

# Lithuania

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## 1. SOURCES OF INFORMATION

Lithuania's 2007 submission to the European Commission under the Monitoring Mechanism, Decision 280/2004/EC (hereinafter MMS)

Lithuania's Third and Fourth National Communication under the United Nations Framework Convention on Climate Change, 2005 (hereinafter 4<sup>th</sup> NC)

National Allocation Plan for Participation of Lithuania in the European Community Scheme for Greenhouse Gases Emission Allowance Trading (For the period 2008 – 2012), Vilnius, 2006 (hereinafter NAP 2)

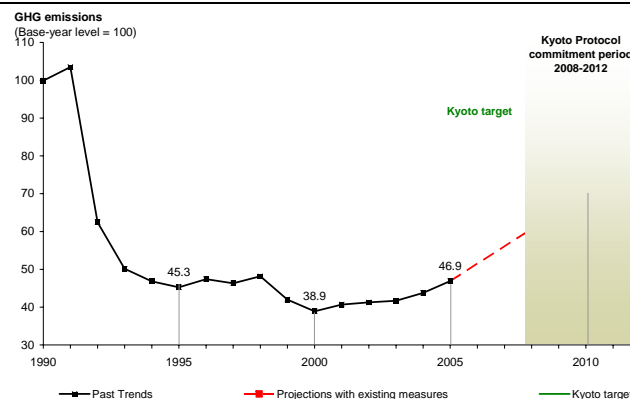
The European Community's initial report under the Kyoto Protocol - Report to facilitate the calculation of the assigned amount of the European Community pursuant to Article 3, paragraphs 7 and 8 of the Kyoto Protocol (Submission to the UNFCCC Secretariat), EEA Technical report No 10/2006.

European Climate Change Programme (ECCP), Database on Policies and Measures in Europe <http://www.oeko.de/service/pam/index.php>

2. SUMMARY

LITHUANIA

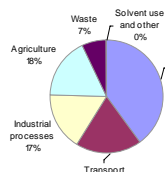
Emissions base year (initial report)	48.1 Mt
Emissions 2005	22.6 Mt
Emissions base year (for projections)	48.0 Mt
Projections with existing measures	33.5 Mt
No projections with additional measures	n.a.
Kyoto target (absolute)	44.3 Mt
Kyoto target (% from base year)	- 8.0 %
Change base year to 2005	- 53.1 %
Change 2004-2005	+ 7.2 %
Change base year to 2010 with existing measures	- 30.2 %
No projections with additional measures	n.a.
Distance to linear target path 2005	- 47.1 percentage points
Use of Kyoto mechanisms	n.a.
Sinks (Articles 3.3 and 3.4)	n.a.
Emissions in 1990 (Article 3.7)	n.a.



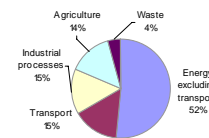
**Past emissions:** Lithuania's GHG emissions were 7.2 % above 2004 and 53.1 % below base-year levels in 2005. The main factors for increasing emissions with regard to 2004 were increased process-related emissions from chemical industry, increased emissions from agricultural soils and transport emissions. Decreased fuel consumption was mainly responsible for the decreases between 1990 and 2005. Emissions from enteric fermentation, agricultural soils and landfills also decreased substantially. As for other Baltic States, emissions from transport decreased until 2000, and increased since then substantially.

**Emission projections:** Lithuania significantly over-delivers on savings with a cut in greenhouse gas emissions of a about 55 % relative to the base year, compared with the target of an 8 % cut. Sectoral projections show that emissions will increase in all sectors except waste.

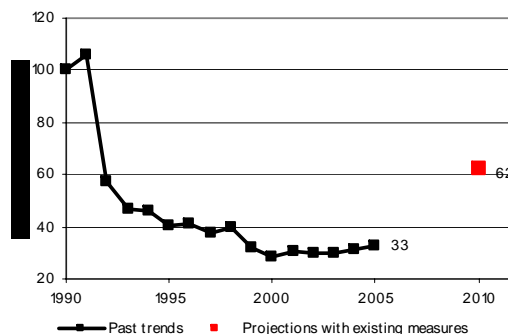
Emissions by sectors (2005)



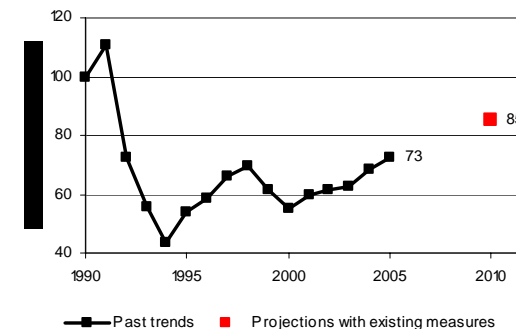
Emissions by sectors (2010)



