

# Latvia

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## 1. SUMMARY

Latvia ratified the Kyoto Protocol on 30 May 2002 with the reduction obligation of 8 % compared to the Kyoto base year, which is 1990 except for fluorinated gases (1995). Since 1990, with the restructuring of Latvia's economy and improvements in energy efficiency, and implementation of EU environmental requirements, the total GHG emission has been decreasing and it will be much below the Kyoto target in the first commitment period. The average total forecast GHG emission value for the period 2008-2012 will not exceed 53% of the 1990 level meaning more than 40 % reduction, against a target of a 6 % reduction.

Latvia has prepared the projections for all sectors and three gases (excluding F-gases). The projections are prepared only for the WEM scenario covering policies and measures implemented till 2007. Long-term macroeconomic data were applied assuming strong GDP increase till 2010. Methodology for the projections in energy and transport sectors are described in detail and sensitivity analysis has been done. Unfortunately, in the other sectors (Waste, Agriculture and Forestry) the underlying assumptions are presented less detailed. Also the F-gases projections have not been prepared. Nevertheless, it is clear, that in addition to the introduced policies and measures the GDP decline started in the beginning of the transition still has effect on the development of the economy. Therefore, Latvia will easily comply with its Kyoto target, even more, the projected GHG emission in 2020 will be still below the Kyoto target. In 2020 the total GHG emission is projected to be 32.2% of the base year.

Latvia participates already in Joint Implementation mechanism as a host party. The country has established the framework for the procedure for the national approval, and reserved the annual reserve in its Second NAP. 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 Kyoto base year is 1990 for CO<sub>2</sub>, CH<sub>4</sub> and N<sub>2</sub>O and 1995 for fluorinated gases. Taking into consideration that WEM policies and measures will fully ensure compliance with the Kyoto target, no WAM scenario was projected. GHG emission projections were based on long-term macro-economic projection scenario. GHG emissions have been projected for all sectors. Various methods were applied for emission forecasting in each sector. For energy sector the MARKAL optimization model, for transport sector COPERT III was used. Sectoral projections show that the largest increase in total GHG emission for 2020 are expected to be in the industry and transport sector. In the energy sector there was a strong decline from 1990 till 2005, but projections show an increase. It is connected to the increasing demand for electrical energy and the construction of a new power station to reduce energy import dependence. GHG emissions are projected to decrease in agriculture and waste sector. The total GHG emission increase is 27% up to 2010 compared to 2005, but still, it will be by 46.6% less than in the base year (1990). In 2020 the total GHG emission is projected to be 32.2% of the base year. There is a small difference between projections from 2006, 2007 (which are the same) and from 2008. Sectoral targets are aiming at achieving compliance with the obligation set by the EC.

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 Latvia
- Historic emissions (in the “reference year”) as reported together with projections.  
For Latvia, the reference year is the Kyoto base-year: 1990 for CO<sub>2</sub>, CH<sub>4</sub> and N<sub>2</sub>O, and 1995 for fluorinated gases (F-gases).

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<sup>1</sup>. In the case of Latvia, the correction factor is very small (1.0005).

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<sup>1</sup> The adjustment consists in applying an adjustment factor to projections from Table 1. This factor is the ratio between total emissions in the reference year as reported in the 2008 GHG inventory report (or, if the reference year is the base-year under the Kyoto Protocol, in the report of the review of the initial report under the Kyoto Protocol) and total emissions in the reference year as reported by the country with projections (Table 1).

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**Table 1. Summary of reported projections by sector and by gas in 2010 (Mt CO<sub>2</sub>-eq.)**

