

# Finland

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## 1. SOURCES OF INFORMATION

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

Finnish proposal for a National Allocation Plan for emission allowances for the years 2008-2012. Draft 29 September 2006.

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>

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.

### **Base-year emissions**

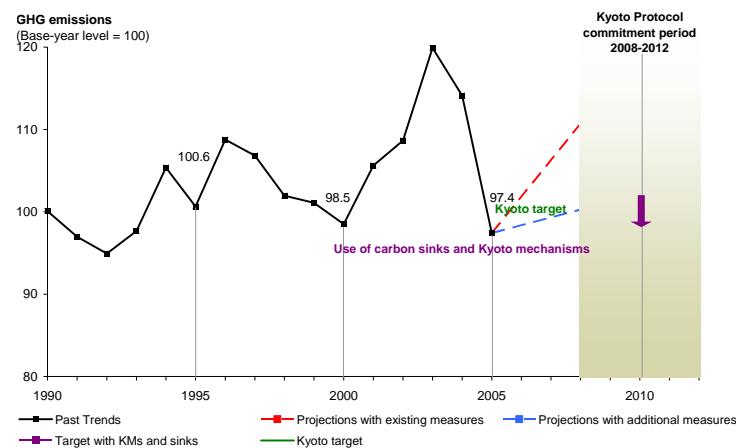
Base-year emissions of greenhouse gases are calculated using 1990 emissions for carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>) and nitrous oxide (N<sub>2</sub>O) and 1995 emissions for fluorinated gases (SF<sub>6</sub>, HFCs and PFCs).

Base-year data is as reported by Member States in the sources noted above. This base year varies only slightly from that 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, with the latter being just 0.03MtCO<sub>2</sub>-eq. greater. This data is currently undergoing a review procedure by UNFCCC and is therefore subject to change.

## 2. SUMMARY

### FINLAND

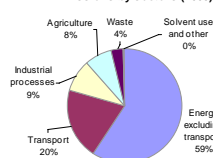
Share in total EU-15 GHG emissions 2005	1.7 %
Emissions base year (initial report)	71.1 Mt
Emissions 2005	69.3 Mt
Emissions base year (for projections)	71.1 Mt
Projections 2010 with existing measures	85.0 Mt
Projections 2010 with additional measures	72.6 Mt
Kyoto target (absolute)	71.1 Mt
Kyoto target (% from base year)	0 %
Change base year to 2005	- 2.6 %
Change 2004–05	- 14.6 %
Change base year to 2010 with existing measures	+ 19.6 %
Change base year to 2010 with additional measures	+ 2.2 %
Distance to linear target path 2004	-5.7 (-2.6) index points
Use of Kyoto mechanisms	2.4 Mt
Sinks (Articles 3.3. and 3.4)	0.6 Mt
Emissions in 1990 (Article 3.7)	n.a.



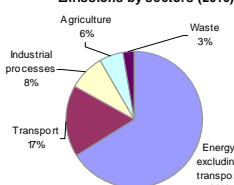
**Past emissions:** Finland's GHG emissions were 14.6 % below those of 2004 and 2.6 % below base-year levels in 2005. The main factor for decreasing emissions with regard to the previous year was a sharp decline of fossil fuel combustion in electricity and heat production. This was partly driven by an increase of net electricity imports also due to high hydro power production in Nordic countries in 2005. Electricity and heat production is also the main driver for emission changes 1990–2005. Compared with most other EU Member States, Finnish transport emissions have increased only moderately since 1990.

**Emission projections:** Emissions in 2005 were 22 percentage points below the level projected in the 'with measures' scenario for 2010. Based on the 'with existing measures' scenario, Finland will be 20 % above base-year levels and thus exceeds its Kyoto target. The effect of additional measures plus the use of Kyoto mechanisms will enable Finland to achieve its Kyoto target by 2010. Finland plans to purchase Kyoto units of 2.4 million tonnes for each year of the commitment period.

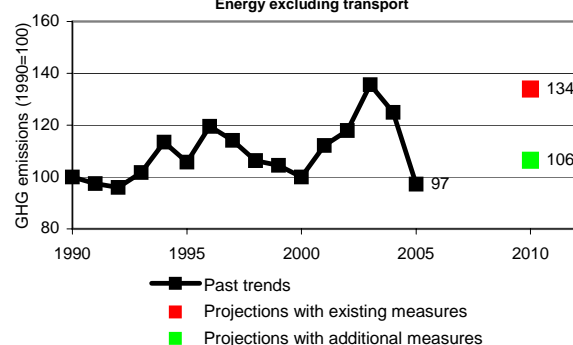
Emissions by sectors (2005)



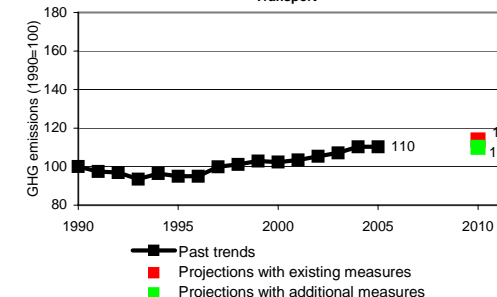
Emissions by sectors (2010)

