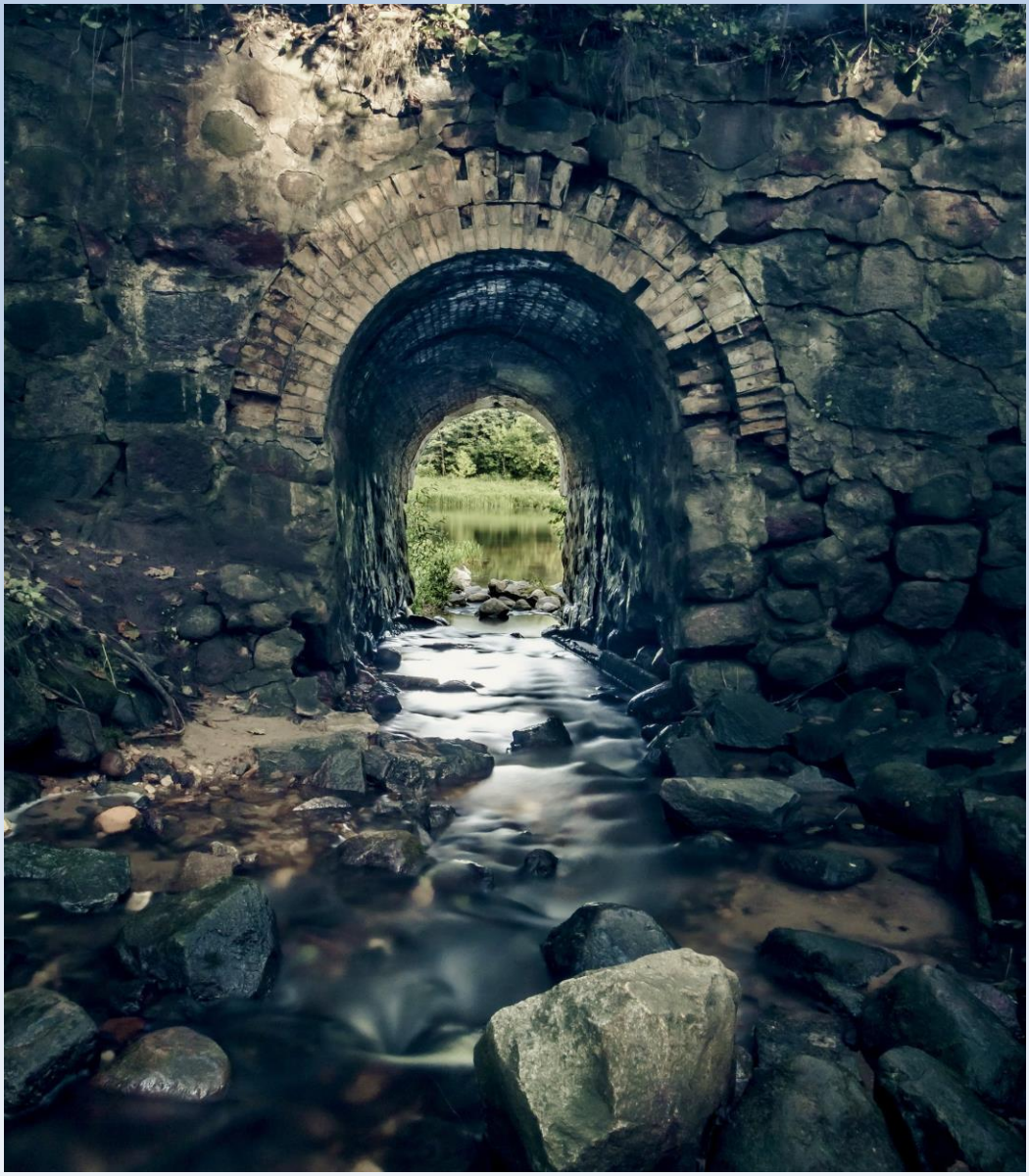

LITHUANIA'S THIRD BIENNIAL REPORT

under the United Nations Framework
Convention on Climate Change

Vilnius 2017

Published by the Ministry of Environment of the Republic of Lithuania
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Introduction

Lithuania is pleased to submit its Third Biennial Report (BR3) under the United Nations Framework Convention on Climate Change (hereinafter – UNFCCC).

The Biennial report is elaborated in accordance with the UNFCCC biennial reporting guidelines for developed country Parties (Decision 2/CP.17 of the Conference of the Parties under UNFCCC). As defined in the guidelines the report structure is the following:

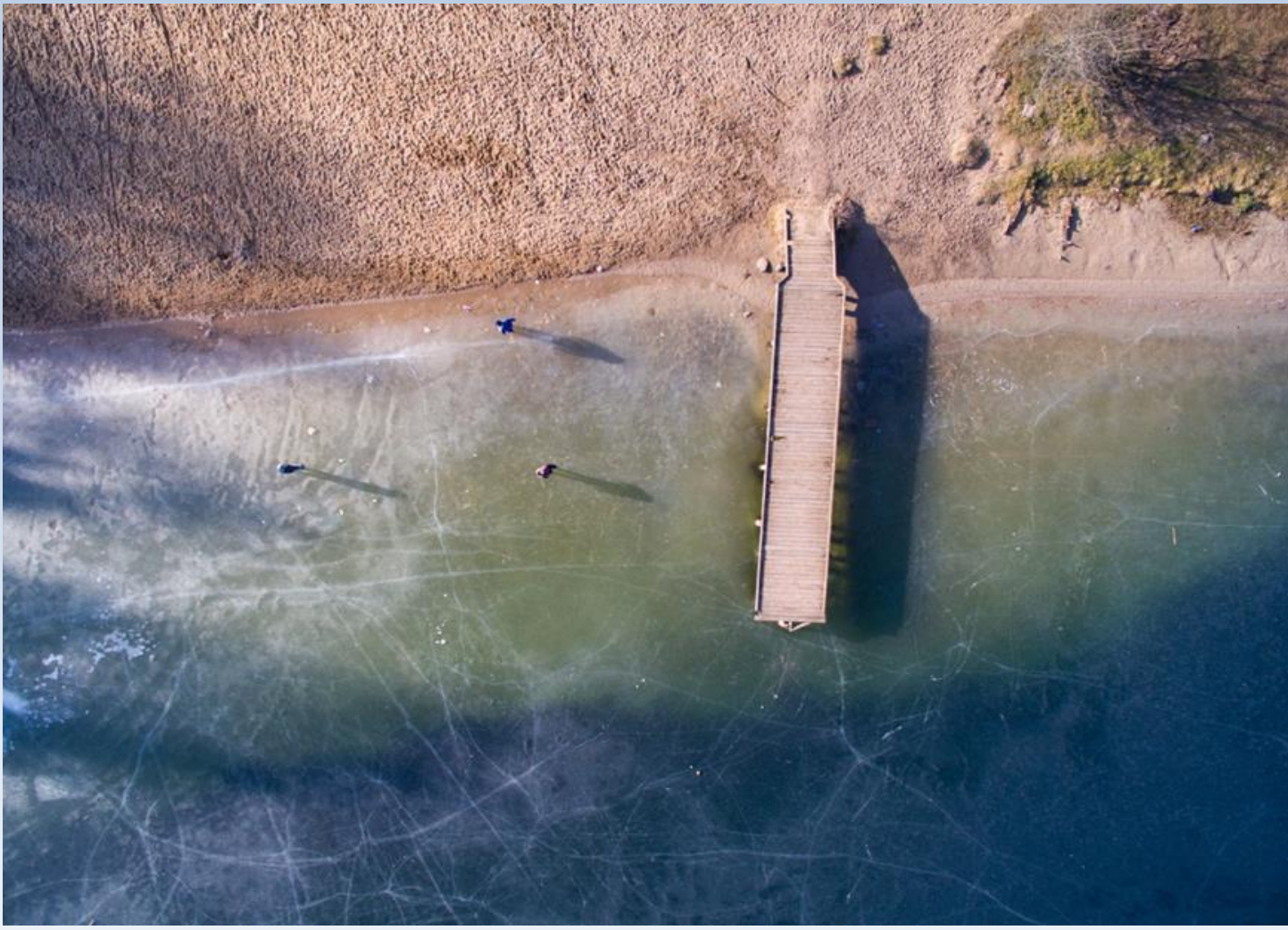
- information on greenhouse gas (hereinafter – GHG) emissions and trends;
- quantified economy-wide emission reduction target;
- progress in achievement of quantified economy-wide emission reduction targets;
- greenhouse gas projections;
- provision of financial, technological and capability-building support to developing country Parties.

This biennial report contains summary information on GHG inventory information for the time period 1990-2015, provides summary information on Lithuania's progress made in relation to Lithuania's contribution to the joint EU quantified economy-wide emission reduction target. Summary information on projections until 2035 is also presented. Information provided on GHG and trends is consistent with the information in Lithuania's National GHG inventory submission to UNFCCC secretariat in 2017.

The Biennial report is prepared taking into account remarks by the UNFCCC expert review team, provided in the Report of the technical review of the second biennial report of Lithuania (FCCC/TRR.2/LTU).

The EU and Member States are committed to achieve a joint quantified economy-wide emission reduction target – 20% by 2020, compared to 1990 levels. The details of the EU joint target under the UNFCCC are clarified in the report. Additional information related to the quantified economy-wide emission reduction targets presented in the document "Compilation of economy-wide emission reduction targets to be implemented by Parties included in Annex I to the Convention (FCCC/SB/2011/INF.1/Rev.1).

Tabular information to be reported electronically in the Common Tabular Format (CTF) in accordance with "UNFCCC biennial reporting guidelines for developed country Parties" (Decision 19/CP.18 of the Conference of the Parties under UNFCCC) is enclosed to the BR3 submission (submitted to the UNFCCC using the CTF software).



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INFORMATION ON GREENHOUSE GAS EMISSIONS AND TRENDS

1. INFORMATION ON GREENHOUSE GAS EMISSIONS AND TRENDS

Lithuania provided GHG inventory data for the first time in its first National Communication under the UNFCCC in 1996. Since 2004, inventory data is reported using common reporting format (CRF) and from 2006 using CRF Reporter software, developed by the UNFCCC secretariat. In 2006 for the first time complete time series 1990-2004 have been estimated and submitted to the European Commission and the UNFCCC secretariat together with Lithuania's Initial Report under the Kyoto Protocol.

The data used in Lithuania's 3rd Biennial Report is in accordance with its National Inventory Report (NIR) that was submitted in 2017 to the Secretariat of the UNFCCC in compliance with the decision 24/CP.19 "Revision of the UNFCCC reporting guidelines on annual inventories for Parties included in Annex I to Convention" (FCCC/CP/2013/10/Add.3). This submission covers the inventory of GHG emissions of Lithuania for the period 1990-2015. It has been also submitted to the European Commission in compliance with European Parliament and the Council Regulation (EU) No 525/2013 on a mechanism for monitoring and reporting greenhouse gas emissions and for reporting other information at national and Union level relevant to climate change and repealing Decision No 280/2004/EC. The NIR includes description of the methodologies and data sources used for estimating emissions by sources and removals by sinks, and review of their trends.

1.1. Greenhouse gas emissions trends

1.1.1. General greenhouse gas emissions trends

In 2015, Lithuania's total GHG emissions amounted to 20 096.2 kt CO_2 eq. excluding LULUCF. GHG emission level drastically fell down in 1992 and remained steady at approx. 22 Mt CO_2 eq. during the last 23 years (Figure 1-1).

A significant decrease in 1992 was caused by the collapse of Soviet economy, which led to the transition from a centrally-planned economy to a market-based economy by restructuring manufacturing industries, energy industries and agriculture. Upon its independence from the Soviet Union in 1990, after 50 years of annexation, Lithuania inherited an economy with high energy intensity. A blockade of resources, imposed by USSR during 1991-1993 led to a sharp fall in economic activity, as reflected by the decrease of the GDP in the beginning of nineties. The economic situation improved in the middle of the last decade and GDP has been increasing until 1999 (during 1999-2000, GDP decreased due to the economic crisis in Russia) and GDP continued increasing from 2001 to 2008.

In the beginning of 1990s, mostly fossil fuel was combusted in manufacturing industries, energy industries and agriculture. A comparison of annual general fuel balances in the period of 1990-2015 shows a significant decrease of use of fuel oil (e.g. from about annual quantity of 57 800 TJ in 1990-1991, to 19 307 TJ in 1992, to about 17 200 TJ in 1993-1994 and 13 126 TJ in 1995, to less than 600 TJ since 2008[1]), also a decrease of use of coal, petrol, natural gas, but increase of use of wood. Decrease of use of fuel oil first of all was influenced by environmental requirements: since 1 January 2004 consumption of sulphurous fuel oil was forbidden and it was followed with the stricter requirements since 2008. As elimination of sulphur from fuel oil was not economically efficient for companies, these requirements led

to the shift of fuel oil to other fuel types (e.g. natural gas), resulting in a considerable decrease in annual GHG emissions.

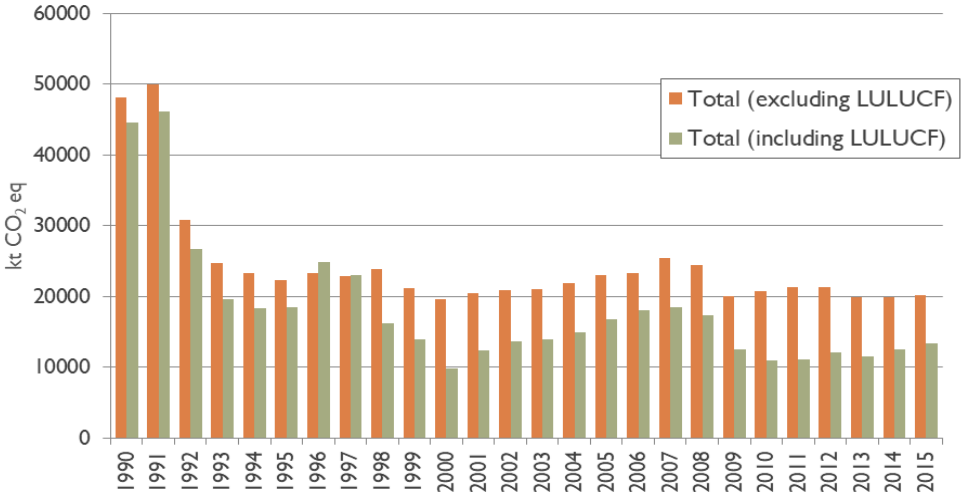

Figure 1-1. GHG emissions 1990-2015, kt CO_2 eq.

Last considerable decrease in 2009 was related with the economic crisis in Europe, while after 2009 GHG emissions stabilized at approx. 20 Mt CO_2 eq.

Comparing with 2014 the total GHG emissions have increased by 1.1% (excl. LULUCF) in 2015.

The composition of GHG emissions by sector in 2015 is presented in Figure 1-2.

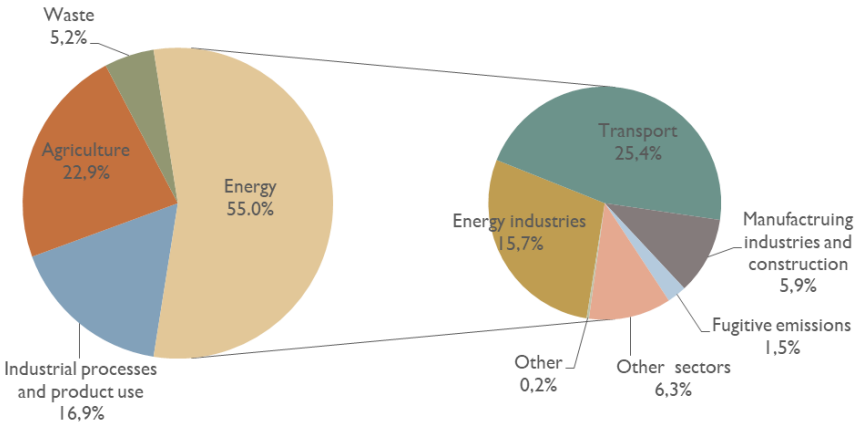

Figure 1-2. The composition of Lithuanian GHG emissions (%) by sector (excl. LULUCF) in 2015

Energy sector is the most significant source of GHG emissions in Lithuania with 55% share of the total emissions (excl. LULUCF) in 2015. Emissions from energy include CO_2, CH_4 and N_2O GHG.

CO_2 emission from energy sector contained 79.3% of the total national CO_2 emissions (excl. LULUCF) in 2015. The main categories are energy industries and transport which contribute 29.7% and 48.4% to the

total national CO_2 emission (excl. LULUCF) respectively. Comparing with 2014 CO_2 emissions from energy sector have increased by 0.004% in 2015. The emissions of CH_4 have increased by 1.5% and N_2O emissions decreased by 0.1%.

The second most important source of GHG emissions is agriculture sector accounting for 22.9% of the total national GHG emissions (excl. LULUCF). This sector is the most significant source of CH_4 and N_2O emissions accounting for 56.4% and 85.1% of the total CH_4 and N_2O emissions, respectively. The main source of CH_4 emissions is enteric fermentation contributing 86% to the total agricultural CH_4 emissions. Agricultural soils are the most significant source of N_2O emissions accounting for 92.4% of the total agricultural N_2O emissions. Comparing with 2014 GHG emissions in agriculture sector have increased by 1.6% in 2015.

Emissions from industrial processes and product use amounted to 16.9% of the total GHG emissions (excl. LULUCF) in 2015. The main categories are: ammonia production, nitric acid production and cement production. Ammonia production is the largest source of CO_2 emissions in industrial processes and product use sector contributing 15.4% to the total national CO_2 emissions (excl. LULUCF) in 2015. Nitric acid production is the single source of N_2O emissions in industrial processes sector and accounts for 8.3% in the total national N_2O emissions (excl. LULUCF) in 2015. GHG emissions in 2015 from industrial processes and product use sector have increased by 6.9% comparing with 2014.

Waste sector accounted for 5.2% of the total GHG emissions in 2015 (excl. LULUCF). The solid waste disposal on land is the second important source of CH_4 emissions. It contributes 23.8% to the total CH_4 emissions (excl. LULUCF). There was 7.1% reduction in CH_4 emission from waste sector in 2015 comparing with 2014.

1.1.2. Greenhouse gas emissions trends by gas

GHG emissions trends by gas in CO_2 eq. are presented in the Figure 1-3 below and reflect the main tendencies of GHG level in general.

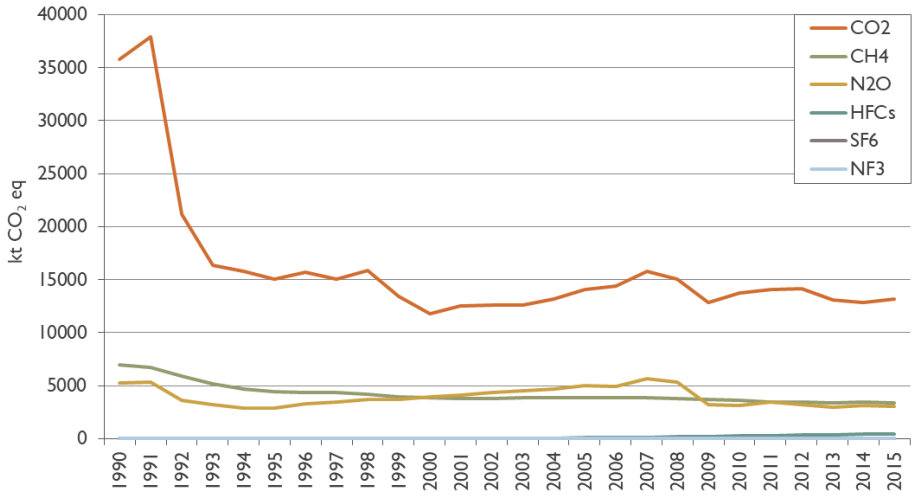

Figure 1-3. Trends of GHG emissions by gas kt CO_2 eq (excl. LULUCF) 1990-2015

The most important GHG in Lithuania is carbon dioxide. In 2015, the actual CO_2 emission (excl. LULUCF) was 63.3% lower than the emission in 1990. Comparing with 2014 CO_2 emissions increased by 2.1% including LULUCF and 17.5% excluding LULUCF. The largest source of CO_2 emissions is energy sector which contributes around 79.3% of all CO_2 emissions. Comparing with 2014 CO_2 emission from energy sector in 2015 have slightly increased by 0.004% wherein CO_2 emission from the energy industries decreased by 0.8% and emissions from transport increased 5.5%.

Distribution of CO_2 emissions in 2015 by the main sectors and subsectors is shown in Figure 1-4.

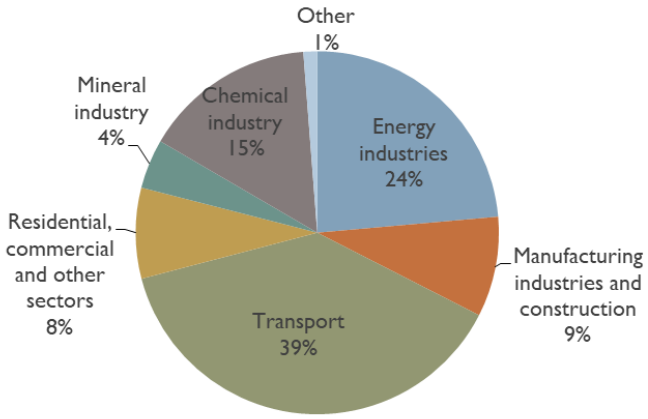

Figure 1-4. Distribution of CO_2 emissions by sector in 2015

Methane is the second most important GHG accounting for 16.8% in the total national GHG emissions (excl. LULUCF). The largest sources of methane emissions are: agriculture sector, contributing with 56% in 2015, waste sector – 29% and fugitive emissions from oil and natural gas operations – 9% (Figure 1-5). The emissions from agriculture derive from enteric fermentation and manure management contributing with 48% and 8% respectively of the total national CH_4 emission (excl. LULUCF).

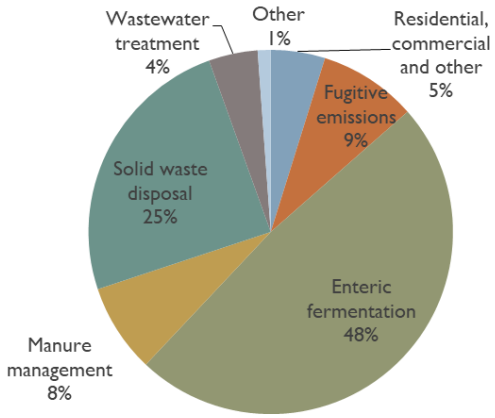

Figure 1-5. Distribution of CH_4 emissions by sector in 2015

Nitrous oxide is accounting for 15.4% in the total national GHG emissions (excl. LULUCF). Agriculture is the main source of N_2O emissions which contributed 85% to the total N_2O emissions in 2015. N_2O emissions from agriculture sector have increased by 2.4% comparing with 2014.

The second significant source of N_2O emissions is nitric acid production. It contributes 8% to the total N_2O emissions. Figure 1-6 shows the distribution of N_2O emissions in 2015 by the main sectors and subsectors.

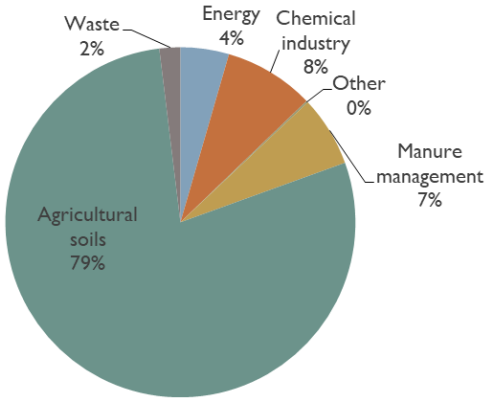

Figure 1-6 Distribution of N_2O emissions by sector in 2015

The F-gases contribute 2.4% to the total national GHG emissions in 2015. The emissions of F-gases have increased significantly during 1993-2015. A key driver behind the trend has been the substitution of ozone depleting substances (ODS) by F-gases in many applications. Figure 1-7 shows the trend of F-gases emissions during the period 1993-2015.

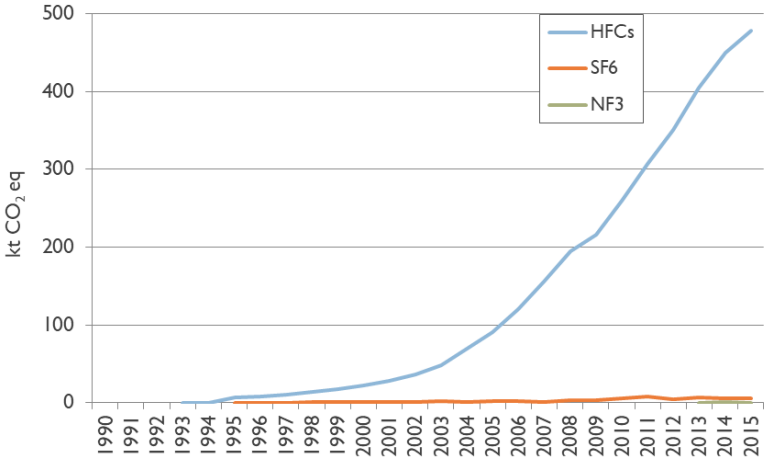

Figure 1-7. Emission trends for F-gases for the period 1993-2015 (kt CO_2 eq.)

1.1.3. Greenhouse gas emissions trends by sector

The trends of GHG emissions by sector expressed in CO_2 eq. are presented in Table 1-1.

The most significant source of GHG emissions in Lithuania is energy sector with 55% share of the total emissions in 2015. Agriculture is the second most significant source and accounted for 22.9% of the total emissions. Emissions from industrial processes contributed 16.9% of the total GHG emissions, waste sector – 5.2%.

Table 1-1. Greenhouse gas emissions/removals by sector during the period 1990-2015, kt CO_2 eq.

GHG source and sink categories	Energy	IPPU	Agriculture	LULUCF	Waste	Total (including LULUCF)	Total (excluding LULUCF)
1990	33 107.7	4 502.7	8 853.5	-3 511.9	1 576.7	44 528.7	48 040.6
1991	35 175.0	4 535.1	8 673.7	-3 840.0	1 602.4	46 146.2	49 986.2
1992	19 881.6	2 689.8	6 607.2	-4 009.2	1 571.6	26 740.9	30 750.1
1993	16 003.5	1 759.3	5 362.2	-5 143.0	1 593.4	19 575.4	24 718.4
1994	15 044.2	1 955.9	4 750.6	-4 921.3	1 549.4	18 378.8	23 300.1
1995	14 062.4	2 243.1	4 442.4	-3 795.3	1 578.3	18 530.8	22 326.1
1996	14 519.4	2 633.1	4 613.6	1 516.0	1 577.3	24 859.4	23 343.4
1997	14 052.4	2 596.4	4 648.5	142.8	1 579.5	23 019.6	22 876.8
1998	14 734.4	3 003.7	4 536.2	-7 613.5	1 565.4	16 226.2	23 839.7
1999	12 361.0	2 939.2	4 272.8	-7 232.3	1 539.9	13 880.5	21 112.8
2000	10 808.2	3 094.4	4 157.0	-9 820.5	1 540.8	9 779.8	19 600.3
2001	11 434.5	3 342.6	4 054.6	-7 981.6	1 583.7	12 433.8	20 415.4
2002	11 525.7	3 515.2	4 226.8	-7 262.4	1 573.7	13 579.0	20 841.4
2003	11529.9	3 597.8	4 339.9	-7 164.1	1 561.4	13 864.8	21 029.0
2004	12 162.9	3 787.2	4 387.7	-6 991.2	1 532.8	14 879.4	21 870.5
2005	13 042.0	4 108.6	4 420.5	-6 328.3	1 496.7	16 739.6	23 067.8
2006	13 116.6	4 367.4	4 396.1	-5 372.9	1 460.6	17 967.8	23 340.7
2007	13 367.7	6 144.9	4 488.5	-6 974.7	1 435.8	18 462.2	25 437.0
2008	13 186.3	5 475.5	4 340.2	-7 045.5	1 421.8	17 378.3	24 423.8
2009	11 922.8	2 294.4	4 381.1	-7 472.1	1 376.2	12 502.5	19 974.6
2010	12 874.7	2 239.2	4 329.2	-9 901.1	1 339.4	10 881.3	20 782.5
2011	12 029.0	3 719.5	4 345.4	-10 228.0	1 250.6	11 116.6	21 344.6
2012	12 071.3	3 565.4	4 379.5	-9 217.1	1 211.7	12 010.8	21 228.0
2013	11 419.7	3 000.4	4 357.3	-8 504.5	1 170.6	11 443.6	19 948.1
2014	11 049.6	3 176.9	4 529.7	-7 332.0	1 113.0	12 537.1	19 869.1
2015	11 057.1	3 396.6	4 600.3	-6 705.0	1 042.2	13 391.2	20 096.2
2015/1990, %	**-66.6**	**-24.6**	**-48.0**	**90.9**	**-33.9**	**-69.9**	**-58.2**

Energy

Energy sector is the most significant source of GHG emissions in Lithuania with 55% share of the total emissions (excl. LULUCF) in 2015. Emissions from energy include CO_2, CH_4 and N_2O.

Emissions of total GHG from energy sector have decreased almost 3 times from 33 107.7 kt CO_2 eq. in 1990 to 11 057.1 kt CO_2 eq. in 2015 (Figure 3-8). Significant decrease of emissions was mainly due to economic slump in the period 1991-1995. During the fast economic growth over the period 2000-2008 GHG emission in energy sector was increasing about 2.5% per annum. The global economic recession had impact on GHG reduction in energy sector by 9.6% in 2009. The closure of Ignalina NPP and GDP increase had impact on GHG increase by 8% in 2010.

During the period 1990-2015 the share of transport sector significantly increased. In 1990 transport sector accounted for 17.6% of total GHG emission in energy sector whereas in 2015 – 46.2%. This growth is influenced by the rapid increase of the density of transport routes and the number of road vehicles.

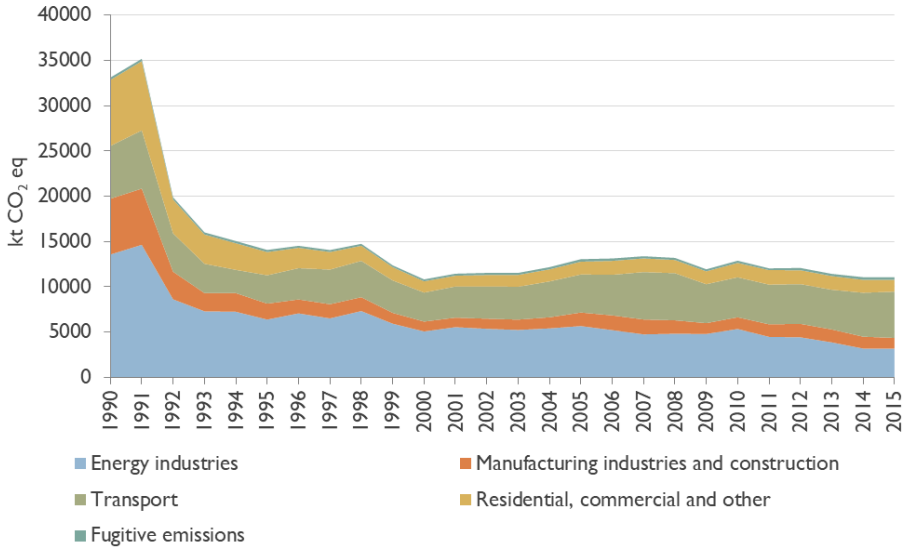

Figure 1-8. Trend of GHG emissions in energy sector during the period 1990-2015

The increase of GHG emissions from fugitive sources is mainly caused by the increase of CH_4 emissions from natural gas distribution, reflecting the increase of the length of natural gas pipelines. Since 2000 GHG emissions from this subsector was increasing by average 3.2% per annum.

Industrial Processes and Product Use

Emissions from industrial processes and product use (referred to as non-energy related ones) amount to 16.9% of the total emissions (excl. LULUCF) in 2015. Emissions from industrial processes and product use include CO_2, N_2O and F-gases emissions. Emissions of total GHG from the industrial processes and product use sector have decreased from 4 502.7 kt CO_2 eq. in 1990 to 3 396.6 kt CO_2 eq. in 2015 (Figure 1-9).

CO_2 emissions from ammonia production contributed 15.3% to the total national CO_2 emissions (excl. LULUCF) in 2015. The lowest emission of CO_2 was in 1993 due to decrease of the ammonia production

and the peak of CO_2 emissions were in 2007 when the ammonia production increased. Comparing with 2014 CO_2 emissions increased by 7%.

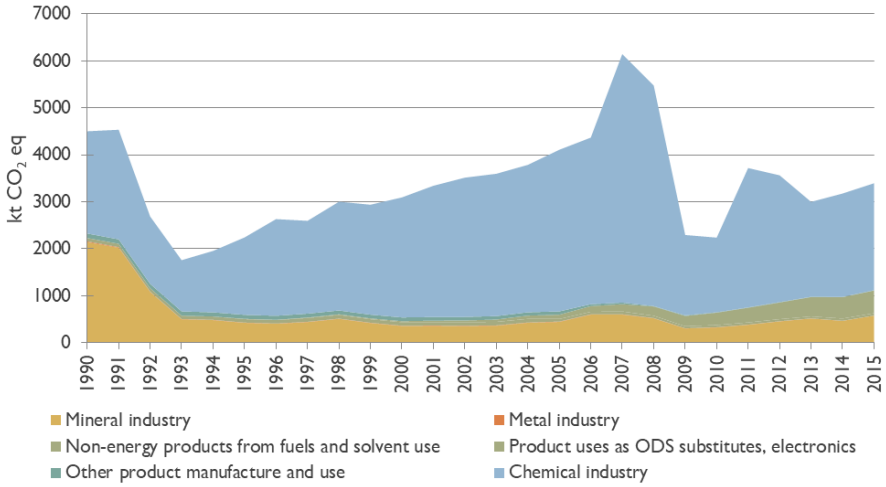

Figure 1-9. Trend of GHG emissions in industrial processes and product use sector during the period 1990-2015

Nitric acid production is the single source of N_2O emissions in industrial processes sector and accounts for 8.3% in the total national N_2O emissions (excl. LULUCF) in 2015. N_2O emissions had been increasing since 1995 and reached its peak in 2007. After the installation of the secondary catalyst in nitric acid production enterprise in 2008 the emissions of N_2O dropped drastically till 2010 and started to increase because of the increase of production capacity. After 2011 emissions began to decrease because the project ("Nitrous Oxide Emission Reduction Project at GP Nitric Acid Plant in AB Achema Fertiliser Factory) of catalyst installation has been finished. Comparing with 2014 nitric acid production increased by 4.7%, however N_2O emissions decreased by 28.6%.

