

# Non-CO<sub>2</sub> Greenhouse Gas Emissions Reduction in the UK

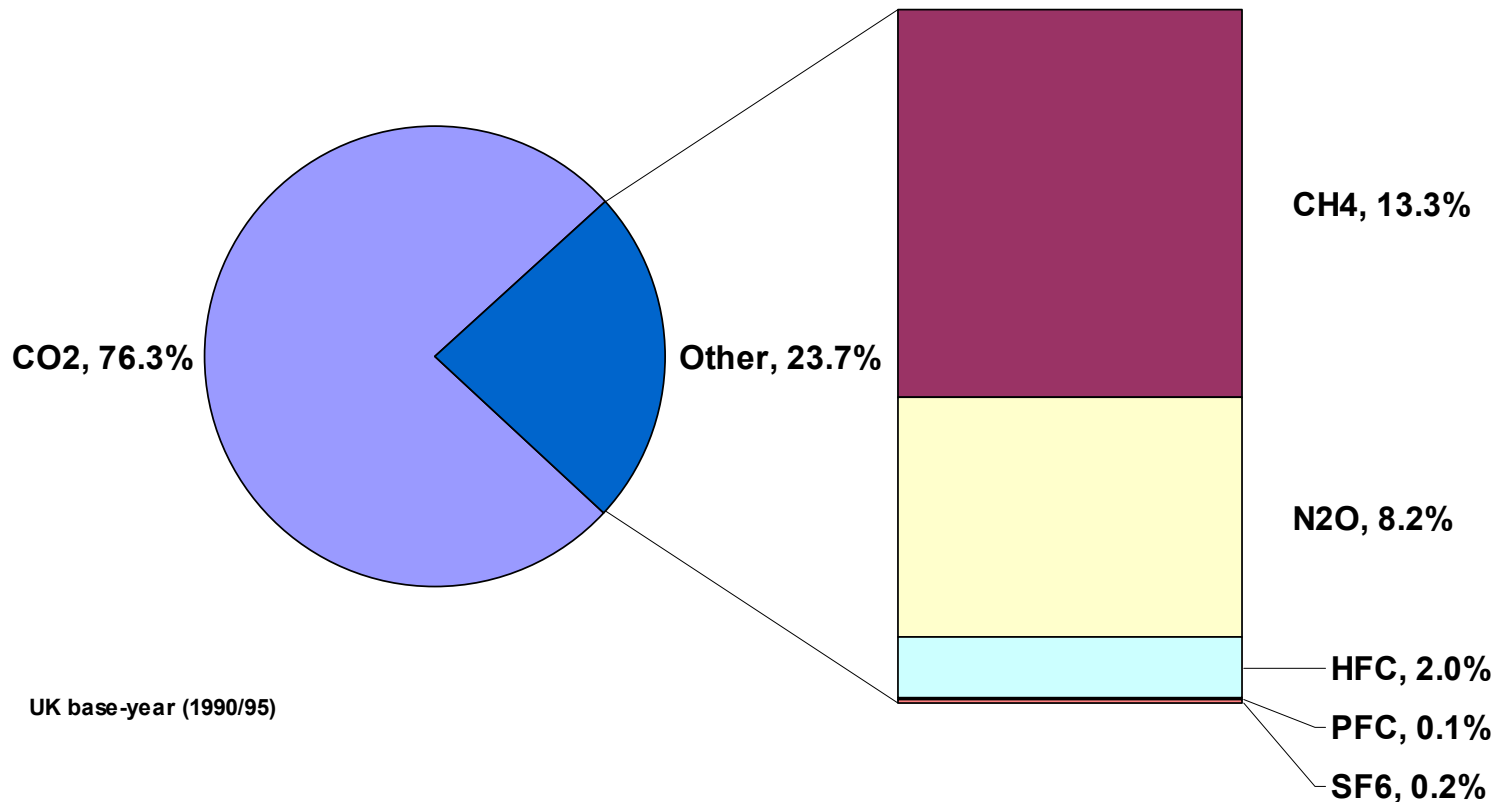
Stephen Cornelius

In-session workshop on  
**Non-CO<sub>2</sub> emissions, including methane recovery and utilisation**  
SBSTA 27, 7 December 2007