	Carbon dioxide			Methane			Nitrous oxide			F-gases (SF <sub>6</sub> , 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
<b>Energy (excl. transport)</b>	15.6	5.7	NE	0.5	0.4	NE	0.1	0.1	NE	NE	NE	NE	16.2	6.1	NE
Energy supply	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
Energy – industry, construction	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
Energy – other (commercial, residential, agriculture)	NE	NE	NE	NE	NE	NE	NE	NE	NE	NA	NA	NE	NE	NE	NE
<b>Transport (energy)</b>	2.9	4.1	NE	0.0	0.0	NE	0.1	0.1	NE	NE	NE	NE	3.0	4.3	NE
<b>Industrial processes</b>	0.5	0.7	NE	0.0	0.0	NE	NE	NE	NE	NE	0.0	NE	0.5	0.7	NE
<b>Waste</b>	NE	NE	NE	0.6	0.7	NE	0.1	0.1	NE	NE	NE	NE	0.7	0.8	NE
<b>Agriculture</b>	NE	NE	NE	2.3	0.6	NE	3.6	1.3	NE	NE	NE	NE	5.9	2.0	NE
<b>Other</b>	0.1	0.1	NE	NA	NA	NE	NE	0.0	NE	NE	NE	NE	0.1	0.1	NE
<b>Total (excl. LULUCF)</b>	19.1	10.6	NE	3.5	1.8	NE	3.8	1.6	NE	NE	0.0	NE	26.4	14.0	NE

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**Key:**

Reference year: base-year under the Kyoto Protocol (1990 for carbon dioxide, methane and nitrous oxide, and 1995 for F-gases).

WEM: 'with existing measures' projection

WAM: 'with additional measures' projection

**Source:** Latvia's MM submission, February 2008

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**Table 2. Summary of projections by sector and by gas in 2010 compared to 1990 emissions (MtCO<sub>2</sub>eq)**

	Carbon dioxide			Methane			Nitrous oxide			F-gases (SF <sub>6</sub> , 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
<b>Energy (excl. transport)</b>	15.7	5.7	NE	0.5	0.4	NE	0.1	0.1	NE	NE	NA	NE	16.3	6.1	NE
Energy supply	6.3	NE	NE	0.3	NE	NE	0.0	NE	NE	NE	NA	NE	NE	NE	NE
Energy – industry, construction	3.8	NE	NE	0.0	NE	NE	0.0	NE	NE	NE	NA	NE	NE	NE	NE
Energy – other (commercial, residential, agriculture)	5.6	NE	NE	0.2	NE	NE	0.1	NE	NE	NE	NA	NE	NE	NE	NE
<b>Transport (energy)</b>	2.9	4.1	NE	0.0	0.0	NE	0.1	0.1	NE	NE	NA	NE	3.0	4.3	NE
<b>Industrial processes</b>	0.5	0.7	NE	0.0	0.0	NE	NE		NE	NE	0.0	NE	0.5	0.7	NE
<b>Waste</b>	NE	NE	NE	0.6	0.7	NE	0.1	0.1	NE	NA	NA	NE	0.7	0.8	NE
<b>Agriculture</b>	NE	NE	NE	2.3	0.6	NE	3.6	1.3	NE	NA	NA	NE	5.9	2.0	NE
<b>Other</b>	0.1	0.1	NE	NE	NE	NE	NE	0.0	NE	NA	NA	NE	0.1	0.1	NE
<b>Total (excl. LULUCF)</b>	19.2	10.6	NE	3.5	1.8	NE	3.8	1.6	NE	NA	0.0	NE	26.5	14.0	NE

**Key:**

WEM: 'with existing measures' projection

WAM: 'with additional measures' projection

**Source:** Latvia's MM submission, February 2008, 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 emissions (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
<b>Energy (excl. transport)</b>	100	36.2	NE	100	72.6	NE	100	89.1	NE	100	NE	NE	100	37.6	NE
Energy supply	100	NE	NE	100	NE	NE	100	NE	NE	100	NE	NE	100	NE	NE
Energy – industry, construction	100	NE	NE	100	NE	NE	100	NE	NE	100	NE	NE	100	NE	NE
Energy – other (commercial, residential, agriculture)	100	NE	NE	100	NE	NE	100	NE	NE	100	NE	NE	100	NE	NE
<b>Transport (energy)</b>	100	144.4	NE	100	86.7	NE	100	179.1	NE	100	NE	NE	100	145.1	NE
<b>Industrial processes</b>	100	134.9	NE	100	1200.0	NE	100	NE	NE	100	NE	NE	100	143.2	NE
<b>Waste</b>	100	NE	NE	100	119.8	NE	100	90.4	NE	100	NE	NE	100	117.3	NE
<b>Agriculture</b>	100	NE	NE	100	27.3	NE	100	36.8	NE	100	NE	NE	100	33.1	NE
<b>Other</b>	100	92.9	NE		NE	NE		NE	NE		NE	NE	100	114.9	NE
<b>Total (excl. LULUCF)</b>	100	55.1	NE	100	50.9	NE	100	41.8	NE	100	NE	NE	100	52.8	NE

