating in the sector. Ensuring that the share of RES, as compared to the final energy consumption, accounts for no less than 10% in the transport sector;

2.1.2. strategic initiatives for 2020-2050:

2.1.2.1. increase in the efficiency of the electricity grid and effective use of the smart grid technology;

2.1.2.2. reduction of heat requirements by gradually improving energy efficiency;

2.1.2.3. shift of the transport sector to the use of electric vehicles.

2.2. **National Strategy for the Development of Renewable Energy Sources** approved by Resolution No 789 of the Government of the Republic of Lithuania of 21 June 2010 (Official Gazette, No 73-3725, 2010). The main goal in increasing the share of RES in the energy balance of the country and in the electricity, heat energy and transport sectors is to meet energy needs as much as possible using domestic resources, abandon the use imported polluting fossil fuels, enhance security of energy supply and energy independence and contribute to international endeavours to reduce GHG emissions. This Strategy defines a minimum RES path to achieve the target set for Lithuania - RES accounting for 23%, as compared to the final energy consumption. According to the Strategy, the share of RES in the total final energy consumption must account for: no less than 16.6% in 2011-2012, no less than 17.4% in 2013-2014, no less than 18.6% in 2015-2016, no less than 20.2% in 2017-2018 and no less than 23% in 2020.

2.3. The **Law on Energy from Renewable Sources** (Official Gazette, No 62-2936, 2011) aims at ensuring sustainable development in relation to the use of RES. The Law sets objectives for individual energy sectors to achieve the common goal, namely, RES accounting for no less than 23% of the final energy consumption in 2020, and establishes a common framework promoting the use of RES.

2.4. **Energy Efficiency Action Plan** approved by Order No 4-270 of the Minister of Economy of the Republic of Lithuania of 2 July 2007 (Official Gazette, No 76-3024, 2007; No 2-38, 2009). This Plan is aimed at defining national energy saving indicators and strategy for their achievement. The national energy saving indicator set by the National Energy Strategy approved by Resolution No X-1046 of the Seimas of the Republic of Lithuania of 18 January 2007 (Official Gazette, No 11-430, 2007) is 9% of final energy consumption in 2005, which corresponds to 404 ktoe (4,700 GWh). The Energy Efficiency Action Plan provides a plan of measures for the attainment of the goal.

*Main EU Documents Describing the Development of the Energy Sector*

2.5. **Directive 2009/28/EC of the European Parliament and of the Council of 23 April 2009 on the promotion of the use of energy from renewable sources and amending and subsequently repealing Directives 2001/77/EC and 2003/30/EC** (OJ 2009 L 140, p. 16). This Directive sets a binding target for Lithuania to achieve that in 2020 the share of RES in the final energy consumption is no less than 23%. In the meanwhile, the share of RES in the final energy consumption of the transport sector must be no less than 10%. The requirements of this Directive have been transposed into the National Strategy for the Development of Renewable Energy Sources and the Law of the Republic of Lithuania on Energy from Renewable Sources.

2.6. **Directive 2010/31/EU of the European Parliament and of the Council of 19 May 2010 on the energy performance of buildings** (OJ 2010 L 153, p. 13). According to this Directive, by 31 December 2020, all new buildings must be zero-energy buildings, but in the case of buildings for public needs this requirement applies after 31 December 2018.

2.7. **Directive 2006/32/EC of the European Parliament and of the Council of 5 April 2006 on energy end-use efficiency and energy services and repealing Council Directive 93/76/EEC (OJ 2006 L 114, p. 64), as last amended by Regulation (EC) No 1137/2008 of the European Parliament and of the Council of 22 October 2008** (OJ

2008 L 311, p. 1). The Directive aims at promoting cost-effective increase in energy end-use efficiency in member states by setting necessary target indicators, mechanisms and incentive measures and enabling the development and promotion of the energy services market and the provision of other measures increasing energy efficiency to end users. This Directive provided the basis for the National Energy Efficiency Programme 2006-2010 approved by Resolution No 443 of the Government of the Republic of Lithuania of 11 May 2006 (Official Gazette, No 54-1956, 2006) and the Energy Efficiency Action Plan approved by Order No 4-270 of the Minister of Economy of the Republic of Lithuania of 2 July 2007 (Official Gazette, No 76-3024, 2007; No 2-38, 2009).

