Finland

Contents

Figures and tables

1. SUMMARY

The projections presented by Finland in their 2007 Monitoring Mechanism submission to the European Commission show decreases in methane and nitrous oxide are expected, while significant increases in carbon dioxide and F-gas emissions are projected. This is linked with increases in emissions from the energy supply, transport and industrial process sectors, which combined account for 67% of total projected emissions in 2010. On the other hand, the waste, agriculture and other energy consuming sectors (industry, commercial, residential) show substantial reductions in expected emissions in 2010 compared to 1990.

Policies and measures resulting in emission reductions are reported to occur largely in the energy sector and focus on energy conservation, renewables, the EU Emissions Trading Scheme and substantial reductions as a result of a new nuclear power plant (8 Mt). These policies and measures are projected to reduce emissions to 2% above the base year emissions against a target to freeze emissions at base year levels (0% increase).

Taking into account the effect of Kyoto Mechanisms (including Joint Implementation, Clean Development Mechanism and International Emissions Trading) and carbon sinks, emissions are projected to be 15% above the base year in the WEM scenario and 2% below the base year in the WAM scenario, meaning that Finland would overachieve the Kyoto target by 2%.

2. GHG PROJECTIONS AND PROGRESS TO KYOTO TARGETS

'With Existing Measures' and 'With Additional Measures' projections were provided for the years 2005, 2010, 2015 and 2020. In addition, 'With Existing Measures' projections for these years were provided for three economic scenarios: central, low and high economic scenarios. Projections used in the following analyses are taken from the 'central economic scenario'. No breakdown by individual F-gas is provided for base year or projections. A 'without measures' projection is not provided.

It should be noted that average annual projections for the period 2008-2012 are not reported in the 2007 Finnish Monitoring Mechanism submission – projections for the actual year 2010 are reported.

Decreases in methane and nitrous oxide are projected, while significant increases in carbon dioxide and F-gas emissions are projected. This is linked with increases in emission increases from the energy supply, transport and industrial process sectors.

Emissions from the transport sector are expected to increase slightly, with most increases in passenger and freight traffic compensated for through efficiency gains in new vehicles. Energy and electricity consumption are expected to increase by 30% and 33% respectively over the period 2000 to 2020. A new nuclear power plant is however likely to result in significant emission reductions from 2010 onwards, reducing electricity imports and variability of emissions as a result of the high contribution of hydropower to the common Nordic power market. While emissions from the energy supply sector are set to increase significantly relative to the base year, emissions from other energy sectors such as residential, commercial and industry are expected to decrease due to policies such as energy efficiency in buildings and EU ETS. Industrial process emissions show an increase over the period as a result of increasing production of mineral products (primarily cement and lime) and chemical products (primarily hydrogen). Emissions from the waste and agricultural sectors are projected to decrease significantly as a result of successful policy and reduced intensity of agricultural production.

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 Finland;
- Historic emissions (in the "reference year") as reported together with projections.

For Finland, the reference year is 1990.

Table 1. Summary of reported projections by sector and by gas in 2010 (Mt CO_2–eq.)

	Carbon dioxide			Methane			Nitrous oxide			F-gases			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)	40.9	54.8	43.2	0.1	0.4	0.4	0.8	0.9	0.9	NO	NO	NO	41.9	56.1	44.6
Energy supply	19.3	35.9	26.9	0.0	0.1	0.1	0.1	0.4	0.4	NO	NO	NO	19.4	36.4	27.4
Energy – industry, construction	13.4	11.9	9.4	0.0	0.0	0.0	0.2	0.2	0.2	NO	NO	NO	13.6	12.1	9.6
Energy – other (commercial, residential, agriculture)	8.2	7.0	7.0	0.1	0.3	0.3	0.5	0.4	0.4	NO	NO	NO	8.9	7.7	7.6
Transport (energy)	12.5	14.0	13.5	0.1	0.0	0.0	0.2	0.6	0.6	NO	NO	NO	12.8	14.6	14.1
Industrial processes	3.4	4.5	4.5	0.0	0.0	0.0	1.7	1.7	1.7	NE	1.0	0.6	5.2	7.2	6.9
Waste	NO	NO	NO	3.8	2.2	2.2	0.2	0.2	0.2	NO	NO	NO	4.0	2.4	2.4
Agriculture	NO	NO	NO	2.1	1.5	1.5	5.0	3.2	3.2	NO	NO	NO	7.1	4.7	4.7
Other	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
Total (excl. LULUCF)	56.9	73.2	61.2	6.2	4.2	4.2	7.9	6.5	6.5	0.0	1.0	0.6	71.0	85.0	72.6

Key:
Reference year: 1990
WEM: 'with existing measures' projection
WAM: 'with additional measures' projection

Source: Finland's national report and template submitted to the European Commission under the Monitoring Mechanism, Decision 280/2004/EC. Report submitted 31 May 2007.

