

# **The use of climate change statistics to inform national policy on mitigation: UK climate change programme**

Martin Nesbit

Director for Evidence

Climate Change Group

UK Department for Environment, Food and Rural Affairs

# Overview

- UK policy on emissions is set out in a comprehensive **Climate Change Programme**. Current **legislation** before Parliament sets out new high-level process for managing UK emissions.
- UK **inventory methods are robust**, and comply with IPCC guidance. **Political focus**, and **high profile targets**, put the data and targets under **intense political scrutiny**.
- Policy makers need a **clear understanding of the basis** of inventory and other data; and need to promote informed public debate. Particular issues include:
  - Treatment of emissions from **international aviation**
  - Embedded emissions from **net UK imports** of carbon-intensive goods
  - Potential in some sectors (e.g. **agriculture**) for policies aimed at reducing inventory record of GHG emissions to be counter-productive
- Understanding of data requirements relating to the **economic impacts** of mitigation options needs to be improved.

# Climate Change Programme: UK progress – greenhouse gases



- UK's Kyoto Protocol target is to reduce its greenhouse gas emissions to 12.5% below base year levels by 2008-12
- UK greenhouse gas emissions were 16.4% below 1990 levels in 2006 or 20.7% below when the impact of the EU ETS is taken into account
- Projected to be more than 23% below 1990 levels by 2010, including the impact of the EU ETS

# Key elements of the Climate Change Bill

## Targets

Long and medium term targets: CO2 emission reductions of at least 60% by 2050 and by at least 26% by 2020, through action in the UK and abroad

## Budgets and accountability

Five-year carbon budgets to set out our trajectory, backed by annual progress reporting to Parliament

## Committee on Climate Change

New independent body to advise Government on carbon budgets and where least cost savings could be made

## Measures to reduce emissions

Powers to introduce emissions trading schemes more quickly and easily, including new Carbon Reduction Commitment. Biofuels. Waste.

