

Sweden

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1. SOURCES OF INFORMATION

Sweden's national report submitted to the European Commission under the Monitoring Mechanism, Decision 280/2004/EC. Report dated March 2007.

Sweden's National Allocation Plan for 2008-2012.

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>

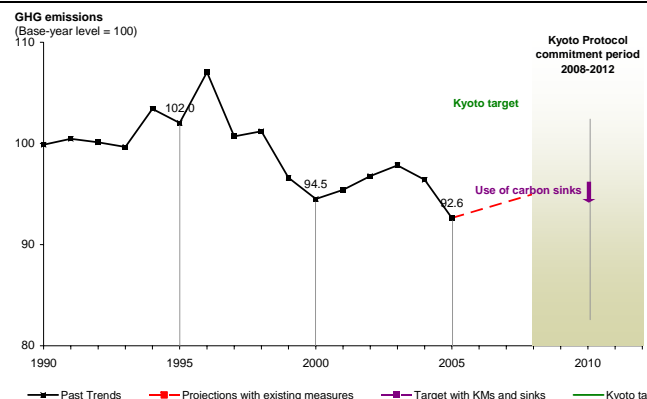
Base-year emissions

Base-year emissions of greenhouse gases are calculated using 1990 emissions for carbon dioxide (CO₂), methane (CH₄) and nitrous oxide (N₂O) and 1995 emissions for fluorinated gases (SF₆, HFCs and PFCs).

Base-year data is as reported by Member States in the sources noted above. Base year data is consistent with data reported in The European Community's initial report under the Kyoto Protocol - Report to facilitate the calculation of the assigned amount of the European Community pursuant to Article 3, paragraphs 7 and 8 of the Kyoto Protocol (Submission to the UNFCCC Secretariat), EEA Technical report No 10/2006 (72.281 MtCO₂-eq). This data is currently undergoing a review procedure by UNFCCC and is therefore subject to change.

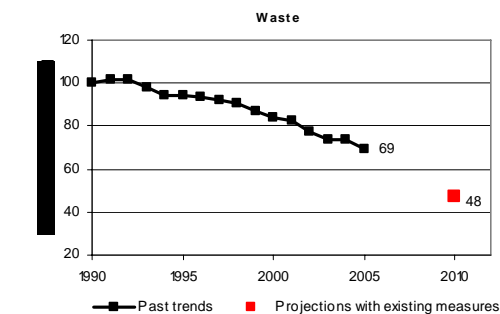
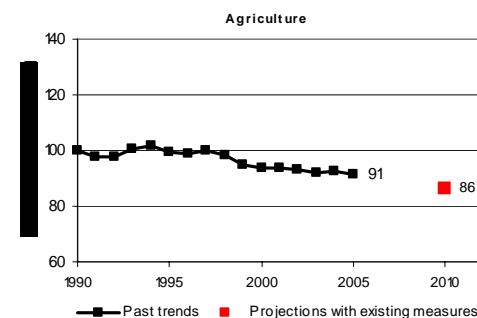
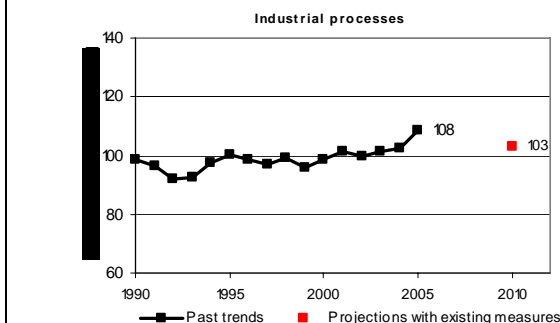
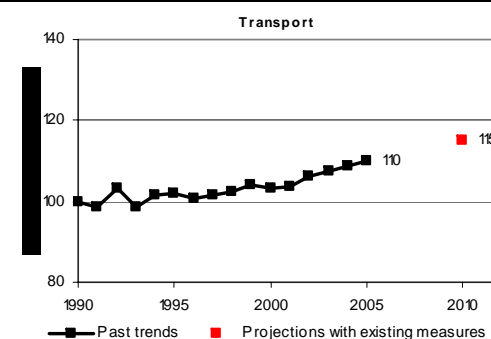
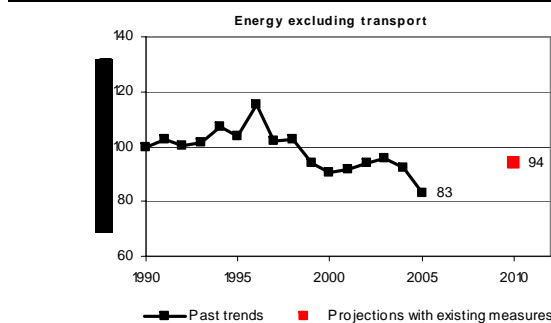
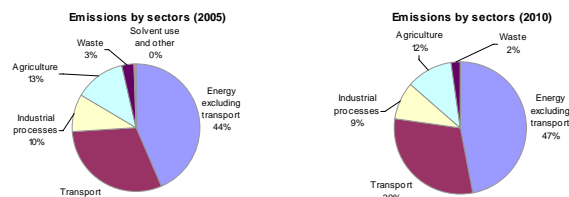
2. SUMMARY

SWEDEN	
Share in total EU-15 GHG emissions 2005	1.6 %
Emissions base year (initial report)	72.3 Mt
Emissions 2005	67.0 Mt
Emissions base year (for projections)	72.3 Mt
Projections 2010 with existing measures	70.3 Mt
+ ETS effect	69.8 Mt
No projections with additional measures	n.a.
Kyoto target (absolute)	75.2 Mt
Kyoto target (% from base year)	+ 4.0 %
Change base year to 2005	- 7.4 %
Change 2004-05	- 3.9 %
Change base year to 2010 with existing measures	- 2.7 %
+ ETS effect	- 3.4 %
No projections with additional measures	n.a.
Distance to linear target path 2005-12.6 (-10.4) index points	
Use of Kyoto mechanisms	(1.2 Mt)
Sinks (Articles 3.3 and 3.4)	2.1. Mt
Emissions in 1990 (Article 3.7)	n.a.