2.8. **Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions of 10 November 2010 "Energy 2020 − A Strategy for competitive, sustainable and secure energy"** (COM(2010) 639 final). This Communication defines the main policy goals of competitiveness, sustainability and security of supply in the EU energy sector and proposes five priorities implementing these goals. Measures specified in the Communication also include climate change related goals (reducing GHG emissions by 20%, increasing the share of RES by 20% and making a 20% improvement in energy efficiency by 2020). The energy strategy sets the following priorities:

2.8.1. achieving energy efficiency in Europe. This priority is directly related to climate change mitigation and includes the following measures:

2.8.1.1. accelerating renovation aimed at improved energy efficiency in buildings through investment incentives;

2.8.1.2. setting energy-related criteria (or criteria related to efficient use of RES or development of smart grids) for public procurement of works, services and products;

2.8.1.3. increasing energy production and distribution efficiency and achieving better implementation of highly efficient overall heat and electricity production (cogeneration);

2.8.1.4. ensuring energy saving and organising implementation of measures to make sure that energy saving supported with documents;

2.8.1.5. implementing ecodesign requirements for energy-intensive products;

2.8.1.6. implementing national energy consumption plans;

2.8.2. developing an integrated European energy market. This priority takes account of the fact that, in developing a European infrastructure project, the internal market needs to be prepared and should integrate large-scale energy production from

renewable energy sources. It is also planned to develop a carbon dioxide transportation infrastructure;

2.8.3. empowering consumers and ensuring the highest level of security. The priority is not associated with climate change mitigation or adaptation measures;

2.8.4. achieving stronger Europe's leadership in energy technologies and innovation. The priority is directly associated with climate mitigation measures:

2.8.4.1. planned support for energy production research programmes (wind, solar, bioenergy, smart grids, nuclear fission, CCS);

2.8.4.2. planned start of four European projects promoting implementation of smart grids and ensuring large-scale sustainable biofuel production. The Smart Cities programme ranking cities in terms of implementation of priorities will also be launched;

2.8.5. strengthening the EU energy market through harmonisation of the EU and neighbouring energy markets and regulatory frameworks. The priority is not directly associated with climate change mitigation or adaptation measures.

2.9. **"A Roadmap for moving to a competitive low carbon economy in 2050"** outlines the vision of the EU energy sector development by 2050. The document proposes the following priorities and actions to be taken by the EU to attain the goals of low carbon economy:

2.9.1. energy efficiency: high potential and effectiveness in terms of investment. Obligatory goals of energy efficiency improvement need also to be defined. The Energy Efficiency Directive was reviewed and ecodesign requirements for energy-using products were strengthened taking into account best available technologies (front-runner approach). Implementation of the Directive on the energy performance of buildings to achieve zero net energy use in new buildings by 2020;

2.9.2. better use of renewable energy sources and development of low-carbon technology: these technologies cover CCS, solar photo-voltaic (PV) energy, offshore wind farms, use of biomass, electric drive vehicles, fuel cells, etc.;

2.9.3. conventional fossil fuel resources, such as natural gas, still play an important role in the energy balance, especially in the transition period, however need to be planned in relation to the use of the CCS technology;

2.9.4. networks and integrated markets: regulation of electricity transmission and distribution, development of smart grids and of regional integration by planning and operating electricity transmission and distribution systems and markets; support of interested parties is also needed;

2.9.5. markets: massive channelling of investments into commercial low-carbon technologies. The majority of investments are expected to come from the private sector.

