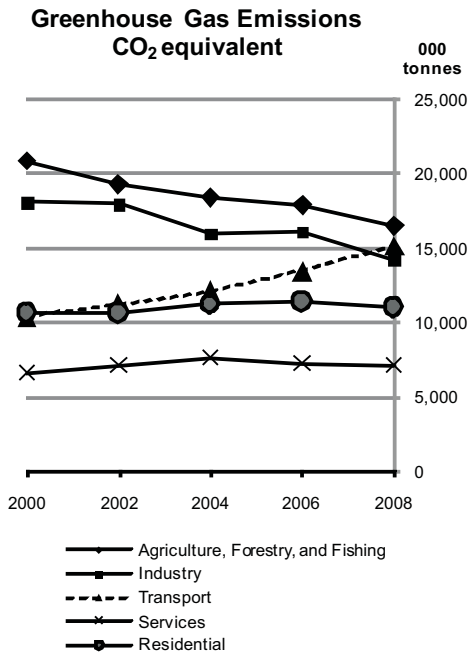


Environmental Accounts

Air Emissions 2008



Greenhouse Gas Emissions	2006	2007	2008
Agriculture, Forestry and Fishing	17,867	17,178	16,512
Industry	16,120	15,345	14,212
Transport	13,433	14,347	15,124
Services	7,236	7,352	7,099
Residential	11,473	11,148	11,091
Total	66,129	65,370	64,038

Decrease of 2% in greenhouse gas emissions in 2008

There was a small decrease of 2.0% in total greenhouse gas emissions in 2008. This followed a decrease of 1.1% in 2007 (see Table 4 and graph).

Taking Forest Sequestration into account, there was a decrease of 3.9% in the Agriculture, Forestry and Fishing Sector. Increases of 5.4% in Transport were more than offset by decreases in Industry (7.4%), Services (3.4%) and Residential (0.5%).

Components of greenhouse gas emissions

There were decreased emissions from the three main greenhouse gases between 2007 and 2008:

- ◆ Carbon dioxide emissions fell from 45,692 thousand tonnes in 2007 to 44,633 in 2008. *See Table 1.*
- ◆ Nitrous oxide emissions fell marginally from 23,800 tonnes to 23,300. *See Table 2.*
- ◆ Methane emissions fell from 585,800 tonnes to 579,300. *See Table 3.*

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Greenhouse gas trends 1999-2008

The main changes in greenhouse gas emissions over the period 1999-2008 were as follows:

- ◆ Agriculture, forestry and fishing fell from 22,388 thousand tonnes of CO₂ equivalent in 1999 to 19,270 thousand tonnes reflecting a decrease in livestock numbers.
- ◆ Emissions from Industry fell by 15.5% from 16,816 to 14,212 thousand tonnes.
- ◆ Transport increased by 56.5% from 9,666 thousand tonnes to 15,124.
- ◆ Services rose by 12% from 6,340 thousand tonnes to 7,099.
- ◆ Residential sector increased by 5.6% from 10,504 thousand tonnes in 1999 to 11,091 in 2008. Increases in the numbers of households and in electricity demand per household were partially offset by factors such as cleaner electricity and less direct use of solid fuels. *See Table 4.*

Components of acid rain precursors

Sulphur dioxide (SO₂) emissions declined by 17.6% from 54,400 tonnes in 2007 to 44,800 tonnes in 2008 (see Table 5). The Industrial, Residential and Services sectors broadly emit around one-third of all SO₂ emissions each.

Tables 6 and 7 give emissions estimates for oxides of nitrogen (NO_x) and ammonia (NH₃). There was a substantial decline of 7.1% in NO_x emissions from 120,400 tonnes in 2007 to 111,900 tonnes in 2008. Ammonia (NH₃) emissions, which predominantly derive from agricultural activities, declined by 1.6% from 2007 to 2008.

Acid rain precursor trends 1999-2008

Emissions of acid rain precursors expressed in SO₂ equivalents declined from 336,700 tonnes in 2007 to 318,100 in 2008 (see Table 8). Over the period 1999-2008, emissions of SO₂ equivalents declined by 35.1%. Emissions from the Agricultural, forestry and fishing sector fell by 19.5% during this period, from Industry by 60.2% and from the Residential sector by 51.7%. Emissions from the Services sector decreased by 36.7%. Transport recorded an increase in emissions of 55.8% for the period.

