



Briefing note, May 2014

Shipping in Changing Climates



It is important to understand how the UK and global shipping sectors are being affected by new patterns of demand, technological developments and changes in regulations. This note summarises outputs from a high-level impact seminar organised by University College London (UCL) in collaboration with the Department for Transport (DfT), in May 2014. 'Shipping in Changing Climates' is an RCUK and industry funded multi-disciplinary research collaboration; further details can be found on www.lowcarbonshipping.co.uk.

Main conclusions from discussions

- The demand for shipping is increasing and as a result achieving absolute reductions in CO₂ emissions from shipping is likely to be increasingly difficult.
- The shipping industry is reluctant to take responsibility for reducing its absolute emissions. However, monitoring absolute emission reduction is key for national and international policies.
- The International Maritime Organisation (IMO) should be responsible for making regulation on CO₂ emissions for the shipping industry, but reaching a consensus is challenging.
- Sulphur regulations should be aligned with CO₂ reduction policy.
- Paying a levy on fuel prices, together with energy efficient technological improvements could have a big impact.

Key messages from the presentations

- The shipping sector is set for a future of radical change and increased uncertainty linked to climate change
- Research can provide a better understanding of the major sources of CO₂ in the shipping industry
- Changing demand for energy in the UK is likely to reduce the CO₂ emissions from the shipping of fuel by between 81% and 62%, depending on the assumptions made about the future energy system
- Regulations made by the World Trade Organisation and other supranational institutions are likely to strongly impact on the UK shipping industry

Areas for further research

Further evidence is needed in relation to:

- Assessing the potential for the industry to reduce its carbon emissions, by comparing it to other industries.
- The impact which market-based measures will have on CO₂ shipping emissions reductions.
- Potential unintended or perverse consequences of future maritime regulations, in particular at the supranational level

University College London Centre for Transport Studies
Contact: Professor Peter Jones, peter.jones@ucl.ac.uk or
Clemence Cavoli, clemence.cavoli.09@ucl.ac.uk

EPSRC

Engineering and Physical Sciences
Research Council

Summary Presentations

“Shipping’s emissions trajectory challenge” by Professor Kevin Anderson, School of Mechanical, Aeronautical and Civil Engineering at the University of Manchester, Tyndall Centre

The shipping sector faces a stark but scientifically robust choice. It can either continue to follow current international emission trends and, as the International Energy Agency note, thereby contribute towards: “a temperature increase of 6 degrees Celsius” [by 2100] with “devastating consequences for the planet”. Or it can “make some tough decisions” “now” as stated by the previous IMO Secretary- General.

Professor Anderson set out a quantitative strategy to address climate change concerns. Whether or not this is adopted, the shipping sector is set for a future of radical change; it can struggle to operate in an increasingly hostile and unpredictable future of rising temperatures, or it can actively engender an ambitious programme of mitigation across all facets of the shipping system.

“Bridging the shipping gap – early findings from the EPSRC ‘Shipping in changing climates’ research programme” by Dr Tristan Smith, Energy Institute, UCL

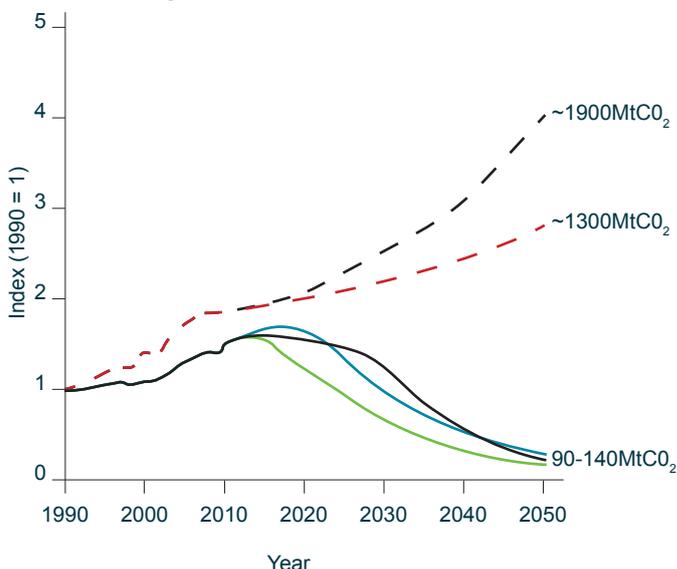
Shipping is a key component of both the UK and the global economy, but it has an uncertain future. A number of shipping related projects at UCL-Energy are looking at the possible evolution of the industry, particularly with an eye on achieving absolute emissions reductions and compliance with regulations to avoid dangerous climate change.

One project estimates the carbon price of a hypothetical shipping emissions carbon market based measure, using the transport model ‘GloTraM’; a model combining multi- disciplinary analysis and modelling techniques to estimate foreseeable futures of the shipping industry. The calculated carbon price shows high sensitivity to the constraints applied to the design of the market based measure, and highlights the importance of further work to understand market based measure design and their consequences.

