

Lithuania

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1. SUMMARY

Lithuania has ratified the Kyoto Protocol on 03 January 2003 with the commitment to reduce its GHG emissions by 8% as compared to the base year emission level. As its base year Lithuania has chosen the year 1990 for CO₂, CH₄, and N₂O, and the year 1995 for the F-gases.

The level of the Lithuanian's base year emissions is provided in the Lithuania's Initial Report, checked and accepted by the Compliance Committee, and equals 49.414 Mt CO₂ eq. This means that the Assigned Amount for Lithuania for the first commitment period equals 247.05 Mt CO₂ eq. altogether, or 45.46 Mt CO₂ eq. on average annually.

Lithuania became a member state of the European Union on 1 May 2004. Pursuant to the Article 3(2) of the European Parliament and Council Decision No 280/2004/EC concerning a mechanism for monitoring Community GHG emissions and for implementing the Kyoto Protocol, Lithuania has submitted its projections of GHG emissions by sources and withdrawals by sinks in March 2007, and the additional information on the flexible mechanisms development in January 2008. This allows drawing preliminary conclusions whether Lithuania will be in compliance with its Kyoto target.

Lithuania has prepared the projections for all required sectors (energy including transportation, industrial processes, waste, forestry and agriculture), and for three gases (CO₂, CH₄, and N₂O). The country has prepared for WEM and WAM scenarios. However, the only difference between the scenarios is observed in the year 2020 in the energy sector. In 2020 the construction of a new nuclear power plant should be already in operation. For the other years and other sectors the WEM and WAM scenario coincide.

In 2010 the emissions from the Lithuanian economy are estimated to be 69.6% as compared to the base year under both WEM scenario and WAM scenarios. In 2015 and 2020 the emissions will respectively reach the level of 80.16% and 114.4%. According to the projections, it is clear that the country will have no difficulties in achieving its Kyoto target.

Policies and measures significantly contribute towards the de-coupling of the GDP growth from the GHG emissions growth. The main driving factors for GHG reduction are the improvement of conversion efficiency of fossil technologies, increase in the share of CHP and renewables, reduction of grid losses of heat and electricity, energy conservation and energy efficiency measures, promotion of biofuels, voluntary agreements in the Industrial sector, and expansion of the forest area.

Lithuania participates already in Joint Implementation mechanism as a host party. The country has acquired full eligibility to participate in the flexible mechanisms, established the framework for the procedure of the national approval, and reserved the reserve in its Second NAP equal to about 11 604 355 Mt CO₂. The country does not plan to use the flexible mechanisms under the Kyoto Protocol for compliance purposes.

2. GHG PROJECTIONS AND PROGRESS TO KYOTO TARGETS

The Lithuanian projections of the GHG emissions are prepared based on the projections of the major macroeconomic variables - GDP growth, population changes, fuel consumption in different sectors, expansion of the forest area, etc. Sensitivity analysis has been done for the projections for such variables as demand for electricity, interest rate, future international fuel prices. As the projections (both WEM and WAM) show, the country will easily comply with set established in the Kyoto target. As it was said above, the average AAU per year is 45.46 Mt. CO₂ eq. The projections show that in 2010 the GHG emissions will be 69.6% as compared to the base year under both WEM and WAM scenarios, in 2015, the same indicator will be 80.16%, and only in 2020 it is expected that the total GHG emissions of the country will surpass the initial level of 1990 with 114.4%.

Not all the sectors within the Lithuanian economy will be reducing their respective emissions. For instance, it is predicted that the emissions in the Industrial Process sector will be growing. To achieve the overall reductions, the other sectors where the emissions decrease will compensate for the increase in the industrial process sector. Especially many reductions are planned in the energy sector.

The basis for the projections in the energy sector is the Lithuanian National Energy Strategy approved by the Decision of the Seimas No. X-1046 from January 18, 2007. The Lithuanian Energy Institute developed previously mentioned Strategy. Specific issues of development of the energy sector were outlined in a technical paper „Analysis and forecast of energy sector development trends up to 2025“ published by the Lithuanian Energy Institute in 2006. The sensitivity analysis for the energy sector was carried out in the same study for demand for electricity, discount rate, and fuel prices. Unfortunately, the documents do not mention either the underlying assumptions in the other sectors of economy or the models applied to the expected projections.

Table 1 shows, for all gases and main sectors:

- GHG emission projections for the two scenarios “with existing measures” (WEM) and “with additional measures” (WAM), as reported by Lithuania;
- Historic emissions (in the “reference year”) as reported together with projections.

For Lithuania, the reference year is the Kyoto base-year: 1990 for CO₂, CH₄ and N₂O, and 1995 for fluorinated gases (F-gases).

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Table 1. Summary of reported projections by sector and by gas in 2010 (Mt CO₂-eq.)