Table 1: Carbon Dioxide (CO₂) Emissions**000 tonnes**

Sector	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Agriculture, Forestry, Fishing	1,089	1,040	891	525	397	17	-188	-99	-175	-965
Agriculture, Forestry, Fishing	1,518	1,591	1,639	1,466	1,535	1,377	1,411	1,385	1,438	1,793
Forest sequestration (-) or emissions (+)	-429	-551	-747	-941	-1,138	-1,360	-1,600	-1,484	-1,613	-2,758
Industry	15,166	16,414	16,952	16,105	14,616	14,361	14,875	14,532	13,930	12,996
Energy Mining and Manufacture of energy products	834	834	913	917	1,006	979	1,007	953	925	903
Metals mining	135	171	206	189	172	161	186	184	184	129
Non-metal mining and quarrying, mining support	350	358	363	349	335	355	390	488	531	406
Food, beverage and tobacco	2,499	2,642	2,736	2,522	2,343	2,116	2,063	2,062	2,022	1,839
Textiles, clothing, leather and footwear	273	258	237	197	153	119	109	77	53	49
Wood and wood products	236	245	248	234	221	216	231	223	238	147
Pulp, paper and print production	175	188	199	183	166	156	137	95	89	98
Chemical production	1,121	1,205	1,274	1,199	1,096	1,032	1,197	1,036	1,087	937
Rubber and plastic production	222	208	190	186	181	182	210	191	206	175
Non-metallic mineral production	5,214	5,922	6,130	5,896	5,041	5,238	5,225	4,902	5,013	4,482
Metal and metal products	1,647	1,687	1,605	1,591	1,546	1,556	1,476	1,529	1,651	1,136
Manufacture of electrical and optical products	748	834	906	811	719	667	678	695	540	533
Other manufacturing	481	510	533	493	453	429	498	1,136	490	458
Transport equipment	97	103	108	98	88	81	97	98	112	62
Fuel, power, water, electricity supply	1,026	1,135	1,185	1,120	993	980	1,262	723	514	821
Repair and installation of machinery and equipment	62	65	66	56	47	39	57	57	56	19
Waste management	9	11	12	13	13	15	10	47	182	771
Construction	38	38	41	52	42	42	42	38	36	33
Transport *	9,430	10,143	10,962	10,985	10,965	11,868	12,484	13,216	14,131	14,940
Services excl Transport	5,955	6,234	6,636	6,756	7,417	7,253	7,587	6,881	7,009	6,854
Residential	10,088	10,269	10,870	10,337	10,365	10,904	11,163	11,097	10,798	10,807
Total	41,727	44,100	46,310	44,708	43,760	44,402	45,920	45,626	45,692	44,633

* Includes both the Transport sector and road transport activities carried out in all other sectors.

Table 2: Nitrous Oxide (N₂O) Emissions**000 tonnes**

Sector	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Agriculture, Forestry, Fishing	26.9	25.4	23.5	22.5	22.5	21.8	21.3	21.0	20.2	20.7
Agriculture, Forestry, Fishing	26.9	25.4	23.5	22.5	22.5	21.8	21.3	21.0	20.2	20.7
Industry	1.3	1.3	1.3	1.2	1.0	1.0	1.1	1.0	0.9	0.6
Energy Mining and Manufacture of energy products	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Metals mining	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Non-metal mining and quarrying, mining support	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Food, beverage and tobacco	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.1
Textiles, clothing, leather and footwear	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Wood and wood products	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pulp, paper and print production	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Chemical production	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Rubber and plastic production	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Non-metallic mineral production	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.1
Metal and metal products	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Manufacture of electrical and optical products	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0
Other manufacturing	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0
Transport equipment	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Fuel, power, water, electricity supply	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0
Repair and installation of machinery and equipment	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Waste management	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Construction	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Transport *	0.6	0.6	0.7	0.6	0.6	0.6	0.6	0.6	0.6	0.5
Services excl Transport	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.1	1.1	0.8
Residential	1.2	1.1	1.2	1.1	1.0	1.0	1.1	1.1	1.0	0.8
Total	31.2	29.7	27.8	26.6	26.2	25.6	25.3	24.8	23.8	23.3

* Includes both the Transport sector and road transport activities carried out in all other sectors.

