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IRELAND'S GREENHOUSE GAS EMISSIONS IN 2006

Summary

The EPA has submitted the latest estimates of greenhouse gases up to 2006 to the European Commission in accordance with reporting obligations for Member States. Following normal practice, the estimates include revision as appropriate of previously published estimates, taking account of *inter alia,* revised energy balance data recently published by Sustainable Energy Ireland (SEI) and peer review recommendations following in-depth review of Ireland's 2006 submissions to the UNFCCC secretariat. This briefing note summarises the status of GHG emissions.

Key features of the 2006 estimates:

Overall

- Total GHG emissions in 2006 were 69.76 million tonnes carbon dioxide equivalent (Mt CO_2eq), which is 0.8 percent lower than the level of emissions in 2005.

Transport

- Transport continues to be the dominant growth sector with emissions at 682,000 tonnes higher in 2006 than in 2005. This represents a 5.2 percent increase on 2005 levels and 165 percent increase on the 1990 transport emissions.

- Road transport accounts for 97 percent of the transport sector emissions.

- The increase in the GHG emissions from the transport sector reflects sustained increases in fuel consumption with petrol usage up 3.4 percent and diesel consumption up 7.9 percent from the previous year.

Energy

- There was a decrease of 746,600 tonnes CO_2eq for energy industries continuing the fluctuating trend in this sector. Emissions were down 4.6 percent on 2005 and 31.6 percent higher than in 1990.

- Some reduction in the use of the Moneypoint station due to improvements taking place at the plant largely account for the decrease in emissions in energy in 2006.

Agriculture

- The emissions from Agriculture decreased by 1.4 percent in 2006, continuing the downward trend from the 1998 peak. Lower sheep and cattle numbers coupled with reduced use of fertiliser resulted in the lower emissions from the agriculture sector.

Residential

- Emissions in 2006 decreased by 94,500 tonnes CO_2 eq or 1.3 percent from the 2005 level.

Kyoto Protocol

- Ireland's target in relation to the Kyoto Protocol is to limit emissions to 13 percent above the baseline estimate in the period 2008-2012. Based on the latest inventory figures, Ireland's emissions in 2006 were 25.5 percent higher than the baseline estimate that underlies Ireland's allowable emissions for the period 2008-2012, as agreed in the peer review of Ireland's 2006 submission to the UNFCCC.

Introduction

The Environmental Protection Agency is responsible for compiling the inventories of greenhouse gases (GHG) emissions for Ireland and for reporting the estimates to the EC and UNFCCC. These inventories are compiled on an annual basis using the good practice guidelines established by the Intergovernmental Panel on Climate Change (IPCC). Previously published estimates are revised as appropriate to account for improved methods and revisions in national input data used by the EPA.

The 2006 figures are given below, followed by an account of how these differ from the latest 2005 figures, a discussion of the longer-term trends in GHG emissions and finally a commentary on the significance of the figures in relation to Ireland's commitments in the first commitment period of the Kyoto Protocol.

Ireland's Greenhouse Gas Emissions in 2006

The latest data indicate that emissions of greenhouse gases in Ireland in 2006 were 69.76 million tonnes (Mt) of CO_2 equivalent. Figure 1 shows the contributions from each of the sectors[1] as used for the Governments National Climate Change Strategy.

Agriculture is the single largest contributor to the overall emissions, at 27.7% of the total, followed by *Energy* (power generation & oil refining) at 22.3% and *Transport* at 19.7%. The remaining 30% is made up by the *Residential* sector at 10.4%, *Industry and Commercial* at 17.2%, and *Waste* at 2.6%.