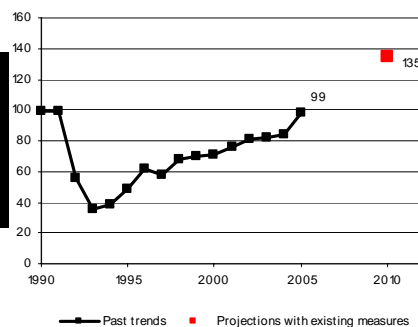
Energy excluding transport



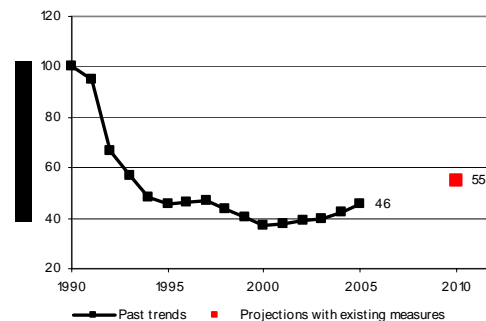
Transport



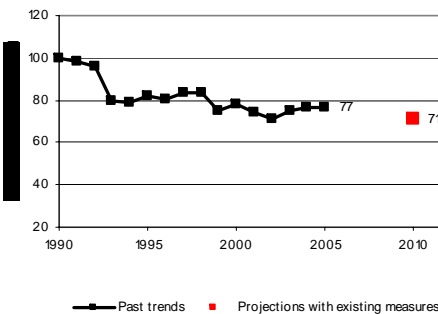
Industrial processes



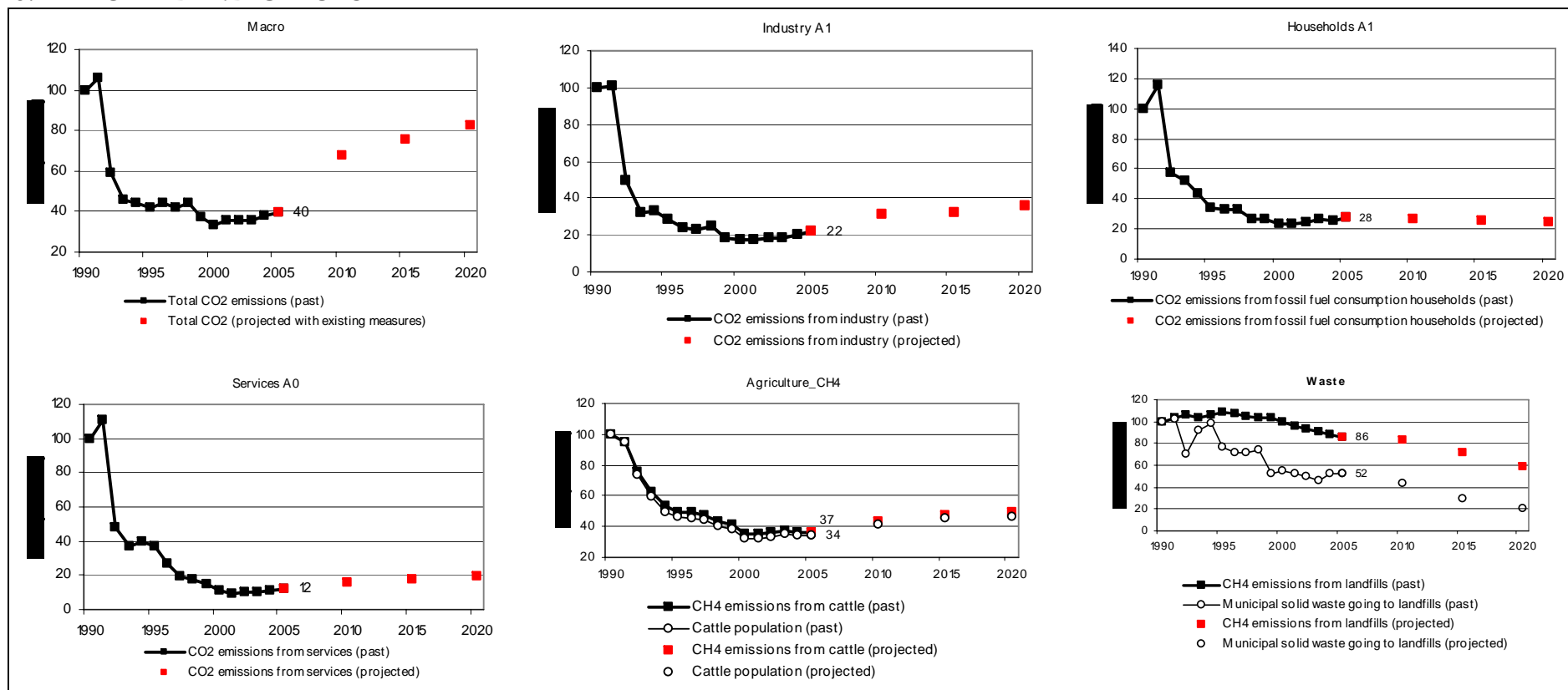
Agriculture



Waste



### 3. REPORTED INDICATORS



## LITHUANIA

Priority Indicators		1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Macro	Total CO <sub>2</sub> emissions, kt	35,670	37,779	21,074	16,328	15,640	14,961	15,661	15,046	15,890	13,224	11,919	12,690	12,784	12,828	13,431	14,156
	GDP, Bio Euro (EC95)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	18	19
Macro B0	CO <sub>2</sub> emissions from energy consumption, kt	32,672	34,785	19,524	15,604	14,658	13,666	14,130	13,667	14,382	11,821	10,516	11,201	11,235	11,315	11,947	12,579
	GDP, Bio Euro (EC95)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	18	19
Transport C0	CO <sub>2</sub> emissions from passenger cars, kt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2,034	2,108
	Number of kilometres by passenger cars, Mkm	-	-	-	-	-	-	-	-	-	-	-	-	-	-	11,384	16,808
Industry A1	CO <sub>2</sub> emissions from industry, kt	6,197	6,254	3,068	2,000	2,050	1,754	1,492	1,439	1,532	1,117	1,106	1,078	1,114	1,155	1,247	1,353
	Gross value-added total industry, Bio Euro (EC95)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	5
Households A1	CO <sub>2</sub> emissions from fossil fuel consumption households, kt	2,380	2,748	1,366	1,246	1,045	803	792	783	623	621	553	563	590	635	608	655
	Stock of permanently occupied dwellings, 1000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1,300	1,300
Services A0	CO <sub>2</sub> emissions from fossil fuel consumption in commercial and institutional sector, kt	3,090	3,426	1,471	1,139	1,219	1,141	819	606	541	451	348	283	313	318	341	366
	Gross value-added services, Bio Euro (EC95)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	9	10
Transformation B0	CO <sub>2</sub> emissions from public and autoproducer thermal power stations, kt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3,809	3,926
	All products - output and autoproducer thermal power stations, PJ	-	-	-	-	-	-	-	-	-	-	-	-	-	-	34	36

## LITHUANIA

Additional Priority Indicators		1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Transport D0	CO <sub>2</sub> emissions from freight transport on road, kt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1,601	1,673
	Freight transport on road, Mtkm	-	-	-	-	-	-	-	-	-	-	-	-	-	-	12,279	15,908
Industry A1.1	Total CO <sub>2</sub> emissions from iron and steel, kt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Gross value-added - iron and steel industry, Bio Euro (EC95)	ND	ND	ND	ND	ND	0	0	0	0	0	0	0	0	0	0	0
Industry A1.2	Energy related CO <sub>2</sub> emissions chemical industries, kt	413	446	193	115	119	117	129	139	147	109	88	67	17	22	107	115
	Gross value-added - chemical industry, Bio Euro (EC95)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	0
Industry A1.3	Energy related CO <sub>2</sub> emissions - glass pottery and building materials industry, kt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	473	549
	Gross value added - glass pottery and building materials industry, Bio Euro (EC95)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	0
Industry C0.1	Total CO <sub>2</sub> emissions from iron and steel, kt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Production of oxygen steel	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Industry C0.2	Energy related CO <sub>2</sub> emissions from glass, pottery and building materials, kt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	473	549
	Cement production, kt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	753	832