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[1].

Table 2. Summary of projections by sector and by gas in 2010 compared to 1990 emissions ($MtCO_2$-eq.)

	Carbon dioxide			Methane			Nitrous oxide			F-gases			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)	40.7	54.7	43.2	0.2	0.4	0.4	0.8	0.9	0.9	NO	NO	NO	41.8	56.1	44.6
Energy supply	19.3	35.9	26.9	0.0	0.1	0.1	0.1	0.4	0.4	NO	NO	NO	19.4	36.3	27.3
Energy – industry, construction	13.2	11.9	9.4	0.0	0.0	0.0	0.2	0.2	0.2	NO	NO	NO	13.4	12.1	9.6
Energy – other (commercial, residential, agriculture)	8.2	7.0	7.0	0.2	0.3	0.3	0.5	0.4	0.4	NO	NO	NO	9.0	7.7	7.6
Transport (energy)	12.6	14.0	13.5	0.1	0.0	0.0	0.2	0.6	0.6	NO	NO	NO	12.8	14.6	14.1
Industrial processes	3.3	4.5	4.5	0.0	0.0	0.0	1.7	1.7	1.7	0.1	1.0	0.6	5.1	7.2	6.9
Waste	0.0	NO	NO	3.8	2.2	2.2	0.2	0.2	0.2	NO	NO	NO	4.0	2.4	2.4
Agriculture	0.0	NO	NO	2.1	1.5	1.5	5.0	3.2	3.2	NO	NO	NO	7.1	4.7	4.7
Other	0.1	NE	NE	NE	NE	NE	0.1	NE	NE	NO	NO	NO	0.2	0.0	0.0
Total (excl. LULUCF)	56.7	73.2	61.2	6.3	4.2	4.2	7.9	6.5	6.5	0.1	1.0	0.6	70.9	85.0	72.6

Key:
WEM: 'with existing measures' projection
WAM: 'with additional measures' projection

[1] 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).

Source: Finland's national report and template submitted to the European Commission under the Monitoring Mechanism, Decision 280/2004/EC. Report submitted 31 May 2007. Annual greenhouse gas inventory 1990 - 2006 and inventory report, [11 April 2008].

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			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	134	106	100	198	200	100	109	109	NA	NA	NA	100	134	107
Energy supply	100	186	139	100	440	440	100	314	314	NA	NA	NA	100	187	141
Energy – industry, construction	100	90	71	100	111	111	100	99	99	NA	NA	NA	100	90	71
Energy – other (commercial, residential, agriculture)	100	85	84	100	179	181	100	65	65	NA	NA	NA	100	86	85
Transport (energy)	100	112	108	100	30	30	100	319	319	NA	NA	NA	100	114	110
Industrial processes	100	135	135	100	166	166	100	105	105	100	1053	670	100	143	135
Waste	NA	NA	NA	100	58	58	100	100	100	NA	NA	NA	100	59	59
Agriculture	NA	NA	NA	100	72	72	100	64	64	NA	NA	NA	100	66	66
Other	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total (excl. LULUCF)	100	129	108	100	67	67	100	83	83	100	1053	670	100	120	102

Key:
WEM: 'with existing measures' projection
WAM: 'with additional measures' projection

Source: Finland's national report and template submitted to the European Commission under the Monitoring Mechanism, Decision 280/2004/EC. Report submitted 31 May 2007. Annual greenhouse gas inventory 1990 - 2006 and inventory report, [11 April 2008].