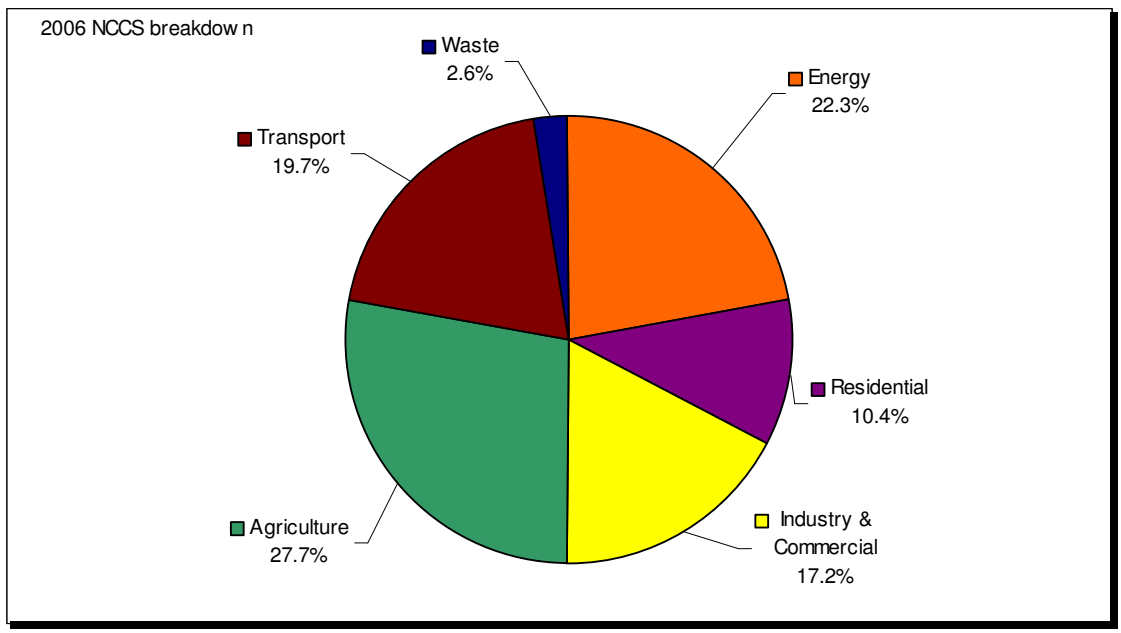

Figure 1. Greenhouse Gas Emissions in 2006 by sector

[1] Using the sector categories as set out in the National Climate Change Strategy (NCCS) sectors

Changes in Emissions from Sectors between 2005 and 2006

Notable changes in 2006 compared to 2005 are:

- *Transport* emissions increased by 5.2 percent from 13.037 Mt CO_2eq in 2005 to 13.719 Mt CO_2eq in 2006. This follows an increase of approximately 6.2 percent in the previous year. Road transport accounts for 97 percent of transport emissions and is the main contributor to the increase in the national total;

- Emissions from *Energy Industries*, principally electricity generation, which continue to fluctuate, decreased from 16.337 Mt CO_2eq in 2005 to 15.590 Mt CO_2eq in 2006, a decrease of 4.6 percent. Lower than normal use of the Moneypoint station due to plant improvements accounts for the bulk of this decrease;

- Emissions from *Industry and Commercial* decreased 1.7 percent from 12.233 Mt CO_2eq in 2005 to 12.023 Mt CO_2eq in 2006 reflecting slight decreases in CO_2 from combustion in industry and commercial sectors;

- Emissions from *Agriculture* decreased by 1.4 percent from 19.581 Mt CO_2eq in 2005 to 19.309 Mt CO_2eq in 2006 continuing the trend from 1999. The decrease reflects lower methane emissions from cattle and sheep as their populations continue to decline and lower nitrous oxide emissions from reduced fertilizer use;

- Emissions from the *Waste* sector, primarily methane gas released from landfills, amounted to 1.831 Mt CO_2eq and showed 3.3 percent increase on the 2005 level. For this source, landfill gas utilisation and on-site flaring are offsetting increases in methane production but the estimates are highly uncertain.

Long-term Changes in Sectoral Emissions 1990 – 2006

The trend in emissions from 1990 to 2006 is shown in Figure 2. Emissions of carbon dioxide (CO_2) from fossil fuel combustion accounted for 64 percent of total greenhouse gas emissions in 2006 compared to 54 percent in 1990. The proportion from *Agriculture*, where methane and nitrous oxide are the relevant greenhouse gases, has fallen from 35.9 percent in 1990 to 27.7 percent in 2006.

Between 1990 and 2006, *Transport* shows the greatest increase at 165 percent. The increase can be attributed to general economic prosperity and increasing population and consequent increasing vehicle numbers as well as the trend towards purchase of larger vehicles and the reliance on private cars, particularly in relation to commuting to and from work. In addition, rapidly increasing road freight transport (i.e. light duty and heavy duty vehicles) has a significant impact on transport emissions and high construction activity is a major influencing factor.

Other sectors showing substantial increases on 1990 are *Energy Industries* at 31.6 percent and *Industry and Commercial* at 22.9 percent respectively, which reflect inter alia increasing demand for electricity and higher industrial activity respectively, in a growing economy.

Emissions from *Agriculture* reached a peak in 1998 and have decreased to below their 1990 level in the last couple of years, reflecting long-term decline in cattle population and in fertiliser use due to the Common Agricultural Policy.

Increased housing stock drove the gradual upward trend in the emissions from the *Residential* sector after 1998 following a sharp reduction in the early 1990s and stabilisation that resulted from fuel switching. The 2006 emissions in this sector are again similar to their 1990 level.

