



David Gardiner
09/07/99 02:47:08 PM

Record Type: Record

To: Roger S. Ballentine/WHO/EOP@EOP

cc:

Subject: Comparative stats on GHG emissions

To help further your thinking about COP5, I have attached a set of charts that compares US emissions in a variety of ways with other OECD countries. I had this prepared to see if we could tell a good emissions story about the US relative to other developed countries. The bottom line is : NO. We look badly in virtually every way that you can look at it.

Attached is are files containing greenhouse gas emission statistics as we discussed over the phone yesterday (8/31/99). You had asked for various statistics showing how U.S. emission trends compared with other developed countries (primarily OECD). I have included an MS Excel spreadsheet and the identical material in a PDF format. The latter file may be easier to review.

The attached files includes several tables addressing a list of countries that was limited by data availability from national GHG inventory submissions to the UNFCCC. Only those countries which have provided updated GHG estimates to the Secretariat have been included. These data provide a time series of GHG emissions from all source categories from 1990 to 1996. Where available, 1997 data was also included. Also included with each table is a simple index to the year 1992 to show the trend during the 1990s. A brief description of each table is given below:

- * Emissions per capita: Of the countries examined, the U.S. ranks at the bottom and exhibits an upward trend. The U.S. rate of growth is somewhat faster than the average across countries.
- * Emissions per Dollar of GDP: The U.S. also ranks near the bottom, but exhibits a downward trend, though not as rapidly declining as the average across countries.
- * Emissions per Unit of Primary Energy Consumption: The U.S. ranks roughly in the middle of countries examined, and is slightly lower than the average across countries. No specific trend for the U.S. or across countries is exhibited.
- * Emissions per Unit of Land Area: The U.S. ranks better than the average across countries. Because the area of each country is static, an examination of the trend is not especially useful.
- * Ratio of Energy-related CO2 Emissions to Aggregate GHG Emissions: This statistic is essentially the percentage of total national GHG emissions that is accounted for by carbon emissions from the combustion of fossil fuels. The U.S. ranks as having slightly more emissions associated with energy consumption than

the average across countries and shows no significant trend.

* Carbon Intensity of Primary Energy Consumption: This statistic is essentially a measure of how much carbon each country puts into the atmosphere for each unit of energy they consume. The U.S. ranks slightly worse than the average across countries. Neither the U.S. or the average across countries shows a significant trend.

* Carbon Intensity of Economy: This statistic is a measure of the amount of carbon each country puts into the atmosphere, related to energy consumption only, for each dollar of GDP generated. The U.S. ranks near the bottom for this statistic also (a function of the energy intensity of the U.S. economy and the carbon intensity of our energy use). The U.S., however, exhibits a significant downward trend, which is consistent with the average across countries. These downward trends are primarily a function of the declining energy intensity of many economies.

I hope this information proves useful. Please let me know if you have any problems accessing the files, or if you would like more or less detail provided. All of these tables could also be presented in a graphical form, if it is preferred.

Additionally, we can give you some more comparative information on the underlying sectoral efficiency/productivity statistics and trends (e.g., transportation-related emissions per unit of land area). Unfortunately, I do not have any technically credible measure of aggregate U.S. GHG emissions to put "a better light on things." Hopefully, the attached data, though, at least puts perspective on the relative position of the U.S. and the measurable trends.

Again, let me know if you have any questions.

Michael Gillenwater
U.S. EPA
Tel: 202/260-8501
gillenwater@alum.mit.edu

(See attached file: Gardiner Summary.xls)(See attached file: Gardiner Summary.pdf)

 - Gardiner Summary.xls

 - Gardiner Summary.pdf

Comparative Statistics for Various Greenhouse Gas Emission-related Variables

1 September 1999

Emissions include CO₂, CH₄, N₂O, HFCs, PFCs, and SF₆ except where noted.