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

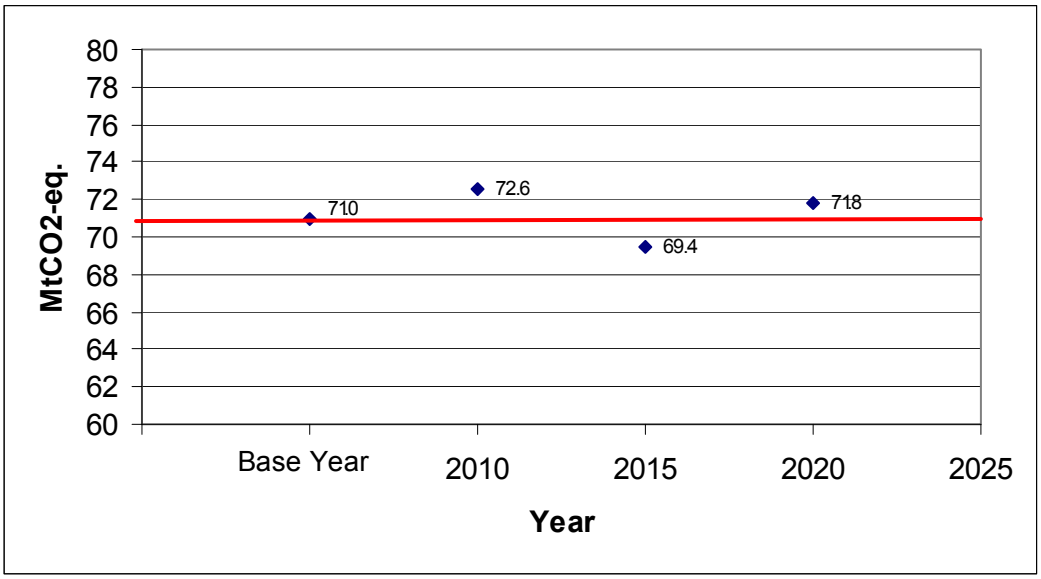
	Unit	Base-year emissions under the Kyoto Protocol	2010 projections 'with existing measures'	2010 projections 'with additional measures'
Total GHG emissions (excluding LULUCF)	Mt CO_2-eq.	71.0	85.0	72.6
	Index (base-year emissions = 100)	100	120	102

Source: Finland's national report and template submitted to the European Commission under the Monitoring Mechanism, Decision 280/2004/EC. Report submitted 31 May 2007. Annual greenhouse gas inventory 1990 - 2006 and inventory report, [11 April 2008].

In Figure 1, the same correction factor used in Table 2 has been applied to the projections for 2010, 2015 and 2020. Figure 1 presents the "With Additional Measures" scenario.

The red lines in Figure 1 and 2 indicate the Kyoto target of 71 Mt CO2-eq., based on the revised Kyoto base year, 2008.