**Key:**

WEM: 'with existing measures' projection

WAM: 'with additional measures' projection

**Source:** Latvia's MM submission, February 2008, 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**

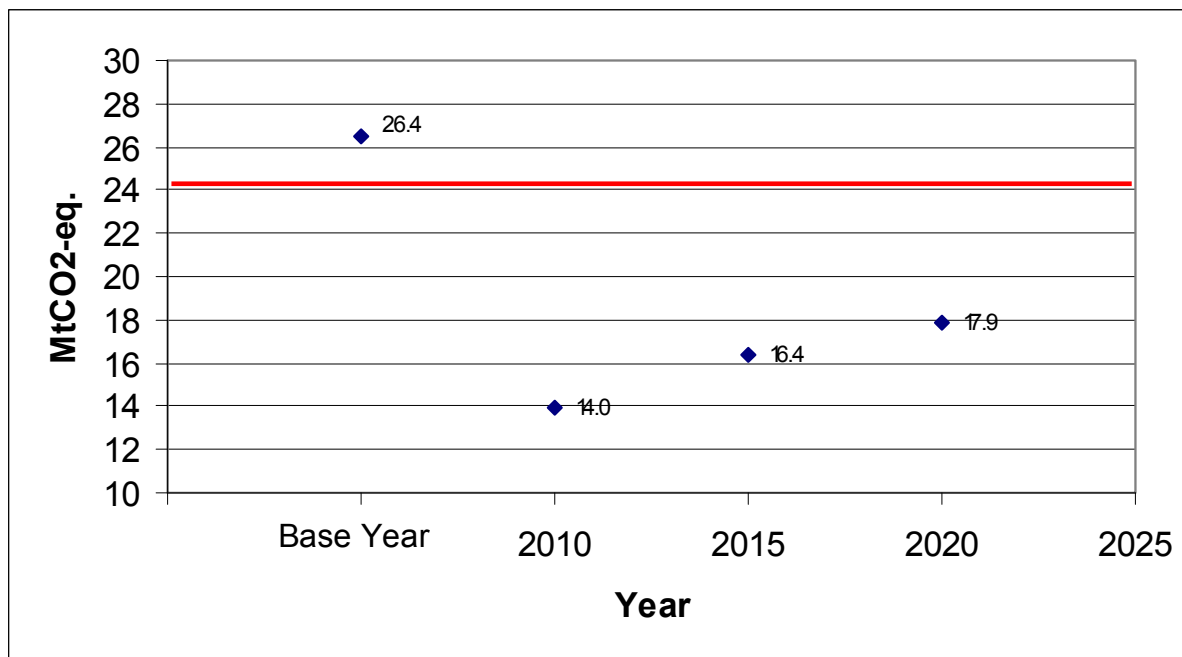
	Unit	Base-year emissions under the Kyoto Protocol	2010 projections 'with existing measures'	2010 projections 'with additional measures'
Total GHG emissions	Mt CO <sub>2</sub> -eq.	25.9	14.0	NE

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(excluding LULUCF)	Index (base-year emissions = 100)	100	52	NE
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**Source:** Latvia’s MM submission, February 2008.

**Figure 1. Greenhouse gas projections in 2010, 2015 and 2020 (Mt CO<sub>2</sub>-eq.)**



**Source:** Latvia’s MM submission, February 2008.

In Figure 1, numbers are the corrected total ones for 2010 WEM scenario in Table 2. The same correction factor used in Table 2 has been applied to the projections for 2015 and 2020. Red line shows the Kyoto target.