# Overview

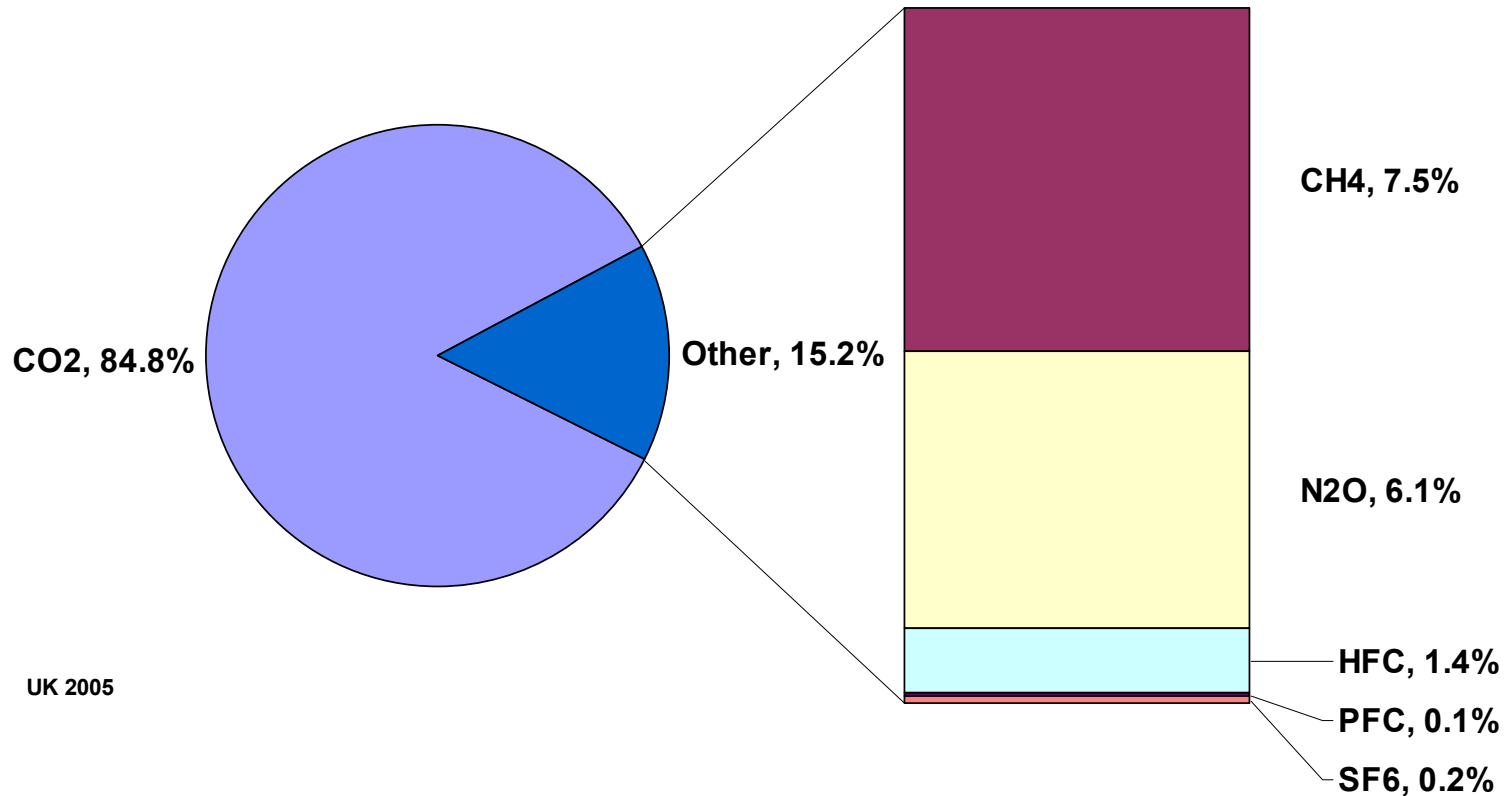
- UK greenhouse gas emissions
  - Breakdown
  - Trends and projections of non-CO<sub>2</sub> GHG emissions
- Non-CO<sub>2</sub> GHG abatement cost curves
- UK policy response
- Case Studies
  - Landfill methane
  - Nitrous oxide from industrial processes
- Experiences and messages

