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IMAGINED PRACTICES AND THE FUTURE OF PERSONAL MOBILITY

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Abstract

We report from a project on the futures of personal mobility in the UK, in the context of sustainable mobility and the need to reduce greenhouse gas emissions from transport. This paper looks at how people, behaviour and mobility are imagined in visioning documents (forecasts, pathways, etc.) in the future up to 2050, a timeline with great emission reduction targets. We use the lens of two innovations, electric vehicles and car clubs, to consider how potential adopters/users are imagined and constructed.
We find that people are imagined primarily as consumers, using the rational actor paradigm. The analysis highlights a tension and seeming dissonance between the imagined public as rational actors and more complex real behaviour. Choice-based approaches limit imagined behaviour (change) to modal choice, or even choice of vehicle purchase, thereby limiting discourse on behaviour change, rather than opening it up. Imagined future mobility in most visions is business-as-usual, with privately owned car transport dominating personal mobility, and technological innovation supplying vehicles with reduced emissions; the link between transport and economic growth is invoked to support continued high transport demand. Car club visions show less car ownership, but retain high mobility and an economic growth perspective. Our findings support the idea that some future mobility visioning is used to support the status quo, rather than explore a variety of futures, by portraying a near business-as-usual option as the only future.

1. INTRODUCTION

The future of personal mobility is an important and topical debate, which ties into discussions about greenhouse gas emissions and sustainable development, as well as technological innovation, economic growth and energy security. In the UK, transport accounts for roughly 25% of all CO_2 emissions, approximately 2/3 of which comes from cars and vans [1]. Growing pressures over road transport's contribution to anthropogenic climate change are compounded by concerns over air pollution and road congestion.

In the UK, cars became the dominant mode of travel in most people's lives after World War II and automobility (the practices, landscapes, institutions, knowledges and cultural representations centred on the privately owned car [2]) came to dominate surface transport. However, since 1990 the use and private ownership of the car have stabilised and even declined, particularly among younger generations and in cities [3]. How significant this 'peak car' phenomenon will be in the long term is not yet clear. On the one hand, systemic change is difficult to achieve because numerous path dependencies in terms of land use, policy, finance, expert knowledge, and people's practices and emotions trap the UK (and the Global North more generally) into continued reliance on the private car [4]. On the other, there are a range of innovations that could reduce greenhouse gas emissions that may durably reconfigure automobility and drive a systemic shift towards more environmentally and socially sustainable mobility in the future. Examples include alternative power trains, such as battery electric vehicles and plug-in hybrids, hydrogen vehicles and biofuels, all with the potential to greatly reduce fossil fuel use. Other key innovations revolve around product-to-services shifts and the integration of information technology into mobility. At the intersection of the last two sit various forms of car sharing, including car clubs – short-term rentals provided by a for-profit firm or not-for-profit organisation.

With many potential innovations and cultural shifts, visions about the future of personal mobility are very much dependent on assumptions about the direction it should be taking. While there are many studies about how new powertrains and other innovations might diffuse under a range of economic and institutional conditions [5,6], there are far fewer studies that critically reflect on how visions about the future of personal mobility are constructed. A notable exception is a recent study on how users are imagined in the visions about the future of electric vehicles (EVs), constructed by a range of stakeholders from the car industry and government in Norway [7]. Imagined users were segmented similarly to the sequential innovation diffusion model [8], with people thought of as 'early adopters', 'current users', 'new users', 'future users' or 'the common Norwegian'. Each group was portrayed either homogenously or with two or three subgroups such as 'EV as second car' or 'city users'. Early adopters were of the most interest, portrayed as environmentalists, idealists and enthusiasts, less concerned with cost and performance.

Our study complements and extends the above work by critically examining how 'future explorations' (visions, forecasts, pathways, etc.) of personal mobility are constructed. By examining future explorations by different stakeholders, it aims to identify how the future is imagined in terms of people, behaviour and personal mobility. Given the current dominance of automobility, the study focuses on two innovations in private car technology,

ownership and use: EVs and car clubs. The analysis offered below suggests that the public is overwhelmingly imagined as consumers who behave as *rational economic actors*, making transport decisions that maximise their utility, and that behaviour (change) is imagined narrowly in terms of modal choice or even choice of vehicle purchase. These imaginings are underpinned by assumptions of strong links between transport and economic growth and continued high levels of demand for car use. It thus appears that the considered future explorations support the status quo, rather than explore a variety of futures, by portraying a near business-as-usual option as the *only* future.