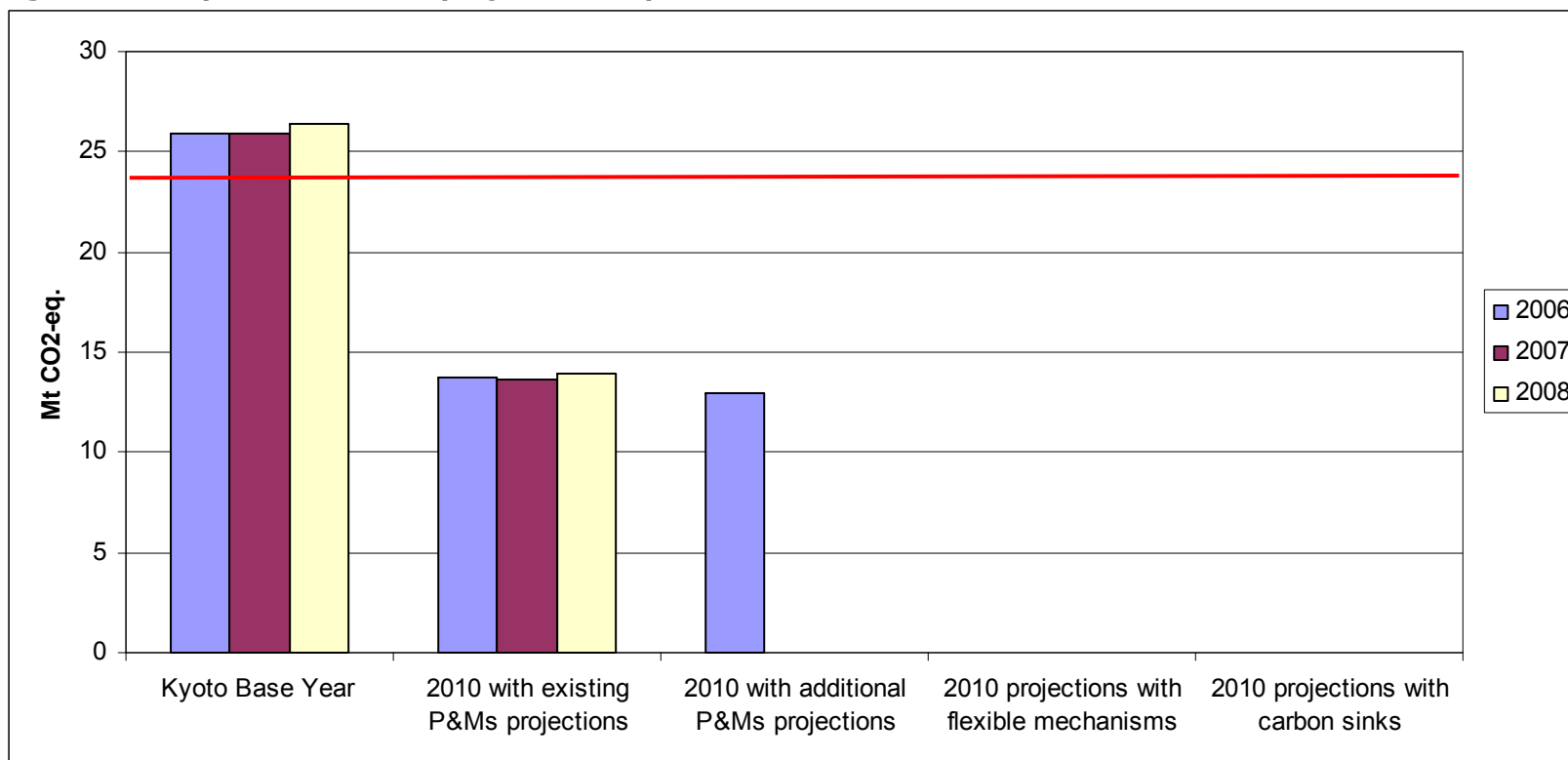
Greenhouse gas (GHG) emissions in Latvia have been projected for 2010, 2015 and 2020, submitted in 2008. Emission forecast includes and provides information on implementation of those policies and measures prescribed in policy documents drawn up by the Latvian government up to 2007. These emission projections include the WEM scenario, but not WAM . Projections (and also base year emission) from 2008 are a bit



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different from those in 2006 and 2007. Emission of greenhouse gases is dependent on economic activities and the efficiency of the economy or the economy's hydrocarbon capacity. The average total forecast GHG emission value for the period 2008-2012 will not exceed 53% of the 1990 level. Expected effect of flexible mechanisms and sinks was not estimated.

