

Trade, Climate Change, and Sustainability

Tao Wang and Jim Watson

International trade has continued to increase in the last few decades as a result of deepening globalization. Relocation of production in the pursuit of comparative advantages has brought economic growth to many regions. Some developing countries have benefited from this trend due to abundant resources or labor supply or both. But the environmental consequences of international trade have been increasingly highlighted. Within discussions about the international targets for and mechanisms to achieve large-scale reductions in carbon emissions, the emissions embodied in traded goods have often been highlighted as a particular challenge.¹

Emissions embodied in internationally traded goods are currently attributed to the producing nation under the U.N. Framework Convention on Climate Change's definition. Many of these goods are manufactured in developing countries, such as China, that do not have binding carbon emissions targets. Exports now account for more than one third of China's total economic output, much higher than most economies of similar size. In 2006, some 58 percent of China's exports were from multinational ventures and around 70 percent of foreign direct

investment went to manufacturing. Given the climate change treaty's definition of the source of emissions, it is not surprising that China is now the world's largest emitter of carbon dioxide.²

Thus the industrial world is becoming ever more reliant on importing goods from China and at the same time "exporting carbon" to this nation to meet carbon reduction targets. A recent initial Tyndall Centre for Climate Change Research assessment of the carbon emissions embodied in China's international trade found that net exports accounted for 23 percent of China's total carbon emissions in 2004. This is partly because of China's large trade surplus but also because of China's higher carbon intensity due to an inefficient, coal-dominated energy system. The carbon embodied in China's exports was comparable to Japan's total carbon emissions in 2004 and more than double the emissions from the United Kingdom. (See Figure.) And several studies show a clear trend of increasing embodied carbon during the last decade as well as an increasing share of total carbon emissions over time.³

These findings highlight the importance of an issue that has been underplayed in climate policy. They show that consumers in industrial countries are indirectly responsible for a significant proportion of China's carbon emissions. This evidence adds weight to the view that industrial countries should help developing ones reduce their

Tao Wang is a Research Fellow at the Sussex Energy Group and the Tyndall Centre for Climate Change Research in England. Jim Watson is Deputy Director of the Sussex Energy Group and Deputy Leader of Tyndall's Climate Change and Energy Programme.

CO₂ Emissions from China's Net Exports and Total Emissions from Selected Countries, 2004

Country	CO ₂ emissions (Mt)
United States	5800.0
China	4732.3
China, from net exports	1109.4
Japan	1215.0
Germany	848.6
United Kingdom	537.1
Australia	354.4

Source: Wang and Watson

carbon emissions through technical assistance and finance.

The scale of this “carbon leakage” to developing countries through international trade is so significant that it needs to be taken into account in the next round of international climate agreements. Some observers have called for a radical change from production-based to consumption-based national emissions accounts so that emissions embodied in traded goods are included within the consuming country's targets. But this would be impractical due to data uncertainties and the large amount of political capital that has already been invested in the current accounting system. Measurement of consumption-based carbon emissions could, however, be used as a “shadow indicator” in negotiations and could complement official nationally based emissions inventories.⁴

This shadow indicator could help inform a range of policies for the mitigation of emissions. Some of these are known as “sectoral agreements.” These are designed to deal with sectors that are not only exposed to high levels of international competition but are also carbon-intensive. If they are sufficiently binding, sectoral approaches could help reduce emissions while helping companies in developing countries to improve their

technological capacity.

Another approach to including traded goods might be to impose border tax adjustments on goods brought into countries or regions with emissions caps. Senior policy-makers in both the European Union and United States are considering such an approach since it would internalize the embodied carbon cost of imports and would “level the playing field” with goods produced domestically. These proposals have inevitably been criticized as being “protectionist,” however, by some developing countries and may be subject to challenge within the World Trade Organization. Again, if this policy were implemented carefully, with compensatory financial and technological assistance to developing country producers, it might be seen more favorably.⁵

It is important not to overstate the impacts of carbon leakage on international competitiveness. Contrary to the arguments of some industrial lobbyists, emissions caps in the United States or the European Union will only significantly affect the competitiveness of a few energy-intensive industries, such as steel and cement. The products of these industries make a relatively small contribution to China's exports—and to the emissions embodied in them. China's exports are instead dominated by consumer goods such as textiles, footwear, and electronics, which are not as carbon-intensive or sensitive to carbon taxes.⁶

Whichever way forward is followed, the solution will require trust not suspicion. Collaboration rather than confrontation in bilateral or multilateral relationships is required, as no country can deal with climate change alone in a globalized trade network. International trade policy could play a significant role in the future climate regime as well as sustainable development. It is important to make sure trade is more ethical and more environmental friendly and that the costs

Trade, Climate Change, and Sustainability

1. B. R. Copeland and M. S. Taylor, *Trade and the Environment: Theory and Evidence* (Princeton, N.J.: Princeton University Press, 2003); A. W. Wyckoff and J. M. Roop, "The Embodiment of Carbon in Imports of Manufactured Products: Implications for International Agreements on Greenhouse Gas Emissions," *Energy Policy*, March 1994, pp. 187–94.
2. Exports from multinationals from Bo Xilai, Minister of Commerce of China, speech at ASEAN Economic Ministers meeting, 26 August 2007.
3. New Economics Foundation (NEF), *Chinadependence: The Second UK Interdependence Report* (London: NEF and the Open University, 2007); Y. Li and C. N. Hewitt, "The Effect of Trade between China and the UK on National and Global Carbon Dioxide Emissions," *Energy Policy*, forthcoming; R. Reinvang and G. Peters, *Norwegian Consumption, Chinese Pollution: An Example of How OECD Imports Generate CO₂ Emissions in Developing Countries* (Oslo and Trondheim: WWF Norway, WWF China Programme Office, and Norwegian University of Science and Technology, 2008); initial assessment and Figure from T. Wang and J. Watson, *Who Owns China's Carbon Emissions?* Tyndall Centre Briefing Note No. 23 (Norwich, U.K.: Tyndall Centre for Climate Change Research, 2007); N. Ahmad and A. Wyckoff, *Carbon Dioxide Emissions Embodied in International Trade of Goods* (Paris: Organisation for Economic Co-operation and Development, 2003); Chinese Academy of Social Sciences, in "WWF: Don't Ignore the Net Export of Embodied Energy from China," 11 December 2007, at www.wwfchina.org/english/loca.php?loca=496; International Energy Agency, *World Energy Outlook 2007* (Paris: 2007); G. P. Peters and E. G. Hertwich, "CO₂ Embodied in International Trade with Implications for Global Climate Policy," *Environmental Science & Technology*, 1 March 2008, pp. 1401–07; G. P. Peters et al., "China's Growing CO₂ Emissions—A Race between Increasing Consumption and Efficiency Gains," *Environmental Science & Technology*, 1 September 2007, pp. 5939–44; C. L. Weber et al., "The Contribution of Chinese Exports to Climate Change," *Energy Policy*, September 2008, pp. 3572–77.
4. G. P. Peters, "From Production-based to Consumption-based National Emission Inventories," *Ecological Economics*, 15 March 2008, pp. 13–23.
5. T. Houser et al., "Trade Measures," in T. Houser et al., eds., *Leveling the Carbon Playing Field: International Competition and US Climate Policy Design* (Washington, DC: Peterson Institute for International Economics, 2008).
6. For arguments of industrial lobbyists, see, for example, Carbon Trust, *EU ETS Impacts on Profitability and Trade: A Sector by Sector Analysis* (London: 2008).