

Commission on Travel Demand

Response to the National Infrastructure Commission Consultation on
a National Infrastructure Assessment

December 2017

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Background

The Commission on Travel Demand is an independent group which has been assembled as part of the Research Council UK funded DEMAND Centre. It has been established to bring together the state-of-art in understanding how travel demand is changing and may change in the future, recognising controversies which exist over current forecasting practice. The Commission also explores professional practice and what would need to change for alternative ways of representing demand futures to become useful and usable by decision-makers.

There are three main rationales for the establishment of the Commission on Travel Demand:

- Carbon obligations which will increasingly require demand reduction
- Large scale uncertainty about what demand futures could be
- Institutional inertia in changing the way we plan

Its aims are to:

- Describe how demand is understood within the transport sector today and consider alternative approaches
- Understand how new types of demand are emerging and old types of demand disappearing and the influences on these processes
- Characterise the anticipated nature and speed of change in key elements of the mobility system and how this will interact with demand
- Explore how current practice would need to change to incorporate new insights, the barriers to change and how these might be overcome

The Commission has conducted its work through a call for evidence (all published [here](#)) and through six expert evidence sessions (summary reports of which are available [here](#)). The response to this consultation draws on this evidence from around fifty academics, cities, consultants, companies and NGOs.

This response draws on the evidence of the Commission but the content reflects the views of the author and not necessarily all of the Commissioners.

General Comments

I have followed the NIC's approach to analysing infrastructure need and to engaging with stakeholders. It offers a valuable additional, evidence-led approach to thinking for the longer-term about infrastructure needs. Before responding to the details of some of the consultation questions a few general observations are laid out.

First, any assessment of infrastructure need has to be informed by some assumption about demand for that infrastructure which is in turn a set of assumptions about infrastructures in use. The work of the DEMAND research centre, through which the Commission on Travel Demand is funded, focuses on how infrastructures not only meet demand but shape demand. In general, this kind of perspective was somewhat missing from the Assessment. For example, on Page 16 on carbon reduction the two options tabled were energy efficiency and changing prices for generation. Recent work (Shove, 2017) challenges the reliance on efficiency alone as a notion for reducing demand as it tends to embed existing consumption patterns in its approach or possibly contributes to ratcheting them up. This is evidenced in up-sizing of vehicles over time to absorb engine efficiency improvements for example.

It is by engaging with not just the technologies but the practices which use the technologies that one can engage with ideas of steering levels of demand. So, for example, the current boom in on-line shopping has led to reductions in personal trips for retail but growth in delivery vans. Our initial assessment is that this is a net benefit to emissions and reduction in miles travelled. However, that does not hold into the future if we continue down the route of ever shorter time windows for delivery (which work against consolidation) and fragmentation of deliveries. The planning system could be used to steer this trend to a system requiring fewer miles driven but still maintaining most, if not all, of the social value that the on-line revolution has created. This is not about efficiency of technologies per se but about broader system thinking about how to organise to steer demand (Jones et al., 2018). Infrastructure need can best be demonstrated when it is clear what the infrastructure is being used for.

Having noted this general point of framing, the NIC report tackles a hugely important policy 'elephant in the room' in the future of how we pay for transport. The approach to forecasting demand in the transport sector (see further below) has limitations. However, the continued decision to exclude the full transition to EVs from future projections is something which cannot be defended. Whilst this may be addressed in the NRTF 2018 refresh it still poses a really important set of questions. If nothing is done about changing the way we pay for travel (which although a very bad policy choice from an economic perspective is nonetheless possible) then there will be a huge reduction in the per mile costs of driving. The elasticities of demand for travel by car with respect to price are between -0.1 and -0.5 in the short and long run (Dunkerley et al., 2015). This drift to cheaper costs could have massive implications for any assessment of 'need'. That need though is only present because of policy inaction. It is not a need that is there today. I have written more on this in a recent report to the Foresight Future of Mobility study. This is under a non-disclosure agreement so if you require further information you can contact me or the project officer for that study (Benedict Taylor, Government Office for Science).

This leads to the final point of introductory comment. The task of the NIC is undoubtedly a challenging one in so far as it has to make an assessment of need far beyond current government

policy horizons in many fields. However, that is somewhat different to having to make policy in the absence of a government policy at all. Here, the lack of a National Transport Strategy for England (which draws down the largest proportion of resource spend) is particularly challenging. Such strategies exist in Wales and Scotland and feed the infrastructure pipeline. This is not to say that there is no transport policy or indeed that many things are not progressing. But what there is scattered across modes or technologies. It is difficult to see how need can be defined in the absence of such a coherent overarching statement which recognises and incorporates some vision of these future technologies and opportunities and how they will shape our transport system of the future.