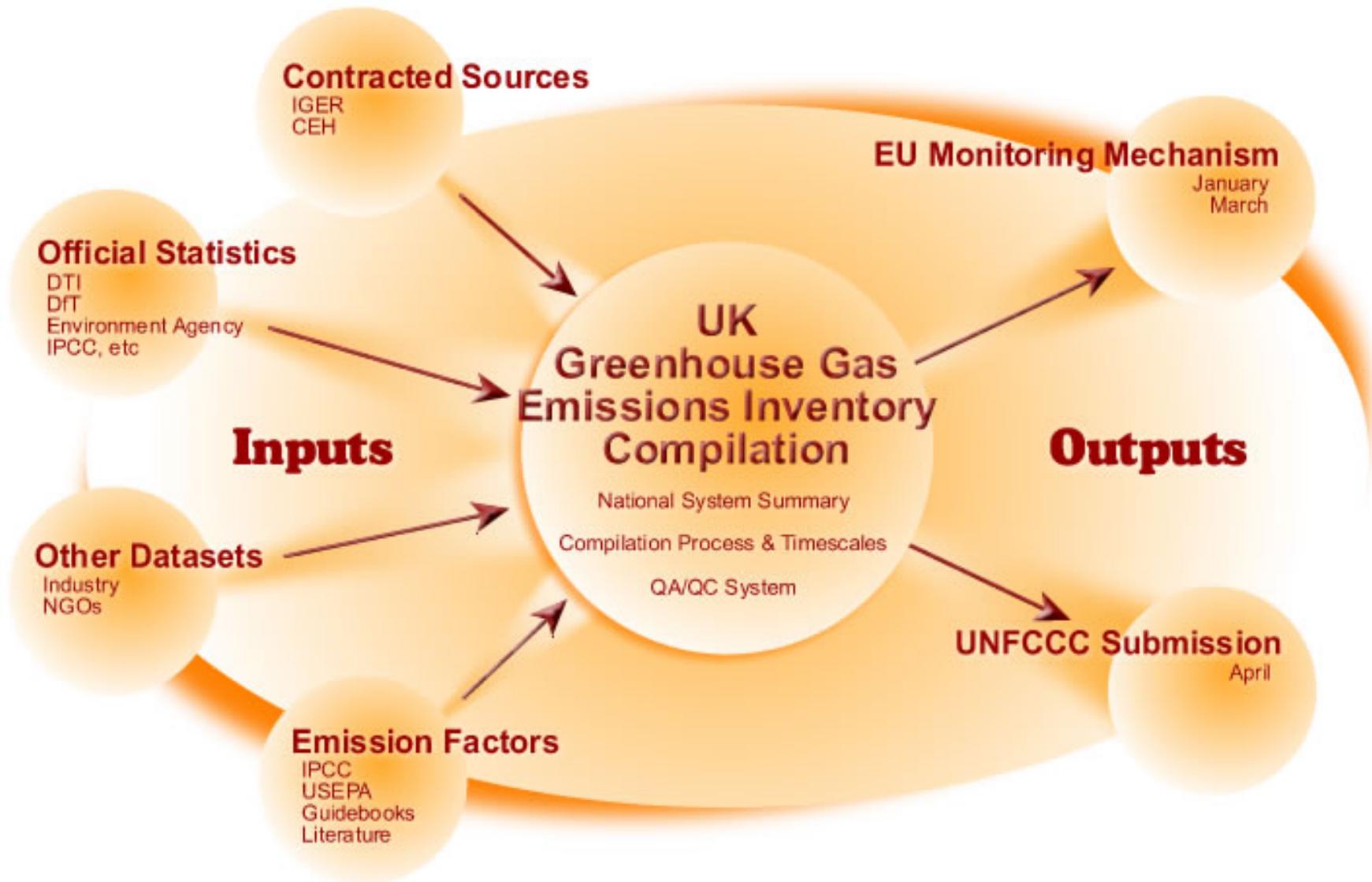
## Adaptation

Government to report at least every five years on climate change risks, and programme to address them

# Statistical approach

- Inventory consistent with IPCC guidance, an international requirement
- Basic methodology uses (activity x emissions factor) calculation
- Reviewed annually by international team coordinated by UNFCCC
- Uncertainties fully quantified, using internationally agreed methods
- Valid (and obligatory) choices raise some political issues:
  - Emissions **within national boundary** included in national total
  - **international aviation and shipping** reported but not included – consistent with international agreement

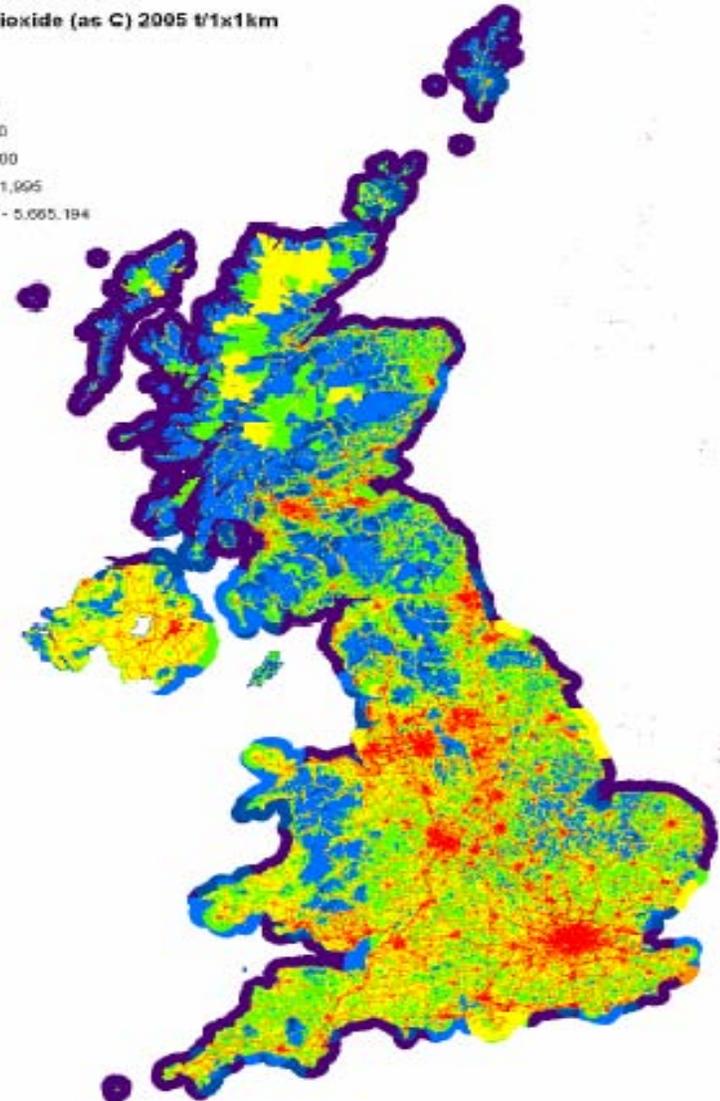
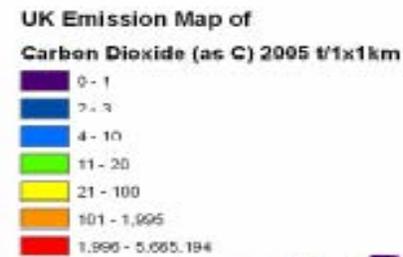
# Preparation and use of UK inventory





# Example map

UK emissions of  
carbon dioxide in  
2005



Source : AEA Report for Defra

# Quality of statistical evidence

Inventory seems robust

- Over 80% of inventory based on fossil fuel statistics – national and international checks apply, energy balance checked and emission factors reviewed annually
- Other categories – transparent estimates based on published statistics wherever available. Inventory agency applies consistency checks from year to year.

