

# IRELAND'S EMISSIONS OF GREENHOUSE GASES

## – REVISED AND UPDATED FIGURES

February 2006

### SUMMARY

The Environmental Protection Agency (EPA) has compiled revised and updated figures for Ireland's Greenhouse Gas (GHG) emissions. The figures cover the period 1990 – 2004 and remain provisional until March 2006 when they are to be submitted to the secretariat of the United Nations Framework Convention on Climate Change (UNFCCC). The figures take account of new methodological guidance, the outcome of recent national research and revised information on energy use.

Key features of the 2004 figures are:

- Following two successive years of reductions there was an increase in overall emissions of GHG in 2004.
- Overall GHG emissions in 2004 were 68.7 million tonnes (Mt).
- This is 0.45% higher than in 2003.
- This reflects, in particular, increases in the following sectors between 2003 and 2004:
  - Emissions from the *transport* sector increased by 6%; this continues a significant long term trend of increased emissions from transport;
  - Emissions from the *residential* sector increased by 7%; this increase follows a number of years when emissions from this sector showed little change;
  - Emissions from the *processes* sector increased by 19.8%; this followed a sharp reduction in the 2002 to 2003 period.
- On the positive side:
  - combustion emissions from *energy industries* (power generation & oil refining) decreased by 2.5 %, due to more efficient plants and some reduction in peat use;
  - there were slight reductions in emissions from the *industry* and *agriculture* sectors.

Ireland's target in relation to the Kyoto Protocol is to limit emissions to 13% above the 1990 level in the period 2008-2012. Based on final revised and updated figures for the full time series from 1990 onwards, Ireland's emissions in 2004 were 23.5% higher than in 1990.

The new figures for 1990 indicate that the total amount of carbon dioxide (CO<sub>2</sub>) equivalent that Ireland will be permitted to release during the 2008 to 2012 period will be 315 Mt (i.e. an average of 63 Mt per annum over the five year period).

## Introduction

The Environmental Protection Agency has the responsibility to compile the inventories of GHG emissions for Ireland. These inventories are compiled on an annual basis using international best practice guidelines established by the Intergovernmental Panel on Climate Change (IPCC). The guidelines on best practice have been revised on occasions and the national figures have been revised accordingly from time to time using the revised guidelines and up to date information. The 2006 submission to UNFCCC must contain the final and definitive estimates for 1990 for the purpose of setting the baseline for compliance with the Kyoto Protocol.

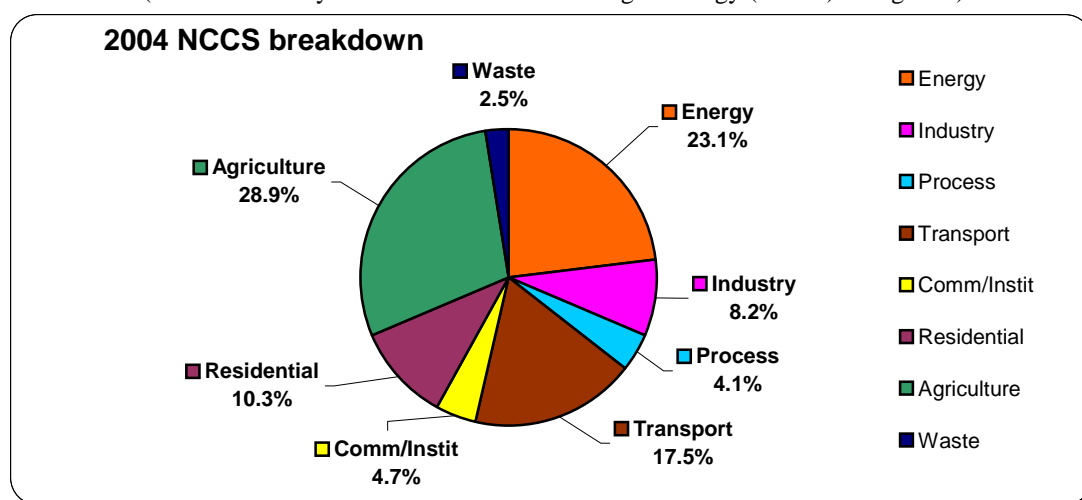
Based on the latest revised IPCC best practice guidelines for GHG inventories, the EPA has prepared the entire time series (1990 – 2004) of emission estimates - employing more detailed methodologies taking on board the findings of a major EPA sponsored research study completed during 2005, and a revised energy balance provided by Sustainable Energy Ireland (SEI). The research work had been one of the key actions assigned to the EPA under the National Climate Change Strategy (NCCS).