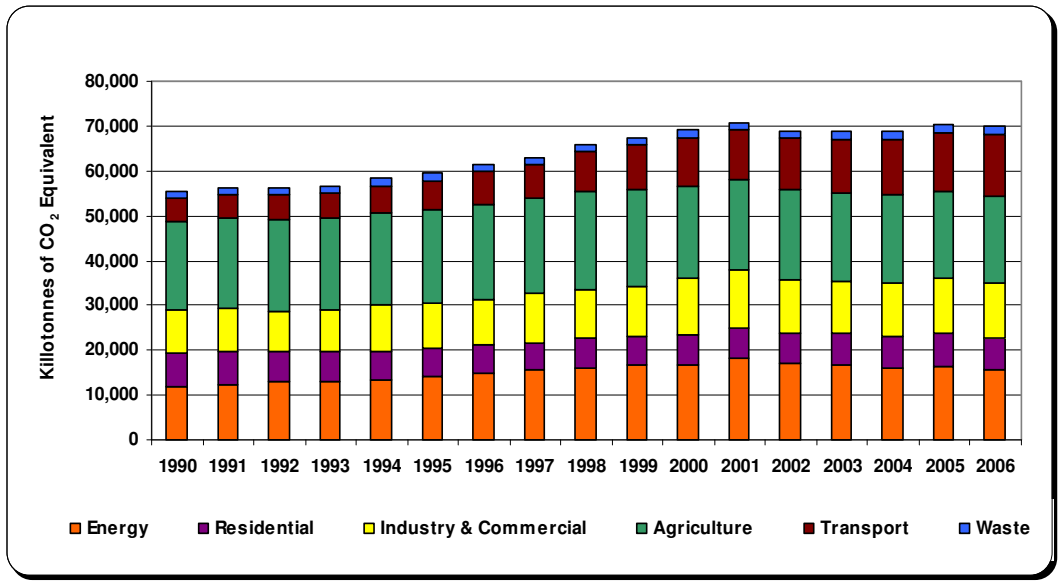

Figure 2. Trends in GHG Emissions by NCCS Sector 1990-2006

Long-term changes in Total GHG emissions relative to baseline estimate

Ireland's target under the Kyoto Protocol is to limit emissions to 13 percent above the *baseline* estimate in the period 2008-2012. The baseline estimate for Ireland is calculated as the sum of carbon dioxide, methane and nitrous oxide emissions in 1990 and the contribution from fluorinated gases in 1995. The baseline value was established and fixed at 55.60 Mt CO_2eq following in-depth review of Ireland's 2006 submissions to the UNFCCC. It determines the total allowable emissions of 314.18 Mt in the period 2008-2012 under the Kyoto Protocol. The percentage increases set out below for the years 2002 through 2006 are determined relative to the baseline of 55.60 Mt CO_2eq.

23.8% in 2002
23.4% in 2003
23.5% in 2004
26.5% in 2005
25.5% in 2006

Figure 3 shows the index of emissions for the period 1990 to 2006 and the 'straight line' path from the baseline to Ireland's Kyoto target, as represented for simplicity by a 13% increase in 2010. (The index is set at 100 for the base year emissions and indices for total emissions in other years are shown relative to 100).