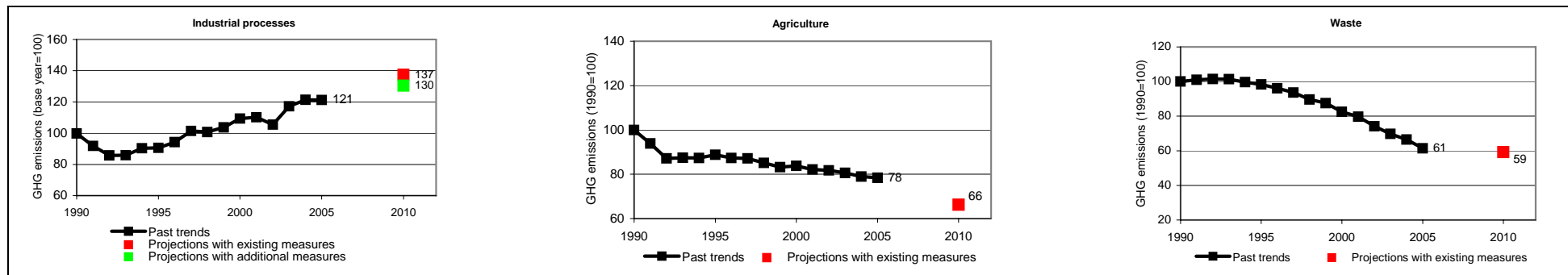


Energy excluding transport



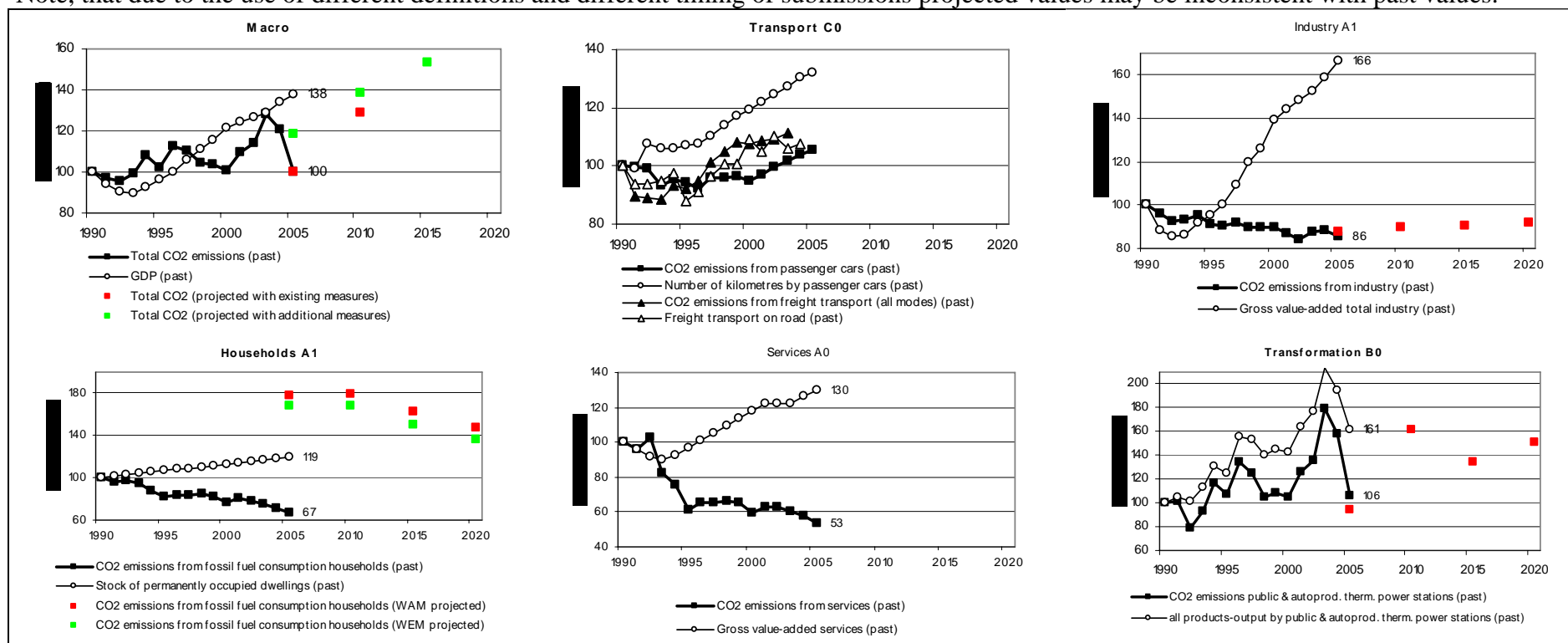
Transport

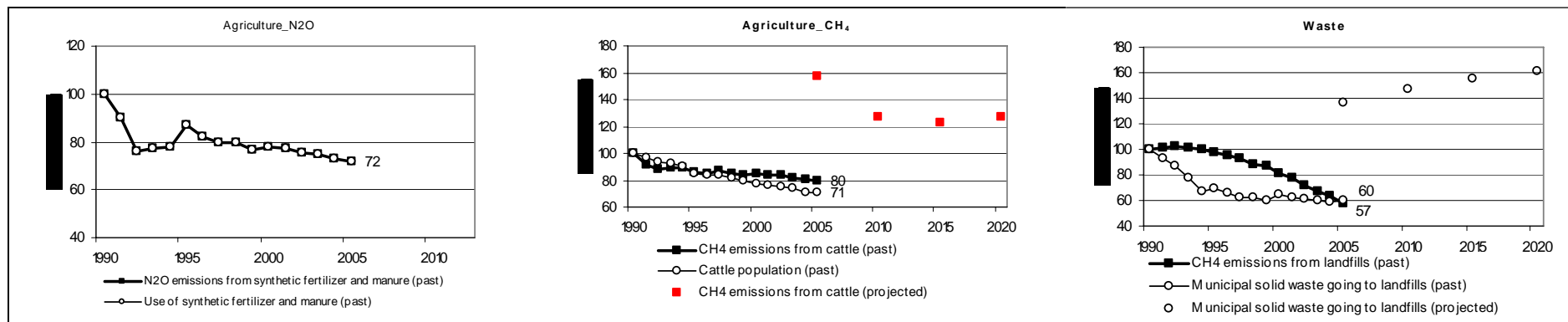




### 3. REPORTED INDICATORS

Note, that due to the use of different definitions and different timing of submissions projected values may be inconsistent with past values.





