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National emissions from tourism: An overlooked policy challenge?

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HIGHLIGHTS

- Emissions from tourism are equivalent to 5–150% of 'official' national emissions.
- Inconsistent methods are used to calculate national tourism emissions.
- Tourism is an energy-intense economic sector compared to other sectors.
- Emissions from tourism are growing rapidly.
- National policy is not concerned with tourism-related emissions.

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ABSTRACT

Tourism has been recognized as a significant greenhouse gas (GHG) emissions sector on a global scale. Yet, only few studies assess tourism's share in national emissions. This paper compares and analyses existing inventories of national emissions from tourism. Studies are difficult to compare, because they use different system boundaries and allocation principles, omitting or including lifecycle emissions and GHG other than CO_2. By outlining and analysing these differences, the paper estimates the contribution made by tourism to national emissions, and its greenhouse gas intensity in comparison to other economic sectors. Results indicate that while emissions from tourism are significant in all countries studied, they may, in some countries, exceed 'official' emissions as calculated on the basis of guidelines for national emission inventories under the Kyoto Protocol. This is a result of the fact that bunker fuels are not considered in national GHG inventories, leading to underestimates of the energy- and GHG intensity of tourism economies. While further growth in tourism emissions can be expected in all countries studied, energy-related vulnerabilities are already considerable in many of these. Climate policy for tourism, on the other hand, is largely non-existent, calling for immediate action to consider this sector in national legislation.

1. Introduction

The Kyoto Protocol assigned responsibilities for emission reductions on the basis of national per capita emissions, considering the "basket of six", i.e. the most important greenhouse gases (GHG), measured in terms of their contribution to global warming over longer time periods, and made comparable on the basis of Global Warming Potentials (GWP) (cf. www.ipcc.ch). Countries have reported and continue to report national emissions on this basis to the United Nations Framework Convention on Climate Change (www.unfcccc.int). An important characteristic of the Kyoto Protocol is the separation of bunker fuels for international aviation and shipping from national emission inventories. Responsibility for emissions from these sectors has been assigned to the International Civil Aviation Organisation (ICAO: aviation) as well as the International Maritime Organization (IMO: shipping). Specifically, article 2 of the Kyoto Protocol states that limiting and reducing GHG emissions from international aviation is the responsibility of the ICAO, while regulation of emissions from shipping was introduced by the IMO in 2011 under amendments to the International Convention for the Prevention of Pollution 9 from Ships (commonly referred to as MARPOL, for MARine POLlution) Annex VI Regulations for the prevention of air pollution from ships that came into force in January 2013.

While emissions from domestic flights are included in national GHG inventories, emissions from international aviation are not considered part of national emissions, even though countries are asked to report emissions from international bunkers to UNFCCC. Possibly as a consequence of this specific situation, even in countries committed to national emission reductions, no plans exist to address bunker fuels in national mitigation plans other than through the European Union Emission Trading Scheme

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(EU ETS), which has no *de facto* importance for airlines or shipping (cf. Organization of Economic Cooperation and Development and United Nations Environment Programme, 2011). Likewise, progress by ICAO and IMO to reduce emissions from bunker fuels in the aviation and shipping sectors has been limited. ICAO has, at the time of writing in October 2012, not presented any strategy that would lead to binding and monitored absolute emission reductions in aviation. Due to expected growth in traffic volumes (revenue passenger kilometers) in the order of 4.7% (Airbus, 2012) to 5.0% (Boeing, 2012) per year, even the organization's ‚commitments' to achieve an ‚aspirational' 2% per annum global fuel efficiency target to 2020 are anticipated to lead to a 2.0–3.6-fold increase in CO_2 emissions from aviation by 2050 (Owens et al., 2010). The IMO anticipates emission reductions under new agreements on efficiency, but the organization expects that absolute emissions will grow by 1.9–2.7% per year up to 2050, and that CO_2 emissions from shipping are likely to at least double by 2050 (International Maritime Organization, 2009).

