

Greenhouse gases 2007

Greenhouse gas emissions exceeded the Kyoto target by approximately 10 per cent in 2007

According to the preliminary estimate that must be submitted to the European Commission on 15 January, greenhouse gas emissions in Finland amounted to 78.5 Mt of CO₂ equivalent in 2007, which is approximately two per cent less than in 2006. Emissions in 2007 exceeded by good 10 per cent the target level of the 2008-2012 commitment period under the Kyoto Protocol. In the past five reporting years emissions in Finland have exceeded by an average of nearly 7.5 million tonnes, or ten per cent, the amount assigned for them in the Kyoto Protocol (71 million tonnes). Annual fluctuations in the emissions have been large. These have arisen especially from variations in the availability of hydro power on the Nordic electricity market, imports of electricity from Russia and the annual structure and volume of domestic energy production.

[The whole reporting concerning year 2007.](#)

Figure 1. Finland's greenhouse gas emissions 1990-2007 in relation to the Kyoto target level.

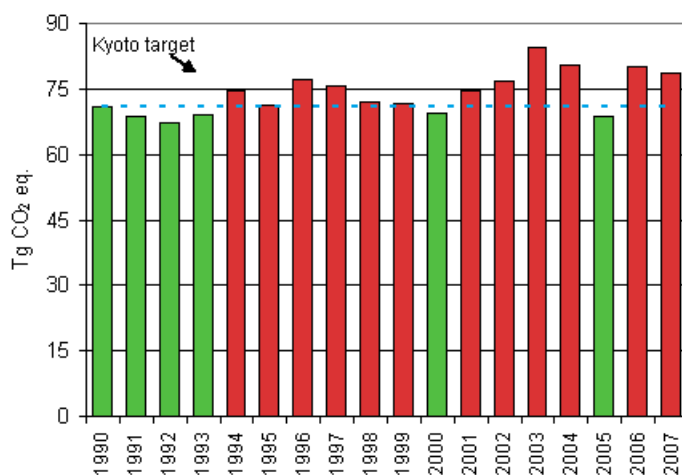


Table 1. Finland's greenhouse gas emissions (million t CO₂ eq.) exclusive of land use, land-use change and forestry sector (see Table 2). Emissions as amounts corresponding to CO₂ tonnes.

Year	Emission category									
	Energy industries	Manufacturing industries and construction	Transport	Other energy	Industrial processes (excl. F-gases)	F-gases	Solvents and other product use	Agriculture	Waste	Total
1990	19.19	13.41	12.79	9.19	4.91	0.09	0.18	7.13	3.98	70.87
1991	18.96	12.90	12.45	8.86	4.54	0.07	0.17	6.68	4.02	68.66
1992	18.73	12.38	12.39	8.98	4.27	0.04	0.16	6.21	4.04	67.20
1993	21.47	12.49	11.94	8.56	4.31	0.03	0.15	6.23	4.04	69.21
1994	26.40	12.79	12.31	8.22	4.52	0.04	0.15	6.22	3.98	74.63
1995	24.12	12.22	12.13	7.79	4.47	0.10	0.14	6.32	3.93	71.23
1996	29.83	12.11	12.12	7.94	4.80	0.15	0.14	6.22	3.85	77.15
1997	27.44	12.27	12.74	7.88	4.99	0.24	0.14	6.21	3.75	75.67
1998	24.18	11.94	12.92	8.15	4.85	0.30	0.14	6.06	3.60	72.14
1999	23.67	11.92	13.16	7.86	4.92	0.40	0.14	5.93	3.52	71.51
2000	22.12	11.93	13.09	7.50	4.92	0.58	0.12	5.97	3.32	69.55
2001	27.51	11.47	13.24	7.71	4.91	0.73	0.12	5.85	3.19	74.75
2002	30.26	11.17	13.46	7.64	4.85	0.53	0.11	5.83	2.98	76.83
2003	37.19	11.53	13.69	7.58	5.17	0.71	0.10	5.75	2.80	84.53
2004	32.94	11.63	14.07	7.28	5.45	0.73	0.11	5.62	2.67	80.49
2005	21.97	11.31	14.14	6.97	5.33	0.89	0.11	5.60	2.46	68.78
2006	32.90	11.56	14.35	6.81	5.31	0.80	0.10	5.59	2.52	79.95
2007	30.71	11.58	14.75	6.73	5.77	0.93	0.10	5.53	2.43	78.53

Table 2. Emissions and removals (million t CO₂ eq.) of the land use, land-use change and forestry sector in Finland. Emissions and sinks as amounts corresponding to CO₂ tonnes.