	Carbon dioxide			Methane			Nitrous oxide			F-gases (SF ₆ , HFCs and PFCs)			Total		
	Reference year	2010 WEM	2010 WAM	Reference year	2010 WEM	2010 WAM	Reference year	2010 WEM	2010 WAM	Reference year	2010 WEM	2010 WAM	Reference year	2010 WEM	2010 WAM
Energy (excl. transport)	27.0	16.5	16.5	0.4	0.5	0.5	0.2	0.2	0.2	NE	NE	NE	27.6	17.3	17.3
Energy supply	13.8	13.0	13.0	0.2	0.3	0.3	0.1	0.1	0.1	NE	NE	NE	14.1	13.3	13.3
Energy – industry, construction	6.2	1.9	1.9	0.0	0.0	0.0	0.0	0.0	0.0	NE	NE	NE	6.3	1.9	1.9
Energy – other (commercial, residential, agriculture)	7.0	1.7	1.7	0.2	0.3	0.3	0.1	0.0	0.0	NE	NE	NE	7.3	2.0	2.0
Transport (energy)	5.7	4.8	4.8	0.1	0.1	0.1	0.1	0.1	0.1	NE	NE	NE	5.8	4.9	4.9
Industrial processes	3.0	2.3	2.3	0.0	0.0	0.0	0.8	2.8	2.8	NE	NE	NE	3.8	5.1	5.1
Waste	0.0	0.0	0.0	1.9	1.3	1.3	0.1	0.1	0.1	NE	NE	NE	2.0	1.4	1.4
Agriculture	NE	NE	NE	3.8	1.7	1.7	5.1	3.2	3.2	NE	NE	NE	8.8	4.8	4.8
Other	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
Total (excl. LULUCF)	35.7	23.7	23.7	6.1	3.6	3.6	6.2	6.3	6.3	NE	NE	NE	48.1	33.5	33.5

Key:

Reference year: 1990

WEM: 'with existing measures' projection

WAM: 'with additional measures' projection

Source: Lithuania's MM submission, March 2007.

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The following Table 2 shows, for all gases and main sectors:

- 1990 GHG emissions as reported in the latest (2008) GHG emissions inventory (1990-2006);
- Adjusted GHG emission projections for the WEM and WAM scenarios. This adjustment of the projections reported in Table 1 is carried out to allow consistency and comparability between projections and the latest (2008) GHG inventory data.

Adjusted GHG emission projections are calculated according to the following formula: Projections = Table 1 projections * Correction Factor.
Correction Factor = latest inventory emissions for the same reference year / Table 1 reported reference year emissions. The correction factor for Lithuania = $49.37/48.087654 = 1.027$.

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Table 2. Summary of projections by sector and by gas in 2010 compared to 1990 emissions (MtCO₂eq)

	Carbon dioxide			Methane			Nitrous oxide			F-gases (SF ₆ , HFCs and PFCs)			Total		
	1990	2010 WEM	2010 WAM	1990	2010 WEM	2010 WAM	1990	2010 WEM	2010 WAM	1990	2010 WEM	2010 WAM	1990	2010 WEM	2010 WAM
Energy (excl. transport)	27.0	17.0	17.0	0.6	0.6	0.6	0.2	0.2	0.2	NE	NE	NE	27.9	17.7	17.7
Energy supply	13.9	13.3	13.3	0.4	0.3	0.3	0.1	0.1	0.1	NE	NE	NE	14.3	13.7	13.7
Energy – industry, construction	6.2	2.0	2.0	0.0	0.0	0.0	0.0	0.0	0.0	NE	NE	NE	6.3	2.0	2.0
Energy – other (commercial, residential, agriculture)	7.0	1.7	1.7	0.2	0.3	0.3	0.0	0.0	0.0	NE	NE	NE	7.2	2.0	2.0
Transport (energy)	5.7	5.0	5.0	0.1	0.1	0.1	0.1	0.1	0.1	NE	NE	NE	5.8	5.1	5.1
Industrial processes	3.5	2.3	2.3	0.0	0.0	0.0	0.8	2.9	2.9	NE	NE	NE	4.2	5.2	5.2
Waste	0.0	0.0	0.0	1.9	1.3	1.3	0.1	0.1	0.1	NE	NE	NE	2.0	1.4	1.4
Agriculture	NE	NE	NE	3.5	1.7	1.7	5.9	3.3	3.3	NE	NE	NE	9.5	5.0	5.0
Other	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
Total (excl. LULUCF)	36.2	24.3	24.3	6.1	3.7	3.7	7.0	6.4	6.4	0.0	NE	NE	49.4	34.4	34.4

Key:

WEM: 'with existing measures' projection

WAM: 'with additional measures' projection

Source: Lithuania's MM submission, March 2007, and Annual greenhouse gas inventory 1990 – 2006, April 2008.