Agriculture

Agriculture sector is the second most important source of GHG emissions in Lithuania contributing 22.9% to the total GHG emission (excl. LULUCF). The emissions from agriculture sector in 2015 include CH_4, N_2O and CO_2 emissions. Emissions of total GHG from agriculture sector have decreased 1.9 times from 8 853.5 kt CO_2 eq. in 1990 to 4 600.3 kt CO_2 eq. in 2015 (Figure 1-10).

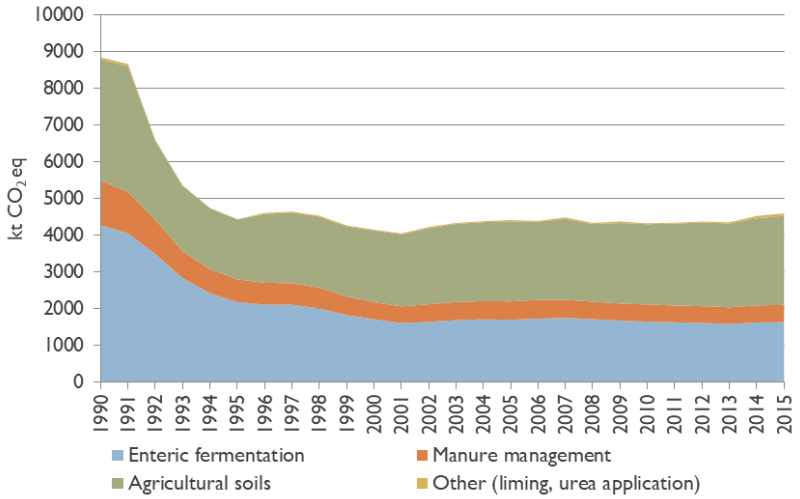

Figure 1-10. Trend of GHG emissions in agriculture sector during the period 1990-2015

Emissions from agriculture sector decreased substantially in the beginning of 1990s. The agriculture sector contributed 24% of the national GDP in 1992 and employed 19% of the labour force. Lithuania's agriculture, efficient according to the past soviet standards, produced a huge surplus that could not be consumed domestically. Lithuania was producing crops, developing livestock farming and food processing industry. Crops accounted for 1/3 and livestock for 2/3 of the total value of agricultural output. Lithuanian agricultural production was high enough to allow the export of about 50% of the total output.

Significant reforms were introduced in the early 1990s, particularly after the restoration of independence. The reform included the re-establishment of private ownership and management in the agriculture sector. Legislation defined dismemberment of the collective farms, but they did not definitively ensure their replacement by at least equally productive private farms or corporations. Agricultural production decreased by more than 50% from 1989 to 1994. The farms were broken into small holdings, averaging 8.8 ha in size, often not large enough to be economically viable.

Agriculture sector is the most significant source of the CH_4 and N_2O emissions accounting for 56.4% and 85.1% in the total CH_4 and N_2O emissions, respectively. The emissions of CH_4 and N_2O from agriculture sector decreased by 61.2% and 32.4% compare to the base year, respectively. The reduction of CH_4 emissions is mostly caused by the decrease in total number of livestock population.

The major part of the agricultural CH_4 emission originates from digestive processes. Enteric fermentation contributes 48.5%, manure management – 7.9% to the total national CH_4 emissions.

Agricultural soils are the most significant source of N_2O emissions accounting for 78.6% in the total national N_2O emissions.

LULUCF

The Land Use, Land-Use Change and Forestry (LULUCF) sector for 1990-2015 as a whole acted as a CO_2 sink except in 1996 and 1997 when emission constituted to 1 516 kt CO_2 eq. and 142.8 kt CO_2 eq. (Figure 1-11). That is explained by sudden spruce dieback that caused huge losses in trees volume, in Lithuania's spruce stands, which has direct impact on biomass calculations and on CO_2 balance from this sector.

Lower removals from LULUCF sector in 2015 comparing with 2014 has been mainly caused by decreased mean annual volume change from forest land (from 4.7 million m^3 in 2014 up to 3.6 million m^3 in 2015). For instance, total removals in forest land decreased to 8,898 kt CO_2 in 2015 comparing with 9 262 kt CO_2 removed in the previous year.

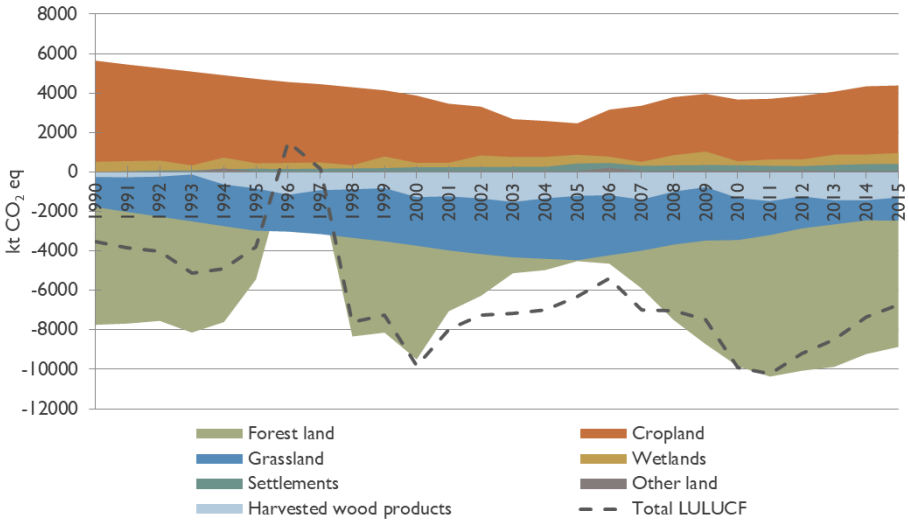

Figure 1-11. Total GHG emissions/removals from LULUCF sector for the period 1990-2015

Waste

The waste sector accounted for 5.2% of the total greenhouse gas emissions in 2015 (excl. LULUCF). The emissions from waste sector included CO_2, CH_4 and N_2O emissions. Emissions of the total GHG from waste sector have decreased from 1 576.7 kt CO_2 eq. in 1990 to 1 042.2 kt CO_2 eq. in 2015 (Figure 1-12).

Solid waste disposal on land including disposal of sewage sludge is the largest GHG emission source from waste sector. It contributed around 77% of the total GHG emission from waste sector in 2015 (73.9% excluding disposal of sewage sludge). GHG emissions occurring due to solid waste and sewage sludge disposal on land were increasing slightly from 1990 to 2003 and then started to decrease due to reduction of disposed waste, extraction of landfill gas, anaerobic digestion of sewage sludge.

Certain increase of emissions was observed from 2001 to 2003 and was caused mainly by disposal of large amounts of organic sugar production waste. In later years the producers managed to hand this waste over to farmers for use in agriculture and GHG emissions declined.

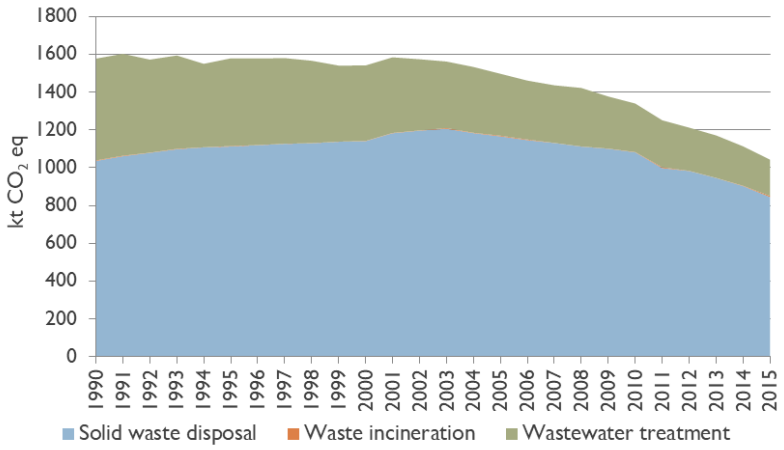

Figure 1-12. Trend of GHG emissions in waste sector during the period 1990-2015

Wastewater treatment and discharge contributed around 18.4% of GHG emissions from waste sector in 2015. Wastewater in Lithuania is treated in aerobic treatment systems with minimum CH_4 generation. However, significant part of population still does not have connection to public sewerage systems and emissions from sewage collected from septic tanks are significant.

KP-LULUCF

Removals and emissions resulting from forestry related activities (afforestation (A), reforestation (R) and deforestation (D)) are addressed in Article 3.3 of the Kyoto Protocol. Reporting under this article was mandatory during the first Kyoto Protocol commitment period (2008-2012) and shall be mandatory accounted and reported during the second commitment period. Article 3.4 includes the following activities: forest management, cropland management, grazing land management and revegetation. For the first commitment period Lithuania had chosen to elect forest management (FM). Lithuania continues to account emissions and removals from FM activity as it is an obligatory activity in the second commitment period. The obligatory accounting period for UNFCCC for cropland management and grazing land management activities begins on 1st January 2021.

Net removals from Article 3.3 activities for the first commitment period were -117.41 kt CO_2 eq. in 2012. Second commitment period has started with total removals of -64.41 kt CO_2 eq. in 2013. Afforestation and reforestation resulted in net removals of -219.84 kt CO_2 eq. and deforestation – net emissions of 213.43 kt CO_2 eq., whereas in 2015 afforestation/reforestation rates were higher and deforestation – significantly lower (A/R – net removals of -288.89 kt CO_2 eq., D – net emissions of 26.63 kt CO_2 eq.), which resulted in total removals of -262.26 kt CO_2 eq. from A/R/D activities.

The area subjected to A/R was 44.59 thousand ha in 2015. There could be two moments distinguished in the time series of 1990-2015 describing the A/R trend line (Figure 1-13). The first time period of human induced afforestation/reforestation has started in 1990-2000 and is the consequence of the restoration of Independency in 1990s. Forest expansion was the key priority among politicians therefore afforested and reforested areas constituted to more than 500 ha annually. But this number was steadily decreasing from 1994. After the spruce dieback which hardly hit the Lithuanian forest in 1994, afforestation and reforestation rates again returned to the 1990s level. Another two huge increases in A/R area were recorded in 2001-2007 and 2009-2011. Increase in afforestation/reforestation activities in State Forest Enterprises since 2001 was the result of increased funding for such activities while increase of

afforestation/reforestation since 2009 is mostly due to the introduction of EU support for such activities for private land owners.

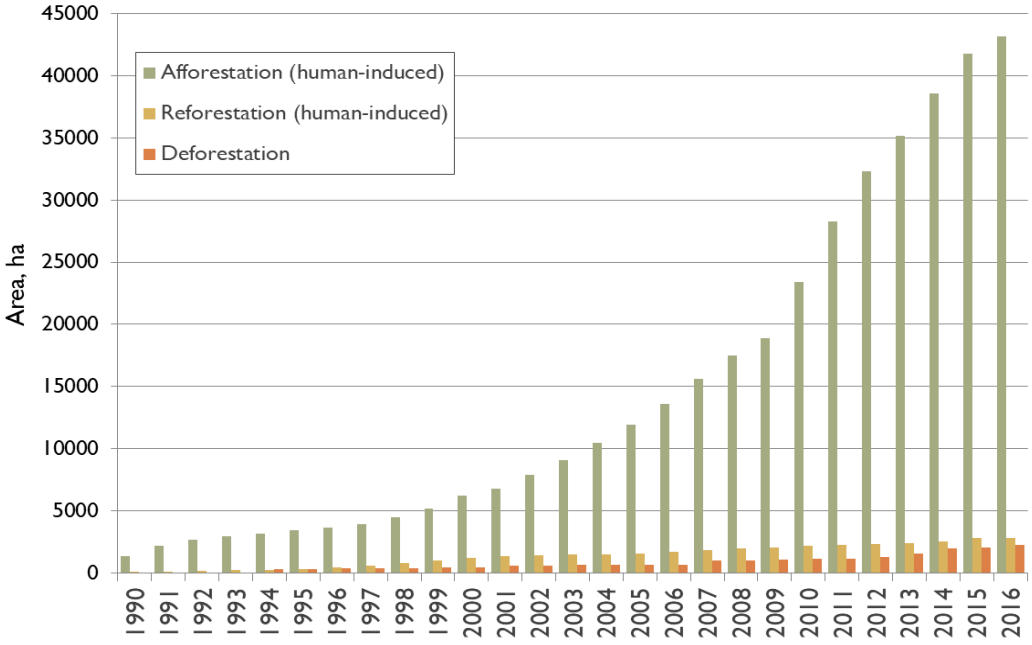

Figure 1-13. Cumulative area of afforestation, reforestation and deforestation, 1990-2016

In the beginning of 2016, deforested area since 1st of January 1990 was 2 022.8 ha. Deforestation was mainly caused by the forest area conversions to settlements (road building, cities expansion, etc.), other lands (e.g. quarry's) and wetlands (e.g. flooding) land use categories.

Net removals from Article 3.4 activity forest management (FM) were -7 916.8 kt CO_2 eq. in 2015. The area subjected to FM was 2 150.2 thousand ha by the end of the first commitment period and 2 151.6 in the beginning of the second commitment period, expanding up to 2 161.4 thousand ha in 2015.

1.2. National systems in accordance with Article 5, paragraph 1, of the Kyoto Protocol

1.2.1. Institutional arrangements for greenhouse gas inventory preparation

Detailed institutional set up for GHG inventory preparation is presented in Lithuania's National Inventory Report 2017, Chapter 1.2.1. Basic elements are presented further in this chapter.

The main entities participating in GHG inventory preparation and submission process are:

- Ministry of Environment;
- Environmental Protection Agency;
- Permanent GHG inventory expert working group;
- State Forest Service;
- National Climate Change Committee;

- Data providers;
- External consultants.

The institutional set-up for GHG inventory report preparation and submission is given in Figure 1-14.

Ministry of Environment of the Republic of Lithuania (MoE) is a National Focal Point to the UNFCCC. The Ministry of Environment is designated as *single national entity* responsible for the national GHG inventory. It has overall responsibility for the National System of GHG inventory and is in charge of the legal, institutional and procedural arrangements for the national system and the strategic development of the national inventory. Within the ministry, the Climate Change Policy Division administers this responsibility by supervising the national system. The Division will continue to supervise and coordinate the preparation of the National Inventory Report, including the final review of draft inventory reports.

The contact person in the MoE with overall responsibility for the national inventory is:

Ms. Jolanta Merkelienė
Chief Desk Officer, Climate Change Policy Division
Tel.: +370 706 63672
Fax: +370 706 63663
E-mail: jolanta.merkeliene@am.lt

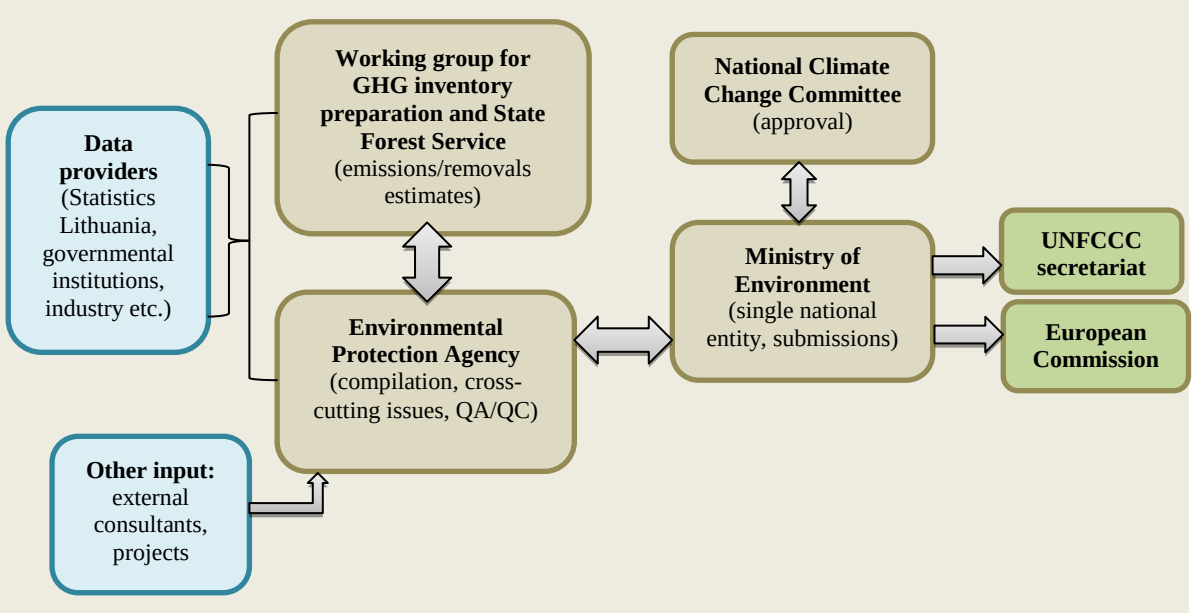

Figure 1-14. Institutional set-up for GHG inventory preparation

The **Lithuanian Environmental Protection Agency (EPA)** under the Ministry of Environment is assigned as an institution responsible for the GHG inventory compilation and QA/QC manager. In 2012 Climate change division was established within the EPA. The EPA responsibilities include: development and implementation of QA/QC plan and specific QA/QC procedures, collection of activity data and emission factors used to calculate emissions, collaboration with sectoral experts on the selection of best available methods complying with IPCC methodology, accomplishment of cross-cutting issues (key categories analysis, overall uncertainty assessment, analysis of GHG trends), establishment of GHG

inventory database and archive, where GHG inventory submissions and all supporting reference material is stored and maintained etc.

Since 2014 submission personnel of EPA is also responsible for calculation of emissions and preparation of NIR part of the industrial processes, solvents and other products use sector and agricultural soils part of the agriculture sector.

The EPA is responsible for compilation of the final report based on the sectoral information provided by the experts/consultants – members of **Permanent expert working group** for GHG inventory preparation, which was established in 2012 by the Governmental Resolution No 683. It consists of experts from the Lithuanian Energy Institute, the Institute of Physics of the Centre for Physical Sciences and Technology, the Institute of Animal Science of the Lithuanian University of Health Sciences, Centre for Environmental Policy, The State Forest Service and Aleksandras Stulginskis University. Composition of the Permanent expert working group for the preparation of GHG inventory is shown in Figure 1-15.

Members of the working group are responsible for determination of activity data and emission factors, calculation of emissions/removals on the basis of 2006 IPCC Guidelines, filling CRF tables for corresponding sectors, drafting relevant NIR sectorial chapters, application of sector specific QA/QC procedures.

External experts, independent specialists providing data for the GHG inventory, may also be involved during the inventory preparation process.

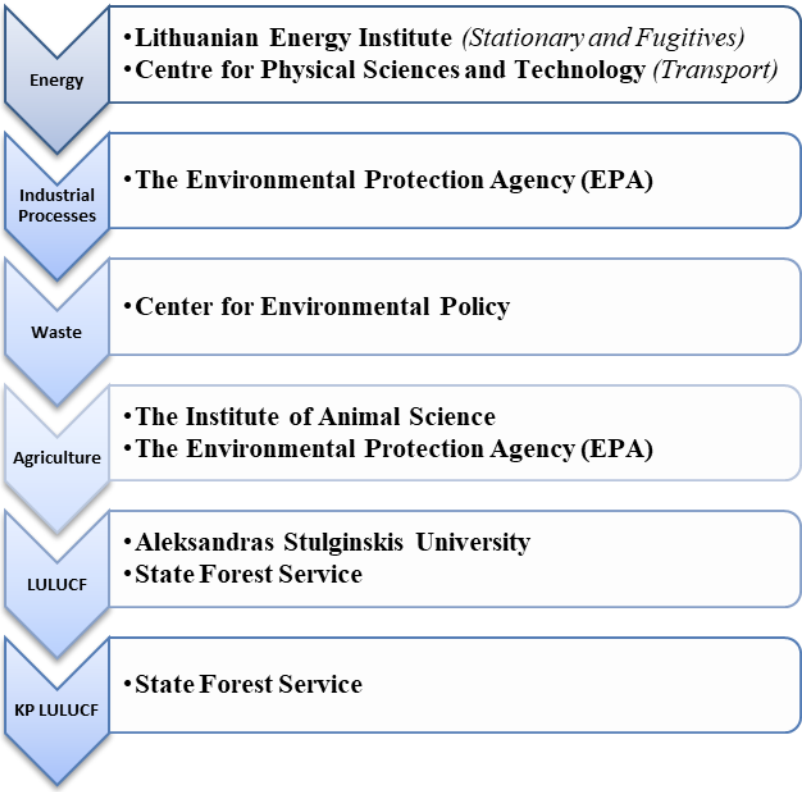

Figure 1-15. The composition of Permanent expert working group for preparation of GHG inventory in Lithuania

The **State Forest Service** under the Ministry of Environment in the GHG inventory preparation process is responsible for calculations of emissions and removals of LULUCF sector and Kyoto Protocol activities under Article 3 para. 3 and 4. The State Forest Service representative is also a member of Permanent working group for GHG inventory preparation. The State Forest Service inter alia compiles the National Forest Inventory (NFI) and the forest information system, carries out monitoring of the status of the Lithuanian forests, collects and manages statistical data etc.

Before final submission to UNFCCC secretariat and European Commission, reports are forwarded to the **National Climate Change Committee** for comments and final approval. National Climate Change Committee was established in 2001 in the first instance and periodically renewed (the latest in January 2015). It consists of experts from academia, government and non-governmental organizations (NGOs) and has an advisory role. The main objective of the Committee is to advise on the development and implementation of the national climate change management policy.

1.2.2. Greenhouse gas inventory preparation process, methodologies and data sources used

Work process of preparation and submission of National GHG inventory in Lithuania is organized by performing planned activities. The Figure 1-16 below shows a general overview of the GHG inventory preparation and submission process cycle.

Lithuania has to submit GHG inventory to the European Commission by 15th January and update estimates by 15th March annually. GHG inventory to the UNFCCC secretariat shall be submitted by 15th April annually.

This timeline shows only general activities overview and might be modified according to the reviews scheduled, planned projects, etc.

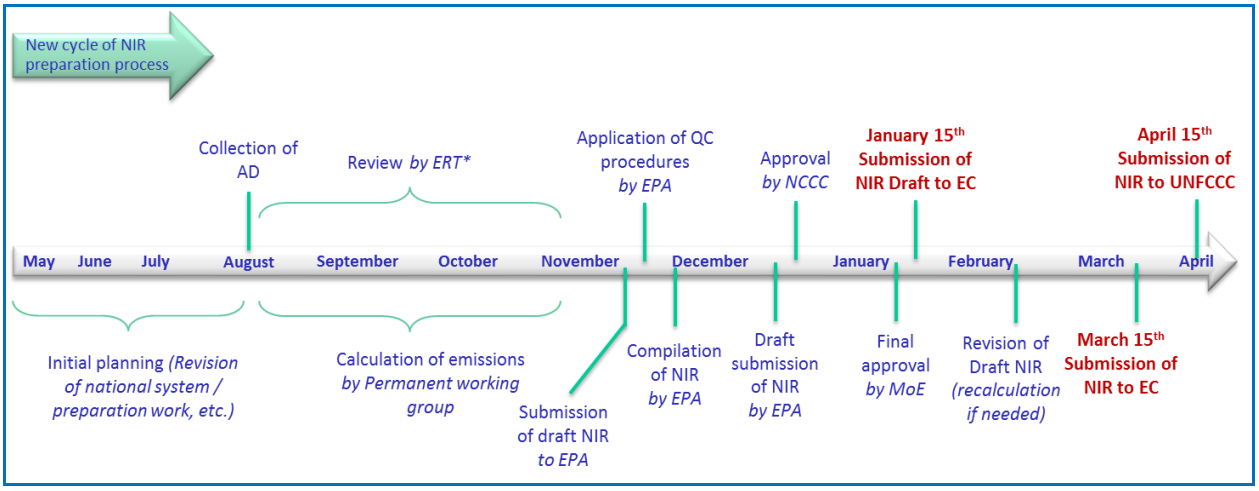

Figure 1-16. General timeline of GHG inventory preparation and submission process

One of the inventory preparation processes is data collection. This process starts with sending official requests to data providers (e.g. industrial companies) and collecting data from official statistical data sources. This process also involves application of QC procedures (conducted by EPA by providing

documentation QC protocols) in order to collect all references and evaluation of uncertainty of activity data.

Activity data necessary for the calculation of GHG emissions is collected from published materials and official national and international databases. Not published data is gathered from relevant authorities (institutes, industry companies etc.) on the request of the EPA.

The main data providers for GHG inventory estimation are:

- Statistics Lithuania (Statistical Yearbooks of Lithuania, Sectorial Yearbooks on energy balance, agriculture, commodities, natural resources and environmental protection);
- The State Forest Service under the Ministry of Environment (NFI data, Lithuanian Statistical Yearbooks of Forestry);
- The Environmental Protection Agency (F-gases data, wastewater and waste data).

Table 1-2. Main data sources used in the GHG inventory

Sector	Main data sources
1.A Energy: Fuel Combustion	Energy Statistics database (Statistics Lithuania) EU ETS emission data
1.B Energy: Fugitive Emissions	Energy Statistics database (Statistics Lithuania) Lithuanian Geological Service Individual companies
2. Industrial Processes and Product Use	Individual production plants EU ETS emission data Industrial statistics database (Statistics Lithuania) F-gases database (EPA) Published literature
3. Agriculture	The Register of Agricultural Information and Rural Business Centre of Ministry of Agriculture Agricultural Statistics database (Statistics Lithuania) Regional Waste Management Centres Published literature International Fertilizer Association (IFA)
4. LULUCF/ KP-LULUCF	NFI (National Forest Inventory) Standwise Forest Inventory State Forest Cadaster Lithuanian Statistical Yearbook of Forestry National Paying Agency database on A/R areas Published literature
5. Waste	Waste database (EPA) Water and wastewater database (EPA) Regional Waste Management Centres

Lithuania's GHG emission inventory includes all major emission sources identified by the 2006 IPPC Guidelines with some exceptions, which have a minor effect on the total GHG emissions (insignificant categories in terms of the overall level and trend in national emissions). All Lithuania's territory is covered by GHG inventory.

The GHG inventory is prepared in accordance with IPCC methodology:

- 2006 IPCC Guidelines for National Greenhouse Gas Inventories (*IPPC, 2006*);
- 2013 Supplement to the 2*006 IPCC* Guidelines for National Greenhouse Gas Inventories: Wetlands (*IPCC, 2014*);

- 2013 Revised Supplementary Methods and Good Practice Guidance Arising from the Kyoto Protocol (*IPCC, 2014*).

GHG inventory is prepared also taking into account requirements, provided in Regulation (EU) No 525/2013 of the European Parliament and of the Council on a mechanism for monitoring and reporting greenhouse gas emissions and for reporting other information at national and Union level relevant to climate change and repealing Decision No 280/2004/EC.

Simple equations that combine activity data with emission factors are used. Different sources in the transport, agriculture, waste and LULUCF sectors necessitate the use of more complicated equations and models. Advanced and country-specific approaches (Tier 2 and Tier 3 methods) are used wherever possible, as these are designed to produce more accurate emission estimates than the basic (Tier 1) methods.

The choice of methodological tier for the individual categories depends among other things on the significance of the source. The key categories analysis for the GHG inventory is performed according to the 2006 IPCC Guidelines (Approach 1 and Approach 2 level and trend assessment of the key categories) by EPA annually. The analysis covers all of the sources and sinks of the inventory. The Approach 2 methodology makes use of category-specific uncertainty analysis. The categories identified by Approach 2 that are different from categories identified by Approach 1 are treated as key categories.

The level of disaggregation used for the key category analysis is performed by taking into account country-specific issues, specifically, in energy and agriculture sectors key categories are broken down into sub-source categories in order to reflect the level at which the EFs were applied and in order to focus efforts towards methodological improvements on these most significant sub-source categories.

Approach 1 key category (level assessment) with a highest contribution to national total emission in 2015 and 1990 was 4.A.1 Forest land remaining forest land - carbon stock change in biomass (CO_2). Its contribution to national total was 20% in 2015 and 10% in the base year. The second most important source of greenhouse gas emissions in 2015 was 1.A.3.b Road transportation accounting for 12% of the total emissions whereas in the base year it was 1.AA.1.a Public electricity and heat production – Liquid fuel (CO_2) accounting for 9% of the total emissions.

Results of the Approach 1 and Approach 2 Level and Trend key categories analysis are provided in Annex II.

Inventory estimates are periodically recalculated. This occurs for a number of reasons, including revisions in key external data sources and revisions of data due to improvements in the estimation methodology or the inclusion of additional sources, input from the QA/QC activities and recommendations from international review process. Recalculations are conducted in accordance with the IPCC methodology and are reported in NIR of each sector. To ensure the accuracy of the estimates and to maintain consistency of the series through time, recalculations of past emissions estimates are undertaken for all previous years to view the actual difference of recalculation performed.

1.2.3. Quality assurance and quality control

Quality assurance and quality control (QA/QC) is an integral part of the inventory process. The quality requirements set for the annual inventories – transparency, consistency, comparability, completeness, accuracy – are fulfilled by implementing the QA/QC procedures. The outcomes of the QA/QC may result

in a reassessment of inventory or category uncertainty estimates and to subsequent improvements in the estimates of emissions and removals.

Lithuanian Environmental Protection Agency has the responsibility for co-ordinating the quality assurance and quality control (QA/QC) process of the greenhouse gas inventory.

As a GHG inventory compiler and QA/QC manager EPA performs general QC procedures which involve check of all the input data, assumptions and data criteria, references provided, emission calculations, units and conversion, consistency between source categories, aggregation and transcription. Besides of general check EPA fills in the checklist for primary data check and QC protocols which record all the corrective actions taken. General control procedures also involve QC of documentation and archiving system. The data providers, sectoral experts are also responsible for the quality of their own inventory calculations and for implementing and documenting the QA/QC procedures. The QC procedures used in Lithuania's greenhouse gas inventory comply with the 2006 IPCC Guidelines.

Category-specific QC checks, including technical reviews of the source categories, activity data, emission factors and methods, are applied on a case-by-case basis by focusing on key categories and on categories where significant methodological and data revisions have taken place.

A QA/QC plan is a fundamental element of a QA/QC system. The Ministry of Environment and the Environment Protection Agency are responsible for the development and update of QA/QC plan. The last update of QA/QC plan was performed in 2016. The quality objectives of the QA/QC plan and its application are an essential requirement in the GHG inventory and submission processes in order to ensure and improve the inventory principles: transparency, consistency, comparability, completeness, accuracy, timeliness and confidence in the national emissions and removals estimates for the purposes of meeting Lithuania's reporting commitments under the UNFCCC and the Kyoto protocol.

The aim of Quality Assurance (QA) procedures is to review the complete GHG inventory by the third party which is not directly involved in preparation of inventory to assess its quality i.e. assure that best available data and methods are used. Review for QA can be applied either for the whole inventory either for a certain sector. QA procedures for Lithuania's GHG inventory are be applied by performing scheduled international review (UNFCCC review, EU review) or performing national QA procedures.

More detailed information about Lithuanian GHG inventory QA/QC system is provided in the Chapter 1.2.3 of Lithuania's National Inventory Report 2017.

1.2.4. Changes to the national inventory arrangements since the latest biennial report

Since the submission of Lithuania' Second Biennial Report, no changes have been made to the GHG inventory arrangements and the national system under Article 5, paragraph 1, of the Kyoto Protocol. Nevertheless, it is important to mention few international capacity-building projects Lithuania implemented during 2015-2017 in cooperation with other countries to improve the quality of GHG inventory:

- Norway Grants partnership project "Cooperation on GHG inventory" between Lithuania and Norway under the program No 25 „Capacity-building and institutional cooperation between beneficiary state and Norwegian public institutions, local and regional authorities" has been implemented in 2015-2017. The partner of this program was Norwegian Environment Agency,

which is the national entity responsible for GHG inventory preparation in Norway. The objective of this partnership project was capacity building and improvement of the Lithuania's National system for the preparation of GHG inventory to comply with the relevant UNFCCC and Kyoto protocol reporting requirements. The main purpose of this project was to share experiences of implementation the new 2006 IPCC Guidelines in GHG inventory.

- In 2016-2017 the Baltic experts network for GHG inventory and projections and PaMs reporting was established, joining experts from Latvia, Lithuania and Estonia (SEED Project S91 "Baltic Expert Network for Greenhouse Gas Inventory, Projections and PaMs Reporting (BENGGI)"). The network was established in order to improve the quality of inventory and projections preparation under EU and UNFCCC in Baltic countries. Networking would allow acquiring necessary knowledge and sharing experience between experts. Baltic countries share similar natural, economic, social and political conditions that influence GHG inventory reporting procedures, as well as reported content.

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Lithuania's National Inventory report 2017 http://unfccc.int/national_reports/annex_i_ghg_inventories/national_inventories_submissions/items/10116.php.