But interested in other NSO experiences – eg with outlier detection or other methods to check data quality.

However, some issues raised by a recent [National Audit Office report](#) on the **use** of our data in policy-making. In particular:

- Should policy take greater account of consumption-based emissions?
- Should progress against emissions targets be calculated with reference to the purchase of emissions reductions in other economies, through emissions trading?

And debate on the current Climate Change Bill has drawn attention to the issue of whether to include international aviation and maritime emissions in the total to which targets apply.

## Policy issues:

### i) Aviation & shipping emissions



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- Emissions estimated from consumption of fuel by domestic *and* international aviation and shipping
- Only domestic estimates included in the national total. International aviation and shipping emissions reported but not included in national total.
- This follows international agreements, but omission from the national total is consistently raised as a gap by UK stakeholders
- Government target has always explicitly excluded international aviation and shipping in formal documentation – but this has not always been made clear in political discourse.
- Domestic/international issue is mainly political rather than statistical; but brings statistics into controversial political territory.
- Allocation between domestic and international can be tricky and statisticians may be able to help develop methods.
- Political issue facilitated by inclusion within EU Emissions Trading Scheme; but data issues potentially complicated, because ETS works on a different basis for allocation.

## Policy issues:

### ii) Embedded emissions



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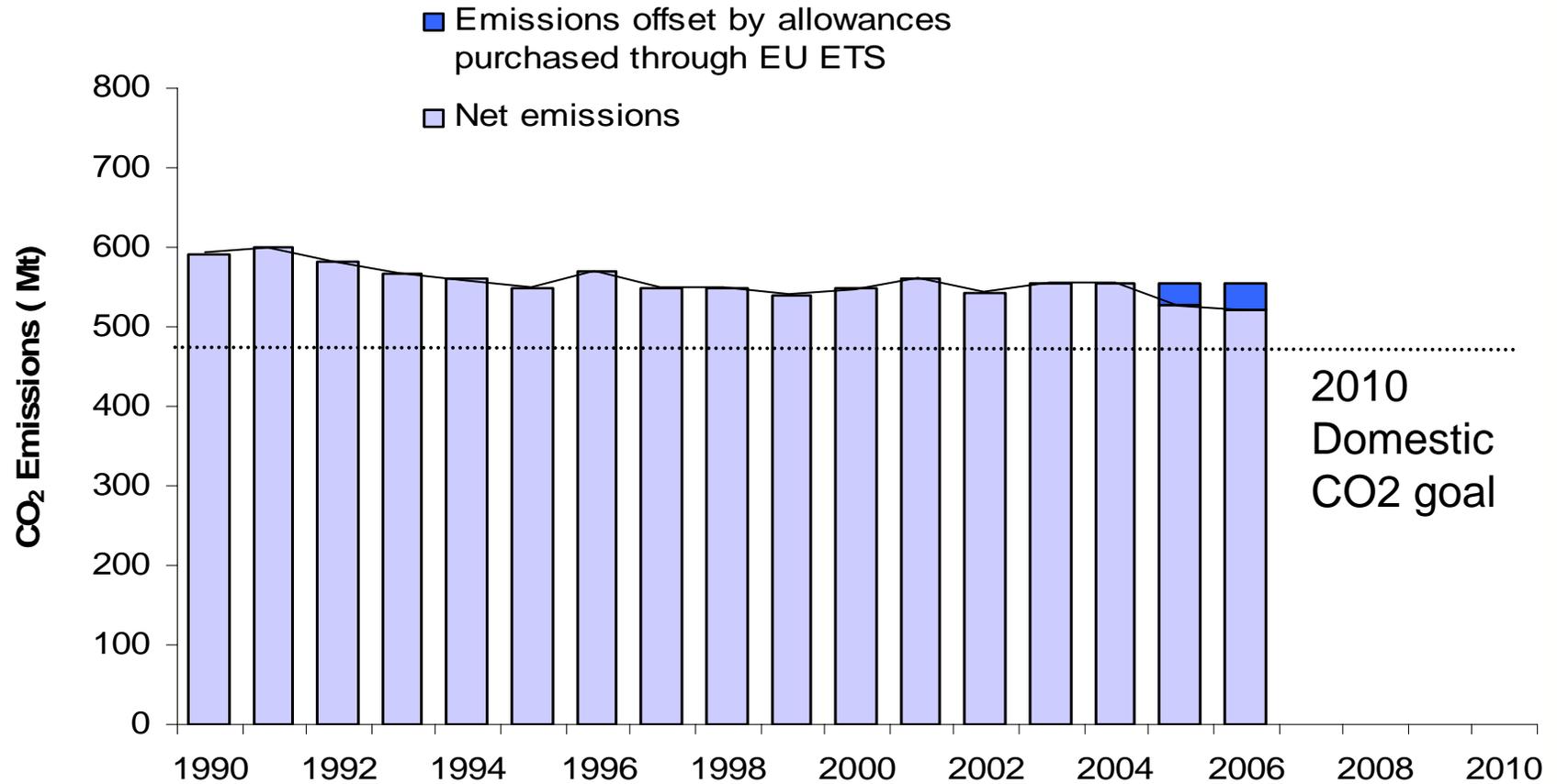
- Internationally agreed territorial approach neither includes emissions embedded in imports, nor excludes emissions from exported goods
- Internationally agreed method for embedded emissions unlikely, given:
  - current focus on territorial basis
  - computational difficulty and uncertainty in making the estimates
  - potential difficulty in reaching agreement (e.g. given the experience with attribution of international aviation and shipping emissions).
- Could suitable statistics still help to shape policy-making in individual countries, even if routine methods not feasible?
- UK carrying out research into estimation of a time-series for consumer emissions

