

Brief: describe research going on around sustainability and Covid recovery including outlining the kinds of challenges that TfGM is facing, the sorts of decisions that are having to be made, what your research is doing etc?

Infrastructure, which includes transport, energy, water, waste, flood protection and digital communications, is crucial to environmental, social and economic wellbeing. However, in its current form it is neither sustainable nor resilient. Both the Climate Change Committee and the National Infrastructure Commission have identified that transforming infrastructure systems is essential to the UK's sustainable development and net-zero commitments.

Covid-19 has highlighted the deep uncertainty associated with infrastructure decision making, which can make this transformation very difficult to do in practice. Researchers at the University of Leeds have been working closely with Transport for Greater Manchester (TfGM) to build flexibility into their Covid recovery plans and into future decision making processes.

Patterns of travel (in terms of frequency of trips, where trips were made and the modes used to travel) changed dramatically during the initial lock-down period with a reduction in public transport use and a surge in and cycling. The reductions in commuting seen during lock-down have persisted as restrictions have been relaxed but it is not clear how this will affect travel patterns and mode in the long-term. 'Future reference case' forecasts projecting what travel patterns will be like in the future are used to underpin decisions about whether to invest in new infrastructure (like extending urban light rail networks or cycle lanes) and how to operate existing infrastructure. The uncertainty highlighted by Covid (but which has always been present) means these forecasts are increasingly unreliable and could lead to costly mistakes.

We have been working with TfGM to improve how it understands and accommodates uncertainty in its decision making processes. The research is helping TfGM understand how their current activities and future plans might be vulnerable to uncertainties around changes in public attitudes and the speed of recovery in economic activity, and to reduce that vulnerability. It is also helping to connect interventions made to respond to Covid with long-term objectives, like climate change mitigation, to ensure that actions now do not lock the transport system into an unsustainable pathway.

Insights and techniques that are being developed and successfully implemented to support Covid recovery can be used to accommodate other uncertainties, like climate change and technology change, in decision making processes and in other sectors and organisations.

There are several ways to accommodate uncertainty in all stages of infrastructure decision making – including during strategy development, options analysis and formal appraisal. The '[Robust Decision Making](#)' method can be used quickly and qualitatively by the public sector to build the tolerance of plans to deep uncertainties. [Adaptive decision making](#) can build flexibility into key policies and interventions whilst directing change towards a particular goal.

Our research has shown how these decision making approaches can be used in the public sector, and we believe they can be beneficial for national policy makers working across infrastructure.