Emissions exclude Land-Use Change and Forestry

(Countries ordered based on unindexed 1995 data)

Emissions per Capita

Country	1990 1995 1996 1997				Index 1992=100				
	1990	1995	1996	1997	1993	1994	1995	1996	1997
Switzerland	2.1	2.0	2.0	-	96	94	95	95	-
Sweden	2.1	2.1	2.2	-	99	102	100	108	-
Latvia	3.6	2.1	2.0	-	88	77	79	75	-
France	2.7	2.6	2.6	-	95	94	95	97	-
Austria	2.7	2.7	2.7	-	98	97	102	103	-
Slovakia	3.8	2.8	2.8	-	95	88	91	93	-
Greece	2.8	2.9	3.0	-	100	102	104	106	-
Japan	2.7	2.9	-	-	99	104	106	-	-
United Kingdom	3.6	3.2	3.3	-	97	95	94	96	-
Norway	3.5	3.5	3.7	-	104	107	108	113	-
Germany	4.2	3.6	3.6	-	98	97	95	97	-
Belgium	3.8	3.9	4.1	-	99	102	102	107	-
Czech Republic	5.1	4.0	4.1	-	96	92	92	94	-
Denmark	3.8	4.1	4.8	-	102	106	101	117	-
Netherlands	4.0	4.1	4.3	-	100	101	104	107	-
Ireland	4.4	4.5	4.5	-	100	102	103	104	-
New Zealand	6.0	5.7	5.7	-	99	97	96	97	-
Canada	5.9	6.0	6.1	-	101	102	104	106	-
Australia	6.7	6.6	6.7	-	99	99	100	102	-
United States	6.5	6.6	6.7	6.8	101	102	102	104	105
Mean	4.0	3.8	3.9		98	98	99	101	

- Data not available

Emissions per Dollar of GDP

Country	1990 1995 1996 1997				Index 1992=100				
	1990	1995	1996	1997	1993	1994	1995	1996	1997
Switzerland	0.06	0.06	0.06	-	97	96	96	98	-
Sweden	0.08	0.08	0.08	-	102	102	97	104	-
Norway	0.13	0.11	0.11	-	102	100	97	97	-
Japan	0.11	0.12	-	-	99	104	104	-	-
France	0.13	0.12	0.12	-	96	94	93	94	-
Austria	0.13	0.12	0.12	-	98	96	99	99	-
Denmark	0.15	0.15	0.16	-	101	102	94	107	-
Germany	0.22	0.16	0.16	-	100	96	93	93	-
United Kingdom	0.21	0.18	0.18	-	95	90	86	87	-
Belgium	0.20	0.19	0.20	-	101	102	100	104	-
Netherlands	0.21	0.21	0.21	-	101	99	100	101	-
United States	0.30	0.27	0.28	0.27	100	98	97	98	95
Ireland	0.34	0.27	0.26	-	97	93	85	80	-
Canada	0.28	0.29	0.29	-	100	99	99	101	-
Australia	0.39	0.35	0.35	-	96	92	91	90	-
New Zealand	0.45	0.40	0.40	-	94	89	86	86	-
Czech Republic	-	-	-	-	-	-	-	-	-
Greece	0.35	-	-	-	102	102	-	-	-
Latvia	-	-	-	-	-	-	-	-	-
Slovakia	-	-	-	-	-	-	-	-	-
Mean	0.22	0.19	0.20		99	97	95	96	

- Data not available

* 1990 real dollars, unadjusted for purchasing power parity

Emissions per Unit of Primary Energy Consumption

(MMTCE/EJ)

Country	1990	1995	1996	1997
Sweden	8.7	8.3	9.4	-
Norway	10.0	9.4	9.7	-
Switzerland	13.2	13.0	12.8	-
Canada	15.8	15.9	15.9	-
France	18.1	16.7	16.5	-
Belgium	18.5	17.8	17.2	-
Austria	19.2	18.1	18.1	-
Netherlands	18.6	18.4	18.5	-
Japan	19.4	18.7	-	-
Slovakia	-	19.4	19.1	-
United States	20.5	20.1	20.1	20.3
United Kingdom	23.1	21.0	20.8	-
Germany	23.6	21.7	22.3	-
New Zealand	28.4	23.9	26.9	-
Czech Republic	-	24.3	23.5	-
Denmark	25.3	26.1	34.7	-
Greece	28.9	28.9	27.9	-
Latvia	-	29.3	26.8	-
Australia	32.3	30.4	31.3	-
Ireland	44.1	38.0	37.0	-
Mean	21.6	21.0	21.5	