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	56,904	55,326	54,466	56,285	61,686	58,210	64,044	62,686	59,536	59,057	57,209	62,327	64,834	72,740	68,828	57,011
	GDP, Bio Euro (EC95)	109	102	98	97	101	105	109	115	121	126	132	136	138	140	146	150
Macro B0	CO <sub>2</sub> emissions from energy consumption, kt	53,249	51,853	51,137	52,970	58,330	54,927	60,645	58,957	55,883	55,343	53,406	58,568	61,160	68,739	64,686	53,139
	GDP, Bio Euro (EC95)	109	102	98	97	101	105	109	115	121	126	132	136	138	140	145	150
Transport C0	CO <sub>2</sub> emissions from passenger cars, kt	6,705	6,681	6,643	6,255	6,407	6,316	6,171	6,426	6,415	6,455	6,353	6,489	6,683	6,810	6,976	7,062
	Number of kilometres by passenger cars, Mkm	33,430	33,130	36,050	35,500	35,400	35,760	36,000	36,790	38,080	39,190	39,815	40,680	41,675	42,565	43,530	44,220
Industry A1	CO <sub>2</sub> emissions from industry, kt	13,278	12,779	12,270	12,349	12,669	12,129	12,045	12,216	11,929	11,911	11,958	11,507	11,217	11,596	11,700	11,407
	Gross value-added total industry, Bio Euro (EC95)	26	23	23	23	24	25	26	29	31	33	37	38	39	40	42	44
Households A1	CO <sub>2</sub> emissions from fossil fuel consumption households, kt	3,072	2,965	2,973	2,921	2,689	2,523	2,568	2,560	2,597	2,543	2,338	2,482	2,414	2,298	2,175	2,050
	Stock of permanently occupied dwellings, 1000	2,037	2,066	2,094	2,120	2,149	2,181	2,199	2,221	2,247	2,273	2,295	2,329	2,354	2,378	2,402	2,429
Services A0	CO <sub>2</sub> emissions from fossil fuel consumption in commercial and institutional sector, kt	1,951	1,878	2,007	1,602	1,468	1,201	1,274	1,282	1,287	1,269	1,168	1,229	1,221	1,183	1,127	1,043
	Gross value-added services, Bio Euro (EC95)	66	63	61	59	61	64	66	70	73	75	78	81	81	81	83	86
Transformation B0	CO <sub>2</sub> emissions from public and autoproducer thermal power stations, kt	19,678	19,989	15,628	18,328	22,864	20,990	26,360	24,586	20,646	21,223	20,530	24,764	26,571	35,244	31,213	20,833
	All products - output and autoproducer thermal power stations, PJ	149	157	150	169	196	186	233	228	210	217	213	244	264	319	291	240

## FINLAND

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	2,571	2,309	2,295	2,273	2,400	2,377	2,438	2,607	2,695	2,785	2,771	2,797	2,809	2,863	2,987	2,935
	Freight transport on road, Mtkm	25,400	23,800	23,800	24,100	24,800	22,339	23,174	24,511	25,611	25,575	27,716	26,677	28,069	26,895	27,330	27,813
Industry A1.1	Total CO <sub>2</sub> emissions from iron and steel, kt	4,414	4,485	4,557	4,832	4,958	4,708	4,943	5,493	5,621	5,691	5,977	5,559	5,513	6,012	6,072	6,020
	Gross value-added - iron and steel industry, Bio Euro (EC95)	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2
Industry A1.2	Energy related CO <sub>2</sub> emissions chemical industries, kt	1,343	1,321	1,298	1,316	1,382	1,417	1,385	1,315	1,207	1,207	1,235	1,304	1,221	1,359	1,350	1,456
	Gross value-added - chemical industry, Bio Euro (EC95)	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2
Industry A1.3	Energy related CO <sub>2</sub> emissions - glass pottery and building materials industry, kt	1,364	1,166	969	841	760	801	821	797	802	860	880	888	909	897	968	944
	Gross value added - glass pottery and building materials industry, Bio Euro (EC95)	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Industry C0.1	Total CO <sub>2</sub> emissions from iron and steel, kt	4,414	4,485	4,557	4,832	4,958	4,708	4,943	5,493	5,621	5,691	5,977	5,559	5,513	6,012	6,072	6,020
	Production of oxygen steel	2,861	2,890	3,077	3,256	3,420	3,176	3,301	3,734	3,952	3,956	4,096	3,938	4,003	4,766	4,830	4,738
Industry C0.2	Energy related CO <sub>2</sub> emissions from glass, pottery and building materials, kt	1,364	1,166	969	841	760	801	821	797	802	860	880	888	909	897	968	944
	Cement production, kt	1,721	1,354	1,119	876	926	930	945	1,119	1,130	1,190	1,252	1,241	1,164	1,127	1,270	1,317

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	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Number of km, of diesel-driven passenger cars, Mio km	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Transport (B0) (petrol)	CO <sub>2</sub> emissions of petrol-driven cars, kt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Number of km, of petrol-driven passenger cars, Mio km	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Transport C0	CO <sub>2</sub> emissions from passenger cars, kt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Passenger transport by cars, Mpkm	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Transport E1	CO <sub>2</sub> emissions from domestic air transport, kt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Domestic air passenger, Mio	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Industry A1.4	Energy related CO <sub>2</sub> emissions food industry, kt	815	789	762	723	713	695	658	606	564	490	322	319	325	264	244	218
	Gross Value Added food, drink and tobacco industry, Mio EUR (EC95)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Industry A1.5	Energy related CO <sub>2</sub> emissions - paper and printing industry, kt	5,326	5,148	4,971	4,933	5,161	4,819	4,628	4,570	4,252	4,179	4,045	3,910	3,676	3,807	3,936	3,509
	Gross value added paper and printing industry, Mio EUR (EC95)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Households A0	Surface area of permanently occupied dwellings, Mio m <sup>2</sup>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Specific CO <sub>2</sub> emissions of households for space heating, t/m <sup>2</sup>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Services B0	CO <sub>2</sub> emissions from space heating in commercial and institutional, kt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Surface area of services buildings, Mio m <sup>2</sup>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Transformation D0	CO <sub>2</sub> emissions from public thermal power stations, kt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	All products output by public thermal power stations, PJ	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Transformation E0	CO <sub>2</sub> emissions from autoproducer, kt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	All products output by autoproducer thermal power stations, PJ	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Transformation	CO <sub>2</sub> emissions from classical power production, kt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	All products output by public and autoproducer power stations, PJ	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Transport	CO <sub>2</sub> emissions from transport, kt	12,551	12,207	12,128	11,666	12,023	11,824	11,802	12,396	12,534	12,729	12,634	12,749	12,951	13,149	13,514	13,492
	Total final energy consumption from transport, PJ	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Industry	Energy related CO <sub>2</sub> emissions paper and printing industries, kt	5,326	5,148	4,971	4,933	5,161	4,819	4,628	4,570	4,252	4,179	4,045	3,910	3,676	3,807	3,936	3,509
	Physical output of paper, kt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Industry	CO <sub>2</sub> emissions from the industry sector	13,278	12,779	12,270	12,349	12,669	12,129	12,045	12,216	11,929	11,911	11,958	11,507	11,217	11,596	11,700	11,407
	Total final energy consumption from industry, PJ	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Households	CO <sub>2</sub> emissions from households, kt	3,072	3,072	2,965	2,973	2,921	2,689	2,523	2,568	2,560	2,597	2,543	2,338	2,482	2,414	2,298	2,175
	Total final energy consumption from households, PJ	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

