

Transitions to low carbon international transport

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Introduction

Growth in international transport is essential for economic growth, but leads to increasing emissions

International transport is one of the main contributors to globalisation: the accelerating interdependence of practically all people in the world with increasing economic integration, increasing political interaction, and increasing cultural contact. The two most important modes of long haul international transport – deep sea shipping and aviation – have seen rapid growth which is projected to continue. This growth in long haul transport has been seen as a major positive driver of economic development, through promoting trade and hence growth, especially in the newly industrialising countries (NICs) such as Brazil, India and China. Freight transport has become part of logistics services forming new Global Production Networks and the trend in international logistics is for ever greater integration, also between modes. Aviation activity has also increased rapidly, through long distance tourism, international business travel and air freight.

However, the ideas of sustainable development, following the Bruntland Report have led to a more critical examination of transportation and trade. The first step in this process has been to consider the environmental impact of transport. International trade has a major impact on CO₂ emissions: allocating emissions based on responsibility by consumption can change the CO₂ emissions allocated to some countries by up to 60%. Recent scenarios, also published by the industry, project rapid growth in aviation activity, particularly in routes to NICs. Given the current rates of improvement in the emissions efficiency of aircraft, this implies large scale increases in emissions to at least 2030. The environmental impacts of shipping have also been widely recognised, shipping climate change emissions have a similar magnitude to aviation (around 3% of all global CO₂ emissions in 2012) and are also increasing rapidly as international trade and transport is projected to continue to grow.

International shipping and aviation present a particularly difficult problem for climate mitigation policy, because both industries have the main part of their productive process in international waters/airspace, outside regions of national legal jurisdiction. Therefore, policy and regulation has to be agreed in the international institutions and proceeds mainly by consensus, such that

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countries that oppose environmental legislation can prevent the adoption of environmental policy. Current policy initiatives are limited: the inclusion of aviation in the EU ETS is assessed to have only a slight effect on emissions to 2020 and the only policy implemented for greenhouse gas emissions reductions in shipping is the Energy Efficiency Design Index, which applies to new ships only and will therefore only have a significant effect in a 20-30 year time frame.

Therefore, it appears that additional approaches to climate change policy for international transport are required. The GLOBIS project has identified possible pathways through which a transition to low carbon international transport is possible. This brief outlines these scenarios and identifies policies that can stimulate the transition.

How a transition to low carbon international transport might happen

There are many alternative possibilities for low carbon international transport. The technologies that could be adopted on a large scale in the next 10-20 years include:

- biofuels for ships and aircraft
- sail/wind technologies for ships
- much slower speeds in ships, with operation speeds less than half of current container ships
- adoption of advanced propeller/propulsion systems in ships
- open rotor engines for aircraft

There are also a range of niche markets that are growing and where sustainability is a major selling feature and provide an incentive for markets to adopt more sustainable systems and technologies. These include organic foods, Fairtrade foods and other industries where the environmental performance of the whole production chain is important, such as the oil industry.

Two possible pathways are:

- The growth of demand for sustainable production and consumption

This transition is driven by a change in the structure of demand, which comes about through a cultural change. The increasing awareness among people in all parts of the world of environmental problems including climate change leads to a change in consumer behaviour and also pressure on governments and firms to take much more account of environmental issues. This is accompanied by an increasing awareness of responsibility for people in poorer countries. The result is a much increased demand for products that are produced in a sustainable way. The environmental impact of transport becomes a major social issue. Increasing oil prices and the adoption of emissions targets and supporting environmental legislation change the cost structure of international transport, placing an even larger emphasis on fuel efficiency and emissions reduction. Hence there is a relatively rapid investment in mitigation technologies including biofuels, inducing a rapid expansion of biofuel production in LDCs (Least Developed Country) and NICs. These considerations also lead to a move to transporting higher value goods by ship, so that the NICs' growth and the expansion of EU-NIC trade together with South-South trade (between NICs and between NICs and LDCs) happen in the maritime sector rather than aviation.

- Eco-innovations in NICs.

This is a transition in which the decisive driver is the economic growth in the NICs, leading to continued rapid growth in exports and import to/from NICs. Economic development in LDCs is driven by expanded trade, both in raw materials and in manufactured products, with the NICs. NICs place more emphasis on environmental

innovation and the development of eco-technologies. This leads to the diffusion of low carbon technologies for shipping and aviation in international transport, led by 'green' market leaders who apply the low carbon technologies developed by specialist, high technology firms selling to the global shipbuilding and aerospace markets. In shipbuilding, shipyards in NICs develop and sell designs that include the niche low carbon technologies identified above, often in cooperation with EU technology providers. Biofuels production and supply systems are adopted on a large scale, for aviation and also to some extent for shipping. Environmental considerations also lead to the expansion of EU-NICs trade and South-South trade happening in the maritime sector rather than aviation, as in the previous scenario. Geographically diverse consumer demand from LDCs and NICs as well as the developed world and diffusion of production into NICs makes continued global concentration in logistics difficult and there is an increase in smaller capacity point to point services. There is a major improvement in emissions efficiency from aviation through widespread adoption of open rotor freight aircraft for long haul freight and medium to short haul passenger and freight, combined with adoption of biofuels.

EU Policies that can stimulate a transition

- Support for increased emphasis in society for environmental issues. This general change in culture can be strengthened by stronger climate policy in the EU, such as renegotiated caps for sectors in the EU ETS. This should be combined with consumer labelling showing the emissions content of internationally traded consumption goods, which will reinforce this change.
- Support for the development of practical methods (including measurement standards) for calculating emissions of goods along the whole supply chain.
- Support for eco-innovations in international transport: the EU can support the development and demonstration by EU industry of the technologies mentioned above, recognising that the rapid growth of international transport presents a relatively secure growth market in the next 10-20 years. This will reduce the barriers of cost and uncertain market uptake to deployment of new technologies. Such support can also help to demonstrate engineering and market feasibility, accelerating the diffusion of mitigation technologies in these industries.
- Support for the development of carbon neutral biofuels supply chains, including cooperation with biofuels producers overseas. This must not restrict food availability in LDCs, but even with this constraint, large scale production of biofuels for international transport is possible.

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