Table 3: Methane (CH4) Emissions**000 tonnes**

Sector	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Agriculture, Forestry, Fishing	596.3	567.4	561.8	558.3	575.9	551.5	548.1	545.8	527.7	526.0
Agriculture, Forestry, Fishing	596.3	567.4	561.8	558.3	575.9	551.5	548.1	545.8	527.7	526.0
Industry	59.8	61.7	67.3	71.0	103.4	62.1	55.5	60.7	54.1	49.1
Energy Mining and Manufacture of energy products	0.0	0.0	0.0	0.0	27.0	0.0	0.0	0.0	0.0	0.0
Metals mining	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-	-
Non-metal mining and quarrying, mining support	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Food, beverage and tobacco	0.3	0.3	0.3	0.2	0.2	0.3	0.1	0.1	0.1	0.1
Textiles, clothing, leather and footwear	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	-	0.0
Wood and wood products	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pulp, paper and print production	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Chemical production	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rubber and plastic production	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Non-metallic mineral production	0.7	0.9	0.9	0.8	0.8	1.0	1.2	0.9	1.1	1.0
Metal and metal products	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.1	0.1
Manufacture of electrical and optical products	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0
Other manufacturing	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Transport equipment	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Fuel, power, water, electricity supply	2.6	2.5	2.7	2.1	1.9	2.0	1.6	1.4	1.9	1.7
Repair and installation of machinery and equipment	0.0	0.0	-	-	-	-	-	0.0	-	-
Waste management	55.9	57.8	63.1	67.6	73.2	58.6	52.4	58.0	50.8	46.2
Construction	-	-	-	-	-	-	-	-	-	-
Transport *	2.4	2.6	2.6	2.5	2.4	2.3	2.2	1.3	1.3	1.2
Services excl Transport	0.6	0.6	0.6	0.5	0.6	0.5	0.6	0.5	0.5	0.5
Residential	2.7	2.7	2.7	2.5	2.4	2.4	2.5	2.3	2.2	2.4
Total	661.8	635.1	635.0	634.7	684.7	618.8	608.9	610.5	585.8	579.3

* Includes both the Transport sector and road transport activities carried out in all other sectors.

Table 4: Greenhouse Gas Emissions (CO₂, N₂O, CH₄)**000 tonnes CO₂ equivalent**

Sector	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Agriculture, Forestry, Fishing	21,960	20,816	19,971	19,238	19,451	18,361	17,935	17,867	17,178	16,512
Agriculture, Forestry, Fishing	22,388	21,367	20,719	20,179	20,589	19,722	19,535	19,351	18,791	19,270
Forest sequestration (-) or emissions (+)	-429	-551	-747	-941	-1,138	-1,360	-1,600	-1,484	-1,613	-2,758
Industry	16,816	18,124	18,763	17,953	17,108	15,970	16,381	16,120	15,345	14,212
Energy Mining and Manufacture of energy products	835	835	914	918	1,574	981	1,009	955	927	904
Metals mining	140	178	214	196	178	166	193	190	190	130
Non-metal mining and quarrying, mining support	362	369	374	358	344	363	399	500	544	411
Food, beverage and tobacco	2,600	2,748	2,836	2,608	2,420	2,187	2,128	2,127	2,079	1,878
Textiles, clothing, leather and footwear	284	270	248	206	160	124	112	80	54	50
Wood and wood products	246	255	258	243	230	224	238	229	245	149
Pulp, paper and print production	182	196	206	189	172	161	142	98	92	99
Chemical production	1,169	1,255	1,323	1,242	1,134	1,067	1,235	1,070	1,119	954
Rubber and plastic production	232	217	198	192	187	188	217	197	212	177
Non-metallic mineral production	5,269	5,985	6,193	5,953	5,096	5,296	5,301	4,957	5,080	4,523
Metal and metal products	1,701	1,746	1,659	1,644	1,600	1,614	1,536	1,585	1,705	1,193
Manufacture of electrical and optical products	780	869	941	841	745	688	700	717	564	547
Other manufacturing	502	531	554	511	469	445	520	1,176	503	465
Transport equipment	101	107	112	102	91	84	100	101	116	63
Fuel, power, water, electricity supply	1,122	1,230	1,285	1,204	1,066	1,053	1,339	775	568	865
Repair and installation of machinery and equipment	65	67	68	58	48	40	59	59	57	20
Waste management	1,184	1,224	1,337	1,432	1,551	1,246	1,110	1,266	1,253	1,750
Construction	39	40	42	54	44	43	43	39	37	33
Transport *	9,666	10,397	11,219	11,225	11,198	12,102	12,720	13,433	14,347	15,124
Services excl Transport	6,340	6,623	7,023	7,132	7,796	7,627	7,967	7,236	7,352	7,099
Residential	10,504	10,677	11,288	10,719	10,723	11,279	11,552	11,473	11,148	11,091
Total	65,285	66,637	68,264	66,267	66,277	65,338	66,556	66,129	65,370	64,038