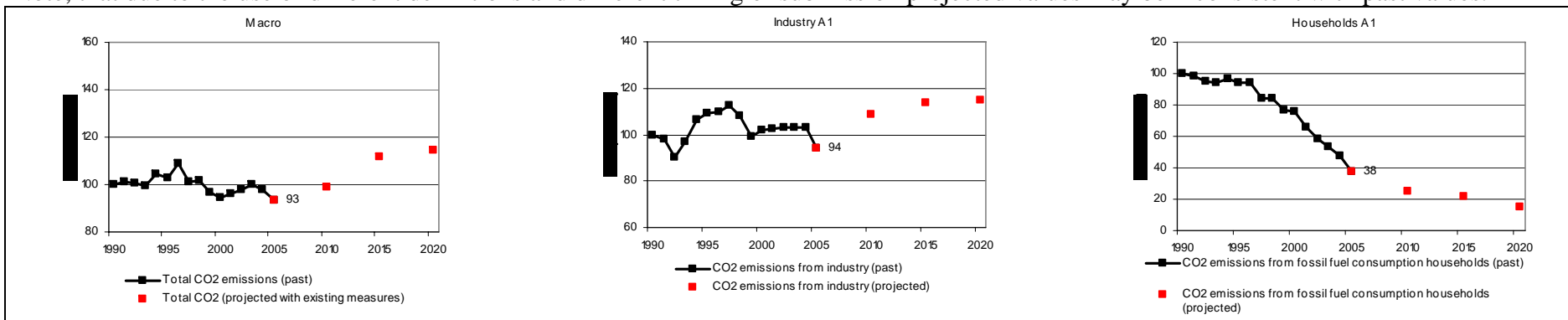
Past emissions: Sweden's GHG emissions were 3.9 % below those of 2004 and 7.4 % below base-year levels in 2005. Main factors for decreasing emissions with regard to 2004 were decreasing fossil fuel use in heat and power production (partly due to higher hydro power production), in manufacturing industries and in households and services. From 1990 to 2005, reductions in fuel use in households and services, partly due to increases in district heating, contributed most to emission decreases. Sweden also managed to limit emission growth from heat and power production despite sharp increases in thermal power production mainly due to increased use of biomass.

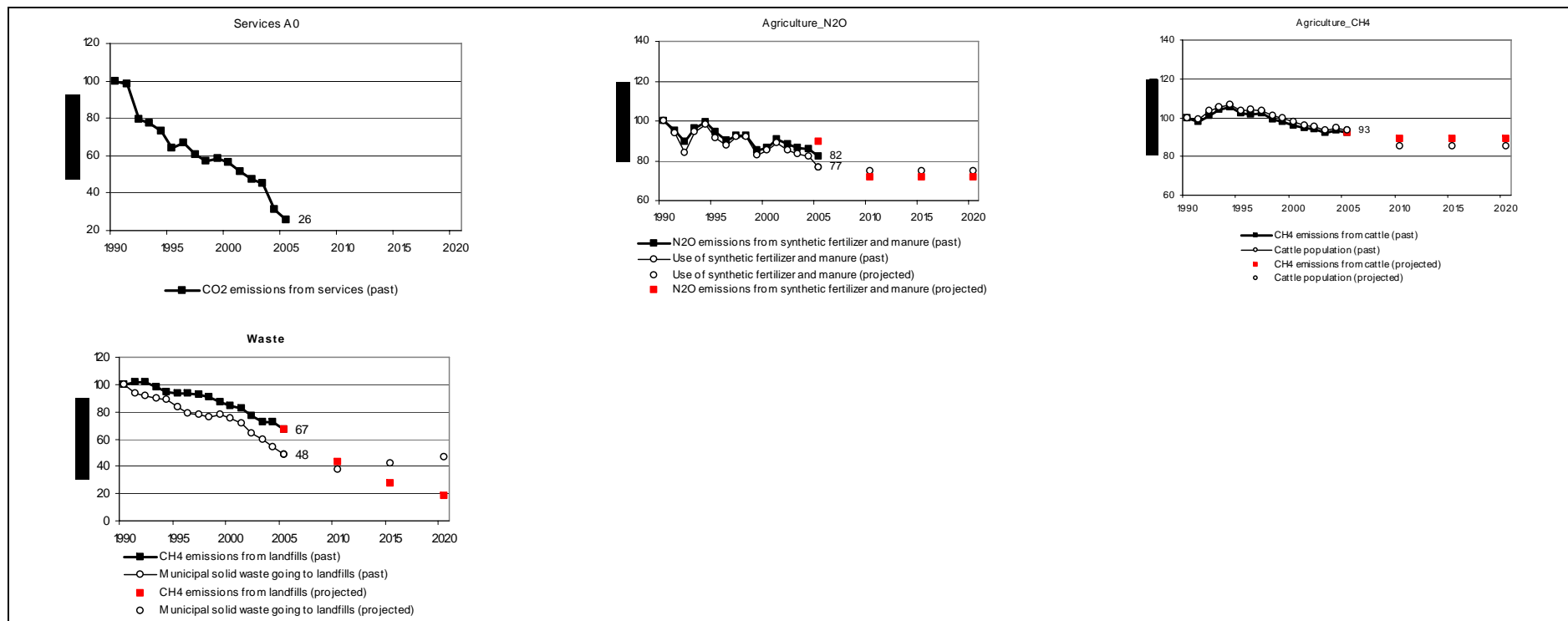
Emission projections: Emissions in 2005 were four percentage points below projections with existing measures for 2010. Sweden will achieve the Kyoto target with existing measures. Sweden is currently planning to make use of carbon sinks of 2.1 million tonnes, but it does not intend to use Kyoto mechanisms. Nevertheless Sweden made the necessary preparations for acquiring Kyoto units of 1.2 Mt CO₂ equivalents per year which have not been considered in the target assessment for Sweden.



