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Aviation, trade and cumulative emissions

As a member of the Kyoto Protocol (KP), the UK has adopted a number of policies to reduce its GHG emissions and is perceived to be at the forefront of combating potentially dangerous climate change. The 2008 Climate Change Act sets legally binding emission targets and anticipates an 80% emissions reduction by 2050. However, despite enduring efforts made to cut emissions at the national level, there is a growing concern over the GHG emissions that have not been covered by the deployed accounting methodologies – the so-called “Carbon omissions” (Brinkley, Less 2006).

Emissions from international aviation and shipping

The Kyoto Protocol’s emission targets do not account for emissions from international aviation and shipping, which constitute a significant 7% share of the UK’s total GHG emissions (UK Department for Transport 2011). The European Union has recently decided to include all flights to and from its territory into its emissions trading scheme (EU ETS), which the US, China and India have fiercely rejected. Potentially those diplomatic issues can be resolved in due course by negotiating an international agreement under the UN aviation organization (ICAO, *ibid.*). A final decision can thus be expected within the next year, for which the EU has “stopped the clock” before returning to its original system (inclusion of the aviation sector) if no satisfactory outcome can be produced. Subsequently, the UK government has deferred a firm decision on whether emissions from international aviation and shipping are to be included in domestic climate targets (Department of Energy and Climate Change 2012). As for the carbon emissions from international shipping, there is no international agreement reached in regard to the allocation of emissions to individual nation states. So far discussions held under the International Maritime Organization (IMO) only achieved limited progress. It has been proposed that more work be done in terms of technological and operational improvements in order to reduce emissions from shipping vessels (Committee on Climate Change 2011). A serious political effort to avoid dangerous climate change must include the international transportation sector. The UK as part of the EU should work actively in engaging its trading partners and the ICAO to find feasible solutions. Although the attribution of emissions between countries is complex (Helm et al. 2007) and has the potential to lead to political distortions, the GHG emissions from transportation are too significant to remain unaddressed.

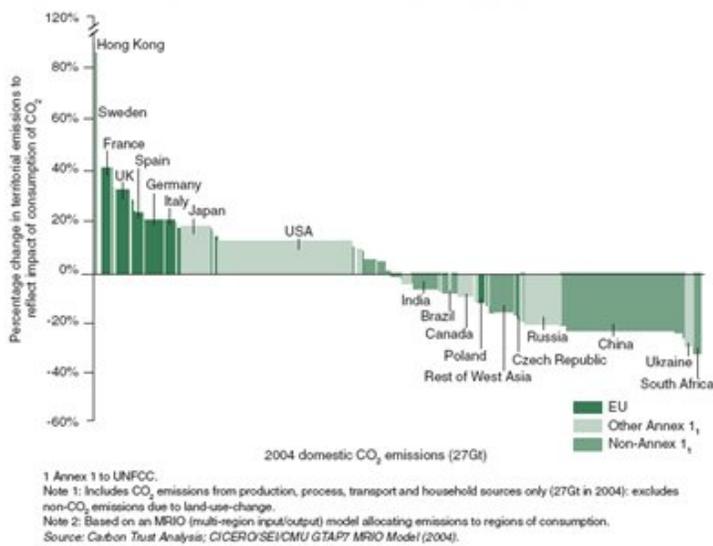
Embodied carbon in international trade and carbon leakage