## Policy issues:

### iii) Emissions trading

- UK publishes separate results showing emissions reductions *within the UK* and reductions *funded by the UK*
- Kyoto Protocol includes trading schemes, so we need to report the *funded by the UK* figure
- 2006 results
  - UK acquired 33.3 Mt of credits through EU ETS
  - CO<sub>2</sub> emissions *within the UK* = 554.5 Mt
  - 6.4% below 1990 levels
  - CO<sub>2</sub> emissions *funded by the UK* = 521.2 Mt
  - 12.0% below 1990 levels
- should EU statisticians work together to present consistent results?
- should we be making more systematic use of different data streams (e.g. inventory calculations; verified emissions; other data on sectoral economic activity) to ensure results in each are robust?

# Impact of emissions trading



# Data issues

## (i) Scope for improvements in UK reporting



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- Formal procedures exist for energy data, consistent with UK National Statistics code of practice.
- We are developing Data Supply Agreements for other data – some of which are currently provided by voluntary agreements
- Energy data revisions indicated in the UK Energy Statistics, and inventory revisions are reported annually to UNFCCC. Could consider more transparent presentation.
- Could there be more clarity in reporting formats?
  - carbon dioxide equivalent is now the UK Government standard
  - source and end-user sectors summaries not always transparent
  - Considering more user-friendly introduction to National Inventory Report
- UK has established a *climate change statistical co-ordinator* function to ensure that all potential users properly understand the official figures. Are further improvements in coordination and presentation needed?

