To:	Transport & Health Policy Makers, & Practitioners
From:	Prof Adrian Davis, TRI, Edinburgh Napier University
Date:	30th September 2019
Subject:	Essential Evidence 4 Scotland No. 16 Lifestyle, transport energy and decarbonisation

Top line: Given the many uncertainties involved in decarbonising the transport sector, there are strong arguments for pursuing both demand and supply side solutions in order to make the path to deep decarbonisation more sustainable and potentially more certain.

Societal energy consumption and pollutant emissions from transport are influenced not only by technical efficiency, mode choice and the carbon/pollutant content of energy but also by lifestyle choices and socio-cultural factors (which create energy 'demand'). However, only a few attempts have been made to integrate all of these insights into systems models of future transport energy demand or even scenario analysis. Researchers have sought to address this gap in research and practice by presenting the development and use of quantitative scenarios using an integrated transport-energy-environment systems model to explore four contrasting futures for Scotland that compare transport-related 'lifestyle' changes and socio-cultural factors against a transition pathway focussing on transport electrification and the phasing out of conventionally fuelled vehicles using a socio-technical approach.[1]

The researchers found that radical demand and supply strategies can have important synergies and trade-offs between reducing life cycle greenhouse gas and air quality emissions. This study found that the carbon budgets set by sub-national policy in Scotland may only be achieved in a radical lifestyle (LS) and high electric vehicles (EV) pathway future (LS EV). While the results are plausible, they will be very difficult to achieve without early action and a holistic, integrated approach as depicted in the LS EV scenario. Even then, the results suggest that the 1.5C target for containment global temperature will be very tough to meet in Scotland without *further* action on heavy goods vehicles, international aviation and shipping – the 'supply side' (where electrification is problematic), and further decarbonisation of the power sector beyond 2030.

The most significant impact of lifestyle change on the transport-energy system is due to reductions in the overall demand for transport energy, particularly for fossil fuels. Lower transport energy demands bring benefits for energy system costs, carbon emissions and energy import requirements. Lifestyle change alone has a similar effect on total transport energy demand to a transition to EVs with no lifestyle change. This has important implications for climate mitigation policy. A scenario that involves lifestyle change will place much less pressure on policy to require rapid (and potentially disruptive) technical change, including technologies at the point of use. This holds true even if the power sector were to decarbonise further than what has been assumed in this study beyond 2030.

Yet, the detailed modelling of four contrasting futures suggests that both strategies have limits to meeting legislated carbon budgets, which may only be achieved with a combined strategy of radical change in travel patterns, mode and vehicle choice, vehicle occupancy and on-road driving behaviour with high electrification and phasing out of conventional petrol and diesel road vehicles. The newfound urgency of 'cleaning up our act' since the 2015 Paris Agreement on climate change and the Dieselgate scandal suggests that nations cannot just wait for 'technology fix'.

[1] Brand, C., Anable, J., Morton, C. 2018. Lifestyle, efficiency and limits: modelling transport energy and emissions using a socio-technical approach, *Energy Efficiency*, 12(1): 187-207.