# Breakdown of UK greenhouse gas emissions



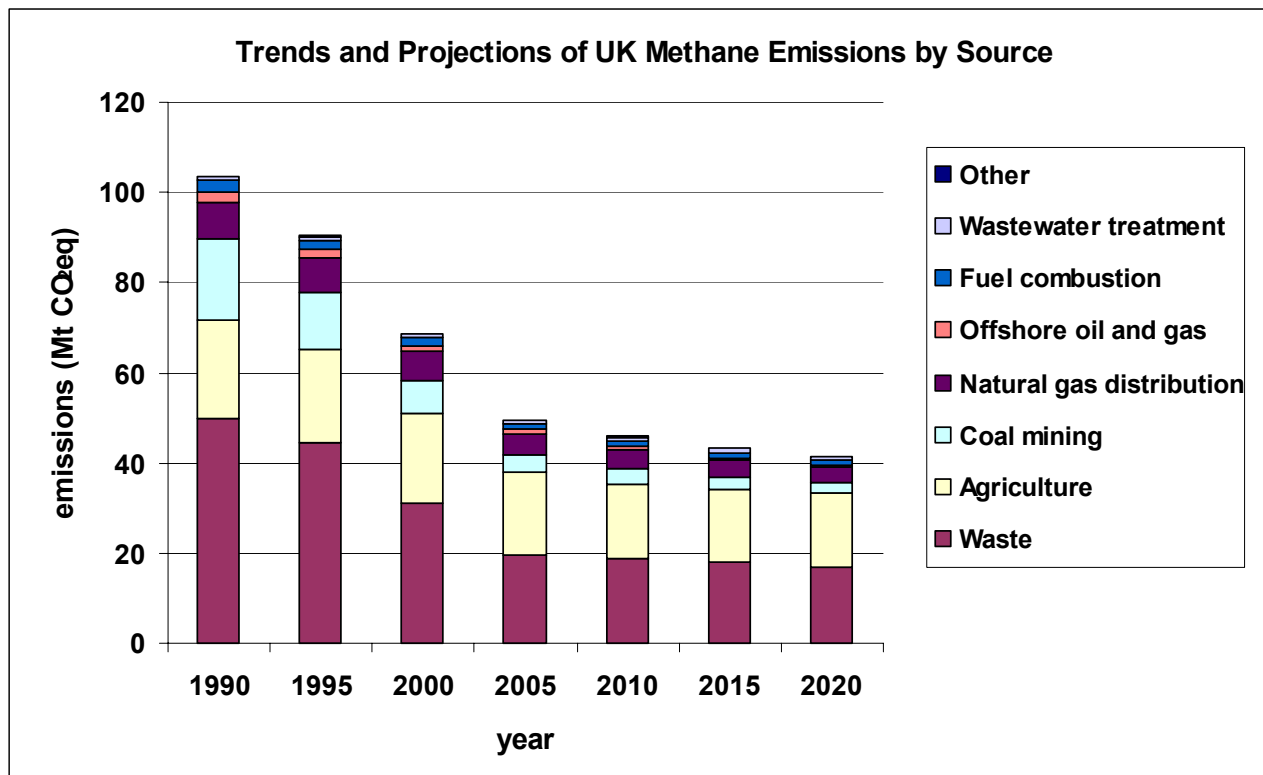
- Non-CO<sub>2</sub> GHG were 23.7% of UK GHG emissions in the Kyoto Protocol base-year

# Breakdown of UK greenhouse gas emissions



- Large reductions to 2005 mean non-CO<sub>2</sub> has declined as a proportion of UK GHG emissions