As noted above with the EV example, not having a written policy is not the same as not having a policy. In that example no policy would be one of the most extensive changes to how we pay for travel ever delivered (entirely tilted towards the private motorist). It would be helpful if you could identify in your infrastructure assessment where in particular the absence of policy makes a difference to the assessment of need. The Commission on Travel Demand's [analysis](#) of the 2015 national road traffic forecasts shows that the lower demand scenario, which is deemed feasible by the Department for Transport, could result in 100bn fewer vehicle kilometres by 2040. Transport policy and the approach taken to shaping demand futures matters massively to need and, therefore, to the types of investment required to support any particular pathway.

Response to Consultation Questions

4) Cost-benefit analysis too often focuses on producing too much detail about too few alternatives. What sort of tools would best ensure the full range of options are identified to inform the selection of future projects?

This question was part of the sixth evidence session of the Commission on Travel Demand. Here, the [approach adopted in the Netherlands](#) may be of interest which incorporates scenario planning and more exploratory modelling tools to think about what the right investment options could be. The approach is then to take a stepwise approach to investment in projects where there is uncertainty about need. Cost-benefit analysis still features but it is not used to organise what schemes get thought about. That seems to be the critical issue for the NIC to grapple with – where in the process does a more detailed CBA need to be conducted. CBA is at its strongest when it is comparing similar schemes or route alternatives and where the assumptions it is based on are not uncertain. That seems to be less likely in transport over the coming decades (e.g. the advent of AVs and Mobility as a Service). Therefore reducing its primacy in the process might be helpful to ensure that there is not an overinvestment in apparently robust analysis which is in fact based on assumptions which do not hold water.

In a recent paper which is under review (Lyons and Marsden, 2018) I worked with professor Glenn Lyons to look at uncertainty in the transport sector and how it might be treated. The paper came up with four questions which are set out below. However, these seem important or relevant to the infrastructure assessment more generally:

“Test 1 – Nature of the decision – to what extent is the opening out of uncertainty important to the planning or decision-making process in question?”

Integrated large area strategies or very substantial infrastructure investments are framed and assessed over large areas and long timescales. These are processes in which the transformative change in the mobility system might alter the package of interventions that makes sense, the need for specific interventions or the scale and flexibility required from future investments. Failing to open out the scoping process to incorporate a fuller range of uncertainties would seem unreasonable. By contrast, lighter touch procedures would seem appropriate and proportionate for decisions which are likely to be viable in the short-run, which are reversible or easily adaptable or where more elaborate assessment procedures are disproportionate to scheme costs.

Test 2 – Uncertain future conditions – if more extensive opening out is necessary then has a set of plausible societal futures been developed that reflects the level of uncertainty faced?

Critical uncertainties - pertinent to the consequences of the possible transport system change - should have been identified from examination of social, technological, economic, environmental and political drivers of change. If these are not accounted for in the societal futures considered then uncertainty will be under-represented. Godet and Roubelat (1996: 196) suggest that scenario approaches are only useful when they comply “with four prerequisites: relevance, coherence, likelihood and transparency”. As such, there needs to be a process of development and testing of the scenario assumptions which allows for multiple knowledges to be incorporated and for there to

be confidence that the scenarios are agreed to be plausible. This would be a substantial shift in current practice.

Test 3 – Closing down options and assessment – does the process adopted for the closing down of assessment correspond to the outcomes of Tests 1 and 2?

For interventions which fit in the category of smaller, shorter term or reversible projects, the continuation of current practice of assessing the sensitivity of the project outcomes to plausible variations in inputs over the near term seems proportionate. However, for longer term and larger projects with long pay back periods a much wider consideration is needed. The Treasury's test in the UK asks, in assessing options, whether there are better ways of meeting an objective. We suggest this needs recasting to ask whether meaningful options are being tested given the anticipated differences in future scenarios. It is not just a case of asking if a project works in multiple futures but whether some futures demand different types of solution.