Year	Emission/sink category ¹					
	Forest land	Cropland	Grassland	Peat production areas	Harvested wood products	Total
1990	-23.19	7.41	-2.13	1.08	-0.95	-17.77
1991	-37.68	5.61	-0.83	1.10	0.31	-31.50
1992	-31.50	5.44	-1.07	1.14	-0.22	-26.22
1993	-30.04	5.43	-0.60	1.16	-0.09	-24.15
1994	-22.82	5.24	-0.13	1.20	-0.76	-17.27
1995	-23.12	6.90	-0.68	1.21	-0.87	-16.56
1996	-32.16	7.13	-0.88	1.25	-1.05	-25.71
1997	-24.99	6.70	-0.57	1.29	-2.12	-19.70
1998	-22.37	6.13	0.09	1.32	-1.77	-16.59
1999	-24.59	5.80	0.96	1.34	-2.04	-18.53
2000	-25.71	5.28	1.92	1.37	-1.27	-18.42
2001	-30.06	5.09	2.42	1.37	-0.31	-21.50
2002	-30.18	4.62	2.15	1.35	-0.44	-22.50
2003	-29.80	4.17	2.66	1.35	-0.89	-22.51
2004	-30.77	3.86	3.01	1.42	-0.83	-23.31
2005	-36.36	3.55	3.44	1.41	-0.34	-28.30
2006	-40.69	3.24	4.24	1.40	-0.39	-32.21
2007	-32.81	3.33	4.06	1.36	-1.22	-25.29

1) Emissions are positive figures, removals negative

Contents

Greenhouse gas emissions exceeded the Kyoto target by approximately 10 per cent in 2007.....	4
Tables	
Table 1: Greenhouse gas emissions in Finland 1990–2007 (million t CO ₂ -eq.) by emission category.....	5
Table 2: Carbon dioxide emissions in Finland 1990, 1995–2007 (million t CO ₂ -eq.) by emission category.....	5
Table 3: Methane emissions in Finland 1990, 1995–2007 (1000 t) by emission category	6
Table 4: Nitrous oxide emissions in Finland 1990, 1995–2007 (1000 t) by emission category.....	6
Table 5: Emissions of F-gases in Finland 1990–2007 (1000 t CO ₂ -eq.)	7
Figures	
Figure 1: Greenhouse gas emissions by sectors in 2007 (%)	8
Figure 2: Greenhouse gas emissions in 1990 - 2007 (million t CO ₂ eq.).....	8
Figure 3: Development of emissions in the energy sector in 1990 - 2007 (million t CO ₂ eq.).....	9
Figure 4: Greenhouse gas emission in Finland in 1990 - 2007 in relation to the Kyoto target level (million t CO ₂ eq.).....	9

Greenhouse gas emissions exceeded the Kyoto target by approximately 10 per cent in 2007

According to the preliminary estimate that must be submitted to the European Commission on 15 January, greenhouse gas emissions in Finland amounted to 78.5 Mt of CO₂ equivalent in 2007, which is approximately two per cent less than in 2006. Emissions in 2007 exceeded by good 10 per cent the target level of the 2008-2012 commitment period under the Kyoto Protocol. In the past five reporting years emissions in Finland have exceeded by an average of nearly 7.5 million tonnes, or ten per cent, the amount assigned for them in the Kyoto Protocol (71 million tonnes). Annual fluctuations in the emissions have been large. These have arisen especially from variations in the availability of hydro power on the Nordic electricity market, imports of electricity from Russia and the annual structure and volume of domestic energy production.