3. REPORTED INDICATORS

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





SWEDEN

Priority Indicators		1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Macro	Total CO ₂ emissions, kt	56,421	56,972	56,769	56,247	58,913	58,043	61,554	56,983	57,496	54,645	53,416	54,161	55,297	56,292	55,182	52,569
	GDP, Bio Euro (EC95)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	268
Macro B0	CO ₂ emissions from energy consumption, kt	50,852	51,446	51,568	51,054	53,112	52,127	55,910	51,610	52,104	49,492	48,024	48,626	49,873	50,851	49,558	46,952
	GDP, Bio Euro (EC95)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	268
Transport C0	CO ₂ emissions from passenger cars, kt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Number of kilometres by passenger cars, Mkm	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Industry A1	CO ₂ emissions from industry, kt	11,062	10,817	9,978	10,698	11,782	12,080	12,146	12,461	11,930	10,973	11,305	11,335	11,379	11,386	11,408	10,403
	Gross value-added total industry, Bio Euro (EC95)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	70
Households A1	CO ₂ emissions from fossil fuel consumption households, kt	6,421	6,319	6,101	6,050	6,187	6,026	6,032	5,417	5,418	4,942	4,884	4,204	3,753	3,443	3,034	2,409
	Stock of permanently occupied dwellings, 1000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4,404
Services A0	CO ₂ emissions from fossil fuel consumption in commercial and institutional sector, kt	2,541	2,490	2,014	1,957	1,862	1,628	1,698	1,546	1,452	1,484	1,435	1,310	1,197	1,152	792	657
	Gross value-added services, Bio Euro (EC95)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	114
Transformation B0	CO ₂ emissions from public and autoproducer thermal power stations, kt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6,254
	All products - output and autoproducer thermal power stations, PJ	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	570

4. OVERVIEW OF CCPM IMPLEMENTATION IN SWEDEN

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

Sector	CCPM	Status
Cross-cutting	Kyoto Protocol project mechanisms 2004/101/EC	N
Cross-cutting	Emissions trading 2003/87/EC	N
Cross-cutting	Integrated pollution prevention and control 96/61/EC	R
Energy supply	Promotion of cogeneration 2004/8/EC	B
Energy supply	Taxation of energy products 2003/96/EC	R
Energy supply	Internal electricity market 2003/54/EC	R
Energy supply	Promotion of electricity from RE sources 2001/77/EC	B
Energy supply	Internal market in natural gas 98/30/EC	R
Energy supply	Emissions from large combustion plants 88/609/EEC	R
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	N
Energy consumption	Eco-management & audit scheme (EMAS) EC 761/2001	B
Energy consumption	Energy-efficiency labelling for office equipment Regulation No. 2422/2001	N
Energy consumption	Efficiency fluorescent lighting 2000/55/EC	N
Energy consumption	Efficiency of hot water boilers 92/42/EEC	N
Transport	Environmental performance freight transport (Marco Polo Programme)	
Transport	Motor challenge, voluntary EC programme	N
Transport	Promotion of biofuels for transport 2003/30/EC	R
Transport	Integrated European railway area (2nd + 3rd Railway package) (COM(2002)18 final)	
Transport	Transport modal shift to rail 2001/12/EC etc.	R
Transport	Consumer information on cars 1999/94/EC	N
Transport	Agreement with car manufacturers ACEA etc.	N
Industrial Process	F-gas regulation (Regulation No 842/2006)	N
Industrial Process	Industrial Process: HFC emissions from air conditioning in motor vehicles 2006/40/EC	N
Agriculture	Support under CAP (1782/2003)	N
Agriculture	Support under CAP - amendment (1783/2003)	N
Agriculture	Nitrates 91/676/EEC	B
Agriculture	Transition to rural development support No 2603/1999	
Agriculture	Agricultural production methods compatible with environment Regulation (EEC) No 2078/92	B
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	N
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	B
Waste	Packaging and packaging waste (Directive 94/62/EC, 2004/12/EC, 2005/20/EC)	

Legend

New national PAM implemented after CCPM was adopted

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

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

Not reported

N
R
B

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

5. COMPLETENESS OF REPORTING

Table 2. Information provided on policies and measures

Information provided	Level of information provided	Comments
Policy names	+++	Clear description
Objectives of policies	+++	Good description of objectives
Which greenhouse gases?	+++	Specifies which gases each PAM deals with; all gases covered.
Status of Implementation	+++	Clear for each PAM, either implemented or expired.
Implementation body specified	+++	Specified for each PAM
Quantitative assessment of implementation	++	Most PAMs quantified, either individually or as a group per sector.
Interaction with other policies and measures discussed	0	Not discussed.

Table 3. Information provided on projections

Category of Information	Level of information provided	Comments
Scenarios considered		With Measures (WM) scenario. WAM not considered as target will be reached WM.
Expressed relative to base year	+++	Relative to 1995 for F-gases and 1990 for other gases.
Starting year	2004 / 2000	The starting year is 2004 for all sectors, except 2000 for Agriculture which used 2000.
Split of projections	+++	Split by all gases (F-gases together) and sectors.
Presentation of results	+++	Clearly presented in MM report and accompanying Excel template. Report has tables as well as graphs.
Description of model (level of detail, approach and assumptions)	++	Good description of models, some discussion of assumptions.
Sensitivity analysis (key inputs to model / high, central and low projections scenarios / robustness of model)	+	One sensitivity alternative, only for energy sector (higher GDP alternative).
Discussion of uncertainty	0	
Details of parameters and assumptions	++	Most mandatory parameters reported

6. ASSESSMENT OF POLICIES AND MEASURES

Table 4. Summary of the effect of policies and measures included in the 2010 projections (Mt CO₂-eq.)

	With measures	With additional measures
Energy (total, excluding transport)	10.0	NE
Energy supply	NE	NE
Energy – industry, construction	NE	NE
Energy – other (commercial, residential, agriculture)	NE	NE
Transport (energy)	3.3	NE
Industrial processes	0.4	NE
Waste	1.4	NE
Agriculture	0.0	NE
Cross-sectoral	2.0	NE
Total (excluding LULUCF)	15.1	NE

Source: Monitoring Mechanism 2007 - Excel submission.