Regulation (EU) No 525/2013 of the European Parliament and of the Council of 21 May 2013 on a mechanism for monitoring and reporting greenhouse gas emissions and for reporting other information at national and Union level relevant to climate change and repealing Decision No 280/2004/EC (OL 2013 L 165, p. 13) http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32013R0525&from=EN

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2013 Revised Supplementary Methods and Good Practice Guidance Arising from the Kyoto Protocol https://www.ipcc-nggip.iges.or.jp/public/kpsg/index.html

Revision of the UNFCCC reporting guidelines on annual inventories for Parties included in Annex I to the Convention, Decision 24/CP.19 http://unfccc.int/resource/docs/2013/cop19/eng/10a03.pdf

2013 Supplement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories: Wetlands https://www.ipcc-nggip.iges.or.jp/public/wetlands/index.html

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QUANTIFIED ECONOMY-WIDE EMISSION REDUCTION TARGET

2. QUANTIFIED ECONOMY WIDE EMISSION REDUCTION TARGET

The climate change policy in Lithuania is based on the EU climate change policy. Lithuania's emission reduction target for the years 2013-2020 is part of the joint target of the European Union. The EU quantified economy-wide emission reduction target is implemented through the EU Climate and Energy Package 2020. This chapter explains Lithuania's 2020 emission reduction target under the UNFCCC.

2.1. Quantified economy-wide emission reduction target jointly with the European Union

Lithuania – a Party of the Convention and Kyoto Protocol – together with the other EU's Member States has committed to a quantified economy-wide emission reduction target of 20% by 2020, below 1990 level. The EU had also committed to raising this target to a 30% emission reduction by 2020 compared with 1990 levels, provided that other developed countries also commit to achieving comparable emission reductions, and that developing countries contribute adequately, according to their responsibilities and respective capabilities. This offer was reiterated in the submission to the UNFCCC by the EU-28 and Iceland on 30 April 2014.

Information on the EU quantified economy-wide emission reduction target has been presented to the UNFCCC and is contained in the "Compilation of economy-wide emission reduction targets to be implemented by Parties included in Annex I to the Convention" (FCCC/SB/2011/INF.1/Rev.1) and document FCCC/AWGLCA/2012/MISC.1. No individual target is set for Lithuania in the documents mentioned previously as 20% target will be reached jointly by the EU. Key assumptions and conditions related to the EU's target (e. g. sectors, base year, coverage of gases etc.) are included in the document FCCC/AWGLCA/2012/MISC.1, the latest EU National Communication and the Third Biennial Report under the UNFCCC. The summary information of EU's target assumptions and parameters is given in the Table 2-1 below.

Table 2-1. Key assumptions and parameters of the EU-28 target

Parameters	Target
Base Year	1990
Target Year	2020
Emission Reduction target	-20% in 2020 compared to 1990
Gases covered	CO_2, CH_4, N_2O, HFCs, PFCs, SF_6
Global Warming Potential	4th AR
Sectors Covered	All IPCC sources and sectors, as measured by the full annual inventory and international aviation to the extent it is included in the EU ETS.
LULUCF	Accounted under KP, reported in EU inventories under the Convention. Assumed to produce net removals
Use of international credits (JI and CDM)	Possible subject to quantitative and qualitative limits.
Other	Conditional offer to move to a 30% reduction by 2020 compared to 1990 levels as part of a global and comprehensive agreement for the period beyond 2012, provided that other developed countries commit themselves to comparable emission reductions and that developing countries contribute adequately according to their responsibilities and respective capabilities.

The EU Directive of the GHG Emissions Trading System (Directive 2003/87/EC and respective amendments) and the Effort Sharing Decision (Decision No 406/2009/EC) are the main EU legal acts that lay down provisions for the implementation of the target. A joint quantified economy-wide emission reduction target of 20% is calculated providing that in 2020 emissions from sectors covered by the EU ETS will be 21% lower than in 2005. As the common EU climate policy objectives shall be divided in accordance with the capacities of the Member States and their development. In 2013 the European Commission by the Commission Decisions 2013/162/EU and 2013/634/EU) adopted the national annual limits denominated in annual emission allocations (AEAs), which have been transferred into binding quantified annual reduction targets for the period from 2013 to 2020 pursuant to Decision No 406/2009/EC of the European Parliament and of the Council (OJ L 90, p. 106) (hereinafter – ESD). With this decision the national emission targets for 2020 have been set on the basis of Member States' GDP per capita and emission level 2005 (Figure 2-1).

The Commission Implementing Decision 2013/634/EU adjusts these annual emission allocations taking into account the changes in coverage of the EU ETS from 2013 onwards. In 2017, the AEAs of the EU Member States were further adjusted to take into account changes introduced by the implementation of the 2006 IPCC guidelines for national GHG inventories on the emissions levels in the inventory as these guidelines were applied in inventory reporting after the AEAs under the ESD were agreed upon (adjusted only AEAs for years 2017 to 2020).

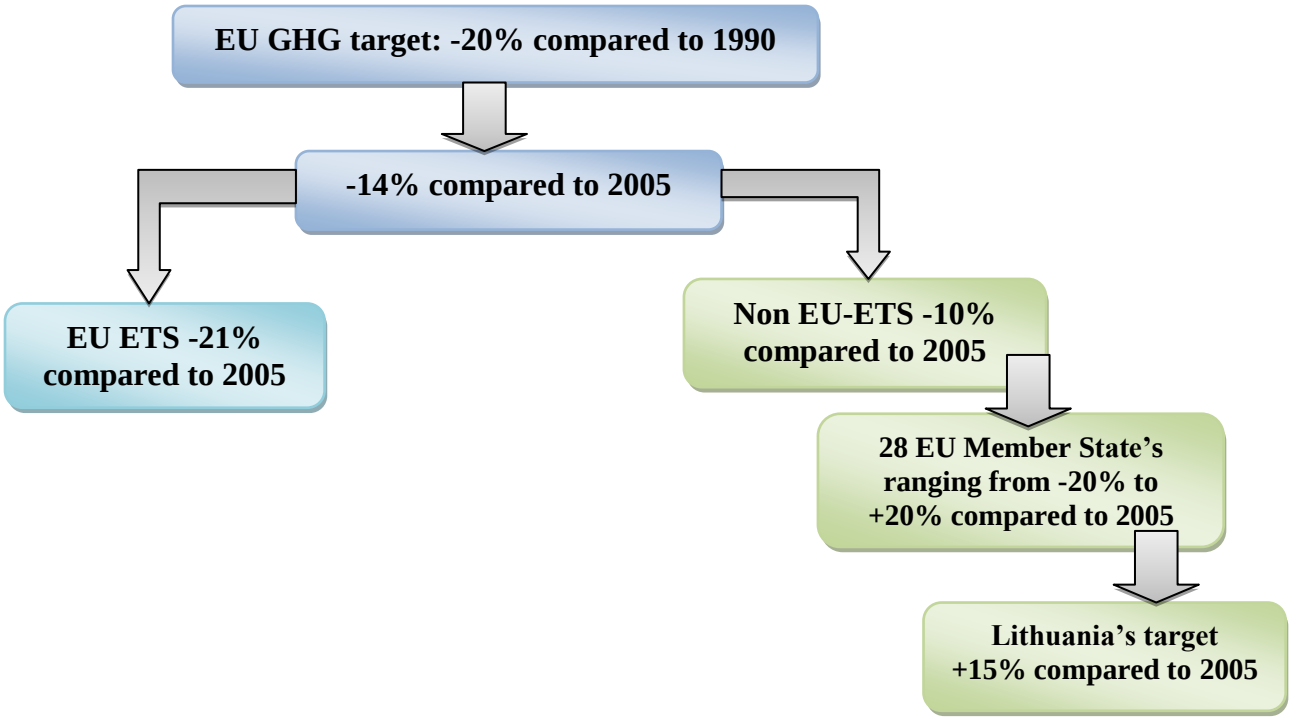

Figure 2-1. GHG emission 2020 target in ETS and ESD separation scheme under the EU legislation (Lithuania's example)

Under the revised EU ETS Directive (Directive 2009/29/EC), a single ETS cap covers the EU Member States and three participating non-EU countries (Norway, Iceland and Liechtenstein), and there are no

further individual caps for Lithuania. Allowances allocated in the EU ETS from 2013 to 2020 decrease by 1.74 % annually, starting from the average level of allowances issued by Member States for the second trading period (2008-2012). For further additional information on recent changes in the EU ETS see Chapter 3.

In case of Lithuania over 90 fixed installations (larger than 20 MW combustion plants and chemical industry) and aircraft operators which are participating in the EU ETS jointly with the analogical operators from the other EU Member States will have to cut GHG emissions by 21% compared to 2005, and in the sectors which are not participating in the EU ETS (transport, agriculture, waste management, small industry and district heating companies, households, services and other sectors) the GHG emissions must not exceed annual emission allocations (kt CO_2 eq.) and to achieve, that GHG emissions in 2020 will not increase by more than 15% compared to 2005.

Generally over eight years GHG emissions must not exceed 112 643 919 kt CO_2 eq. Lithuania's binding ESD annual emission allocations (AEAs) for 2013-2020 are provided in table 2-2 below.

Table 2-2. Lithuania's ESD annual emission allocations 2013-2020 and actual ESD emissions, tonnes CO_2 eq.

	2013	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**
ESD annual emission allocations*	12.936.664	13.297.646	13.658.629	14.019.611	14.125.626	14.497.103	14.868.581	15.240.059
Actual ESD emissions	12.449.462	12.922.268	13.250.961	-	-	-	-	-

*AEAs including adjustments in Commission Implementing Decision 2013/634/EU and Commission Decision (EU) 2017/1471

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

In Lithuania emissions have decreased by 12.88% between 2005 and 2015 based on data of National GHG inventory report 2017. According to 2020 "with existing measures" (WEM) projections, Lithuania is on track to reach its 2020 target, with more than 7% reduction as compared to 2005. Lithuania as a Member State with a positive limit under Annex II of ESD over the years 2013-2015 was in compliance with AEAs targets and based on the Lithuanian GHG emissions projections there will be no shortage of the AEAs during remaining years of the commitment period. In Lithuanian there is no intention to use credits from market-based mechanisms for the compliance with ESD 2020 target. However, in case of shortage of AEAs, Lithuania primarily plans to use a possibility to carry over (i.e. to borrow) the lacking part of the AEAs from the forthcoming year, if GHG emissions in current year exceed the amount of AEAs for that year. According to credit entitlements for 2013-2020 under EU ETS Lithuania's operators are eligible to use 3 068 788 credits.

In addition, the EU Climate and Energy Package also requires Lithuania to increase its use of renewable energy sources to 23% of final energy consumption by 2020 and the share of renewable energy sources of final energy consumption in transport involves not only biofuels and also electricity to 10% by 2020.

The quantified economy-wide emission reduction target for Lithuania is provided in Annex the CTF Table 2.

2.2. Other emission reduction targets

In addition to the EU target under the Convention, the EU also committed to a legally binding quantified emission limitation reduction commitment for the second commitment period of the **Kyoto Protocol** (2013-2020). In Table 2-3 all relevant GHG reduction targets for the EU and their key facts are displayed in an overview. On the left, the table includes the international commitments under the Kyoto Protocol and the UNFCCC. On the right, the EU commitments under the Climate and Energy Package are included.

Lithuania signed and ratified the **Paris Agreement** in 2016. Under the Paris Agreement Lithuania jointly with the EU and its Member States took a binding target of at least a 40% domestic reduction in economy wide GHG emissions by 2030 compared to 1990, by implementing the EU legal acts for the EU climate and energy policy targets till 2030, mainly through the EU emission trading system (EU ETS) and Efforts Sharing Regulation, as well as Clean Energy Package legislation. Moreover, cooperating with the EU Member States and other countries, Lithuania will promote the development of a low-carbon and climate-resilient economy in order jointly to reduce GHG emissions by 80-90% by 2050 and achieve climate neutrality in the second half of this century. The target will be delivered implementing the EU legal acts on 2030 climate and energy targets by all economy sectors, with the reductions in the Emission trading system (ETS) and non-ETS sectors amounting to 43% and 30% respectively by 2030 compared to 2005.

Table 2-3. Overview of GHG reduction targets for the EU

	International commitments			EU domestic legislation	
	Kyoto Protocol		UNFCCC	Climate and Energy Package	
				EU ETS	ESD
Target year of period	First commitment period (2008-2012)	Second commitment period (2013-2020)	2020	2013-2020	2013-2020
Emission reduction target	-8%	-20%	-20%	-21% compared to 2005 for ETS emissions	Annual targets by MS. In 2020 -10% compared to 2005 for non-ETS emissions
Further targets	-	-	Conditional target of -30% if other Parties take on adequate commitments	According to **Renewable Energy Directive** Lithuania has undertaken to increase the RES share in the final national energy consumption up to 23% by 2020. In 2016, the share RES in the total energy balance of the country accounted for 25.46%. According to the **Energy Efficiency Action Plan for 2017-2019** to increase energy efficiency by 1.5% annually until 2020, the target is to achieve savings of 740 thous. toe of the total final energy consumption until 2020.	
Base year	1990 KP Flexibility rules (Art 3(5)) regarding F-Gases and Economies in Transition	1990, but subject to flexibility rules. 1995 or 2000 may be used as the base year for NF_3	1990	1990 for overall emission reduction target; 2005 for renewable energy and energy efficiency target; as well as for targets broken down into ETS and non-ETS emissions	
LULUCF	Included ARD and other activities if elected	Includes ARD and forest management, other activities if elected (new accounting rules)	Excluded	Excluded	
Aviation	Domestic aviation included. International aviation excluded	Domestic aviation included. International aviation excluded	Aviation in the scope of the EU ETS included. In practice total aviation emissions considered	Domestic and international aviation included, as in the scope of EU ETS	Aviation generally excluded, some domestic aviation included(operators below ETS de minimis thresholds)
Use of international credits	Use of KP flexible mechanisms subject to KP rules	Use of KP flexible mechanisms subject to KP rules	Subject to quantitative and qualitative limits	Subject to quantitative and qualitative limits	Subject to quantitative and qualitative limits
Carry-over of units	Not applicable	Subject to KP rules	Not applicable	EU ETS allowances can	No carry-over from

from preceding periods		including those agreed in the Doha Amendment		be banked into subsequent ETS trading periods since the second trading period	previous period
Gases covered	CO_2, CH_4, N_2O, HFCs, PFCs, SF_6	CO_2, CH_4, N_2O, HFCs, PFCs, SF_6, NF_3	CO_2, CH_4, N_2O, HFCs, PFCs, SF_6	CO_2, CH_4, N_2O, HFCs, PFCs, SF_6[2]	
Sectors included	Annex A of KP (Energy, IPPU, agriculture, waste), LULUCF according to KP accounting rules for CP1	Annex A of KP (Energy, IPPU, agriculture, waste), LULUCF according to KP accounting rules for CP2	Energy, IPPU, agriculture, waste, aviation in the scope of the EU ETS	Power & heat generation, energy-intensive industry sectors, aviation (Annex 1 of ETS directive)	Transport (except aviation), buildings, non-ETS industry, agriculture (except forestry) and waste
GWPs used	IPCC 2nd AR	IPCC 4th AR	IPCC 4th AR	IPCC 4th AR	

[2] In its third trading period, the EU ETS only covers the gases CO_2, N_2O, CF_4 and C_2F_6.

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Quantified economy-wide emission reduction target

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PROGRESS IN ACHIEVEMENT OF QUANTIFIED ECONOMY-WIDE EMISSION REDUCTION TARGET

3. PROGRESS IN ACHIEVEMENT OF QUANTIFIED ECONOMY-WIDE EMISSION REDUCTION TARGETS

3.1. Background for the information provided

Lithuania's emission reduction target for the years 2013-2020 is part of the joint target of the European Union. The historical trend in the national total emissions excluding LULUCF sector is the key indicator for progress in the achievement of the target. The EU joint target under the Convention refers to greenhouse gas emissions of the EU-28 and the emissions are calculated as the sum of the emission of the Member States. The EU-28 emissions in 1990 excluding the LULUCF sector including the indirect CO_2 emissions were 5.647 million tonnes of CO_2 eq. in 1990 and 4.310 million tonnes CO_2 in 2015 that is 23.7% lower than in 1990.

In 1990, Lithuania's total national emissions excluding LULUCF sector was 48 million tonnes CO_2 eq. In the beginning of 1990s, mostly fossil fuel was combusted in energy, manufacturing and other industries. A comparison of annual general fuel balances in the period of 1990-2015 shows a significant decrease of use of fuel oil (e.g. from about annual quantity of 57 800 TJ in 1990-1991 to less than 600 TJ since 2008), also a decrease of use of coal, petrol, natural gas, but increase of use of biomass. Lithuania's emission trends 1990-2015 are reported in detail in CTF Table 1.

Progress in achievement of quantified economy-wide emission reduction targets is described through policies and measures planned, adopted and implemented for achieving the targets and commitments under Convention and EU's Climate and Energy Package 2020. Information on the effects of the mitigation actions and progress in achievement of the target under the Convention, where available, been included also in CTF Tables 3 and 4.

Removals in the LULUCF sector are not included in the EU target under the Convention. They are therefore reported in CTF Table 4 and CTF Table 4(a) as "not applicable" (NA). Mitigation actions in the LULUCF sector are described in Chapter 3.4.5 and presented in CTF Table 3.

The monitoring and evaluation procedure of the implementation of the policies and measures related to climate change management in Lithuania

The Ministry of Environment is a coordinating institution of the implementation of the Strategy and plays the main role in the implementation process together with institutions within its remit. The **National Strategy for Climate Change Management Policy** which lays down the targets and objectives for climate change mitigation and adaptation by 2050. The Lithuanian legally binding short-term climate change mitigation targets by 2020 are:

- achieving that GHG emissions of EU ETS sectors do not exceed 8.530 million tonnes of CO_2 eq.;
- achieving that non-ETS sectors meet their annual GHG emission targets and do not exceed 15.240 million tonnes of CO_2 eq. by 2020;
- achieving that the share of renewable energy resources (RES), by comparison with the overall final energy consumption of the country, accounts for minimum 23%;
- reducing energy consumption by 1.5% every year (reducing energy consumption in 2020 by 17% as compared to 2009);
- reaching in 2020, no less than 0.38% of the country's GDP is assigned for the implementation of short-term climate change mitigation targets.

To implement this Strategy, in 2013 the Government approved the **Interinstitutional Action Plan on the implementation of the targets and objectives for 2013-2020** of the National Strategy for Climate Change

Management Policy, which defines measures for the reduction of GHG emissions and adaptation to climate change in all the sectors of Lithuanian economy, including industry, energy, agriculture, development of residential areas, transport, health care, waste management, etc. This Plan is subject to annual updating. The Plan approved 2016 defines measures for 2017-2019.

Monitoring of the effectiveness of the implementation PaMs usually is done at the level of individual policies or measures.

The Ministry of Environment is responsible for the collection and analysis of the information on implementation process of PaMs related to the GHG reduction in different sectors and submitting it to the UNFCCC Secretariat according to decisions 9/CP.16, 2/CP.17 and 19/CP.18 as part of National Communication and Biennial Report and to the European Commission under the regulation No 525/2013.

The Environmental Protection Agency is also involved in the implementation of the goals and objectives defined in the Inter-institutional Action Plan of the Strategy for National Climate Change Management. The Agency's role in evaluation of PaMs mitigation of GHG emissions is mostly related to the preparation of the GHG projections estimations by evaluating all the actual and expected implemented PaMs mitigation actions on the GHG emissions.

The Environmental Protection Agency and other institutions supervised by the Ministry of Environment within are participating in the implementation and monitoring of the PaMs which mitigate GHG emissions. For example, **Public Company Housing Advisory Agency** provides consulting services and assistance for homeowners on matters related to the renovation (modernisation) of multi-apartment buildings. It also evaluates and approves submitted investment plans and procurement documents, cooperates with municipal authorities, engineering consultancy companies, educational institutions, non-governmental organisations. Public Company Housing Advisory Agency performs monitoring. Monitoring aims to determine the actual energy savings and the GHG emission reduction in the renovated buildings, assess the work quality, the energetic and technical efficiency of the implemented measures, further improve building renovation process control and maintenance as well as technical and technological regulation.

3.2. Policies and Measures and their effects

There are several directions of climate policy where appropriate measures are made to achieve overall goals. In Lithuania, climate policy is integrated with the decision-making processes in energy, transport, agriculture, waste, forestry and land-use sectors and territorial planning. Policies and measures, mitigation actions and their effects are presented in CTF table 3 and described below.

Table 3-1. Climate change policy directions

Climate policy sectors	Goals of sectorial policies related to climate change	Sectorial policy planning documents
ENERGY	- To increase energy efficiency	The National Energy Strategy National Energy Independence Strategy Energy Efficiency Action Plan The Republic of Lithuania Energy efficiency law Multi-apartment Building Renovation (Modernization) Programme Public Building Renovation Programme Order for the development and implementation programs on quarter energy efficiency improvement

		The Lithuanian Law on Heat Economy
	- To increase the share of renewable energy sources (RES) in the balance of energy sources - To increase share of district heating from RES - To promote of the RES use in industry sector	The National Energy Strategy National Renewable Energy Resources Development Strategy National Renewable Energy Resources Programme for 2016-2020. Recommendations on the main Lithuania's Republic energy strategic directions Multi-apartment Building Renovation (Modernization) Programme
	- To reduce relative consumption of thermal energy per unit of the used dwelling area by up to 30% by 2020	Strategy on dwellings of the Republic of Lithuania
	- To implement energy saving technologies	Law on Energy from Renewable Sources
	- To renovate buildings	Programme of Public building renovation The Programme on Heat industry development in 2015-2021 Program for Increasing the Energy Efficiency of Public Buildings
TRANSPORT	- To promote of RES use in transport sector	The National Programme on the Development of Transport and Communications Law on Energy from Renewable Sources
	- To increase the share of RES (biofuels and electricity) not less than by 10% in all modes of transport in comparison with the final consumption of the energy in the transport sector	Law on Energy from Renewable Sources
	- To promote clean and energy-efficient road transport vehicles.	The Order No 3-100 of the Minister of Transport and Communications of the Republic of Lithuania On the adoption of the energy efficiency and environmental protection requirements for the purchasing of road vehicles and setting the cases when the ones are mandatory. Recommendations on the main Lithuania's Republic energy strategic directions
	- To promote the use of bicycles and development of bicycle track's infrastructure	National Programme on the Development of Transport and Communications for 2014-2022
	- To improve road infrastructure	National Programme on the Development of Transport and Communications for 2014-2022
INDUSTRY	- To increase energy-efficiency in industrial process	The Programme for investment incentives and industry development for 2014-2020
	- To prevent emissions of pollutants and GHG	IPPC permits and Pollution permits
	- To ensure a more cost-efficient contribution to achieving the EU's climate objectives by discouraging the	Regulation (EU) No 517/2014 of the European Parliament and of the Council on fluorinated greenhouse gases and repealing Regulation (EC) No

	use of F-gases	842/2006
	- To promote the environmental management system in the manufacturing sectors	The Order No D1-973 of the Minister of Environment on the green procurement implementation measures for 2012-2015
	- To reduce the direct and indirect impact of VOC emissions	The Order No 620 of the Minister of Environment On limitation of emissions of volatile organic compounds (hereinafter – VOC)
	- To reduce energy use in manufacturing industry	Recommendations on the main Lithuania's Republic energy strategic directions
AGRICULTURE	- To ensure environmental requirements for manure management	The Order No D1-367/3D-342 of Ministers of Environment and Agriculture On environmental requirements for manure management
	- To set requirements pursuant to Council Directive 91/676/EEC concerning the protection of waters against pollution caused by nitrates from agricultural sources	The Program for Minimization of Water Pollution Caused by Agriculture activities
	- To introduce Good Agricultural Practice	Lithuania's Rural Development Programme 2014-2020
	- To improve status of ground and surface water bodies, to achieve and maintain good environmental status of the Baltic Sea, to reduce the risk of the floods, to provide quality public drinking water supply and sanitation services and to reduce pollution by waste water.	National Water Area Development Programme 2017-2023
	- To minimize water pollution caused by agriculture activities	The Program for Minimization of Water Pollution Caused by Agriculture activities, adopted on 8th June 2012 by the Order No D1-490/3D-39 of Ministers of Environment and Agriculture.
FORESTRY	- To implement long-term forest economy policy	The National Forest Area Development Program 2012-2020
	- To increase forest area by 3% until 2020.	Lithuania's Rural Development Programme 2014-2020 The National Forest Area Development Program 2012-2020
WASTE	- To implement recycling	National Waste Management Plan for 2014-2020 Circular economy package
	- To ensure that biodegradable municipal waste compose 35% until 2020, (compared with the amount in 2000)	National Waste Management Plan for 2014-2020 Circular economy package
	- To increase biogas extraction	National Waste Management Plan for 2014-2020

Number of measures has been implemented, adopted and planned to fulfill policy goals mentioned above.

The following chapters provide a description of measure according to these directions of action, as well as implemented additions.

3.3. The GHG emissions trading system in Lithuania

The EU Emissions Trading System (EU ETS) is a key climate policy instrument that has been implemented in the EU to achieve its objectives of reducing GHG emissions in a cost-effective manner since 2005. From 2013 the EU ETS covers certain activities that emit carbon dioxide (CO_2), nitrous oxide (N_2O) and perfluorocarbons (PFCs).

EU ETS is established by the Directive 2003/87/EC under which each operator carrying activities under the Directives scope participates each year in a so called "compliance cycle". This yearly cycle includes monitoring GHG emissions, verifying them and reporting to the competent authority. After the reporting is complete the each installation is obligated to surrender EU ETS allowances equal in the amount to the emitted GHG in tonnes during the reporting year.

EU ETS allowances are given for free to the operators which are deemed to be exposed to carbon leakage to third countries. However this allocation is reduced each year to encourage operators to plan for the shortage of allowances and reduce their GHG emissions by modernising their installations. Since 2013 the main principle of allocation is auctions and operators receive just limited amount free allowances and the rest needed amount are obligated to purchase from other operators or auctions of allowances.

Since 2005, Lithuania takes part in European Union Emissions Trading System. Aviation has been included in the EU ETS since 2012, and monitored since 2010. Installations under scope of the EU ETS are required to have a GHG emissions permit, issued by the Environmental Protection Agency in accordance with Order of the Minister of Environment No. D1-231 approved on 29 April 2004 (latest amendments in Order No. D1-169 adopted on 26 February 2015). These permits must be updated if changes to the functioning of the installation occur.

In 2016, 89 installations and 1 aircraft operator from Lithuania carried out activities that fall under the scope of the EU ETS (Fig. 4-2). Most of these installations are small district heating units.

According to Commission Regulation (EU) No 601/2012 of 21 June 2012 on the monitoring and reporting of greenhouse gas emissions (MRR) all 89 installations are divided into 3 categories:

- 82 installations fall under category A (installations that emit less than 50 kt of CO_2 equivalent (CO_2 eq.) per year or low emitters (less than 25 kt of CO_2 eq. per year));
- 4 installations fall under category B (installations that emit more than 50 kt CO_2 eq., but less than 500 kt of CO_2 eq. per year);
- 3 installations fall in category C **(**installations emitted > 500 kt of CO_2 eq.).

In total Lithuanian EU ETS operators emit about 35% of total national greenhouse gas emissions. The majority of GHG is emitted from 3 installations that carry out production of ammonia and nitric acid, petroleum refining and cement production. All operators of stationary installations and aircraft operators in the EU ETS are required to monitor and report their annual emissions in accordance with the MRR. Reported emissions are also affected by obligations under the Accreditation and Verification Regulation (AVR) and must be verified by independent 3rd party verifiers that are accredited by the National accreditation bodies. Any verifier accredited by the EU Member State National accreditation body (NAB) may carry out verification in any EU Member State. In case of Lithuania, all verifications are carried out by verifiers that are accredited by foreign NABs. There are no verifiers accredited by the Lithuanian NAB.

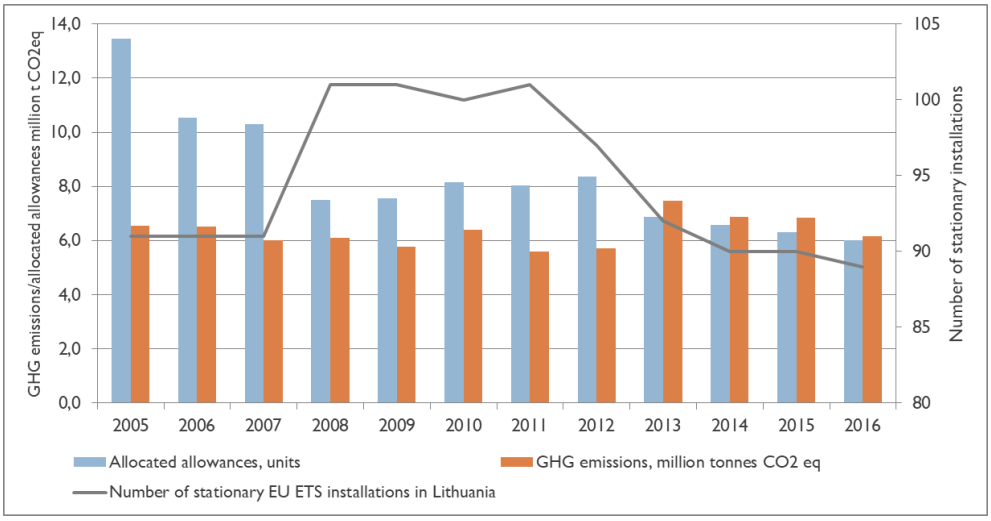


Figure 3-1. Trends of EU ETS in Lithuania

During the first (2005-2007) and second (2008-2012) EU ETS trading periods, emission allowances were allocated on a national level according to EU wide rules. Since the beginning of the third (2013-2020) trading period the allocation was changed and this means that approximately half of the allowances are expected to be auctioned, with this proportion continually rising throughout the trading period. Furthermore, it was decided to decrease the EU ETS total emissions cap by 1.74% yearly so that the target of 21% of GHG reduction by 2020 in EU ETS would be achieved (compared to 2005 GHG emission level).

Starting from the third trading period, no free allocation is given to electricity producer's with the exception for some countries, including Lithuania. Under article 10c of the Directive 2003/87/EB Lithuania is able to allocate free allowance to electricity producers for the transitional period 2013-2019. For this period Lithuania may allocate 2 853 628 EUAs that are withdrawn from the total Lithuanian auctioning share of allowances. The amount of EUAs that is not allocated under derogation 10c is returned to the Lithuania auctioning share.

Electricity producers that are willing to make use of Article 10c derogation must make investments that are fixed in the National Investment Plan. These investments must directly (i.e. within the installation) or indirectly (i.e. switching into more efficient electricity generating equipment in the installations owned by different operator) contribute to decreasing GHG emissions and this reduction must be verified and measurable. Investments should be related only with the modernization of electricity production, transmission, distribution and consumption and should be additional to investments Member States must undertake in order to comply with other objectives or legal requirements accruing from Union law.

Table 3-2. Number of free allowances issued pursuant to Article 10c

2013	2014	2015	2016
322 449	297 113	269 475	237 230

However, given that any unused Article 10c allocations will be auctioned before the end of the third trading period, this may also lead to increases in auctioning volumes in later years. For example Lithuania in 2015 auctioned additional allowances that could have been allocated for free under Article 10c of the EU ETS Directive. The auctions took place over the third ETS period through the common auction platforms (European Energy Exchange AG) for 25 EU Member States participating in a joint procurement procedure.

Revision of the EU ETS – phase 4 (2021-2030)

In July 2015, the Commission presented a legislative proposal to reform the EU ETS for the period after 2020. European Parliament and Council reached an agreement on the revision of the Directive in November 2017. The annual reduction in the number of allowances of the EU quota will be from the current 1.74% to 2.2% in order to provide the emissions reductions and thus deliver the underlying environmental objective. It is determined further strengthening the EU ETS by temporarily doubling the rate at which allowances are placed in the Market Stability Reserve (MSR) from 2019. This change would allow the MSR to reduce the existing market oversupply of allowances faster.

Since European leaders have agreed to continue free allocation after 2021, the necessary changes to update the relevant rules are also proposed. This includes updated benchmarks to reflect technological progress where necessary, criteria for the future composition of the carbon leakage list and procedures to reflect changes in production.

Several low carbon funding mechanisms are proposed, in particular an Innovation Fund (to support demonstration of innovative renewable energy and low-carbon innovation in industry, as well as carbon capture, use and storage) and a Modernisation Fund (modernising the energy systems of EU Member States with lower GDP).

3.4. Sectoral policies and measures

In this chapter the main policies and measures related to climate change mitigation in different Lithuania's economy sectors as well as having the most influence on GHG emissions reduction at national level are overviewed.

3.4.1. Energy

The general objective of Lithuania's energy policy is to ensure energy security at competitive prices and with the lowest possible environmental impacts. Energy sector are key sector for the overall functioning of the economy as it provide an important input and service to the other sectors of the economy.

The Law on Energy (2002, with later amendments) is the main law, setting the functions and obligations in the energy sector. Different energy sub-sectors are regulated by the following sectorial laws: the Law on Electricity (2000, with later amendments), the Law on Heat Sector (2003, with later amendments), the Law on Natural Gas (2000, with later amendments), the Law on Nuclear Energy (1996, with later amendments), the Law on the Nuclear Power Plant (regulates implementation of the new NPP) (2007, with later amendments), the Law on Construction (1996, with later amendments), the Law on Energy from Renewable Sources (2011, with later amendments) and the Law on energy efficiency improvement (2016).

In energy sector, the focus will be on implementation of the strategic projects aimed to achieve energy independence including ensuring sufficient local power generation capacities to cover domestic demand (estimated at 12-14 TWh in 2020). Lithuania is obligated to progressively increase the use of renewable energy resources in the production of electricity and heating. According to the current legal documents state aims to reach the target of 23% of renewable energy in final energy consumption in 2020, including no less than 20% of renewable energy in the electricity sector, 60% in the district heating sector and 10% in the transport sector and 80% in the households. Energy consumption is reduced by 1.5% every year to compare with an average of final energy consumption in 2010-2012, achieving 17% till 2020.

The National Energy Strategy**,** approved of by the Parliament (Seimas) of the Republic of Lithuania in 2007 was repealed with new **National Energy Independence Strategy**, adopted on 26 June 2012 by the Decree No XI-2133 of the Parliament of the Republic of Lithuania (*currently under revision*). The main goal of the Strategy is to ensure

Lithuania's energy independence before the year 2020 by strengthening Lithuanian's energy security and competitiveness.

The following main programmes and plans are prepared, setting the particular measures for the implementation of energy sector targets: District Heating Development Program, the Energy Efficiency Action Plan, and the National Renewable Energy Resources Development Strategy.

