

# Research reveals China's reversing emission flows

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The flow of China's carbon emissions has reversed according to new research led by scientists at the University of East Anglia (UEA).

The study estimates the carbon implications of recent changes in the country's [economic development](#) patterns and role in international trade

since the global financial crisis.

The researchers found that emission flows have changed greatly in both domestic and foreign trade. Some economically less-developed regions, such as southwest and northeast China, have shifted from being a net emission exporter to a net emission importer. This is mainly due to the rapid growth of consumption in western China and changes in production structure.

In terms of foreign trade, China's role in global supply chains has also been experiencing a major structural shift. Emissions represented in China's exports declined from 2007 to 2012, the period studied, mainly due to changes in production structure and efficiency gains, while the destinations of its export emissions have been moving from developed to developing [countries](#).

For example, emissions embodied in exports to North America and Western Europe declined by 20 per cent and 16 per cent, respectively, while those in exports to Latin America and the Caribbean increased by 33 per cent.

The authors call for more attention to be paid to emissions resulting from increasing trade between developing countries, largely due to the rapid [development](#) in south-south trade - trade with and among developing countries - which has seen the share of developing economies in international trade grow.

The study involved researchers from the Schools of International Development and Environmental Sciences, and the Tyndall Centre for Climate Change Research at UEA, working with international colleagues in China and the US. The findings are published today in *Nature Communications*.

Lead author Dr Zhifu Mi, until recently at UEA's School of International Development, now at University College London, said: "The patterns of emissions embodied in China's domestic and foreign trade have changed since the economic recession but the interregional carbon emission flows in China and internationally in the post-financial crisis era have not been analysed thoroughly.

"This study shows these new carbon flow patterns within China and analyses the domestic drivers as well as investigates China's new role in global trade as reflected by embodied carbon emission flows between countries."

In China, large amounts of CO<sub>2</sub> emissions related to goods and services consumed in the richer eastern coastal provinces are imported from poorer provinces in central and western China. In 2012, approximately 50 per cent of CO<sub>2</sub> emissions in China were emitted during the production of goods and services that were ultimately consumed in different provinces in China or abroad.

Study co-author Prof Dabo Guan, a professor in climate change economics in the School of International Development and researcher at the Tyndall Centre, said: "Great imbalances in the CO<sub>2</sub> emissions embodied in domestic trade are a reflection of the discrepancies in the levels of economic development between provinces.

"The net emission flows from western regions to eastern regions in China may further decline because of the faster economic growth in the western regions. China is struggling to balance economic development among provinces and to narrow the gap between the east and the west."

The global economy has been marked by slow growth and slow trade since the financial crisis. However, for the period 2010-2012, more than half of China's export emissions resulted from the growth in foreign

trade to developing countries. Before this, China's exports were highly dependent on the import demand from developed economies, especially the US and European markets.

The authors argue that the recent trajectory implies that the destinations of China's foreign [export](#) emissions would further shift from developed countries to developing countries because of its changing role in global trade.

China's increasing volume of trade with other developing countries contributes greatly to the development of south-south trade. It has been increasing its investments in emerging economies, for example Africa, and promoting trade with developing countries. Therefore, emissions from China's exports to these economies will further increase.

Prof Guan said: "In recent years, many researchers have proposed that consumption-based accounting be applied to re-allocate the responsibilities of mitigating [climate change](#) because of the large net emission flows from developing countries to developed countries. China has a dominant contribution to these net emission flows, but emissions embodied in its exports to developed countries have declined.

"Policies that address carbon leakage between developed and developing countries are less relevant. Outsourcing of [carbon emissions](#) is a global problem not only between developed and developing countries, but increasingly between developing countries. We need to pay more attention to the CO2 [emission](#) transfers among developing countries because of the rapid development of south-south [trade](#)."

**More information:** 'Chinese CO2 emission flows have reversed since the global financial crisis', Zhifu Mi, Jing Meng, Dabo Guan, Yuli Shan, Malin Song, Yi-Ming Wei, Zhu Liu, Klaus Hubacek, is published in on Nov 23, 2017 *Nature Communications*.

Provided by University of East Anglia

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