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

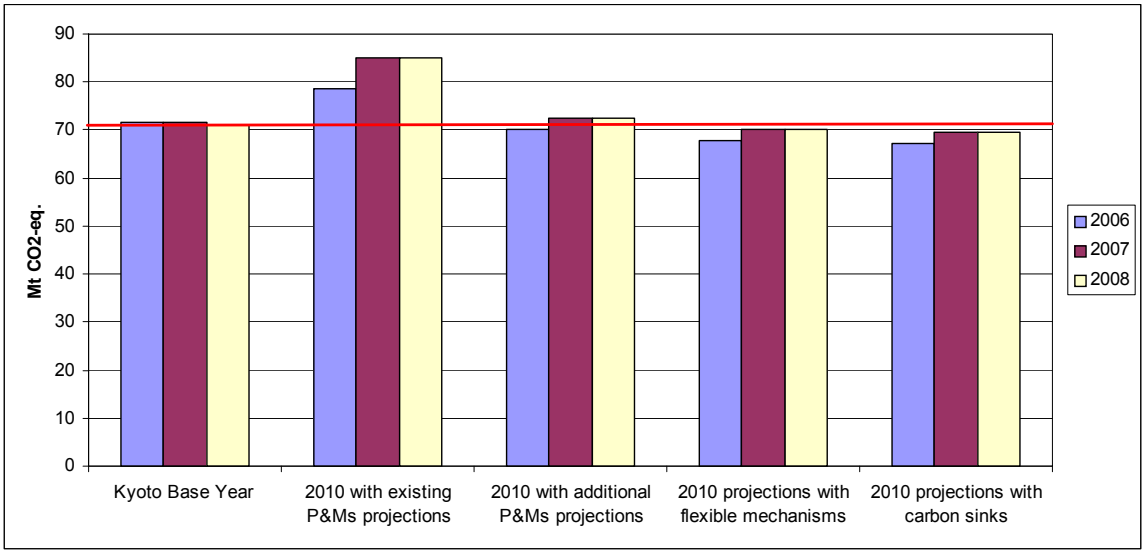


Source: Finland's national report and template submitted to the European Commission under the Monitoring Mechanism, Decision 280/2004/EC. Report submitted 31 May 2007. Annual greenhouse gas inventory 1990 - 2006 and inventory report, [11 April 2008].

Divergences in projections from previous years are as a result of expected delays to the completion of a fifth nuclear power plant (delayed one year to 2010) and a gas pipeline extension to southwestern Finland (delayed from 2010 to 2015).

Finland intends to use JI, CDM and international emissions trading to achieve a further emissions reduction of 2.4 MtCO2-eq. per year in the period 2008-2012. Carbon sinks are expected to reduce emissions by a further 0.6 MtCO2-eq. in 2010.

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



Source: Finland's national report and template submitted to the European Commission under the Monitoring Mechanism, Decision 280/2004/EC. Report submitted 31 May 2007. Annual greenhouse gas inventory 1990 -

2006 and inventory report, [11 April 2008]. For 2006 data: Finland's 4th National Communication to the United Nations Framework Convention on Climate Change (February 2006), Finnish Report on Demonstrable Progress under the Kyoto Protocol (February 2006) and personal communication.

3. CLIMATE CHANGE MITIGATION POLICIES AND MEASURES

An updated Finnish National Energy and Climate Strategy was approved by the Finnish parliament in late 2005. The strategy outlines measures to enable Finland to meet the targets for greenhouse gas emissions set by the Kyoto Protocol.

A top down calculation of existing measures was not possible as a 'without measures' projection was not provided.

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	11.52	17.50	0.01
Energy supply	NE	9.00	12.50	0.00
Energy – industry, construction	NE	2.49	0.00	0.00
Energy – other (commercial, residential, agriculture)	NE	0.04	5.00	0.01
Transport (energy)	NE	0.50	0.00	0.50
Industrial processes	NE	0.37	0.03	0.36
Waste	NE	0.00	0.10	0.24
Agriculture	NE	0.00	0.00	0.00
Cross-sectoral	NE	0.00	0.00	8.70
Total (excluding LULUCF)	NE	12.39	17.63	9.81

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: Finland's national report and template submitted to the European Commission under the Monitoring Mechanism, Decision 280/2004/EC. Report submitted 31 May 2007. Öko Institut, (accessed 13th June 2007), ECCP Policies and Measures database, http://www.oeko.de/service/pam/index.php

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	Costs [EUR/t]
Agriculture	Agenda 2000, including Agri-environmental support measures Horizontal Rural Development Programme in Continental Finland (2000-2006)	Economic	CH_4 CO_2 N_2O	implemented				
Agriculture	Nitrate Statute	Regulatory	N_2O	implemented				
Cross-cutting	Energy taxation	Fiscal	CO_2	implemented				
Energy consumption	Energy conservation programme	Economic Education Regulatory	CO_2	implemented	details	3,500 more		details
Energy consumption	Measures to promote energy conservation and use of renewables	Economic	CO_2	implemented	details	1,500 more		details
Energy consumption	Eco Management and audit sheme	Voluntary/ negotiated agreement	CO_2	implemented				
Energy consumption	Energy labelling of household appliances	Information	CO_2	implemented				
Energy supply	Construction of a new nuclear power unit	Economic Regulatory	CO_2	implemented	details	8,000		details
Energy supply	Action plan for renewable energy	Economic Education Fiscal	CH_4 CO_2 N_2O	implemented	details	4,500 more		details
Energy supply	Electricity Market Act	Regulatory	CO_2	implemented	details	details		details
Industrial Processes	F-gases from air conditioning	Regulatory	HFC	implemented		30		
Forestry	National Forest Programme	Education	CO_2	implemented				
Forestry	Promotion of use of wood products	Information	CO_2	expired				
Forestry	Forest Certification	Information	CO_2	implemented				
Forestry	Environment Programme for Forestry	Planning	CO_2	implemented				
Transport	Voluntary agreements with European, Japanese and Korean car industries,	Voluntary/ negotiated agreement	CO_2	implemented		details	Cluster value	
Transport	Promotion of public and non-motorised transport	Economic Education	CO_2 N_2O	implemented	details	details	Cluster value	