#### 4. OVERVIEW OF CCPM IMPLEMENTATION IN FINLAND

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

Sector	CCPM	Status
Cross-cutting	Kyoto Protocol project mechanisms 2004/101/EC	
Cross-cutting	Emissions trading 2003/87/EC	N
Cross-cutting	Integrated pollution prevention and control 96/61/EC	
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	
Energy supply	Promotion of electricity from RE sources 2001/77/EC	R
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	N
Energy consumption	End-use efficiency and energy services 2006/32/EC	
Energy consumption	Ecodesign requirements for energy-using products 2005/32/EC	
Energy consumption	Energy performance of buildings 2002/91/EC	B
Energy consumption	Eco-management & audit scheme (EMAS) EC 761/2001	N
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 (2nd + 3rd Railway package) (COM(2002)18 final)	
Transport	Transport modal shift to rail 2001/12/EC etc.	N
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	Industrial Process: HFC emissions from air conditioning in motor vehicles 2006/40/EC	
Agriculture	Support under CAP (1782/2003)	N
Agriculture	Support under CAP - amendment (1783/2003)	N
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	R
Waste	Packaging and packaging waste (Directive 94/62/EC, 2004/12/EC, 2005/20/EC)	

*Legend*

**New** national PAM implemented after CCPM was adopted

N

Existing national PAM **re-enforced** by CCPM

R

National PAM already in force **before** CCPM was adopted

B

Not reported

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.

## 5. COMPLETENESS OF REPORTING

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, completed to a high level of detail. A summary of progress to the Kyoto target, comparing projections to base year and details of the modelling methodology is not however provided.

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

Information provided	Level of information provided	Comments
Policy names	+++	Names given, clear name/description
Objectives of policies	++	Description of objectives for most PAMs.
Which greenhouse gases?	++	Specifies which gases most PAMs deal with.
Status of Implementation	++	Clear for almost all PAMs.
Implementation body specified	+++	Ministry specified
Quantitative assessment of implementation	++	All 'additional' PAMs quantified
Interaction with other policies and measures discussed	o	No information

**Table 3. Information provided on projections**

Category of Information	Level of information provided	Comments
Scenarios considered	+++	WM and WAM clearly presented
Expressed relative to base year	+++	Clear base year
Starting year	o	The starting year for projections is not clearly presented.
Split of projections	+++	By all gases (F-gases together) and all sectors as CRF.
Presentation of results	+++	Clear, both tables & graphs though base year not presented in tables of report.

Description of model (level of detail, approach and assumptions)	+	No detail.
Sensitivity analysis (key inputs to model / high, central and low projections scenarios / robustness of model)	+++	High, central and low projections given for 'with measures'.
Discussion of uncertainty	o	
Details of parameters and assumptions	++	Very detailed information on the mandatory parameters provided. Only 4 of 10 indicators for projections could be calculated.

## 6. ASSESSMENT OF POLICIES AND MEASURES

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

	<b>With measures</b>	<b>With additional measures</b>
Energy (total, excluding transport)	14.0	11.5
Energy supply	14.0	9.0
Energy – industry, construction	0.0	2.5
Energy – other (commercial, residential, agriculture)	0.0	0.0
Transport (energy)	0.0	0.5
Industrial processes	0.0	0.4
Waste	0.1	1.6
Agriculture	0.0	2.4
Cross-sectoral	3.5	0.0
<b>Total (excluding LULUCF)</b>	<b>17.6</b>	<b>16.4</b>

Note: The effect of additional measures is calculated by subtracting WAM projected emissions in 2010 from WM projected emissions in 2010. The effect of existing measures is taken from the Öko Institut database (<http://www.oeko.de/service/pam/index.php>).

**Table 5. Detailed information on 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.

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

<a href="#">Sector</a>	Projection		Name	Type	GHG	Status	Absolute Reduction			<a href="#">Costs</a> [EUR/t]
	Scenario	[kt CO <sub>2</sub> eq. p.a.]								
		2005					2010	2020		
Cross-cutting	WM		<a href="#">Energy taxation</a>	Fiscal	CO <sub>2</sub>	implemented				
Energy supply	WM		<a href="#">Construction of a new nuclear power unit</a>	Economic	CO <sub>2</sub>	implemented	<a href="#">details</a>	8,000	<a href="#">details</a>	
				Regulatory						
Energy supply	WM		<a href="#">Action plan for renewable energy</a>	Economic	CH <sub>4</sub>	implemented	<a href="#">details</a>	4,500	<a href="#">details</a>	
				Education	CO <sub>2</sub>			<a href="#">more</a>		
				Fiscal	N <sub>2</sub> O					
Energy supply	WM		<a href="#">Electricity Market Act</a>	Regulatory	CO <sub>2</sub>	implemented	<a href="#">details</a>	<a href="#">details</a>	<a href="#">details</a>	
Energy consumption	WM		<a href="#">Energy conservation programme</a>	Economic	CO <sub>2</sub>	implemented	<a href="#">details</a>	3,500	<a href="#">details</a>	
				Education				<a href="#">more</a>		
				Regulatory						
Energy consumption	WM		<a href="#">Measures to promote energy conservation and use of renewables</a>	Economic	CO <sub>2</sub>	implemented	<a href="#">details</a>	1,500	<a href="#">details</a>	
								<a href="#">more</a>		