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



**Source:** Latvia's MM submission, February 2008.

### 3. CLIMATE CHANGE MITIGATION POLICIES AND MEASURES

Since total GHG emission in Latvia is very much below the Kyoto target and will be still much below in 2020, only WEM scenario was projected. WEM scenario includes policies and measures implemented up to 2007. Energy sector has the highest (and dominating) share in total GHG emission, so most of the measures are covering this sector. Quantitative impact of measures in the energy sector is partly made. Top down calculations provide with information on reduction effect in the transport, industry, waste and agricultural sectors. Bottom up calculations show that there will be a reduction effect of 0.8 Mt CO<sub>2</sub> eq. by 2010. Most of the measures are targeting at increasing the share of renewable energy sources in the energy mix (hydro, wind, biomass, CHP) and increasing the energy efficiency. Planned measures include reduction of GHG emissions by appropriate waste management process and support for energy generation in biogas plants from agriculture waste.

**Table 5. Summary of the effect of policies and measures included in the 2010 projections (Mt CO<sub>2</sub>-eq.)**

	Top down calculation		Bottom Up calculation	
	Existing Measures	Planned Measures	Existing Measures	Planned Measures
<b>Energy (total, excluding transport)</b>	NE	NE	0.8	0.0
Energy supply	NE	NE	NE	NE
Energy – industry, construction	NE	NE	NE	NE
Energy – other (commercial, residential, agriculture)	NE	NE	NE	NE
<b>Transport (energy)</b>	3.0	4.28	NE	NE
<b>Industrial processes</b>	0.28	0.73	NE	NE
<b>Waste</b>	0.7	0.8	NE	NE
<b>Agriculture</b>	1.9	1.96	NE	NE
<b>Cross-sectoral</b>	NE	NE	NE	NE
Total (excluding LULUCF)	5.88	7.77	0.8	0.0

**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'). Bottom up calculation is very rough estimation due to the lack of data on reduction effect of individual policies and measures in Latvia's MM submission.

**Source:** Latvia's MM submission, February 2008, for the top down calculation; ECCP Policies and Measures database, June 2008, for the bottom up calculation and personal communication with MoE, Latvia

**Table 6. Detailed information on Existing Policies and measures**

Sector	Name	Type	GHG	Status	Absolute Reduction			Costs [EUR/t]
					[kt CO <sub>2</sub> eq. p.a.]			
					2005	2010	2020	
Cross-cutting	Implementation of the EU Emissions Trading Scheme	economic	CO <sub>2</sub>	implemented	2.854			
Cross-cutting	Participation in Kyoto protocol flexible mechanisms	Voluntary/ negotiated agreement	CH <sub>4</sub> , CO <sub>2</sub> HFC, N <sub>2</sub> O PFC, SF <sub>6</sub>	other				
Cross-cutting	Active participation in Joint Implementation projects	Voluntary/ negotiated agreement	CH <sub>4</sub> , CO <sub>2</sub> HFC, N <sub>2</sub> O PFC, SF <sub>6</sub>					
Cross-cutting	Active participation in Joint Implementation projects	Voluntary/ negotiated agreement	CH <sub>4</sub> , CO <sub>2</sub> HFC, N <sub>2</sub> O PFC, SF <sub>6</sub>					
Cross-cutting	Natural Resources Tax	fiscal	CH <sub>4</sub> , CO <sub>2</sub> HFC, N <sub>2</sub> O PFC, SF <sub>6</sub>	implemented				
Cross-cutting	Law on pollution	regulatory	CO <sub>2</sub>	implemented				
Cross-cutting	Promote the implementation of environmental and energy management systems	Regulatory, Voluntary/ negotiated agreement	CH <sub>4</sub> , CO <sub>2</sub> HFC, N <sub>2</sub> O PFC, SF <sub>6</sub>	implemented				
Cross-cutting	Promote the inclusion of environmental considerations in consumer decisions	Information, regulatory	CH <sub>4</sub> , CO <sub>2</sub> HFC, N <sub>2</sub> O PFC, SF <sub>6</sub>					
Energy supply	Investment programmes to support energy efficiency & promote RES use in the DH systems	Information, Regulatory	CH <sub>4</sub> , CO <sub>2</sub> HFC, N <sub>2</sub> O PFC, SF <sub>6</sub>					
Energy supply	Support for power generation in small hydropower plants	Economic, Regulatory	CO <sub>2</sub> , N <sub>2</sub> O		3.596	4.524	4.524	