Sector	Name	Type	GHG	Status	Absolute Reduction [kt CO_2 eq. p.a.] 2005	2010	2020	Costs [EUR/t]
		Information						
Transport	Energy-saving agreements	Voluntary/ negotiated agreement	CO_2	implemented			Cluster value	
Transport	Railway act	Regulatory	CO_2	implemented				
Waste	Government decision on landiflls	Regulatory	CH_4	implemented		100		
Waste	Waste minimisation, the collection and recovery of waste paper and other waste fractions	Planning Regulatory	CH_4	implemented				
Waste	Waste tax	Fiscal	CH_4	implemented				
Waste	Limitation of waste volumes	Regulatory	CH_4			10		
Energy consumption	Directive 2002/91/EC on the energy performance of buildings		CO_2					
Transport	Combined emission reduction of FI-TRA-03 FI-TRA-05 FI-TRA-06 FI-TRA-07	Economic Education Information Voluntary/ negotiated agreement	CO_2 N_2O	implemented planned			1000	
Cross-cutting	EU Emission Trading Scheme - Allocation 2005-2007	Economic	CO_2	implemented	800	details	details	
Cross-cutting	EU Emission Trading Scheme - Allocation 2008-2012	Economic	CO_2	implemented	details	8,700	details	
Energy consumption	Improvements of energy efficiency in building	Economic Information	CO_2	adopted		10		

Source: Öko Institut, (accessed 13th June 2007), ECCP Policies and Measures database, http://www.oeko.de/service/pam/index.php
Note: Where no projection scenario information was reported for a policy or measure, the status field was used to decide which projection scenario it should be included in. A status of implemented, adopted, expired or a blank field was assumed to belong to the "With Existing Measures" projection. If the status is reported as planned the policy or measure is included in the "With Additional Measures" projection scenario.

Table 7. Detailed information on Planned Policies and measures

Sector	Name	Type	GHG	Status	Absolute Reduction [kt CO_2 eq. p.a.] 2005	2010	2020	Costs [EUR/t]
Industrial Processes	Regulation on F-gas	Regulatory	HFC PFC SF_6	planned		360		
Transport	Act on biofuels	Regulatory	CO_2			Cluster value	Cluster value	
Transport	Differentiation of vehicle taxation in conjunction with voluntary energy saving agreements	Fiscal	CO_2	planned				
Transport	Additional Measures to maintain urban structure	Education Planning	CO_2	planned	details	Cluster value	Cluster value	
Transport	Increase of fuel taxation	Fiscal	CO_2	planned	details	Cluster value	Cluster value	
Transport	Differentiation of vehicle taxation in conjunction with voluntary energy saving agreements of the car industry	Economic	CO_2	planned		Cluster value	Cluster value	
Waste	Landfill gas recovery and utilization	Fiscal Regulatory	CH_4	planned		100		
Waste	Waste minimisation, the utilisation of source-separated waste fractions as material and energy	Regulatory	CH_4	planned				
Waste	Development of waste taxation	Fiscal Regulatory	CH_4	planned				
Waste	Biowaste strategy	Economic Information Regulatory	CH_4	planned		130		
Transport	Combined emission reduction of FI-TRA-02 FI-TRA-08 FI-TRA-09 FI-TRA-14	Economic Education Fiscal Planning Regulatory	CO_2	planned	not quantified	500	500	
Transport	Eco-driving	Economic Education	CO_2	planned	details	details	Cluster value	

Sector	Name	Type	GHG	Status	Absolute Reduction [kt CO_2 eq. p.a.] 2005	2010	2020	Costs [EUR/t]
		Information						