Improvement of energy efficiency through increase of cogeneration is among the targets set in the National Energy Independence Strategy.

Besides the main objectives set until 2020, in the currently valid Energy independence strategy the energy sector development guidelines for 2030 and 2050 are set. However, there is no quantitative targets for RES, energy efficiency but the guidelines for 2030 are the following:

- in 2020-2030 in the country energy efficiency will increase by 1.3% per year;
- RES share will continue to increase in the final energy balance.

Indicative targets outlined for 2050: 40-100% renewables in the energy mix; 0-30% nuclear energy, and 0-30% fossil fuel with carbon capture storage.

Ministry of Energy in June 2017 presented the draft of **renewed National Energy Independence Strategy** (NEIS), which was endorsed by Government on 29 November 2017. The Strategy sets the energy goals of Lithuania and the directions of their implementation until 2030, and sets the energy development guidelines until 2050. The main strategic directions of the Lithuanian energy policy development are energy security, competitiveness, green energy development and innovations. The long term-vision of the Lithuanian energy sector is to achieve complete independence from fossil fuels in both electricity generation and heating.

Reduced dependence on electricity import and more energy independence will strengthen the local production of electricity. This will be done by promoting investment in a reliable and competitive local generation. It is expected that by 2020 Lithuania will produce 35% of its electricity demand.

The breakthrough – more electricity produced in Lithuania than imported – should take place in 2030, when electricity import will decrease twice and Lithuania will produce 70% of the necessary electricity. By 2050, all consumed electricity should be generated in Lithuania.

To reduce environmental pollution, combat climate change, and increase competitiveness, renewable energy will be further developed. The goal is to reach a 30% share of renewable energy sources (RES) in the final energy consumption by 2020. In the next three years, the installed power of wind energy will increase by 50%, and that of solar twice. It is planned that by 2030 RES installed power will be 2.5 times what it is now, and almost half (45%) of the consumed energy should be manufactured from renewable sources; by 2050 energy from renewable and other non-polluting sources will comprise the majority of energy used in the electricity, heating, and transport sectors (80%). By 2050, all electricity – and all heating in the district heating sector – should be produced from RES, while in the transportation sector RES energy will amount to 50%.

National Renewable Energy Resources Development Strategy adopted on 21 June 2010 by the Government Resolution No 789 of the Republic of Lithuania. The main objective of this Strategy is to meet the demand of electricity in the best way in the sector of electricity, heating and transport by increase of the share of RES in the final energy balance and to reduce the import of fossil fuel and in this way to increase the energy security, energy independence and to contribute to the international efforts to reduce the emissions of GHG. This strategy foresees

the minimum RES trajectory ensuring that Lithuania meets the objective of 23% of RES in the final energy consumption in 2020.

According to the targets set in the Strategy the part of RES in the final energy consumption must reach not less than 18.6% in 2015-2016, not less than 20.2% in 2017-2018, and by 2020 not less than 23%.

Lithuania in the last decade has rather successfully deployed renewable energy sources. According to the Lithuanian Statistics, in 2016 Lithuania has already generated 25.46% of its gross final energy from RES and nowadays it's over reached this target set for 2020.

The update of the National Renewable Energy Resources Development Strategy until 2020 is being performed. Lithuania further plans to increase the share of RES in gross final energy consumption by 2020 (update of the strategy): in heating and cooling sector from 37.72% to 45% (district heating sector from 33% to 70%), in electricity from 13.14% to 20%; in transport sector currently the government is looking into possible measures how to reach 10% with the lowest cost.

It is planned to implement two major national importance higher-efficiency cogeneration power plant projects (in Vilnius planned cogeneration plant (biomass/waste) of 150 MW_e power and in Kaunas – 50 MW_e) that will contribute to the national sectorial targets in electricity, heating and cooling sectors and also to the share of RES in gross final energy consumption by 2020. Concerning latter, it is expected to reach 29-30% in 2020. In 2020 renewable energy sources will cover no less than 60% of heat from district heating sector.

It should be noted that in Lithuania the potential of use of biomass, especially of felling residues, is still poorly exploited. Wood fuel potential accumulated in Lithuania's forests is not fully used in the country's energy sector. The biggest part of this not used potential is in softwood broad leave stands as they are used not intensively enough, also in felling residues in private forests, pre-commercial thinnings. There is possibility to use additionally about 1 billion m^3 of such wood each year. However, using part of this potential is not economically beneficial and requires financial support. Additionally, approximately 95% straw pellets are exported and not used in domestic market.

Agriculture and forestry contribution to the climate change mitigation is linked to the production of renewable energy as these sectors are the largest contributors to renewable energy (93.4% 2010). The biggest contributor of the production of renewable energy is forestry – 84.6% (on average in the EU-27 to 48.3%) and agriculture – 8.8% (on average in the EU – 27 to 10.6%). In Lithuania the share of energy crops growing on agricultural land increased from 3.5% in 2007 to 4.5% in 2014 of total agricultural lands and this number is much higher than the average in the EU-27 (1.6%).

Strategy on dwellings of the Republic of Lithuania approved in 21 January 2004 by the Resolution No 60 of Government of the Republic of Lithuania. The main target set in the Strategy is to reduce relative consumption of thermal energy per unit of the used dwelling area by up to 30% by 2020 (compared with the year 2004) by modernization of heating system of the residential houses, renovation of roof constructions and other constructions.

The Law on Energy from Renewable Sources adopted on 12 May 2011 by the Parliament of the Republic of Lithuania, updated in 2015. The Law was adopted to ensure the balanced development of the RES. This Law establishes the tasks for separate energy sectors in order to reach the common goal of 23% of RES in the final consumption of energy by 2020. The Law also establishes the common promotion system on the enhancement of the use of RES and the following tasks by 2020 in separate energy sectors:

- to increase the share of electricity energy, produced from RES, not less than by 20% in comparison to the total country electricity energy consumption;

- to increase the share of centralized provided heating energy, produced from RES, not less than by 60% in the balance of heating energy;
- 10% RES energy consumption in transport sector;
- and, to increase the share of RES used for heating in the households not less than by 80% in the balance of heating energy.

The key support instruments for RES production are feed-in tariffs, also support scheme consisting of several support measures:

- reservation of the capacity and transfer of energy grids or systems for connection of renewable energy installations;
- discount of the costs of connection of renewable energy installations to energy grids or systems;
- priority of transmission of energy from renewable sources;
- support for production and processing of agricultural commodities, namely, raw materials for the production of biofuels, biofuels for transport, bio lubricants and bio oils;
- support of investments in renewable energy technologies;
- purchase of energy from renewable sources.

After adoption of this Law, a mixed support measures model was chosen, where producers of small power plants has the fixed rate of the price and larger producers had to participate in an auction where they compete for quotas and for lowest desired fixed tariff price.

Electricity produced from wind, solar hydropower, biogas and biomass power plants with the installed capacity not exceeding 30 kW was purchased at the fixed price (feed-in tariff) which is determined by the national regulatory authority.

However, in order to avoid a significant distortion of the market and reduce financial burden on consumers in 2013 the important amendments of the Law on Energy from Renewable Sources have been made, for example:

- The power of RES plant, for which the simplified requirements are applied, has been reduced from 30 kW to 10 kW.
- The frequency of feed in tariff review for all types of renewable sources has been changed from one time per year up to four times per year.
- The rules for promotion have been changed. Feed in tariff has been applied from the production permit date, not development permit.

In comparison from 2012 to 2014, feed in tariffs depending on the installed capacity have decreased:

- wind power – 21-24%
- solar – 56-62%
- biomass – 38-40%.

In December 2014, the Parliament of the Republic of Lithuania approved the amendments on Law on Energy from Renewable sources allowing net-metering system application for small solar power plants (residential <10kW budget and public institutions <50 kW). This law promoting solar energy use in households (by entering net-metering system) came into force on 2 March 2015.

Energy Efficiency Action Plan for 2017-2019 approved by Order No 1-181 of 7 July 2017 of the Minister of Energy of the Republic of Lithuania. The Action Plan describes energy efficiency improvement policies:

- taxes on fuel;

- renovation of apartment buildings;
- increasing the energy efficiency of public buildings;
- energy audits in industry;
- agreements with energy suppliers on consumer education and counseling;
- agreements with energy companies on energy saving;
- replacement of boilers in households.

Lithuania has set a target of increasing energy efficiency by 1.5% each year by 2020 and reach 740 thousand. final energy savings by 2020. The total amount of energy savings by 2020 will be 3932.5 GWh, which is 33.7% from 11.67 TWh required to save energy. The Plan sets energy efficiency targets for public buildings and multi-apartment buildings. For multi-apartment buildings the main goal is to reduce the cost of thermal energy (fuel) in multi-apartment buildings constructed in 1993 by at least 20% by the end of 2020, that is, the estimated annual cost of thermal energy in these houses up to 2020 to reduce at least 1 000 GWh/year, carbon dioxide emissions to the atmosphere - at least 230 thousand. tons per year compared to 2005. The 2020 target set in this Plan is to renovate area of 700 000 m^2 of the public buildings by saving 60 GWh of the annual primary energy. In the plan the ongoing measures covering household, services, industry, energy and transport sectors as well as horizontal measures to enhance energy efficiency are prescribed.

On the 3rd of November of 2016 the **Law on Energy Efficiency** with amendments of related energy laws were adopted in 2016. This law establishes the energy efficiency of state management, regulation and supervision of the legal framework. The purpose of this law – to ensure all Lithuanian economic sectors of energy consumption savings in line with Lithuania's European Union legislation enshrined in energy efficiency obligations, and efficient production, distribution and use of energy. In the law the system of energy efficiency improvement is determined to ensure that energy consumption is reduced by 1.5% every year till 2020 to compare with an average of final energy consumption in 2010-2012.

Meanwhile, **renewed National Energy Independence Strategy** (NEIS), which was endorsed by Government on 29 November 2017 and will be approved by Parliament (Seimas), sets more ambitious gross of the final RES energy consumption targets 45% until 2030 and 80% until 2050.

The European Commission adopted in November 2016 Regulation Proposal for the **Governance of the Energy Union**. Lithuania has started preparing a draft integrated national energy and climate plan (NECP) covering a 10-year period, starting from 2021 to 2030. The plan will set out national energy and climate targets and objectives and will represent contribution to the Energy Union's objectives, including the EU at least 40% GHG emission reduction target to compare with 1990 level till 2030 and the EU's joint energy efficiency and renewable energy targets.

Multi-apartment Building Renovation (Modernization) Programme approved by the Government of the Republic of Lithuania Resolution No 1213 of 23 September 2004, later amendments in 2015. In 2009 essential adjustments of the Programme were adopted which have changed the financing rules. Due to this the modernization process was slowed down in 2009 while the owners of multi-apartment buildings were waiting for the determination of the new explicit rules for financing. However, in 2012 Programme of Modernization of Multi-apartment Buildings was changed again, this time enhancing implementation of actual modernisation projects. More detailed information is available in the National Reform Programme 2014.

The main aim of the Programme is to reduce thermal energy use in multi-apartment buildings, built before 1993, at least by 20% by the end of 2020, i.e. estimated annual energy consumption in these buildings by the end of 2020

should be reduced at least by 1 000 GWh/year, and reduce GHG emissions by 230 kt CO_2 eq./year, comparing with 2005.

Programme of Public building renovation approved by the Government of the Republic of Lithuania Resolution No 1328 of 26 of November 2014. The 2020 target set in this Progamme is to renovate area of 700 000 m^2 of the public buildings by saving 60 GWh of the annual primary energy and to reduce GHG emissions by 14 kt CO_2.

It is planned to renovate public buildings by reaching C class of building energy performance. In this Programme it is defined that the total area of public houses which are owned by the state and municipalities is 14.8 million m^2 (approximately 35% of all are non-residential buildings), for the heating all these building approximately 2 300 GWh of heat energy is used.

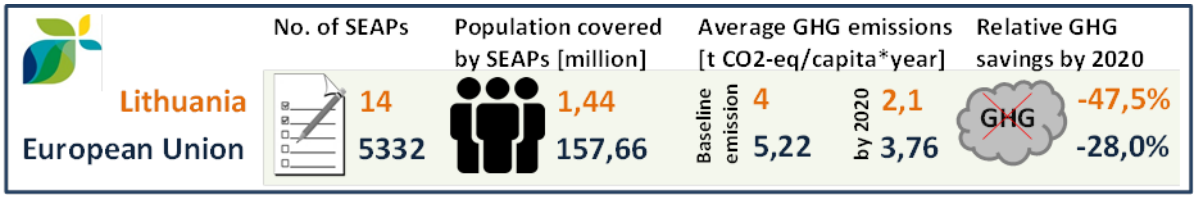
The **Lithuanian Law on Heat Economy** adopted on 2003 by the Parliament (Seimas) of the Republic of Lithuania and later amendments. The objective of this legal act is to reduce the unfavourable effect of heat energy on the environment by promoting combined heat and power generation, the heat generation from biofuels and renewable energy resources.

The **Programme on Heat industry development in 2015-2021** adopted in 2015. The Programme determines trends of heat industry development and modernisation, technical solutions and energy mix for the production of the heat, demand and potential for higher efficiency cogeneration, investments and time frames. In Lithuanian cities, approximately 72% of residential space is heated via centralized heating systems. It is forecasted that 5% will be reduced consumption of centralized heat by 2021 to compare with 2014 due to energy efficiency improvement in public and multi-apartment buildings.

Aiming to shift investments towards a low carbon economy Lithuania promotes cooperation between public, private sector and financial institutions. This cooperation has proved as a valid alternative source of finance for investments in low carbon solutions. As an example of greening finance for sustainable business is project implemented by Lietuvos Energija. This summer Lithuanian's national energy company, which is one of the largest state-owned energy groups in the Baltics, in cooperation with the European Bank for Reconstruction and Development, has successfully issued 300 million euros **green bonds**. This was the biggest ever issued green bond emission (for a duration of 10 years) in all Central and Eastern EU states, and yet the issue was oversubscribed 5 times, resulting in 1.4 billion euros offered from investors. Not only has Lithuania's company managed to get finances at a record low rates for investments in renewable energy, energy efficiency, clean transportation and pollution prevention and control including waste-to-energy. Also, Lithuania has learned a valuable lesson that there many possibilities for green investment projects based on public private and finance institutions partnership in Central and Eastern Europe.

The Covenant of Mayors

By 2016, in the context of the Covenant of Mayors, the sustainable energy action plans delivered by 14 Lithuanian municipalities had been assessed. Overall, these municipalities cover more than 1.4 million inhabitants. All together, these municipalities committed to reduce by 2020 the GHG emissions by 47.5% (as compared to 1990 baseline).



(source: JRC 2016. Notes: SEAP=sustainable energy action plan, GHG=greenhouse gas emissions)

In Lithuania, by September 2016, no cities have yet committed to conduct vulnerability and risk assessment and develop and implement adaptation plans in the framework of the Covenant of Mayors for Climate and Energy. In 2016, the Covenant of Mayors for Climate and Energy and the Compact of Mayors announced the Global Covenant of Mayors for Climate & Energy, a newly merged initiative to bring these two efforts together.

Stimulation of liquefied natural gas (LNG) consumption

On the upstream gas market, until the opening of the Klaipėda LNG terminal and the signing of an LNG supply contract with Statoil, Gazprom was the only gas supplier to Lithuania and the whole Eastern-Baltic region. The Klaipėda LNG terminal significantly enhanced security of natural gas supply for all consumers in the Baltic States by providing an alternative gas supply source on the basis of full Third Party Access, thus ending Lithuania's single dependency on Russian gas. Klaipėda LNG terminal regasification capacities of 3.8 bcm/y (10.3 mcm/d) are sufficient to cover around 90% of all current demand of the Baltic States. The related gas pipeline (Klaipėda-Kuršėnai) was commissioned in November 2015. Furthermore, an agreement on a gas interconnector with Poland (GIPL) was reached in September 2015. The diversification of import sources via the new LNG terminal has had a positive impact on prices. The gas market is 100% liberalised and customers are free to choose among gas suppliers, while the concentration on the wholesale market remains very high. Moreover, LNG is important promoting infrastructure for alternative fuels in order to decarbonize not only energy, but transport sector as well.

Impact assessment of planned policies and measures in energy sector

The **National Energy Independence Strategy** (2012) was revised by Government and there are set quantitative targets for RES, energy efficiency till 2050, which is envisaged to be adopted by Parliament (Seimas) by the end of 2017. The primary and final energy intensity will be 1.5 times lower in 2030 compared with 2017, and in 2050 – 2.4 times. In 2020, in renovated multi-apartment buildings and public buildings will be saved about 2.6-3 TWh of energy, and 5-6 TWh of energy in 2030. In industry will be saved. 1 TWh of electricity by 2030.

Intended energy efficiency measures would allow to save 35 TWh energy and would lead to reduction GHG emission by 1 144 kt CO_2 eq. in 10 years period. It is estimated that 35% use of RES would increase from 1 102 ktoe in 2012 to 1 860 ktoe in 2030. This would decrease the use of natural gas by 960.6 ktoe in energy sector and 37.1 ktoe of gasoline and diesel oil in transport sector. It is assumed that by changing this amount of natural gas, gasoline and diesel oil by RES would influence a decrease reduce in GHG emissions by 2 320 kt CO_2 eq.

Regional cooperation in energy sector

Lithuania is part of **the Baltic Energy Market Interconnection Plan (BEMIP).** BEMIP's main objectives are to develop an internal and regional energy market between the EU Member States in the Baltic Sea region and integrating it fully into the EU's energy markets thus increasing security of supplies. BEMIP projects have been part of the European Economic Recovery Plan (EERP) and the Trans-European Energy Networks Programme. BEMIP projects have also been funded through the EU's structural funds, including the European Regional Development Fund (ERDF) and the Cohesion Fund (CF). Many infrastructure projects are supported through CEF co-funding amounting to EUR 534.3 million. In the framework of the societal challenge for secure, clean and efficient energy of the Horizon 2020 programme, EUR 16.9 million is allocated to participants from the Baltics to stimulate research and innovation in this field.

The implementation of the Paris Agreement and the EU climate and energy targets till 2030 are being periodically discussed in different comities of the Baltic Assembly, which is represented by members of Parliament of Estonia, Latvia and Lithuania, Summits of Prime Ministers, the Baltic Environmental Councils and senior officials group meetings as well as the forums for the implementation **of the European Union Strategy for the Baltic Sea Region (EUSBSR)**.

Also, Baltic States cooperate actively on the energy issues, in particular related to common projects of electricity generation, synchronization and operation of electricity market in the framework **of the Baltic Council of Ministers of Senior Officials on Energy.**

Table 3-3. Summary of policies and measures by energy sector

Name of policy/measure	Objective and activity affected	GHG affected	Type of instrument	Status	Implementing entities	Estimate of mitigation impact by gas CO_2 eq.		
						2015	2020	2030
Promote energy efficiency	Increase energy efficiency in 2020-2030 by 1.3% per year	CO_2	Regulatory, Economic	Implemented (2013-2020)	Ministry of Energy	-	-	-
Increase the share of RES in the final energy balance and to refuse the importation of polluting fuel	In 2016 Lithuania has already generated 25.46% of its gross final energy from RES and nowadays it's over reached this target set for 2020.	CO_2	Regulatory	Implemented (2016-2020)	Ministry of Energy	-	-	-
Vilnius CHP	In Vilnius power plant - energy savings per unit shall be 43.6% for the waste-to-energy unit (around 440 GWh per year) and 38.9% for the biomass unit (around 640 GWh per year).	CH_4 CO_2	Regulatory, Economic	Implemented (2017-2020)	Ministry of Energy, Ministry of Finance, Ministry of Environment, Vilnius Municipality	-	343	-
Kaunas CHP	High performance CHP plant with electrical capacity of 24 MW and heat production capacity of 70 MW is planned in Kaunas. Such capacity will enable rational use of 200 thous. tons of municipal waste after sorting and production of approx. 500 GWh of heat and 170 GWh of electrical power.	CH_4 CO_2	Regulatory, Economic	Implemented (2017-2020)	Ministry of Energy, Ministry of Finance, Ministry of Environment, Kaunas Municipality	-	310	-
Increasing share of electricity generated from RES	To increase the share of energy produced from RES no less than by 20% in comparison to the total country's electricity energy consumption. In 2015, gross final energy consumption, was 25.8% (above the target).	CO_2	Regulatory, Economic	Implemented (2013-2020)	Ministry of Energy; Ministry of Environment	479	747	-
To increase share of district heating from RES	To increase the share of centralized provided heating energy produced from RES, no less than by 60% by 2020 in the balance of heating energy.	CO_2	Regulatory, Economic, Fiscal	Implemented (2013-2020)	Ministry of Energy; Ministry of Energy; Ministry of Environment; Ministry of Agriculture Ministry of Energy	-	-	-

To increase share of renewable energy sources in the households	To increase the share of RES used for heating in the households not less than by 80% in the balance of heating energy.	CO_2	Regulatory	Implemented (2013-2020)	Ministry of Environment Ministry of Agriculture; Ministry of Economy; Government	-	800	-
Voluntary agreements with energy companies	To implement energy efficiency	CO_2	Voluntary/ negotiated agreements	Implemented (2014-2020)	Ministry of Energy; Municipalities	-	-	-
Promotion of energy efficiency in industry	To implement energy efficiency measures and to reduce energy	CO_2	Economic, Information	Implemented (2014-2020)	Ministry of Environment; Ministry of Energy; Municipalities	815	1 496	-
Renovation (modernization) of multi-apartment	To reduce heating consumption in multi-apartment and public buildings by 30-40% by 2020 and compared to 2011 to save heat from 2 to 3 TWh.	CO_2	Regulatory, Economic	Implemented (2014-2020)	Ministry of Environment, Ministry of Energy, Ministry of Finance Municipalities	230	355	-
Public buildings renovation	The 2020 target set in this Progamme is to renovate area of 700 000 m^2 of the public buildings by saving 60 GWh of the annual primary energy.	CO_2	Regulatory, Economic	Implemented (2014-2020)	Ministry of Environment, Ministry of Energy, Municipalities, Ministry of Finance	-	14	-
Recommendations on the main Lithuania's Republic energy strategic directions for industry subsectors	To promote energy intensive in industry subsectors, applicate eco-innovative technologies	CO_2	Regulatory; Economy	Adopted 2016	Ministry of Economy	-	-	-

3.4.2. Transport

The National Renewable Energy Resources Development Strategy sets the target to increase use of renewable energy resources in transport sector from 4.3% in 2008 to 10% in 2020. A part of raw materials (mainly rape seeds and triticale) for biofuels production is compensated under the Lithuanian state aid scheme.

Lithuania started production of biofuel in 2004 and made about 4 thous. tonnes of biodiesel that year and has made a considerable progress in developing biofuel production. In 2013 the volumes of biofuel production increased to 141 thous. tonnes. About 117 thous. tonnes of biodiesel and 24 thous. tonnes of bioethanol were produced that year. Respectively, about 365 thous. tonnes of rape seeds and about 83 thous. tonnes of triticale were used in the production of biofuel in 2014, Lithuanian producers produced 105.9 thous. tonnes of biodiesel and 9.7 thous. tonnes of bioethanol.

Gross final consumption of electricity produced from renewable energy sources in the transport sector in 2013 the consumption – 60.1 ktoe, in 2014 – 61 ktoe and in 2015 – 69 ktoe. The main legal documents related to promotion of biofuels and climate change mitigation actions in transport sector are listed below.

The National Programme on the Development of Transport and Communications for 2014-2022 was adopted on 15 December 2014 by the Resolution No 1443 of Government of the Republic of Lithuania (latest amendment in 2017) and replaced Long-term (until 2025) Strategy of Lithuanian Transport System Development, adopted on 5 June 2005 by the Government Resolution No 692 of the Republic of Lithuania. The Programme is medium-term strategic planning document setting out the strategic goal, the objectives and tasks aimed at reaching the goal, their evaluation criteria and the institutions implementing the Programme. The Programme contains an analysis of the development prospects of the transport and communications sector, namely, transport (road, railway, maritime, inland waterways and air), logistics and post. The areas of information society development and electronic communications, including their objectives and tasks, are analysed in 'Lithuania's Digital Agenda' – the Programme on the Information Society Development in 2014-2020 approved by Resolution of the Government of the Republic of Lithuania No 244 of 12 March 2014 'On approval of the Programme on the Information Society Development in 2014-2020 'Lithuania's Digital Agenda'. The Programme emphasises the horizontal priorities in the area of transport and communications including the multimodality of transport, integrated urban transport, application of intelligent transport systems to all modes of transport, traffic safety and security, increase in energy efficiency in the transport sector, and development of environmentally-friendly transport. In the Programme it is foreseen 15-16 thousand electric cars (around 6 thousand in 2020) by 2025 in Lithuania.

The strategic goal of the Programme is to create a sustainable, environmentally-friendly and competitive national transport and communications system with a high value-added creation potential. Upon attainment of the strategic goal, the transport and communications system would ensure a high-quality, efficient, uninterrupted and sustainable mobility of members of the public and goods' transportation as well as high-quality logistic and postal services. There are 5 objectives of the Programme:

- Increase mobility of goods and passengers, improve the corridors of the core network of the EU Trans-European Transport Networks as well as their connections with national and local transport networks, and increase the efficiency of multimodal transport.

- By means of the active transport policy measures, increase competitiveness of the transport sector and improve the transport and logistic service quality.
- Promote sustainability of the local (urban and suburban) transport system.
- Increase energy efficiency in transport and reduce the adverse impact of transport on the environment.
- Improve traffic safety and security.

In 2017 the Program was updated transposing the requirements of the Directive 2014/94/EU on the deployment of alternative fuels infrastructure.

The Program identifies the main goals for the development of alternative fuel infrastructure:

- it is planned to install 28 public electric charging access points (high power near the road network of the "Trans-European Transport Network" (hereinafter – TEN-T) and 100 public electric vehicle charging access points (urban and suburban agglomerations with more than 25 thousand inhabitants) until 2020;
- it is planned to install 1 refueling point for liquefied natural gas in inland waters and in port of Klaipėda;
- 1 LNG refuelling point accessible to the public for heavy-duty vehicles shall be put in place in Kaunas along the TEN-T Core Network by 2025;
- it is planned to install 1 liquefied natural gas distribution system for supplying LNG fuel refueling points until 2025;
- it is planned to install 9 publicly available refueling points for compressed natural gas in Vilnius, Kaunas, Klaipėda, Šiauliai, Panevėžys, Telšiai, Ukmergė, Marijampolė, Elektrėnai;
- it is planned to install 10 publicly available compressed natural gas refueling points on the automobile roads of the "TEN-T core network" near the E85 and E67 roads until 2025.

The Law on Energy from Renewable Sources adopted on 12 May 2011 by the Parliament of the Republic of Lithuania, updated in 2015. The Law was adopted to ensure the balanced development of the RES. This Law establishes the tasks for separate energy sectors in order to reach the common goal of 23% of RES in the final consumption of energy by 2020. The Law also establishes the common promotion system on the enhancement of the use of RES and the following tasks by 2020 in separate energy sectors:

- to increase the share of energy from renewable sources in all modes of transport at least up to 10% as compared with the final energy consumption in the transport sector;
- to increase the share of electricity energy, produced from RES, not less than by 20% in comparison to the total country electricity energy consumption;
- to increase the share of centralized provided heating energy, produced from RES, not less than by 60% in the balance of heating energy;
- and, to increase the share of RES used for heating in the households not less than by 80% in the balance of heating energy.

In 2017 an **amendment of the Law on Energy from renewable sources** is adopted transposing the requirements of the ILUC directive (EU) 2015/1513 setting the requirements that the share of energy from biofuels produced from cereal and other starch-rich crops, sugars and oil crops and from crops grown as main crops primarily for energy purposes on agricultural land shall be no more than 7% of the

final consumption of energy in transport and a reference value for advanced biofuels target at least 0.5% in energy content of the share of energy from renewable sources in all forms of transport in 2020.

The Order No 3-100 of the Minister of Transport and Communications of the Republic of Lithuania on the adoption **of the energy efficiency and environmental protection requirements for the purchasing of road vehicles and setting the cases when the ones are mandatory** adopted on 21 of February in 2011 with latest amendments in 2017.

This legal act implements and transposes to national legislation the 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, and Directive 2006/32/EC on energy end-use efficiency and energy services and repealing Council Directive 93/76/EEC.

The Order of the Ministers of Environment, Social Security and Labour, and Transport and Communications **on the control of volatile organic compound (VOC) emissions resulting from the storage of petrol and its distribution from terminals to service stations** was adopted on 2000 and revised in 2016 by Order No D1-350/A1-250/3-171(1.5 E) implementing European Parliament and Council Directive 94/63/EC of 20 December 1994 on the control of VOC emissions resulting from the storage of petrol and its distribution from terminals to service stations. This act determining limitations for emissions of VOC from modern equipment of petrol storage, distribution and transportation.

Recommendations on the main Lithuania's Republic energy strategic directions, approved by Order No 1-1314 of Minister of Energy of the Republic of Lithuania on 24 November 2016. In the recommendations energy efficiency improvement measures such as modernising vehicles stock, promotion of efficient public transportation and infrastructure by their electrification are foreseen in transport sector. Energy intensity shall be reduced 2.4 times to compare with current level in transport sector by 2050.

The **Connecting Europe Facility (CEF)** contributes to the goals of the Energy Union. Regarding Lithuanian participation to the CEF – Transport programme 2014-2016, the current Lithuanian action portfolio comprises 12 signed grant agreements, allocating EUR 368.8 million of actual CEF Transport Funding to Lithuanian beneficiaries. The transport mode which receives the highest share of funding is rail (84% of actual funding). Lithuania has a considerable rail portfolio under the CEF programme. Apart from the involvement in a multinational study for the Rail Freight Corridor "North Sea – Baltic", the focus is definitely on the Rail Baltic line, the most significant and strategic Global Project of the North Sea-Baltic Corridor.

First municipalities has prepared and confirmed **City sustainable mobility plans (SSMP)**, in which stated necessity to develop public, engineless and ecologic transport, also infrastructure applied for people with special needs. The objectives of cleantech in transport sector of Lithuania are implementing basic objectives of White book – to reduce twice number of cars which uses fuel by 2030, to avoid them totally by 2050 and to achieve zero pollution from transport in biggest urban centres by 2030.

The Order No 3-108(1.5E) of the Minister of Transport and Communications of the Republic of Lithuania on the approval of **Guidance for the development of sustainable mobility plans in cities,** adopted on 13 March 2015, which provide guidance for the municipalities exceeding 25 thousand inhabitants to develop sustainable mobility plans in cities. 18 municipalities have developed sustainable urban mobility plans containing GHG emission reduction measures in transport.

Stimulation of bio-fuel production and consumption

In Lithuania annual fuel consumption amounts to 200-250 thousand tonnes of gasoline and 1.0 to 1.2 million tonnes of diesel per year. Lithuania produces two types of biofuel: biodiesel and bioethanol. The main feed stocks for biodiesel and bioethanol production are rape seed and rye. In Lithuania there are two biodiesel plants with capacity of 110 thousand tonnes and 30 thousand tonnes. It is estimated that in 2016 production of biodiesel amounted over 103 thousand tonnes. Annual consumption of biodiesel in 2016 is estimated at 56.7 thousand tonnes. The remaining amount of biodiesel is exported. In 2016 annual production of bioethanol is estimated at 14.1 thousand tonnes. In 2014 one of two plants producing bioethanol in Lithuania went bankrupt. In 2016 total bioethanol consumption is estimated at 9 thousand tonnes.

Table 3-4. Bio-fuel production and consumption

Year		2005	2010	2011	2012	2013	2014	2015	2016
Production (thous. tonnes)	Biodiesel	7	89.2	79.9	106.7	117.3	119.7	117.6	103.1
	Bioethanol	6.6	39.3	20.9	24.3	27.1	15.1	17.4	14.1
	Total	**13.6**	**128.5**	**101.8**	**131.0**	**144.4**	**134.8**	**135.0**	**117.2**
Consumption (thous. tonnes)	Biodiesel	3.2	39.3	40.0	58.6	58.6	65.1	65.4	56.7
	Bioethanol	0.9	16.2	14.7	13.5	10.4	10.5	15.0	9.9
	Total	**4.1**	**55.5**	**54.7**	**72.1**	**69.0**	**75.6**	**80.4**	**66.6**
Bio-fuel share in total fuel consumption (%)		1.1	4.0	3.5	4.8	4.6	4.2	3.2	2.2

Biofuel production in Lithuania started in 2002 and has expanded continuously since then. A reduction of prices for regular fuels in 2014 made biofuels less competitive. In addition there is still only a small number of bio-fuel using vehicles in the country. The harsh winter conditions and very low temperatures in Lithuania make use of high ethanol blends dangerous to car engines. A third reason is market limitations. Lithuanian blending companies can purchase bio-components from other EU producers who offer more competitive prices. Therefore, local producers are finding it a challenge to sell their higher cost bio-fuels.

Lithuania, as a member of the European Union, has implemented EU law on biofuels with a number of regulations. The basic requirements are two EU directives: Renewable Energy Directive (RED) (2009/28/EC) and Fuel Quality Directive (2009/30/EC).

The efficient implementation of GHG emissions reduction targets in maritime (shipping) sector can be achieved only with international instrument developed under IMO.

The efficient implementation of GHG emissions reduction targets in civil aviation sector can be achieved only with a proper functioning of global market-based measure getting agreement in ICAO. Information about steps taken to promote or implement any decisions by ICAO and IMO to limit or reduce associated emissions is provided in Chapter 4.8.

Regional cooperation

Rail Baltica is a project to link Finland, Estonia, Latvia, Lithuania and Poland with a standard gauge rail line, providing passenger and freight service between the countries and improving rail connections between Central and Northern Europe. It envisages a continuous rail link from Tallinn (Estonia), to Warsaw (Poland), via Riga (Latvia) and Kaunas (Lithuania). It will bypass the Kaliningrad Oblast (Russia) and Hrodna (Belarus), which have historically hosted two Poland-Lithuania rail routes. Rail

Baltica is one of the priority projects of the European Union: Trans-European Transport Networks (TEN-T). The constructions are planned to be finished by 2030.