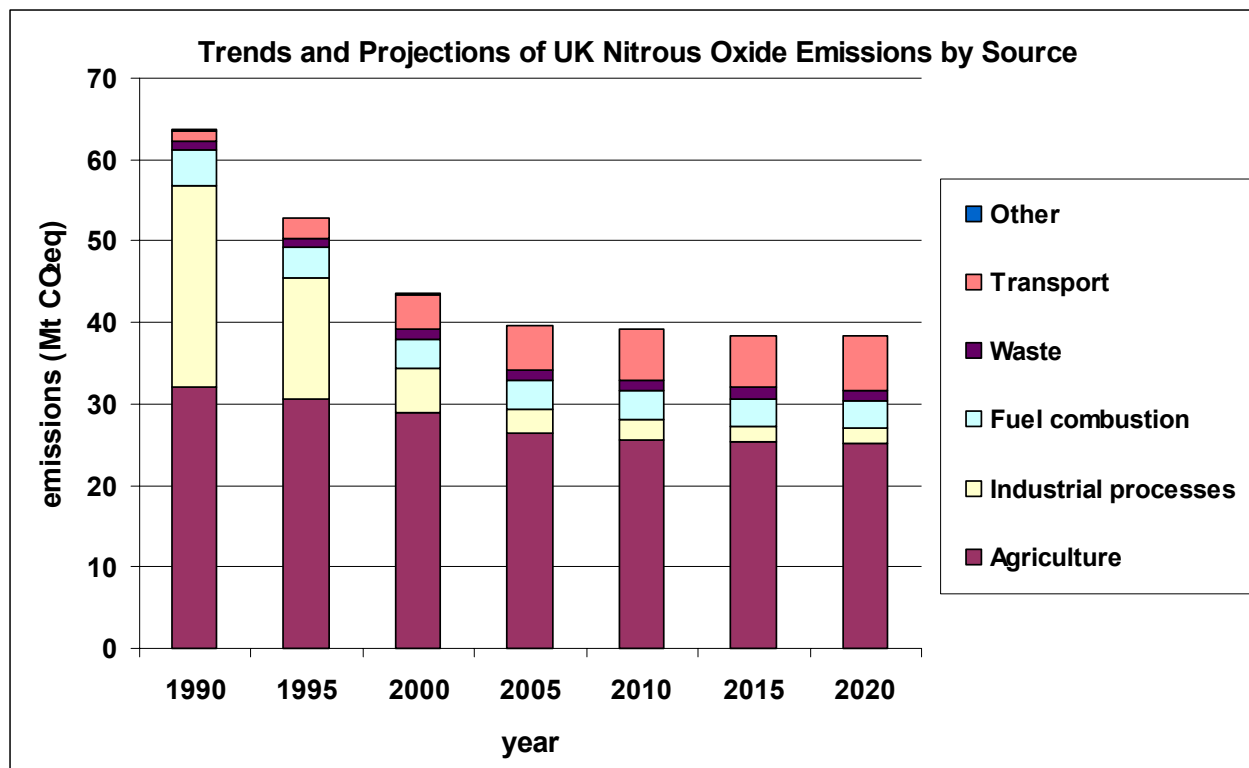
# Methane trends and projections



year	change from 1990 levels
1995	-12.9%
2000	-33.8%
<b>2005</b>	<b>-52.2%</b>
2010	-55.8%
2015	-58.2%
2020	-60.0%