Source: Öko Institut, (accessed 24 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 **before** CCPM was adopted	Energy performance of buildings 2002/91/EC	Energy consumption
	Energy labelling for office equipment 2422/2001	Energy consumption
Existing national policies and measures **re-enforced** by CCPM	Promotion of cogeneration 2004/8/EC	Energy supply
	Promotion of electricity from RE sources 2001/77/EC	Energy supply
	Taxation of energy products 2003/96/EC	Energy supply
	End-use efficiency and energy services 2006/32/EC	Energy consumption
	Landfill directive 1999/31/EC	Waste
New national policies and measures implemented after CCPM was adopted	Kyoto Protocol project mechanisms 2004/101/EC	Cross-cutting
	Emissions trading 2003/87/EC	Cross-cutting
	Directives on energy labelling of appliances	Energy consumption
	Eco-management & audit scheme (EMAS) EC 761/2001	Energy consumption
	Efficiency fluorescent lighting 2000/55/EC	Energy consumption
	Promotion of biofuels for transport 2003/30/EC	Transport
	Transport modal shift to rail 2001/12/EC etc.	Transport
	Support under CAP (1782/2003)	Agriculture
	Support under CAP - amendment (1783/2003)	Agriculture
Status of national policy or measure **not reported**	Integrated pollution prevention and control 96/61/EC	Cross-cutting
	Internal electricity market 2003/54/EC	Energy supply
	Internal market in natural gas 98/30/EC*	Energy supply
	Ecodesign requirements for energy-using products 2005/32/EC	Energy consumption
	Efficiency of hot water boilers 92/42/EEC	Energy consumption
	Integrated European railway area (COM(2002)18 final)	Transport
	Consumer information on cars 1999/94/EC	Transport
	Agreement with car manufacturers ACEA etc.	Transport
	Marco Polo programme on freight transport	Transport
	Motor challenge, voluntary EC programme	Energy consumption
	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; Finland's national report submitted to the European Commission under the Monitoring Mechanism, Decision 280/2004/EC (31 May 2007).

Notes:
* Finland has requested derogation as long as Finland is not connected to the European grid.

4. METADATA

Sources of information

Finland's national report and template submitted to the European Commission under Article 3(2) of the Monitoring Mechanism, Decision 280/2004/EC. Report submitted 31 May 2007.

Finland's 4th National Communication to the United Nations Framework Convention on Climate Change and Report on Demonstrable Progress under the Kyoto Protocol, both submitted February 2006.

Annual greenhouse gas inventory 1990 - 2006 and inventory report, [11 April 2008].

Base-year emissions from the UNFCCC website,
http://unfccc.int/ghg_data/kp_data_unfccc/base_year_data/items/4354.php

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 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 (CO_2), methane (CH_4), nitrous oxide (N_2O) and fluorinated gases (SF_6, HFCs and PFCs).

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

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. 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 = 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 no 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
Projection scenarios	"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 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	+++	Names given, clear name/description
Objectives of policies	++	Description of objectives for most policies.
Types of policies	++	Detailed for most policies.
Which greenhouse gases?	++	Specified for most policies.
Status of Implementation	++	Clear for almost all PAMs.
Implementation body	+++	Ministry specified
Quantitative assessment of emission reduction effect and cost of policies	++	All planned measures quantified for 2010. Some existing measures quantified for 2005.
Interaction with other national and EU level policies	o	No information
Measures implementing community legislation	+++	CCPMs mapped to national policies.
Arrangements for flexible mechanisms	+++	Information reported.
Balance between domestic action and flexible mechanisms	+	Some discussion.

Table 10. Information provided on projections

Category of Information	Level of information provided	Comments
Projection scenarios	+++	WEM and WAM clearly presented
Policies included in each projection	+++	Clearly presented in template.
Expressed relative to historic reference year data	+++	
Starting year	o	The starting year for projections is not clearly stated.
Split of projections	+++	By all gases (F-gases together) and all sectors as CRF.
Presentation of results	+++	Clear, both tables & graphs.
Description of methodologies	+	No detail.
Sensitivity analysis	+++	High, central and low projections given for 'With Existing Measures'.
Discussion of uncertainty	+	Sources of uncertainty affecting future emissions identified but not quantified

Details of parameters and assumptions	++	Very detailed information on the mandatory parameters provided. Only 4 of 10 indicators for projections could be calculated.
Indicators for projections	++	Data is reported for 10 of the 20 numerators required.

In the 2007 Monitoring Mechanism submission to the European Commission, Finland provides a clear and informative report accompanied by the Climate Change Committee Working Group II excel template, presenting additional detail. A summary of progress to the Kyoto target and details of the modelling methodology is not however provided.