All Annex I State Parties¹ to the KP are accountable for greenhouse gas (GHG) emissions released within their territory (UNFCCC 2008). However, by definition this does not include emissions that are produced on behalf of a state party – but beyond its borders (Brinkley, Less 2006). This gap in current international policy leads to a highly distorted view of GHG emission reduction achievements in industrial countries. For example, the UK’s territorial emissions have fallen remarkably from 1990 to 2009 by 19%, whereas in the same period a 20% rise in consumer emissions was reported (UKERC 2011). Thus a holistic approach to GHG emissions would not only reveal a country’s “fair share”, but is also anticipated to encourage exporting and developing countries to participate in future climate agreements (Wiedmann 2009). ‘Embodied carbon’ refers to carbon dioxide emitted at all stages of a good’s manufacturing process (Kejun 2008). About 40% of emissions arising from UK domestic consumption occur outside of the UK (Carbon Trust 2011). Its net import of emissions is the third highest in the world, only next to the US and Japan (Davis, Caldeira 2010). The chart below shows how GHG emissions of nation states would change if consumption-based accounting were adopted (Carbon Trust 2011). On the other hand, relocation of some of the emission-intensive industries from developed countries to developing countries (partly due to the absence of a globally uniform carbon price) also gave rise to the issue of ‘carbon leakage’, which may undermine mitigation efforts. Yet the current emission calculation system in the UK fails to cover emissions from outsourcing industries and carbon content embodied in its imports, which to some extent undermines its reliability.

Cumulative emissions

A further distortion of current GHG accounting stems from the fact that cumulative carbon emissions rather than annual emission rates determine global warming (Allen et al. 2009a). An equitable calculation method should hence include a clear methodology of how cumulative emissions are to be addressed. However, historical emissions as an integral part of cumulative emissions also raise issues of intergenerational justice and are beyond the scope of this article. A recently suggested scheme is to impose a compulsory fraction of carbon that has to be sequestered from fossil fuels after they have been extracted from the ground – hopefully this fraction could rise to 100% in the future, leading to zero emissions (Allen, Frame and Mason 2009). However, some issues remain to be tackled,

¹ All major industrialized countries, see http://unfccc.int/parties_and_observers/parties/annex_i/items/2774.php



including technical feasibility and choice of sequestration sites as well as allocation of the cost arising from the scheme.

Policy implications

The current calculation of carbon emissions under the UK carbon budget system fails to represent the accurate and comprehensive inventory of its carbon emissions. With the growing attention on global carbon flow and accumulated emissions, a more rigorous and equitable calculation of carbon emissions will not only lay the foundation for adjustments to the Kyoto Protocol, but also lead to further progress in global climate negotiations. The UK, as an active player in tackling climate change, should act as the early mover towards such transformations of calculation methods and set a model for other countries.

1. Including carbon emissions from international transportation into national climate policy and carbon budgets. The current Climate Change Act of the UK, with its emission cutting targets for 2050, does not cover emissions from international aviation and shipping. The inclusion of such emissions to the national targets and carbon budget would send a clear message to the international community and demonstrate the UK’s resolution to effectively tackle climate change. This would also encourage other developed countries to follow suit.

2. The UK government should actively facilitate and encourage the EU and trade partners to finalize a firm and comprehensive agreement under ICAO on emissions from international aviation. The ‘stopped clock’ for one year should be used productively in order to come to a firm international agreement under ICAO. Adjustments to the current system could be made as a basis for negotiations with trading partners.

3. Advancing research in carbon accounting and carbon footprint assessment as the basis for further actions. Meanwhile there are still uncertainties and differences in terms of methods and methodologies of consumption-based calculation of carbon emissions. More efforts need to be made to streamline different scopes and methodologies in order to construct a reliable and robust dataset for carbon emissions.

4. Working with the EU and other trading partners to discuss possibilities of adopting consumption-based calculation of carbon emissions. Based on the above dataset and calculations, proposals could be made to the UNFCCC on shifting from production-based carbon accounting to consumption-based accounting in the short term. This initiative could help to break the current deadlock of global climate negotiation and strengthen the UK’s position in the global climate regime.

5. Facilitating research on carbon sequestration technologies and solutions through joint R&D projects with trading partners in order to deal with cumulative carbon emissions. In the long-term, main stakeholders should be engaged in a discussion that aims not only to reduce emissions, but also to tackle cumulative carbon emissions. This could involve the introduction of carbon sequestration policies (Allen et al. 2009b).

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The authors are graduate students reading for an MSc in Environmental Change and Management at Oxford University’s Environmental Change Institute.

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