2. BACKGROUND

Visions of the future are powerful tools in policymaking, not least through their effect on present policies. In the context of future innovations, the literatures on strategic niche management (SNM) [9] and transition management [10, 11] suggest that creation of forecasts, pathways, future visions, etc. can generate support from a greater range of stakeholders and additional (financial) resources that may advance the uptake of particular innovations. Visioning exercises and documents make various assumptions about the future, including imagining the nature and behaviour of (non) adopters/users of innovations.

In the context of sustainable development, and especially when rapid technological change is required, "technology promoters have much to gain by having 'the public' on-side rather than resistant to innovation" [12, p.931]. While public engagement is an option, in technology, industry and policy circles an *imagined public* is also invoked, with presumed voice and subjectivity [12,13], i.e., decisions are made with an imagined public response in mind. How the public are imagined can significantly shape innovation trajectories in visioning exercises. For example, if purchase is key, people might be imagined primarily as consumers [12,13]. Imagined publics tend to be portrayed as 'universal individuals' [14], sometimes segmented into a number of groups (of interchangeable individuals).

In the transport context, behaviour is often imagined as a collection of independent *choices* made by individuals, from daily travel to car purchase [15]. However, the literature challenges this idea, e.g., one study [14] suggests that car ownership and use are about identity, not just practicalities of mobility. Another [16,17] found that travel attitudes and strategies were affected by a wide array of parameters, from personality and lifestyle to socio-economic characteristics and prior experience, well beyond demand models used in public policies.

A key question in the future of personal mobility is whether it is with or without personal vehicles [18]. Currently, future visions appear to be dominated by business-as-usual assumptions of continued car use; even recent documents project overall automobility and travel to remain stable or increase, despite 'peak car'. In this narrative, ULEVs (ultra-low emission vehicles) allow combating climate change, and consumer behaviour is sometimes reduced to a means of distributing technology, which will in turn reduce emissions. In contrast, studies suggest car clubs have the potential to reduce driving mileage, demand and car numbers [19] as part of a product-to-services shift in the transport sector.

Forecasts of market shares of ULEVs vary widely, and depend on assumptions about technological development, policy and public attitudes. A recent review and modelling exercise

[5] suggests subsidies were important in the short term for market creation, but in the longer term have little impact on their own, with public attitudes playing an important role. The model predicts conventional vehicles will be completely dominant through 2020, with 3/4 of the market share in 2050. Only a combination of subsidies, marketing and technological improvements saw ULEVs gaining significant ground. Nonetheless, thinking focused on financial incentives seems to dominate. In this framing, people are portrayed as rational consumers. This thinking is evident in recent studies of electric vehicles (EVs). A study of EVs in Finland [20] found that an economic discourse dominated over ideas of social embedding, constructing EVs either as a business-as-usual option or from a rational consumer perspective. In the Norwegian EV study [7], users were mainly portrayed as rational actors concerned with cost. However, 'range anxiety' was believed to be a major concern, and seen as an *irrational* fear, a psychological barrier that would disappear with experience.

3. METHODOLOGY

3.1. Two innovations

We focus on two innovations that are closely linked to the currently prevailing system of automobility: electric vehicles (EVs) offer technological reduction in greenhouse gas emissions whilst potentially continuing the dominance of private vehicle ownership; and car clubs as one form of car sharing, which offer a cultural and behavioural shift that potentially forms part of an emerging mobility services paradigm. The fact that the innovations are qualitatively different, both in focus (technological / social) and in institutional make up, drivers, and perceptions, allows for a broader, more informative critique of how visions of a future more sustainable mobility systems are constructed.

3.2. Document selection

We look at 'future explorations' (visioning documents) prepared by, and on behalf of, a range of stakeholders in the UK transport sector, including government, industry, consultancies and transport coalitions. We chose documents published in 2002—2015, a period which saw a rise in the need for low carbon transport and a certain hype over EVs (and hydrogen). We selected documents that explicitly discussed EVs or car clubs and contained projections about the mid-term future (2020s through 2050s), a period long enough for a socio-technical transition in personal mobility to unfold [21], and a time horizon with great emission reduction targets. We identified some 40 relevant documents through searches of the websites of well-known organisations (DECC, RAC, CarPlus, etc.), references in documents and academic journals, and suggestions from colleagues. This search is unlikely to have been exhaustive but gave a wide enough range of perspectives for analysis. After initial screening, the set of documents was reduced to 20 which offered a representative range of the full set and which were suited to in-depth textual analysis. The primary focus is on EVs, which are prominent in transport research and future explorations. Car clubs receive less focus in research, and we found very few such documents focusing on car clubs, so we had less choice there. In total, three explorations focus explicitly on EVs and four on car clubs. The majority focus on the

Table 1: The 20 documents chosen as future explorations of transport in the UK. The letters a-t in the first column will be used to reference the explorations in the results section.