Finland provided some of the mandatory parameters for a base year, 2005, 2010, 2015 and 2020 for the following scenarios: Central economic scenario, With Existing Measures and With Additional Measures; Low economic scenario With Existing Measures; and High economic scenario With Existing Measures. Parameters for the central economic scenario, "With Existing Measures" projection are presented in Table 9. Mandatory parameters for the transport, buildings, agriculture and forestry sectors are missing. Recommended parameters are not reported.

Table 11. Parameters for Projections

1. Mandatory parameters on projections	units	Base Year	2005	2010	2015	2020
Assumptions for general economic parameters						
GDP (value at given years)	Value (Euro 2000 basis)	92084	128938.80	150599.62	166996.29	184407.08
GDP (growth rate)	Annual growth rate		0.02	0.03	0.02	0.02
Population (annual growth rate)	Thousand People		0.00	0.00	0.00	0.00
Population (value at given years)	% of 2005 value	4998	5229.52	5274.70	5303.09	5319.36
International coal prices at given years in euro per tonne or GJ (Gigajoule)	€ per GJ		1.64	1.71	1.75	1.79
International oil prices at given years in euro per barrel or GJ	€ per GJ		4.71	4.27	4.64	5.00
International gas prices at given years in euro per m3 or GJ	€ per GJ		3.61	3.44	3.69	3.95
Assumptions for the energy sector						
Total gross inland consumption (PJ) (split by oil, gas, coal, renewables, nuclear, other)		0	1385.88	1580.33	1634.43	1677.06
Oil (fossil)	Petajoule (PJ)		376.25	390.14	383.17	376.49
Gas (fossil)	Petajoule (PJ)		149.10	177.36	196.94	202.15
coal	Petajoule (PJ)		93.51	108.04	108.47	133.58
Solid bio-fuels	Petajoule (PJ)		142.23	153.81	150.74	154.26
Liquid bio-fuels	Petajoule (PJ)		138.87	169.33	173.04	182.49
solar	Petajoule (PJ)					
wind	Petajoule (PJ)		0.79	1.66	2.80	4.12
geothermal	Petajoule (PJ)					
Hydro	Petajoule (PJ)		48.95	49.85	50.75	51.65
Nuclear (IEA definition for energy calc.)	Petajoule (PJ)		243.60	339.45	376.97	376.97
Net Electricity import (-+)	Petajoule (PJ)		61.19	28.80	25.20	18.00
Other (Includes peat, coke, reaction heat of industry, blast furnace gas and coke owen gas and energy from heat pumps)	Petajoule (PJ)		131.39	161.88	166.34	177.35
Total electricity production by fuel type (oil, gas, coal, renewables, nuclear, other)		0	68547.30	86120.42	91062.78	95295.66
Oil (fossil)	Gwhe		616.04	762.40	656.69	631.81
Gas (fossil)	Gwhe		10662.84	13178.17	15603.02	16564.47
coal	Gwhe		8126.23	9517.22	9941.13	12593.37
Renewable	Gwhe		23032.03	23032.03	23032.03	23032.03