Current practice might suggest a need to test an option or multiple options in multiple futures to be disproportionate given the analytical resource it might demand. This, to us, is a question of the approach taken to understanding futures. Current tools are expensive to build and run and data hungry. They are not necessarily an effective guide to alternative futures. Preference can be given to closing down the number of options and scenarios too far because of the resourcing implications of the perceived need for subsequent 'robust' analytical modelling of each combination. It may instead be just as robust, if not more so, to apply more simplistic analytical techniques to examine a greater range of scenario/option combinations in the interests of identifying those options that seem most resilient towards or compatible with the breadth of plausible scenarios reflecting uncertain future conditions (Test 2). There is also no analytical reason why all policies or projects would have to be assessed in every future. If the solution set were to be the same then it suggests either a lack of variation in the scenario content or a lack of imagination in the planning process.

Test 4 – Transparent treatment of uncertainty - is guidance for decision makers that emanates from the opening out and closing down processes transparent about its limitations?

It is possible for guidance to give a false sense of confidence to a decision maker if this is not the case – especially if analytical weight and false precision in numerical results for elements such as cost-benefit analysis are at play at the expense of spelling out the full extent of underlying implicit (bias related) and explicit assumptions. Here, we wish to acknowledge that the UK process for assessing traffic growth and scheme design has sought to be extremely transparent albeit, perhaps inevitably, that elements of bias are retained within it. Accepting that there is more uncertainty about travel demand futures is difficult for decision-makers. Decisions are more likely to appear to be 'wrong' with hindsight. However, the alternative approach of ignoring those uncertainties will surely expose decision-makers to greater error. Test 4 is about ensuring that the uncertainties are clearly presented and that decision-makers arrive at their decisions in the light of those rather than in ignorance of them. How to do this well requires further research."

9) What strategic plans for transport, housing and the urban environment are needed? How can they be developed to reflect the specific needs of different city regions?

Whilst this is best answered by cities, the evidence to the Commission on Travel Demand below from [Peter Headicar](#) shows just how variable the demand for travel is across different areas. There are very different trends in our big urban areas and in particular closer to the centre of our big urban areas than we see in smaller towns and cities.

Chart 5

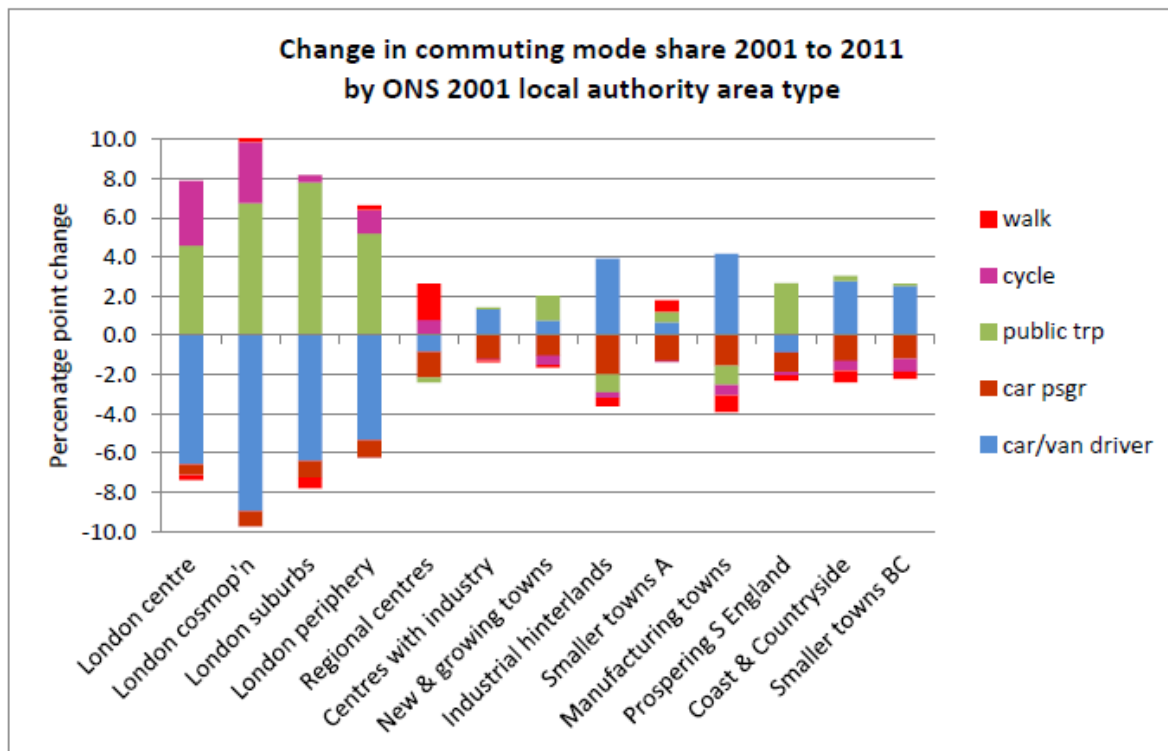


Figure 1: Commute changes (Evidence from Peter Headicar)

One of the observations we have made through the work of the Commission on Travel Demand has been that, whilst the changes in different areas are beginning to be recognised, they are not necessarily well understood. The Department for Transport, whilst being confident in its overall demand model calibration recognises that at a disaggregate level it is less accurate. This is a problem for cities as they are supposed to work with TEMPRO data for forecasting how to deal with housing, employment and population growth.