The 2004 figures are first outlined, followed by an account of how these differ from 2003 and a discussion of the longer-term trends and finally the significance of the figures in relation to Ireland's commitments under the Kyoto Protocol.

## Ireland's Greenhouse Gas Emissions in 2004

The latest data indicate that emissions of greenhouse gases in Ireland in 2004 were 68.7 million tonnes (Mt) of CO<sub>2</sub> equivalent. Figure 1 shows the contributions from each of the sectors (using the sector categories as set out in the National Climate Change Strategy). *Agriculture* is the single largest contributor to the overall emissions, where emissions of methane and nitrous oxide account for almost 29% of the national total of CO<sub>2</sub> equivalents, followed by *energy* (power generation & oil refining) at just over 23% and *transport* at 17.5%.

**Figure 1: Greenhouse Gas Emissions 2004 by Sector**  
(Broken down by the National Climate Change Strategy (NCCS) Categories)



## Changes in Emissions from Sectors between 2003 and 2004

Key changes in sectors (using the National Climate Change Strategy sector categories) between 2003 and 2004 are summarised below. The amounts are expressed as Mt of CO<sub>2</sub> equivalent and the year on year percentage change is also given.

- Emissions from *agriculture* decreased from 20.07 Mt in 2003 to 19.88 Mt in 2004, a decrease of 193 kilo tonnes (kt) or 0.96 percent, due largely to a slight reduction in emissions of nitrous oxide from fertilizer use.
- Emissions from the *residential* sector increased from 6.61 Mt in 2003 to 7.10 Mt in 2004 (up 7%). This reflects increases in population and housing stock.
- *Transport* emissions increased from 11.85 Mt in 2003 to 12.56 Mt in 2004 (up 6%). This reflects increases in population and road traffic.
- Emissions from the *processes* sector increased from 2.38 Mt in 2003 to 2.85 Mt in 2004 an increase of 0.47 Mt or 19.8 percent. This increase was entirely due to increased emissions from the cement industry.
- Emissions from the *waste* sector were unchanged in 2004 at 1.75 Mt. In all, 90 percent of the emissions in this sector were due to methane gas released from landfill waste disposal sites.
- On the positive side combustion emissions from *energy industries* (power generation & oil refining) decreased from 16.15 Mt in 2003 to 15.75 in 2004, a decrease of 0.40 Mt (2.5 %), due to more efficient plants and some reduction in peat use.

## Long-term Changes in Emissions from Sectors 1990-2004

The emissions from the sectors over the full time series 1990-2004 are set out in Figures 2 and 3. The graphs show the trends and the relative contribution from each sector, broken down by the categories set out in the 2000 National Climate Change Strategy. The figures for the past five years, and 1990, are also given in Table 1 (all figures are in kt). From these, some longer term changes and trends are clear.

The most significant and sustained increase in emissions has been in the *transport* sector. For the sector overall, the emissions are well over double what they were in 1990 (an increase of 143%). This is almost entirely due to road transport and has mainly occurred in the past decade. Between 1994 and 2004 emissions from road transport have more than doubled from 5.66 Mt to 12.13 Mt of CO<sub>2</sub> equivalent.

Emissions from the *energy industries* sector in 2004 were almost 35% above 1990 figures, but a downward trend is evident since 2001.

The process sector includes industrial processes such as cement and lime manufacture. It also includes production of ammonia and nitric acid at the former IFI

plants. Closure of the latter led to a substantial reduction in emissions between 2001 and 2003. However, over the past decade process emissions from clinker production in cement manufacturing trebled from 0.86 Mt to 2.63 Mt of CO<sub>2</sub>.