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Energy supply	Support for power generation in wind plants	Economic, Regulatory	CO <sub>2</sub> , N <sub>2</sub> O		2.726	19.952	29.522	
Energy supply	"Law on Energy" (1998), followed by "Electricity Market Law" (2005).	economic	CO <sub>2</sub>	implemented				
Energy supply	Support for energy generation in biogas plants from agriculture waste	economic, regulatory	CH <sub>4</sub> , CO <sub>2</sub> , N <sub>2</sub> O			14.811	55.084	
Energy supply	Support for power generation in biogas plants from landfill waste	economic, regulatory	CH <sub>4</sub> , CO <sub>2</sub> , N <sub>2</sub> O	implemented	119.0	174.898	249.854	
Energy supply	Support the power generation in combined heat-power plants utilizing renewable fuel	Economic, Regulatory	CH <sub>4</sub> , CO <sub>2</sub> , N <sub>2</sub> O		2.693	99.634	278.705	
Energy supply	Support the power generation in combined heat-power plants	Economic, Regulatory	CH <sub>4</sub> , CO <sub>2</sub> , N <sub>2</sub> O			165.424	401.744	
Energy supply	Support for biofuels farmers and producers	Economic, Regulatory, Information	CH <sub>4</sub> , CO <sub>2</sub> , N <sub>2</sub> O					
Energy supply	Support for fuel production from agriculture and forestry products (except biogas)	Economic, Regulatory	CO <sub>2</sub>					
Energy consumption	Support of projects improving energy performance of buildings	Economic, Information	CO <sub>2</sub>			7.544	92.196	
Energy consumption	Regulations for labeling of household air conditioners, electric bulbs, dish washing machines, washing machines, drying machines, refrigerators, freezers and ovens	regulatory	CO <sub>2</sub>	implemented				

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Energy consumption	Projects improving energy performance of buildings	Voluntary/ negotiated agreement	CO2			3.463	481.505	
Transport	Improvement of the public transport system in Riga	Economic, Information	CO <sub>2</sub> , N <sub>2</sub> O					
Transport	Development of cycling	Economic, Information	CO <sub>2</sub> , N <sub>2</sub> O					
Transport	Creation of environmentally friendly transport system	Economic	CO <sub>2</sub>					
Transport	Optimization of the traffic flow in cities	Economic, Information, Regulatory	CH <sub>4</sub> , CO <sub>2</sub> , N <sub>2</sub> O					
Industrial Processes	Promote the implementation of best available techniques (BAT), environmentally friendly technologies and cleaner production	Economic, Information, Regulatory	CO <sub>2</sub>					
Agriculture	Sustainable use of agricultural resources	Economic, Voluntary/ negotiated agreement, Information	CH <sub>4</sub> , CO <sub>2</sub> , N <sub>2</sub> O					
Agriculture	Development of environmentally friendly agriculture and promotion of Good agricultural practices	Economic, Regulatory	CH <sub>4</sub> , CO <sub>2</sub> , N <sub>2</sub> O					
Forestry	Increase in forest stand productivity	Regulatory, Information	CO <sub>2</sub>	implemented				
Forestry	Afforestation of unmanaged agricultural land	Regulatory	CO <sub>2</sub>	implemented				
Waste	Processing biologically degradable waste	Economic, Information, Regulatory	CH <sub>4</sub> , CO <sub>2</sub>	implemented				
Waste	Restoration of small municipal dumpsites not meeting environmental requirements	Information, Regulatory	CH <sub>4</sub>	other				
Waste	Law on waste management	Regulatory	CH <sub>4</sub>	implemented				
Waste	National Plan for waste management (2003-2012)	Regulatory	CH <sub>4</sub>	implemented				