In the climate and energy strategy Finland is estimated to require additional emission units in the Kyoto commitment period in order to meet its commitment level. This can be achieved by exploiting the mechanisms offered by the Kyoto Protocol, and forestry sinks. The clean development mechanism allows Finland to receive emission reductions through the implementation of diverse projects to reduce emissions in developing countries, and the joint implementation mechanism through the implementation of projects in other industrialised countries (mainly transition economies). The EU's internal emissions trading, aimed at the achievement of the emissions reduction targets of the emissions trade sector as cost-efficiently as possible, has the largest significance in the strategy. It is estimated that emissions can be reduced cost-efficiently outside the emissions trading sector (transport, agriculture, waste management, heating of buildings) but the estimated reduction potential is significantly smaller.

The emissions of the dominant energy sector decreased by just under three per cent from 2006 in 2007. The consumption of fossil fuels in power and heat production decreased by approximately 10 per cent. The use of coal diminished most, or by around 14 per cent. However, the overall reduction in the emissions of the energy sector remained small because the use of peat went up by nine per cent. The proportion of energy produced with renewable energy sources in total heat and power production remained on level with the previous year in 2007. The total consumption of primary energy fell slightly.

In 2007, the emissions of the agricultural sector diminished by around one per cent and those of the waste sector by good three per cent from 2006. Altogether, the emissions of the agricultural sector have fallen by a total of 22 per cent and those of the waste sector by nearly 39 per cent since 1990. The accuracy of the emissions calculation for the waste sector has improved from the previous reporting round due to an update of the composition of municipal waste. The emissions from industrial processes have increased by 34 per cent since 1990.

The sinks reported in the land use, land use change and forestry sector diminished by one-fifth, or approximately seven million tonnes, from 2006 in 2007. This is primarily due to larger felling volumes than in the preceding years. In 2007, market fellings totalled a record amount of almost 58 million cubic metres. The forest industry replaced timber imports by increased use of domestic timber. Fellings of saw timber increased by 18 per cent and those of pulpwood by 10 per cent in Finland. Finland's land use, land use change and forestry sector is a significant sink, even though the soil-based emissions from drained peatland fields and forests are significant. However, in the Kyoto commitment period sinks can only be exploited within certain limits

Tables

Table 1: Greenhouse gas emissions in Finland 1990–2007 (million t CO₂-eq.) by emission category

Year	Emission category							Total	Total excl. land use, land use change and forestry
	Energy	Industrial processes	Solvents and other product use	Agriculture	Waste	Land use, land use change and forestry ¹			
1990	54.60	5.00	0.20	7.10	4.00	-17.80	53.10	70.90	
1991	53.20	4.60	0.20	6.70	4.00	-31.50	37.20	68.70	
1992	52.50	4.30	0.20	6.20	4.00	-26.20	41.00	67.20	
1993	54.50	4.30	0.20	6.20	4.00	-24.10	45.10	69.20	
1994	59.70	4.60	0.10	6.20	4.00	-17.30	57.30	74.60	
1995	56.30	4.60	0.10	6.30	3.90	-16.60	54.60	71.20	
1996	62.00	4.90	0.10	6.20	3.80	-25.70	51.30	77.00	
1997	60.30	5.20	0.10	6.20	3.80	-19.70	55.90	75.60	
1998	57.20	5.20	0.10	6.10	3.60	-16.60	55.60	72.20	
1999	56.60	5.30	0.10	5.90	3.50	-18.50	52.90	71.40	
2000	54.60	5.50	0.10	6.00	3.30	-18.40	51.10	69.50	
2001	59.90	5.60	0.10	5.90	3.20	-21.50	53.20	74.70	
2002	62.50	5.40	0.10	5.80	3.00	-22.50	54.30	76.80	
2003	70.00	5.90	0.10	5.70	2.80	-22.50	62.00	84.50	
2004	65.90	6.20	0.10	5.60	2.70	-23.30	57.20	80.50	
2005	54.40	6.20	0.10	5.60	2.50	-28.30	40.50	68.80	
2006	65.60	6.10	0.10	5.60	2.50	-32.20	47.70	79.90	
2007	63.80	6.70	0.10	5.50	2.40	-25.30	53.20	78.50	

1) Emissions are positive figures, removals negative

Table 2: Carbon dioxide emissions in Finland 1990, 1995–2007 (million t CO₂-eq.) by emission category.