<a href="#">Sector</a>	Projection Scenario	Name	Type	GHG	Status	Absolute Reduction [kt CO <sub>2</sub> eq. p.a.]			<a href="#">Costs</a>
						2005	<a href="#">2010</a>	2020	<a href="#">[EUR/t]</a>
Energy consumption	WM	<a href="#">Eco Management and audit scheme</a>	Voluntary/ negotiated agreement	CO <sub>2</sub>	implemented				
Energy consumption	WM	<a href="#">Energy labelling of household appliances</a>	Information	CO <sub>2</sub>	implemented				
Transport	WM	<a href="#">Voluntary agreements with European, Japanese and Korean car industries,</a>	Voluntary/ negotiated agreement	CO <sub>2</sub>	implemented		<a href="#">details</a>	Cluster value	
Transport		<a href="#">Tax deduction for employer paid public transport tickets</a>	Economic	CO <sub>2</sub>					
Transport	WM	<a href="#">Promotion of public and non-motorised transport</a>	Economic Education Information	CO <sub>2</sub> N <sub>2</sub> O	implemented	<a href="#">details</a>	<a href="#">details</a>	Cluster value	
Transport	WM	<a href="#">Eco-driving</a>	Economic Education Information	CO <sub>2</sub>	planned	<a href="#">details</a>	<a href="#">details</a>	Cluster value	
Transport	WM	<a href="#">Energy-saving agreements</a>	Voluntary/ negotiated agreement	CO <sub>2</sub>	implemented			Cluster value	
Transport	WM	<a href="#">Railway act</a>	Regulatory	CO <sub>2</sub>	implemented				
Transport		Combined emission reduction of	Economic	CO <sub>2</sub>	implemented			1000	
		FI-TRA-03	Education	N <sub>2</sub> O	planned				
		FI-TRA-05	Information						

<a href="#">Sector</a>	Projection Scenario	Name	Type	GHG	Status	Absolute Reduction [kt CO <sub>2</sub> eq. p.a.]			<a href="#">Costs</a>
						2005	<a href="#">2010</a>	2020	<a href="#">[EUR/t]</a>
		FI-TRA-06	Voluntary/ negotiated agreement						
		FI-TRA-07							
Industrial Processes	WM	<a href="#">F-gases from air conditioning</a>	Regulatory	HFC	implemented			30	
Agriculture	WM	<a href="#">Agenda 2000, including Agri-environmental support measures Horizontal Rural Development Programme in Continental Finland (2000-2006)</a>	Economic	CH <sub>4</sub>  CO <sub>2</sub> N <sub>2</sub> O	implemented				
Agriculture	WM	<a href="#">Nitrate Statute</a>	Regulatory	N <sub>2</sub> O	implemented				
Waste	WM	<a href="#">Government decision on landfills</a>	Regulatory	CH <sub>4</sub>	implemented			100	
Waste	WM	<a href="#">Waste minimisation, the collection and recovery of waste paper and other waste fractions</a>	Planning Regulatory	CH <sub>4</sub>	implemented				
Waste	WM	<a href="#">Waste tax</a>	Fiscal	CH <sub>4</sub>	implemented				

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

Sector	Projection Scenario	Name	Type	GHG	Status	Absolute Reduction			Costs
						[kt CO <sub>2</sub> eq. p.a.]			[EUR/t]
						2005	2010	2020	
Cross-cutting	WAM	<a href="#">Use of Kyoto Mechanisms</a>	Economic	CH <sub>4</sub> CO <sub>2</sub> HFC N <sub>2</sub> O PFC SF <sub>6</sub>	implemented	<a href="#">details</a>	2,000	<a href="#">details</a>	
Cross-cutting	WAM	<a href="#">EU Emission Trading Scheme - Allocation 2005-2007</a>	Economic	CO <sub>2</sub>	implemented	800	<a href="#">details</a>	<a href="#">details</a>	
Cross-cutting	WAM	<a href="#">EU Emission Trading Scheme - Allocation 2008-2012</a>	Economic	CO <sub>2</sub>		<a href="#">details</a>	8,700	<a href="#">details</a>	
Cross-cutting	WAM	<a href="#">Finnish CDM/JI Pilot Programme</a>	Economic	CO <sub>2</sub>		<a href="#">details</a>	400	<a href="#">details</a>	
Energy consumption	WAM	<a href="#">Directive 2002/91/EC on the energy performance of buildings</a>		CO <sub>2</sub>					
Transport	WAM	<a href="#">Act on biofuels</a>	Regulatory	CO <sub>2</sub>			Cluster value	Cluster value	
Transport	WAM	<a href="#">Differentiation of vehicle taxation in conjunction with voluntary energy saving agreements</a>	Fiscal	CO <sub>2</sub>	planned				
Transport	WAM	<a href="#">Additional measures to maintain urban structure</a>	Education Planning	CO <sub>2</sub>	planned	<a href="#">details</a>	Cluster value	Cluster value	
Transport	WAM	<a href="#">Increase of fuel taxation</a>	Fiscal	CO <sub>2</sub>	planned	<a href="#">details</a>	Cluster value	Cluster value	