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**Source:** Öko Institut, (accessed 06/2008), ECCP Policies and Measures database, <http://www.oeko.de/service/pam/index.php>

**Table 7. Detailed information on Planned Policies and measures**

Sector	Name	Type	GHG	Status	Estimated savings (ktCO <sub>2</sub> -eq.)		Costs (EUR/t)
					2010	2020	
Agriculture	Improving an construction of manure storage facilities	Regulatory	CH <sub>4</sub> , N <sub>2</sub> O	planned			

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

**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 <b>before</b> CCPM was adopted			
Existing national policies and measures <b>re-enforced</b> by CCPM	Promotion of electricity from RE sources 2001/77/EC	Energy supply	
	Internal electricity market 2003/54/EC	Energy supply	
New national policies and measures implemented after CCPM was adopted	Emissions trading 2003/87/EC	Cross-cutting	
	Promotion of cogeneration 2004/8/EC	Energy supply	
	Taxation of energy products 2003/96/EC	Energy supply	
	Directives on energy labelling of appliances	Energy consumption	
	Energy performance of buildings 2002/91/EC		
	Promotion of biofuels for transport 2003/30/EC	Transport	
	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	
	Support under CAP - amendment (1783/2003)	Agriculture	
	Landfill directive 1999/31/EC	Waste	
	Status of national policy or measure <b>not reported</b>	Kyoto Protocol project mechanisms 2004/101/EC	Cross-cutting
		Integrated pollution prevention and control 96/61/EC	Cross-cutting
Internal market in natural gas 98/30/EC		Energy supply	
Ecodesign requirements for energy-using products 2005/32/EC		Energy consumption	
End-use efficiency and energy services 2006/32/EC		Energy consumption	
Energy labelling for office equipment 2422/2001		Energy consumption	
Efficiency fluorescent lighting 2000/55/EC		Energy consumption	
Integrated European railway area (COM(2002)18 final)		Transport	
Agreement with car manufacturers ACEA etc.		Transport	
Marco Polo programme on freight transport		Transport	
Motor challenge, voluntary EC programme		Transport	

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HFCs in mobile air conditioning 2006/40/EC	Transport
F-gas regulation (842/2006)	Industrial Process
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
Packaging and packaging waste (94/62/EC, 2004/12/EC, 2005/20/EC)	Waste
Directive on waste 2006/12/EC	Waste

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

## 4. METADATA

### Sources of information

Latvia's national report submitted to the European Commission under Article 3(2) of the Monitoring Mechanism, Decision 280/2004/EC. Report dated February 2008 (hereinafter MMS 2008)

Latvia's Fourth National Communication under the United Nations Framework Convention on Climate Change, Ministry of Environment of Latvia, May 2006 (hereinafter 4th NC).

Annual greenhouse gas inventory 1990-2006 and inventory report, February 2008, Riga, Latvia (hereinafter CRF 2008).

[http://unfccc.int/ghg\\_data/kp\\_data\\_unfccc/base\\_year\\_data/items/4354.php](http://unfccc.int/ghg_data/kp_data_unfccc/base_year_data/items/4354.php)

Base-year emissions from the UNFCCC website,

[http://unfccc.int/ghg\\_data/kp\\_data\\_unfccc/base\\_year\\_data/items/4354.php](http://unfccc.int/ghg_data/kp_data_unfccc/base_year_data/items/4354.php)

Öko Institut, (accessed June 2008), ECCP Database on Policies and Measures in Europe

<http://www.oeko.de/service/pam/index.php>

### Kyoto base-year emissions

Kyoto base-year emissions (1990/1995) are presented throughout, including 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 (CO<sub>2</sub>), methane (CH<sub>4</sub>) and nitrous oxide (N<sub>2</sub>O) and 1995 emissions for fluorinated gases (SF<sub>6</sub>, HFCs and PFCs).

.Kyoto base-year emissions have now been reviewed and set for all EEA countries, including Latvia. It is equal to 25.909 Mt CO<sub>2</sub> eq.