- Data not available

Index 1992=100

1993	1994	1995	1996	1997
100	104	95	107	-
104	108	105	109	-
98	97	101	98	-
99	99	101	101	-
96	97	96	95	-
99	100	99	96	-
95	96	99	99	-
99	101	101	102	-
98	99	98	-	-
-	-	-	-	-
100	100	99	99	100
94	93	92	92	-
98	98	95	98	-
97	92	84	95	-
-	-	-	-	-
98	103	96	127	-
96	96	98	95	-
120	112	102	93	-
98	98	97	100	-
98	97	92	90	-
99	100	97	100	

Emissions per Unit of Land Area

(MMTCE/km²)

Country	1990	1995	1996	1997
Australia	15	15	16	-
Canada	18	19	20	-
Sweden	43	44	48	-
Norway	49	50	52	-
New Zealand	74	74	76	-
Latvia	157	84	79	-
United States	179	189	195	198
Ireland	225	234	236	-
Greece	222	237	243	-
Austria	254	259	263	-
France	276	272	279	-
Slovakia	412	308	313	-
Switzerland	366	360	364	-
Denmark	465	512	602	-
Czech Republic	681	535	544	-
United Kingdom	854	784	808	-
Germany	945	839	853	-
Japan	884	978	-	-
Belgium	1,148	1,199	1,255	-
Netherlands	1,742	1,880	1,950	-
Mean	450	444	431	

- Data not available

Index 1992=100

1993	1994	1995	1996	1997
100	101	104	106	-
102	105	108	111	-
100	103	102	111	-
104	109	109	115	-
100	99	99	102	-
86	75	75	70	-
102	104	105	108	110
100	103	104	105	-
101	103	106	108	-
99	99	104	106	-
95	95	96	99	-
95	89	92	94	-
97	96	97	98	-
102	106	102	120	-
96	92	92	94	-
97	96	95	98	-
99	98	97	98	-
99	105	106	-	-
99	103	103	108	-
101	102	106	110	-
99	99	100	103	

Ratio of Energy-related CO₂ Emissions to Aggregate GHG Emissions

(Percent) Country	1990	1995	1996	1997	Index 1992=100				
					1993	1994	1995	1996	1997
Latvia	-	48%	54%	-	79	86	95	107	-
New Zealand	40%	49%	42%	-	100	100	114	98	-
Ireland	46%	53%	54%	-	101	101	108	110	-
France	68%	65%	67%	-	99	95	97	99	-
Norway	63%	67%	68%	-	94	93	97	98	-
Australia	66%	68%	66%	-	100	100	100	98	-
Austria	77%	74%	75%	-	99	98	95	97	-
Greece	78%	75%	76%	-	104	103	100	101	-
Slovakia	-	77%	76%	-	-	-	-	-	-
Canada	78%	77%	77%	-	99	100	98	97	-
Japan	82%	79%	-	-	98	98	96	-	-
Switzerland	82%	80%	85%	-	100	103	94	100	-
United Kingdom	81%	80%	79%	-	104	103	102	101	-
Germany	81%	80%	79%	-	101	100	101	99	-
United States	83%	82%	82%	82%	100	100	100	100	100
Czech Republic	-	86%	86%	-	-	-	-	-	-
Denmark	78%	86%	76%	-	95	99	109	97	-
Belgium	90%	88%	89%	-	99	98	99	99	-
Sweden	83%	92%	88%	-	102	100	113	107	-
Netherlands	101%	94%	94%	-	97	96	93	93	-
Mean	75%	75%	74%		98	98	101	100	