# Data issues: Fossil fuels data robust, non-fossil sources more difficult

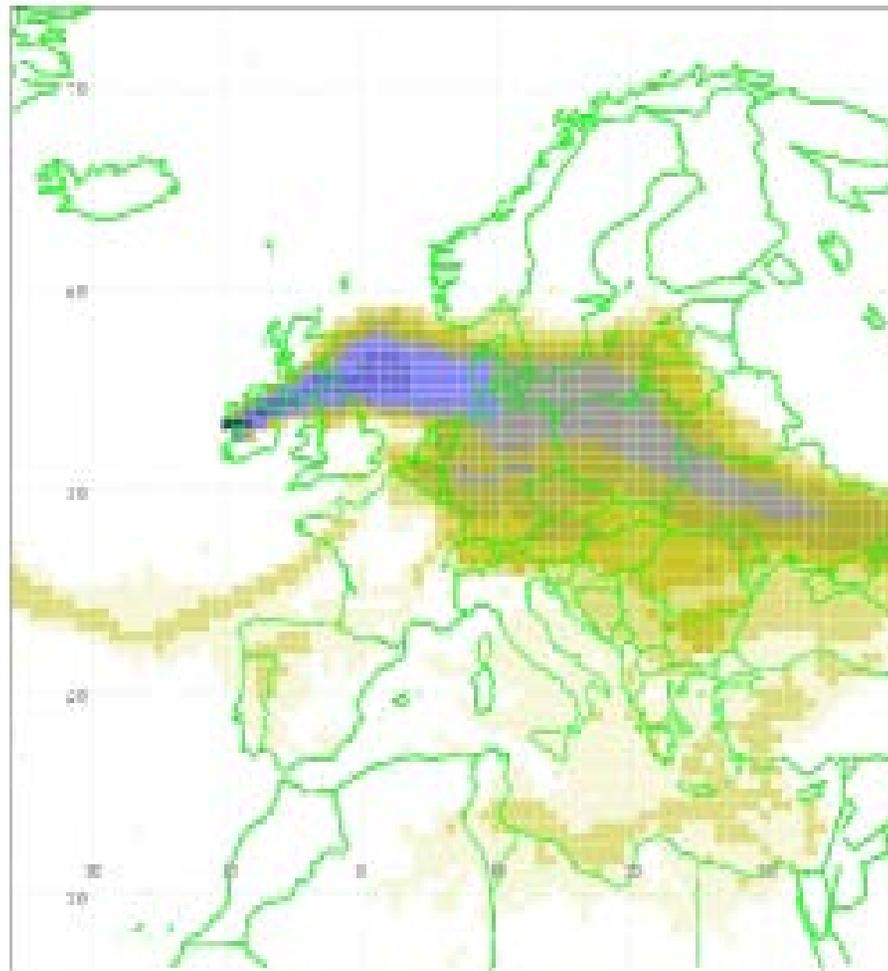
- Fossil fuel consumption known to within 2%: with careful scientific work on emissions factors, CO<sub>2</sub> emissions accurately known
- Domestic and commercial gas and electricity supply now collated at 1km<sup>2</sup> grid level.
- Regional breakdown of emissions from surface transport more tricky – but national total well known
- Emissions from aviation well known (shipping more uncertain)
- Industrial emissions well reported due to pollution legislation
- Agricultural and land use emissions diffuse and difficult to characterise
- Major challenge to ensure changes in land-use practice are reflected in inventory. In the meantime, policy-makers need to resist the temptation to respond to the need to reduce the inventory results. For example, reducing livestock numbers is unlikely to reduce emissions associated with UK consumption if UK consumption of livestock products remains constant.

# Data issues: Importance of validation against observed data

- UK uses atmospheric measurements of GHG concentrations at Mace Head (Ireland)
- Measurements are then put through ‘inverse model’ to identify where gases came from
- Few countries attempt this comparison routinely

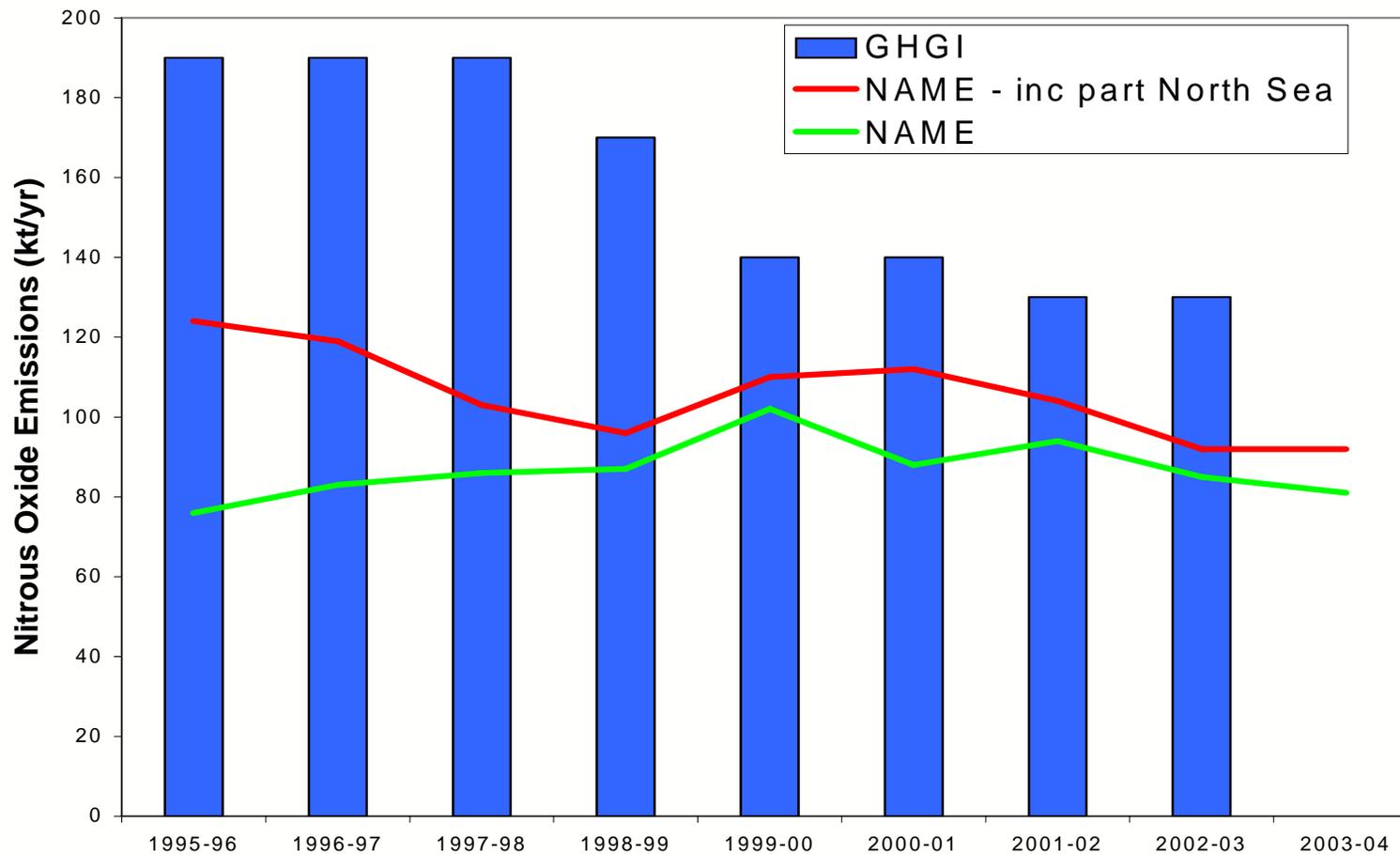
# N<sub>2</sub>O emissions across Europe (1 hour, one day)