Emission category ¹	Year													
	1990	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Public electricity and heat production	16.45	21.05	26.52	24.35	20.92	20.33	19.00	24.38	26.86	33.64	29.40	18.66	29.41	27.15
Oil refineries	2.26	2.56	2.77	2.51	2.64	2.68	2.55	2.53	2.73	2.80	2.79	2.64	2.73	2.86
Manufacturing of solid fuels and other energy industries	0.35	0.32	0.30	0.34	0.38	0.42	0.35	0.32	0.36	0.39	0.42	0.39	0.40	0.35
Manufacturing industries and construction	13.23	12.04	11.92	12.07	11.74	11.72	11.72	11.28	10.98	11.34	11.43	11.12	11.38	11.41
Transport	12.52	11.77	11.74	12.33	12.48	12.68	12.59	12.71	12.91	13.10	13.45	13.48	13.67	14.04
Heating of buildings, other fuel use in agriculture, forestry and fisheries	7.04	5.70	5.81	5.82	5.92	5.83	5.46	5.66	5.60	5.44	5.38	5.15	5.03	4.94
Industrial processes	3.24	3.00	3.32	3.54	3.47	3.56	3.55	3.61	3.51	3.76	3.94	3.70	3.87	4.27
Fugitive emissions from fuels	0.23	0.18	0.16	0.20	0.15	0.13	0.13	0.12	0.13	0.12	0.12	0.13	0.11	0.14
Solvents and other products use	0.12	0.08	0.08	0.07	0.07	0.07	0.07	0.07	0.07	0.06	0.06	0.06	0.06	0.06
Other fuel use	1.19	1.20	1.23	1.14	1.39	1.23	1.27	1.26	1.26	1.35	1.15	1.09	1.04	1.06
Land use, land use change and forestry	-17.96	-16.74	-25.90	-19.90	-16.80	-18.74	-18.63	-21.72	-22.71	-22.72	-23.53	-28.53	-32.44	-25.51
Total	38.66	41.13	37.95	42.49	42.36	39.92	38.06	40.24	41.69	49.29	44.60	27.90	35.28	40.77
Total excl. land use, land use change and forestry	56.62	57.88	63.86	62.38	59.16	58.66	56.69	61.96	64.40	72.01	68.13	56.43	67.72	66.29

1) Positive figures are emissions, negative removals

Table 3: Methane emissions in Finland 1990, 1995–2007 (1000 t) by emission category

Emission category	Year														
	1990	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	
Energy industries	0.4	0.6	0.7	0.8	0.8	0.8	0.7	0.9	1.2	1.3	1.2	1.0	1.2	1.1	
Manufacturing industry and construction	0.6	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	
Transport	4.7	3.9	3.7	3.6	3.5	3.4	3.2	3.0	2.9	2.8	2.6	2.4	2.2	2.1	
Enteric fermentation	91.9	80.7	81.1	82.2	80.4	79.1	79.0	77.9	78.2	76.9	75.9	75.4	75.4	74.3	
Manure management	10.9	11.7	11.8	12.5	12.3	12.2	12.3	12.0	12.6	12.9	12.9	13.2	13.5	13.5	
Solid waste disposal	173.5	170.9	166.7	162.4	155.2	151.7	142.1	135.8	125.4	116.8	110.2	100.0	102.8	98.1	
Sewage treatment	7.3	7.0	6.8	6.7	6.6	6.4	6.3	6.2	6.4	6.3	6.4	6.2	6.3	6.3	
Heating of institutional and commercial buildings	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	
Residential heating	7.8	8.1	8.5	8.5	8.6	8.4	8.2	8.5	8.6	8.6	8.5	8.4	8.6	8.5	
Fuel use in agriculture, forestry and fisheries	0.6	0.4	0.4	0.4	0.5	0.4	0.4	0.5	0.5	0.5	0.5	0.5	0.5	0.5	
Fugitive emissions from fuels	0.5	3.8	3.9	3.4	3.5	2.8	2.6	3.2	2.7	2.9	2.6	3.1	2.6	2.4	
Industrial processes	0.2	0.5	0.5	0.4	0.5	0.5	0.5	0.5	0.5	0.4	0.5	0.4	0.4	0.4	
Other fuel use	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	
Land use, land use change and forestry	4.8	5.4	5.6	5.8	5.9	6.0	6.0	6.1	6.0	6.0	6.4	6.3	6.4	6.1	
Compost production	1.0	1.7	1.9	1.9	2.0	2.2	2.3	2.4	2.5	2.6	2.7	3.0	3.0	3.3	
Total	304.9	295.8	292.8	289.7	280.6	274.9	264.6	258.0	248.6	239.2	231.4	220.9	224.0	217.6	