- Methane emissions have been cut by more than half since 1990

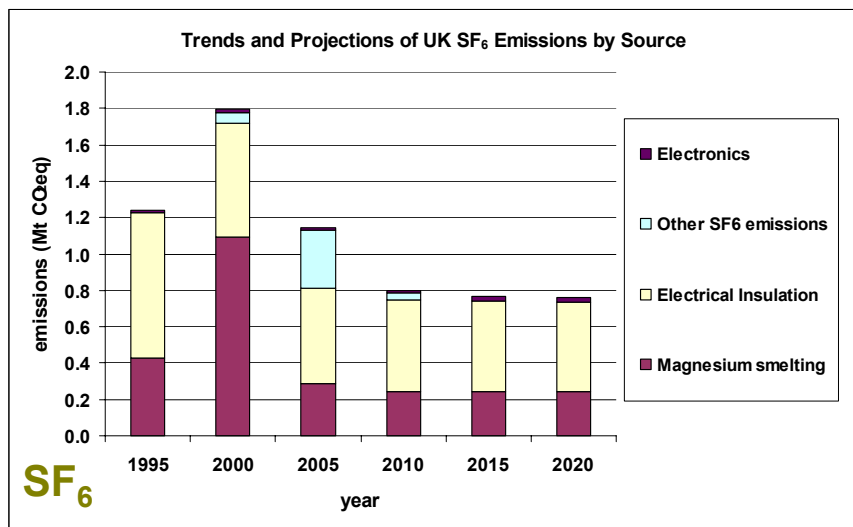
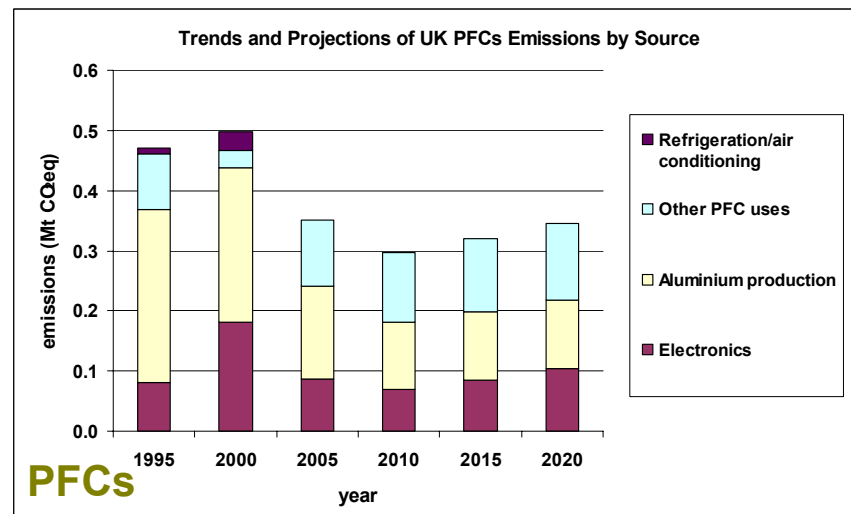
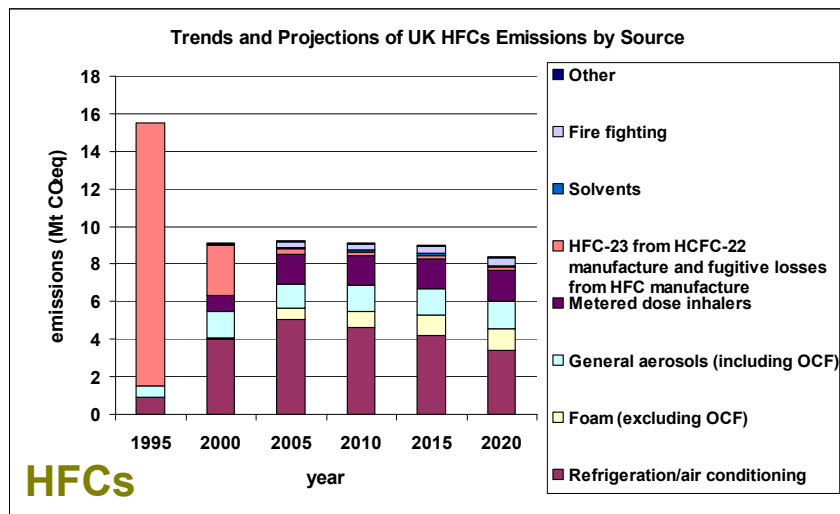
# Nitrous oxide trends and projections



year	change from 1990 levels
1995	-17.0%
2000	-31.6%
<b>2005</b>	<b>-37.7%</b>
2010	-38.4%
2015	-39.7%
2020	-39.8%