The presentation concluded that:

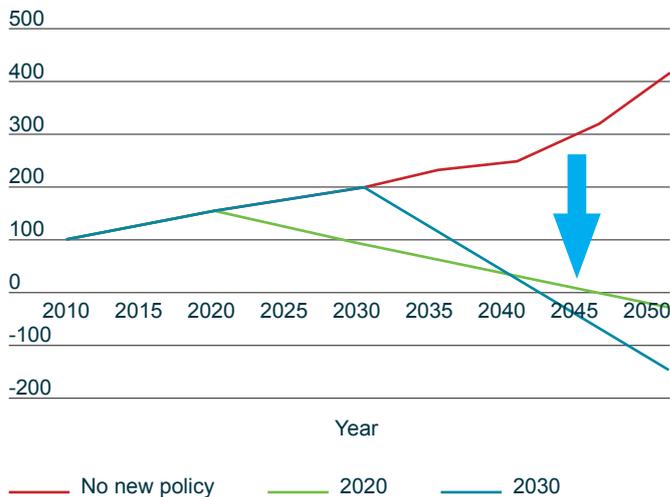
- The assessment of potential impacts on the industry from Market Based Measures (MBM) is in its infancy
- Indications suggest high risk of turbulence and of unintended consequences from policy measures
- Challenges lie ahead in unpicking some of the drivers of shipping CO₂ emissions, and the validation of currently envisioned scenarios

Superimposing IMO/ICS plans/projections on their high-level commitments



Anderson and Bows, 2012, Carbon Management (2012) 3(6), 615–628

We need to go far beyond the IMO & ICS’s flagship policies ...



Emissions index, 100=international shipping emissions in 2010.

Summary Presentations

“Energy system and shipping emissions interactions” by Dr Sarah Mander, Research Fellow, Deputy-leader of the Tyndall Energy Programme, University of Manchester, Tyndall Centre Research

The UK’s climate change mitigation policies require reductions in national CO₂ emissions of 80% by 2050, within specified emission budgets. Meeting these objectives necessitates the deployment of low carbon technology across the whole UK energy system for the provision of electricity, heat and energy for transport.

Current energy supply relies heavily on the shipping of fossil fuels in the form of coal, gas, oil and transport fuels; these contribute 46% of UK imports by weight. The future energy system may take many different forms, and different supply options will have a knock-on effect on the patterns of fossil fuel trade into the UK, with a corresponding major impact on the demand for shipping. Two contrasting future energy scenarios devised by the UK’s Department of Energy and Climate Change are used to explore future demand for fuel and their consequences for patterns of imports and on the CO₂ emissions from the shipping of that fuel.

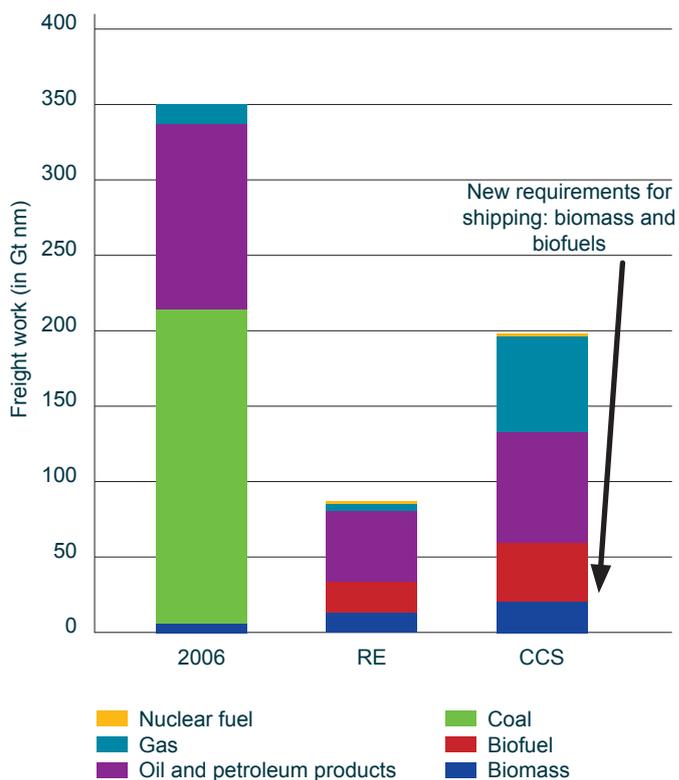
Key conclusions highlighted that:

- Under low carbon energy system scenarios, biomass and biofuels become increasingly important
- Bio-energy commodities offer a new market for shipping
- Transport of bio-energy commodities in dedicated carriers is essential, so that transport does not contribute significantly to CO₂ emissions
- Even without technological abatement, changing demand for fuels can reduce the CO₂ emissions from the shipping of fuel by between 81% and 62%, depending on the assumptions made about the future UK energy system

“Shipping in changing climates: a legal perspective” by Professor Joanne Scott, Professor of European Law, UCL

Prof. Scott examined the relationship between the principle of common but differentiated responsibilities and respective capabilities (CBDR) and the principle of non-discrimination.