Supplementary Indicators		1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Transport B0 (diesel)	CO <sub>2</sub> emissions of diesel-driven cars, kt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	385	426
	Number of km, of diesel-driven passenger cars, Mio km	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7,509	3,549
Transport (B0) (petrol)	CO <sub>2</sub> emissions of petrol-driven cars, kt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1,042	1,019
	Number of km, of petrol-driven passenger cars, Mio km	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2,779	9,163
Transport C0	CO <sub>2</sub> emissions from passenger cars, kt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Passenger transport by cars, Mpkm	-	-	-	-	-	-	-	-	-	-	-	-	-	-	25,799	34,793
Transport E1	CO <sub>2</sub> emissions from domestic air transport, kt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Domestic air passenger, Mio	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	0
Industry A1.4	Energy related CO <sub>2</sub> emissions food industry, kt	758	811	542	269	335	308	409	378	390	272	288	311	288	307	286	277
	Gross Value Added food, drink and tobacco industry, Mio EUR (EC95)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	596	694
Industry A1.5	Energy related CO <sub>2</sub> emissions - paper and printing industry, kt	262	289	182	71	88	81	91	89	79	58	53	57	55	23	1	4
	Gross value added paper and printing industry, Mio EUR (EC95)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	206	212
Households A0	Surface area of permanently occupied dwellings, Mio m <sup>2</sup>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	608	655
	Specific CO <sub>2</sub> emissions of households for space heating, t/m <sup>2</sup>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	80	80
Services B0	CO <sub>2</sub> emissions from space heating in commercial and institutional, kt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	341	366
	Surface area of services buildings, Mio m <sup>2</sup>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1
Transformation D0	CO <sub>2</sub> emissions from public thermal power stations, kt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3,695	3,803
	All products output by public thermal power stations, PJ	-	-	-	-	-	-	-	-	-	-	-	-	-	-	68	70
Transformation E0	CO <sub>2</sub> emissions from autoproducer, kt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	114	122
	All products output by autoproducer thermal power stations, PJ	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	2
Transformation	CO <sub>2</sub> emissions from classical power production, kt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3,809	3,926
	All products output by public and autoproducer power stations, PJ	-	-	-	-	-	-	-	-	-	-	-	-	-	-	70	72
Transport	CO <sub>2</sub> emissions from transport, kt	5,652	6,243	4,108	3,143	2,467	3,031	3,311	3,720	3,921	3,487	3,107	3,377	3,485	3,550	3,887	4,123
	Total final energy consumption from transport, PJ	-	-	-	-	-	-	-	-	-	-	-	-	-	-	54	60
Industry	Energy related CO <sub>2</sub> emissions paper and printing industries, kt	262	289	182	71	88	81	91	89	79	58	53	57	55	23	1	4
	Physical output of paper, kt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	149	113
Industry	CO <sub>2</sub> emissions from the industry sector	6,197	6,254	3,068	2,000	2,050	1,754	1,492	1,439	1,532	1,117	1,106	1,078	1,114	1,155	1,247	1,353
	Total final energy consumption from industry, PJ	-	-	-	-	-	-	-	-	-	-	-	-	-	-	22	42
Households	CO <sub>2</sub> emissions from households, kt	2,380	2,380	2,748	1,366	1,246	1,045	803	792	783	623	621	553	563	590	635	608
	Total final energy consumption from households, PJ	-	-	-	-	-	-	-	-	-	-	-	-	-	-	27	58

**Base-year emissions**

Base-year emissions of greenhouse gases are reported in the MMS. They are calculated using 1990 emissions for carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>) and nitrous oxide (N<sub>2</sub>O). They equal 48 Mt CO<sub>2</sub> eq.

It should be noted here that the year 1995 is chosen for emissions of fluorinated gases - hydrofluorocarbons (HFC), perfluorocarbons (PFCs), and sulphur hexafluoride (SF<sub>6</sub>). Unfortunately, the historical emissions of these gases are not reported, and the base year level of emissions of these gases is not included in the calculation of the total level of base year GHG emissions in Lithuania.

Base year data is consistent with data reported in *The European Community's initial report under the Kyoto Protocol - Report to facilitate the calculation of the assigned amount of the European Community pursuant to Article 3, paragraphs 7 and 8 of the Kyoto Protocol (Submission to the UNFCCC Secretariat)*, EEA Technical report No 10/2006 which equals to 48.103 Mt CO<sub>2</sub> eq. It should be noted that this data is currently undergoing a review procedure by UNFCCC and is therefore subject to change.



## 4. OVERVIEW OF CCPM IMPLEMENTATION IN LITHUANIA

Table 1. Information provided on the implementation of policies and measures

Sector	CCPM	Status
Cross-cutting	Emissions trading 2003/87/EC	N
Cross-cutting	Kyoto Protocol project mechanisms 2004/101/EC	B
Cross-cutting	Integrated pollution prevention and control 96/61/EC	R
Energy supply	Promotion of cogeneration 2004/8/EC	R
Energy supply	Taxation of energy products 2003/96/EC	R
Energy supply	Internal electricity market 2003/54/EC	R
Energy supply	Promotion of electricity from RE sources 2001/77/EC	N
Energy supply	Internal market in natural gas 98/30/EC	
Energy supply	Emissions from large combustion plants 88/609/EEC	
Energy consumption	Directives on energy labelling of appliances	
Energy consumption	End-use efficiency and energy services 2006/32/EC	R
Energy consumption	Ecodesign requirements for energy-using products 2005/32/EC	
Energy consumption	Energy performance of buildings 2002/91/EC	N
Energy consumption	Eco-management & audit scheme (EMAS) EC 761/2001	
Energy consumption	Energy-efficiency labelling for office equipment Regulation No. 2422/2001	
Energy consumption	Efficiency fluorescent lighting 2000/55/EC	
Energy consumption	Efficiency of hot water boilers 92/42/EEC	
Transport	Environmental performance freight transport (Marco Polo Programme)	
Transport	Motor challenge, voluntary EC programme	
Transport	Promotion of biofuels for transport 2003/30/EC	N
Transport	Integrated European railway area (2 <sup>nd</sup> + 3rd Railway package) (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.	
Industrial Process	F-gas regulation (Regulation No 842/2006)	
Industrial Process	HFC emissions from air conditioning in motor vehicles 2006/40/EC	
Agriculture	Support under CAP (1782/2003)	
Agriculture	Support under CAP - amendment (1783/2003)	
Agriculture	Nitrates 91/676/EEC	
Agriculture	Transition to rural development support No 2603/1999	
Agriculture	Agricultural production methods compatible with environment Regulation (EEC) No 2078/92	
Agriculture	Aid scheme for forestry measures in agriculture (Regulation (EEC) No 2080/92)	
Agriculture	Emission by engines to power agricultural or forestry 2000/25/EC	
Agriculture	Pre-accession measures for agriculture and rural development Regulation (EC) No 1268/1999	
Waste	Directive on waste 2006/12/EC	
Waste	Landfill directive 1999/31/EC	N
Waste	Packaging and packaging waste (Directive 94/62/EC, 2004/12/EC, 2005/20/EC)	N

*Legend*

<b>New national PAM implemented after CCPM was adopted</b>	<b>N</b>
<b>Existing national PAM re-enforced by CCPM</b>	<b>R</b>
<b>National PAM already in force before CCPM was adopted</b>	<b>B</b>
<b>Not reported</b>	

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

## 5. COMPLETENESS OF REPORTING

Lithuania provides extensive information on policies and measures through its 4 NC and MMS. It should be noted that the main information on policies and measures is provided in the 4 NC. The MMS reports the adoption of several new (relative to the 4 NC) national strategies as well as sums up information about some policies already mentioned in the 4 NC. Of particular note, the MMS presents cost and impact assessments for each policy. The level of information provided in the MMS is summarized in Tables 1 and 2.