<a href="#">Sector</a>	Projection Scenario	Name	Type	GHG	Status	Absolute Reduction			<a href="#">Costs</a>
						[kt CO <sub>2</sub> eq. p.a.]			<a href="#">[EUR/t]</a>
						2005	<a href="#">2010</a> Cluster value	2020 Cluster value	
Transport	WAM	<a href="#">Differentiation of vehicle taxation in conjunction with voluntary energy saving agreements of the car industry</a>	Economic	CO <sub>2</sub>	planned				
Industrial Processes	WAM	<a href="#">Regulation on F-gas</a>	Regulatory	HFC PFC SF <sub>6</sub>	planned		360		
Transport		Combined emission reduction of FI-TRA-02 FI-TRA-08 FI-TRA-09 FI-TRA-14	Economic  Education  Fiscal Planning  Regulatory	CO <sub>2</sub>	planned	not quantified	500	500	
Waste	WAM	<a href="#">Landfill gas recovery and utilization</a>	Fiscal Regulatory	CH <sub>4</sub>	planned		100		
Waste	WAM	<a href="#">Waste minimisation, the utilisation of source-separated waste fractions as material and energy</a>	Regulatory	CH <sub>4</sub>	planned				
Waste	WAM	<a href="#">Development of waste taxation</a>	Fiscal Regulatory	CH <sub>4</sub>	planned				
Waste	WAM	<a href="#">Biowaste strategy</a>	Economic  Information	CH <sub>4</sub>	planned		130		

<a href="#">Sector</a>	Projection Scenario	Name	Type	GHG	Status	Absolute Reduction [kt CO <sub>2</sub> eq. p.a.]			<a href="#">Costs</a>
						2005	<a href="#">2010</a>	2020	<a href="#">[EUR/t]</a>
			Regulatory						

Source: Öko Institut, (accessed 13<sup>th</sup> 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 measures" projection. If the status is reported as planned the policy or measure is included in the "with additional measures" projection scenario.

## 7. EVALUATION OF PROJECTIONS

'With measures' and 'With additional measures' projections were provided for the years 2005, 2010, 2015 and 2020. In addition, 'with 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.

**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)	56.9	73.2	61.2
Methane	6.2	4.2	4.2
Nitrous oxide	7.9	6.5	6.5
F-gases	0.1	1.0	0.6
<b>Total (excl. LULUCF)</b>	<b>71.1</b>	<b>85.0</b>	<b>72.6</b>
% change relative to base year (excl. LULUCF)		19.6%	2.2%

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.

**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)	41.9	56.1	34%	44.6	6%
Energy supply	19.4	36.4	87%	27.4	41%
Energy – industry, construction	13.6	12.1	-11%	9.6	-29%
Energy – other (commercial, residential, agriculture)	8.9	7.7	-14%	7.6	-14%
Transport (energy)	12.8	14.6	14%	14.1	10%
Industrial processes	5.3	7.2	37%	6.9	30%
Waste	4.0	2.4	-41%	2.4	-41%
Agriculture	7.1	4.7	-34%	4.7	-34%
<b>Total (excl. LULUCF)</b>	<b>71.1</b>	<b>85.0</b>	<b>20%</b>	<b>72.6</b>	<b>2%</b>

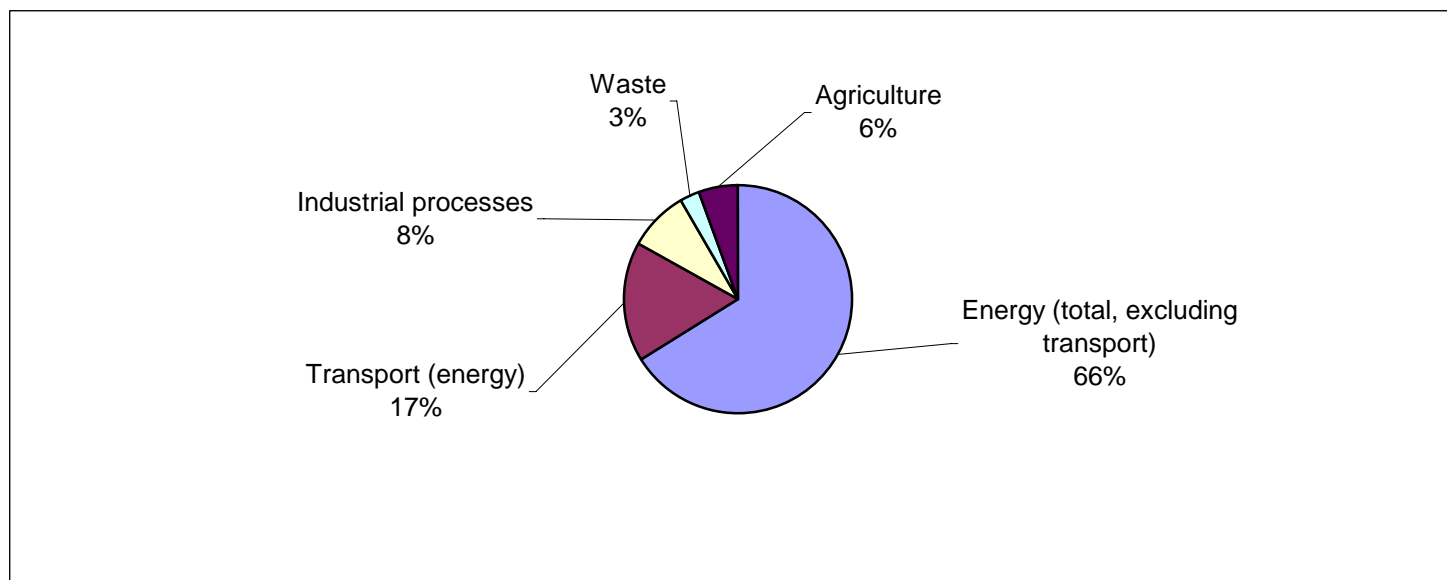
Emissions from the transport sector are expected to increase slightly, with most increases in passenger and freight traffic compensated for through efficiency gains in new vehicles. Energy and electricity consumption are expected to increase by 30%