Table 5. Detailed information on policies and measures

Policies and measures in the “with measures” projection

Sector	Projection Scenario	Name	Type	GHG	Status	Absolute Reduction [kt CO ₂ eq. p.a.]			Costs
						2005	2010	2020	[EUR/t]
Cross-cutting Energy supply	WM	Energy tax	Fiscal	CO ₂	implemented	Cluster value	Cluster value	Cluster value	
Cross-cutting Energy supply	WM	Carbon dioxide tax	Fiscal	CO ₂	implemented	Cluster value	Cluster value	Cluster value	
Cross-cutting	WM	The Environmental Code	Regulatory	CH ₄ CO ₂ HFC N ₂ O PFC SF ₆	implemented	details			
Cross-cutting	WM	Local Investment Programme (LIP)	Economic	CH ₄ CO ₂ HFC N ₂ O PFC SF ₆	expired	1,500	1,500	1,500	
Cross-cutting	WM	Climate Investment Programme (KLIMP)	Economic	CH ₄ CO ₂ HFC N ₂ O PFC SF ₆	implemented	500	500	500	
Cross-cutting	WM	Climate Information Campaign	Education	CH ₄	expired	details			

				CO ₂					
				HFC					
				N ₂ O					
				PFC					
				SF ₆					
Cross-cutting	WM	EU Emissions trading scheme	Economic	CO ₂	implemented	Cluster value	Cluster value	Cluster value	
Cross-cutting		Combined emission reduction of	Economic	CO ₂	expired	700	10000	38000	
Energy supply		SE-CRS-300	Fiscal		implemented				
		SE-CRS-301							
		SE-CRS-308							
		SE-ENS-190							
		SE-ENS-191							
Cross-cutting	WM	Energy tax	Fiscal	CO ₂	implemented	Cluster value	Cluster value	Cluster value	
Energy supply									
Cross-cutting	WM	Carbon dioxide tax	Fiscal	CO ₂	implemented	Cluster value	Cluster value	Cluster value	
Energy supply									
Energy supply	WM	Investment support for conversion from oil	Economic	CO ₂	implemented	details			
Energy supply	WM	Investment support for conversion from direct-acting electric heating	Economic	CO ₂	implemented	details			
Energy supply	WM	Reduced tax for wind power	Fiscal	CO ₂	implemented	details			
Energy supply	WM	Law on guarantees of origin	Regulatory	CO ₂	implemented	details			
Energy supply	WM	Programme for increased supply of electricity from renewables, 1990-2002	Economic	CO ₂	expired	Cluster value	Cluster value	Cluster value	
Energy supply	WM	Electricity certificate system	Economic	CO ₂	implemented	Cluster value	Cluster value	Cluster value	

Cross-cutting		Combined emission reduction of	Economic	CO ₂	expired	700	10000	38000
Energy supply		SE-CRS-300	Fiscal		implemented			
		SE-CRS-301						
		SE-CRS-308						
		SE-ENS-190						
		SE-ENS-191						
Energy consumption	WM	Subsidies for technology procurement	Economic	CO ₂	implemented	details		
Energy consumption	WM	Energy labelling	Education	CO ₂	implemented	details		
Energy consumption	WM	Law on energy declaration for buildings	Regulatory	CO ₂	implemented	details		
Energy consumption	WM	Energy efficiency campaign	Information	CO ₂	implemented	details		
Energy consumption	WM	Implementation of the Energy Performance of Building Directive	Information	CO ₂		details		
Energy consumption	WM	Programme for Energy efficiency improvement	Voluntary/negotiated agreement	CO ₂	implemented	details		
Energy consumption	WM	Programme for reduced electricity use 1990-2002	Economic	CO ₂	expired			800
Energy consumption	WM	Building regulations standards for energy efficiency	Regulatory	CO ₂	implemented	details		
Energy consumption	WM	Subsidies for energy advisory services	Education	CO ₂	implemented	details		
Transport	WM	Tax relief on biomass fuels	Fiscal	CO ₂	implemented	300	400	400
Transport	WM	Motor fuel taxes	Fiscal	CO ₂	implemented	2,350	2,500	2,800
						more	more	more

Transport	WM	Implementation of the automotive industry's commitment on lower carbon dioxide emissions from new cars	Voluntary/ negotiated agreement	CO ₂	implemented	details			
Transport	WM	Taxation of cars received as benefit	Fiscal	CO ₂	implemented		200	200	200
Transport	WM	Law on supply of renewable fuels	Regulatory	CO ₂	implemented	details			
Transport	WM	Support for renewable fuels	Economic	CO ₂	implemented	details			
Transport	WM	Instruments for increased introduction of green cars	Regulatory	CO ₂	implemented		100	200	200
Transport	WM	Vehicle tax	Fiscal	CO ₂	implemented	details			
Industrial Processes	WM	F-gas regulation including mobile air conditioning directive	Regulatory	HFC PFC SF ₆	implemented			150	400
Industrial Processes	WM	Application of the Environmental Code	Regulatory	HFC PFC SF ₆	implemented			200	200
Agriculture	WM	Programme of measures to reduce losses of crop nutrients	Economic Education	CH ₄ N ₂ O	implemented	details			
Agriculture	WM	Targeted environmental payments in the environment and rural development programme	Economic	CH ₄ N ₂ O	implemented	details			
Waste	WM	Rules on municipal waste planning, rules on producer responsibility for certain goods, tax on landfilling of waste, prohibition of landfilling	Fiscal Regulatory	CH ₄	implemented		800	1,400	1,900

Source: Öko Institut, (accessed 13th June 2007), ECCP Policies and Measures database, <http://www.oeko.de/service/pam/index.php>

7. EVALUATION OF PROJECTIONS

Table 6. Summary of projections by gas in 2010 (Mt CO₂-eq.)

	Base-year	With measures	With additional measures
Carbon dioxide (excl. LULUCF)	56.421	57.395	NE
Methane	6.681	4.607	NE
Nitrous oxide	8.538	7.357	NE
F-gases	0.642	0.940	NE
Total (excl. LULUCF)	72.282	70.299	NE
% change relative to base year (excl. LULUCF)		-2.7%	NE

Table 7. Summary of projections (6 gas basket) by sector in 2010 (Mt CO₂-eq.)