2.10. “A Roadmap for moving to a competitive low carbon economy in 2050” and recommendations for the implementation of this Roadmap determine that, in implementing “A Roadmap for moving to a competitive low carbon economy in 2050”, the main areas of focus of EU member states are as follows:

2.10.1. setting ambitious goals for the implementation of energy efficiency measures to double (triple) the present growth in energy efficiency. Member states have to raise the level of energy efficiency standards for existent buildings;

2.10.2. setting implementation goals beyond 2020 for the sector using renewable energy sources taking into account estimated needs. Key technologies that require special attention are offshore wind farms and solar PV energy; also defining implementation strategies for CCS, especially in heavy industry. The EU plans to review the goals of the EU ETS to make sure that they are in conformity with the common policy for the reduction of GHG emissions in 2050, and therefore member states will be requested to set long-term goals for the development of main RES and simultaneously adopt measures implementing CCS technologies. Member states are anticipated to make inventories of possible carbon storages, distribute storage capacities among sectors and develop an adequate mechanism regulating carbon network;

2.10.3. undertaking the review of the wholesale market arrangement to ensure promotion of investment in energy efficiency and other demand-related resources, system balancing and low-carbon sources, contributing to the support of effective cross-border trade:

2.10.3.1. reviewing local planning with neighbouring member states in areas of low-carbon resources development, network planning and operation and also planning and operation of the wholesale market;

2.10.3.2. reviewing network regulation powers in domestic energy markets by developing a strong investment scheme allowing implementation and improvement of the smart infrastructure in terms of transmission and distribution (Third Energy Package);

2.10.3.3. drawing up a schedule for the implementation of smart grids by maximising possibilities of meeting demand and distributing production;

2.10.3.4. reviewing spatial planning and environment protection laws to ensure their conformity to goals;

2.10.3.5. making sure that funding sources, funding institutions and risk distribution are properly arranged and that the new low-carbon infrastructure may be prepared and funded in an economically justified manner.

## 3. Transport Sector

*Basic Strategic Documents of the Republic of Lithuania and Paths of Development Defined Thereby*

3.1. **Long-term (Until 2025) Strategy for the Development of the Lithuanian Transport System** approved by Resolution No 692 of the Government of the Republic of Lithuania of 23 June 2005 (Official Gazette, No 79-2860, 2005). In order to achieve the development goals of the transport system, this Strategy establishes policies that cover:

3.1.1. development of the transport infrastructure and intermodal transport;

3.1.2. development of information technology and intelligent transport systems;

3.1.3. transport development and environment protection;

3.1.4. improvement of road traffic safety;

3.1.5. protection of transport infrastructure installations, goods and passengers;

3.1.6. strengthening of administrative capacities.

3.2. Measures implementing environmental goals are planned until 2013 and 2025. These measures contribute to the GHG emission reduction goals and are focused on the renewal of transport fleets, improvement of the road infrastructure (paving of gravel roads, introduction of walking and cycling routes), use of greener fuel (by increasing the share of RES in the fuel balance of the transport sector) and promotion of the use of less polluting vehicles. The Strategy aims to achieve that indigenous biological resources account for 15% of the transport fuel requirements.

3.3. As one of the priorities of the National Programme for Transport and Communications Development, GHG emission reduction is sought by stiffening requirements for the transport industry on the technical level and promoting more effective organisation of transport services. The goals set by the Programme in relation to climate change are the promotion of sustainable mobility and development of public transport and the improvement of energy efficiency in transport and reduction of environmental impact. In order to attain these goals, measures have been introduced with the focus on

improvement of green driving skills in road and railway transport, enhancement of energy efficiency, harmonisation of modes of transport and use of biofuels.