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 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)	40.9	54.8	43.2	0.1	0.4	0.4	0.8	0.9	0.9	0.0	0.0	0.0
Transport (energy)	12.5	14.0	13.5	0.1	0.0	0.0	0.2	0.6	0.6	0.0	0.0	0.0
Industrial processes	3.4	4.5	4.5	0.0	0.0	0.0	1.7	1.7	1.7	0.1	1.0	0.6
Waste	0.0	0.0	0.0	3.8	2.2	2.2	0.2	0.2	0.2	0.0	0.0	0.0
Agriculture	0.0	0.0	0.0	2.1	1.5	1.5	5.0	3.2	3.2	0.0	0.0	0.0
<b>Total (excl. LULUCF)</b>	<b>56.9</b>	<b>73.2</b>	<b>61.2</b>	<b>6.2</b>	<b>4.2</b>	<b>4.2</b>	<b>7.9</b>	<b>6.5</b>	<b>6.5</b>	<b>0.1</b>	<b>1.0</b>	<b>0.6</b>

Figure 1. Share by sector of 2010 greenhouse gas emissions according to the “with measures” projection



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

	Base-year*	2010	2010 % of base- year level	2015	2015 % of base- year level	2020	2020 % of base- year level
Total (excl. LULUCF)	71.1	72.6	102.2%	69.5	97.7%	71.8	101.0%

\* Base year is 1990 for all gases except F-gases for which the base year is 1995.

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

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	70.5	71.5	71.1*	100%
Kyoto Commitment/burden sharing	70.5	71.5	71.1	0.0%
With existing P&Ms projections	79.7	78.5	85.0	119.6%
Gap (-ve means overachievement of target)	9.2	7.0	13.9	19.6%
With additional P&Ms projections	71.1	70.1	72.6	102.2%
Remaining gap	0.6	-1.4	1.5	2.2%
Effect of flexible mechanisms	0.6	2.4	2.4	3.4%
Remaining gap (with use of flexible mechanisms)	0.0	-3.8	-0.9	-1.2%

Notes:

Above table excludes LULUCF. LULUCF will be covered in the main report, based on the questionnaire submissions.

Sources for 2005 data: Finland's national report submitted to the European Commission under the Monitoring Mechanism, Decision 280/2004/EC. Submitted in June 2005. Information on Kyoto Mechanisms based on the submission of comments on the EEA Draft Report by Finland on 23rd September 2005. Sources 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.

\* Base year varies only slightly from that 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, with the latter being just 0.03MtCO<sub>2</sub>-eq. greater. This data is currently undergoing a review procedure by UNFCCC and is therefore subject to change.

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 MtCO<sub>2</sub>-eq. per year in the period 2008-2012.

**Table 11. Comparison with projections for the trading sector (EU ETS) for the year 2010**

	MMS	NAP 2 projections	Difference
Energy sector	56.10 <sup>a</sup>	54.90 <sup>b</sup>	--
Energy sector included in EU ETS	--	46.00 <sup>c</sup>	--
Industry sector	7.22 <sup>d</sup>	8.10 <sup>e</sup>	--
Industry sector included in EU ETS	--	4.40 <sup>f</sup>	--
Total Energy & Industry	63.3	63	99.5%

a Included are all GHG emissions from the "Energy (total, excluding transport)" sector

b Included are all GHG from "Energy generation" (which includes energy use by industry), "Commercial and institutional, Residential and Agricultural energy use" and "All other sectors"

c Included are CO<sub>2</sub> emissions from the ETS sectors "Energy generation" (which includes energy use by industry), "Commercial and institutional, Residential and Agricultural energy use" and "All other sectors"

d Included are all GHG emissions from the sector "Industrial processes"

e Included are all GHG emissions from the sector "Industrial processes"

f Included are CO<sub>2</sub> emissions from the sector "Industrial processes"

Table 11 compares projections provided in Finland's 2007 Monitoring Mechanism report and the Finnish proposal for a NAP for emission allowances for the year 2010 (as average annual emissions for the trading period 2008-2012 are not provided). This comparison reveals very little difference between the projections (0.03MtCO<sub>2</sub>), other than breakdown between the industrial and energy sectors. Indeed, 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.



## 8. DESCRIPTION OF MODELLING APPROACH

### Overview of modelling approach

No information was provided in Finland's 2007 Monitoring Mechanism submission regarding the modelling process. Information on the responsible ministry for each sector is provided, along with details of the role of the Ministerial Working Group on Climate and Energy Policy in the preparation of the Energy and Climate Strategy and NAP2.

In their 4<sup>th</sup> National Communication to the UNFCCC, however, Finland provided a description of the assumptions and methodology behind the projections model.

Finland's national projections are developed with various models for the energy sector, economic sector and agricultural sector including TIMES, GTAP, DREMFIA and CGE model. The 'with measures' scenario was compared to the BAU Scenario, which was the 'with measures' scenario presented in Finland's Third National Communication.

The calculations concerning the energy sector were carried out with the TIMES model where both investments and operating costs are counted in the cost calculation.

Economic effects were calculated with the help of two CGE models. Domestic effects of the mitigation measures were studied with the hybrid EV model. The GTAP-E takes the results on Finnish exports and world prices as inputs for the model. The GTAP model (Global Trade Analysis Project) is a multi-region, applied general equilibrium model.

The Dynamic Regional Sector Model of Finnish Agriculture DREMFIA (Lehtonen 2001, 2004) was used in the agricultural sector. The model provides effects of various agricultural policies on land use, animal production, farm investments and farmers' income.

### Sensitivity analysis

A sensitivity analysis was carried out on the key inputs to the model, resulting in high, central and low projection scenarios (considering only existing measures). The report presents the effects of variances in expected economic growth of the energy intensive industry sector.

### Details of the uncertainty assessment

Levels of uncertainty were not provided. The Finnish report does however identify several sources of uncertainty affecting future emissions. These include general economic growth, the growth of energy intensive industry (particularly paper and pulp, metal and chemical), levels of imports of electricity and the fuel mix of imports.

## 9. PROJECTION INDICATOR REPORTING

Indicators 1, 4 and 7 are reported by Finland for a base year, 2005, 2010, 2015 and 2020.