* Includes both the Transport sector and road transport activities carried out in all other sectors.

Table 5: Sulphur Dioxide (SO₂) Emissions
000 tonnes

Sector	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Agriculture, Forestry, Fishing	4.3	3.5	3.6	2.6	1.8	1.7	1.7	1.4	1.1	0.9
Agriculture, Forestry, Fishing	4.3	3.5	3.6	2.6	1.8	1.7	1.7	1.4	1.1	0.9
Industry	65.6	61.5	55.7	42.0	31.5	24.6	26.0	22.7	19.1	15.5
Energy Mining and Manufacture of energy products	0.3	0.3	0.3	0.2	0.2	0.1	0.2	0.2	0.1	0.1
Metals mining	1.3	1.5	1.7	1.3	1.0	0.7	0.8	0.7	0.7	0.4
Non-metal mining and quarrying, mining support	1.5	1.5	1.4	1.0	0.8	0.6	0.6	0.6	0.6	0.3
Food, beverage and tobacco	12.9	12.4	11.1	8.4	6.4	4.7	4.4	4.1	3.5	2.1
Textiles, clothing, leather and footwear	1.5	1.3	1.1	0.7	0.5	0.3	0.3	0.2	0.2	0.1
Wood and wood products	2.4	2.2	2.0	1.5	1.2	0.9	0.9	0.8	0.8	0.4
Pulp, paper and print production	1.5	1.4	1.3	1.0	0.8	0.6	0.5	0.3	0.3	0.2
Chemical production	8.2	8.0	7.3	5.5	4.2	3.0	3.3	2.9	2.8	1.8
Rubber and plastic production	2.3	2.0	1.5	1.2	1.0	0.8	0.8	0.7	0.7	0.5
Non-metallic mineral production	4.3	3.9	3.2	2.5	2.1	1.7	2.1	2.1	2.0	1.1
Metal and metal products	4.4	3.7	2.8	2.1	1.6	1.3	1.3	0.4	0.6	0.3
Manufacture of electrical and optical products	6.8	6.8	6.5	5.0	3.8	2.9	2.7	2.6	1.8	1.6
Other manufacturing	4.3	4.0	3.5	2.6	2.0	1.5	1.6	3.4	1.5	1.0
Transport equipment	0.9	0.8	0.7	0.5	0.4	0.3	0.3	0.3	0.3	0.1
Fuel, power, water, electricity supply	11.9	10.8	10.4	7.7	5.1	4.9	5.9	3.1	2.1	2.9
Repair and installation of machinery and equipment	0.6	0.6	0.5	0.4	0.3	0.2	0.2	0.2	0.2	0.1
Waste management	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.2	0.7	2.4
Construction	0.4	0.4	0.4	0.4	0.2	0.2	0.2	0.2	0.2	0.1
Transport *	0.2	0.2	0.2	0.1	0.1	0.2	0.2	0.2	0.1	0.1
Services excl Transport	41.0	35.3	35.5	29.1	24.7	23.8	22.9	18.2	17.8	15.0
Residential	47.9	39.2	39.6	27.8	20.7	21.1	19.9	17.8	16.3	13.4
Total	159.0	139.7	134.4	101.5	78.7	71.3	70.7	60.3	54.4	44.8

* Includes both the Transport sector and road transport activities carried out in all other sectors.