## Projections reference year emissions

Projections reference year (1990) 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. 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, in Table 2:

Corrected projection = reported projections \* latest inventory total GHG emissions / Table 1 reported total GHG emissions for the same reference year

## 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 o (representing not 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, and 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.

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Balance between domestic action and flexible mechanisms	Regarding reductions required to meet Kyoto target, details proportion to result from domestic action and flexible mechanisms.
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Category of Information	Example of good practice
WEM and WAM projections	"with 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 for projections is detailed.
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	++	Not clear, some missing
Implementation body	+++	Clear which authorities are responsible for implementation
Quantitative assessment of emission reduction effect and cost of policies	+	PaMs in energy sector are quantified partly, otherwise no figures are indicated. No WAM is provided
Interaction with other national and EU level policies	+	Missing information
Measures implementing community legislation	++	Some are missing
Arrangements for flexible mechanisms	++	Information is given
Balance between domestic action and flexible mechanisms	0	Not relevant

**Table 10. Information provided on projections**

Category of Information	Level of information provided	Comments
Projection scenarios	++	WEM is provided for each sector
Policies included in each projection	++	Mostly yes
Expressed relative to base year	+++	yes
Starting year	+++	1990
Split of projections	+++	Projection split by 3 gases (F-gases are excluded), all sectors and years
Presentation of results	++	Only tables, no graphs provided
Description of methodologies (approach, model and assumptions)	++	For energy and transport sector methodology is described
Sensitivity analysis	++	For energy and transport sector analyses was carried out for alternative scenarios
Discussion of uncertainty	o	No
Details of parameters and assumptions	+	No
Indicators for projections	+	No

**Table 11. Parameters for Projections**

1. Mandatory parameters on projections	2005	2010	2015	2020	Units
<b>Assumptions for general economic parameters</b>					
GDP (value at given years or annual growth rate and base year)	8.1	8	5.5	5	%
Population (value at given years or annual growth rate and base year)	2298	2240	2168	2115	thousand
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					
<b>Assumptions for the energy sector</b>					
Total gross inland consumption (PJ) (split by oil, gas, coal, renewables, nuclear, other)					
Total electricity production by fuel type (oil, gas, coal, renewables, nuclear, other)					
Energy demand by sector split by fuel (delivered)					
Assumptions on weather parameters, especially heating or cooling degree days					
<b>Assumptions for the industry sector</b>					
<i>For Member States using macroeconomic models:</i>					
The share of the industrial sector in GDP and growth rate	8.3	9.5	7.2	6.6	%
<i>For Member States using other models:</i>					
The production index for industrial sector					
<b>Assumptions for the transport sector</b>					
<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					
<b>Assumptions for buildings (in residential and commercial or tertiary sector)</b>					
<i>For Member States using macroeconomic models:</i>					

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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					
<b>Assumptions in the agriculture sector</b>					
<i>For Member States using macroeconomic models:</i>					
The share of the agriculture sector in GDP and relative growth	4.5	3.0	3.0	3.0	%
<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)					
<b>Assumptions in the waste sector</b>					
Waste generation per head of population or tonnes of municipal solid waste	759	801			kt
The organic fractions of municipal solid waste					
Municipal solid waste disposed to landfills, incinerated or composted (in tonnes or %)					
<b>Assumptions in the forestry sector</b>					
Forest definitions					
Areas of:					
managed forests					
unmanaged forests					

<b>2. Recommended parameters on projections</b>	<b>2005</b>	<b>2010</b>	<b>2015</b>	<b>2020</b>	<b>Units</b>
<b>Assumptions for general economic parameters</b>					
GDP growth rates split by industrial sectors in relation to 2000					
Comparison projected data with official forecasts					
<b>Assumptions for the energy sector</b>					
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					
<b>Assumptions for the industry sector</b>					
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					
<b>Assumptions for buildings (in residential and commercial / tertiary sector)</b>					
<i>For Member States using macroeconomic models:</i>					
Share of tertiary and household sectors in GDP					
Rate of improvement of energy intensity					

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<i>For Member States using other models:</i>					
Number of households					
Number of new buildings					
Rate of improvement of energy efficiency (1990 = 100)					
<b>Assumptions for the transport sector</b>					
<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					
<b>Assumptions for the agriculture sector</b>					
<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					