3.4. The long-term goals of **the National Strategy for Sustainable Development** approved by Resolution No 1160 of the Government of the Republic of Lithuania of 11 September 2003 (Official Gazette, No 89-4029, 2003; No121-5215, 2009) in the transport sector, which are related to climate change mitigation, include the development of an environmentally friendly transport system using alternative and less polluting fuels. This Strategy emphasises the need to improve energy efficiency and use greener fuels to make sure that fuel consumption and GHG emission increases by half of the growth rate of carriage of goods and passengers. It also highlights the need to develop transport that has a lesser impact on human health, especially railway and sea transport, multimodal and intermodal transport systems. Intermodal systems allow carriage of the same goods involving different modes of transport by changing the mode of transport rather than transshipping the goods. This makes it possible to use least GHG emitting vehicles for the carriage of goods and, as a result, reduce GHG emissions throughout the life cycle of a product.

3.5. **The National Strategy for the Development of Renewable Energy Sources** determines a minimum RES trajectory. According to this trajectory, the share of RES in the transport sector, as compared to the final energy consumption, should account for 10% in 2020. The Strategy sets the goal of increasing the share of biofuels in the mixture with fossil fuels up to 20%.

3.6. **The Law of the Republic of Lithuania on Energy from Renewable Sources** sets the objective of increasing the share of RES in the transport sector so that, as compared to final energy consumption, it accounts for 10% of final energy consumption of this sector. The Law promotes the use of alternative fuels (biofuels for transport, biogas, electricity, hydrogen, etc.) and highlights the importance of promotion of vehicles running on such fuels. In the transport sector, this Law establishes a framework for the sustainability of biofuels for transport and bioliquids and blending of biofuels for transport into fuels produced from mineral fuels.

*Basic Strategic Documents of the European Union*
*and Paths of Development Defined Thereby*

3.7. **Directive 2009/28/EC of the European Parliament and of the Council of 23 April 2009 on the promotion of the use of energy from renewable sources and amending and subsequently repealing Directives 2001/77/EC and 2003/30/EC** (OJ 2009 L 140, p. 16) lays down general requirements for the production of energy from renewable sources and its promotion. It also sets the requirement for member states to draw up national action plans defining the share of renewable energy resources in the final energy consumption of the transport sector, electricity production and heat production by 2020 (the provision transposed to the legal acts of the Republic of Lithuania, the National Strategy for the Development of Renewable Energy Sources prepared and approved). The Directive takes account of the use of transport biofuels and defines sustainability indicators for transport biofuel production.

3.8. **Directive 2009/33/EC of the European Parliament and of the Council of 23 April 2009 on the promotion of clean and energy-efficient road transport vehicles** (OJ 2009, L 120, p. 5) lays down requirements for the procurement of vehicles taking account of the impact of the lifetime of a vehicle on energy and environment, including energy consumption and $CO_2$ emissions and the volume of some other pollutants. The Directive applies to contracting authorities, contracting entities and operators acting under public service contracts.

3.9. **Directive 2008/101/EC of the European Parliament and of the Council of 19 November 2008 amending Directive 2003/87/EC so as to include aviation activities in the scheme for greenhouse gas emission allowance trading within the Community** (OJ 2009 L8, p. 3). This Directive provides for the inclusion of aviation activities in the EU ETS as of 1 January 2012. In 2012 and beyond, the number of emission allowances allocated for this type of activity will accordingly account for 97% and 95% of the GHG emissions from aviation as compared to the previous period (2004-2006). 82% of emission allowances will be allocated free of charge, 15% will be sold at auction and 3% will remain reserved for new participants.

3.10. **Regulation (EC) No 443/2009 of the European Parliament and of the Council of 23 April 2009 setting emission performance standards for new passenger cars as part of the Community's integrated approach to reduce $CO_2$ emissions from light-duty vehicles** (OJ 2009 L 140, p. 1) This Regulation aims at attaining the Community's goal to achieve 120 g $CO_2$/km as the average level of emissions from the new vehicle fleet. The indicator set for the year 2015 is 130 g $CO_2$/km. The average emission standard of 95 g $CO_2$/km is set for new vehicles and will apply in 2020.