Table 6: Oxides of Nitrogen (NO_x) Emissions**000 tonnes**

Sector	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Agriculture, Forestry, Fishing	3.6	3.6	3.7	3.4	3.0	3.1	3.1	2.7	2.5	2.2
Agriculture, Forestry, Fishing	3.6	3.6	3.7	3.4	3.0	3.1	3.1	2.7	2.5	2.2
Industry	58.9	59.2	58.1	52.4	46.1	43.1	46.5	45.9	42.2	38.7
Energy Mining and Manufacture of energy products	0.3	0.3	0.3	0.3	0.2	0.2	0.3	0.3	0.3	0.3
Metals mining	1.2	1.5	1.8	1.6	1.4	1.3	1.4	1.5	1.6	1.0
Non-metal mining and quarrying, mining support	1.4	1.4	1.4	1.3	1.1	1.0	1.1	1.2	1.3	0.8
Food, beverage and tobacco	11.8	11.8	11.6	10.3	9.1	8.2	7.9	8.2	7.6	5.2
Textiles, clothing, leather and footwear	1.4	1.2	1.1	0.9	0.7	0.5	0.5	0.4	0.4	0.3
Wood and wood products	2.2	2.1	2.0	1.8	1.7	1.6	1.5	1.6	1.8	1.0
Pulp, paper and print production	1.4	1.4	1.3	1.2	1.1	1.0	0.9	0.6	0.6	0.6
Chemical production	7.6	7.6	7.6	6.7	5.9	5.3	5.9	5.9	6.2	4.6
Rubber and plastic production	2.1	1.8	1.6	1.5	1.4	1.4	1.4	1.4	1.6	1.2
Non-metallic mineral production	3.9	3.7	3.4	3.2	3.0	3.0	3.7	4.2	4.4	2.8
Metal and metal products	3.9	3.4	2.9	2.6	2.3	2.2	2.4	0.8	1.4	0.7
Manufacture of electrical and optical products	6.3	6.6	6.8	6.1	5.4	5.0	4.8	5.2	4.1	3.9
Other manufacturing	3.9	3.8	3.6	3.2	2.8	2.6	2.9	6.8	3.3	2.6
Transport equipment	0.8	0.8	0.7	0.6	0.6	0.5	0.6	0.6	0.6	0.3
Fuel, power, water, electricity supply	10.0	10.9	10.9	10.1	8.6	8.7	10.5	6.2	4.6	7.2
Repair and installation of machinery and equipment	0.6	0.6	0.6	0.5	0.4	0.3	0.4	0.4	0.4	0.1
Waste management	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.4	1.6	5.9
Construction	0.4	0.4	0.4	0.5	0.4	0.4	0.4	0.3	0.3	0.3
Transport *	0.2	0.2	0.2	0.1	0.1	0.3	0.3	0.4	0.2	0.2
Services excl Transport	34.3	35.7	37.0	38.2	41.6	41.7	40.9	36.7	39.5	37.4
Residential	40.1	39.8	41.3	36.6	35.0	37.0	35.6	35.9	36.0	33.4
Total	137.0	138.5	140.3	130.7	125.8	125.1	126.3	121.6	120.4	111.9

* Includes both the Transport sector and road transport activities carried out in all other sectors.