Table 4: Nitrous oxide emissions in Finland 1990, 1995–2007 (1000 t) by emission category

Emission category	Year														
	1990	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	
Energy industries	0.4	0.6	0.7	0.7	0.7	0.7	0.7	0.8	0.9	1.1	1.0	0.8	1.1	1.0	
Manufacturing and construction	0.6	0.5	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.5	0.5	0.5	
Transport	0.6	0.9	1.0	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	2.0	2.0	2.1	
Industrial processes	5.3	4.7	4.7	4.7	4.4	4.3	4.4	4.2	4.3	4.5	4.8	5.2	4.6	4.8	
Solvents and other product use	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.2	0.1	0.1	
Manure management	2.1	1.8	1.9	1.9	1.9	1.8	1.8	1.7	1.7	1.7	1.6	1.6	1.7	1.6	
Agricultural soils	13.9	12.3	11.9	11.7	11.4	11.1	11.3	11.1	10.9	10.8	10.5	10.4	10.3	10.3	
Waste	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	
Heating of buildings, other fuel use in agriculture, forestry and fisheries	0.3	0.2	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	
Fugitive emissions from fuels ¹	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Other fuel use	1.4	1.2	1.2	1.2	1.1	1.1	1.0	1.0	1.0	1.1	1.0	0.9	0.9	0.9	
Land use, land use change and forestry	0.3	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	
Total	25.6	23.3	23.2	23.1	22.6	22.2	22.4	22.1	22.3	22.6	22.7	22.4	22.4		

1) Notation 0.0 means that the value of the quantity is less than half of the unit of measurement used. LULUCF is the land use, land-use change and forestry sector.

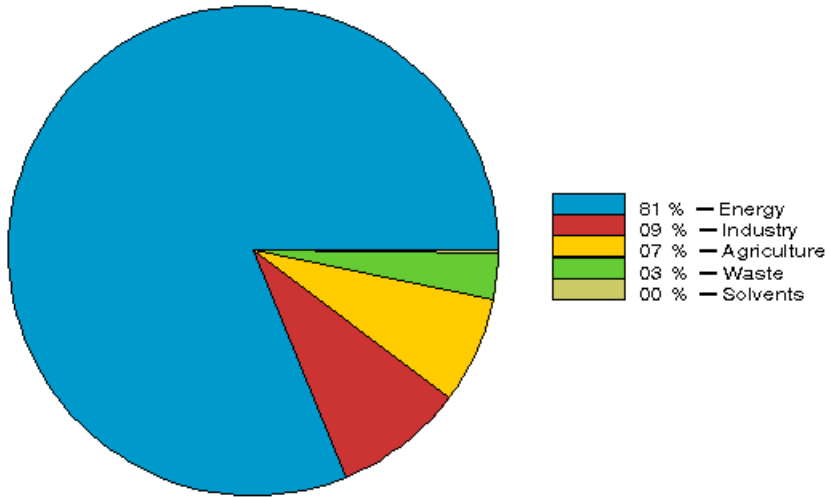
Table 5: Emissions of F-gases in Finland 1990–2007 (1000 t CO2-eq.)