- Data not available

**Carbon Intensity of Primary Energy Consumption
(Energy-related CO₂ Emissions Only)**

(MMTCE/EJ) Country	1990	1995	1996	1997	Index 1992=100				
					1993	1994	1995	1996	1997
Norway	6.3	6.3	6.6	6.7	98	101	101	107	108
Sweden	7.2	7.7	8.2	7.4	102	104	107	114	102
Switzerland	10.9	10.4	10.8	10.9	98	99	95	98	100
France	12.3	10.9	11.1	11.0	95	93	93	94	94
New Zealand	11.4	11.7	11.3	12.0	97	92	97	93	99
Canada	12.4	12.2	12.2	12.4	98	99	99	99	100
Austria	14.7	13.4	13.7	13.7	95	94	93	95	96
Latvia	-	14.1	14.6	15.3	95	97	96	99	105
Japan	15.9	14.8	14.9	14.7	96	98	94	-	-
Slovakia	-	14.9	14.5	14.4	-	-	-	-	-
Belgium	16.7	15.7	15.3	15.1	98	98	98	95	94
United States	17.0	16.5	16.5	16.7	100	99	98	99	100
United Kingdom	18.7	16.8	16.4	16.4	97	96	95	93	93
Netherlands	18.8	17.3	17.4	17.5	96	96	94	95	96
Germany	19.1	17.4	17.5	17.4	99	97	96	96	96
Ireland	20.1	20.0	19.8	19.8	99	99	100	99	99
Australia	21.2	20.7	20.7	21.0	98	98	97	97	99
Czech Republic	-	20.8	20.3	20.5	-	-	-	-	-
Greece	22.5	21.7	21.3	21.3	100	100	98	96	96
Denmark	19.8	22.5	26.5	21.2	93	103	105	124	99
Mean	15.6	15.3	15.5	15.3	97	98	97	100	98

- Data not available

**Carbon Intensity of Economy
(Energy-related CO₂ Emissions Only)**

Country	(MMTCE/\$B GDP)*				Index 1992=100				
	1990	1995	1996	1997	1993	1994	1995	1996	1997
Switzerland	0.05	0.05	0.05	0.05	97	99	91	98	99
Sweden	0.06	0.07	0.07	0.06	104	102	110	111	95
Norway	0.08	0.07	0.08	0.08	96	94	94	96	96
France	0.09	0.08	0.08	0.08	96	89	90	93	91
Austria	0.10	0.09	0.09	0.09	98	94	94	96	95
Japan	0.09	0.09	0.09	0.09	97	102	99	99	96
Denmark	0.12	0.12	0.13	0.12	95	101	103	104	101
Germany	0.18	0.13	0.13	0.13	101	96	94	92	90
Ireland	0.16	0.14	0.14	0.13	98	94	92	87	83
United Kingdom	0.17	0.14	0.14	0.14	98	93	89	88	86
Belgium	0.18	0.17	0.17	0.17	99	100	99	103	100
Netherlands	0.21	0.19	0.19	0.19	97	95	94	94	93
New Zealand	0.18	0.20	0.17	0.17	94	89	99	85	86
Canada	0.22	0.22	0.22	0.22	99	99	97	98	97
United States	0.245	0.225	0.227	0.221	100	98	97	97	95
Australia	0.26	0.24	0.23	0.25	96	92	91	88	94
Czech Republic	-	-	-	-	-	-	-	-	-
Greece	0.27	-	-	-	106	106	-	-	-
Latvia	-	-	-	-	-	-	-	-	-
Slovakia	-	-	-	-	-	-	-	-	-
Mean	0.16	0.14	0.14	0.14	98	96	96	96	94

- Data not available

* 1990 real dollars, unadjusted for purchasing power parity

Notes:

Emissions data from Japan was only available through the year 1995.

The following countries were missing complete HFC, PFC, and SF₆ emission estimates from their inventory:

Austria, Belgium, Czech Republic, Denmark, Ireland, Latvia, Monaco, Slovakia, Sweden, and Switzerland.

REFERENCES

Emissions Data

Source: UN Framework Convention on Climate Change, FCCC/CP/1998/INF.9, 31 October 1998

<http://www.unfccc.de/resource/docs/cop4/inf09.pdf>

Table 1, page 11

Population Data

Source: U.S. Bureau of the Census, International Data Base, Accessed 8/31/99

<http://www.census.gov/cgi-bin/ipc/idbsprd>

Land Area Data

World Development Indicators 1998, CD-ROM, World Bank

<http://www.worldbank.org/data/databytopic/databytopic.html>

GDP Data

Source: DOE Energy Information Agency, International Energy Annual, accessed 8/31/99

<http://www.eia.doe.gov/emeu/international/other.html>

Primary Energy Consumption Data

Source: DOE Energy Information Agency, International Energy Annual, accessed 8/31/99

<http://www.eia.doe.gov/pub/international/iealf/tablef1.xls>

CO₂ Emissions from Energy Sector Data

Source: DOE Energy Information Agency, International Energy Annual, accessed 8/31/99

<http://www.eia.doe.gov/emeu/international/carbon.html>