Table 7: Ammonia (NH₃) Emissions
000 tonnes

Sector	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Agriculture, Forestry, Fishing	123.9	119.4	113.1	110.8	109.6	109.1	107.5	107.1	103.0	101.3
Agriculture, Forestry, Fishing	123.9	119.4	113.1	110.8	109.6	109.1	107.5	107.1	103.0	101.3
Industry	-	-	-	-	-	-	-	-	-	-
Energy Mining and Manufacture of energy products	-	-	-	-	-	-	-	-	-	-
Metals mining	-	-	-	-	-	-	-	-	-	-
Non-metal mining and quarrying, mining support	-	-	-	-	-	-	-	-	-	-
Food, beverage and tobacco	-	-	-	-	-	-	-	-	-	-
Textiles, clothing, leather and footwear	-	-	-	-	-	-	-	-	-	-
Wood and wood products	-	-	-	-	-	-	-	-	-	-
Pulp, paper and print production	-	-	-	-	-	-	-	-	-	-
Chemical production	-	-	-	-	-	-	-	-	-	-
Rubber and plastic production	-	-	-	-	-	-	-	-	-	-
Non-metallic mineral production	-	-	-	-	-	-	-	-	-	-
Metal and metal products	-	-	-	-	-	-	-	-	-	-
Manufacture of electrical and optical products	-	-	-	-	-	-	-	-	-	-
Other manufacturing	-	-	-	-	-	-	-	-	-	-
Transport equipment	-	-	-	-	-	-	-	-	-	-
Fuel, power, water, electricity supply	-	-	-	-	-	-	-	-	-	-
Repair and installation of machinery and equipment	-	-	-	-	-	-	-	-	-	-
Waste management	-	-	-	-	-	-	-	-	-	-
Construction	-	-	-	-	-	-	-	-	-	-
Transport *	1.5	2.0	2.3	2.3	2.2	2.2	2.8	2.7	2.5	2.5
Services excl Transport	-	-	-	-	-	-	-	-	-	-
Residential	-	-	-	-	-	-	-	-	-	-
Total	125.5	121.4	115.4	113.1	111.8	111.3	110.3	109.8	105.5	103.8

* Includes both the Transport sector and road transport activities carried out in all other sectors.

Table 8: Acid Rain Precursor Emissions (SO₂, NO_x, NH₃)
000 tonnes SO₂ equivalent

Sector	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Agriculture, Forestry, Fishing	240.0	230.7	219.1	213.4	210.1	209.2	206.1	204.9	196.7	193.1
Agriculture, Forestry, Fishing	240.0	230.7	219.1	213.4	210.1	209.2	206.1	204.9	196.7	193.1
Industry	106.5	102.7	96.1	78.4	63.5	54.6	58.4	54.7	48.4	42.4
Energy Mining and Manufacture of energy products	0.4	0.5	0.5	0.4	0.3	0.3	0.4	0.4	0.3	0.3
Metals mining	2.2	2.6	2.9	2.4	2.0	1.6	1.7	1.7	1.8	1.1
Non-metal mining and quarrying, mining support	2.4	2.4	2.4	1.9	1.6	1.3	1.4	1.4	1.5	0.9
Food, beverage and tobacco	21.1	20.5	19.2	15.6	12.7	10.4	10.0	9.8	8.8	5.7
Textiles, clothing, leather and footwear	2.5	2.2	1.8	1.3	0.9	0.6	0.6	0.5	0.5	0.3
Wood and wood products	3.9	3.7	3.4	2.8	2.3	2.0	1.9	1.9	2.0	1.1
Pulp, paper and print production	2.5	2.4	2.2	1.8	1.5	1.2	1.1	0.8	0.7	0.6
Chemical production	13.5	13.3	12.6	10.2	8.3	6.7	7.4	7.0	7.1	5.0
Rubber and plastic production	3.8	3.3	2.6	2.2	1.9	1.7	1.8	1.7	1.9	1.3
Non-metallic mineral production	7.0	6.4	5.6	4.8	4.2	3.7	4.6	5.0	5.1	3.1
Metal and metal products	7.2	6.1	4.8	3.9	3.3	2.8	3.0	0.9	1.6	0.8
Manufacture of electrical and optical products	11.2	11.4	11.3	9.2	7.6	6.4	6.0	6.1	4.7	4.3
Other manufacturing	7.0	6.6	6.0	4.9	4.0	3.3	3.6	8.1	3.8	2.8
Transport equipment	1.4	1.3	1.2	1.0	0.8	0.7	0.7	0.7	0.7	0.3
Fuel, power, water, electricity supply	18.8	18.4	18.0	14.7	11.1	11.0	13.2	7.4	5.3	7.9
Repair and installation of machinery and equipment	1.0	1.0	0.9	0.7	0.5	0.4	0.5	0.5	0.5	0.1
Waste management	0.1	0.2	0.2	0.2	0.1	0.1	0.1	0.5	1.8	6.5
Construction	0.7	0.6	0.6	0.7	0.5	0.5	0.4	0.4	0.4	0.3
Transport *	3.2	4.1	4.6	4.5	4.4	4.5	5.6	5.5	5.0	5.0
Services excl Transport	64.8	60.1	61.2	55.7	53.6	52.8	51.3	43.7	45.3	41.0
Residential	75.8	66.9	68.3	53.2	45.0	46.8	44.7	42.8	41.3	36.6
Total	490.4	464.6	449.3	405.2	376.7	367.9	366.2	351.5	336.7	318.1