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Table 3: Summary of projections by sector and by gas in 2010 compared to 1990 (index 100 = 1990)

	Carbon dioxide			Methane			Nitrous oxide			F-gases (SF6, HFCs and PFCs)			Total		
	1990	2010 WEM	2010 WAM	1990	2010 WEM	2010 WAM	1990	2010 WEM	2010 WAM	1990	2010 WEM	2010 WAM	1990	2010 WEM	2010 WAM
Energy (excl. transport)	100	62.9	62.9	100	91.9	91.8	100	103.6	103.6	100	NE	NE	100	63.6	63.6
Energy supply	100	96.0	96.0	100	72.9	72.9	100	96.8	96.8	100	NE	NE	100	95.4	95.4
Energy – industry, construction	100	31.6	31.6	100	86.5	86.5	100	41.1	41.1	100	NE	NE	100	31.8	31.8
Energy – other (commercial, residential, agriculture)	100	24.8	24.8	100	124.4	124.4	100	575.5	575.5	100	NE	NE	100	28.4	28.4
Transport (energy)	100	87.8	87.8	100	77.4	77.4	100	88.7	88.7	100	NE	NE	100	87.7	87.7
Industrial processes	100	66.9	66.9	100	58.2	58.2	100	361.7	361.7	100	NE	NE	100	124.90	124.9
Waste	100	162.5	162.5	100	69.9	69.9	100	78.9	78.9	100	NE	NE	100	70.5	70.5
Agriculture	100	NE	NE	100	48.0	48.0	100	55.3	55.3	100	NE	NE	100	52.5	52.5
Other	100	NE	NE	100	NE	NE	100	NE	NE	100	NE	NE	100	NE	NE
Total (excl. LULUCF)	100	67.2	67.2	100	59.6	59.5	100	91.5	91.5	100	NE	NE	100	69.6	69.6

Key:

WEM: 'with existing measures' projection

WAM: 'with additional measures' projection

Source: Lithuania's MM submission, March 2007, and Annual greenhouse gas inventory 1990 – 2006, April 2008.

Table 4: Summary of projections in 2010 compared to base year emissions under the Kyoto Protocol

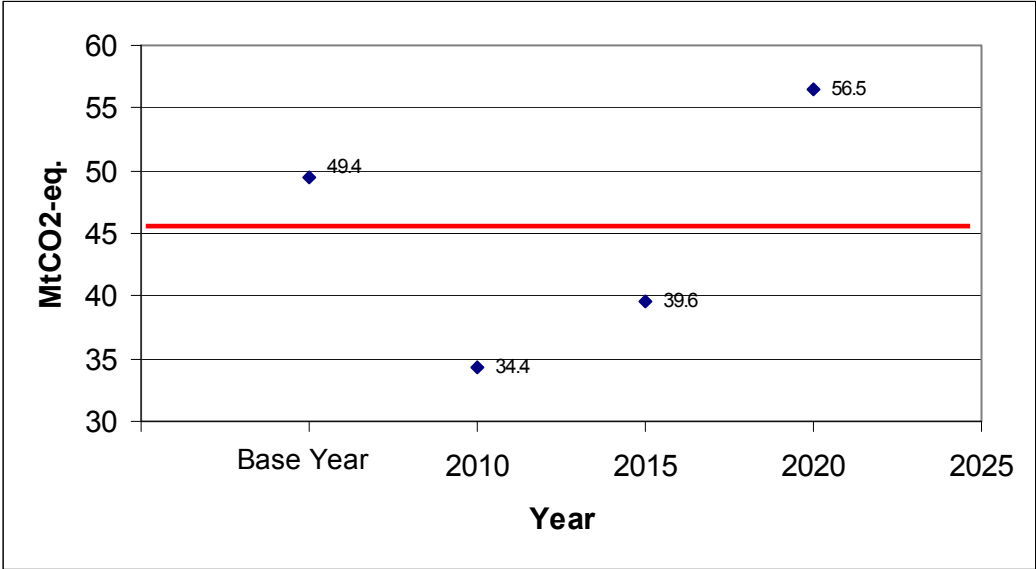
	Unit	Base-year emissions under the Kyoto Protocol	2010 projections 'with existing measures'	2010 projections 'with additional measures'
Total GHG emissions (excluding LULUCF)	Mt CO ₂ -eq.	49.4	34.4	34.4
	Index (base-year emissions = 100)	100	69.6	69.6

Source: Lithuania's MM submission, March 2007, and Annual greenhouse gas inventory 1990 – 2006, April 2008.