Year	HFCs	PFCs	Sulphur hexafluoride	Total
1990	0.0 ¹¹	0.1	94.4	94.5
1991	0.1	0.1	67.3	67.5
1992	0.1	0.1	36.6	36.8
1993	0.1	0.1	33.6	33.8
1994	6.5	0.1	34.9	41.5
1995	29.3	0.1	68.5	98.0
1996	77.3	0.2	72.2	149.7
1997	167.8	0.2	76.0	243.9
1998	245.2	0.2	53.2	298.6
1999	318.6	28.0	52.0	398.5
2000	501.7	22.5	51.5	575.7
2001	656.9	20.1	55.0	732.0
2002	463.4	13.4	51.3	528.1
2003	652.1	14.9	41.7	708.6
2004	695.1	12.2	23.2	730.5
2005	863.8	9.9	19.6	893.2
2006	747.7	15.4	40.4	803.5
2007	903.9	8.4	22.6	934.9

1) Notation 0.0 means that the value of the quantity is less than half of the unit of measurement used. LULUCF is the land use, land-use change and forestry sector

Figures

Figure 1: Greenhouse gas emissions by sectors in 2007 (%)



A zero means that contribution to the total is less than half percent

Figure 2: Greenhouse gas emissions in 1990 - 2007 (million t CO2 eq.)

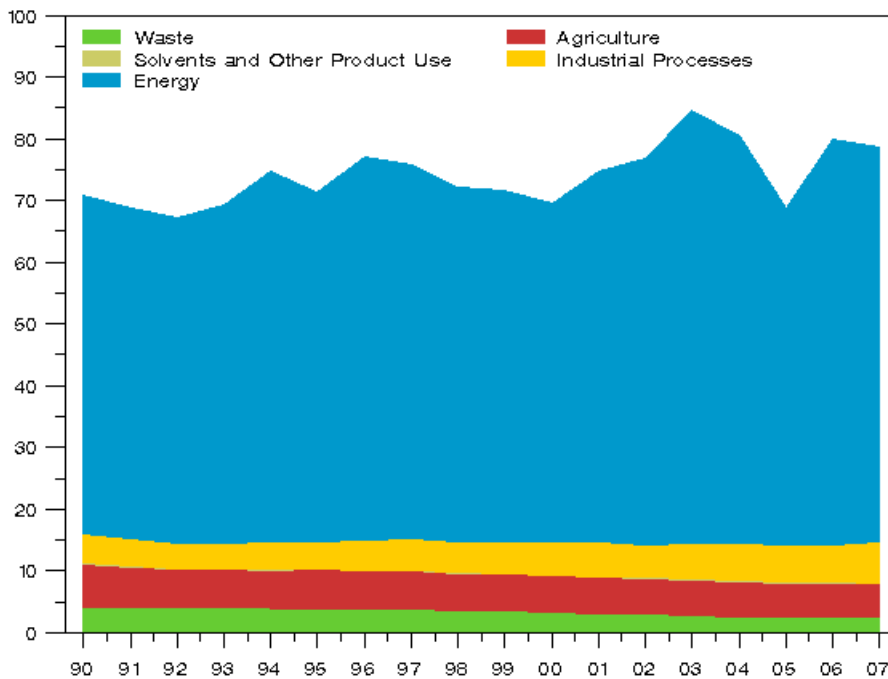


Figure 3: Development of emissions in the energy sector in 1990 - 2007 (million t CO2 eq.)