* Includes both the Transport sector and road transport activities carried out in all other sectors.

Background Notes

Introduction These environmental accounts analyse emissions of greenhouse gases and acid rain precursors into the environment by economic sector. The allocations are based on the sector of the end-user as distinct from the sector of gas generation/production.

Data source The data in the tables have been normalised to agree with the figures published by the Environment Protection Agency. Most of the data for the industry sector is derived from the CSO's annual Census of Industrial Production (CIP). The work involves inferring from this economic data the extent of emissions to air attributable to each economic sector (e.g. from fuel expenditure data).

Prior to 2004 the CIP collected detailed information on the breakdown of fuel expenditure on an infrequent basis and this detailed data was used to infer expenditure by fuel type in the intervening years. Expenditure on fuel is now collected on an annual basis in the CIP. Quantities of fuels consumed are estimated by dividing fuel expenditure by average fuel prices using fuel price time series maintained by the Sustainable Energy Authority of Ireland (SEAI). Standard conversion factors are then used to convert the fuel quantities consumed into estimates of air emissions.

Figures for the services sectors, both market and non-market, and the Residential sector, were derived from the SEAI's Energy Balance Sheets. These balance sheets disaggregate consumption by fuel type into five major sectors: Industry, Transport, Agriculture, Commercial and Public Services, and the Residential sector.

Electricity-related emissions were attributed to the individual economic sectors in proportion to their final demand for electricity. Emissions associated with natural gas consumption were similarly attributed to individual economic sectors in proportion to their consumption except where natural gas is used as a production feedstock, in which case the associated emissions are estimated separately.

In the industry sector, the accounts include gas emissions from the Emissions Trading Scheme (ETS) group of companies. For 2005 and later years CO₂ emissions to air from this group are audited by the EPA and therefore are not imputed or derived from underlying expenditure, price and emissions factor data. For years prior to 2005, estimates for the ETS industry sectors are based directly upon the numbers employed in the constituent companies. It is therefore assumed that gas emissions are proportional to the numbers employed by the ETS companies in the various sectors. Within all industry sectors defined at a NACE 2-digit level, it was assumed that demand for energy was approximately proportional to the numbers employed by organisations within those sectors.

Where no raw data were available for disaggregated energy spending (1999, 2000, 2002, and 2003) estimates are made for it by linear interpolation of data from the years 1998, 2001, and 2004 at a 2-digit NACE level.

Revisions This report and the related excel file on the CSO website incorporates revisions to the estimates previously published.

Greenhouse gases The three main Greenhouse gases included in this publication are **carbon dioxide** (CO₂), **nitrous oxide** (N₂O) and **methane** (CH₄). CO₂ emissions are the result of burning fossil fuels such as coal, turf and petroleum. CO₂ is also sequestered (absorbed) by vegetation growth, the most important in this context being by trees. N₂O emissions arise from a few industrial processes and from nitrogen fertilisers. The digestive systems of ruminant animals and waste treatment systems lead to CH₄ emissions.

There are other greenhouse gases (i.e. Hydrofluorocarbons (HFCs), Perfluorocarbons (PFCs) and Sulphur Hexafluoride (SF₆)) which were not taken into account in this report. The emissions from these gases are estimated to comprise around one per cent (in terms of CO₂ equivalent) of the total greenhouse gas emissions for Ireland.