**Table 2. Information provided on policies and measures**

Information provided	Level provided	Comments
Policy names	+++	The policy names are provided. Moreover, they are summarized in one Table 4-1. in the 4 NC.
Objective of policies	++	Some references to policy instruments made in text
Which greenhouse gases?	+++	Clear.
Status of Implementation	+++	Provided
Implementation body specified	++	Provided for most P&Ms
Quantitative assessment of implementation	+++	Impact of P&Ms is quantified
Interaction with other P&Ms discussed	++	Interaction discussed with other P&Ms

Lithuania provides rather extensive information on projections through its 4 NC and MMS though there is the room for improvement in the modelling section.

**Table 3. Information provided on projections**

Category of Information	Level of Information Provided	Comments
Scenarios considered	++	There are two scenarios: "with measures" scenario and "with additional measures" scenario. These two scenarios coincide in 2000, 2005, 2010 and 2015. There is only one WAM policy the effect of which appears only in 2020.
Expressed relative to inventory for previous years	o	No analysis presented.
Starting year	+++	2000
Projections	++	Projections for non-energy sectors cover only

		some sub-sectors: mineral products, chemical industry (industrial processes), enteric fermentation, manure management and agricultural soils (agriculture), biomass growth (LULUCF) and CH <sub>4</sub> emission from landfill (waste)
Split of projections	+++	6 sectors for CO <sub>2</sub> , CH <sub>4</sub> , N <sub>2</sub> O. The data on the seventh sector (Other) is not available.
Presentation of results	+++	Activity charts and tables are provided by sector.
Description of model (level of detail, approach and assumptions)	++	Description of energy model given
Sensitivity analysis (key inputs to model / high, central and low projections scenarios)	o	Not provided
Discussion of uncertainty	o	Not provided
Details of parameters and assumptions	+++	Extensive list of parameters is provided

## 6. ASSESSMENT OF POLICIES AND MEASURES

The documents describe policies and measures implemented since 1990 which have had, or are expected to have, a large impact on greenhouse gas emissions in the Lithuania.

The structure of policies and measures follow the structure of CCPM under both European Union Climate Change Programmes. No GHG reduction targets are set for separate sectors. However, almost all the policies mentioned have quantifiable targets expressed in terms other than GHG emission reductions. For instance, these are the number of CHP units to be installed, the threshold for CHP energy efficiency, the area covered by forests, etc. In chapter 5 (Projections and the total effects of Policies and Measures) as well as in MMS these targets are translated into GHG reductions.

A list of ministries and agencies responsible for a policies' implementation is provided in almost all cases.

The policies and measures are provided by sector using the sectoral definitions requested by the UNFCCC guidelines (Energy, Transport, Industry, Agriculture, Forestry, and Waste). Additionally, information on policies in the buildings sector (households and services sector) and on cross-sectoral policies is provided. The effects of cross-sectoral policies are included in the respective sectors. Policies and measures which have been discontinued but still have impacts on emission levels are included in the projections.

There are two scenarios for projections, i.e. "with measures" and "without measures". However, there is only one policy reported under "with additional measures" scenario, i.e. construction of new nuclear power plant, which will start to have effect on emissions in 2020. Thus, up to 2020 there is no difference in the scenarios.

Table 4 provides information on the overall effect of implementation of existing and additional policies and measures, according to reported emission reduction potentials from individual policies in 2010.

Table 5 provides an overview over all policies and measures included in the projections. The policies whose status is planned are only included in the 'with additional measures' scenario

(there is only one policy under with additional measures scenario, i.e. construction of the nuclear power plant).

**Table 4. Summary of the effect of policies and measures included in the 2010 projections (Mt CO<sub>2</sub>-eq.)**

	With measures	With additional measures
Energy (total, excluding transport)	0.947	NE
Energy supply	0.647	NE
Energy – industry, construction	NE	NE
Energy – other (commercial, residential, agriculture)	0.3	NE
Transport (energy)	0.697	NE
Industrial processes	0.48	NE
Waste	0.01	NE
Agriculture	NE	NE
Cross-sectoral	0.03	NE
<b>Total (excluding LULUCF)</b>	<b>2.2</b>	<b>NE</b>

Source: MMS 2007

Table 5. Detailed information on policies and measures

## Policies and measures in the “with measures” projection

Sector	Projection Scenario	Name	Type	GHG	Status	Absolute Reduction [kt CO <sub>2</sub> eq. p.a.]		
						2005	2010	2020
Cross-cutting	WM	<a href="#">National allocation plan for GHG emission allowances for the period 2005-2007</a>	Economic	CO <sub>2</sub>	implemented			
Energy consumption	WM	<a href="#">Energy saving in residential houses</a>	Economic Information	CH <sub>4</sub> CO <sub>2</sub> N <sub>2</sub> O	implemented		300	
Energy consumption Transport		<a href="#">Increase in energy efficiency</a>	Education Information Regulatory Research	CO <sub>2</sub>				
Energy supply	WM	<a href="#">Installation of combined cycle gas turbine unit in the Lithuanian Power Plant</a>	Planning	CO <sub>2</sub>	implemented			
Energy supply	WM	<a href="#">Construction of Combined heat and power plants</a>	Planning	CH <sub>4</sub> CO <sub>2</sub>	implemented	304	345	483
Energy supply	WM	<a href="#">Use of renewable energy resources</a>	Planning	CH <sub>4</sub> CO <sub>2</sub> N <sub>2</sub> O	implemented	235	302	451
Industrial Processes	WM	<a href="#">Pollution prevention in industry</a>	Education Regulatory	CO <sub>2</sub>	implemented	510	480	420
Forestry	WM	<a href="#">Expansion of forest area</a>		CO <sub>2</sub>	implemented		33	
Transport	WM	<a href="#">Implementation of Energy efficiency programme</a>	Economic	CO <sub>2</sub>	implemented	442	442	410
Energy supply	WM	<a href="#">Promotion of biofuel use in transport</a>	Planning	CH <sub>4</sub> CO <sub>2</sub>	implemented			
Waste	WM	<a href="#">Reduction of biodegradable waste disposed of in landfills</a>	Regulatory	CH <sub>4</sub>	implemented		10	21