1. Mandatory parameters on projections	units	Base Year	2005	2010	2015	2020
Nuclear (IEA definition for energy calc.)			22330.00	31116.00	34556.00	34556.00
Other Please Specify			3780.17	8514.60	7273.92	7917.98
Energy demand by sector split by fuel (delivered)						
Energy demand by sector (delivered)		0.00	1227.21	1439.70	1500.33	1542.81
Energy Industries	Petajoule (PJ)	0.00	501.64	626.95	682.78	714.53
Oil (fossil)	Petajoule (PJ)		11.25	12.71	11.97	11.52
Gas (fossil)	Petajoule (PJ)		79.21	92.07	110.95	115.62
coal	PJ		84.10	98.24	98.60	123.64
Renewables	PJ		83.48	84.48	84.29	86.79
Nuclear (IEA definition for energy calc.)	PJ		243.60	339.45	376.97	376.97
Industry	Petajoule (PJ)	0.00	449.19	534.62	545.09	561.35
Oil (fossil)	Petajoule (PJ)		93.26	108.24	109.21	110.41
Gas (fossil)	Petajoule (PJ)		66.60	82.11	82.87	83.45
coal	PJ		85.40	98.34	100.95	102.47
Renewables[3]			203.92	245.93	252.07	265.01
Commercial (Tertiary)	Petajoule (PJ)	0.00	17.98	14.05	11.03	8.33
Oil (fossil)	Petajoule (PJ)		14.00	10.54	7.87	5.48
Gas (fossil)	Petajoule (PJ)		1.31	1.05	0.86	0.68
coal			0.00	0.00	0.00	0.00
Renewables			2.67	2.46	2.30	2.17
Residential	Petajoule (PJ)	0.00	79.33	80.70	79.05	77.67
Oil (fossil)	Petajoule (PJ)		32.24	30.42	27.26	24.17
Gas (fossil)	Petajoule (PJ)		1.07	1.12	1.16	1.19
coal			0.10	0.10	0.10	0.10
Renewables[3]			45.92	49.06	50.54	52.22
Transport	Petajoule (PJ)	0.00	179.07	183.37	182.37	180.94
Oil (fossil)	Petajoule (PJ)		178.55	182.74	181.65	180.12
Gas (fossil)	Petajoule (PJ)		0.29	0.41	0.51	0.61
coal			0.00	0.00	0.00	0.00
Renewables[3]			0.23	0.22	0.21	0.21
Assumptions on weather parameters, especially heating or cooling degree days						
Heating Degree Days	Annual HDD	4050.00	4142.00	4312.00	4312.00	4312.00
Cooling Degree Days	Annual CDD	0	0	0	0	0
Assumptions for the industry sector						
For Member States using macroeconomic models:						
The share of the industrial sector in GDP and growth						

1. Mandatory parameters on projections	units	Base Year	2005	2010	2015	2020
rate						
Gross value-added total industry	Bio Euro (EC95) 2000		128.94	147.51	163.70	180.90
For Member States using other models:						
The production index for industrial sector	GVA or index units					
Pulp and paper industry			1	1.29	1.40	1.50
Iron and steel			1	1.11	1.14	1.17
Manufacture of electrical and optical equipment			1	1.25	1.44	1.67
Other manufacturing industry			1	1.12	1.19	1.27
Assumptions for the transport sector						
For Member States using macroeconomic models:						
The growth of transport relative to GDP						
For Member States using other models:						
The growth of passenger person kilometres						
The growth of freight tonne kilometres						
Assumptions for buildings (in residential and commercial or tertiary sector)						
For Member States using macroeconomic models:						
The level of private consumption (excluding private transport)						
The share of the tertiary sector in GDP and the growth rate						
For Member States using other models:						
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						
For Member States using macroeconomic models:						
The share of the agriculture sector in GDP and relative growth						
For Member States using other models:						
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)						

1. Mandatory parameters on projections	units	Base Year	2005	2010	2015	2020
Assumptions in the waste sector						
Municipal solid waste generation	kt		2.48	2.58	2.64	2.70
The organic fractions of municipal solid waste	%		2.10	2.19	2.25	2.29
Municipal solid waste disposed to landfills	%		1.35	1.40	1.44	1.47
Municipal solid waste disposed incinerated	%		0.26	0.27	0.27	0.28
Municipal solid waste disposed composted	%		0.25	0.26	0.27	0.27
Municipal solid waste disposed to landfills	kt	0	3.33	3.62	3.80	3.95
Assumptions in the forestry sector						
Forest definitions						
Areas of:						
managed forests						
unmanaged forests						

Source: Finland's national report and template submitted to the European Commission under the Monitoring Mechanism, Decision 280/2004/EC. Report submitted 31 May 2007.

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					
For Member States using macroeconomic models:					
Share of GDP for different sectors and growth rates					
Rate of improvement of energy intensity (1990 = 100)					
For Member States using other models:					
Index of production for different sectors					
Rate of improvement or index of energy efficiency					
Assumptions for buildings (in residential and commercial / tertiary sector)					
For Member States using macroeconomic models:					
Share of tertiary and household sectors in GDP					
Rate of improvement of energy intensity					
For Member States using other models:					
Number of households					
Number of new buildings					
Rate of improvement of energy efficiency (1990 = 100)					
Assumptions for the transport sector					
For Member States using econometric models:					
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					
For Member States using econometric models:					
Agricultural trade (import/export)					
Domestic consumption (e.g. milk/beef consumption)					
For Member States using other models:					
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					