	Base-year	with measures	% change relative to base-year	with additional measures	% change relative to base-year
Energy (total, excluding transport)	35.081	33.041	-6%	NE	
Energy supply	11.304	15.421	36%	NE	
Energy – industry, construction	11.619	12.652	9%	NE	
Energy – other (commercial, residential, agriculture)	12.159	4.968	-59%	NE	
Transport (energy)	18.439	21.222	15%	NE	
Industrial processes	6.279	6.456	3%	NE	
Waste	3.113	1.480	-52%	NE	
Agriculture	9.369	8.100	-14%	NE	
Total (excl. LULUCF)	72.282	70.299	-3%	NE	

Table 8. Summary of projections by sector and by gas in 2010 (Mt CO₂-eq.) compared to base-year emissions

	Carbon dioxide			Methane			Nitrous oxide			F-gases (SF ₆ , 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)	33.560	31.338	NE	0.322	0.330	NE	1.200	1.373	NE	0	0	NE
Transport (energy)	18.174	21.018	NE	0.105	0.029	NE	0.160	0.175	NE	0	0	NE
Industrial processes	4.643	4.939	NE	0.006	0.008	NE	0.988	0.569	NE	0.642	0.940	NE
Waste	0.044	0.100	NE	2.874	1.240	NE	0.196	0.140	NE	0	0	NE
Agriculture	0	0	NE	3.374	3.000	NE	5.994	5.100	NE	0	0	NE
Total (excl. LULUCF)	56.421	57.395	NE	6.681	4.607	NE	8.538	7.357	NE	0.642	0.940	NE

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 CO₂-eq.)

	Base-year*	2010	2010 % of base- year level	2015	2015 % of base- year level	2020	2020 % of base- year level
Total (excl. LULUCF)	72.282	70.299	97.2%	72.004	99.6%	71.906	99.5%

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

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 ₂ -equiv., excluding LUCF			
	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	72.2	72.2	72.28	100%
Kyoto Commitment/burden sharing	75.1	75.1	75.17	4.0%
With existing P&Ms projections	71.5	71.5	70.30	97.3%
Gap (-ve means overachievement of target)	-3.6	-3.6	-4.9	-6.7%
With additional P&Ms projections	71.5	71.5	70.30	97.3%
Remaining gap	-3.6	-3.6	-4.9	-6.7%
Effect of EU ETS not included in projections			0.50	
Effect of flexible mechanisms ¹	0.0	0.0	1.24	1.7%
Remaining gap (including use of flexible mechanisms and EU ETS not included in projections)	-3.6	-3.6	-6.6	-9.2%

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

Source for 2005 data is 2005 Monitoring Mechanism submission. Source for 2006 data is 4th National Communication.

* Base year data is consistent with data reported in *The European Community's initial report under the Kyoto Protocol - Report to facilitate the calculation of the assigned amount of the European Community pursuant to Article 3, paragraphs 7 and 8 of the Kyoto Protocol (Submission to the UNFCCC Secretariat)*, EEA Technical report No 10/2006 (72.282 MtCO₂-eq). This data is currently undergoing a review procedure by UNFCCC and is therefore subject to change.

¹ In the 2005 report, flexible mechanisms were estimated to amount to 1Mt/year in emission credits. This effect would be additional to that summarised above.

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

Table 11 provides a comparison of projections in the Monitoring Mechanism submission and National Allocation Plan (NAP). Overall, the NAP projections were found to be slightly higher: total GHG emissions in 2010 are projected to be 71.70 MtCO₂-eq. in the NAP compared with 71.30 MtCO₂-eq. in the Monitoring Mechanism submission. The sector projections are also slightly higher as shown below:

	Monitoring Mechanism projections	NAP 2 projections	Difference
Energy sector	33.04 ^a	33.80 ^b	--
Energy sector included in EU ETS	--	11.80 ^c	--
Industry sector	6.46 ^d	7.10 ^e	--
Industry sector included in EU ETS	--	15.30 ^f	--
Total Energy & Industry	39.5	40.9	103.6%

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

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

^c Included are CO₂ emissions from the ETS sectors "Combustion installations", "Mineral oil refineries" and "Coke ovens"

^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 CO₂ emissions from the "Industry" ETS sectors (all except those in ^c).

8. DESCRIPTION OF MODELLING APPROACH

Overview of modelling approach

The Monitoring Mechanism report describes the models used for different sectors. These include the MARKAL-Nordic model, PoMo Power Model and DoS (Demand and Supply) model for the energy sector; the EMEC general equilibrium model for projections of economic development; for waste, a model developed by the IPCC which has been partially modified so that it fits Swedish circumstances better, and for agriculture the same method of calculation as for historic emissions using emission factors and activity data. The names (eg for waste and agriculture) and assumptions of some models are not provided.

The report describes some verification of the models in terms of comparing the results of top-down and bottom-up modelling within the same sector.

Sensitivity analysis

Results are given for one sensitivity analysis, for a higher GDP alternative, only for the energy sector. Emissions in 2015 and 2020 are estimated to be 1.2% and 1.6% higher than base year emissions, compared with 0.4% and 0.5% lower for the main projections, with the increase mostly attributed to further growth in industry and an increased projection of electricity and district heating.

The Monitoring Mechanism submission states that a further sensitivity analysis will be carried out with a higher oil price.

As described below, the projection parameters are provided for both a Central and High economic scenario, however emission projections are only provided for the Central scenario.

No comment is made on key inputs to the model or model robustness.

Details of the uncertainty assessment

Not provided in the Monitoring Mechanism report.

9. PROJECTION INDICATOR REPORTING

With the exception of indicator 6, for which only numerators are provided, all mandatory indicators, including both numerators and denominators, are reported for the years 2005, 2010, 2015 and 2020.

10. REPORTING OF PARAMETERS ON PROJECTIONS

Mandatory parameters are comprehensively reported for the general economic and energy sectors for both a central and a high economic scenario and over the years; base case, 2004, 2005, 2010, 2015, 2020, 2025. Half of the mandatory parameters are also reported for the industry sector for both scenarios, but excluding the year 2025. In the agriculture sector, most parameters are reported for the central economic scenario, and in both the waste and

agriculture sectors only one parameter is provided for this scenario over the years up to 2020.

The energy demand from the commercial sector is missing from the reported energy sector parameters.

None of the mandatory parameters for the industry and transport sectors are provided and the majority in the buildings and wastes sectors are also missing.

No recommended parameters are reported.