3.11. **Regulation (EU) No 510/2011 of the European Parliament and of the Council of 11 May 2011 setting emission performance standards for new light commercial vehicles as part of the Union's integrated approach to reduce $CO_2$ emissions from light-duty vehicles** (OJ 2011 L 145, p. 1) sets the average of 175 g $CO_2$/km and 147 g $CO_2$/km emissions in 2014 and 2020 respectively to be achieved through the enhancement of vehicle technology.

3.12. **Commission Regulation (EC) No 692/2008 of 18 July 2008 implementing and amending Regulation (EC) No 715/2007 of the European Parliament and of the Council on type-approval of motor vehicles with respect to emissions from light passenger and commercial vehicles (Euro 5 and Euro 6) and on access to vehicle repair and maintenance information** (OJ 2008 L 199, p. 1), as last amended by Commission Regulation (EU) No 459/2012 of 29 May 2012 (OJ 2012 L 142, p. 16) (hereinafter: 'Regulation No 692/2008'). Regulation (EC) No 715/2007 of the European Parliament and of the Council of 20 June 2007 on type-approval of motor vehicles with respect to emissions from light passenger and commercial vehicles (Euro 5 and Euro 6) and on access to vehicle repair and maintenance information (OJ 2007 L 171, p. 1) and Regulation (EC) No 692/2008 implementing and amending Regulation (EC) No 715/2007 establish type-approval of motor vehicles with respect to emissions from new light passenger vehicles (Euro 5) and light commercial vehicles (Euro 6). These Regulations introduce limit values for carbon dioxide, carbon monoxide, hydrocarbon, nitric oxide and particulate matter in exhaust gas emissions and will apply to Euro 5 and Euro 6 from 2012 and 2014 respectively.

3.13. The vision of the EU transport sector in 2050 laid down in the **Commission Communication of 28 March 2011 on White Paper "Roadmap to a Single European Transport Area – Towards a competitive and resource efficient transport system" (COM(2011) 144)** (hereinafter: 'the White Paper on Transport') sets development priorities and paths for this sector. The main goals are to halve the use of 'conventionally-fuelled' cars in urban transport by 2030 and phase them out in cities by 2050. As compared to 1990, the 60% GHG emission reduction target is to be achieved in 2050. The White Paper on Transport sets the following goals:

3.13.1. halve the use of 'conventionally-fuelled' cars in urban transport by 2030; phase them out in cities by 2050; achieve essentially $CO_2$-free city logistics in major urban centres by 2030;

3.13.2. ensure that low-carbon sustainable fuels in aviation reach 40% by 2050; also by 2050 reduce EU $CO_2$ emissions from maritime bunker fuels by 40% (if feasible 50%); optimise the performance of multimodal logistic chains, including making greater use of more energy-efficient modes;

3.13.3. shift 30% of road freight over 300 km to other modes, such as rail or waterborne transport, by 2030, and more than 50% by 2050, which should be facilitated by efficient and green freight corridors. To meet this goal will also require appropriate infrastructure to be developed;

3.13.4. complete a European high-speed rail network by 2050; triple the length of the existing high-speed rail network by 2030 and maintain a dense railway network in all member states; achieve that, by 2050, the majority of medium-distance passenger transport goes by rail;

3.13.5. seek to develop a fully functional and EU-wide multimodal TEN-T 'core network' by 2030, with a high quality and capacity network and a corresponding set of information services by 2050;

3.13.6. connect, by 2050, all core network airports to the rail network, preferably high-speed; ensure that all core seaports are sufficiently connected to the rail freight and, where possible, inland waterway system;

3.13.7. deploy the modernised air traffic management infrastructure (SESAR) in Europe and complete the European Common Aviation Area by 2020; deploy equivalent land and waterborne transport management systems (ERTMS, ITS, SSN and LRIT, RIS); deploy the European Global Navigation Satellite System (Galileo);

3.13.8. establish the framework for a European multimodal transport information, management and payment system by 2020;

3.13.9. move close to zero fatalities in road transport by 2050. In line with this goal, the EU aims at halving road casualties by 2020 and ensuring the EU's worldwide leadership in safety and security of transport in all modes of transport;

3.13.10. move towards full application of "user pays" and "polluter pays" principles and private sector engagement to eliminate distortions, including harmful subsidies, generate revenues and ensure financing for future transport investments.

