

An Energy Insight briefing paper

## Carbon Emission Accounting – Balancing the books for the UK

### Summary

- Nearly 20 years of climate change policy has failed to reduce greenhouse gas (GHG) emissions linked to economic activity in the UK.
- Although the UK has met its Kyoto obligations, this has been achieved largely by outsourcing production and relying on importing consumer products from abroad to meet growing consumer demand. As UK consumer demand has continued to grow, so have the GHG emissions embedded in imported goods.
- If the UK is to measure its overall contribution to changes in global GHG emissions, consumer emission accounting offers a sound method for attributing GHG emissions.
- Increased transfer of low-carbon technologies to producer countries, even when technology transfer does not form part of any international GHG emissions reduction agreement, will help those countries to reduce their emissions and thereby contribute to a true global reduction.
- “Framework conditions” to encourage sustainable consumption might involve government intervention in areas such as prices, providing infrastructure for a sustainable lifestyle, and public engagement.

### Greenhouse gas emissions: is hitting the targets enough?

As the UK has already met its Kyoto obligations, it appears to be a leader in the effort to curb greenhouse gas (GHG) emissions. But all is not what it seems. The Kyoto Protocol reductions only take into account “territorial emissions”, or GHG emissions generated within a country. Emissions related to international shipping, aviation and the embedded emissions in imported goods and services are excluded from the calculations.

This accounting procedure hides the fact that the reduction in UK GHG emissions has been achieved mainly by outsourcing production and meeting the

increasing demand for consumer products by imports from abroad. It also reveals that the UK has failed to decouple economic growth from GHG emissions. As a result increasing UK demand for consumer goods and services means GHG “imports” will also increase. There are no binding agreements to regulate this growth. Following the 2010 UN Climate Change Conference in Cancun, Mexico, this UKERC *Energy Insights* paper, based on research by Professor John Barrett (University of Leeds) and his research team, summarises the situation and suggests ways for the UK to achieve a “real” reduction in GHG emissions.

## What are territorial emissions?

The accounting framework of the United Nations Framework Convention on Climate Change (UNFCCC) is based on the concept of "territorial" emissions. These are defined as all GHG emissions from a country's territory, apart from those associated with international aviation and shipping. According to the UNFCCC the UK achieved a reduction in territorial greenhouse gas (GHG) emissions of 19% between 1990 and 2009. Since 1990, UK territorial emissions have declined by around 1% per annum, and are now 145 million tonnes lower in 2009 than they were in 1990. On the surface this sounds like good news, and indicates that the UK government has achieved the target established under the Kyoto Protocol. But these headline figures do not tell the whole story.

## Accounting matters

The use of different accounting methods that take into account emissions from international aviation and shipping reveals that the UK has achieved a reduction in territorial GHG emissions of just 14%. In addition, they show that the UK's "excluded" GHG emissions, those embedded in imports, have doubled between 1990 and 2009.

Research carried out by UKERC at the University of Leeds, reveals that because the Kyoto Protocol does not take into account the GHG emissions associated with products imported into a country or with services consumed there; there is a significant difference between the UK's reported reductions in GHG emissions and those that take account of consumption. Emissions have effectively been shifted from one country to another. The key problem is that many other countries don't have an emission reduction target under the Kyoto Protocol, particularly the countries that are key trade partners with the UK. As a result, emissions reported under the Kyoto Protocol do not provide a full picture of the reduction of GHG emissions associated with economic activity in an individual country.

## Consumer accounting

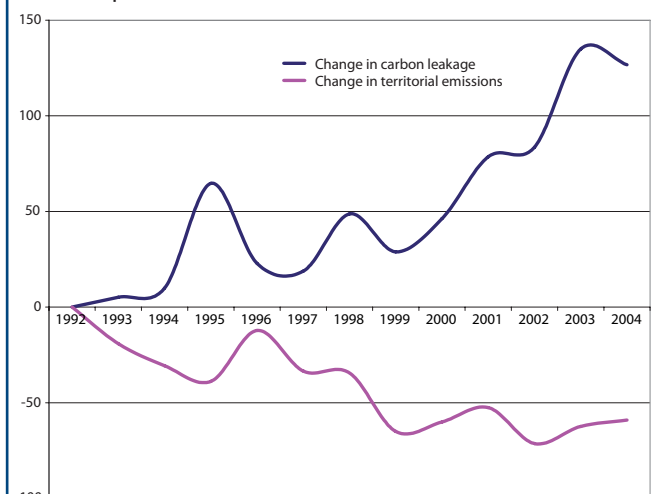
The UKERC team has applied an approach to consumer accounting that takes into account these "imported" GHG emissions. This results in a very different picture of the UK's progress towards reducing its GHG emissions. Where Kyoto Protocol accounting methods suggest that there has been 1% a year reduction in UK territorial GHG emissions, consumer accounting methods indicate that the UK's GHG emissions are actually rising at a rate of over 1% a year. Therefore, the gap between consumer and territorial GHG emissions has continued to grow year on year. If this trend continues, GHG emissions

embedded in imports to the UK will be greater than UK territorial emissions by 2018.