Source: Öko Institut, (accessed 06/2007), ECCP Policies and Measures database, <http://www.oeko.de/service/pam/index.php>

## Policies and measures in the “with additional measures” projection

<u>Sector</u>	Projection Scenario	Name	Type	GHG	Status	Absolute Reduction [kt CO <sub>2</sub> eq. p.a.]		
						2005	<u>2010</u>	2020
Energy supply	WAM	<a href="#">Construction of new nuclear power plant</a>	Planning	CH <sub>4</sub> CO <sub>2</sub> N <sub>2</sub> O	planned			2,300

Source: Öko Institut, (accessed 06/2007), ECCP Policies and Measures database, <http://www.oeko.de/service/pam/index.php>

## 7. EVALUATION OF PROJECTIONS

Table 6 provides the results of the projections for the year 2010 for the 'with measures' and the 'with additional measures' variant. The results are split by greenhouse gas. The same information split by sector is presented in tables 7 and 8. Figure 1 demonstrates the share of greenhouse gas emissions by sector for the year 2010 in to the "With Measures" projections. In table 9 the total emissions of the projections for the years 2010, 2015 and 2020 for the 'with additional measures' variant are summarised.

In table 10 the results of the target assessment are shown with a comparison of 2010 projections reported in 2005, 2006 and 2007.

**Table 6. Summary of projections by gas in 2010 (Mt CO<sub>2</sub>-eq.)**

	Base-year	With measures	With additional measures
Carbon dioxide (excl. LULUCF)	35.67	23.66	23.66
Methane	6.14	3.56	3.56
Nitrous oxide	6.16	6.26	6.26
HFCs	NE	NE	NE
PFCs	NE	NE	NE
SF <sub>6</sub>	NE	NE	NE
<b>Total (excl. LULUCF)</b>	<b>48.0</b>	<b>33.5</b>	<b>33.48</b>
% change relative to base year (excl. LULUCF)		-30.21%	-30.21%

Source for data is MMS 2007

**Table 7. Summary of projections (6 gas basket) by sector in 2010 (Mt CO<sub>2</sub>-eq.)**

	Base-year	with measures	% change relative to base-year	with additional measures	% change relative to base-year
Energy (total, excluding transport)	27.65	17.3	-37.6%	17.3	-37.6%
Energy supply	14.1	13.3	-5.7%	13.3	-5.7%
Energy – industry, construction	6.3	1.9	-69.0%	1.9	-69.0%
Energy – other (commercial, residential, agriculture)	7.3	2.0	-72.6%	2.0	-72.6%
Transport (energy)	5.8	4.9	-14.6%	4.9	-14.6%
Industrial processes	3.8	5.1	34.5%	5.1	34.5%
Waste	1.9	1.4	-28.5%	1.4	-28.5%
Agriculture	8.8	4.8	-45.3%	4.8	-45.3%
<b>Total (excl. LULUCF)</b>	<b>48.0</b>	<b>33.5</b>	<b>-30.2%</b>	<b>33.5</b>	<b>-30.2%</b>

Source for data is MMS 2007

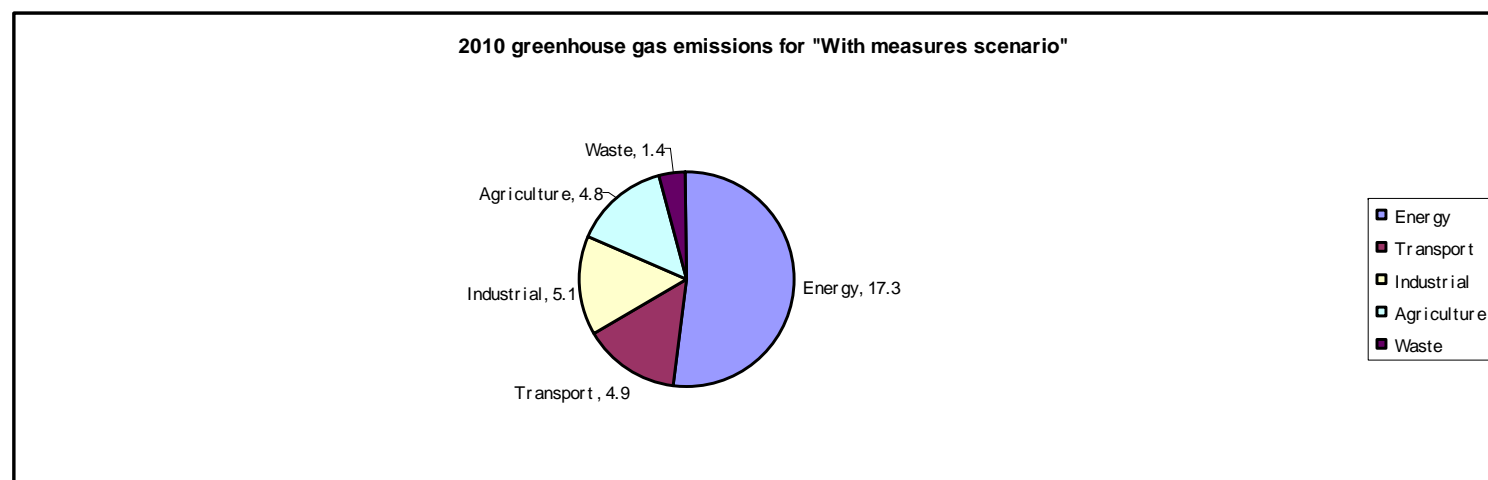




Table 8. Summary of projections by sector and by gas in 2010 (Mt CO<sub>2</sub>-eq.) compared to base-year emissions

	Carbon dioxide			Methane			Nitrous oxide			F-gases (SF <sub>6</sub> , HFCs and PFCs)		
	Base-year	With measures	With additional measures	Base-year	With measures	With additional measures	Base-year	With measures	With additional measures	Base-year	With measures	With additional measures
Energy (excl. transport)	27.02	16.546	16.546	0.39597	0.54043	0.54043	0.23036	0.16513	0.16513	NE	NE	NE
Transport (energy)	5.65	4.834	4.834	0.06822	0.05146	0.05146	0.06748	0.05954	0.05954	NE	NE	NE
Industrial processes	2.99352	2.2761	2.2761	0.00378	0.00210	0.00210	0.77129	2.79087	2.79087	NE	NE	NE
Waste	0.004	0.0064	0.0064	1.91638	1.30469	1.30469	0.00026	0.062	0.062	NE	NE	NE
Agriculture	0	0	0	3.7548	1.65751	1.65751	5.09299	3.18519	3.18519	NE	NE	NE
<b>Total (excl. LULUCF)</b>	<b>35.6703</b>	<b>23.6625</b>	<b>23.6625</b>	<b>6.13914</b>	<b>3.55619</b>	<b>3.55619</b>	<b>6.16239</b>	<b>6.2627</b>	<b>6.26272</b>	<b>NE</b>	<b>NE</b>	<b>NE</b>