Tourism is responsible for about 5% of global emissions of CO_2 (UNWTO, UNEP, WMO, 2008) and an estimated 7.9% of global warming (medium range estimate), if measured as radiative forcing for the year 2005 (Scott et al., 2010). Tourism has been called a "non-negligible" emissions sector (UNWTO, UNEP, WMO, 2008), but this view can be challenged considering the sectors observed and projected growth: Up to 2035, emissions from tourism are expected to more than double (UNWTO, UNEP, WMO, 2008). As most of this growth is associated with aviation, the sector's contribution to global warming can be expected to be even greater, particularly if emission reductions in other sectors are achieved (Scott et al., 2010). Fig. 1 visualizes the growth of global emissions from tourism in a business-as-usual scenario, and in comparison to global emission reduction needs in a maximum 2 °C global warming scenario, as agreed upon during conferences of parties (COP-15 and COP-16) in Mexico and South Africa (www.unfccc.int). If growth of tourism continues, the sector will be responsible for a considerable share of "sustainable" emissions by mid-century—notably, this scenario already considers rather optimistic assumptions for efficiency gains in the sector in the order of 1.5% per year (Scott et al., 2010). Scott et al. (2010: 403) conclude that "continued substantial growth in GHG emissions from the global tourism sector would be in conflict with emission reduction recommendations of the IPCC and existing climate policy objectives of the international community".

In this situation, a better understanding of the role of tourism in national emissions becomes increasingly important. As outlined by Patterson and McDonald (2004: 11) for tourism in New Zealand:

Conventional analysis and policy responses tend to ignore the "tourism sector" as it is not considered to be a sector. For climate change policy, this is an unfortunate oversight as this sector is the second largest energy user and the largest producer of CO_2 emissions. This coupled with the fact that tourism is the fastest growing sector in the economy, means that serious policy attention needs to be given to energy use and CO_2 emissions by the sector…"

This argument has been echoed by other authors (e.g. Dwyer et al., 2010, Gössling and Hall, 2008, Scott et al., 2010), who have highlighted the role and importance of tourism in current and future emission scenarios, and called for national tourism-specific mitigation policies. In order to design such policies, national tourism systems need to be analysed, as it can be assumed that emissions from this sector vary widely between countries, both in relative (share of total emissions) and absolute terms (measured as per capita tourism emissions), and that there will consequently be varying degrees of vulnerability to climate policy. However, in defining "tourism", existing studies have used widely varying approaches. The following review sets out with a discussion of possible system boundaries and allocation principles, and continues to present an overview of studies assessing national emissions from tourism. Results are discussed with regard to their implications for tourism climate governance.

2. Emissions from tourism: Methodological issues

The calculation of GHG emissions from tourism is complex, particularly when environmental data is used for comparison with economic data to derive measures of greenhouse gas intensities (e.g. Gössling et al., 2005; Perch-Nielsen et al., 2010). There are various reasons for this complexity. First of all, 'tourism' includes both international and domestic travel, and motives involving business and leisure travel, as well as visiting friends and relatives (VFR). In order to be counted as a tourist, one has to be travelling outside one's usual environment for not more than one consecutive year, either involving an overnight stay or a same-day trip. Most countries collect statistics on international tourist arrivals, but there is considerably less information on domestic and outgoing tourism by national residents.

An important question in defining national tourism greenhouse gas inventories is whether the emissions associated with

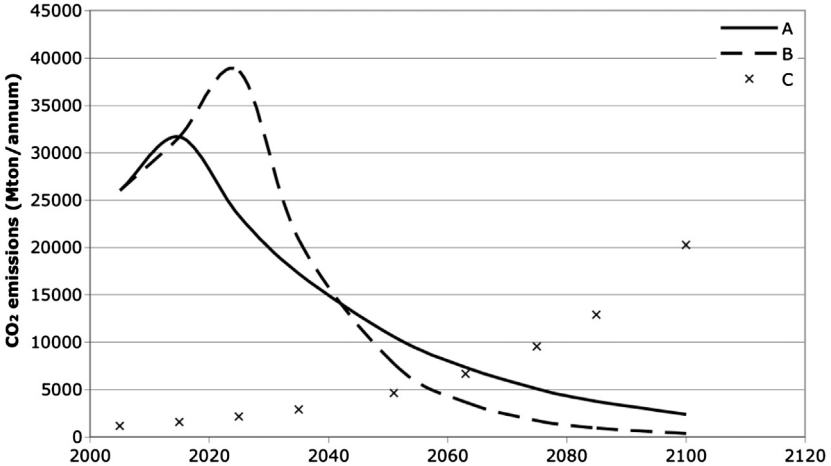

Fig. 1. Global emissions from tourism and sustainable global emission reduction pathways.