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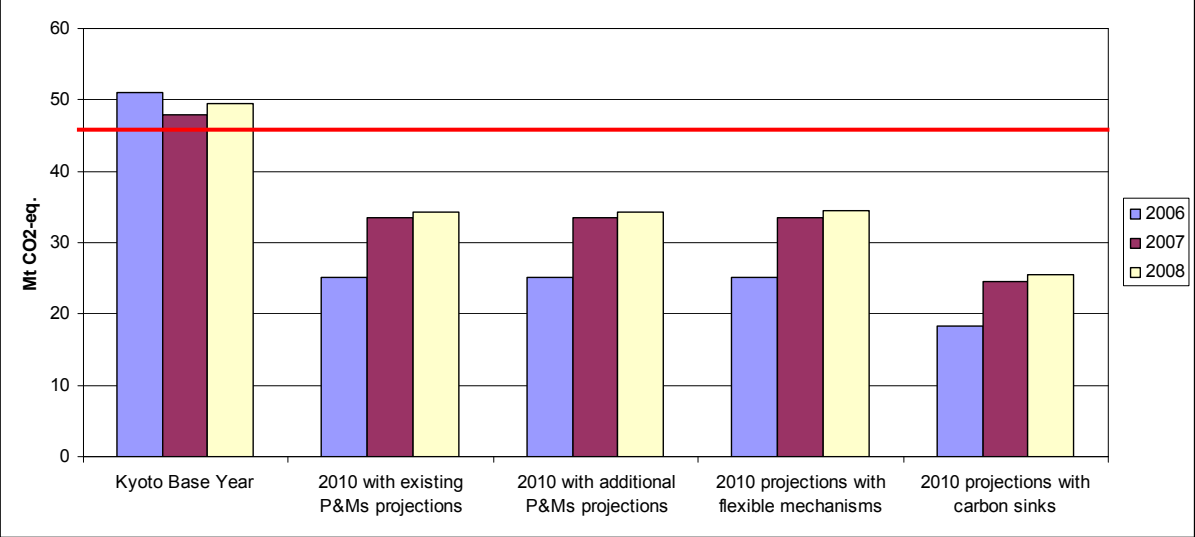
In Figure 1, the same correction factor used in Table 2 has been applied to the projections for 2010, 2015 and 2020. The graph shows WAM scenario for the year 2010, 2015 and 2020. The projected GHG emission will be below the Kyoto target (indicated by red line in the figures below).

Figure 1. Greenhouse gas projections in 2010, 2015 and 2020 (Mt CO₂-eq.)



Source: Lithuania’s MM submission, March 2007

Figure 2. Comparison of 2010 projections reported in 2006, 2007 and 2008



Source: Lithuania’s MM submission, March 2007

3. CLIMATE CHANGE MITIGATION POLICIES AND MEASURES

Despite the fact that Lithuania will comply with its Kyoto target, the country implements the policies and measures leading towards the reductions of GHG emissions and enhancement of CO₂ withdrawals by sinks.

In the below Table 5, the data are provided on the effect of PaMs on the GHG emissions. In the columns related to the top down approach this effect is calculated on the national scale.

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For estimating the effects of the existing measures the projected GHG in 2010 under WEM scenario are deducted from the projected GHG emission level under WOM scenario. For estimating the effect of the planned measures on the national level the projected emissions under WAM scenario are subtracted from the level of projected emissions under WEM scenario.

Since Lithuania has not provided the WOM and WAM projection data for the year 2010, it is impossible to assess directly the contribution of policies and measures in each sector towards the overall GHG emission reductions in the country.

For bottom up calculation the effect of the individual measures (if any estimation has been done at all) for existing and planned PaMs are summed up.

From the below Table 5, Table 6 and Table 7 it becomes clear that the majority of the individual PaMs are either undertaken or planned in the energy supply and energy consumption sectors. These PaMs are a part of the implementation of CCPMs.

The further analysis of the projections under WEM and WAM scenarios in the year 2020 show that the construction of a new nuclear power plant will bring significant GHG reduction.

Table 5. Summary of the effect of policies and measures included in the 2010 projections (Mt CO₂-eq.)

	Top down calculation		Bottom Up calculation	
	Existing Measures	Planned Measures	Existing Measures	Planned Measures
Energy (total, excluding transport)	NE	NE	1.4	NE
Energy supply	NE	NE	0.9	NE
Energy – industry, construction	NE	NE	NE	NE
Energy – other (commercial, residential, agriculture)	NE	NE	0.4	NE
Transport (energy)	NE	NE	0.3	NE
Industrial processes	NE	NE	0.5	NE
Waste	NE	NE	0.0	NE
Agriculture	NE	NE	NE	NE
Cross-sectoral	NE	NE	NE	NE
Total (excluding LULUCF)	NE	NE	2.1	NE

Note: The effects of measures detailed above are calculated firstly by determining the difference between total projections in each scenario ('top down calculation') and secondly by summing the reported effect of individual measures ('bottom up calculation').