0300Z 22/03/1996 to 0400Z 22/03/1996



Source : Met Office Report for Defra

# Emissions measurements (Nitrous oxide) can be compared with inventory estimates



# Data issues: importance of robust sectoral economic data in making judgements on impacts of different mitigation strategies

- Carbon pricing – in particular through the EU emissions trading scheme, but also through carbon taxes and other instruments – a key measure.
- But – as earlier discussion of embedded emissions shows – carbon leakage is an important consideration for policy effectiveness.
- In addition to an understanding of environment statistics, policy makers need to rely on economic data, at sectoral and sub-sectoral level.
- Robustness, timeliness and accuracy of data sets on production, trade, and profitability in key sectors and subsectors will be increasingly important in developing mitigation strategies.
- Policy debate at present is heavily influenced by assertion from different stakeholders: policy-makers will need help in understanding available data and drawing robust conclusions

# Impact of carbon pricing on sectors, compared with their exposure to international competition

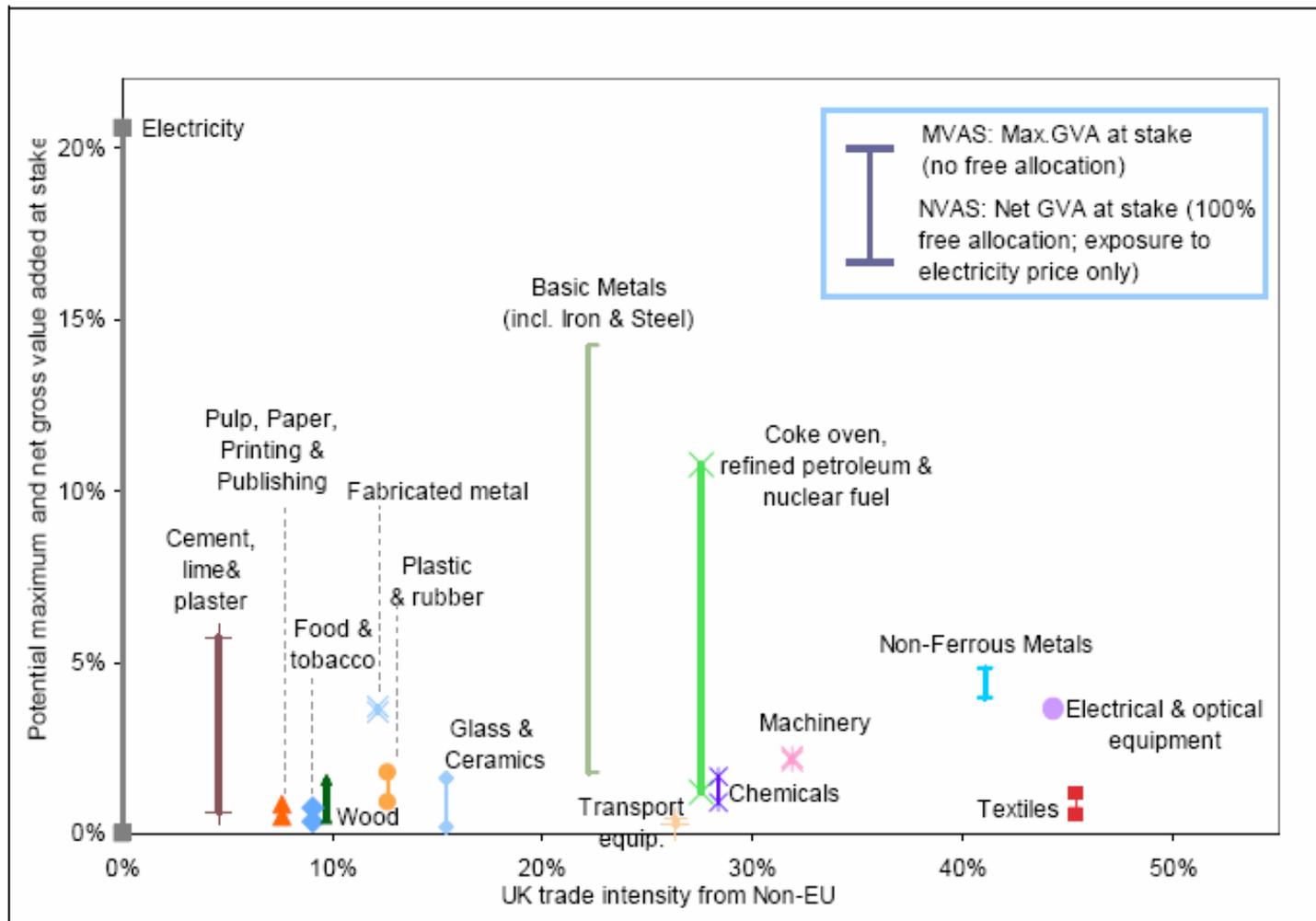
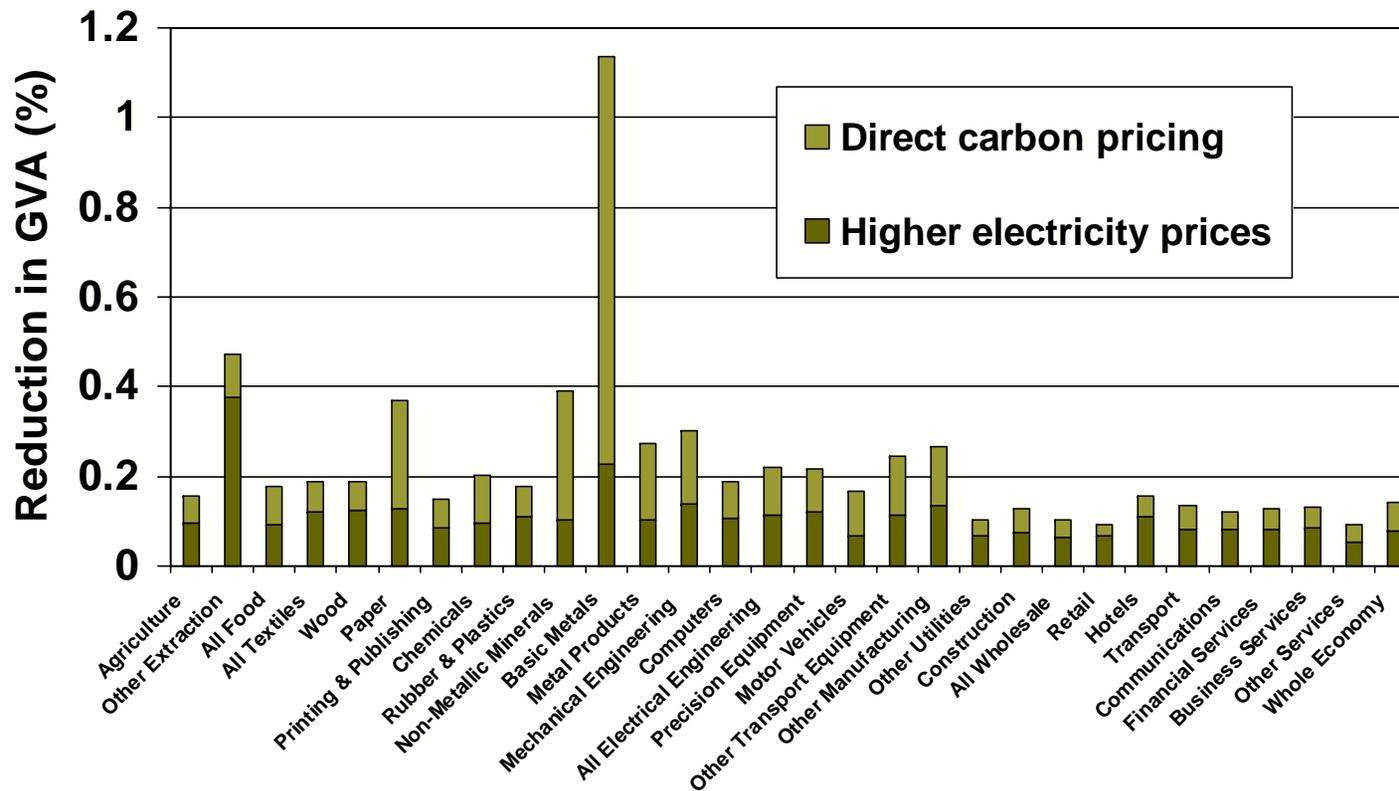


Figure 3 -Value at Stake for main industrial activities, relative to UK trade intensity from outside the EU, for €20/t CO<sub>2</sub>.