- Nitrous oxide emissions are down well over one third of 1990 levels

# Fluorinated gases trends and projections



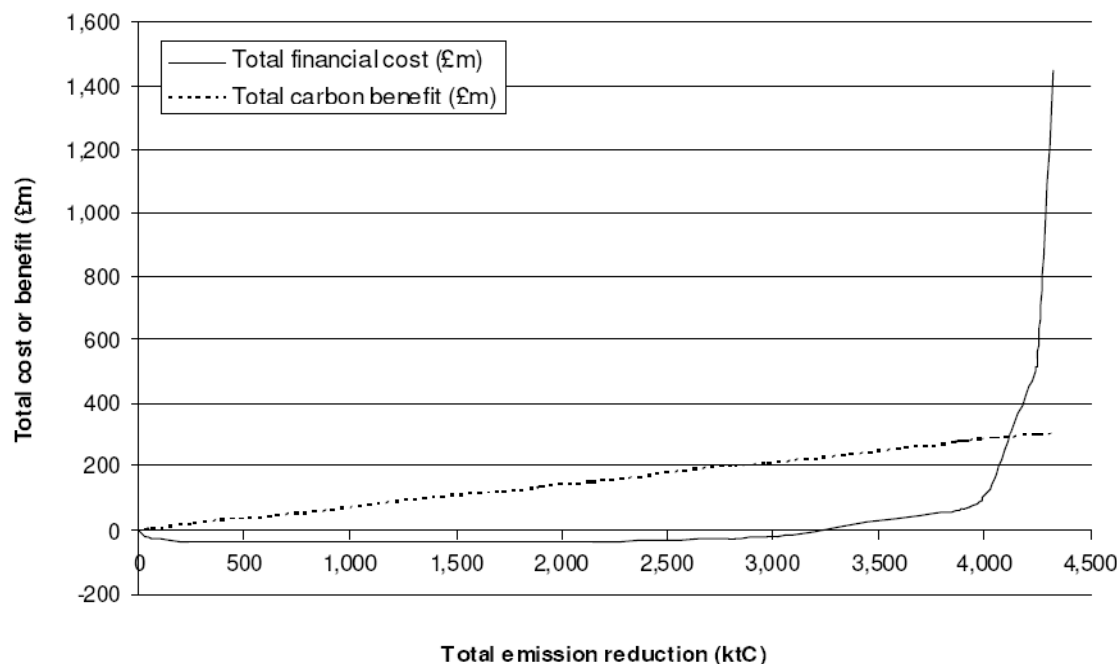
year	change from 1995 levels
2000	-33.7%
2005	-37.7%
2010	-40.7%
2015	-41.5%
2020	-44.8%

- HFCs provide the largest contribution to reduction in F-gases on 1995 levels

# Cost of non-CO<sub>2</sub> GHG abatement

- UK has developed cost curves for non-CO<sub>2</sub> GHGs
- Demonstrates that there is much cost-effective potential then a steep rise in costs

Figure 4.2 Comparison of Potential Costs and Benefits of Identified Measures in 2010  
Assuming a Cost of Carbon of £70/tC (excludes least cost-effective measures)



From: Updating of  
Non-CO<sub>2</sub>  
Greenhouse Gas  
Emissions  
Projections for the  
UK (2006)



# UK Policy response

- Instruments include statutory guidance, fiscal, voluntary action, guidelines, regulation
- Climate Change Programme (revised in 2006) includes
  - UK emissions trading scheme/IPPC
  - Implementation of the Landfill directive
  - Replacement of gas distribution infrastructure
  - Research on agricultural emissions
- Fuel switching in the energy supply industry led to a substantial reduction in methane emissions from coal production

year	emissions (Mt CO <sub>2</sub> eq)	change from base- year
base-year	184.5	-
1995	160.4	-13.1%
2000	123.5	-33.1%
<b>2005</b>	<b>99.9</b>	<b>-45.9%</b>
2010	95.2	-48.4%
2015	91.8	-50.3%
2020	89.2	-51.6%

# Case study: Land-fill methane

- Methane from waste declined 60.8% between 1990 and 2005
- The main drivers were:
  - Diversion of biodegradable waste from landfill
  - Increased collection of landfill gas for energy recovery and environmental control
- 4,425 GWh of power produced from landfill gas engines in the UK
- In 2006 landfill gas represented 33.1% of all sources of renewable energy in the UK



# Case-study: N<sub>2</sub>O from industrial processes

- N<sub>2</sub>O from industrial processes declined 88.6% between 1990 and 2005
- Large reduction in N<sub>2</sub>O from adipic acid manufacture driven by:
  - UK Emissions Trading Scheme
  - Regulation – Pollution Prevention and Control
- Further reductions in N<sub>2</sub>O from nitric acid production to be achieved through EU Emissions Trading Scheme in future phases

# Experiences and messages

- Non-CO<sub>2</sub> GHG emissions reductions are due to:
  - Actions directed at GHG reduction
  - Co-benefits from other policies
- Deep cuts can be made in non-CO<sub>2</sub> GHG emissions:
  - Much abatement is cost-effective
  - Rising abatement costs will increase the focus on CO<sub>2</sub>
- Historically in the UK it has been easier to reduce non-CO<sub>2</sub> GHG emissions than CO<sub>2</sub>
  - Non-CO<sub>2</sub> GHG emissions fell 45.9% between the Kyoto Protocol base-year and 2005 while CO<sub>2</sub> has declined by 6.4%
- We need to keep up pressure across all sectors and all gases to achieve the necessary deep cuts in GHG emissions