Numerators are provided for all indicators except numbers 6, 8 and 10. Denominators for indicators 2, 5, 6, 8 and 9 are not reported.

## **10. REPORTING OF PARAMETERS ON PROJECTIONS**

Finland provided some of the mandatory parameters for a base year, 2005, 2010, 2015 and 2020 for the following scenarios: Central economic scenario, with measures and with additional measures; Low economic scenario with measures; and High economic scenario with measures. Parameters for the central economic scenario, “with measures” projection are presented in Table 13.

Mandatory parameters for the transport, buildings, agriculture and forestry sectors are missing.

Recommended parameters are not reported.

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

N°	Eurostat Sectors	Indicator	Base Year	2005	2010	2015	2020	Numerator/denominator	Base Year	2005	2010	2015	2020
1	Macro	CO <sub>2</sub> intensity of GDP, t/Euro million	0.62	0.44	0.49	0.40	0.38	Total CO <sub>2</sub> emissions, kt	56893.81	57046.65	73240.55	67444.75	70505.53
								GDP, bio Euro (EC95)	92084.00	128938.80	150599.62	166996.29	184407.08
2	Transport C0	CO <sub>2</sub> emissions from passenger cars, kt	NE	13488.86	14009.89	13878.66	13769.75						
		Number of kilometres by passenger cars, Mkm											
3	Transport D0	CO <sub>2</sub> emissions from freight transport (all modes), kt											
		Freight transport (all modes), Mtkm											
4	Industry A1	Energy related CO <sub>2</sub> intensity of industry, t/Euro million	NE	90.15	80.56	73.55	67.28	CO <sub>2</sub> emissions from fuel consumption industry, kt	NE	11623.68	11882.78	12039.96	12171.54
								Gross value-added total industry, Bio Euro (EC 95)	NE	128.94	147.51	163.70	180.90
5	Households A1	Specific CO <sub>2</sub> emissions of households, t/dwelling						CO <sub>2</sub> emissions from fossil fuel consumption households, kt	NE	5181.71	5144.58	4631.53	4167.92
								Stock of permanently occupied dwellings, 1000					
6	Services A0	CO <sub>2</sub> intensity of the services sector, t/Euro million						CO <sub>2</sub> emissions from fossil fuel consumption services, kt					
								gross value-added services, bio Euro (EC95)					
7	Transformation B0	Specific CO <sub>2</sub> emissions of public and autoproducer power plants, t/TJ	NE	0.27	0.37	0.29	0.31	CO <sub>2</sub> emissions from public and autoproducer thermal power stations, kt	16448.09	18493.46	31817.32	26422.56	29795.24
								all products-output by public and autoproducer thermal power stations, PJ	NE	68547.30	86120.42	91062.78	95295.66
8	Agriculture	Specific N <sub>2</sub> O emissions of fertilizer and manure use, kg/kg						N <sub>2</sub> O emissions from synthetic fertilizer and manure use, kt					
								use of synthetic fertiliser and manure, kt nitrogen					

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9	Agriculture	Specific CH <sub>4</sub> emissions of cattle production, kg/head					CH <sub>4</sub> emissions from cattle, kt	NE	75.08	60.55	58.40	60.43
							cattle populations, 1000 head					
10	Waste	Specific CH <sub>4</sub> emissions from landfills, kt/kt					CH <sub>4</sub> emissions from landfills, kt					
							Municipal solid waste going to landfills, kt	NE	3.33	3.62	3.80	3.95

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

1. Mandatory parameters on projections	units	Base Year	2005	2010	2015	2020
<b>Assumptions for general economic parameters</b>						
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
<b>Assumptions for the energy sector</b>						
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 oven 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

<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

1. Mandatory parameters on projections	units	Base Year	2005	2010	2015	2020
coal	Gwhe		8126.23	9517.22	9941.13	12593.37
Renewable	Gwhe		23032.03	23032.03	23032.03	23032.03
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 <sup>3</sup>			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 <sup>3</sup>			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 <sup>3</sup>			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
<b>Assumptions for the industry sector</b>						

<b>1. Mandatory parameters on projections</b>	<b>units</b>	<b>Base Year</b>	<b>2005</b>	<b>2010</b>	<b>2015</b>	<b>2020</b>
<i>For Member States using macroeconomic models:</i>						
The share of the industrial sector in GDP and growth rate						
Gross value-added total industry	Bio Euro (EC95) 2000		128.94	147.51	163.70	180.90
<i>For Member States using other models:</i>						
<i>The production index for industrial sector</i>	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
<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>						
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						
<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						

<b>1. Mandatory parameters on projections</b>	<b>units</b>	<b>Base Year</b>	<b>2005</b>	<b>2010</b>	<b>2015</b>	<b>2020</b>
Emissions factors by type of livestock for enteric fermentation and manure management (t)						
<b>Assumptions in the waste sector</b>						
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
<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>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>2. Recommended parameters on projections</b>	<b>2005</b>	<b>2010</b>	<b>2015</b>	<b>2020</b>
<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				
<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>2. Recommended parameters on projections</b>	<b>2005</b>	<b>2010</b>	<b>2015</b>	<b>2020</b>
<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				

## 11. COUNTRY CONCLUSIONS

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, completed to a high level of detail. A summary of progress to the Kyoto target, comparing projections to base year and details of the modelling methodology is not however provided.

The projections presented by Finland 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 emission increases from the energy supply, transport and industrial process sectors.

A suite of policies and measures, introduced in the current Finnish National Energy and Climate Strategy are expected to successfully reduce emissions across all sectors. These policies and measures are projected to reduce emissions to 1.5MtCO<sub>2</sub>-eq. *above* the Kyoto target for Finland, which requires stabilisation of emissions at base year level. In addition, Finland expects emissions in 2010 to be reduced by a further 2.4MtCO<sub>2</sub>-eq. as a result of usage of Kyoto Mechanisms (including Joint Implementation, Clean Development Mechanism and International Emissions Trading). This would result in Finland's emissions being 0.9MtCO<sub>2</sub>-eq. *below* the Kyoto target in the year 2010.