This growth in "embedded" emissions is partly the result of "carbon leakage" in which the growing demand for consumer goods and services in the UK is being met increasingly by imports from countries without binding GHG emissions reduction targets rather than from increased production inside the UK. Under current accounting methods, this provides a mechanism for one country to "shift" emissions associated with consumption to other countries. It also makes it possible for the UK to outsource manufacturing and claim emission reduction even though the global burden of emissions has remained constant or even increased. (See *Carbon leakage: hidden emissions*)

### Carbon leakage: hidden emissions

- In 2004, nearly 130 million tonnes of GHG emissions associated with imports into the UK occurred in countries that had no binding targets. This represents an additional 20% on top of territorial emissions for that year.
- In 1992, 64% of the GHG emissions associated with goods and services were emitted inside the UK. In 2001, a key turning point occurred when GHG emissions embedded in imports exceeded those resulting from domestic production. With the exception of direct household emissions, imports now dominate most product categories, and products such as clothing are becoming almost wholly dependent on imports.
- Health and communication has also shown a large shift away from domestic production to imports. Medical products are increasingly being imported and there is an increase in demand for mobile phones which are imported from elsewhere.



Change in territorial emissions and carbon leakage (1992=100) (derived from Minx et al., 2009)

Since 2004 the GHG emissions embedded in products imported into the UK have been higher than those resulting from domestic production. Nearly 20 years of climate change policy has failed to reduce consumption-based emissions.

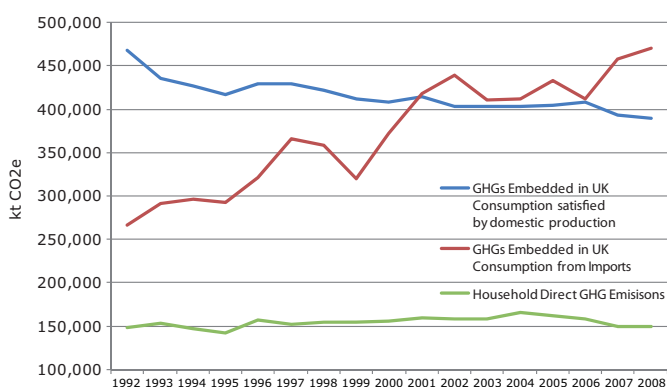
Globally, in 2001, 10% of all CO<sub>2</sub> emissions were of “leaked” GHG emissions and this figure appears to be increasing. As the economies of developed countries become increasingly service based, they will import more manufactured goods and consequently more “embedded” GHG emissions. Affluence in industrialised countries leads to greater consumption which is a fundamental driver of GHG emissions. These trends mean that accounting for emissions by shifting measurement from one country to another will not lead to an overall reduction in GHG emissions.

## What to do?

Utilizing the consumer accounting method will highlight the relationship between higher GHG emissions and economic growth and consumer affluence, enabling industrialised countries to obtain a fuller picture of their contribution to progress towards global emissions reduction than can be provided using the current territorial accounting methods.

Trade will continue and does have positive effects for many developing countries, meaning that the UK must act on the international stage to ensure lower carbon goods and services from imports. Ensuring that low carbon technologies will be made available and affordable for all will help to reduce GHG emissions “embedded” in imported products. There needs to be adequate technology transfer to enable producers to reduce the GHG emissions associated with production of the goods they export and consume themselves.

Additionally, consumer accounting provides insights into where to get the most value for money in terms of emission reduction. Direct comparisons can be made between funding domestic mitigation strategies and mitigation options overseas. This ensures that the



Origin of embedded GHG emissions in UK consumption (1992 to 2008)

focus is clearly on global emission reduction and not solely on lower territorial emissions.

The second key area of intervention relates to changing the consumption patterns of UK residents. Increased affluence associated with economic development leads to increased consumption and hence enhanced carbon emissions. New technologies alone cannot compensate for this. Changes are needed in the ways in which households consume. At the moment the only approach that reduces emissions is reducing economic growth which would be to everyone’s disadvantage because they are so intertwined. At present there is no clear strategy by the UK Government to decouple emissions from affluence.

There are three main areas where government intervention and setting “framework conditions” may encourage sustainable consumption: setting prices so that a low carbon product is also low in price; establishing infrastructures, particularly in relation to transport, that encourage sustainable lifestyles; and engaging with the public about the need for change and the role that government, citizens and businesses have in building the low carbon economy.

If territorial emissions are to be measured accurately, adopting consumer emission accounting will establish a more complete base from which to measure reductions. However, adopting this methodology raises significant questions, examined in the box below, *Future questions*. In addition to national initiatives, local action is vital.

### Future questions

Important questions that need to be addressed include:

- How can consumption-based carbon accounts be published alongside territorial-based emissions inventories?
- What are the indirect carbon impacts of energy technologies and how does this affect the future policy mix to achieve an 80% reduction in GHG emissions by 2050?
- What future carbon budgets should be established in the UK to increase the chances of restricting temperature rises to just 2 °C?
- What is the role of international trade in future climate change negotiations?
- What policy options are available for dealing with carbon leakage?

## Think globally, act locally

Because of their role in planning, influence on the build-up of infrastructure and their close contact to their residents, there is an increasing recognition of

the important role local governments can play in achieving reductions in GHG emissions. Bad decision making at the local level can lead to carbon lock-in for years to come, while the investment into low carbon infrastructures can ease the UK's transition towards a low carbon society.

Considering carbon footprint evidence in local decision making processes might go beyond traditional policy

practices. Addressing issues related to spatial planning (preventing urban sprawl, densification, accessibility, public transport infrastructure etc.) and public procurement, as well as instigating information campaigns are just a few of the ways that local government can make a real difference to reducing GHG emissions.

## Further information and references

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