Figure 1. Share by sector of 2010 greenhouse gas emissions according to the "With existing measures" projections



**Table 9. Summary of projections (6 gas basket) in 2010, 2015 and 2020 (Mt CO<sub>2</sub>-eq.) under "with additional measures" scenario**

	Base-year*	2010	2010 % of base- year level	2015	2015 % of base- year level	2020	2020 % of base- year level
Total (excl. LULUCF)	48.0	33.5	69.79%	38.5	80.31%	44.1	91.99%

Base year is 1990 for all gases except 1995 for F-gases

'With measures' projections.

Source for data is MMS 2007

**Table 10. Assessment of the target (6 gas basket), with a comparison of 2010 projections in 2005, 2006 and 2007 national reports excluding LULUCF\***

	Emissions in MtCO <sub>2</sub> -equiv., excluding LULUCF			
	2010 projections from 2005	2010 projections from 2006	2010 projections from 2007**	2010 projections from 2007 % of base- year level
Base year emissions used for projections	50.9	51.0	48.0	100.0%
Kyoto Commitment/burden sharing	46.9	46.9	44.2	-8.0%
With existing P&Ms projections	25.2	25.2	33.5	69.8%
Gap (-ve means overachievement of target)	-21.7	-21.7	-10.7	-22.2%
With additional P&Ms projections	25.2	25.2	33.5	69.8%
Remaining gap	-21.7	-21.7	-10.7	-22.2%
Effect of flexible mechanisms	0.0	0.0	0.0	NA
Remaining gap (with use of flexible mechanisms)	-21.7	-21.7	-10.7	-22.2%

Source for 2005 data is Greenhouse gas emission trends and projections in Europe 2005, European Environmental Agency Report No8/2005.

Source for 2006 data is Greenhouse gas emission trends and projections in Europe 2006, European Environmental Agency Report No9/2006.

Source for 2007 data is the MMS 2007.

\*LULUCF will be covered in the main report, based on the questionnaire submissions

\*\*Base year data is consistent with data reported in *The European Community's initial report under the Kyoto Protocol - Report to facilitate the calculation of the assigned amount of the European Community pursuant to Article 3, paragraphs 7 and 8 of the Kyoto Protocol (Submission to the UNFCCC Secretariat)*, EEA Technical report No 10/2006 (48.103 MtCO<sub>2</sub>-eq). This data is currently undergoing a review procedure by UNFCCC and is therefore subject to change.

The result of the JI projects implemented on the territory of Lithuania will not affect the Kyoto surplus of the country since Lithuania is a host country of JI projects.

In Table 11 a comparison is drawn concerning the projections for the trading sector between emissions projections for the year 2010 under the 'with additional measures' scenario as reported in MMS 2007 and the NAP 2. It should be noted that energy use from industry is normally included in the energy sector for projections under the UNFCCC and included in the industry sector for NAP 2 projections. Due to these and other differences in the sector definitions projections for the individual sectors might not be comparable.

**Table 11 Comparison with projections for the trading sector (EU ETS)**

	MM Submission	NAP 2 projections	Difference
Energy sector	17.120 <sup>a</sup>	17.956 <sup>c</sup>	0.836
Energy sector included in EU ETS	14.862 <sup>b</sup>	15.938 <sup>d</sup>	1.076
Industry sector	5.069 <sup>e</sup>	8.134 <sup>g</sup>	3.065
Industry sector included in EU ETS	3.959 <sup>f</sup>	3.945 <sup>h</sup>	-0.014
Total Energy & Industry	22.19	26.09	3.9

<sup>a</sup> Included are GHG emissions from the energy sector excluding transport (1.A.3) as reported in MMS 2007 under “with additional measures” scenario

<sup>b</sup> Included are CO<sub>2</sub> emissions from the sectors energy industries (1.A.1), Manufacturing industries and construction (1.A.2), Other (1.A.5), Fugitive emissions from fuels (1.B), Solvent and other product use(3), Other (7) as reported

<sup>c</sup> Included are GHG emissions from Energy Generation (1.A.1) and Commercial and institutional, Residential, and Agricultural energy use (1.A.4) as reported in the NAP 2 Summary Table Recent and projected greenhouse gas emissions per common reporting format sector

<sup>d</sup> Included are CO<sub>2</sub> emissions from installation covered by EU ETS as reported in the NAP 2 Summary Table Recent and projected greenhouse gas emissions per common reporting format sector

<sup>e</sup> Included are GHG emissions from the Industrial processes as reported in MMS 2007 under “with additional measures” scenario

<sup>f</sup> Included are CO<sub>2</sub> emissions from the Industrial processes and energy use in other sectors (1.A.4) as reported in MMS 2007 under “with additional measures” scenario

<sup>g</sup> Included are GHG emissions from Industrial Processes (2) and All Other Sectors as reported in the NAP 2 Summary Table Recent and projected greenhouse gas emissions per common reporting format sector

<sup>h</sup> Included are CO<sub>2</sub> emissions from installations covered by EU ETS from Industrial Processes (2) and All Other Sectors as reported in the NAP 2 Summary Table Recent and projected greenhouse gas emissions per common reporting format sector

## 8. DESCRIPTION OF MODELLING APPROACH

Though the projection indicators are presented in more detail in the MMS than in 4 NC, no additional information is provided about the modelling approach. Therefore, the information below is from the 4 NC.

In the Energy Sector the model used was a simulation model MAED (Model of Analysis of Energy Demands). Projections of energy demand and consumption were provided until 2020.

Calculation projections of emissions of greenhouse gases from industrial processes and agriculture sectors are based on the European Union's Clean Air for Europe (CAFÉ) Program. The baseline scenarios were developed by IIASA and local experts.

There is a list of parameters against which sensitivity of model can be checked as well as a list of uncertainties. However, there is no detailed discussion how these parameters and uncertainties are included in the model.

## 9. PROJECTION INDICATOR REPORTING

Table 12 shows the projection indicators for monitoring and evaluating progress with regard to policies and measures as well as the given numerators and denominators. Comprehensive information has been provided for the years 2005, 2010, 2015 and 2020

## 10. REPORTING OF PARAMETERS ON PROJECTIONS

The mandatory parameters for projection are provided in Table 13. For most parameters, information is provided in absolute values for the years 2010 and 2020; in some cases relative data are provided. Only for the energy demand split by fuel are no projections available.