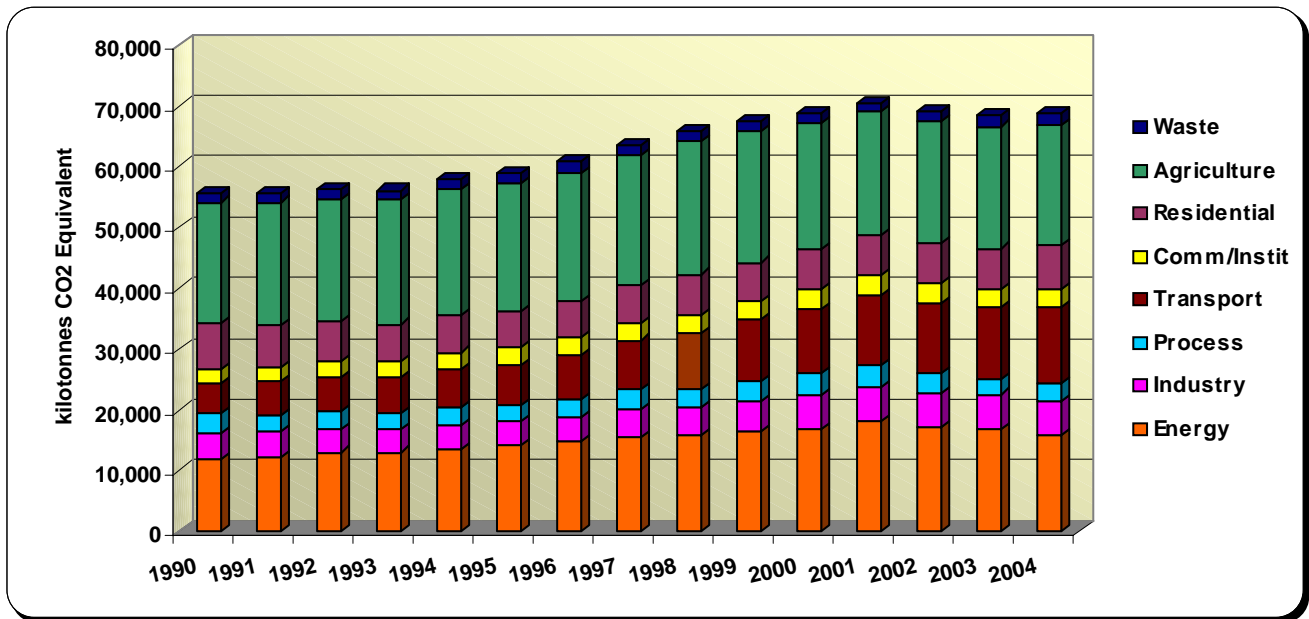


Figure 2: Trends in Greenhouse Gases by Sector

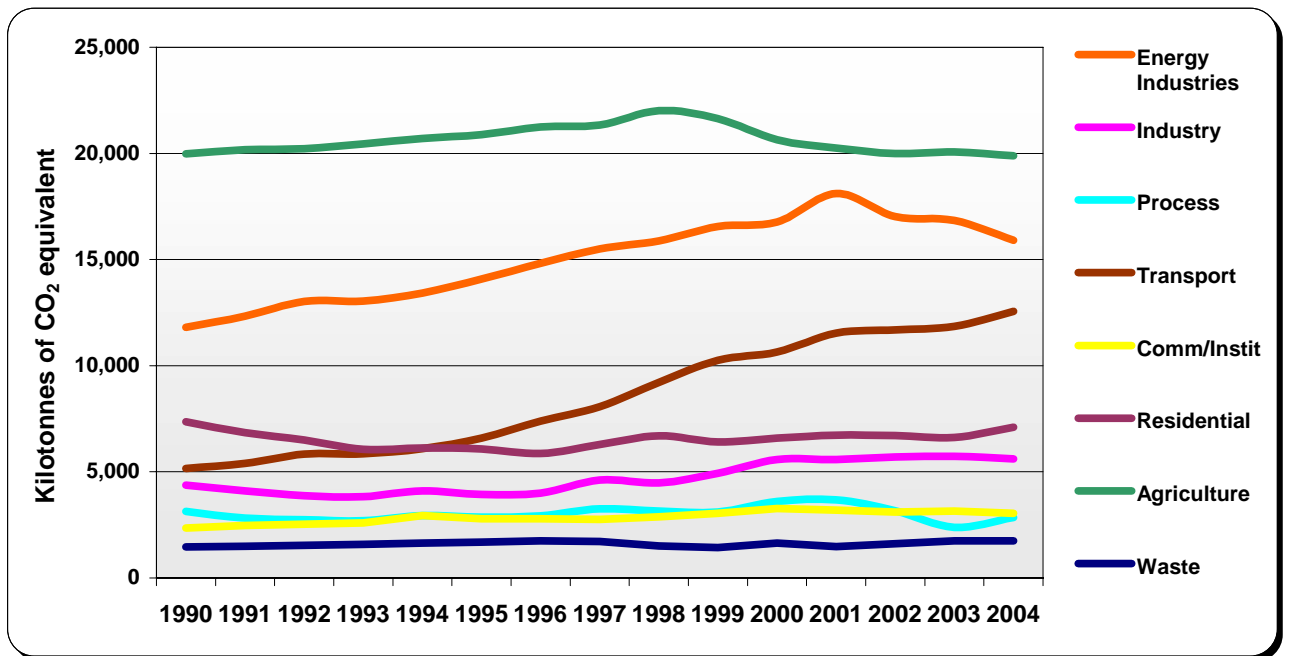


Figure 3: Trends by Sectors

**Table 1: Greenhouse Gas Emissions in 1990 and in recent Years (kt)**

	% share	1990	2000	2001	2002	2003	2004	% share	% change 1990-2004
Energy Industries	21.2	11,805.56	16,767.38	18,113.93	17,030.37	16,847.03	15,903.21	23.1	<b>34.71</b>
Industry	7.9	4,367.35	5,574.80	5,584.33	5,700.99	5,723.08	5,611.66	8.2	<b>28.49</b>
Process	5.6	3,130.24	3,596.41	3,675.82	3,162.92	2,375.04	2,846.40	4.1	<b>-9.07</b>
Transport	9.3	5,159.46	10,639.47	11,530.98	11,678.23	11,850.77	12,557.76	18.3	<b>143.39</b>
Comm/Instit	4.2	2,356.17	3,270.00	3,191.68	3,104.83	3,155.45	3,048.81	4.4	<b>29.4</b>
Residential	13.2	7,355.05	6,588.51	6,723.80	6,705.27	6,614.01	7,099.17	10.3	<b>-3.48</b>
Agriculture	35.9	19,979.05	20,641.17	20,251.89	19,995.81	20,074.26	19,881.12	28.9	<b>-0.49</b>
Waste	2.6	1,460.75	1,650.92	1,477.36	1,606.13	1,750.28	1,749.40	2.5	<b>19.76</b>
<b>Total</b>		<b>55,614</b>	<b>68,729</b>	<b>70,550</b>	<b>68,985</b>	<b>68,390</b>	<b>68,698</b>		

### **Long-term Changes in Total GHG emissions 1990-2004**

The revised figures show that Ireland emitted 55.6 million tonnes (Mt) of GHG in 1990. This is 1.86 Mt higher than previous estimates for that year, due to a number of factors including revised best practice and improved methodologies and data.