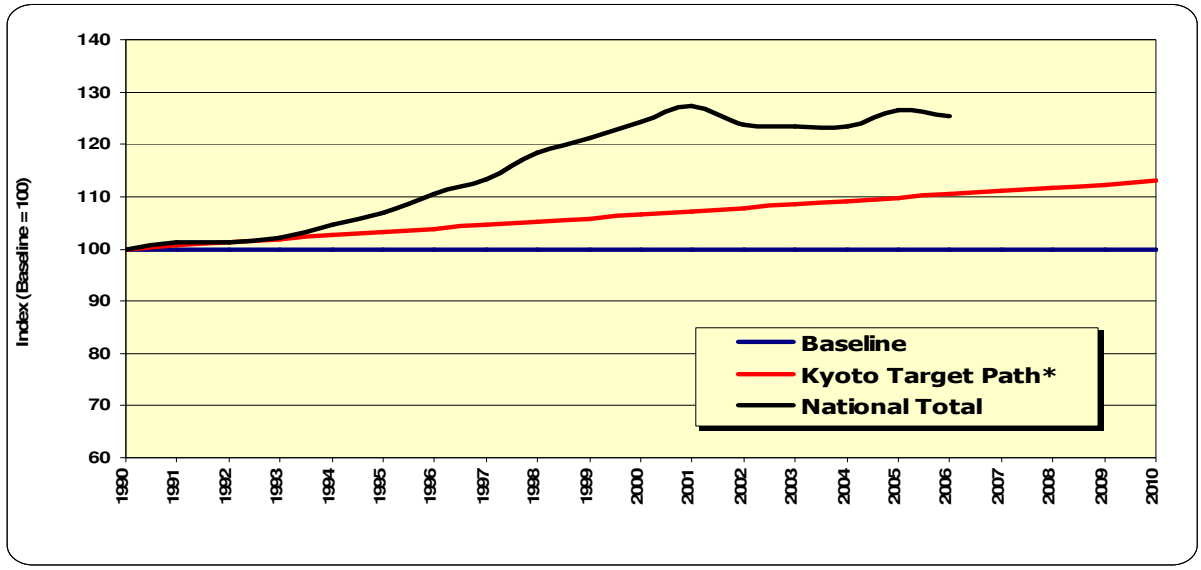

Figure 3. Index of Total GHG Emissions compared to Baseline Level and Kyoto Target Path
*The straight line from baseline in 1990 to 13% above baseline in 2010 represents the Kyoto Target Path

As noted earlier, GHG estimates are subject to constant revision in the annual reporting cycle to take account of new methodological guidance, the outcome of national research, revised information on energy use and improved data from other sectors. This will explain inconsistencies between the percent increases presented here and those reported in previous years. The important points to note are the year on year changes reported in 2007, which are computed using the most up-to-date and accurate information.

Notes:

Units: 1 Mt = 1,000 Kilotonnes

CO_2 Equivalent: greenhouse gases other than CO_2 (i.e. methane, nitrous oxide and so-called F-gases) may be converted to CO_2 equivalent using their global warming potentials.

F-gases: These gases comprise the following three families, HFCs (Hydroflurocarbons), PFCs (Perfluorcarbons) and SF_6 (Sulphur Hexafluoride). They are much more potent than the naturally occurring GHGs (carbon dioxide, methane and nitrous oxide).

National Climate Change Strategy Sectors: The Government Strategy to combat Climate Change uses the following six sectors for analysis:

1. Energy (electricity generation and oil refining)
2. Residential (combustion for domestic heating)
3. Industry and Commercial (combustion emissions from industrial and commercial activities, industrial process emissions, f-gas emissions),
4. Agriculture (ruminant digestion, agricultural soils and manures)
5. Transport (road, rail, navigation and domestic air transport)
6. Waste (solid waste disposal, wastewater treatment)

Table 1. Emissions by National Climate Change Strategy Sectors (kilotonnes CO_2 Eq)

1990-2006_Submission 2008 (kilotonnes CO_2eq)

	Energy	Residential	Industry & Commercial	Agriculture	Transport	Waste	Total
1990	11,846.36	7,350.38	9,781.86	19,917.73	5,168.23	1,461.00	55,525.56
1991	12,342.21	7,427.31	9,657.92	20,065.90	5,373.65	1,496.02	56,363.01
1992	13,032.65	6,592.07	9,209.67	20,138.92	5,824.70	1,541.30	56,339.30
1993	13,058.34	6,553.89	9,423.80	20,326.72	5,791.57	1,586.91	56,741.22
1994	13,418.29	6,419.67	10,181.62	20,562.13	6,034.36	1,636.52	58,252.58
1995	14,116.49	6,404.02	10,016.59	20,870.98	6,270.94	1,688.56	59,367.58
1996	14,830.82	6,547.95	10,051.54	21,014.91	7,329.20	1,627.23	61,401.65
1997	15,493.83	6,233.26	10,957.57	21,154.29	7,683.37	1,432.27	62,954.59
1998	15,885.78	6,758.15	10,775.91	21,844.83	9,054.55	1,509.40	65,828.63
1999	16,566.40	6,453.69	11,201.63	21,547.92	10,021.40	1,550.34	67,341.38
2000	16,804.65	6,552.01	12,769.88	20,498.04	10,760.40	1,643.43	69,028.42
2001	18,152.89	6,860.54	12,934.86	20,030.60	11,274.04	1,481.77	70,734.70
2002	17,080.13	6,776.50	12,003.74	19,865.27	11,457.75	1,651.90	68,835.28
2003	16,856.21	6,913.64	11,507.90	19,937.89	11,635.66	1,794.90	68,646.20
2004	15,951.10	7,116.57	11,868.54	19,702.21	12,270.47	1,792.08	68,700.97
2005	16,336.76	7,384.41	12,232.28	19,581.20	13,036.90	1,773.52	70,345.06
2006	15,590.15	7,289.87	12,022.90	19,309.07	13,718.94	1,831.42	69,762.35