

## Factor 20: reducing inland transport emissions

*One of the ways to reduce CO<sub>2</sub> emissions in the UK is to encourage a shift in the mode of transport used away from car travel to other modes. A significant modal shift is needed to support the UK Governments commitment to reduce emissions by 80% by 2050. This is a major challenge which embraces a complex set of academic disciplines.*

The three Midlands Energy Consortium universities along with partners from Newcastle, Leeds, Imperial, and Sheffield are part of a University of Southampton-led project working on this problem.

The EPSRC funded Feasibility Account, **Factor 20: reducing CO<sub>2</sub> emissions from inland transport by a major modal shift to rail**, is a suit of research projects that will explore the premise that, to bring about a significant reduction in UK CO<sub>2</sub> emissions from transport by 2050, rail system capacity and use will need to increase by a factor of 10 on current levels. Halving total CO<sub>2</sub> emissions from rail transport over the same period gives a reduction in CO<sub>2</sub> emissions per tonne- or passenger km by a factor of 20.

This is a major challenge, and the potential barriers are manifold. They encompass economics, human behaviour, societal norms and social acceptance as well as technical, operational and social factors. Radical thinking in all of these areas is needed, covering work and travel patterns, incentivising rail travel above other modes, improving its attractiveness, optimising system capacity and spreading use, and overcoming societal, political and economic constraints on the development of new lines. The project will consider all types of railways, including metro systems and light rail, commuter, long-distance and rural passenger services, as well as freight. The project aims to deliver radical thinking across all the disciplines.

The Midlands Energy Consortium is involved in projects looking at:

- Reducing headway – examining how we can safely reduce the gap between trains on the track as a mechanism to increase the railway network’s capacity. This could involve trains running in “platoons”, which requires an understanding of a variety of issues including train dynamics and aerodynamics, track vibration etc; or trains running separately but much closer together than at present, which would require changes in train control methods.
- Decision making in the railways – using cognitive ergonomics to examine how people, both staff and the public, make decisions in the rail sector. The project will look specifically at people’s environmental decision-making, with a view to using simulation or games to inform people of more sustainable travel alternatives
- Harnessing data collection and monitoring – there is a massive array of data collected in the railways from photography of track, electrical sensor measurements of the points to through to data about passengers / freight and their movements. This project will look how best to structure data and facilitate the exchange across industry stakeholders.

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