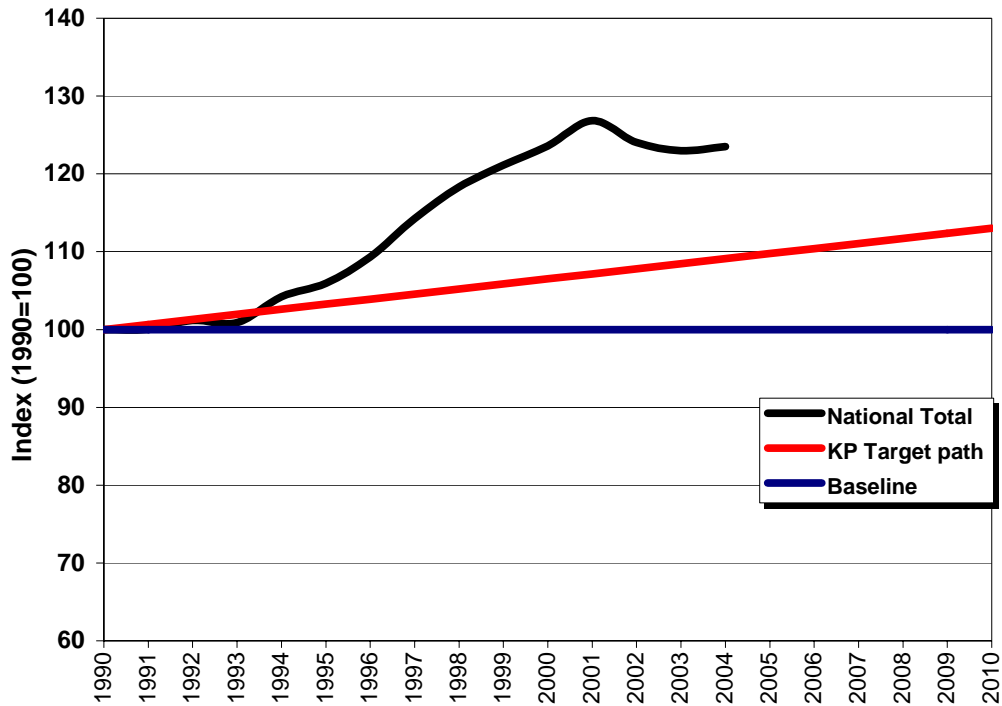
Any change in the base year has a knock-on effect including an effect on the distance from the Kyoto target.

Ireland's target in relation to the Kyoto Protocol is to limit emissions to 13% above the 1990 level in the period 2008-2012. Figure 4 shows the full time series of emissions from 1990 to 2004 and also the 'straight line' path from 1990 to the 2008 – 2012 target. (The figures in this graph are in the form of an index - whereby the 1990 value is set at 100 and other years are shown relative to this).

Based on the new figures for the full time-series, Ireland's emissions in recent years in terms of percentage above the 1990 baseline were:

- 27% in 2001
- 24% in 2002
- 23% in 2003
- 23.5% in 2004

This again shows how the downward trend observed in 2002 and 2003 has not continued with emissions rising slightly in 2004 (see Figure 4).



**Figure 4: Greenhouse Gas emissions trend along with Kyoto Target path**

Based on the revised estimates for the 1990 base year the quantity of greenhouse gases that Ireland is permitted to release during the period 2008 to 2012 (which is called the assigned amount) is 315 million tonnes CO<sub>2</sub> equivalent (i.e. an average of 63 Mt per annum over the five year period).

This information note is prepared in advance of Ireland's National Inventory Report published by the EPA. The report will provide a full and detailed presentation of the revised and updated figures for the 1990 – 2004 period.

## Notes

1 Mt = 1,000 Kilotonnes

CO<sub>2</sub> Equivalent: CO<sub>2</sub> is the main greenhouse gas. Emissions of other greenhouse gases are converted to CO<sub>2</sub> equivalent on the basis of their global warming potential (GWP). For example, the GWP of methane is 21, which means that one tonne of methane is equivalent to 21 tonnes of CO<sub>2</sub>.

National Climate Change Strategy: The Government Strategy from 2000 to combat Climate Change divides the sectors emitting greenhouse gases into eight categories: Transport, Commercial/Institutional (combustion emissions from hospitals, universities, shopping centres, public buildings, businesses and schools), Process (cement, lime, ammonia and nitric acid process emissions only), Energy (power generation), Industry (combustion emissions from industry), Agriculture (ruminant digestion, agricultural soils and manures), Waste (decomposition of waste), and Residential.