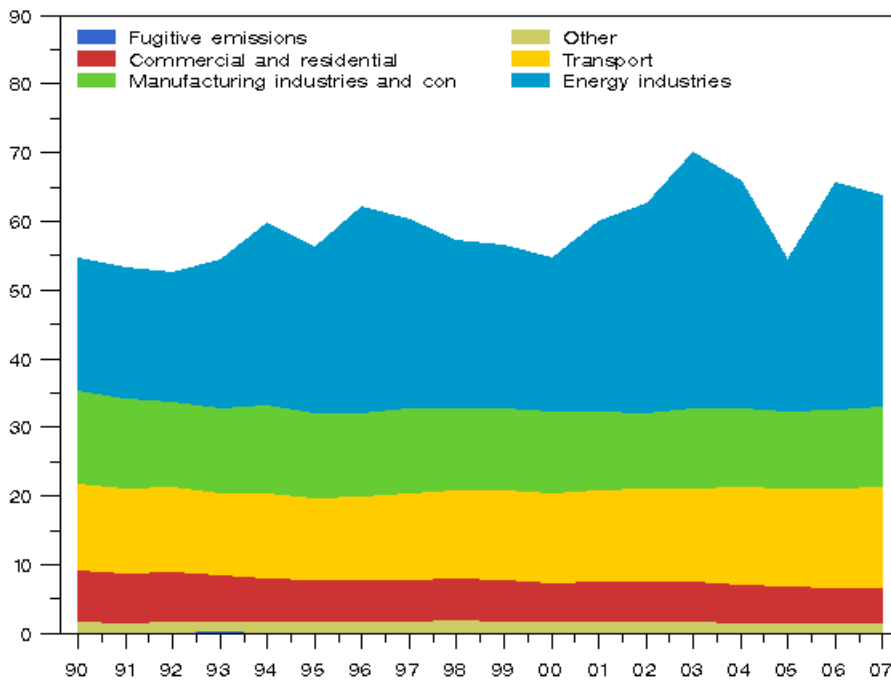
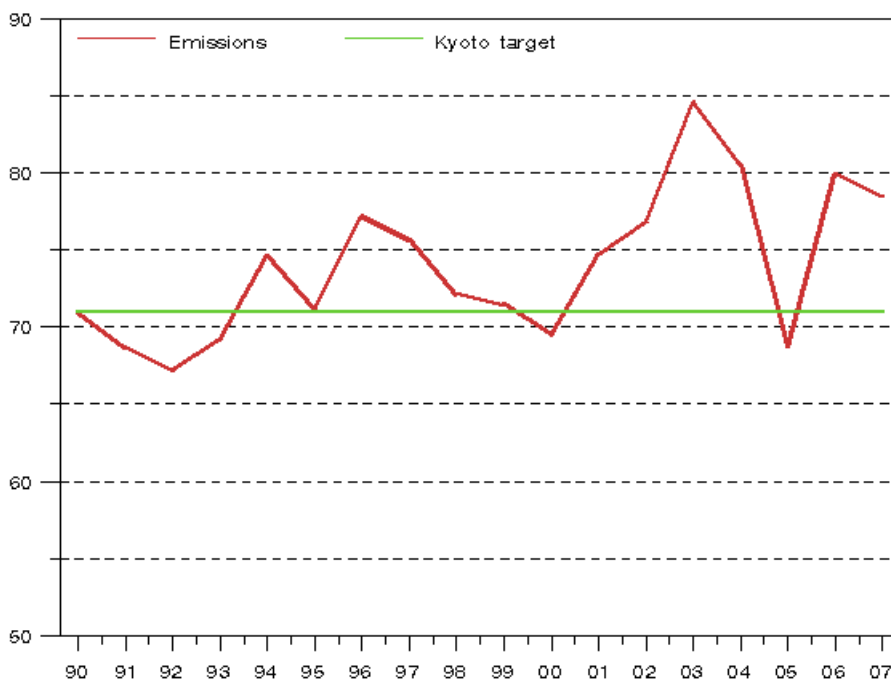


Figure 4: Greenhouse gas emission in Finland in 1990 - 2007 in relation to the Kyoto target level (million t CO2 eq.)



Suomen virallinen tilasto
Finlands officiella statistik
Official Statistics of Finland

Environment and Natural Resources 2009

Inquiries

Riitta Pipatti (09) 1734 3543
Tuija Lapveteläinen (09) 1734 3528
Director in charge:
Leena Storgårds

Sähköpostiosoite

www.stat.fi