Impact assessment of planned policies and measures in transport sector

Renewed National Energy Independence Strategy (NEIS), which was endorsed by Government on 29 November 2017 and will be approved by Parliament (Seimas), sets ambitious gross of the final RES energy consumption targets 45% until 2030 and 80% until 2050 and targets to reduce the use of fossil fuel vehicles in cities by half till 2030 and to reach zero use in 2050. It is estimated that 45% use RES in 2035 would reduce the use of gasoline and diesel oil by 33 ktoe in transport sector.

Based on data provided in the study on the "Development of the criteria for determining the rates of vehicle circulation tax and formulation of recommendations for the taxation of vehicles in Lithuania" the estimated impact of the introduced environmental car circulation tax (with the calculation of the tariffs based on CO_2 emissions and type of fuel) could bring up to EUR 76.6 million a year and would reduce 1.2 million tonnes CO_2 emissions in a period of 15 years.

Table 3-5. Summary of policies and measures in transport sector

Name of policy/measure	Objective and activity affected	GHG affected	Type of instrument	Status	Implementing entities	Estimate of mitigation impact by gas CO_2 eq. 2015	2020	2030	General comments
Promotion of the RES use in transport sector	Increase the share of RES (biofuels and electricity) by 10% in all modes of transport in comparison with the final consumption of the energy in the transport sector.	CO_2	Regulatory, Economic, Information	Implemented (2014-2021)	Ministry of Energy; Ministry of Transport and Communication; Ministry of Environment; Ministry of Interior; Ministry of Agriculture	-	423	-	Renewable energy share in transport is 4.6% in 2015.
Reduction of the final energy consumption in transport sector	To reduce energy consumption	CO_2	Regulatory	Implemented (2014-2020)	Ministry of Transport and Communication; Ministry of Environment	-	-	2 320	-
Electrification of railways	By 2030 it is planned to have 459.3 km (26% of railways network) of electrified railways in Lithuania and more than 3/4 of all freight and passengers will be transported using electric traction.	CO_2	Regulatory, Economic	Implemented (2014-2030)	Ministry of Transport and Communication	-	-	-	Electrified railway route (km) {2016 : 122, 2030 : 459.3}
Promotion the use of bicycles and development of bicycle track's infrastructure	To develop 564.3 km of bicycle tracks till 2022 in urban and suburban areas in Lithuania.	CO_2	Regulatory; Economic; Information; Education	Implemented (2014-2020)	Ministry of Transport and Communication; Ministry of Environment; Ministry of Interior; Municipalities	-	-	-	The length of bicycle track paved at national level per year (km) {2015 : 30, 2016 : 40, 2017 : 50, 2022 : 564.3}
Promotion of the use of public transport and improvement of its infrastructure	To increase number of passengers traveling by public transport	CO_2	Information; Education; Planning	Implemented (2014-2022)	Ministry of Transport and Communication; Ministry of Interior; Municipalities	-	-	-	Number of passengers traveling by public transport (Millions) {2012 : 234.9, 2022 : 244}
Improvement of road infrastructure	To improve national roads infrastructure	CO_2	Regulatory	Implemented (2014-2022)	Ministry of Transport and Communication	-	-	-	The length of national gravel roads that have been asphalted (km) {2015 : 42, 2016 : 50, 2017 : 50}
Taxation for vehicles in Lithuania	To introduce taxation for vehicles	CO_2	Economic; Fiscal	Planned (2018-2020)	Ministry of Environment; Ministry of Finance	-	160	960	-
Limitation of fuel use in transport sector	The increase of biofuel consumption part in the transport sector to 10% by	CO_2	Regulatory	Implemented (2014-2020)	Ministry of Transport and Communication Ministry of	278	423	-	-

	2020				Environment				
Promote energy efficiency consumption in transport sector	Annual consumption of diesel would be >5%.	CO_2	Regulatory	Implemented (2014-2020)	Ministry of Energy Ministry of Transport and Communication Ministry of Transport and Communication Municipalities Ministry of Environment Ministry of Interior	-	-	-	-
Sustainable mobility plans	To reduce twice number of cars which uses fuel by 2030, to avoid them totally by 2050 and to achieve 0 pollution from transport in biggest urban centres by 2030	CO_2	Regulatory; Economic; Information	Implemented (2016-2020)	Ministry of Transport and Communication Municipalities	-	-	-	http://sumin.lrv.lt/lt/veiklos-sritys/darnaus-judumo-mieste-planai

3.4.3. Industrial Processes

The policies and measures in industry sector are based on few main principles which are required in order to reach environmental targets. Firstly, the amount of its waste should be reduced, the production should be more sustainable, natural and energy resources should be used efficiently. Secondary, raw materials should be processed, the multi-use packaging and materials should be produced and utilized, waste (especially hazardous) should be securely managed, and equipment needed for environmental protection should be manufactured.

The legal documents and measures covering these issues in industrial sector are provided below.

The Programme for investment incentives and industry development for 2014-2020 was approved on 17 of September 2014 by the Resolution No 986 of the Government of the Republic of Lithuania. In this programme an objective to encourage enterprises to use recourses and energy more efficiently as well as use of RES is set. It is planned to implement energy efficiency measures and to reduce energy use in manufacturing industry from 222.9 (in 2012) to 182.9 (in 2020) kg of oil equivalent (for creation of EUR 1000 value added). Additionally, Ministry of Economy of the Republic of Lithuania prepared a study on "The potential of energy use efficiency increase in industry enterprises and determination of measures which encourage the use of different types of energy" in 2015. The aim of this study is to identify measures and main drives which encourage increasing energy efficiency in industry and to use different types of energy as well as help to identify the main implementation mechanisms and provide recommendations how to implement the proposed measures. Implementation of the Programme is financed from the EU structural funds.

The Directive 2010/75/EU of the European Parliament and of the Council of 24 November 2010 on industrial emissions (integrated pollution prevention and control) and the Directive 2008/1/EC of the European Parliament and of the Council of the 15th January 2008 concerning **integrated pollution prevention and control (IPPC)** are transposed into the national legislation.

Industrial enterprises, exceeding 50 MW must apply for the IPPC permit and enterprises below 50 MW must apply for the Pollution Permit in order to ensure pollution prevention and to incentivise transfer to cleaner technologies protecting the quality of environment. Natural resources must be used rationally and sparingly, energy use must be efficient, monitoring and control must be performed for the substances and raw materials, fuel and energy consumption in the processes of production. Less hazardous materials are promoted to use in the process of industrial activities.

The term "best available techniques" includes both the technology used and the way in which the installation is designed and maintained. The presented techniques are developed in the scale that allows implementation under economically and technically viable conditions and the techniques are most effective in achieving a high general level of protection of the environment as whole.

The ISO 14000 family of standards provides practical tools for companies and organizations of all kinds looking to manage their environmental responsibilities. ISO 14001:2015 and its supporting standards such as ISO 14006:2011 focus on environmental systems to achieve this. The other ISO 14000 standards focus on specific approaches such as audits, communications, labelling and life cycle analysis, as well as environmental challenges such as climate change. GHG emissions permits issued for the installations participating in the EU ETS are consistent part of the IPCC permits or Pollution permits.

On 1st of January 2015 **Regulation (EU) No 517/2014 of the European Parliament and of the Council on fluorinated greenhouse gases** and repealing Regulation (EC) No 842/2006 was adopted. The main goals of the new Regulation is to ensure a more cost-efficient contribution to achieving the EU's climate objectives by discouraging the use of F-gases with a high impact on the climate in favour of energy-efficient and safe alternatives, and further improving the containment and end-of-life treatment of products and equipment that contain F-gases; help to bring about a consensus on an international agreement to phase down hydrofluorocarbons (HFCs), the most relevant group of F-gases, under the Montreal Protocol.

It is aimed at cutting total EU emissions from F-gases by two thirds by 2030 compared to 2014 levels. It prohibits the placing of F-gases on the market in certain circumstances where alternatives are available. During 2018-2020, quotas for legally placing HFCs on the EU market were reduced to 63% of 2015 levels.

The Ministry of Environment of the Republic of Lithuania has updated the existing national legislation in the area of fluorinated greenhouse gases ensuring the implementation of the requirements of the Regulation (EU) No 517/2014 :

- The Order No D1-897 of the Minister of Environment the Republic of Lithuania ensuring the implementation of the requirements of the containment, use, recovery and destruction of the fluorinated greenhouse gases was adopted on 12 December 2016. This order defines the functions of the national authorities ensuring the implementation of the requirements of the new Regulation (EU) No 517/2014;
- The Order No D1-372 of the Minister of Environment of the Republic of Lithuania establishing the Rules on the issuance of Certificates for the companies handling fluorinated greenhouse gases was updated on 19 December 2014;
- The Order No D1-668 of the Minister of Environment of the Republic of Lithuania establishing the training and attestation system for the employees engaged in the activities with the fluorinated greenhouse gases was prepared with the view to amend and updated the existing national legislation in this area in order to comply with the requirements on the new Regulation (EU) No 517/2014, adopted on 20 October 2016.
- The Order No D1-12 of the Minister of Environment establishing the procedures for reporting on fluorinated greenhouse gases and ozone depleting substances, data collection and management, accounting of equipment and systems which contain these gases or materials was adopted on 10 January 2010 and was amended in 2016.

The amendment to the Administrative Infringement Code establishing more stringent responsibilities for the breach of the requirements of handling fluorinated greenhouse gases was adopted in 2016.

In July 2017, the EU and its Member States committed to ratifying the **Kigali Amendment to the Montreal Protocol** quickly, so that it comes into force on 1 January 2019. This amendment, adopted in October 2016, is a significant step forward in implementing the Paris Agreement by limiting the global production and use of hydrofluorocarbons (HFCs). Science suggests that an ambitious phase-down of HFCs alone could prevent up to 0.5°C of global warming by the end of the century.

The Order No D1-973 of the Minister of Environment on the **green procurement implementation measures for 2012-2015** adopted on 14 December 2011 and later amendments promoting the environmental management system in the manufacturing sectors as well as the strengthening ability of enterprises to organise green procurements.

The Order No 620 of the Minister of Environment of 5 December 2002 (with later amendments in 2014) on **limitation of emissions of volatile organic compounds** (hereinafter – VOC) was adopted. The aim of this order is to reduce the direct and indirect impact of VOC emissions (released by paints, solvents, adhesives and other products) on environment, usually on the ambient air, and the potential risk on human health, by providing measures and procedures to be implemented in the activities referred to by this document, in case the activity exceeds the solvent consumption level prescribed in this normative document.

The pollution reduction scheme is a part of the procedure of the limitation of emissions of VOC due to the use of organic solvents in certain activities and installations. The aim of this scheme is to give a possibility to an operator by using various implements to reduce VOC emission levels at the same degree as it would be reduced if the VOC emissions satisfied the limit levels. In this case, the operator may use any reduction scheme, prepared specially to his equipment to achieve an ultimate equivalent effect of VOC emission reduction.

The Order No 520/104/360 of 11 December 2000 of the Minister of Environment and Minister of Social Security and Labor, Minister of Transport and Communications (with later amendments in 2016) on **Stage II petrol vapour recovery during refuelling of motor vehicles at service stations.** The order lays down measures aimed at reducing the amount of petrol vapour emitted to the atmosphere during the refuelling of motor vehicles at service stations.

Recommendations on the main Lithuania's Republic energy strategic directions, approved by Order No 1-1314 of Minister of Energy on 24 November 2016. In the recommendations promotion of law energy intensive industry subsectors, application of eco-innovative technologies are foreseen in order savings of electricity will amount 620 GWh by 2025. Energy intensity shall be reduced 2.4 times to compare with current level in industry sector by 2050.

Table 3-6. Summary of policies and measures by industrial processes

Name of policy/measure	Objective and activity affected	GHG affected	Type of instrument	Status	Implementing entities	Estimate of mitigation impact by gas CO_2 eq. 2015	2020	2030	General comments
Investment incentives and industry development for 2014-2020	Programme's objective to encourage enterprises to use recourses and energy more efficiently as well as use of RES is set.	CO_2	Regulatory	Implemented (2014-2020)	Ministry of Economy, Ministry of Education and Science Municipalities	-	-	-	-
IPPC permits and Pollution permits	Directive apply to combustion plants with a rated thermal input equal to or greater than 1 MW and less than 50 MW	CO_2	Regulatory	Implemented 2015	Ministry of Environment	-	-	-	-
Best available technology	Reduce the GHG emissions released during the cement production process by changing manufacturing technologies.	CO_2	Economic	Implemented (2013)	Cement producing company	500	500	-	-
Regulation of Fluorinated Greenhouse Gases	To ensure a more cost-efficient contribution to achieving the EU's climate objectives by discouraging the use of F-gases with a high impact on the climate in favour of energy-efficient and safe alternatives, and further improving the containment and end-of-life treatment of products and equipment that contain F-gases; help to bring about a consensus on an international agreement to phase down hydrofluorocarbons (HFCs), the most relevant group of F-gases, under the Montreal Protocol.	HFC, PFC, SF_6	Regulatory	Implemented (2015-2030)	Ministry of Environment	-	-	-	The Ministry of Environment of the Republic of Lithuania has updated the existing national legislation in the area of fluorinated greenhouse gases ensuring the implementation of the requirements of the EU Regulation.
Limitation of emissions of volatile organic compounds VOC	To reduce the direct and indirect impact of VOC emissions (released by paints, solvents, adhesives and other products)	CO_2	Regulatory	Implemented	Ministry of Environment	-	-	-	-
On Stage II petrol	Reducing the amount of	CO_2	Regulatory	Implemented	Ministry of	-	-	-	-

vapour recovery during refuelling of motor vehicles at service stations	petrol vapour emitted to the atmosphere during the refuelling of motor vehicles at service stations.			2016	Environment				
To implement innovative technologies in industry	To promote eco-innovative technologies in industry sector.	CO_2	Regulatory, Economic	Implemented	Ministry of Energy	-	-	-	Electricity savings will amount 620 GWh by 2025. Energy intensity shall be reduced 2.4 times to compare with current level in industry sector by 2050.
Ratification of the Kigali Amendment	The goal is to achieve over 80% reduction in HFC consumption by 2047	HFC	Regulatory	Adopted (2019-2032)	Ministry of Environment	-	-	-	-

3.4.4. Agriculture

More than a half of Lithuania's land is suitable for agriculture. About 33.5% of our land area is occupied by forests, 5.8% by wetlands, 4.8% is attributed to settlements.

In 2014 **Lithuania's Rural Development Programme 2014-2020** was prepared by the Ministry of Agriculture of the Republic of Lithuania (MoA) in cooperation with the Ministry of Environment in fulfilment mission and objectives laid down in the Articles 3 and 4 of the European Parliament and the Council Regulation (EC) Nr. 1305/2013 on support for rural development by the European Agricultural Fund for Rural Development (EAFRD) and repealing Council Regulation (EC) No 1698/2005. In order to achieve the objectives of rural development, which contribute to the Europe 2020 strategy for smart, sustainable and inclusive growth, the main target of the National Rural Development Programme is promoting growth of agriculture sector based on innovative technologies, that is more territorially and environmentally balanced, climate-friendly and resilient and competitive as well as innovative. Therefore, all three objectives of the EAFRD will be implemented: (a) fostering the competitiveness of agriculture; (b) ensuring the sustainable management of natural resources, and climate action; (c) achieving a balanced territorial development of rural economies and communities including the creation and maintenance of employment. On the basis of the analysis of the Lithuanian rural conditions and problems identified, measures will be implemented in all six Union priorities for rural development of the EAFRD and in 16 out of 18 thematic areas. Also, in order to implement properly the EU strategy on Forestry the thematic area related to the improvement of forestry economic value and forest areas expansion has been chosen in addition. The total program budget is EUR 1.978 billion. 36% of all funds be allocated for climate change mitigation (this amount includes previous programming period). The main targets of the program are switching to organic farming (25 000 hectares), keeping organic farming areas (110 000 hectares). The Lithuanian Rural Development Programme has been formally adopted by the European Commission on 13 February, 2015. It outlines Lithuania's priorities for using EUR 1.9 billion of public money that is available for the period 2014-2020 (EUR 1.6 billion from the EU budget and EUR 0.3 billion of national funding). The main objectives are the modernization and improvement of the economic performance of small and medium-sized farms (nearly 8 000 farms will be supported), the preservation of biodiversity (11% of farmland), better management of soil (8% of farmland), the promotion of organic farming, the creation of new jobs (nearly 2 000) and the development of rural areas and businesses. Almost 150 000 people will be trained. They include farmers, land managers, food industry actors, forest holders and the staff of rural SMEs. Their professional skills will be upgraded. They will also be encouraged to diversify their activities. More than EUR 120 million have been allocated for the forestry sector. Trend two, which includes ecological farming (in 2012 a total of 2 594 certified ecological farms accounted for 163.3 thousand ha and covered 5.7% of agricultural land and in 2015 it increased up to 209.6 thousand ha), land afforestation, and improvement of the condition of risky water bodies was assigned nearly EUR 0.3 billion. Manure utilization and utilization for the production of biogas enables to solve problems related to the negative environmental impact of production activities. Livestock and poultry manure can produce about 50 million m^3 of biogas. Total financial assistance of EUR 45 million from Rural Development Programm is planned for the period for 2014-2020. Using this support could be built about 30 biogas plants with a total electric power of about 20 MW. In 2017, there are already operating 8 biogas plants and planned to build 14 biogas plants until 2020, using financial support from Lithuania's Rural Development Programme 2014-2020.

The National Forest Area Development Program 2012-2020 approved on 23 May 2012 by Resolution No 569 of the Government of the Republic of Lithuania. The goal of the Programme is to implement long-term forest economy policy that would be coherent with other sectorial policies, would be based on country specific traditions, the EU regulations, international conventions, resolutions, treaties, programmes, and to set goals and tasks for forestry sector development up to 2020. The Programme sets a strategic goal on forestry development, other forestry goals, and tasks to achieve the set goals, evaluation criteria. In the Annex the implementation evaluation criteria for the years 2011, 2015 and 2020 are set. The Programme is sought to increase forest coverage of the country up to 34.2% by 2020 by afforestation of abandoned lands and lands that are not suitable to be used for agricultural activities, and to encourage people financially to plant forests in private and state-owned lands, to develop forest regeneration on a genetic-ecological basis with selectively valuable and qualitative forest increasing matter. In 2011 the Forest Law was amended by tightening the procedure of forest land transformation. Forest land may be transformed into farming land or other type of land only in exceptional cases. In addition to that new compensation system was created, which ensures obligation to plant new forest on non-forest land as a compensation for the forest land plot transformed into the other land use. This regulation serves not only as additional guarantee to prevent decrease of forest land area, but also creates conditions for increase of forest coverage. In the period 2007-2013 with a financial support from Rural Development Program 2007-2013 the area of 17.2 thousand ha was afforested and additional 3.6 thousand ha were afforested in 2014.

National **Water Area Development Programme 2017-2023** approved on 1 February 2017 by Resolution No 88 of the Government of the Republic of Lithuania. The main goals of the Programme are: to improve status of ground and surface water bodies, to achieve and maintain good environmental status of the Baltic Sea, to reduce the risk of the floods, to provide quality public drinking water supply and sanitation services and to reduce pollution by waste water.

Action plan for the implementation of the Program was approved on 5 May 2017 by the Order No D1-375/3D-312 of Minister of Environment and the Minister of Agriculture of the Republic of Lithuania.

Implementation of the Council Directive of 12 December 1991 concerning **the protection of waters against pollution caused by nitrates from agricultural sources** (91/676/EEC) with the latest amendment by the Regulation (EC) No 1137/2008 of the European Parliament and the Council of 22 October 2008 (further – Nitrates Directive) is primarily directed towards the minimization of the water pollution with nitrates. Activities are supported for the establishment of modern manure silos and other measures which enable the control against manure penetration into the surroundings. Replacement of manure handling systems from thick or dry silos to liquid silos may lead to a reduction in emission of nitrogen compounds to atmosphere by up to 20 times. The country took an obligation that the Nitrates Directive would be implemented in two phases. The implementing Nitrates Directive legal documents are:

- The Order No D1-367/3D-342 of Ministers of Environment and Agriculture on **Environmental Requirements for Manure Management** adopted on 14 July 2005 with later amendments sets requirements pursuant to Council Directive 91/676/EEC concerning the protection of waters against pollution caused by nitrates from agriculture activities, particularly the environmental requirements on the use of manure for croplands fertilization. Additionally, the farm, keeping animals are required to store manure and slurry in storage vessels which comply with environmental requirements. In order to reduce GHG emissions, also there are established

requirements for slurry storage covering and slurry speeding technology by the Order No D1-367/3D-342.

- By the Order No D1-490/3D-39 of Ministers of Environment and Agriculture the **Program for Minimization of Water Pollution Caused by Agriculture activities** was adopted on 8 June 2012. The Oder sets requirements pursuant to Council Directive 91/676/EEC concerning the protection of waters against pollution caused by nitrates from agricultural sources.

Table 3-7. Summary of policies and measures by agriculture sector

Name of policy/measure	Objective and activity affected	GHG affected	Type of instrument	Status	Implementing entities	Estimate of mitigation impact by gas CO_2 eq			General comments
						2015	2020	2030	
Implementation of Nitrates directive	Reduced water pollution and the emissions of N_2O	N_2O, CH_4	Regulatory, control and monitoring	Implementing (2014-2020)	Ministry of Environment, Ministry of Agriculture	100	100	-	-
Nitrogen compounds into the Baltic Sea the central part of the change, compared with the inflow of reference (1997-2003) for the period 42 kt	Reduced water pollution and the emissions of N_2O	N_2O	Regulatory, control and monitoring	Implementing (2014-2020)	Ministry of Environment, Ministry of Agriculture	9.9	8	-	-
Lithuania's Rural Development Programme 2014-2020	Promote growth of agriculture sector based on innovative technologies, that is more territorially and environmentally balanced, climate-friendly and resilient and competitive as well as innovative	CH_4, N_2O	Regulatory	Implementing (2014-2020)	Ministry of Agriculture, Ministry of Environment	-	-	-	-
Sustainable farming	Promote sustainable farming, crop rotation, rational and regulated use of synthetic fertilisers and replacement of synthetic fertilisers by organic fertilizers, expansion of perennial meadows in order to improve soil fertility, manure handling, review of subsidies and tax concessions (Rural Development Programme 2014-2020).	CH_4, N_2O	Regulatory, Information	Implementing (2014-2020)	Ministry of Agriculture, Ministry of Environment	-	-	-	-
Promotion of the production of biogas from livestock holdings	The planned biogas capacities from livestock holdings are: in 2014 – 1.6 MW, in 2015 – 1 MW, in 2016-2017 – 3 MW, and in 2018-2020 – 4 MW	CH_4	Economic, Regulatory	Implementing (2014-2020)	Ministry of Agriculture, Ministry of Environment	4.34	4.45	-	-
Promotion growth of protein crops	To grow protein crops	N_2O	Economic	Implementing (2014-2020)	Ministry of Agriculture	-	-	-	-

3.4.5. Land use, Land use Change and Forestry

In the land use, land use change and forestry (hereinafter – LULUCF) sector one of the main factor influencing the CO_2 absorption is the forest expansion. **National Forest Area Development Program 2012-2020** approved by Resolution No 569 of the Government of the Republic of Lithuania on 23 May 2012, sets a strategic goal on forestry development, other forestry goals, and tasks to achieve the set goals, evaluation criteria. In the Annex the implementation evaluation criteria for the years 2011, 2015 and 2020 are set. The Programme is sought to increase forest coverage of the country up to 34.2% by 2020 by afforestation of abandoned lands and lands that are not suitable to be used for agricultural activities, and to encourage people financially to plant forests in private and state-owned lands, to develop forest regeneration on a genetic-ecological basis with selectively valuable and qualitative forest increasing matter.

In 2011 the Forest Law was amended by tightening the procedure of forest land transformation. Forest land may be transformed into farming land or other type of land only in exceptional cases. In addition to that new compensation system was created, which ensures obligation to plant new forest on non-forest land as a compensation for the forest land plot transformed into the other land use. This regulation serves not only as additional guarantee to prevent decrease of forest land area, but also creates conditions for increase of forest coverage.

In the period 2007-2013 with a financial support from Rural Development Program 2007-2013 the area of 17.2 thousand ha was afforested and additional 8.4 thousand ha were afforested in the period of 2014-2016.

The main legal act regulating forest management is the Law No XI-1830 on Forests adopted by the Parliament (Seimas) of Republic of Lithuania on 2011. By the amendments of this legal act the new measures were introduced, that creates legal conditions for better preserving of forests and forest land in cases of land use change from the forestry to other use, in particular: the number of cases when it is allowed to change forest land in to any other land is narrowed and prescribed precisely.

The compensatory afforestation in all cases of changing forest land in to any other land was established under the National Forest Area Development Program 2012-2020, adopted on 23 May 2012 by the Government Resolution No 569 of the Republic of Lithuania.

The estimation of policy and measures effect on GHG emissions mitigation in LULUCF sector effect is basically related to the National Forest Area Development Program 2012-2020 where the target to increase the forest area by 3% by 2020 is set. (Table 4-9).

Table 3-8. The mitigation measures in LULUCF sector to minimize GHG emissions in forestry sector

Name of measure	Description	Year of implementation	Implementing entity
Restoration of forestry potential and introduction of prevention actions	Fires and natural disasters pose a significant threat to forest ecosystems. Each year in Lithuania between 100 and 750 hectares of forest is burned. Lithuania's Rural Development Programme 2014-2020 provides investment support for restoration of forest damaged by fires and other natural disasters including pests and diseases, as well as support for implementation of forest fire prevention measures.	2014-2020	Ministry of Environment

Afforestation and restoration of damaged forest	In order to reduce atmospheric pollution originated from agricultural activities and contribute to climate change mitigation as well as to reduce the area of the abandoned land, the afforestation of these lands and the restoration of damaged forests is supported. In the inter-institutional Action Plan on the implementation of the Goals and Objectives for 2013-2020 of the Strategy for the National Climate Change Management Policy the measure is set to plant new economically valuable and productive as well as biological resistant forests in abandoned lands in the state's possession.	2014-2020	Ministry of Environment
Afforestation	Afforestation actions are supported by Lithuania's Rural Development Programme 2014-2020. EUR 53 million allocated for new commitments under the sub-measure „Afforestation" for the programming period 2014-2020. Planned that forest land in 2020 reach 34.2%.	2014-2020	Ministry of Agriculture

EU proposal on LULUCF Regulation for the period 2021-2030

The proposal on LULUCF regulation sets out Member States' commitments on LULUCF that contribute to meeting the GHG emission reduction target at least 40% to compare with 1990 of the Union for the period from 2021 to 2030, as well as the rules for the accounting of emissions and removals from LULUCF and checking the compliance of Member States with these commitments. The Regulation sets a binding commitment for each Member State to ensure that accounted emissions from land use are entirely compensated by an equivalent removal of CO_2 from the atmosphere through action in the sector, what is known as the 'no debit rule'. Although Member States undertook this commitment under the Kyoto Protocol up to 2020, the proposal enshrines the commitment in EU law for the period 2021-2030. Member States would be required to balance GHG emissions and removals from land use, land use change and forestry under the 'no debits rule'. It is proposed that GHG emissions from land use would have to be entirely compensated by equivalent removal of CO_2 from the atmosphere through action in that sector or in the effort-sharing sectors. The new rules will provide Member States with a framework to incentivise more climate-friendly land use, without imposing new restrictions or red tape on individual actors. This will help farmers to develop climate-smart agriculture practices and support foresters through greater visibility for the climate benefits of wood products which can store carbon sequestered from the atmosphere.

Impact assessment of planned policies and measures in LULUCF sector

It is expected to increase forest land area up to 35% of total country area according to the suggestions (not exactly determined in any of the strategic planning documents). National Forestry Development Programme for 2021-2020 sets the goal to increase forest coverage by 3% until 2020. It was estimated that afforestation of the poorly fertile soils in order to increase forest coverage could increase LULUCF sector GHG removals by 1 680 kt CO_2 eq. in 2020. However, successful increase in forest land area mostly depends on support from national programs for afforestation of abandoned lands and Rural Development Program, therefore the aim to increase forest coverage to 35% is unsecured. Additional measure to increase forest land coverage could be specific measures adopted to protect natural

afforestation and reforestation areas in abandoned land or land not suitable for agricultural purposes. The need to identify measures reducing GHG emissions and increasing absorption potential of LULUCF sector included in the Action Plan for the implementation of the Government Work Programme in the period of 2017-2020. Implementation of additional measures could result in increase of GHG removals in LULUCF sector approx. up to 1 050 kt CO_2 eq. in 2035.

Table 3-9. Summary of policies and measures by LULUCF sector

Name of policy/measure	Objective and activity affected	GHG affected	Type of instrument	Status	Implementing entities	Estimate of mitigation impact by gas CO_2 eq			General comments
						2015	2020	2030	
Increase forest area	To increase forest area by 3% until 2020. Planned that forest land in 2020 reach 34.2%.	CO_2	Economic; Regulatory	Implementing (2014-2020)	Ministry of Agriculture; Ministry of Environment	-	1 680	-	-
Restoration of forestry potential and introduction of prevention actions	Support restoration of forest damaged by fires and other natural disasters	CO_2	Economic; Regulatory	Implementing (2007-2020)	Ministry of Environment; Ministry of Agriculture	-	500	-	-
Afforestation and restoration of damaged forest	To reduce atmospheric pollution	CO_2	Regulatory; Economic; Information; Education; Research	Implementing (2007-2020)	Ministry of Environment; Ministry of Agriculture	-	-	-	-
Promotion of planting of short rotation coppices	The support for planting of short rotation coppices with an aim to produce biomass as a source of energy which partially replaces imported raw materials (oil, gas, coal) and contributes to the reduction of CO_2 emissions.	CO_2	Economic; Regulatory	Implementing (2014-2020)	Ministry of Agriculture; Ministry of Energy	-	-	-	Newly afforested area (from 2011) Ha (ha) {2015: 15 000, 2016: 17 500, 2017: 20 000}
Afforestation and damaged forest restoration	To reduce atmospheric pollution	CO_2	Regulatory; Economic; Information; Education; Research	Implementing (2013-2020)	Ministry of Environment; Ministry of Agriculture		840	1 680	-	Increasing the national forest area The National Forest Area Development Program 2012-2020 approved by Resolution No 569 of the Government of the Republic of Lithuania of 23 May 2012 is sought to increase forest coverage of the country up to 34.2% by 2020. To increase forest area by 3% until 2020. LULUCF sector is not included into the implementation of the EU GHG emission reduction target until 2020.

Sustainable forestry: Promoting the use of biomass for energy production	It's planned to use 300 thou. m^3 per year of wood from state forests for biomass production by 2020.	CO_2	Regulatory; Economic	Implementing (2012-2020)	Ministry of Environment; Ministry of Energy; Ministry of Agriculture	-	700	-	The amount of the use of forest cutting waste and residual wood for biomass production (thousand cubic metres) {2015: 300, 2016: 300, 2017: 300}

3.4.6. Waste management

The National Strategic Waste Management Plan 2007-2013 was repealed in April 2014 with the National Waste Management Plan for 2014-2020 by Resolution No 519 of the Government Republic of Lithuania (the latest amendment in June 2016). The targets, directly related to minimisation of GHG emissions in waste sector remains the same, however, stricter measures are set in order to reach those targets. For example, introduction of the Landfill tax since 2016, more requirements for kitchen and food waste treatment, reduced disposal of biodegradable waste and waste containing energy/calorific value in landfills till 2020. By 2020, the preparing for re-use and the recycling of waste materials at least paper, metal, plastic and glass from households, and possibly from other origins as far as these waste streams are similar to waste from households, shall be increased to a minimum of overall 50% by weight. By 2020, the preparing for re-use, recycling and other material recovery, including backfilling operations using waste to substitute other materials, of non-hazardous construction and demolition waste, excluding naturally occurring material defined in category 17 05 04 in the list of waste, shall be increased to a minimum of 70% by weight. Currently, in Lithuania are 54 biodegradable waste collection areas. It's categorized by regions: Alytus, Kaunas, Klaipėda, Marijampolė, Panevėžys, Šiauliai, Tauragė, Telšiai, Utena and Vilnius.

In the light of the on-going review of the recycling targets and landfill restrictions for municipal waste – 65% recycling target for 2030 and possible upwards review of the targets by 2025 and a landfill restriction to 10% for 2030 – the Commission services consider that the optimal incineration capacity in a country is 20-25% of municipal waste generated. Incineration capacity in excess of this is likely to further hinder Lithuania from meeting the 50% recycling target in 2020 and future increase of that target level.

According to the EU Environmental Implementation Review Country Report full implementation of the existing legislation could create more than 5 200 jobs in Lithuania and increase the annual turnover of the waste sector by EUR 550 million.

EU structural and investment funds are an important source of funding for improved waste management system in Lithuania. In 2007-2013 EUR 190 million were invested into waste management projects, including construction of 1 regional mechanical and 9 mechanical sorting and biological waste treatment facilities, remediation of 341 old landfills/dumpsites, construction of numerous bulky waste collection and green waste composting sites, extension of separate waste collection system (210 000 containers for recyclable and biodegradable waste).

In the 2014-2020 period EUR 87.2 million investment from the Cohesion Fund is planned to support further development of the separate collection of waste, modernization of capacities to prepare waste for recycling, reuse or other recovery (sorting lines, other equipment), and modernization of the waste management information system and monitoring.

Several new biogas plants have been constructed in wastewater treatment plants. In 2013 first waste incineration plant in Lithuania has started operation with energy recovery.

The main legal acts and programs of the Republic of Lithuania regulating waste management activities include the Law on Waste Management, Law on Management of Packaging and Packaging Waste, the Law on Taxes for Environment Pollution, the Rules on Waste Management, the National Waste Prevention Programme and the National Waste Management Plan for 2014-2020. Management of

wastewater and sludge is regulated by the Law on Potable Water Supply and Wastewater Handling and the Development strategy of Potable Water supply and wastewater handling.