The figure below is an extract from the draft Leeds development plan. It shows a rising trend of traffic which, for all lines is at a gradient not seen anywhere in the city for morning peak or all day traffic growth in the city at any time since the data series started back in 1990. This suggests that cities are being asked to plan for growth that might not actually be believable. In this example it is important to note that the early 1990s were still a period of national traffic growth and the whole period has been one of job and population growth in Leeds. Why now would there be a radical increase in traffic? Our emerging view is that, where capacity exists to take this on, cities would be better placed to develop their own demand futures and projections and the Department for Transport would take more of an oversight role.

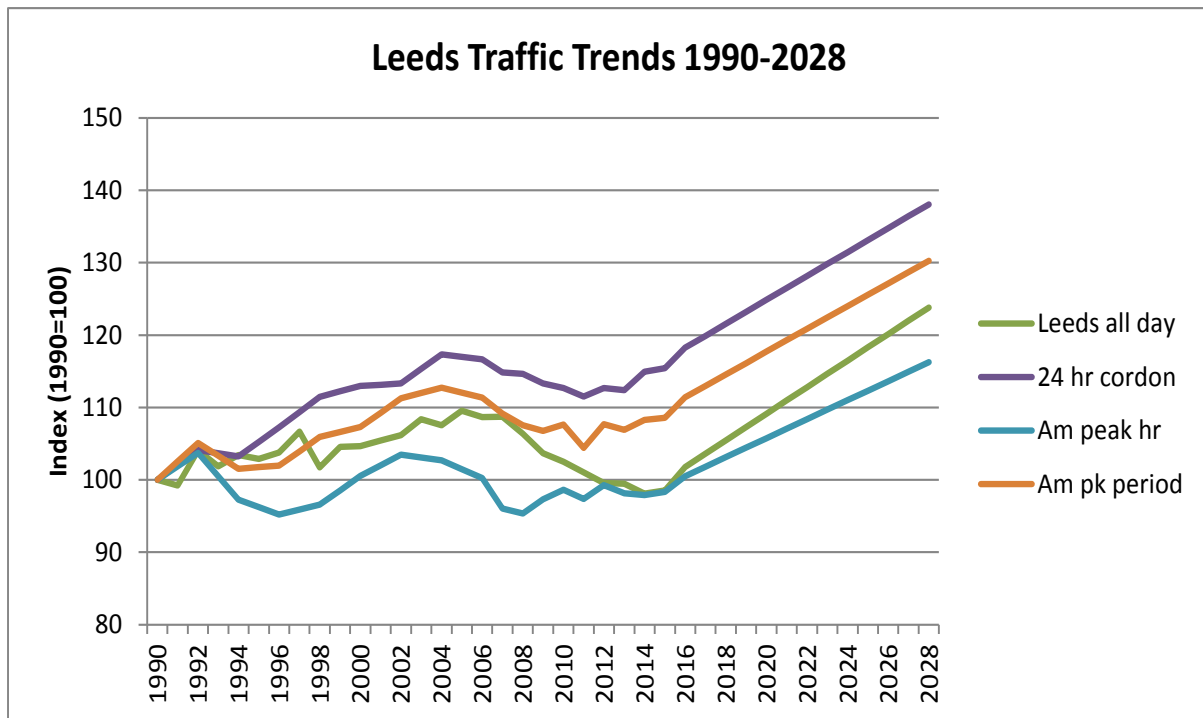


Figure 2: Traffic Growth from draft Leeds Development Plan

12) What mechanisms are needed to deliver infrastructure on time to facilitate the provision of good quality new housing?