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

No	Eurostat Sectors	Indicator	2005	2010	2015	2020	Numerator/denominator	2005	2010	2015	2020
1	Macro	CO ₂ intensity of GDP, t/Euro million	186.4	176.9	163.9	149.0	Total CO ₂ emissions, kt	52568	57395	59741	60172
							GDP, bio Euro (EC95)	282.0	324.4	364.5	404.0
2	Transport C0	CO ₂ emissions from passenger cars, kt ¹	18502	19412	20379	21361					
		Number of kilometres by passenger cars, Mkm ²	75438	77995	81688	85380					
3	Transport D0	CO ₂ emissions from freight transport (all modes), kt ³	20041	21018	22013	23044					
		Freight transport (all modes), Mtkm ⁴	NE	NE	NE	NE					
4	Industry A1	Energy related CO ₂ intensity of industry, t/Euro million	185.7107	170.1397	146.2481	124.8833	CO ₂ emissions from fuel consumption industry, kt	10403	12047	12588	12729
							Gross value-added total industry, Bio Euro (EC 95)	56.02	70.81	86.07	101.93
5	Households A1	Specific CO ₂ emissions of households, t/dwelling	0.5582	0.3580	0.2953	0.1990	CO ₂ emissions from fossil fuel consumption households, kt	2409	1612	1385	963
							Stock of permanently occupied dwellings, 1000 ⁵	4316	4503	4690	4840
6	Services A0	CO ₂ intensity of the services sector, t/Euro million	NE	NE	NE	NE	CO ₂ emissions from fossil fuel consumption services, kt	657	493	437	343
							gross value-added services, bio Euro (EC95) ⁴	NE	NE	NE	NE
7	Transformation B0	Specific CO ₂ emissions of public and autoproducer power plants, t/TJ	0.5135	0.4403	0.3744	0.3542	CO ₂ emissions from public and autoproducer thermal power stations, kt	8436	9965	10410	9856
							all products-output by public and autoproducer thermal power stations, PJ	16427.89	22634.70	27807.04	27829.61
8	Agriculture	Specific N ₂ O emissions of fertilizer and manure use, kg/kg	0.0205	0.0209	0.0209	0.0209	N ₂ O emissions from synthetic fertilizer and manure use, kt	5	4	4	4
							use of synthetic fertiliser and manure, kt nitrogen	227	222	222	222
9	Agriculture	Specific CH ₄ emissions of cattle production, kg/head	0.0748	0.0795	0.0795	0.0795	CH ₄ emissions from cattle, kt	120	116	116	116
							cattle populations, 1000 head	1605	1460	1460	1460
10	Waste	Specific CH ₄ emissions from	0.2180	0.7195	0.4176	0.2500	CH ₄ emissions from landfills, kt	92	59	38	25

		landfills, kt/kt					Municipal solid waste going to landfills, kt	2009	1580	1745	1926
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1 Total carbon dioxide emissions from road transportation sector are included here. The projections are disaggregated in fuel type since the historical emissions are calculated based on the amount of fuel sold in Sweden. The projection model do not disaggregate the fuel sold for passenger cars.

2 The total number of vehicle kilometres from road transportation are presented here based on another projection produced in 2006 with the oil price of \$50/barrel. The vehicle kilometres driven in Sweden are independent of where the fuel is sold and are not consistent with the carbon dioxide emissions from transport (according to the IPCC guidelines).

3 Total carbon dioxide emissions from the transport sector are included here. The projections are disaggregated in fuel type since the emissions are calculated based on the amount of fuel, sold in Sweden. The projection model do not disaggregate the fuel sold for freight transport.

4 No data available

5 The sum of detached/semidetached houses and apartments are included here.

Table 13. List of parameters on projections (Annex IV of Implementing Provisions¹)

Parameters used for the projections are presented. Parameters not included were not used in the projections. Note that figures for 2010 and 2020 in the energy sector are interpolations of 2015 and 2025.

1. Mandatory parameters on projections	units	Base Year	Central Economic Scenario					High Economic Scenario					
			2004	2005	2010	2015	2020	2025	2005	2010	2015	2020	2025
Assumptions for general economic parameters													
GDP (value at given years)	Value (Euro 2000 basis)	213331.40	282007.20	290194.49	324380.62	364516.47	403950.45	447650.46	290194.49	329054.63	374203.50	419111.46	469408.79
GDP growth rate	Annual growth rate			2.90	2.36	2.36	2.08	2.08	2.90	2.60	2.60	2.29	2.29
Population (value at given years)	Thousand People	8.59	9.01	9.05		9.5		9.9	9.05		9.5		9.9
Population growth rate	% of 2005 value												
International coal prices	USD/tonne		55	54	49	50.5	50	50.5	54	49	50.5	50	50.5
International oil prices	USD/Barrel		36	35.83	35.00	38	37	38	35.83	35	38	37	38
International gas prices	USD/Mbtu		4.2	4.33	5.00	5.3	5.2	5.4	4.33	5	5.3	5.2	5.4