Source: Lithuania's MM submission, March 2007, for the top down calculation; ECCP Policies and Measures database, June 2008, for the bottom up calculation.

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Table 6. Detailed information on Existing Policies and measures

Sector	Name	Type	GHG	Status	Absolute Reduction		
					[kt CO ₂ eq. p.a.]		
					2005	2010	2020
Cross-cutting	National allocation plan for GHG emission allowances for the period 2005-2007	Economic	CO ₂	implemented			
Energy supply	Use of renewable energy resources	Planning	CH ₄ CO ₂ N ₂ O	implemented		300	
Energy supply	Construction of Combined heat and power plants	Planning	CH ₄ CO ₂	implemented	235	302	451
Energy supply	Installation of combined cycle gas turbine unit in the Lithuanian Power Plant	Planning	CO ₂	implemented	304	345	483
Energy consumption	Energy saving in residential houses	Economic Information	CH ₄ CO ₂ N ₂ O	implemented			
Energy consumption	Increase in energy efficiency	Education Information Regulatory Research	CO ₂				
	Implementation of Energy efficiency programme	Economic	CO ₂	implemented	442	442	410
Transport	Promotion of biofuel use in transport	Planning	CH ₄ CO ₂	implemented			
	Fuel taxes: excise exemptions for biofuel	Fiscal	CO ₂	implemented	78	255	390
Transport	Limitation of emissions of	Regulatory	CO ₂	implemented			

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[volatile organic compounds](#)

Industrial Processes	<u>Pollution prevention in industry</u>	Education Regulatory	CO ₂	implemented	510	480	420
Forestry	<u>Expansion of forest area</u>	Planning	CO ₂	implemented		33	
Waste	<u>Reduction of biodegradable waste disposed of in landfills</u>	Regulatory	CH ₄	implemented		10	21

Source: Öko Institut, (accessed 17 June 2008, ECCP Policies and Measures database, <http://www.oeko.de/service/pam/index.php>)

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Table 7. Detailed information on Planned Policies and measures

Sector	Name	Type	GHG	Status	Absolute Reduction [kt CO ₂ eq. p.a.]			Costs [EUR/t]
					2005	2010	2020	
Energy supply	Construction of new nuclear power plant	Economic	CH ₄	planned				2,300
		Information	CO ₂					
		Planning	N ₂ O					

Source: Öko Institut, (accessed 17 June 2008, ECCP Policies and Measures database, <http://www.oeko.de/service/pam/index.php>)

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Table 8. Status of national policies and measures (PAM) in relation to European common and coordinated policies and measures (CCPM)

Status	CCPM	Sector
National policies and measures already in force before CCPM was adopted	Kyoto Protocol project mechanisms 2004/101/EC	Cross-cutting
Existing national policies and measures reinforced by CCPM	Integrated pollution prevention and control 96/61/EC	Cross-cutting
	Promotion of cogeneration 2004/8/EC	Energy supply
	Taxation of energy products 2003/96/EC	Energy supply
	Internal electricity market 2003/54/EC	Energy supply
	End-use efficiency and energy services 2006/32/EC	Energy demand
New national policies and measures implemented after CCPM was adopted	Emissions trading 2003/87/EC	Cross-cutting
	Promotion of electricity from RE sources 2001/77/EC	Energy supply
	Energy performance of buildings 2002/91/EC	Energy demand
	Promotion of biofuels for transport 2003/30/EC	Transport
	Landfill directive 1999/31/EC	Waste
	Packaging and packaging waste (94/62/EC, 2004/12/EC, 2005/20/EC)	Waste
Status of national policy or measure not reported	Internal market in natural gas 98/30/EC	Energy supply
	Directives on energy labeling of appliances	Energy consumption
	Ecodesign requirements for energy-using products 2005/32/EC	Energy consumption
	Eco-management & audit scheme (EMAS) EC 761/2001	Energy consumption
	Energy labeling for office equipment 2422/2001	Energy consumption
	Efficiency fluorescent lighting 2000/55/EC	Energy consumption
	Efficiency of hot water boilers 92/42/EEC	Energy consumption

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Motor challenge, voluntary EC programme	Energy consumption
Integrated European railway area (COM(2002)18 final)	Transport
Transport modal shift to rail 2001/12/EC etc.	Transport
Consumer information on cars 1999/94/EC	Transport
Agreement with car manufacturers ACEA etc.	Transport
Marco Polo programme on freight transport	Transport
HFCs in mobile air conditioning 2006/40/EC	Transport
F-gas regulation (842/2006)	Industrial Process
Support under CAP (1782/2003)	Agriculture
Support under CAP - amendment (1783/2003)	Agriculture
Rural development support and CAP(2603/1999, 1698/2005 and 1290/2005)	Agriculture
Support scheme for energy crops under CAP (795/2004)	Agriculture
Support for rural development from EAGGF (1257/1999)	Agriculture
Pre-accession measures for agriculture and rural development (1268/1999)	Agriculture
Nitrates directive 91/676/EEC	Agriculture
Directive on waste 2006/12/EC	Waste

Source: MS responses to the CCPMs questionnaire, 2005. Personal communications.