Drawing on examples from the law of the World Trade Organisation (WTO law), Prof Scott considered whether the principle of non-discrimination leaves room for, or may even require, the differential treatment of different states, including on the basis of their development status. She also considered the role that the principle of CBDR has played, and should play, if/when the European Union engages in unilateral, extraterritorial climate action - such as in relation to the EU’s (postponed) decision on whether to include international aviation in the EU’s emissions trading scheme.



Freight work (in Gt nm) for fuel imports in 2050
 RE: ‘higher energy efficiency, more renewable energy’ scenario
 CCS: ‘higher carbon capture and storage, more bioenergy’ scenario

NOTE: Coal, oil and oil imports are most important for shipping in 2006

“I would emphasise that, probably more than any other industrialised region, the EU recognises the differentiated responsibilities and capabilities of various countries, and we are open to considering how this could be reflected in the use of revenues coming from further market-based action agreed upon in ICAO.”

Jos Delbeke (7 Feb. 2012) Director General for Climate Action, EU Commission

Summary of the discussion

What is the shipping industry's responsibility to reduce emissions?

- It was recognised that shipping is a difficult sector to decarbonise and that demand for shipping is expected to increase. As a result, emissions are likely to increase substantially in the shipping sector.
- It is still unclear what responsibility or obligation the shipping industry should have to reduce the emissions generated by its activity.
- There is a general agreement that the shipping industry needs to reduce its emissions and to agree on reduction targets in the sector.
- However, some in the industry argue that shipping cannot be held responsible for its absolute emissions given that it can only control its relative emissions (emissions per tonne km), and is unable to control global trade.

How to regulate shipping emissions?

- It is still unclear how shipping emissions should be regulated, particularly if regulation for absolute emissions is undertaken.
- According to the industry, shipping emissions should not be included into national emission targets, as it is a global industry.
- Participants agreed that regulation needs to be taken in agreement with the International Maritime Organisation (IMO) but this is a big institution representing close to 170 member states, which has a complex political dynamic.
- Sulphur limit regulations could have a strong impact on shipping's emissions. However, this might not contribute to CO₂ emissions reduction as it could lead to an increase in fuel consumption.

Other solutions?

- Requiring the shipping industry to pay tax on fuel – which would impact on overall prices and patterns of trade.
- Agreeing on a meaningful contribution to the green fund from the shipping industry.
- It was acknowledged that there is a lack of innovation within the shipping industry, and that there is potential for improvement. However, the variety of shipping types means that it's unlikely that one technological improvement will have a broad impact on the sector as a whole

Further research:

- There is a need to assess what the overall potential is for the industry to reduce its carbon emissions, by comparing it to other industries and then assessing the relative and absolute figures.
- It is unclear what impact market-based measures taken by the IMO will have on overall CO₂ shipping emissions reduction.
- Unintended consequences that could result from future regulations should be better understood.

Background

This seminar is part of a programme of activities funded through an EPSRC 'Impact Acceleration Award'. The initiative aims to create bridges between senior researchers, key policy makers and practitioners working in transport, to ensure that significant research outputs are rapidly absorbed into policy making and practice, and have practical impact.

This seminar was an opportunity for key policy makers to hear about recent academics' findings from the 'Shipping in Changing Climates'. This project aims to develop new knowledge on the subject of the UK and international shipping industry and its challenges to adapt in an era of changing climates.

The following institutions were represented:

- Department for Transport
- Department for Energy and Climate Change
- International Maritime Organisation
- International Chamber of shipping
- British Chamber of shipping
- Committee on Climate Change
- Carbon War Room
- Manchester University
- Energy Institute, UCL
- Centre for Transport Studies, UCL
- Faculty of Laws, UCL

References

- Jordan A, Schroeder H, Adger N, Anderson K L, Bows-Larkin A, Le Quere C, Joshi M, Mander S, Vaughan N, Whitmarsh L. 2013. "Beyond 2 degrees: the risks & opportunities of different options". *Climate Policy*. September
- Smith T. W. P. (2012) *Energy, Transport and The Environment: Addressing the Sustainable Mobility Paradigm*. In King D. A. and Inderwildi O. R. (Eds.) *Low Carbon Shipping*. Springer.
- Mander, Sarah; Walsh, Connor; Traut, Michael; Gilbert, Paul and Bows, Alice. *Decarbonising the UK energy system and the implications for UK shipping*. *Carbon Management*. 2012 December; 3(6): 601-614
- J.Scott & L. Rajamani, 'EU Climate Change Unilateralism' (2012) *European Journal International Law* at: http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1952554