Implementation of the **Circular Economy Action Package** has been a step in progressing the EU's efforts to reduce emissions from waste. The Package provides a clear, systematic approach that focusses on a number of priority issues, including plastics, food waste, critical raw materials and construction and demolition and clearly delineates actions, commitments and timetables. Implementation of the EU's circular economy action package has been key in progressing efforts to reduce emissions from waste. It provides a clear, systematic and holistic approach that focuses on a number of priority issues, including plastics, food waste, critical raw materials, and construction and demolition, and sets out clear actions, commitments and timetables. The Commission has adopted a raft of legislative proposals on areas such as waste, packaging, landfill, end-of-life vehicles, batteries and accumulators, and waste electrical and electronic equipment. They include stricter targets, such as recycling 65% of municipal waste and 75% of packaging waste by 2030, and reducing landfill to 10% of municipal waste by 2030

The Ministry of Environment of the Republic of Lithuania supports the EU Circular Economy Package and is demonstrating interest in adopting the package on the national level. Government of the Republic of Lithuania approved plan for implementation of measures in 2017. According to this plan amount of recycled, reclaimed or otherwise used municipal waste in 2020 will consider 65% and target for waste suitable for recycling will be 65%.

National waste prevention and management 2021-2027 plan will be prepared after the analysis of the Lithuania's waste prevention and management system, waste trends, taking into account the EU circular economy and other directions of the waste sector. The Ministry of Environment will announced a competition for such analysis. Public procurement procedures will started in 2018.

Impact assessment of planned policies and measures in waste sector

Lithuania is taking steps towards realising the concepts of "recycle, repair and re-use" and avoiding waste at all stages of the value chain with its **EU circular economy package**. The 2015 Circular Economy Package emphasizes the need to move towards a lifecycle-driven 'circular' economy, with a cascading use of resources and residual waste that is close to zero. Implementation of the Circular Economy Action Package has been a key in progressing efforts to reduce emissions from waste. With continuation of existing measures and planned policies GHG emissions from waste sector will decrease by 57% in 2025 and by 62% in 2035, compared with 2014 GHG emissions.

Table 3-10. Summary of policies and measures by waste sector

Name of policy/measure	Objective and activity affected	GHG affected	Type of instrument	Status	Implementing entities	Estimate of mitigation impact by gas CO_2 eq.			General comments
						2015	2020	2030	
Promotion of high efficiency cogeneration in Vilnius	The waste-to-energy unit is expected to reduce CO2 emissions by 93 166 tons per year and biomass unit is expected to reduce CO_2 emissions by 343 328 tons per year.	CH_4; CO_2	Regulatory, Economic	Implemented (2017-2020)	Ministry of Energy, Ministry of Environment, Vilnius Municipality	-	343	-	-
Promotion of high efficiency cogeneration in Kaunas	High performance CHP plant with electrical capacity of 24 MW and heat production capacity of 70 MW is planned in Kaunas. Such capacity will enable rational use of 200 thous. tons of municipal waste after sorting and production of approx. 500 GWh of heat and 170 GWh of electrical power.	CH_4; CO_2	Regulatory, Economic	Implemented (2017-2020)	Ministry of Energy, Ministry of Environment, Kaunas Municipality	-	310	-	-
Promotion of municipal and other waste recycling or using otherwise	To incinerate 180 000 t of waste in 2015 and in 2020 it is planned to incinerate 360 000 - 530 000 t; Potential reaches 150-210 ktoe in 2020.	CO_2; CH_4	Regulatory; Planning	Implemented (2007-2020)	Ministry of Environment; Ministry of Energy; Private sector	-	-	-	-
Biodegradable municipal waste handling	Lowered amounts of landfilled of biodegradable municipal waste ensuring that biodegradable municipal waste would make not more than 50% until 2013 and not more than 27% until 2020, if compared with the year 2000 quantities of the biodegradable municipal waste.	CH_4	Regulatory	Implemented (2013-2020)	Ministry of Energy; Ministry of Environment	359	538	-	-
Biodegradable municipal waste handling	Collection and use of methane from all existing and new landfills	CH_4	Regulatory	Implemented (2013-2020)	Ministries of Energy and Environment	1 440	1 940	-	-
Decreasing the amount of biodegradable waste in landfills	National Waste Management Plan for 2014-2020 sets the goal by the 2030 that	CH_4	Regulatory	Implemented (2014-2020)	Ministry of Environment; Regional Waste	-	538	-	-

		approximately 100 000 t of green waste will be composted.				Management Centres					
Circular package	economy	To reduce GHG intensity of production of goods (sustainable waste management	CH_4; CO_2	Regulatory	Implemented (2016-2030)	Ministry of Environmenr; Municipalities	-	74	260	-	

3.5. Effect of policies and measures on longer term trends

Lithuania believes that policies and measures described in Chapter 4 are modifying long-term trends in anthropogenic GHG emissions and removals, consistent with the objective of the EU commitments and agreements.

Lithuania is aware of the importance of setting long-term goals and actively trying to achieve them. A large proportion of current climate and energy policies also contribute to the reduction of GHG emissions in the longer term. For example, buildings have long lifetimes, and therefore, the regulations for the energy efficiency of new and existing renovated buildings have long-lasting impacts. Also the improving possibilities for cycling and using public transportation increase CO_2 emissions from transport sector. Lithuania's renewable energy share, expressed in percentage of gross final energy consumption, was 25.46% in 2016, above its 2020 target of 23%. This good performance was driven mostly by the heating sector, where the share of renewables reached 46%, as opposed to a 39% renewables share anticipated for 2020 by Lithuania's National Renewable Energy Action Plan. This reflects a strong growth during the last five years in the deployment of biomass via new investment in district heating and cogeneration, also helping raise the renewables shares in electricity production.

Renewed National Energy Independence Strategy (NEIS), which was endorsed by Government on 29 November 2017 and will be approved by Parliament (Seimas), sets ambitious gross of the final RES energy consumption targets 45% until 2030 and 80% until 2050 and energy efficiency targets: to reduce primary and final energy intensity by 1.5 times till 2030 and 2.4 times till 2050, compare with 2017 level; to save 2,6-3 TWh energy in modernized multi-apartment and public buildings by 2020 and 5-6 TWh energy by 2030; in industry sector to reduce electricity consumption by 1 TWh till 2030.

Measures that promote investments in renewable energy and energy efficiency are the mostly contributed towards transition to low carbon development in all economy sectors in the longer term.

Furthermore waste recycling, the disposal of biodegradable waste on landfills can be expected to lead to permanent changes in current practices, and therefore to yield permanent emission reductions.

F-gases Regulation EU No 517/2014 implementation creates controls of fluorinated GHG and sets the opportunity to reduce emission reductions.

Macroeconomic, environmental, social impacts (in terms of costs and benefits as well as cost-effectiveness) of the planned policies and measures

Based on data, provided in the Commission impact assessment accompanying "A policy framework for climate and energy in the period from 2020 up to 2030", implementation of Lithuania's GHG emissions reduction target will cost annually from 0.39% to 0.91% of GDP depending on the range of percentage of RES in final energy demand and energy efficiency improvement, at the same time it will allow to save from EUR 2.9 till 4.7 billion for the purchasing fossil fuels, in comparison with oil prices in 2014, in the period 2021-2030.

In 2015 Study for the evaluation of the effects, benefits and costs for Lithuania by implementing the EU climate and energy policy targets till 2030 under the identified the most cost efficient GHG emissions reduction scenario including the measures for both ETS and non-ETS sectors in Lithuania has led to the total costs to EUR 7 569 million, and would amount the reduction of GHG emissions by 1 382.7 kt CO_2 eq. in the period of 2021-2030. The following estimation are provided for the different economy sectors:

- **For electricity production sector** the total installed capacity of wind power plants in 2030 would make 1 000 MW with another 350 MW to be derived from biomass cogeneration plants. Total investments are planned for EUR 890 million. Total GHG emissions in electricity production sector in 2030 would be **116 644 t CO_2 eq**.
- **For heat production (DH) sector** 80% of heat energy would be generated from RES and municipal waste incineration. An overall need for bio-fuel boilers to be installed after 2020 would make 106 MW. Total investment sum is anticipated for EUR 37 million. Total GHG emissions in heat production (DH) sector in 2030 would be **526 084 t CO_2 eq**.
- **In transport sector** the main measures projected include the development of ecological driving skills and habits, and renewal of the available vehicle fleet. Introduction of both measures in the transport sector would result in more efficient fuel consumption. Total investments are planned for EUR 760 million. Total GHG emissions in transport sector in 2030 would be **4 865 029 t CO_2 eq.**
- **In industrial sector** it is foreseen that the final energy consumption in 2030 would make 910 ktoe (in 2005 it was 942.5 ktoe or was by 4% higher than expected in 2030), and an overall use of RES would amount to 15%. Total investments are planned for EUR 750 million. Total GHG emissions in industrial sector (excluding GHG emissions by industrial processes) in 2030 would be **1 056 252 t CO_2 eq.**
- **In services sector** it is projected that the final energy consumption in 2030 would be 630 ktoe (in 2005 it was 569.3 ktoe or was by 10% lower than planned for 2030), and a share of RES would make 10%. Total investments are planned for EUR 630 million. Total GHG emissions in services sector in 2030 would be **394 283 t CO_2 eq.**
- **In household** sector the final energy consumption for 2030 is anticipated to amount to 910 ktoe (in 2005 it was 1 386.3 ktoe or was by 52% higher than expected in 2030), and a share of RES would make 39%. Total investments are planned for EUR 4 180 million. Total GHG emissions in household sector in 2030 would be **268 373 t CO_2 eq**.
- **In agricultural** sector the implementation of numerous GHG emissions reduction measures is foreseen (in agronomy, cattle rearing, and biogas collection, and agrarian environment protection). Total investments are planned for EUR 132 million. Total GHG emissions in agricultural sector in 2030 would be **4 395 300 t CO_2 eq.**
- **For other sectors** no additional measures to reduce GHG emissions are planned.

All non-ETS sectors will have to duly contribute for the purpose of achieving the GHG emissions targets. Moreover, the most GHG emissions reduction-efficient sectors have been identified: transport and agricultural sectors. Eco driving is considered the most effective measure for GHG emissions reduction in transport sector with the effectiveness of the reduced GHG emissions totalling in 9.2 EUR/tCO_2/year. The most effective measure for GHG emissions reduction in agriculture would be the construction of biogas plants with the effectiveness of the reduced GHG emissions totalling in nearly 59.6 EUR/tCO_2/year.

Implementation of this scenario would also lead to reaching an advantageous effect from the social standpoint, which would be reflected in the creation of new 550 jobs due to use of RES and 1 000 jobs due to implementation additional measures in transport sector. In the period of 2021-2030 EUR 40.5 million might be received from labour taxes and reduced amount of fossil fuel by 190 ktoe in transport, which would allow to save EUR 752 million for the oil import. Reduced amount of GHG emissions at the same time would lower air pollutants influencing health benefits. Reduction of a share of fossil fuel in the

import balance would enable extra savings thus making the investments into the proposed scenario more attractive and also achieving an optimal level of GHG emissions reduction.

3.6. Use of Kyoto mechanisms

Kyoto mechanisms allowed for Lithuania to meet its national emission reduction commitments of the Kyoto Protocol. The Kyoto Protocol introduced three market-based mechanisms: clean development mechanism (CDM); joint implementation (JI) and emissions trading. Use of Kyoto mechanisms must be supplemental to domestic action to achieve KP targets. These mechanisms are referred to as flexible mechanisms.

Certified emission reduction (CERs) units from the clean development mechanism and emission reduction (ERUs) units from JI projects, can be used to achieve the targets under the EU ETS and EU Effort Sharing Decision (with limitations).

In 2008-2012 there were implemented 11 Joint implementation projects related to GHG emissions reduction in electricity sector (10 wind power parks, 1 landfill biogas use for heat and electricity production) and the estimated GHG emissions reduction during whole period is 864 kt CO_2.

Together with the implemented JI projects during 2008-2012 period in Lithuania 64 wind power plants (total capacity 183.8 MW) had been installed (in 2002-2012 period there were 78 operating wind power plants in Lithuania with an installed capacity of 234.8 MW). And during the period 2003-2012 totally 20 biogas plants had been installed in Lithuania with the capacity of 20.32 MW.

GHG emissions reduction due to the 2 JI projects of N_2O emissions reduction in chemical industry amounts to 7 643 017 t CO_2 eq. Thus, without the implementation of these projects in 2013 the ETS sector‘s verified emission could be 1.2 million t CO_2 eq. higher (8.7 million instead current 7.5 million t CO_2 eq.).

Lithuania’s total greenhouse gas emissions in the 2008-2012 commitment period were 109 786 321 t CO_2 eq., approximately 52 per cent lower than the assigned amount, which was 227 306 177 tonnes CO_2 eq. The total amount of Kyoto Protocol units retired in the first commitment period is 109 786 321. Lithuania has requested 71 822 887 AAUs, 246 966 CERs and 2 327 000 ERUs to be carried over to the second commitment period of the Kyoto Protocol.

According to projections “with existing measures” (WEM scenario) for 2020, Lithuania’s Kyoto target for the second commitment period will be met entirely by domestic actions.

3.7. Information on changes in domestic institutional arrangements

In Lithuania, climate policy is integrated with the decision-making processes in energy, transport, agriculture, waste, forestry and land-use sectors and territorial planning. Issues related to development and implementation of the climate change policy are carried out by Ministry of Finance, Ministry of Energy, Ministry of Economics, Ministry of Transport and Communications, Ministry of Agriculture, Ministry of Health, Ministry of Interior, Ministry of Foreign Affairs, Ministry of Education and Science and institutions supervised by the relevant ministries.
Lithuania has not made any major changes in the domestic institutional, legal, administrative and procedural arrangements for domestic compliance, monitoring, reporting and archiving of information

and evaluation of the progress towards emissions reductions obligations and targets since the submission of Lithuania's Second Biennial Report. Institutional arrangements are described in Lithuania's 7th National Communication Chapter 4.

The improvement and further development of the national system on reporting of PaMs and projections were implemented within the framework of the Norway Grants partnership project **"Cooperation on GHG inventory and projections development**" between Lithuania and Norway under the programme No 25 „Capacity-building and institutional cooperation between beneficiary state and Norwegian public institutions, local and regional authorities". The partner of this programme was Norwegian Environment Agency, which is the national entity responsible for development of climate and environmental policy in Norway.

The objective of this partnership project was capacity building and improvement of Lithuania's national system for the preparation of the GHG inventory and projections to comply with the relevant the EU, the UNFCCC and the Kyoto Protocol reporting requirements.

Project participants exchanged experience in the preparation of the GHG emission projections with the Norwegian colleagues and the study on assessment of Lithuania's national GHG projections reporting system and Methodological guidance for the preparation of national greenhouse gas emission projections in different economy sectors has been developed. During the project the assistance from the Norwegian experts in improving of the national system for the reporting on GHG emission projections as well as proposals on fulfilment of the relevant the EU and the UNFCCC reporting requirements on GHG emission projections were received. Evaluation and implementation of the recommendations on the national system improvement ensure the quality of GHG emission projections report and its compliance with the relevant requirements. Project activities were implemented during the period 2015-2016 and were finalized by 1st of January 2017.

The exchange of experience in the preparation of the GHG emission projections with Latvian and Estonian colleagues and increase the quality of GHG inventory reports and projections through knowledge and experience sharing was initiated through the project **„Baltic Expert Network for Greenhouse Gas Inventory, Projections and PaMs Reporting (BENGGI)",** which was implemented during the years 2016-2017. Baltic countries share similar natural, economic, social and political conditions that influence GHG projections calculations and reporting procedures. The goal of the Project is to establish a network between Baltic state GHG inventory and projections experts in order to improve the national system for preparing, analysing and reporting high quality information to the GHG inventory, policies, measures and projections and to comply with the relevant UNFCCC and Kyoto protocol reporting requirements. Networking allows acquiring necessary knowledge and sharing experience between experts.

The European Commission has launched a voluntary **project to assist Member States in developing and improving national GHG projections.** The project was led by the contractor ICF, with the support of Aether, E4SMA, and IIASA. The project aimed at providing technical assistance and capacity building support to selected 10 Member States with identified potential for improving their projections as required under the MMR. Initial analysis has indicated that Lithuania may benefit from technical support for agriculture, LULUCF, waste sectors from the project team. This technical support was implemented through workshop, technical exchange between MS experts and experts of the project team. MS receiving

support include Bulgaria, Croatia, Cyprus, Hungary, Lithuania, Malta and Romania. Project activities were implemented during the period 2016-2017 and were finalized by September 2017.

3.8. Estimates of emission reductions and removals and the use of units from the market-based mechanisms and land use, land-use change and forestry

Lithuania's total national greenhouse gas emission excluding the LULUCF sector are presented in the CTF Table 4. In Lithuania emissions have decreased by 12.88% between 2005 and 2015 based on data of National GHG inventory report 2017. According to 2020 "with existing measures" (WEM) projections, Lithuania is on track to reach its 2020 target, with more than 7% reduction as compared to 2005. Lithuania as a Member State with a positive limit under Annex II of ESD over the years 2013-2015 was in compliance with AEAs targets and based on the Lithuanian GHG emissions projections there will be no shortage of the AEAs during remaining years of the commitment period. The progress made in achieving ESD target is illustrated in the Table 3-11.

Table 3-11. Lithuania's ESD annual emission allocations 2013-2020 and actual ESD emissions, tonnes CO_2 eq.

	2013	2014	2015	2016	2017	2018	2019	2020
ESD annual emission allocations*	12.936.664	13.297.646	13.658.629	14.019.611	14.125.626	14.497.103	14.868.581	15.240.059
Actual ESD emissions	12.449.462	12.922.268	13.250.961	-	-	-	-	-

*AEAs including adjustments in Commission Implementing Decision 2013/634/EU and Commission Decision (EU) 2017/1471

In Lithuanian there is no intention to use credits from market-based mechanisms for the compliance with ESD 2020 target. However, in case of shortage of AEAs, Lithuania primarily plans to use a possibility to carry over (i.e. to borrow) the lacking part of the AEAs from the forthcoming year, if GHG emissions in current year exceed the amount of AEAs for that year.

The emissions from the LULUCF sector are not included in the EU joint target, or Lithuania's contribution to the emission reduction under this target under the UNFCCC, and therefore not given in the CTF Tables 4and 4(a)I but are presented in CTF Table 1. The Land Use, Land-Use Change and Forestry (LULUCF) sector for 1990-2015 as a whole acted as a CO_2 sink except in 1996 and 1997 when emission constituted to 1 516 kt CO_2 eq. and 142.8 kt CO_2 eq. That is explained by sudden spruce dieback that caused huge losses in trees volume, in Lithuania's spruce stands, which has direct impact on biomass calculations and on CO_2 balance from this sector.

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PROJECTIONS

4. PROJECTIONS

4.1. Greenhouse gas emissions projections

This chapter provides information of future trends in GHG emissions and removals in Lithuania, given current national circumstances and adopted and implemented policies and measures described in Chapter above.

Projections of GHG emissions have been calculated according to Methodological guidance for the preparation of national GHG emission projections, prepared in 2016 by Lithuanian energy institute. The Methodological guidance for the preparation of GHG emission projections is based on an integrated approach to the long-term development of the economic sectors, with account of the EU climate change and energy objectives by 2030 and targets by 2050, and also on the existing situation and possibilities.

Only activate existing measures allowed the modelling of scenarios 'with existing measures' (WEM) related to climate change mitigation. Activating the planned measures also allowed modelling scenarios 'with additional measures' (WAM) (along with existing measures) related to climate change mitigation.

Projections as well as policies and measures are divided into the following reporting categories: energy, industrial processes, agriculture, land use, land use change and forestry (LULUCF) and waste.

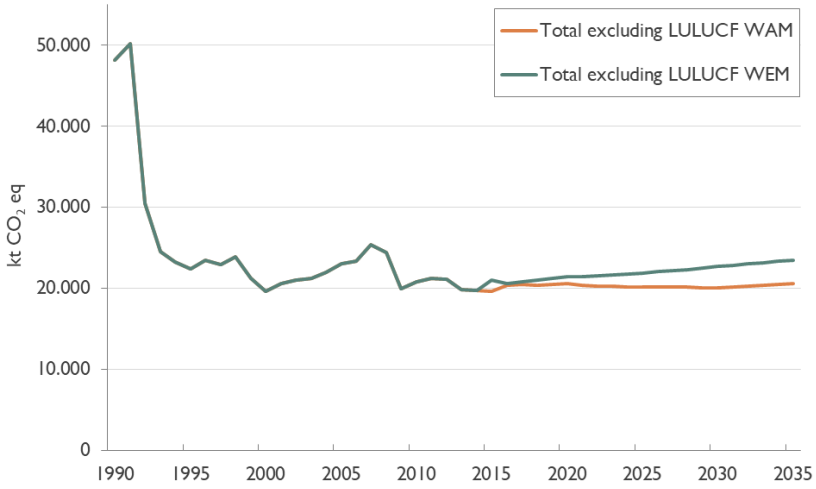

Figure 4-1. Aggregated projected GHG emissions by 2035, kt CO_2 eq.

Table 4-1. Projected GHG emissions in case of WEM scenario, kt CO_2 eq.

Sector	2015	2020	2025	2030	2035
Energy	11 050	11 758	12 109	12 872	13 582
IPPU	3 455	3 945	3 781	3 743	3 738
Agriculture	4 664	4 989	5 044	5 093	5 160
LULUCF	-7 937	-7 954	-7 972	-7 990	-8 006
Waste	1 009	638	491	427	430
Total excl. LULUCF	20 178	21 330	21 425	22 136	22 910
Total incl. LULUCF	12 241	13 376	13 453	14 147	14 904

Table 4-2. Projected GHG emissions in case of WAM scenario, kt CO_2 eq.

Sector	2015	2020	2025	2030	2035
Energy	10 636	9 306	8 928	8 734	8 934

IPPU	3 455	3 945	3 781	3 743	3 738
Agriculture	4 664	4 989	5 044	5 093	5 160
LULUCF	-8 485	-8 653	-8 821	-8 989	-9 157
Waste	1 009	634	470	374	336
Total excl. LULUCF	19 764	18 875	18 223	17 945	18 167
Total incl. LULUCF	11 279	10 222	9 402	8 956	9 011

Implementation of the additional measures would lead to reaching an advantageous effect from the social standpoint, which would be reflected in the creation of new jobs, improvement of life quality, competitiveness, saving financial resources for the purchasing of imported fossil fuel. GHG emissions projection suggests that an increasing demand in energy will result in increasing GHG emissions. Although, existing measures will lessen this increase, the implementation of additional measures could result in lower GHG emissions in 2035 if compared between WAM and WEM scenarios.

4.1.1. Energy

Lithuanian energy institute performed Lithuanian energy sector development analysis in 2014. The main assumptions of this scenario is that the implementation of main energy efficiency initiatives, use of RES, increase in use of co-generation of heat and electricity.

The main scenario assumes successful implementation of mentioned measures would result that final energy consumption in industry would increase by 0.9% up to 2030 and by 0.7% after the year 2030. Same tendencies were applied for construction sector. Energy consumption in residential sector would increase by 0.7% yearly up to 2035. In Commercial/Institutional sector the increase would result in a yearly 0.9% up to 2030 and 0.7% up to 2035. Agricultural, forestry and fisheries sectors final energy consumption would remain the same as in 2015. Fuel demand for house heating will decline due to the increased fuel efficiency, renovation of residential and public buildings and modernization of heating systems and combustion equipment.

According to the Lithuanian energy sector development analysis in average electricity demand will increase 2.0% up to 2030 and thereafter 1.5% up to 2035 and would reach a total of 13 545 GWh by 2035, which may influence slight increase of GHG emissions in energy sector.

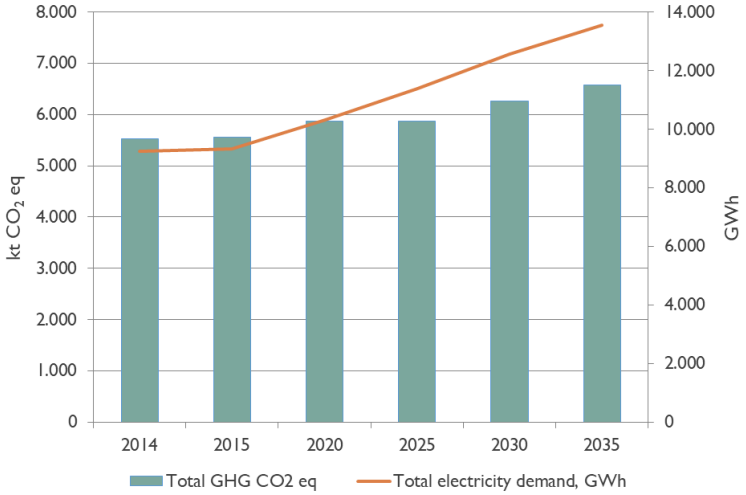

Figure 4-2. Projected total electricity demand and GHG emissions in Energy sector (without transport sector)

It is estimated that the Public electricity and heat production, Manufacture of solid fuels and Residential sectors will remain the main sources of GHG emissions in energy sector.

Historical and projected GHG emissions 1990-2035 from energy subsectors, kt CO_2 eq. (excluding transport sector)

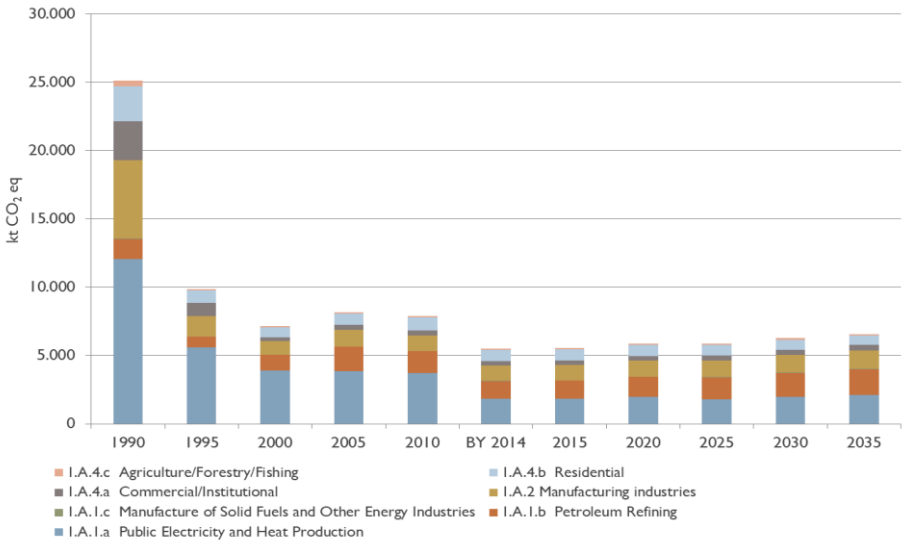

Figure 4-3. Historical and projected GHG emissions, kt CO_2 eq. (excluding transport sector)

Compared to 2014 the GHG emissions will overall increase in all sectors except in Residential sector were buildings renovation program is currently taking place. It was estimated that increased energy consumption efficiency and use of biomass will decrease the use of fossil fuel and final energy consumption by 13.7% in 2035 which will lead to decrease in GHG emissions in this sector.

In energy sector GHG emissions are estimated to reach a total of 6 574.3 kt CO_2 eq. in 2035. Most of the GHG will originate from Public electricity (31.9%), Petroleum refining (29.2%) and Manufacturing industries (20.2%). Manufacture of solid fuels and other energy industries and Agriculture/Forestry/Fishing sectors are still expected to remain the smallest GHG emissions of energy subsectors.

The biggest potential for reducing GHG emissions is expected in the EU ETS sectors and mainly the public electricity and heat production sector. These sectors are currently undergoing a trend of switching fossil fuel to use of biomass. Same trends are seen in other energy and industry sectors. This change is mainly caused by the increase of the EU ETS carbon price which according to the Commission recommended parameters will increase up to 42 EUR/tonne CO_2 eq. in 2035. For scenario with existing national and EU policies and measures of GHG emissions projections it was assumed that the EU ETS carbon price will remain at the same level as in 2014 (6.37 EUR/tonne CO_2 eq.).

Methodologies and key assumptions

Energy sector constitute of six main subsectors (*Energy Industries, Manufacturing Industries, Transport, Other sectors, Fugitive emissions from fuels and other*) from which GHG emissions are projected. GHG emissions projections from transport sector will be reported separately in the chapter.

4.1.2. Transport

Road transport sector is the main source of GHG emissions (approximately 92% of total transport sector emissions) and fuel consumer in transport sector. It was assumed that GHG emissions in road transport sector are directly linked with fuel consumption which is influenced by the numbers of cars registered in Lithuania. The total number of cars registered in Lithuania was linearly interpolated according to historic data from 2005 to 2014 available from the State Enterprise "Regitra". It was projected that the total number of cars (including passenger cars, light and heavy duty vehicles and motorcycles) will reach 1 917 113 units in 2035. Projected number of vehicles registered and GHG emissions in road transport sector provided in figure 4-4 below.

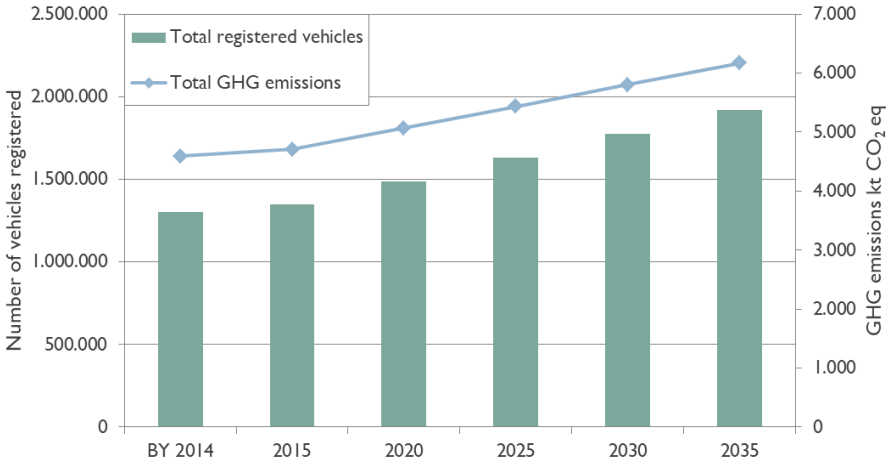

Figure 4-4. Projected number of vehicles registered and GHG emissions in road transport sector

Road transport sector is projected to remain the main gasoline and diesel oil consumption source in transport sector. According to the projected data the gasoline and diesel oil consumption in this sector will increase accordingly by 71% and 14% by 2035.

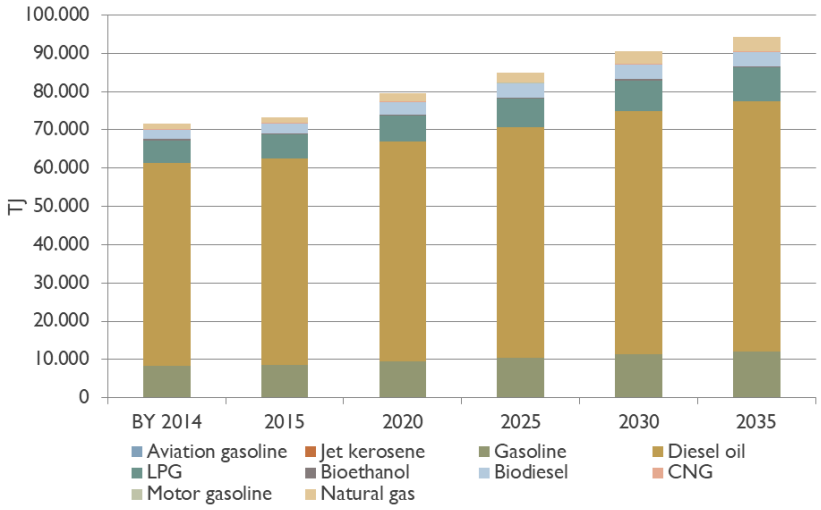

Figure 4-5. Projected fuel consumption and GHG emissions in road transport sector

According to the projected data on number of the registered vehicles in Lithuania the fuel consumption in road transport would increase from 65 721 TJ in 2014 to 88 848 TJ in 2035.

With existing national and the EU policies and measures GHG emissions from transport sector are projected to increase up to 6 710.1 kt CO_2 eq. in 2035. Compared to 2014 the GHG emissions from this sector will increase 1.38 times. The increase of GHG is mostly stipulated because of the increased use of fossil fuel in road transport and transportation in pipelines due to increased need of natural gas.

Figure 4-6. Projected total GHG emissions in transport sector

The main GHG emissions source in transport sector will remain road transport sector followed by transportation in pipelines sector. In civil aviation subsector it is estimated that the GHG emissions would increase 2.24 times, but this sector will remain a minor source of GHG emissions as there are only 10 aircraft operators that have valid licence issued to perform air communication in Lithuania. Most of the flights performed by the Lithuanian aircraft operators are international.

Railways sector is projected to emit less amounts of GHG in 2035 (141.7 kt CO_2 eq. and decreased 27% compared to 2014). This is due to the fact that the fuel consumption in railways would decrease 25.69% and an increase in use of biodiesel in this sector.

Transport sector is less affected by the EU ETS carbon price as in current situation only aviation sector is involved in the EU ETS market. In Lithuania there are several aircraft operators that fall under the scope of the EU ETS and according to the latest data from EUROCONTROL only one aircraft operator was not considered as small emitter in 2015 (emitted more than 55 493 t CO_2 per year).

Methodologies and key assumptions

The projections were carried out by firstly determining the consumption of each fuel type in every subsector (Civil aviation, Road transportation, Railways, Water-borne navigation, other transportation) up to the year 2035. As the GHG emissions are directly linked to the fuel consumption through specific fuel emission factors, knowing the fuel consumption during the specific time period would enable simplified calculation of the GHG emissions.

4.1.3. Industrial processes and product use

The GHG emissions projections from industrial processes and product use with existing policies and measures were estimated using projected production levels data (activity data) by 2035 provided by the main emitters in this sector: clinker, lime, glass, ammonia and nitric acid producing companies. Emissions from these industries covered up about 83% of total industrial processes and product use sector emissions in 2014.