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Sources of information

- Report pursuant to Article 3(2) of the European Parliament and Council Decision No 280/2004/EC concerning a mechanism for monitoring Community GHG emissions and for implementing the Kyoto Protocol, 21 June 2008.
- Lithuania's Third and Fourth National Communication under the United Nations Framework Convention on Climate Change, 2005.
- Annual greenhouse gas inventory 1990 - 2006 and inventory report, 11 April 2008, Vilnius, Lithuania
- European Climate Change Programme (ECCP), Database on Policies and Measures in Europe <http://www.oeko.de/service/pam/index.php>

Kyoto base-year emissions

Kyoto base-year emissions (49.414 Mt CO₂ eq.) are presented throughout, except Table 1 which presents projections reference year emissions (see below). Kyoto base year emissions of greenhouse gases were calculated using 1990 emissions for carbon dioxide (CO₂), methane (CH₄) and nitrous oxide (N₂O) and 1995 emissions for fluorinated gases (SF₆, HFCs and PFCs).

Kyoto base-year emissions have now been reviewed and set for all EEA countries including Lithuania.

Projections reference year emissions

Projections reference year emissions are presented in Table 1.

Projections reference year emissions are defined as projections-consistent emissions data for a given historic year, as chosen by the Member State. In the Lithuanian case the chosen year is 1990. Inventory recalculations from year to year may mean that latest inventory data cannot be compared with projections based on older inventory data. Where such an inconsistency has arisen, MS projections have been corrected by applying the following formula:

Corrected projection = projections reported by MS * reference year emissions reported by MS alongside projections / latest inventory emissions for the same reference year. The correction factor for Lithuania is 1.027.

Quality of Reporting

Member State reporting in the sources detailed above was assessed semi-qualitatively. Scoring was attributed according to the level of detail and clarity: from 0 (representing no

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reported) to +++ (representing very detailed and/or clear reporting). Guidance used for this assessment included the reporting requirements laid down in:

- EU legislation: Monitoring Mechanism (280/2004/EC) and Implementing Provisions (2005/166/EC)
- UNFCCC reporting guidelines for national communications available in English, French, Spanish (“Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part II: UNFCCC reporting guidelines on national communications - FCCC/CP/1999/7”)

The following tables detail reporting considered to be best practice for the purposes of this assessment.

Information provided	Example of good practice
Policy names	Clear names and description provided with unique identifier.
Objectives of policies	Good description of objectives
Types of policies	Type of policy instrument specified e.g. regulatory, fiscal
Which greenhouse gases?	Specifies which gases each PAM affects
Status of Implementation	Clear for each PAM: planned, adopted, implemented, expired
Implementation body	Clear which authorities are responsible for implementation
Quantitative assessment of emission reduction effect and cost of policies	Almost all PAMs are actually quantified. Total effect of all PAMs specified. WOM projection provided.
Interaction with other national and EU level policies	Detailed discussion and analysis of policy interactions.
Measures implementing community legislation	Report details which national policies are implementing individual pieces of EU legislation.
Arrangements for flexible mechanisms	Details arrangements for use of flexible mechanisms.
Balance between domestic action and flexible mechanisms	Regarding reductions required to meet Kyoto target, details proportion to result from domestic action and flexible mechanisms.

Category of Information	Example of good practice
WEM and WAM projections	"with existing measures" and "with additional measures" projections required. "without measures projection" optional.
Policies included in each projection	Clear presentation of the policies included in each projections scenario.
Expressed relative to historic reference year data	Projections are presented alongside consistent historic emissions.
Starting year	Starting year and emissions used as basis for projections is detailed.

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Split of projections	Projection split by all 6 gases (or F-gases together), all sectors and years
Presentation of results	Clear, both tables and graphs provided and/or used excel reporting template.
Description of methodologies	Description of approach, model and assumptions
Sensitivity analysis	Was an analysis carried out to determine the sensitivity of projections to variance in the input parameters? Are high medium and low scenarios presented?
Discussion of uncertainty	Is an uncertainty range for the projections provided?
Details of parameters and assumptions	Are parameters as required under Monitoring Mechanism 280/2004/EC reported?
Indicators for projections	Are indicators for projections as required under Monitoring Mechanism 280/2004/EC reported?