Global warming potential over 100 years

Greenhouse gases other than carbon dioxide may be converted into CO₂ using their global warming potentials.

CO₂ equivalents per tonne of gas emitted

Carbon dioxide (CO ₂)	1
Methane (CH ₄)	21
Nitrous Oxide (NO ₂)	310

Acid rain precursors

Acid rain occurs when acidic gases and particles are transported in the air before falling as wet or dry deposition. High concentrations can be harmful to health, to water and soil quality, to buildings, and can reduce plant growth and damage forests. Emissions *per se* are not necessarily harmful but they have acidification potential and are therefore aggregated into an acid rain precursor theme.

The three main Acid Rain precursor emissions included in this publication are **sulphur dioxide** (SO₂), **oxides of nitrogen** (NO_x) and **ammonia** (NH₃). Burning of coal with high sulphur content is a significant source of (SO₂). NO_x arise when fossil fuels are burnt under certain conditions. NH₃ emissions arise primarily from animal manure and nitrogen based fertilisers. There are other acid rain precursors (e.g. volatile organic compounds (VOC) and carbon monoxide (CO) that were not included in this report.

SO₂ equivalents per tonne of gas emitted

Sulphur dioxide (SO ₂)	1.0000
Oxides of Nitrogen (NO _x)	0.6957
Ammonia (NH ₃)	1.8824

Forestry sequestration

The methodology developed by the Environment Protection Agency was used. The year 2008 is the first year of reporting under Kyoto Protocol Article 3.3. A new methodology for measuring sequestration resulted in a net sequestration figure of 2,758 thousand tonnes CO₂eq in 2008. Sequestration data for earlier years has been revised in accordance with the new methodology.

Air transport greenhouse gases

Only the gases resulting from domestic flights Landings and Take-Offs (LTO's) and cruising from one Irish airport to another Irish airport are accounted for under IPCC guidelines. No emissions from international flights are accounted for.

Air transport acid rain gases

The emissions from both domestic and international LTO's are accounted for, but nothing from cruising is taken into account.

NACE Rev 2

The latest version of NACE (NACE Revision 2) is used in this publication. Sector 58 and 59 (Publishing and Visual Media) has been reclassified to Services for all years (it was in Industry in NACE Rev 1.1).

Similarly, Sewage treatment which is now included under Industry in NACE 37 under Waste Management, was previously accounted for under Services.

NACE Category	Description
01,02,03	Agriculture, forestry and fishing
05,06,19	Energy Mining and Manufacture of energy products
7	Metals mining
08,09	Non-metal mining and quarrying, mining support
10,11,12	Food, beverage and tobacco
13,14,15	Textiles, clothing, leather and footwear
16	Wood and wood products
17,18	Pulp, paper and print production
20,21	Chemical production
22	Rubber and plastic production
23	Non-metallic mineral production
24,25	Metal and metal products
26,27	Manufacture of electrical and optical products
28,31,32	Other manufacturing
29,30	Transport equipment
35,36	Fuel, power, water, electricity supply

NACE Category	Description (continued)
33	Repair and installation of machinery and equipment
37,38,39	Waste management
41,42,43	Construction
49-53	Transport
45-47, 55-96	Services excluding transport

Air emission factors

	TOE per tonne	TOE per 1000 litres	Tonnes CO₂/TJ	Tonnes SO₂/TJ	Tonnes NO_x/TJ	Tonnes CH₄/TJ
Briquettes	0.443		98.860	0.280	0.100	0.050
Milled Peat	0.186		113.262	0.270	0.160	0.050
Sod Peat	0.313		104.000	0.300	0.100	0.050
Coal	0.665		94.600	0.323	0.050	0.100
Gas/Diesel Oil	1.034	0.869	73.247	0.074	0.100	
Kerosene	1.056	0.845	71.342	0.034	0.100	0.005
Residual Fuel Oil	0.985		75.959	0.485	0.200	
LPG	1.126	0.579	63.647	0.000	0.100	
Natural Gas			54.890	0.000	0.100	0.005