¹ 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

Assumptions for the energy sector													
Total gross inland consumption	Petajoule (PJ)	1058.67	1289.41	1316.11	1449.62	1583.14	1663.99	1744.84	1319.73	1452.63	1623.00	1724.67	1826.34
Oil (fossil)	Petajoule (PJ)	683.39	732.24	740.18	779.89	819.59	871.55	923.51	742.32	799.39	843.14	911.32	979.50
Gas (fossil)	Petajoule (PJ)	23.52	36.90	40.58	59.00	77.42	82.45	87.47	40.64	54.75	78.10	84.52	90.94
coal	Petajoule (PJ)	111.43	109.89	111.35	118.64	125.92	122.58	119.24	111.70	116.31	129.78	127.00	124.22
Solid bio-fuels	Petajoule (PJ)	240.32	401.01	411.57	464.41	517.24	541.30	565.36	412.49	458.32	527.31	553.84	580.37
Liquid bio-fuels	Petajoule (PJ)	0.00	6.31	7.38	12.75	18.11	21.19	24.28	7.43	12.20	18.64	22.01	25.37
solar	Petajoule (PJ)												
wind	Petajoule (PJ)	0.00	3.06	5.04	14.95	24.85	24.91	24.97	5.15	11.66	26.04	25.99	25.94
geothermal	Petajoule (PJ)												
Hydro	Petajoule (PJ)	261.03	218.25	220.85	233.85	246.85	246.85	246.85	220.85	228.97	246.85	246.85	246.85
Nuclear (IEA definition for energy calc.)	Petajoule (PJ)	728.63	817.43	814.86	802.03	789.20	789.20	789.20	814.86	806.85	789.20	789.20	789.20
Net Electricity import (-+)	Petajoule (PJ)	-6.36	-7.57	-13.84	-45.17	-76.50	-67.92	-59.34	-13.13	-26.05	-68.73	-56.85	-44.97
Other Please Specify Heat received from industry, dwellings, services etc.		27.77	40.28	38.84	31.66	24.48	24.76	25.04	38.94	34.79	25.49	25.64	25.79
Total electricity production	Gwhe	7051.43	16427.89	17462.36	22634.70	27807.04	27829.61	27852.19	17505.97	20930.98	28286.77	28436.14	28585.51
Oil (fossil)	Gwhe	1810.56	2416.39	2271.30	1545.88	820.45	722.37	624.29	2271.73	1782.01	825.14	724.71	624.29
Gas (fossil)	Gwhe	464.44	858.06	1336.44	3728.35	6120.27	5989.48	5858.69	1335.74	2848.44	6112.63	6165.74	6218.86
coal	Gwhe	2377.78	4129.72	4146.39	4229.76	4313.12	3682.10	3051.08	4175.29	4091.99	4630.99	4029.11	3427.22
Renewable	PJ	2398.65	9023.72	9708.22	13130.71	16553.20	17435.67	18318.14	9723.20	12208.54	16718.00	17516.57	18315.14
Nuclear (IEA definition for energy calc.)	GWh	728.63	817.43	814.86	802.03	789.20	789.20	789.20	814.86	806.85	789.20	789.20	789.20
Other Please Specify Energy demand by sector (delivered)		1590.12	1716.69	1735.37	1828.80	1922.23	1954.10	1985.96	1743.16	1838.76	2007.90	2054.94	2101.98
Energy Industries	Petajoule (PJ)	829.35	914.56	924.32	973.10	1021.89	1018.95	1016.01	929.75	972.92	1081.71	1082.91	1084.11
Oil (fossil)	Petajoule (PJ)	21.33	22.75	21.09	12.76	4.44	3.72	3.01	21.09	15.63	4.49	3.75	3.01
Gas (fossil)	Petajoule (PJ)	8.83	12.28	14.79	27.36	39.92	39.12	38.32	14.80	22.81	40.02	40.36	40.70

coal	PJ	38.17	27.71	27.92	28.99	30.05	23.15	16.25	28.10	26.78	32.00	25.23	18.45
Renewables	PJ	32.02	34.81	46.05	102.27	158.48	163.95	169.42	51.30	105.97	216.19	224.57	232.95
Nuclear (IEA definition for energy calc.)		729.00	817.00	814.45	801.73	789.00	789.00	789.00	814.45	801.73	789.00	789.00	789.00
Industry	Petajoule (PJ)	301.09	354.46	360.02	387.87	415.71	436.96	458.22	361.22	391.96	428.84	454.48	480.12
Oil (fossil)	Petajoule (PJ)	74.58	67.55	67.92	69.74	71.57	69.21	66.85	68.10	69.04	73.64	71.53	69.43
Gas (fossil)	Petajoule (PJ)	10.37	15.82	16.45	19.60	22.74	27.61	32.48	16.52	20.60	23.44	28.55	33.66
coal	PJ	62.11	64.90	65.95	71.20	76.44	79.43	82.42	66.12	71.23	78.33	81.77	85.20
Renewables	PJ	154.03	206.18	209.70	227.33	244.96	260.71	276.46	210.47	231.09	253.42	272.62	291.82
Commercial (Tertiary)	Petajoule (PJ)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Oil (fossil)	Petajoule (PJ)												
Gas (fossil)	Petajoule (PJ)												
coal													
Renewables													
Residential	Petajoule (PJ)	194.21	131.86	130.91	126.12	121.34	112.28	103.22	130.91	124.53	121.38	112.30	103.22
Oil (fossil)	Petajoule (PJ)	148.01	78.15	75.65	63.14	50.64	42.37	34.09	75.65	64.73	50.64	42.37	34.09
Gas (fossil)	Petajoule (PJ)	4.33	8.00	8.46	10.75	13.04	13.28	13.52	8.46	9.98	13.04	13.28	13.52
coal		1.71	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Renewables	PJ	40.15	45.71	46.79	52.22	57.65	56.63	55.60	46.80	49.81	57.69	56.65	55.60
Transport	Petajoule (PJ)	265.47	315.81	320.13	341.71	363.29	385.91	408.52	321.28	349.35	375.98	405.25	434.53
Oil (fossil)	Petajoule (PJ)	265.47	308.70	311.86	327.67	343.48	362.29	381.10	312.97	335.75	355.62	380.82	406.02
Gas (fossil)	Petajoule (PJ)	0.00	0.80	0.88	1.29	1.71	2.43	3.14	0.88	1.41	1.71	2.43	3.14
coal													
Renewables	PJ	0.00	6.31	7.38	12.75	18.11	21.19	24.28	7.43	12.20	18.64	22.01	25.37
Assumptions on weather parameters, especially heating or cooling degree days													
Heating Degree Days	Annual HDD	81.7	94.1	92.4	100	100	100	100	92.4	100	100	100	100
Cooling Degree Days	Annual CDD												
Assumptions for the industry sector													
Gross value-added total industry, Bio Euro (EC95) 2000	Value (Euro 2000 basis)		56.02	56.57	70.81	86.07	101.93	120.70	56.57	72.24	89.29	106.85	127.85

<i>For Member States using macroeconomic models:</i>											
The share of the industrial sector in GDP and growth rate											
<i>For Member States using other models:</i>											
<i>The production index for industrial sector</i>											
Energy Intensive	Index units (Base Year 100)	100.00	160.39			211.60		258.18		219.40	272.69
Non Energy Intensive	Index units (Base Year 100)	100.00	204.22			330.99		483.18		343.43	512.18
Assumptions for the transport sector											
<i>For Member States using macroeconomic models:</i>											
The growth of transport relative to GDP											
<i>For Member States using other models:</i>											
The growth of passenger person kilometres											
The growth of freight tonne kilometres											
Assumptions for buildings (in residential and commercial or tertiary sector)											
<i>For Member States using macroeconomic models:</i>											
The level of private consumption (excluding private transport)											
The share of the tertiary sector in GDP and the growth rate											
<i>For Member States using other models:</i>											
The rate of change of floor space for tertiary											