On a related note, the commission looked at [evidence](#) on planning and transport demand. In particular, Keith Mitchell’s [evidence](#) pointed at the dilemma facing places dealing with housing growth. He wrote:

“The development planning process outside the main conurbations is caught between stages one and two – places that are seeking economic growth and regeneration through housing and employment development, quite likely to be suffering from the effects of road congestion, wanting to support public transport, walking and cycling, but finding this hard to do and instead continuing with the predict and provide, roads based thinking they are used to, and in response to public/ Member concern...

There are a range of effects arising from these issues, all of which tend to work against the objectives of good growth. There are three broad issues: The lack of a clear vision for development and a plan for infrastructure delivery at the local plan level can result in unplanned development being permitted, and undermine the effectiveness of, and funding for the intended infrastructure plan, and the sustainability derived from the intended relationship between housing, employment and other facilities.

Whilst the conflicts inherent in the transport assessment and development management processes persist between good growth objectives and the public perceptions that drive decision making, the process of securing planning permission will continue to be lengthy, costly and ineffective in delivering good growth.”

In summary, it is not possible to deliver good growth without taking a more pro-active and vision-led approach to planning for new housing sites. Business as usual will lead to an incremental roads based set of developments which will create further infrastructure pressures down the line. Why though would developers take on the risk of more speculative or advanced investments in transport systems to unlock areas in a more sustainable way? This will require state funding and it will require a decision to put this in place before the traffic is generated. It will inevitably dent the BCR of the projects. However if that were a matter of policy then the BCRs would be used to assess which sites to open up first not whether or not to do development like this. My understanding is that this is the approach adopted to opening up housing growth in Stockholm. We also took [evidence from Oslo](#) where the national government has asked cities to work out how much it would cost to allow their growth plans to happen with zero traffic growth. To underline the key point here, this is not going to happen with solely a technocratic led approach. It requires a policy commitment and it will require up front state funding, some of which can then be clawed back through augmented Community Infrastructure Levies if the places become as attractive to live in as anticipated.

20) What changes to the design and use of the road would be needed to maximise the opportunities from connected and autonomous vehicles on:

- motorways and 'A' roads outside of cities?
- roads in the urban environment?

Overall the NIC is right to look at some really exciting options to change how we use road space by time of day and across modes and lanes. Some of this may only become really game changing as almost all vehicles are autonomous though. I think though the division of roads needs flagging up. As shown in Figures 3 and 4 below, there is a bifurcation between trends in urban areas (including quite widely drawn boundaries of urban areas) and the Strategic road network. Growth may not be possible to cater for in urban areas, yet we seem to continue expanding inter-urban links. This interface and what to do about it is critical. If there is no space for growth in urban areas then the implications of expanding inter-urban links would tend to promote sprawl. I have yet to see very strong joint working to address this problem. It matters now and will be critical well before technology starts to offer opportunities to improve it.

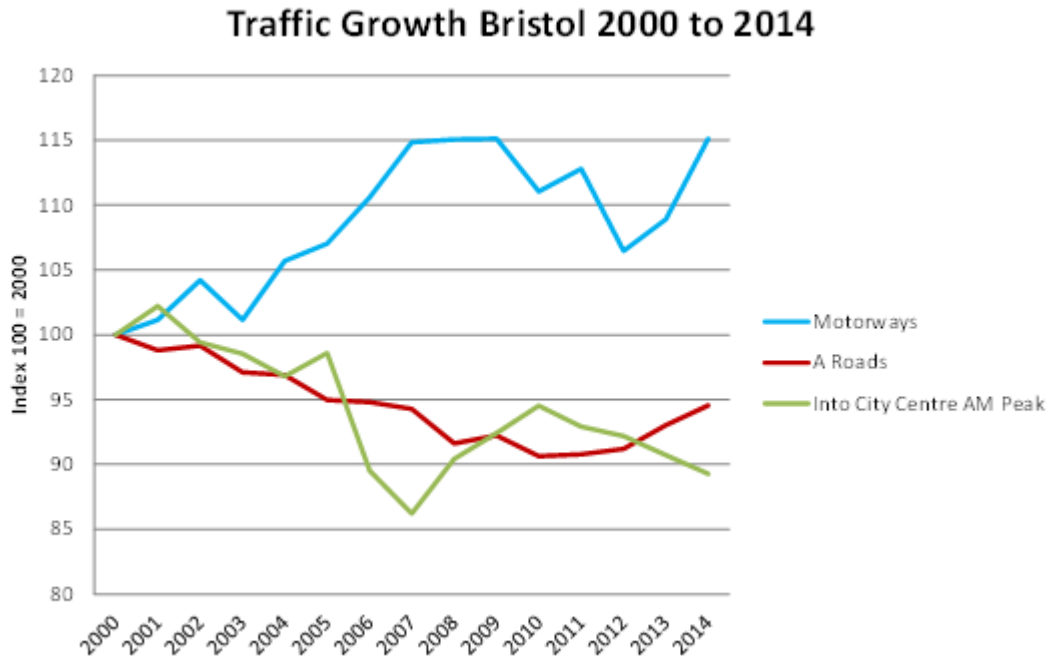


Figure 3: Traffic Growth in Bristol ([Evidence](#) from Commission on Travel Demand)