3.14. The White Paper on Transport lays down the following initiatives targeted at climate change mitigation:

3.14.1. identifying the necessary regulatory framework conditions through standardisation or regulation;

3.14.2. setting appropriate standards for $CO_2$ emissions of vehicles in all modes, where necessary supplemented by requirements on energy efficiency to address all types of propulsion systems;

3.14.3. ensuring that $CO_2$ and pollutant emissions are reduced under real-world driving conditions by proposing at the latest by 2013 a revised test cycle to measure emissions;

3.14.4. laying down rules on the interoperability of charging infrastructure for environmentally friendly vehicles;

3.14.5. improving the efficiency of the vehicle labelling system concerning $CO_2$ emissions and fuel efficiency and supporting the market take-up of safe and fuel efficient tyres;

3.14.6. encouraging eco-driving and setting possible speed limits with regard to energy efficiency;

3.14.7. revising transport charges and taxes with clear identification of the energy and $CO_2$ component in motor fuel taxation;

3.14.8. defining a strategy for moving towards 'zero-emission urban logistics', bringing together aspects of land planning, rail and river access, business practices and information, charging and vehicle technology standards.

3.15. European Commission Directorate-General for Climate Action funded the project **"EU Transport GHG: Routes to 2050"** aimed at defining possibilities of reducing GHG emissions by 2050 and political measures that may be required. Seeking to revise present strategies and initiate new ones, the Commission has formed a stakeholder Expert Group on Future Transport Fuels. The purpose of the Expert Group is to propose development strategies ensuring that transport energy demand is fulfilled by 2050 taking into account possibilities of meeting the demand for low GHG emitting energy carriers in 2050. The European Expert Group has distinguished the following initiatives:

3.15.1. setting of $CO_2$ reduction goals in the transport sector is more effective than defining quantitative indicators for the use of RES or for alternative biofuels. Setting of the GHG emission reduction goal does not limit the ways in which the indicator can be achieved and therefore allows using a number of different measures or their combinations;

3.15.2. reduction of carbon in fuels should be revised, and stringent goals need to be set to reduce carbon intensity in the transport sector. Possibilities of increasing the share of transport biofuels in the mixture up to 20% should be taken into account;

3.15.3. development of a legal framework focused on railway transport electrification. In general, this mode of transport has low GHG emission reduction potential, because the electrification level is relatively high; in addition, electricity production is included in the EU ETS and starting from 2013 electricity generating plants will not be allocated free emission allowances for electricity production. However this potential may be unlocked by providing conditions for the growth of the share of this mode of freight and passenger carriage in the total balance of the transport sector. To this end, regulatory documents need to be prepared to limit long-distance freight carriage by road transport;

3.15.4. avoiding the construction of new parking lots, which encourage the use of personal vehicles, in order to reduce light-duty vehicle traffic to a town centre. However, restriction of vehicle parking should be possibly considered as an option. The possibility of introducing benefit programmes for green vehicles, such as transformation of existing parking lots with certain requirements for vehicles, could also be taken into account. In this case, access to a parking lot would be limited only to green vehicles to promote their use;

3.15.5. application of facilitated administrative procedures to promote the development of alternative fuels;

3.15.6. encouraging the use of less energy-intensive vehicles by providing conditions of leaving one's own vehicle and continuing a trip by public transport. The public transport sector should shift towards alternative energy sources through maximum reduction of $CO_2$ emissions;

3.15.7. the development of the recharging infrastructure to promote the take-up of electric vehicles. Electricity is anticipated to become one of the main energy sources for short to medium distance transportation. Now is the time to start preparing a legal framework for the regulation of the development of the recharging infrastructure to facilitate subsequent start of operation of electric vehicles and their entry to the transport market.