Table 9. Information provided on policies and Kyoto flexible mechanisms

Information provided	Level of information provided	Comments
Policy names	+++	Clear names and description provided with unique identifier.
Objectives of policies	+++	Good description of objectives
Types of policies	+++	Type of policy instrument specified e.g. regulatory, fiscal
Which greenhouse gases?	+++	Specifies which gases each PAM affects
Status of Implementation	+++	Clear for each PAM: planned, adopted, implemented, expired
Implementation body	+	Not clear which authorities are responsible for implementation
Quantitative assessment of emission reduction effect and cost of policies	+	Not always
Interaction with other national and EU level policies	++	MMS submission presents the basis of projections for the Energy Sector. It also mentions some of the relevant Directives.
Measures implementing community legislation	+	Not always
Arrangements for flexible mechanisms	+++	DNA is appointed, National Approval procedures are in place, full eligibility is acquired
Balance between domestic action and flexible mechanisms	+++	Lithuania is a host country for JI. For Lithuania JI is rather a financial mechanism to implement national

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		priorities.
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Table 10. Information provided on projections

Category of Information	Level of information provided	Comments
WEM and WAM projections	++	There are sets of projections for both scenarios. However, they only differ in 2020.
Policies included in each projection	0	No information
Expressed relative to historic reference year data	++	Projections for CO ₂ , CH ₄ , and N ₂ O are presented alongside consistent historic emissions. F-gases do not have either projections or hitstoric inventories
Starting year	+++	Clear
Split of projections	++	The projections are split for all sectors and all years. F-gases are not estimated.
Presentation of results	+	The is no Excel template for the year 2008.
Description of methodologies	+	Some assumptions are presented but not the description of models, etc
Sensitivity analysis	0	Sensitivity analysis is done only for the projections of electricity production structure.
Discussion of uncertainty	0	Not made
Details of parameters and assumptions	+	Few parameters and assumptions are reported
Indicators for projections	+	Few indicators are provided for the whole economy though for the energy the parameters are more numerous.

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Table 3. Parameters for Projections

1. Mandatory parameters on projections		2005	2010	2015	2020	Units
Assumptions for general economic parameters						
GDP (value at given years or annual growth rate and base year)		19169.4	24465.5	31224.9	37989.8	MI EUR (2000 basis)
Population (value at given years or annual growth rate and base year)		3425.3	3363.7	3302.1	3240.4	1000 p
International coal prices at given years in euro per tonne or GJ (Gigajoule)						
International oil prices at given years in euro per barrel or GJ						
International gas prices at given years in euro per m3 or GJ						
Assumptions for the energy sector						
Total gross inland consumption (split by oil,gas,coal,renewables,nuclear,other)						
Oil (fossil)		84.954	141.466	147.761	154.23	PJ
Gas (fossil)		93.049	163.23	174.98	187.577	PJ
Coal		8.583	10.882	7.777	4.168	PJ
Renewable energy sources		30.264	47.155	58.327	70.862	PJ
Nuclear (IEA definition of energy calc)		109.25	0	0	0	PJ
Net electricity import		10.7	0	0	4	PJ
Total electricity production by fuel type (oil, gas, coal, renewables, nuclear, other)						
Oil (fossil)		1353	7185	8242	11206	Gwhe
Gas (fossil)		5043	3824	4330	6375	Gwhe
Coal		42	425	234	86	Gwhe
Renewable		445	446	1164	1823	Gwhe
Nuclear (IEA definition for energy calc.)		10338	0	0	0	Gwhe
Energy demand by sector split by fuel (delivered)						
Energy Industries		211.017	176.949	195.809	200.809	PJ
Oil (fossil)		19.309	107.015	115.529	115.454	PJ
Gas (fossil)		71.976	56.951	60.693	65.683	PJ
Coal		0.603	6.336	3.274	0.885	PJ
Renewable energy sources		6.345	6.647	16.313	18.787	PJ
Nuclear (IEA definition of energy calc)		112.784	0	0	0	PJ
Other						PJ
Industry		24120	44926.1	45349.77	51018.3	PJ
Oil (fossil)		3799	3942.86	4006.112	4282.92	PJ
Gas (fossil)		12133	30929.7	30783.59	34719.3	PJ
Coal		3955	3448.6	3652	3307.98	PJ
Renewable energy sources		4233	6604.95	6908.068	8708.04	PJ
Other						PJ
Commercial (Tertiary)		37418	61901.5	63609.94	74939.7	PJ
Oil (fossil)		4767	4819.05	4896.359	5234.68	PJ
Gas (fossil)		8940	20619.8	20522.39	23146.2	PJ
Coal		4025	4214.96	4463.556	4043.09	PJ
Renewable energy sources		19686	32247.7	33727.63	42515.7	PJ