The GHG emissions in industry sector are determined by technology processes and notable emission reduction per production output is hardly possible. Therefore, it is expected that GHG emissions will grow together with increasing industrial production. The projected emissions from industrial processes and product use are presented in figure below:

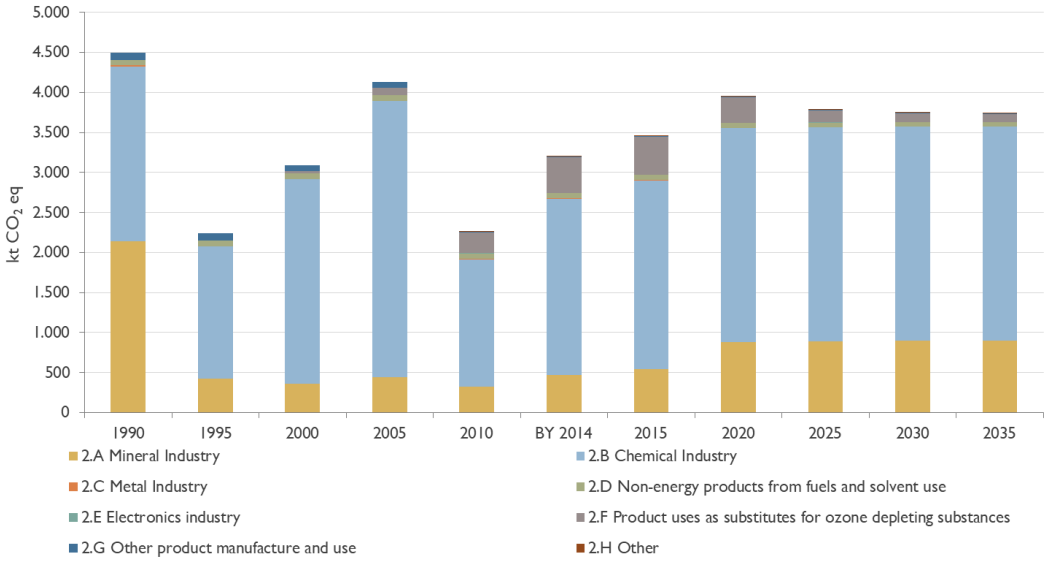

Figure 4-7. Historical and projected GHG emissions in industrial processes and product use sector

The main GHG emissions source in industrial processes and product use sector remains nitric acid and ammonia production. Based on data from chemicals company the GHG emissions trends will remain stable in a period of 2020-2035 due to constant production capacity.

The projections on of F-gases emissions for most sub-categories were based on 1990-2014 emissions trend taking into account growth rates for the different sectors and by including relevant technological improvements and taking into account the impacts of the F-gases Regulation (EU) No 517/2014 implementation (introduced restrictions/controls of the use and introduction of quotas for placing on the market hydrofluorocarbons).

Emissions from domestic refrigeration equipment are expected to decline in 2020-2035 due to EU wide measures and technical changes resulting in decreased leakage. Due to the ban on HFCs with GWP of 2 500 and more to service or maintain refrigeration equipment in domestic refrigerators and freezers the use of (and thus emissions from) HFCs in domestic refrigeration will be phased out gradually and that mainly emissions from disposal will occur. Implementation of F-gases quota system will reduce amount of HFCs placed on the market by 79% between 2015 and 2030. Taking into account these assumptions, it is predicted that in 2035 emissions from commercial and industrial refrigeration sectors will account only 11% compared to F-gases emissions in these sectors in 2015. The emissions from mobile air-conditioning will decrease also taking into account implementation of EU MAC Directive, which prohibits the use of F-gases with GWP of more than 150 in new types of cars and vans introduced from 2011, and in all new cars and vans produced from 2017. Emissions from foam blowing are expected to decrease due to reduced use and emissions from metered dose inhalers will decline due to decrease of population.

Methodology and key assumptions

The GHG emissions projections from industrial processes and product use with existing measures were estimated using projected production levels data (activity data) by 2035 provided by the main emitters in this sector: clinker, lime, glass, ammonia and nitric acid producing companies. The projections of GHG emissions were estimated by applying emission factors taken from Methodological guidance for the preparation of national GHG emission projections prepared by Lithuanian Energy Institute in 2016.

4.1.4. Agriculture

Projections of GHG emissions from agriculture sector with existing policies and measures (WEM) are based on forecasted livestock population, main harvested crops and area harvested, the amount of sold limestone materials, consumption of inorganic N fertilizers and application of urea.

Livestock populations

It is projected that dairy cattle population will decrease by 22% from 315 thousand heads in 2014 to 236 thousand heads in 2030. This decrease is mainly associated with increasing productivity (increase in milk yield).

Population of non-dairy cattle will be constantly increasing: from 2014 to 2015 by 4%; during the period 2015-2020 by 20%, and from 2020 to 2030 – 16%. For the period 2031-2035 average annual growth of 1.5% was applied (1.5% increase represents average non-dairy cattle population increase during the period 2025-2030 each year).

Population of swine will be decreasing during the whole period. Swine population from the base year (2014) until 2020 will decrease by 14%. From 2020 to 2030 swine population will decrease by 1%. It is projected that poultry population will increase about 5% from 2020 to 2030.

Taking into account livestock population developments, it is projected that CH_4 emissions from enteric fermentation during the 2015-2035 period will increase about 5%. Slight decrease of CH_4 emissions from enteric fermentation can be seen from the base year (2014) to 2020. It is projected that emissions from enteric fermentation could decrease 1.2% in 2020 compared to the base year. The share of CH_4 emissions from livestock enteric fermentation generated by different livestock categories is presented below.

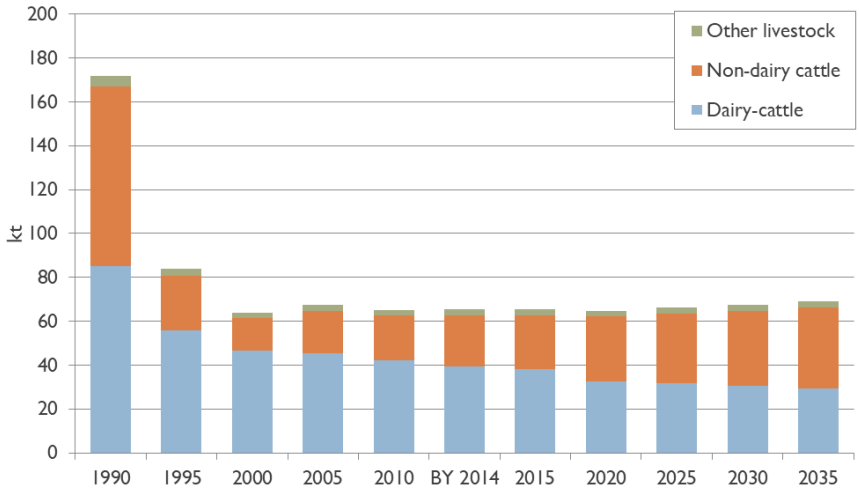

Figure 4-8. Historical and projected CH_4 emissions from enteric fermentation

In the base year (2014) the majority of these emissions comprised from dairy cattle enteric fermentation – 60%. It is projected that the share of non-dairy cattle CH_4 emissions from enteric fermentation will be increasing from 36% in 2015 to 53% in 2035.

It is projected that CH_4 emissions from manure management during the 2015-2035 period will vary slightly. Decrease of CH_4 emissions from manure management can be by 7% in 2020 compared to 2014. From 2020 to 2030 it is projected that CH_4 emissions will increase by 4% and by 2% in 2035. Historical and projected CH_4 emissions from manure management are presented below.

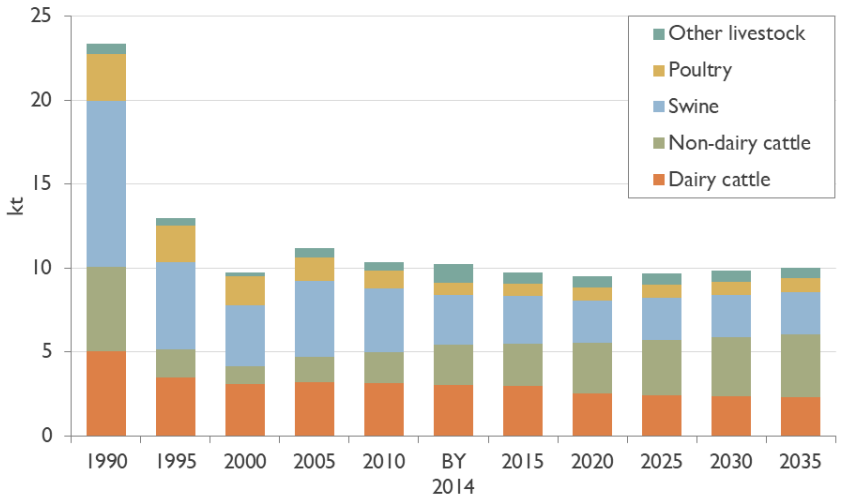

Figure 4-9. Historical and projected CH_4 emissions from manure management

It is projected that total direct and indirect N_2O emissions from manure management will increase by 2% in 2020 compared with the base year (2014). From 2020 to 2035 emissions will increase by 3.2%. Historical and projected direct and indirect N_2O emissions from manure management generated by different livestock categories is presented below:

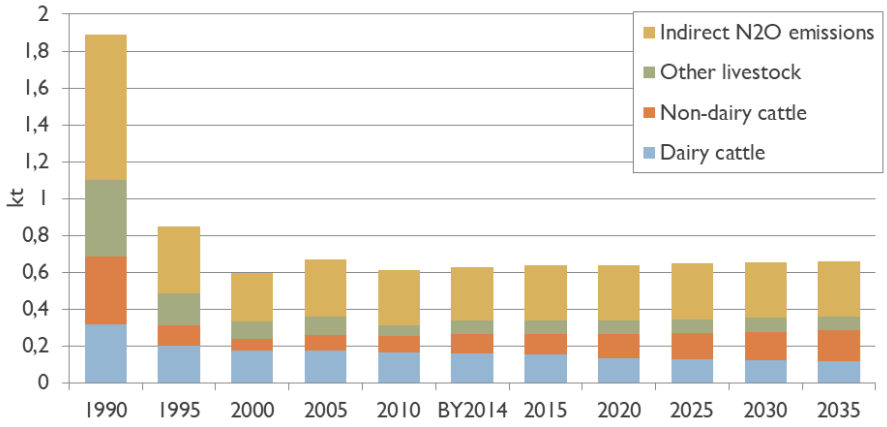

Figure 4-10. Historical and projected direct and indirect N_2O emissions from manure management

Crop residues projections

It is projected that crop yield will be increasing by reducing crops cultivation in less fertile areas and implementing intensive growth technologies in specialized more efficient (fertile) soil farms. Crop yield will be also increasing due to concentration of farms in the lands of middle Lithuania, the rise of farming culture, implementation of new technologies and best practice of the EU. The projected activity data of harvested crops and area of crops harvested for the year 2020 and 2030 presented below in the table:

Table 4-3. Projected amount of crops harvested and area harvested

Activity data	2014	2015	2020	2025	2030	2035
Harvested crops (thous. tonnes)						

Wheat	1 708	2 890	4 542	4 576	4 611	4 646
Triticale	395	434	528	532	536	541
Barley	1 019	912	897	904	911	918
Rye	85	118	168	169	171	172
Oats	184	256	365	368	371	373
Rape	286	362	460	465	470	475
Peas	101	213	357	375	393	412
Beans	63	137	233	245	256	268
Sugar beet	1 014	897	850	855	860	860
Potatoes	469	434	255	258	260	262
Vegetables	275	267	275	280	285	290
Area harvested (thous. ha)						
Wheat	355	615	884	893	902	911
Triticale	120	111	103	104	105	106
Barley	267	220	175	176	178	180
Rye	38	35	33	33	33	34
Oats	76	73	71	72	73	73
Rape	104	129	155	156	158	160
Peas	41	98	156	158	159	161
Beans	22	45	70	71	71	72
Sugar beet	17	17	17	17	18	18
Potatoes	27	25	18	18	18	18
Vegetables	12	12	12	13	13	13

Increase of direct and indirect N_2O emissions from agricultural soils by 5.7% from 2014 to 2015 and by 13% from 2015 to 2020. From 2020 to 2035 the expected increase in N_2O emissions from agricultural soils is about 0.7% every 5 years.

The share of the total N_2O emissions from agricultural soils categories is presented below:

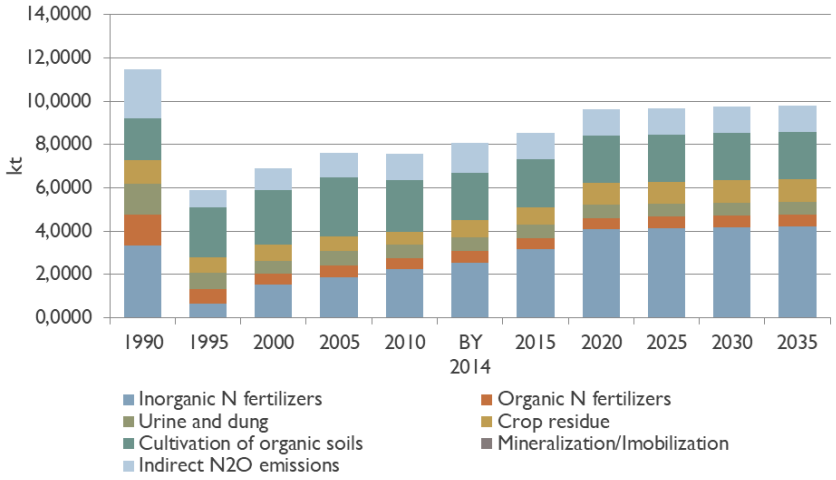

Figure 4-11. Historical and projected emissions from agricultural soils categories

Inorganic N fertilizers projections

Projections of inorganic N fertilizers consumption was based on the projected harvest of the crops.

Consumption of inorganic N fertilizers will be increasing during the projected period. The biggest increase is expected in 2014-2020 period where inorganic N fertilizers consumption will increase 60%. Afterwards slight increase in inorganic N fertilizers consumption is projected. The increase of inorganic

N fertilizers consumption is strongly related with increase in crop yield. Urea application projection is related to the projection of inorganic N fertilizers (estimated as average (2010-2014) percentage of urea in total amount of inorganic N fertilizers).

Table 4-4. Projected amount of inorganic N fertilizers consumption, kt N

Activity data	2015	2020	2025	2030	2035
Inorganic N fertilizers	201	260	262	265	267
Urea application	28	36	36	37	37

It is projected that emissions from urea application will increase 1.7 times in 2020. From 2020 CO_2 emissions from urea application will increase slightly by 1% in every 5 years.

Liming materials projections

Consumption of limestone and dolomite will be increasing during 2014-2035 period. Due to currently about 66.5% of soils are acidic, consumption of limestone and dolomite will increase by 28% and 48%, respectively in 2035 compared to the base year (2014).

Table 4-5. Projected amount of limestone and dolomite consumption, tonnes

Activity data	2015	2020	2025	2030	2035
Limestone	73 798	99 738	88 547	66 022	66 283
Dolomite	4 991	5 859	5 964	6 084	6 223

It is projected that CO_2 emissions from liming will increase 1.7 times by 2020 compared to the base year (2014) as more than half of soils in Lithuania are acidic. After 2020 CO_2 emissions from liming will decrease by 10% and by 24% in 2030, a slight increase (0.6%) of CO_2 emissions in 2035 could be observed.

Aggregated emissions

Total GHG emissions from agriculture sector will increase by 3.1% from 2014 to 2015 and will increase afterwards – by 7% from 2015 to 2020, by 1% in 2025 and 2030, and by 1.3% in 2035. The largest source of GHG emissions is agricultural soils, particularly direct soils emissions. The figure below represents GHG emissions trend during the historical and projected period, covering 35 years.

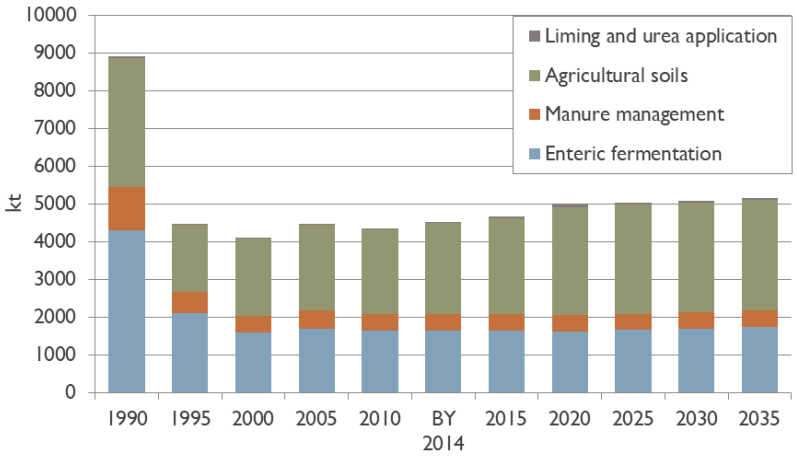

Figure 4-12. Historical and projected GHG emissions from agriculture sector by categories

No additional measures were identified for agriculture sector.

Methodology and key assumptions

Projections of GHG emissions from agriculture sector with existing measures (WEM) are based on forecasted livestock population, main harvested crops and area harvested, the amount of sold limestone materials, consumption of inorganic N fertilizers and application of urea. Forecast of the main data are provided by the Ministry of Agriculture (MoA), Environmental Protection Agency (EPA) and main companies that sell liming products.

4.1.5. LULUCF

About 33.8% (33.5% according to State Forest Cadaster) of Lithuania's land area is covered by forests, 32.8% cropland, 22.6% grassland, 5.2% by wetlands, 5.4% is attributed to settlements. Forest land area should reach 34.2% of the total country area in 2020 as determined in the National Forestry Development Programme for 2012-2020. Due to the implementation of measures for afforestation/reforestation activities, listed in National Forestry Development Programme for 2012-2020 and Interinstitutional action plan on the implementation of the Goals and Objectives of the Strategy for the National Climate Change Management Policy, which contains LULUCF action plan measures under the LULUCF decision No 529/2013/EU, land conversion to forest land will remain as determined in the most recent years of inventory, therefore total forest land area should not increase more than approximately 0.8 thousand ha annually. Felling rates will remain constant and similar as in current situation – 7.3 million m^3 (2010-2014 year data). The full potential of harvesting is not exploited in Lithuania. There could be approximately 9.5 million m^3 harvested each year, however at the moment full harvest potential is not promoted by any specific measures in Lithuania, therefore removals in harvested wood product pool should remain constant as reported in 2014. Current cropland and grassland trend shows that with support from the Rural Development Program (RDP) in agriculture, both crop production and livestock farming are equally important, what means that cropland and grassland will remain constant, as well as share between conversions among these two land use categories. LULUCF sector is expected to act as a net sink until 2035 according to the projections, the main sink remaining forest land (GHG removals in biomass) with projected stable carbon sink in harvested wood products and grassland mineral soils (in the event of conversions from cropland to grassland). The main sources of GHG emissions in LULUCF sector is cropland category, especially emissions from mineral soils after conversion to arable land, and wetlands category, emissions mainly from peat extraction sites. GHG emissions from cropland and wetlands are projected to remain similar as in 2014: 4 385 kt CO_2 eq. and 892 kt CO_2 eq. respectively. It is expected that approximately 8 000 kt CO_2 eq. could be removed in LULUCF sector annually, sector's GHG removals are not projected to increase with the existing measures comparing to the GHG removals in 2014. The impact of implementation of 2013 Wetlands Supplement on emissions and removals from all key categories under WEM scenario was also calculated, assuming that area of drained organic soils in forest land, cropland and grassland will remain stable for the entire projection period. The implementation of 2013 Wetlands Supplement results in significant decrease of total projected GHG emissions under WEM scenario, average annual GHG removals in LULUCF sector key categories will comprise only half of the removals without implementation of Wetlands Supplement – 4 669 kt CO_2 eq.

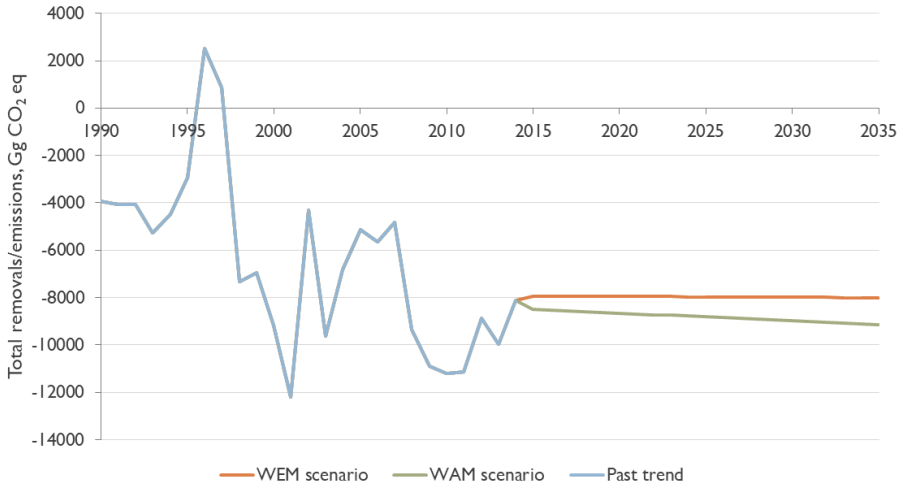

Figure 4-13. Overall historical (1990-2015) and projected (2016-2035) GHG emissions and removals from LULUCF sector

4.1.6. Waste management

Projected amount of generated municipal solid and biodegradable waste (MSW) for period 2015-2020 is provided in the National Waste Management Plan for 2014-2020. The projections on industrial biodegradable and sewage sludge generation are provided for the period 2015-2035 by the Ministry of the Environment. Municipal solid waste and biodegradable MSW generation during the period 2021-2035 was calculated following the increase during the period 2015-2020. Results are shown in the figure 4-14 below.

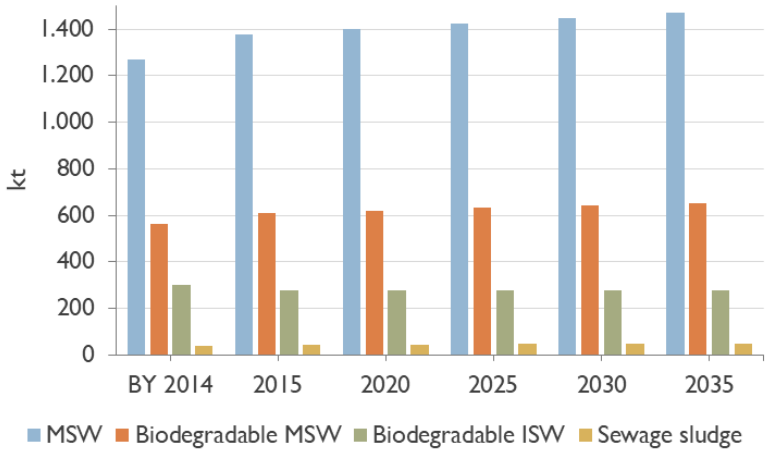

Figure 4-14. Projected amount of generated waste

GHG emissions projections are provided in four subsectors: disposal in landfills, composting, incineration of waste and wastewater treatment and discharge. Compared with 2014 emissions from waste sector will decrease by 57% in 2025 and by 62% in 2035. Historical and projected GHG emissions from waste sector are presented in figure 4-15 below.

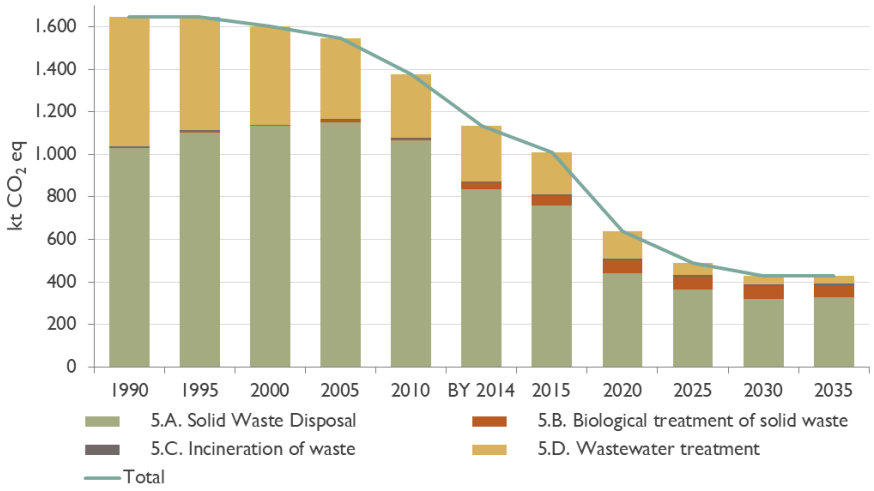

Figure 4-15. Historical and projected GHG emissions from waste sector

Methodologies and key assumptions

Projections of GHG emissions from waste sector with existing measures are based on the National Waste Management Plan for 2014-2020, data provided by the Ministry of Environment, the Environmental Protection Agency and the Regional Waste Management Centres. Projections with additional measures are based on the 2015 Circular Economy Package.

4.2. Assessment of aggregate effects of policies and measures

As an European Union Member State, Lithuania is subject to EU climate policy and thus it applies EU Common and Coordinated Policies and Measures relevant to climate change. Lithuania believes that country's policies and measures modifying long term trends in anthropogenic GHG emissions and removals consist with the objective of the Convention.

Moreover, GHG emissions are inseparable from the long-term development analysis of the economic sectors that meet human needs. GHG emissions projection suggests that an increasing demand in energy will result increasing of GHG emissions. Existing measures will lessen this increase. Total historic and projected GHG emissions in Lithuania are presented in table:

Table 4-6. Actual and projected GHG emissions in case of WEM scenario, kt CO_2 eq.

	2015	2020	2025	2030	2035
CO_2 emissions excl. net CO_2 from LULUCF	13 142	14 429	14 790	15 553	16 264
CO_2 emissions incl. net CO_2 from LULUCF	5 974	6 094	6 437	7 183	7 878
CH_4 emissions excl. net CH_4 from LULUCF	3 376	2 908	2 800	2 774	2821
CH_4 emissions incl. net CH_4 from LULUCF	3 377	2 911	2 803	2 777	2 824
N_2O emissions excl. net N_2O from LULUCF	3 094	3 670	3 681	3 697	3 717

N_2O emissions incl. net N_2O from LULUCF	3 555	4 047	4 059	4 074	4 094
HFCs	478	316	148	105	102
PFCs	NO	NO	NO	NO	NO
SF_6	5.54	5.98	5.98	5.98	5.98
NF_3	0.26	0.50	0.50	0.50	0.50
Total incl. LULUCF	13 391	13 376	13 453	14 146	14 904
Total excl. LULUCF	20 096	21 330	21 425	22 136	22 910

Since Sixth National Communication report Lithuania has improved its estimations for GHG projections calculations. National system on reporting projections were improved within the framework of several experience exchange projects (Chapter 3.7). In the following table difference between projections in Sixth and Seventh National Communication reports is shown:

Table 4-7. Changes in projections since Sixth National Communication report (WEM scenario), kt CO_2 eq

Projections in Sixth National Communication report (using WEM scenario)					
Sector	**2015**	**2020**	**2025**	**2030**	**2035**
Energy	15 592	17 397	19 714	21 964	-
IPPU	6 452	6 936	6 396	6 396	-
Agriculture	6 753	7 369	7 500	7 638	-
Waste	2 667	3 179	3 100	3 058	-
LULUCF	-11 650	-12 000	-12 350	-12 500	-
Total excl. LULUCF	31 464	34 881	36 710	39 056	-
Total incl. LULUCF	19 814	22 881	24 360	26 556	-
Projections in Seventh National Communication report (using WEM scenario)					
Sector	**2015**	**2020**	**2025**	**2030**	**2035**
Energy	11 050	11 758	12 109	12 872	13 582
IPPU	3 396	3 945	3 781	3 743	3 738
Agriculture	4 664	4 989	5 044	5 093	5 160
Waste	1 042	638	491	427	430
LULUCF	-6 705	-7 954	-7 972	-7 990	-8 006
Total excl. LULUCF	20 096	21 330	21 425	22 135	22 910
Total incl. LULUCF	13 391	13 376	13 453	14 146	14 904

Human economic activities are among the key sources of GHG emissions. This is primarily linked with fuel combustion for energy production, but also other processes of human economic activities have a fairly great significance as well. Total projected emissions for year 2030 have decrease by 53% comparing projections in Sixth and Seventh National Communication reports. Noticeable changes are visible in all sectors – in Agriculture, LULUCF, Energy, Industry and Waste management. GHG projected emissions have decreased.

Based on data, provided in the Commission impact assessment accompanying a policy framework for climate and energy in the period from 2020 up to 2030, implementation of Lithuania' s GHG emissions reduction target will cost annually from 0.39% to 0.91% of GDP depending on the range of percentage of RES in final energy demand and EE improvement, at the same time it will allow to save from 2.9 till 4.7 billion EUR for the purchasing fossil fuels, in comparison with oil prices in 2014, in the period 2021-2030.

4.3. Sensitivity analysis

4.3.1. Energy sector

One of the main parameters used to project GHG emissions in Lithuania is annual growth of gross domestic product. It is well known that the growth and expansion of economic activities are directly linked to the consumption of fuel and therefore is influencing GHG emission trends. For the projections of the GHG emission, the annual GDP growth rate was assumed to be 3.5% up to year 2030 and 2.6% thereafter. These assumptions were based on the data provided in the Lithuanian energy sector development outlook analysis in relation to the EU's strategic energy initiatives performed by the Lithuanian Energy Institute in 2015 and data available from the Ministry of Finance of the Republic of Lithuania. Sensitivity analysis focused on GDP growth rate provided from parameters recommended by the European Commission in 2016. The GDP growth rate recommended for Lithuania is presented in Table 4-8.

Table 4-8. European Commission recommended annual real GDP growth rate in Lithuania

	Annual real GDP growth rate (in market prices)			
	2015-2020	**2020-2025**	**2025-2030**	**2030-2035**
EC recommended	2.8%	1.2%	0.2%	0.3%
Used for GHG projections	3.5%	3.5%	3.5%	2.6%

For the purpose of sensitivity analysis it was assumed that changes in GDP will most likely affect energy and industry sectors. Results of GDP sensitivity analysis are presented in Figure 4-16.

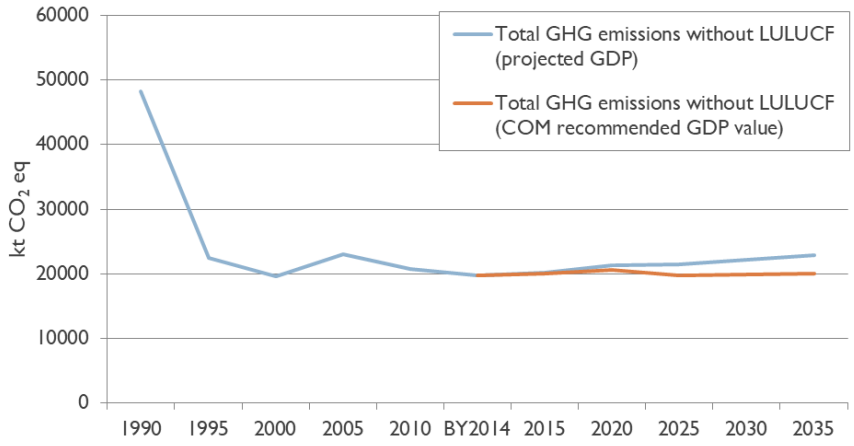

Figure 4-16. GDP sensitivity analysis for GHG emissions

Results of sensitivity analysis show that lower GDP values would result lower GHG emissions in Lithuania. According to performed sensitivity analysis GHG emissions would be lower by 12.37% in 2035 if annual GDP growth rate would be lower than expected (Table 4-9).

Table 4-9. Comparison of GDP sensitivity analysis, kt CO_2 eq.

	2014	**2015**	**2020**	**2025**	**2030**	**2035**
Total GHG emissions excl. LULUCF (Projected GDP)	19 777.7	20 178.0	21 330.3	21 424.8	22 135.6	22 910.2

Total GHG emissions excl. LULUCF (Commission recommend GDP value)	19 777.7	19 988.8	20 559.3	19 751.7	19 924.3	20 075.8
Difference,%	-	0.94	3.61	7.81	9.99	12.37

Another important parameter in preparing GHG emissions projections can be considered the EU ETS carbon price. Most of installations under the EU ETS are local districts heat providers. Over the last few years and from the start of the 3rd EU ETS trading period many smaller installations producing heat energy started to switch from fossil fuel to biomass. This can be explained by the fact that recently the European Commission proposed the EU ETS market back-loading solution to decrease the surplus of EUAs in the market and therefore increase carbon price. Therefore, the switch to biomass may greatly reduce the amount of EUAs needed for installations to cover the GHG emissions or even opt-out from the EU ETS. The EU ETS carbon prices used in sensitivity analysis for the EU ETS sectors are presented in Table 4-10.

Table 4-10. Carbon price used for GHG sensitivity analysis

	Carbon price (in constant €2010/t CO_2)				
	2015	**2020**	**2025**	**2030**	**2035**
Used in GHG projections	6.37	6.37	6.37	6.37	6.37
EC recommended	7	15	22.5	33.5	42

Results of the EU ETS GHG emissions sensitivity analysis are presented in Figure 4-17.