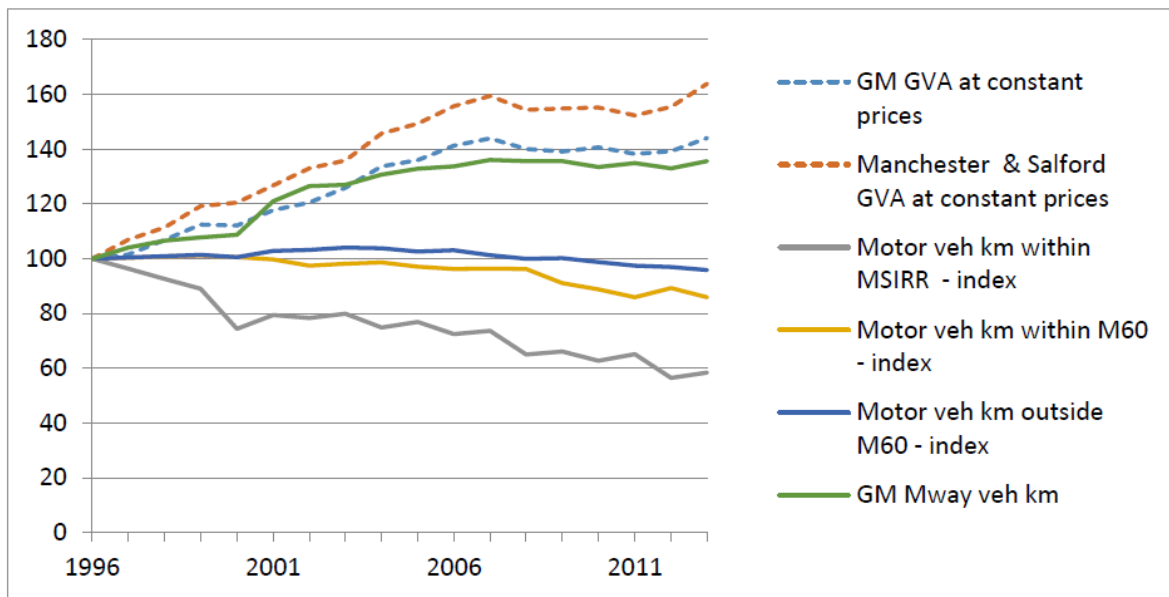


Figure 4: Traffic Growth in Greater Manchester ([Evidence](#) from Commission on Travel Demand)

21) What Government policies are needed to support the take-up of electric vehicles? What is the role of Government in ensuring a rapid rollout of charging infrastructure? What is the most cost-effective way of ensuring the electricity distribution network can cope?

There is further treatment of this topic in the recent study completed for the government Office for Science on Future Mobility governance as noted earlier. I am not able to disclose that here but would be happy to facilitate further conversation on this.

A critical issue which is not well addressed yet in transport is the justice implications of this transition. Who pays for the improvements to the grid? The drivers, households (through energy bills) or the government. This is, to me a part of the need to set out a vision for how we pay for travel in the future and what the bargain is with the public about this. Great care needs to go in to understanding who will have access to the technology and therefore whether this is a regressive approach or not (see Mullen and Marsden, 2016). There are precedents with solar subsidies etc. for the well off to do better out of the subsidy schemes.

Other issues

The consultation is a complex process so I keep these observations brief and would be happy to expand further at a later date:

1. There is a need to plan for managing the decline of infrastructures. E.g. filling stations and refinery capacity. Will these become strategic resources requiring subsidy?
2. Greater emphasis needs to be given to thinking about the resilience of EVs and AVs during power cuts. Loss of power is probably one of the most significant problems in severe winter weather, storms etc.. Rather than individual links in networks being lost as today it will be individual links and whole control systems and refuelling/charging capabilities. If our networks are developed to move ever greater capacities of vehicles in AV mode then it will not be possible to switch back to manual and expect the system to cope.

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