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Other					
Residential					
Oil (fossil)					
Gas (fossil)					
Coal					
Renewable energy sources					
Other					
Transport	57079	66223	74888	85060	PJ
Oil (fossil)	57079	66223	74888	85060	PJ
Gas (fossil)	0	0	0	0	PJ
Coal	0	0	0	0	PJ
Renewable energy sources					PJ
Other					PJ
Assumptions on weather parameters (heating degree days)	4176	4176	4176	4176	
Assumptions for the industry sector					
<i>For Member States using macroeconomic models:</i>					
The share of the industrial sector in GDP and growth rate					
<i>For Member States using other models:</i>					
The production index for industrial sector					
Assumptions for the transport sector					
<i>For Member States using macroeconomic models:</i>					
The growth of transport relative to GDP					
<i>For Member States using other models:</i>					
The growth of passenger person kilometres					
The growth of freight tonne kilometres					
Assumptions for buildings (in residential and commercial or tertiary sector)					
<i>For Member States using macroeconomic models:</i>					
The level of private consumption (excluding private transport)					
The share of the tertiary sector in GDP and the growth rate					
<i>For Member States using other models:</i>					
The rate of change of floor space for tertiary buildings and dwellings					
The number of dwellings and number of employees in the tertiary sector					
Assumptions in the agriculture sector					
<i>For Member States using macroeconomic models:</i>					
The share of the agriculture sector in GDP and relative growth					
<i>For Member States using other models:</i>					
Livestock numbers by animal type (for enteric fermentation beef, cows, sheep, for manure management pigs and poultry)					
The area of crops by crop type					
Emissions factors by type of livestock for enteric fermentation and manure management (t)					

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Assumptions in the waste sector					
Waste generation per head of population or tonnes of municipal solid waste					
The organic fractions of municipal solid waste					
Municipal solid waste disposed to landfills, incinerated or composted (in tonnes or %)					
Assumptions in the forestry sector					
Forest definitions	Forest is the area within their geographic boundaries encompassing units larger than 0.1 ha. Forest management areas are also determined statistically within squares of 4 km grid.				
Areas of:					
managed forests					
unmanaged forests					

2. Recommended parameters on projections	2005	2010	2015	2020	Units
Assumptions for general economic parameters					
GDP growth rates split by industrial sectors in relation to 2000					
Comparison projected data with official forecasts					
Assumptions for the energy sector					
National coal, oil and gas energy prices per sector (including taxes)					
National electricity prices per sector as above (may be model output)					
Total production of district heating by fuel type					
Assumptions for the industry sector					
Assumptions fluorinated gases:					
Aluminium production and emissions factors					
Magnesium production and emissions factors					
Foam production and emissions factors					
Stock of refrigerant and leakage rates					
<i>For Member States using macroeconomic models:</i>					
Share of GDP for different sectors and growth rates					
Rate of improvement of energy intensity (1990 = 100)					
<i>For Member States using other models:</i>					
Index of production for different sectors					
Rate of improvement or index of energy efficiency					
Assumptions for buildings (in residential and commercial / tertiary sector)					
<i>For Member States using macroeconomic models:</i>					
Share of tertiary and household sectors in GDP					
Rate of improvement of energy intensity					
<i>For Member States using other models:</i>					
Number of households					

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Number of new buildings					
Rate of improvement of energy efficiency (1990 = 100)					
Assumptions for the transport sector					
<i>For Member States using econometric models:</i>					
Growth of transport relative to GDP split by passenger and freight					
Improvements in energy efficiency split by vehicle type					
Improvements in energy efficiency split by vehicle type, whole fleet/new cars					
Rate of change of modal split (passenger and freight)					
Growth of passenger road kilometres					
Growth of passenger rail kilometres					
Growth of passenger aviation kilometres					
Growth of freight tonne kilometres on road					
Growth of freight tonne kilometres by rail					
Growth of freight tonne kilometres by navigation					
Assumptions for the agriculture sector					
<i>For Member States using econometric models:</i>					
Agricultural trade (import/export)					
Domestic consumption (e.g. milk/beef consumption)					
<i>For Member States using other models:</i>					
Development of area of crops, grassland, arable, set-aside, conversion to forests etc					
Macroeconomic assumptions behind projections of agricultural activity					
Description of livestock (e.g. by nutrient balance, output/animal production, milk production)					
Development of farming types (e.g. intensive conventional, organic farming)					
Distribution of housing/grazing systems and housing/grazing period					
Parameters of fertiliser regime:					
Details of fertiliser use (type of fertiliser, timing of application, inorganic/organic ratio)					
Volatilisation rate of ammonia, following spreading of manure on the soil					
Efficiency of manure use					
Parameters of manure management system:					
Distribution of storage facilities (e.g. with or without cover):					
Nitrogen excretion rate of manures					
Methods of application of manure					
Extent of introduction of control measures (storage systems, manure application), use of best available techniques					
Parameters related to nitrous oxide emissions from agricultural soils					
Amount of manure treatment					

Source: MMS 2007

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