Table 12. Indicators for projections to monitor and evaluate progress with policies and measures (2005/166/EC) Annex III

No	Eurostat Sectors	Indicator	2005	2010	2015	2020	Numerator/ denominator	2005	2010	2015	2020
1	Macro	CO <sub>2</sub> intensity of GDP, t/Euro million	0.738492505	0.981853621	0.859671643	0.775296423	Total CO <sub>2</sub> emissions, kt	14156	23663	27229	30970
							GDP, bio Euro (EC95)	19169.37	24465.51	31224.88	37989.84
2	Transport C0	CO <sub>2</sub> emissions from passenger cars, kt	2108.446	2143.235359	2092.869328	1958.925691					
		Number of kilometres by passenger cars, Mkm	16808	17984.56	18883.788	19639.139					
3	Transport D0	CO <sub>2</sub> emissions from freight transport (all modes), kt	1673.448	2142.000561	2413.774336	2496.216719					
		Freight transport (all modes), Mtkm	15908	21894.75007	27414.14	33353.488					
4	Industry A1	Energy related CO <sub>2</sub> intensity of industry, t/Euro million	290.4356161	254.7304008	190.7247183	168.7570002	CO <sub>2</sub> emissions from fuel consumption industry, kt	1352.98	1910.97	1969.34	2224.04
							Gross value-added total industry, Bio Euro (EC 95)	4.66	7.50	10.32	13.18
5	Households A1	Specific CO <sub>2</sub> emissions of households, t/dwelling	0.503882262	0.488765795	0.474102821	0.45039768	CO <sub>2</sub> emissions from fossil fuel consumption households, kt	654.79	635.15	616.09	585.29
							Stock of permanently occupied dwellings, 1000	1299.5	1299.5	1299.5	1299.5

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6	Services A0	CO <sub>2</sub> intensity of the services sector, t/Euro million	38.05191141	36.14931584	32.53438425	29.28094583	CO <sub>2</sub> emissions from fossil fuel consumption services, kt	365.58	478.00	538.65	589.82
							gross value-added services, bio Euro (EC95)	9.61	13.22	16.56	20.14
7	Transformation B0	Specific CO <sub>2</sub> emissions of public and autoproducer power plants, t/TJ	0.435697806	1.088610556	1.010122309	0.747736384	CO <sub>2</sub> emissions from public and autoproducer thermal power stations, kt	3926	12932.69	14111.41	14573.38
							all products-output by public and autoproducer thermal power stations, GWhe	6883	11880	13970	19490
8	Agriculture	Specific N <sub>2</sub> O emissions of fertilizer and manure use, kg/kg	0.019642857	0.0504	0.0504	0.0504	N <sub>2</sub> O emissions from synthetic fertilizer and manure use, kt	2.71	8.89	11.34	14.48
							use of synthetic fertiliser and manure, kt nitrogen	138.18	176.36	225.08	287.27
9	Agriculture	Specific CH <sub>4</sub> emissions of cattle production, kg/head	0.069010746	0.069010746	0.069010746	0.069010746	CH <sub>4</sub> emissions from cattle, kt	55.23	65.22	72.00	74.74
							cattle populations, 1000 head	800.3	945.1	1043.27	1083.00
10	Waste	Specific CH <sub>4</sub> emissions from landfills, kt/kt	0.042958002	0.049606774	0.062980549	0.076178119	CH <sub>4</sub> emissions from landfills, kt	44.29	42.78	36.76	30.58
							Municipal solid waste going to landfills, kt	1031	579.72	816.74	1082.08

**Table 13. List of parameters on projections (Annex IV of Implementing Provisions<sup>1</sup>)**

<b>1. Mandatory parameters on projections</b>	<b>2005</b>	<b>2010</b>	<b>2015</b>	<b>2020</b>
<b>Assumptions for general economic parameters</b>				
GDP (GDP, bio Euro (EC95))	19169.37	24465.51322	31224.88344	37989.84507
Population (thousand people)	3425.3	3363.68	3302.06	3240.44
International coal prices at given years in Euro per tone or GJ (Gigajoule)				
International oil prices at given years in Euro per barrel or GJ	32.51	23.44	24.42	25.48
International gas prices EUR (2000)/m <sup>3</sup>	0.23	0.19	0.20	0.21
<b>Assumptions for the energy sector</b>				
Total gross inland consumption (PJ) (split by oil,gas,coal,renewables,nuclear,other)	216.85	362.733	388.845	416.837
Oil (fossil) PJ	84.954	141.466	147.761	154.23
Gas (fossil) PJ	93.049	163.23	174.98	187.577
Coal PJ	8.583	10.882	7.777	4.168
Renewable energy sources PJ	30.264	47.155	58.327	70.862
Nuclear (IEA definition of energy calc) PJ	109.25	0	0	0
Net electricity import PJ	10.7	0	0	4
Other PJ				
Total electricity production by fuel type (oil, gas, coal, renewables, nuclear, other) GWhe	6883	11880	13970	19490
Oil (fossil) Gwhe	1353	7185	8242	11206
Gas (fossil) Gwhe	5043	3824	4330	6375
Coal Gwhe	42	425	234	86
Renewable Gwhe	445	446	1164	1823
Nuclear (IEA definition for energy calc. Gwhe	10338	0	0	0
Other GWhe				
Energy demand by sector split by fuel (delivered)	118828.02	173227.519	184043.5123	211218.7917
Energy Industries	211.017	176.949	195.809	200.809
Oil (fossil) PJ	19.309	107.015	115.529	115.454
Gas (fossil) PJ	71.976	56.951	60.693	65.683
Coal PJ	0.603	6.336	3.274	0.885

<sup>1</sup> Commission Decision of 10 February 2005 laying down rules implementing Decision No 280/2004/EC of the European Parliament and of the Council concerning a mechanism for monitoring Community greenhouse gas emissions and for implementing the Kyoto Protocol