buildings and dwellings												
The number of dwellings and number of employees in the tertiary sector												
The number of dwellings	1000 dwellings			4316	4503	4690	4840					
The number of employees in the tertiary sector												
Assumptions in the agriculture sector												
<i>For Member States using macroeconomic models:</i>												
The share of the agriculture sector in GDP and relative growth												
<i>For Member States using other models:</i>												
Livestock numbers by animal type												
Total Cattle	1000 heads	1718	0	1605	1460	1460	1460		0	0	0	
Dairy cattle	1000 heads	576		393	360	360	360					
Non-dairy cattle	1000 heads	1142		1212	1100	1100	1100					
sheep	1000 heads	406		471	500	500	500					
swine	1000 heads	2264		1811	2000	2000	2000					
poultry	1000 heads	15200		17154	17000	17000	17000					
Other, please specify	1000 heads											
Goats		4		5.5	5	5	5					
Horses		300		283	300	300	300					
Reindeer		271		251	220	220	220					
The area of crops by crop type												
Emissions factors by type of livestock for enteric fermentation and manure management												
Enteric fermentation Dairy cattle	Kg CH4 / animal and year are used	130	130	130	130	130	130					

Enteric fermentation Non-dairy cattle - suckler cows	Kg CH4 / animal and year are used	98	98	98	98	98	98							
Enteric fermentation Non dairy cattle - other cattle	Kg CH4 / animal and year are used	50	50	50	50	50	50							
Enteric fermentation sheep	Kg CH4 / animal and year are used	8	8	8	8	8	8							
manure management Dairy cattle	Kg CH4 / animal and year are used	18.14	18.14	18.14	18.14	18.14	18.14							
manure management Non- dairy cattle	Kg CH4 / animal and year are used	4.89	4.89	4.89	4.89	4.89	4.89							
manure management sheep	Kg CH4 / animal and year are used	0.19	0.19	0.19	0.19	0.19	0.19							
manure management Swine	Kg CH4 / animal and year are used	2.49	2.49	2.49	2.49	2.49	2.49							
manure management Poultry	Kg CH4 / animal and year are used	0.078	0.087	0.078	0.078	0.078	0.078							
Fertilizer use & Crops														
Synthetic fertilizers	tonnes of nitrogen per year		17970 0	170000	170000	170000	170000							
Farmyard manure	tonnes of nitrogen per year		65296	65400	65400	65400	65400							
Pasture manure	tonnes of nitrogen per year		41180	42200	42200	42200	42200							
Assumptions in the waste sector														
Waste generation per head of population or tonnes of municipal solid waste														
The organic fractions of municipal solid waste														
Municipal solid waste disposed to landfills,	kt	0		422	82	91	100							

incinerated or composted (in tonnes or %)													
Assumptions in the forestry sector													
Forest definitions	Forest land is defined as land with a tree crown cover of more than 10%, an area of more than 0.5 ha and trees that should be able to reach a minimum height of 5 m at maturity.												
Areas of:													
managed forests	Hectares	2796 6000		2893900 0	2893900 0	28939000	2893900 0						
unmanaged forests													
Total electricity production	Gwhe	7051.43	16427.89	17462.36	22634.70	27807.04	27829.61	27852.19	17505.97	20930.98	28286.77	28436.14	28585.51
Oil (fossil)	Gwhe	1810.56	2416.39	2271.30	1545.88	820.45	722.37	624.29	2271.73	1782.01	825.14	724.71	624.29
Gas (fossil)	Gwhe	464.44	858.06	1336.44	3728.35	6120.27	5989.48	5858.69	1335.74	2848.44	6112.63	6165.74	6218.86
coal	Gwhe	2377.78	4129.72	4146.39	4229.76	4313.12	3682.10	3051.08	4175.29	4091.99	4630.99	4029.11	3427.22
Renewable	PJ	2398.65	9023.72	9708.22	13130.71	16553.20	17435.67	18318.14	9723.20	12208.54	16718.00	17516.57	18315.14
Nuclear (IEA definition for energy calc.)	GWh	728.63	817.43	814.86	802.03	789.20	789.20	789.20	814.86	806.85	789.20	789.20	789.20

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

2. Recommended parameters on projections	2005	2010	2015	2020
Assumptions for the agriculture sector				
<i>For Member States using econometric models:</i>				
Agricultural trade (import/export)				
Domestic consumption (e.g. milk/beef consumption)				
<i>For Member States using other models:</i>				
Development of area of crops, grassland, arable, set-aside, conversion to forests etc				
Macroeconomic assumptions behind projections of agricultural activity				
Description of livestock (e.g. by nutrient balance, output/animal production, milk production)				
Development of farming types (e.g. intensive conventional, organic farming)				
Distribution of housing/grazing systems and housing/grazing period				
Parameters of fertiliser regime:				
Details of fertiliser use (type of fertiliser, timing of application, inorganic/organic ratio)				
Volatilisation rate of ammonia, following spreading of manure on the soil				
Efficiency of manure use				
Parameters of manure management system:				
Distribution of storage facilities (e.g. with or without cover):				
Nitrogen excretion rate of manures				
Methods of application of manure				
Extent of introduction of control measures (storage systems, manure application), use of best available techniques				
Parameters related to nitrous oxide emissions from agricultural soils				
Amount of manure treatment				

11. COUNTRY CONCLUSIONS

The latest projections from Sweden's 2007 Monitoring Mechanism submission indicate total emissions of 70.30 Mt CO₂-eq. in 2010, or around 2.7% below the base year. This is slightly lower than reported in 2005 and 2006 and again means that Sweden should overachieve its Kyoto target of 75.17 Mt CO₂-eq. In addition to the emission reductions achieved through policies and measures included in the 'with measures' projection is the effect of the EU ETS, 0.5 Mt CO₂-eq. Sweden also proposes to make use of 1.24 Mt CO₂-eq./year of flexible mechanisms.

The Monitoring Mechanism report and accompanying Excel template provided good description of policies and measures (PAMs). Most PAMs were quantified either individually or as a group per sector. However there was no quantification of PAMs reported for the first time in the 2007 Monitoring Mechanism report, ie those that were introduced since Sweden's submission of its 4th National Communication.

The projections were clearly and comprehensively reported, with a split of projections by greenhouse gases and by sectors according to the Common Reporting Format (CRF).

Nearly all projection indicators and some parameters were provided. Limited information was provided about model sensitivity and uncertainty.