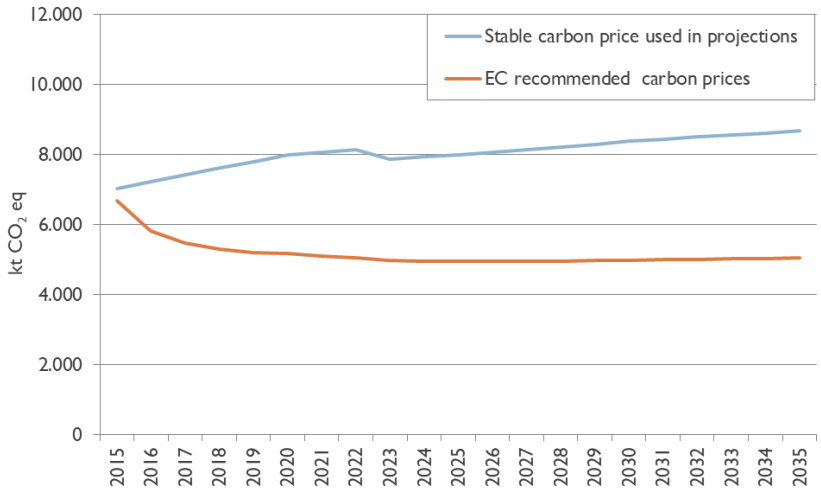

Figure 4-17. Results of carbon price impact on GHG emissions in Lithuania's EU ETS sectors

Sensitivity analysis results showed considerable margin between GHG emissions projected using stable carbon price and increasingly high carbon price in 2035. Huge distinction can be explained due to increase of expenditures for GHG emissions from installations. The operators will most likely consider switching to use biomass instead of fossil fuels. Also it is more likely that those operators will start investing in energy efficiency due to not only increasing fossil fuel prices, but also due to increasing EUAs price.

Results show that because of increase of EUAs price up to 42 EUR/t CO_2 the biggest reduction of GHG will be seen in Public electricity and heat production sectors and in Manufacturing industries and

construction sectors. This is due to the fact that at a current state fossil fuel fired combustion units are still vastly used in these sectors and there is a potential to replace them with biomass using units.

4.3.2. Agriculture sector

For the estimation of GHG emissions projections from agriculture sector livestock population's projections were provided by the Ministry of Agriculture (MoA). However, EPA also received projections on livestock populations from Institute of Animal Science (IAS). Projections on livestock populations from both institutions differ. ISA provided approximate livestock population's projections only for 2030 and noted that more precise projections on livestock populations should be prepared by MoA as it is responsible for the agriculture policy and measures. MoA livestock population's projections calculates according to National livestock sector development program (2014-2020).

Sensitivity analysis has been made on how changes in the projected livestock populations would affect total GHG emissions. Results of sensitivity analysis on the total GHG emissions are provided in the table and figure below.

Table 4-12. Comparison of livestock population's sensitivity analysis, kt CO_2 eq.

	2014	2015	2020	2025	2030	2035
Total GHG emissions excl. LULUCF (data of MoA)	19 777.7	20 177.1	21 329.3	21 423.9	22 134.7	22 909.3
Total GHG emissions excl. LULUCF (data of IAS)	19 777.7	20 177.4	21 330.9	21 351.6	21 988.6	22 738.0
Difference, %	-	-0.001	-0.007	0.338	0.664	0.753

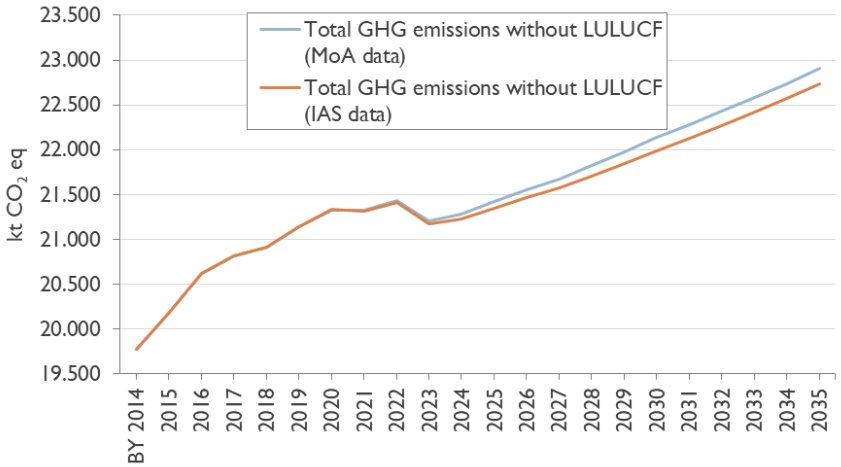

Figure 4-18. Results of livestock populations impact on GHG emissions

4.3.3. LULUCF sector

Sensitivity analysis was performed with the same projection tool for LULUCF sector GHG projections – *LULUCFeat*. Sensitivity analysis results are provided in the table below and include all the parameters

defined as having the most important share for the overall LULUCF sector GHG removals/emissions in the past and projected for WEM and WAM scenarios in the future.

Table 4-13. Sensitivity analysis for the parameters projected for 1990 and 2035

Parameter	WEM scenario		WAM scenario	
	1990	2035	1990	2035
Forest land remaining forest land, area	-71.54	-91.38	-71.54	-68.27
Forest land carbon stock change in living biomass	-66.80	-85.32	-66.80	-62.21
Forest land carbon stock change in dead wood	-4.74	-6.06	-4.74	-6.06
Grassland converted to forest land, area	-6.78	-7.18	-6.78	-8.55
Grassland converted to forest land, carbon stock change in living biomass	-3.86	-4.06	-3.86	-4.84
Grassland converted to forest land, carbon stock change in litter	-2.92	-3.11	-2.92	-3.71
Grassland converted to cropland, area	47.13	35.75	47.13	12.90
Grassland converted to cropland, carbon stock change in mineral soil	46.15	32.56	46.15	11.75
Cropland converted to grassland, area	-20.82	-26.81	-20.82	-49.14
Copland converted to grassland, carbon stock change in mineral soil	-20.82	-26.81	-20.82	-49.14

4.4. Change compared to the Sixth National Communication and the Second Biennial Report

The models and methods used for the projections and impact assessment of policies and measures are described in Chapter 4. The models and methods are the same as those used in preparing the projections for the Sixth National Communication and the Second Biennial Report.

The improvement and further development of the national system on reporting of PaMs and projections were implemented within the capacity-building projects: **"Cooperation on GHG inventory and projections development**", **„Baltic Expert Network for Greenhouse Gas Inventory, Projections and PaMs Reporting (BENGGI)"**, voluntary project to assist **Member States in developing and improving national GHG projections**.

During the Norway Grants project was prepared Methodological guidance for the preparation of national greenhouse gas emission projections in different economy sectors.

Detailed information about changes between Sixth and Seventh National Communications described in Chapter 5 of 7NC.

REFERENCES

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Photo credits: BOD group

PROVISION OF FINANCIAL, TECHNOLOGICAL AND CAPACITY-BUILDING SUPPORT TO DEVELOPING COUNTRY PARTIES

5. PROVISION OF FINANCIAL, TECHNOLOGICAL AND CAPACITY-BUILDING SUPPORT TO DEVELOPING COUNTRY PARTIES

Article 4(1) of the UNFCCC states that all parties shall fulfil their obligations taking into account their common, but differentiated responsibilities. By doing so, the countries should evaluate their specific national and regional development priorities, objectives and circumstances. Lithuania is among the countries listed in Annex I with the specific added condition that the country is undergoing the process of transition to market economy.

Article 4(3) of the UNFCCC (to provide new and additional financial resources to meet the agreed full costs incurred by developing country Parties in complying with their obligations under Article 12, paragraph 1), article 4(4) (to assist the developing country Parties that are particularly vulnerable to the adverse effects of climate change in meeting costs of adaptation to those adverse effects) and article 4(5) (to take all practicable steps to promote, facilitate and finance, as appropriate, the transfer of, or access to, environmentally sound technologies and know-how to other Parties) are applicable to developed countries and countries listed in Annex II of the UNFCCC. Lithuania is not referred to as a developed country listed in Annex II of the UNFCCC.

In December 2009, all Parties of the Convention met in Copenhagen (COP15) and agreed to provide developing countries with new and supplementary, larger-scale, foreseeable and adequate funding to enable them to take more active measures to combat climate change. Developed countries pledged 30 million dollars for 2010-2012, which was called *Fast Start Financing* (FSF). They also set a long-term target for 2020 to jointly mobilize USD 100 billion annually from a variety of sources: public, private and alternative. Despite the difficult economic situation and tight budgetary constraints, the EU and its member states have fulfilled their FSF commitment: in 2010-2012 they jointly awarded EUR 7.34 billion in support.

In 2013 climate finance provided by EU to developing countries reached EUR 9.5 billion, in 2014 – EUR 14.5 billion, in 2015 – EUR 17.6 billion, in 2016 – EUR 20.2 billion.

Although Lithuania is among the countries listed in Annex I with the specific added condition that the country is undergoing the process of transition to market economy and do not have obligations to support developing countries, as part of the EU, Lithuania voluntary has been providing technical and financial support in climate change area to developing countries since 2011.

Lithuania's aim to ensure financial and technological support for the implementation of climate change mitigation and adaptation measures in other countries, as well as cooperating with other countries in developing climate change-oriented projects is determined in various legal acts:

- **Law on Development Cooperation and Humanitarian Assistance** (approved by the Parliament on 16th May 2013). This law determines the goals of the Lithuanian development cooperation policy, formation, implementation, coordination and financing of the Lithuanian development cooperation, and ways of providing humanitarian aid. One of the priority areas of cooperation development is climate change mitigation and adaptation measures.

- **Law on financial instruments for climate change management** (approved by the Parliament in 2009) states that the funds of the Climate Change Special Programme may be used for climate change mitigation and adaption measures in third countries in accordance with the EU legislation, the UNFCCC, the Kyoto Protocol and other international agreements.
- **Inter-institutional action plan of implementation of objectives and tasks of the National climate change management policy strategy for 2013-2020** (approved by the Government in 2013 and annually updated). In the inter-institutional Action Plan the identification of potential finance sources in public and private sectors and contribution to financing and implementation of measures of climate change mitigation and adaptation in developing countries are foreseen in 2013 and onwards (up to the year 2020) by the Ministry of Environment.
- **National Interinstitutional Development Cooperation Action Plan for the period 2017-2019** (approved by the Government in 2016 with the latest amendment in 2017, setting measures for 2018-2020). This Plan lays down development cooperation policy guidelines and sets out concrete measures in order to contribute to the achievement of the sustainable development goals set by the UN 2030 Agenda within the aid recipient countries. The Plan is based on the Lithuanian Law on Development Cooperation and Humanitarian Aid, Lithuania's foreign policy priorities, taking into account relevant strategic documents of the UN and EU, and international commitments. The Plan will help to ensure continuous and efficient implementation and coordination of the development cooperation activities and to enhance Lithuania's role as a reliable and responsible donor country in the international community. For the 2013-2016 period *Directions for the Politics of Development Cooperation in 2014-2016* and *Inter-institutional action plan for development cooperation* was in place.

Lithuanian institutions responsible for financial support to developing countries in the field of climate change mitigation and adaptation through are:

- Ministry of Environment through the funding from the Climate Change Special Programme (the main financial fund);
- Ministry of Foreign Affairs which administrates development cooperation projects, some of the projects are climate related and
- Ministry of Finance that makes contribution to international funds and programs, including EPTATF.

Through 2011-2013 period the Ministry of Environment provided climate finance through various multilateral and regional funds. In 2015 Ministry of Environment made a contribution to the Green Climate Fund (more information can be found in the table 5-1 below).

From 2014 onwards the Ministry of Environment supports **bilateral development cooperation projects** related to climate change. The decision to focus on bilateral support was due to new legislation and policy adopted by the Government of Lithuania (mentioned above). The Ministry of Environment believes that bilateral support is more efficient and beneficial for both parties, not only helps to share Lithuanian experience and gain valuable relationships through cooperation, but creates enabling environment to using public finances to mobilize private sector investments into low carbon solutions under bilateral cooperation projects transferring technologies to developing countries.

Eligible for this bilateral support are a variety of Lithuanian entities (private and public) which intend to implement climate change mitigation and adaptation projects in developing countries. Each year Ministry's *Commission on development cooperation and humanitarian aid* announces calls for project concepts/applications and selects the most distinguished projects. Requirements for projects and all procedural issues are laid down in the *Manual on the implementation of development cooperation activities by state and municipal institutions and agencies*, approved on 26 March 2014 by Resolution No 278 of the Government of the Republic of Lithuania).

Generally applicants are required to contribute financially at least 10% of total eligible costs of the project. In this way Lithuania is seeking to mobilise private finance. The Commission approves the list of eligible countries, usually Lithuania gives priority (additional evaluation points) to the Eastern European partnership countries.

Calls for submission of bilateral development cooperation projects are announced each year – usually in the second quarter – on www.am.lt, www.orangeprojects.lt and in the national press.

2017 call for bilateral development cooperation projects

Last update: 31.07.2017

The Ministry of Environment of the Republic of Lithuania invites local companies, institutions and organisations to submit projects of bilateral development cooperation in the field of climate change according to conditions confirmed 27.07.2017 by the ministry's Commission on development cooperation and humanitarian aid (see the table below).

Grants are being provided from the funds of the Climate Change Special Programme, administered by the Ministry of Environment of the Republic of Lithuania.

Requirements for bilateral development cooperation projects:

Recipient country(-ies)	Low or lower-middle income (GNP per capita up to 3955 USD) developing country(-ies) according to World bank's classification, included in OECD DAC list of ODA recipients: * **Europe & Central Asia**: Afghanistan, Armenia, Georgia, Kyrgyzstan, Kosovo, Moldova, Tajikistan, Uzbekistan; * **Near East & North Africa**: Egypt, Jordan, Morocco, Syria, Tunesia, West Bank and Gaza Strip, Yemen; * **Latin America & Caribbean**: Bolivia, Guatemala, Haiti, Honduras, Nicaragua, El Salvador; * **East & South Asia, the Pacific Ocean**: Bangladesh, Bhutan, Cambodia, India, Indonesia, , Kiribati, Korea DPR, Lao PDR, Micronesia, Myanmar, Mongolia, Nepal, Pakistan, Papua New Guinea, Philippines, Solomon Islands, Sri Lanka, Timor-Leste, Vanuatu, Viet Nam; * **Sub-Saharan Africa**: Angola, Benin, Burkina Faso, Burundi, Cabo Verde, Cameroon, Central African Republic, Chad, Comoros, Congo, Congo DR, Cote d'Ivoire, Djibouti, Eritrea, Ethiopia, Gambia, Ghana, Guinea, Guinea-Bissau, Kenia, Lesotho, Liberia, Madagascar, Malawi, Mali, Mauritania, Mozambique, Niger, Nigeria, Rwanda, Sao Tome and Principe, Senegal, Sierra Leone, Somalia, South Sudan, Sudan, Swaziland, Tanzania, Togo, Uganda, Zambia, Zimbabwe.

Figure 5-1. Calls announcements

In 2014 finance was given to the Lithuanian solar cell producer "BOD Group" which implemented project in Malaysia. During the project two solar power plants were installed on the roof-top of the University and in the harbor in the Perak state of Malaysia (total capacity of the solar plants is 60 kW). The total costs of the project were EUR 222 300, from which EUR 144 000 were subsidy from the Ministry of Environment.

Figure 5-2. Project in Malaysia (photo credits: BOD group)

In 2015 two projects in Moldova were approved: solar power plant on the Ministry of Environment of Moldova building (55 kW capacity) and the installation of 4 biomass boilers in kindergartens, schools and health center in the nearby area of Kishinev. These projects still ongoing, solar power plant projects is planned to be finished at the end of 2017. The biomass boilers project is planned to be finished in the middle of 2018.

In 2016 the Ministry of Environment approved one project in Georgia. Lithuanian company "Saulės grąža" has installed 6 solar power plants in the schools and kindergartens in the remote areas of Georgia. The total capacity of solar power plants is 131 kW. The total budget of the project is EUR 286 500, from which EUR 191 160 is the subsidy. The project planned to be finished in May of 2018.

Table 5-1. The data on international climate finance provided by Lithuania

Year	Thousands, EUR	Type of support	Recipient of support	Provider of support
2011	25.7	multilateral	ESMAP - Energy Sector Management Assistance Program, administered by the World Bank	MoE
	29.0	regional	E5P - Eastern Europe Energy Efficiency and Environment Partnership Fund, administered by the European Bank for Reconstruction and Development	MoFA
	34.8	bilateral	Development cooperation projects (Moldova, Georgia)	MoFA
2012	29.0	multilateral	ESMAP	MoE
2013	105.4	regional	E5P (Moldova, Georgia, Armenia)	MoE
	9.2	bilateral	Development cooperation project (Ukraine)	MoFA
2014	222.3	bilateral	Development cooperation project (Malaysia, solar power plants)	MoE
	6.8	regional	Development cooperation project (Armenia, Moldova, Ukraine)	MoFA
	50.0	multilateral	EPTATF - Eastern Partnership Technical Assistance Trust Fund, administered by the European Investment Bank	MoFin
2015	100	multilateral	Green Climate Fund	MoE
	397.4*****	bilateral	Development cooperation projects (Moldova, solar power plant and biomass boilers)	MoE
	50	multilateral	EPTATF	MoFin
2016	286.5*****	bilateral	Development cooperation project (Georgia, solar power plants)	MoE

	50	multilateral	EPTATF	MoFin
2017	618**	bilateral	Development cooperation projects (selection of projects ongoing)	MoE

* planned total project value, including beneficiary's own contribution
** preliminary figures

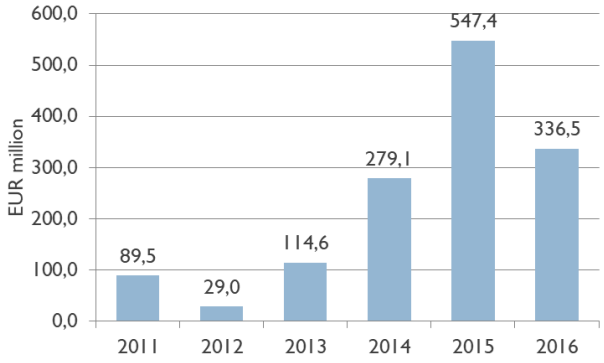

Figure 5-1. International climate finance provided by Lithuania (in EUR thous.)

Starting from 2018 Lithuania is voluntarily doubling its climate finance to developing countries and has intentions to mobilize 1 million euros for climate financing from public and private sources annually till 2020.

International cooperation on training and capacity building

The EU-funded EU Twinning Program supports cross-border co-operation between institutions, strengthens the administrative capacity of the beneficiary countries and helps them implement the necessary reforms. Lithuania has provided expert support in this EU program since 2004.

Lithuania has participated in international cooperation measures listed in Table 9-3 below.

Table 5-2. International cooperation measures

Recipient country/region	Programme or project title	Description of programme or project
Serbia	Serbia's waste management system improvement	Specialists of the Ministry of Environment and the Environmental Project Management Agency will help Serbia to develop and improve its waste management system under the EU Twinning programme project intended to support the waste management policy. The European Commission has assigned EUR 1.5 million to this project. The Lithuanian experts will participate in the project together with their colleagues from Austria and Sweden. For two years they will help the Serbian Ministry of Agriculture and Environment to drawn up national and strategic waste management plans, upgrade legislation of this sector and determine economic instruments for ensuring its operation. The EU Twinning programme funded by the European Commission supports cooperation of sister institutions in different countries, enhances the administrative capacity of beneficiaries and helps to implement the necessary reforms.

Macedonia	Strengthening the capacities for effective implementation of the acquis in the field of water quality	Recognizing the need to improve the water quality management issues in the country, the European Union, through the Instrument for Pre-Accession Assistance, is funding the Twinning Project *"Strengthening the capacities for effective implementation of the acquis in the field of water quality"*. The project duration is 21 months (May 2017 – January 2019) with a budget of EUR 1.2 million. The main beneficiary institutions are the Ministry of Environment and Physical Planning and the Hydrometeorological Service. The main EU member state partners are Environment Agency Austria (Umweltbundesamt), Ministry of Environment of the Republic of Lithuania and the National Institute for Public Health from The Netherlands. The project purpose is to strengthen the administrative capacities in the area of water management by implementing the appropriate EU acquis. In particular the project will assist the national authorities in drafting the Vardar River Basin Management Plan and in harmonising and implementing secondary legislation in the area of water monitoring and water permitting.
Georgia	Strengthening Sustainable Management of Forests in Georgia	The European Union delegation in the Republic of Georgia notified that European Union Twinning project *"Strengthening Sustainable Management of Forests in Georgia"* will be implemented by Lithuanian and Hungarian consortium. The proposal of Lithuanian-Hungarian consortium was selected against the proposals of Austrian-German consortium and Greece. This is the first Twinning project in Georgia, which will be implemented by Lithuania as a leading partner. Ministry of Environment of the Republic of Lithuania, State Forest Service of Lithuania and Ministry of Agriculture of the Republic of Hungary in cooperation with National Food Chain Safety Office of Hungary will enhance the capacity of the state forest institutions in order to prevent and combat illegal activities in the sector, ensuring the sustainable management of Georgian forests and harmonizing the Georgian forest regulatory framework to the EU standards and practices. Environmental Projects Management Agency will be responsible for the project administration management, while Central Project Management Agency will be responsible for the financial management of the project. This Twinning project will be implemented during 18 months period. The European Commission provides the budget of EUR 840 000. As a Junior Leader, Lithuania has been participating in two other European Union Twinning projects in Georgia. Lithuanian Standards Board with partner institutions from Germany were strengthening the Meteorology and Standards Infrastructure in Georgia in 2010-2012. Moreover, Lithuanian National Commission for Energy Control and Prices in cooperation with partners from Austria have been helping to develop Energy Market Regulatory System in Georgia since 2015. EU Twinning project is an EU instrument for representatives from the public administrations of the EU Member States and Beneficiary Countries working together in order to transfer the know-how and good practices developed within the EU to beneficiary public administrations during implementation of the Twinning Project. Lithuania is participating in this programme since 2004. Lithuania has been awarded 76 European Union Twinning projects with the budget of EUR 65.5 million. According to the European Commission, Lithuania is one of the five most successful countries implementing the European Union twinning projects in 2013-2015. The other four countries are France, Germany, Spain and Austria.

Moldova	Support to the Civil Service Modernization in the Republic of Moldova in line with EU best practices	The Steering Committee of the EU-funded Twinning project *"Support to the Civil Service Modernization in the Republic of Moldova in line with EU best practices"* has gathered for the7th quarterly meeting. The activities jointly carried out, reform agenda on public administration, building institutional capacity of the State Chancellery as a result of its reorganization process, as well as perspectives on the partnership framework were among the tackled subjects of the meeting. The Twinning projectwere analysed, such as: providing expertise in drafting legislative and normative acts, organizing training programs for civil servants from the Republic of Moldova and others. In this regard, the execution of the planned budget was discussed, concluding the saved financial resources would enable the project to organize additional activities.
Macedonia	Strengthening capacities to effectively implement EU requirements in the area of nature protection in Macedonia.	State service for protected areas under the ministry of Environment , together with the Finnish state-owned enterprise "Metsähallitus" implement the project *"Strengthening capacities to effectively implement EU requirements in the area of nature protection"* in Macedonia. The project consists of four activities: preparation of management plans for natural protected areas, strengthening of capacities for the preparation of assessment studies, strengthening of capacities for the preparation of biodiversity monitoring methodologies and development of the National Biodiversity Monitoring Programme. Project started in the autumn of 2017, with a duration of 24 months. The Lead Project Leader is Finland, while Lithuania is the Junior Project Leader.

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ABBREVIATIONS

BY	Base year
CHP	Combined heat and power
CRF	Common reporting format
CTF	Common tabular format
EPA	Environmental Protection Agency
EPTATF	Eastern Partnership Technical Assistance Trust Fund
ETS	Emissions Trading System
EU	European Union
EUA	European Union emission allowance
GDP	Gross domestic product
GHG	Greenhouse gases
IPCC	Intergovernmental Panel on Climate Change
ISPS Code	International Ship and Port Facility Security Code
JI	Joint Implementation
LULUCF	Land Use, Land-Use Change and Forestry
MMR	Monitoring Mechanism Regulation
NIR	National Inventory Report
NMVOC	Non-methane volatile organic compounds
NPP	Nuclear Power Plant
QA/QC	Quality assurance/ Quality control
RES	Renewable energy sources
SFS	State Forest Service
UCTE	The Union for the Co-ordination of Transmission of Electricity
UNFCCC	United Nations Framework Convention on Climate Change
WAM	Scenario with additional measures

CHEMICAL FORMULAS

CH_4	Methane
CO_2	Carbon dioxide
HFCs	Hydrofluorocarbons
N_2O	Nitrous oxide
NF_3	Nitrogen trifluoride
PFCs	Perflurocarbons
SF_6	Sulphur hexafluoride
VOC	Volatile organic compounds

UNITS OF MEASUREMENT

CO_2 eq.	CO_2 equivalent
^oC	Degree Celsius
GWh	Gigawatthour
ha	Hectare
kg	Kilograms
km^2	Square kilometres
kt	Kilotonnes
ktoe	Kilotonne of oil equivalent
Mt	Million tonnes
MW	Megawatt
%	Per cent
PJ	Petajoule
thous.	Thousand
toe	Tonnes of oil equivalent
TJ	Terajoule
TWh	Terawatt hours

ANNEX I. Overview on CTF tables provided with the third Lithuania's Biennial Report

CTF Table No	Reporting elements
CTF Table 1	Emission trends
CTF Table 2	Description of quantified economy-wide emission reduction target
CTF Table 3	Progress in achievement of the quantified economy-wide emission reduction target: information on mitigation actions and their effects
CTF Table 4	Reporting on progress
CTF Table 4(a)II	Progress in achievement of the quantified economy-wide emission reduction targets – further information on mitigation actions relevant to the counting of emissions and removals from the land use, land-use change and forestry sector in relation to activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol
CTF Table 4(b)	Reporting on progress
CTF Table 4	Reporting on progress
CTF Table 4(a)II	Progress in achievement of the quantified economy-wide emission reduction targets – further information on mitigation actions relevant to the counting of emissions and removals from the land use, land-use change and forestry sector in relation to activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol
CTF Table 4(b)	Reporting on progress
CTF Table 5	Summary of key variables and assumptions used in the projections analysis
CTF Table 6(a)/(c)	Information on updated greenhouse gas projections under a 'with measures' scenario and under a 'with additional measures' scenario
CTF Table 7	Provision of public financial support: summary information CTF Table 7(b) Provision of public financial support: contribution through bilateral, regional and other channels

ANNEX II List of key categories in Lithuanian greenhouse gas inventory

IPCC Category	GHG	Identification criteria
1.A.1 Energy industries - Other fossil fuels	CO_2	T1
1.A.1 Energy industries - Solid fuels	CO_2	T1
1.A.1 Energy industries - Biomass	N_2O	T2
1.A.1 Energy industries - Biomass	CH_4	T2sub*
1.A.1.a Public electricity and heat production - Gaseous Fuels	CO_2	L1,T1,T2
1.A.1.a Public electricity and heat production - Liquid Fuels	CO_2	L1,T1, T2
1.A.1.b Petroleum refining - Liquid Fuels	CO_2	L1,T1
1.A.1.c Manufacture of solid fuels and other energy industries - Gaseous fuels	CO_2	T1sub*
1.A.2 Manufacturing industries and construction - Gaseous fuels	CO_2	L1,T1
1.A.2 Manufacturing industries and construction - Liquid fuels	CO_2	T1,T2
1.A.2 Manufacturing industries and construction - Solid fuels	CO_2	L1,T1
1.A.3.b Road transportation	CO_2	L1,T1,T2
1.A.3.c Railways	CO_2	L1, T1
1.A.4 Other sectors-Biomass	CH_4	L1,L2,T1,T2
1.A.4 Other sectors-Biomass	N_2O	L2sub, T2sub*
1.A.4 Other sectors-Gaseous fuels	CO_2	L1,T1
1.A.4 Other sectors-Liquid fuels	CO_2	L1,T1, T2
1.A.4 Other sectors-Liquid fuels	N_2O	T1
1.A.4 Other sectors-Peat	CO_2	T1sub*
1.A.4 Other sectors-Solid fuels	CO_2	L1,T1,T2
1.A.4 Other sectors-Solid fuels	CH_4	T2sub*
1.B.2.b Fugitive Emissions from Fuels - Oil and Natural Gas - Natural Gas	CH_4	L1,T1
2.A.1 Cement Production	CO_2	L1,T1
2.A.2 Lime Production	CO_2	T1
2.A.4 Other process use of carbonates	CO_2	T1
2.B.1 Ammonia Production	CO_2	L1,T1
2.B.2 Nitric Acid Production	N_2O	L1,T1
2.F.1 Refrigeration and Air Conditioning Equipment	HFCs	L1,T1, T2
3.A.1 Enteric Fermentation - Cattle	CH_4	L1,L2,T1,T2
3.B.1.1 Manure Management - Cattle	CH_4	L1
3.B.1.3 Manure Management - Swine	CH_4	T1
3.B.2 Manure Management - Cattle	N_2O	L1sub*
3.B.2 Manure Management - Indirect N_2O Emissions	N_2O	L2, T1,T2
3.D.1.1 Direct N_2O Emissions From Managed Soils - Inorganic N Fertilizers	N_2O	L1,L2,T2
3.D.1.2 Direct N_2O Emissions From Managed Soils - Organic N Fertilizers	N_2O	L1, T2
3.D.1.3 Direct N_2O Emissions From Managed Soils - Urine and dung	N_2O	L1,L2,T1,T2
3.D.1.4 Direct N_2O Emissions From Managed Soils - Crop Residues	N_2O	L1,L2
3.D.1.6 Direct N_2O Emissions From Managed Soils - Cultivation of organic soils	N_2O	L1,L2,T1,T2

3.D.2.1 Indirect N_2O Emissions From Managed Soils - Atmospheric deposition	N_2O	L2
3.D.2.2 Indirect N_2O Emissions From Managed Soils - Nitrogen leaching and run-off	N_2O	L1, L2
4.A Forest land, Emissions and removals from drainage and rewetting	CO_2	L1,L2,T1,T2
4.A.1 Forest land remaining forest land - carbon stock change in biomass	CO_2	L1,L2,T1,T2
4.A.1 Forest land remaining forest land - net carbon stock change in dead wood	CO_2	L1
4.A.2 Land converted to forest land - carbon stock change in biomass	CO_2	L1,L2,T1,T2
4.A.2 Land converted to forest land - net carbon stock change in litter	CO_2	L1,L2,T1,T2
4.B Cropland, Emissions and removals from drainage and rewetting	CO_2	L1
4.B Cropland	N_2O	L1, L2, T2
4.B.2 Land converted to cropland - net carbon stock change in mineral soils	CO_2	L1,L2,T1,T2
4.B.2 Land converted to cropland - carbon stock change in biomass	CO_2	L1,L2,T1,T2
4.C.2 Land converted to grassland - net carbon stock change in mineral soils	CO_2	L1,L2,T1,T2
4.D.1 Wetlands remaining wetlands -net carbon stock change in organic soils	CO_2	L1,L2,T1,T2
4.E.2 Land converted to settlements	CO_2	L1,L2,T1,T2
4.G Harvested wood products	CO_2	L1,L2,T1,T2
5.A Solid Waste Disposal	CH_4	L1,L2,T2
5.B Biological treatment of waste	CH_4	T2sub*
5.D Wastewater Treatment and Discharge	CH_4	L1,T1,T2

**Lsub, Tsub denote the categories that were identified by level and trend assessment for a subset without LULUCF when compared to Approach 1*
Abbreviations:
L1, T1 – approach 1 (level and trend) assessment
L2, T2 - approach 2 (level and trend) assessment

ANNEX III Response to the review recommendations of Lithuania‘s Second Biennial Report

Recommendation	Lithuania’s response
14. The ERT recommends that Lithuania improve the transparency of its reporting and provide information in its next BR on the possible scale of contributions from market-based mechanisms under the Convention and other market-based mechanisms in its description of the emission reduction target	In Lithuanian there is no intention to use credits from market-based mechanisms for the compliance with ESD 2020 target. Possible scale of contributions from credit entitlements for 2013-2020 under EU ETS Lithuania’s operators is provided in CTF table 4 and BR3 Chapter 3.
21. In its BR2, Lithuania reported on its domestic institutional arrangements, including legal, administrative and procedural arrangements used for domestic compliance, monitoring and reporting of the progress towards its target. However, Lithuania did not explicitly indicate whether there were any changes in these arrangements since the submission of its BR1. During the review, Lithuania indicated that it had not changed any institutional arrangements. The ERT recommends that Lithuania provide in its next BR information on changes in its domestic institutional arrangements.	In BR3 Chapter 3 it is explained that Lithuania has not made any major changes in the domestic institutional arrangements, including legal, administrative and procedural arrangements used for domestic compliance, monitoring and reporting of the progress towards its target since the submission of Lithuania’s BR2. Information on few international capacity-building projects implemented in Lithuania during 2015-2017 in cooperation with other countries to improve the reporting quality of GHG projections is provided in Chapter 3.
22. The ERT noted that the BR2 did not provide in textual format the information on mitigation actions organized by gas to reflect information presented in CTF table 3. The ERT recommends that Lithuania improve the transparency of its reporting by organizing, to the appropriate extent, the reporting of its mitigation actions by gas in its next BR, as is currently done in CTF table 3.	Textual information on mitigation actions by gas is provided in BR3 Chapter 3 (summary tables of policies and measures by different economy sectors).
37. Under CTF table 4(b), Lithuania included a footnote explaining that the compliance assessment for 2013 under the ESD was delayed owing to delays in the 2015 submission of Lithuania’s GHG inventory and that the use of market-based mechanisms for meeting the 2013 ESD target was unknown at the time of BR2 submission. However, this information is not provided in the text of the BR. The ERT recommends that Lithuania improve the transparency of its reporting and provide information in the text of its BR and in CTF table 4 on the quantity of units from market-based mechanisms under the Convention and other market-based mechanisms used by Lithuania on its progress towards achieving the emission reduction target.	See response to recommendation No 14 above.
44. In the BR2 and CTF table 6(a), Lithuania did not report separately on the projections of emissions from fuel sold to ships and international aircraft as required by the UNFCCC reporting guidelines on BRs. Furthermore, these emissions were included in the totals. During the review, Lithuania clarified that it is possible to report such projections separately. To improve transparency, the	In CTF tables 6(a) (WEM scenario) and 6 (c) (WAM scenario) GHG emissions projections from aviation and navigation bunker fuels are reported separately.

ERT recommends that Lithuania report separately, to the extent possible, its emission projections related to fuel sold to ships and aircraft engaged in international transport in its next BR and not to include them in the totals.	