# Estimated impacts on competitiveness is small in most sectors at a carbon price of €25/tCO<sub>2</sub>



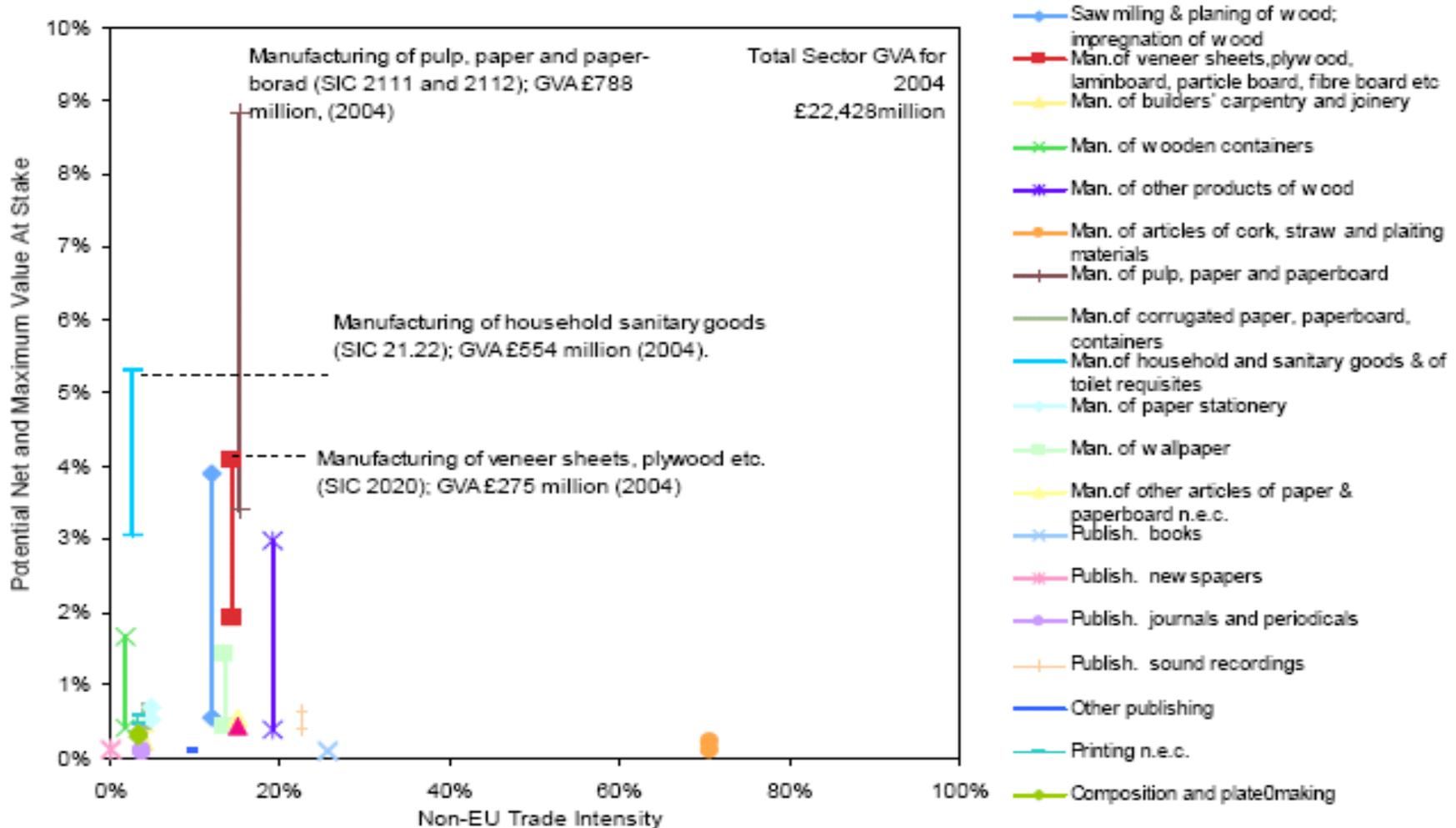
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# Sub-sector analysis (e.g. paper sector) reveals a range of different levels of impact



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