Renewable energy sources PJ	6.345	6.647	16.313	18.787
Nuclear (IEA definition of energy calc) PJ	112.784	0	0	0
Other PJ				
<b>Industry</b>	<b>24120</b>	<b>44926.09004</b>	<b>45349.76823</b>	<b>51018.25866</b>
Oil (fossil) PJ	3799	3942.8595	4006.112305	4282.921515
Gas (fossil) PJ	12133	30929.682	30783.58738	34719.30888
Coal PJ	3955	3448.6011	3652.000092	3307.984224
Renewable energy sources PJ	4233	6604.94744	6908.068455	8708.044037
Other PJ				
<b>Commercial (Tertiary)</b>	<b>37418</b>	<b>61901.47996</b>	<b>63609.93508</b>	<b>74939.72402</b>
Oil (fossil) PJ	4767	4819.0505	4896.359484	5234.681852
Gas (fossil) PJ	8940	20619.788	20522.39159	23146.20592
Coal PJ	4025	4214.9569	4463.555668	4043.091829
Renewable energy sources PJ	19686	32247.68456	33727.62834	42515.74442
Other PJ				
<b>Residential</b>				
Oil (fossil) PJ				
Gas (fossil) PJ				
Coal PJ				
Renewable energy sources PJ				
Other PJ				
<b>Transport</b>	<b>57079</b>	<b>66223</b>	<b>74888</b>	<b>85060</b>
Oil (fossil) PJ	57079	66223	74888	85060
Gas (fossil) PJ	0	0	0	0
Coal PJ	0	0	0	0
Renewable energy sources PJ				
Other PJ				
Assumptions on weather parameters, especially heating or cooling degree days				
Heating Degree Days	4176	4176	4176	4176
Cooling Degree Days	0	0	0	0
<b>Assumptions for the industry sector</b>				
<b>Gross value-added total industry, Bio Euro (EC95) 2000</b>	<b>4.65846</b>	<b>7.501935584</b>	<b>10.32554567</b>	<b>13.178954</b>
The share of the industrial sector in GDP and growth rate				
Manufacturing, Bio Euro 2000	3.8375436	6.180402362	8.506309094	10.85644546
Construction, Bio Euro 2000	1.3213711	2.128081357	2.928954579	3.738170727
The growth of the industrial sector in GDP				



Manufacturing, Bio Euro 2000	10.0%	7.0%	5.0%	5.0%
Construction, Bio Euro 2000	10.0%	7.0%	5.0%	5.0%
<b>Assumptions for the transport sector</b>				
<b>For Member States using macroeconomic models:</b>				
The growth of transport relative to GDP (Gg fuel consumed/GDP)	0.0711327	0.064662918	0.057294401	0.05348828
<b>For Member States using other models:</b>				
The growth of passenger person kilometres (ml passenger km)	5310	6971.902764	8320.047175	9645.214987
Number of kilometres by passenger cars, Mkm	16808	17984.56	18883.788	19639.13952
The growth of freight tonne kilometres	34787	47878.59384	59948.1745	72936.1205
Freight transport (all modes) Mtkm	15908	21894.75007	27414.13631	33353.48851
<b>Assumptions for buildings (in residential and commercial or tertiary sector)</b>				
Gross value-added — services, Bio Euro (EC95)	9.607407	13.2230183	16.55637196	20.143358
<b>For Member States using macroeconomic models:</b>				
The level of private consumption (excluding private transport)	23761.991	30637.6668	35892.23011	40832.4643
The share of the tertiary sector in GDP and the growth rate	10.412905	14.33165416	17.94448073	21.83220456
<b>For Member States using other models:</b>				
The rate of change of floor space for tertiary buildings and dwellings				
Average floor space per dwelling (m <sup>2</sup> )	61.3	62.84790182	64.43489009	66.06195181
The number of dwellings and number of employees in the tertiary sector				
Number of dwellings (thousand)	1299.5	1299.5	1299.5	1299.5
The number of employees in the tertiary sector (thousand)	838.2	875.735295	909.5223822	941.8044622
<b>Assumptions in the agriculture sector</b>				
<b>For Member States using macroeconomic models:</b>				
The share of the agriculture sector in GDP and relative growth	984.86851	1035.106697	1087.907541	1143.40176
<b>For Member States using other models:</b>				
Livestock numbers by animal type				
Total cattle (1000 heads)	800.3	945.1	1043.3	1082.9
Dairy cattle	416.5	519.805	573.801	595.6438836
Non-dairy cattle	383.8	425.295	469.474	487.3449956

sheep	29.2	41.11836735	47.181	48.9775163
swine	1114.7	1263	1305.567	1355.266147
poultry	9397.1	10886	11921.892	12222.93572
Other, please specify				
The area of crops by crop type				
Fertilizer used - syntetic and manure (kt Nitrogen)	138.18054	176.3572742	225.0815375	287.2674163
Emission factors				
enteric fermentation Dairy cattle (Tonnes CO2e /1000 Heads)	1.701	1.701	1.701	1.701
enteric fermentation Non-dairy cattle (Tonnes CO2e /1000 Heads)	1.176	1.176	1.176	1.176
enteric fermentation sheep (Tonnes CO2e /1000 Heads)	0.168	0.168	0.168	0.168
manure management Dairy cattle (Tonnes CO2e /1000 Heads)	0.126	0.126	0.126	0.126
manure management Non-dairy cattle (Tonnes CO2e /1000 Heads)	0.084	0.084	0.084	0.084
manure management sheep (Tonnes CO2e /1000 Heads)	0.00399	0.00399	0.00399	0.00399
manure management Swine (Tonnes CO2e /1000 Heads)	0.084	0.084	0.084	0.084
manure management Poultry (Tonnes CO2e /1000 Heads)	0.00168	0.00168	0.00168	0.00168
<b>Assumptions in the waste sector</b>				
Municipal solid waste generation kt	1031	1232.08055	1297.03559	1337.931103
The organic fraction of municipal solid waste	60%	60%	60%	60%
Municipal solid waste disposed to landfills	100%	70%	45%	30%
Municipal solid waste disposed incinerated	0%	25%	40%	50%
Municipal solid waste disposed composted	0%	5%	15%	20%
Municipal solid waste disposed to landfills kt	1031	862.46	583.66	401.38
<b>Assumptions in the Forestry sector</b>				
Forest definition				
<b>Area of managed forest (hectares)</b>	2014009	2071509	2129009	2186509
unmanaged forests				

## 11. COUNTRY CONCLUSIONS

The 2007 Monitoring Mechanism Excel submission was used as the main source of information.

Lithuania has a target of an 8% reduction in greenhouse gases relative to the base year. The recently submitted updated projections for “with measures” scenario indicate that Lithuania will overachieve its Kyoto Commitment by 10.7MtCO<sub>2</sub>-eq.

A detailed description of policies and measures was provided together with reduction impact assessment of individual policies and measures for the majority of measures.

The projections show that the total greenhouse gas emissions will be increasing in each sector in the projected years (2010, 2015, 2020). Development trends show that the Lithuanian economy is and will be developing rapidly resulting in higher GHG emissions than at present due to the constant GDP growth

‘With measures’ projections predict an increase in total GHG emissions between 2010 and 2020. The projected value for 2020 is 91.99 % of the base year emissions (1990).