	exploration	year	produced by *(& for)*	focus	time horizon
a	Developing Car Clubs in Scotland	2010	Richard Armitage *for Transform Scotland Trust*	car clubs	2015 (& 2027)
b	Car-sharing in London – Vision 2020	2014	Frost & Sullivan *for Zipcar*		2020
c	A new approach ... carsharing systems: Case study of London	2014	Le Vine et al. *(academic publication)*		no timeline
d	A Car Club Strategy for London	2015	(members of the) Car Club Coalition		2025
e	Investigation into the Scope for the Transport Sector to Switch to EVs and PHEVs	2008	Arup and Cenex *for BERR and DfT*	EVs	2030
f	Market outlook to 2022 for BEVs and PHEVs	2009	AEA *for CCC*		2022
g	How to Avoid an Electric Shock: Electric cars: from hype to reality	2009	Transport and Environment		2050
h	Market Delivery of Ultra-Low Carbon Vehicles in the UK	2011	Ecolane *for RAC Foundation*	ULEVs	2020, 2030
i	Leading the Charge: Can Britain develop a global advantage in ULEVs?	2013	Institute for Public Policy Research (IPPR)		2030, 2050
j	Pathways to Future Vehicles: A 2020 Strategy	2002	EST (TransportAction) *for UK Government*	road transport	2020
k	Passenger Car Market transformation model	2007	Element Energy and Ricardo Ltd *for EST*		2020
l	The King Review of low carbon cars: Part I	2007	Julia King *for UK Government*		2030, 2050
m	The King Review of low carbon cars: Part II	2008	Julia King *for UK Government*		2030, 2050
n	Powering Ahead: The future of low-carbon cars and fuels	2013	Ricardo-AEA Ltd *for RAC Foundation & UKPIA*		2050
o	Fourth Carbon Budget: Reducing emissions through the 2020s	2010	CCC *for UK Government*	UK economy	2023-27 (& 2050)
p	The Carbon Plan: Delivering our low carbon future	2011	DECC *for Parliament*		2050
q	Fourth Carbon Budget Review: technical report	2013	CCC *for UK Government*		2050
r	Meeting Carbon Budgets – 2014 progress report to parliament	2014	CCC *report to Parliament*		2027, 2030
s	Future Energy Scenarios: UK gas and electricity transmission	2015	National Grid	gas & electricity	2020,50
t	Intelligent Infrastructure Futures: The Scenarios – Towards 2055	2006	Foresight Programme	futures	2055

transport sector as a whole, or on energy futures of the UK economy. These wider studies usually focus on technological innovation, including EVs, much more than on car clubs or other non-technological change. The documents are listed in Table 1.

3.3. Analysis

Our analysis consisted of a 'hybrid' coding approach. It combined a grounded approach, where we looked for themes, narratives and frames (such as 'technological neutrality' and presumed continued car dependence) emerging from the documents themselves, with *a priori* coding, focused on perceived drivers and barrier for innovations, assumptions about mobility and behaviours, policy recommendations, and projections for the future. In this paper, we draw on this analysis to explore how (and why) visions of the future imagine people, their behaviour and personal mobility in general.

4. RESULTS

4.1. Imagining people

Despite some variation across the examined future explorations, there were strong similarities in how people were imagined. First, people are imagined mainly as consumer or users, linking to narratives of increased uptake of an innovation in the future. There is some consideration of people as subjects whose behaviour affects sustainability (primarily through uptake), but little thought of the public as stakeholders, knowledge providers, or partners. While many explorations consult stakeholders from business, industry and elsewhere, only two [c,k] used primary research of people's opinions via consumer surveys, and only one [h] called for including consumer voices in the innovation process, including an ULEV users' forum, although the primary focus remained on uptake.

Second, many of the explorations, especially those with a technological focus (EVs or ULEVs more generally), imagine people as roughly identical, interchangeable consumers. When heterogeneity is acknowledged, it is usually in the form of population segmentation (into groups of interchangeable individuals) with calls to "*address the differing priorities of the innovation adoption segments*" [e, p.58]. These segments loosely follow the sequential innovation diffusion model [8], from 'innovators' and 'early adopters', through early and late majority to 'laggards'. The innovators and early adopters in this case are those who have already purchased EVs or joined car clubs, or are likely to do so soon. This segmentation focuses on the order of adoption (with consideration on how to support uptake for each segment), but not heterogeneity of use or needs.

Nonetheless, several ULEV focused explorations do show an interest in serving a heterogeneous public, for example, though a broad range of models of EVs for different preferences and needs. However, the stress is on consumer choice and the need for EVs to replace ICEVs (internal combustion engine vehicles) through mirroring existing choices and brand loyalty, rather than an analysis of different vehicles for different needs. The underlying assumption is that "*new technologies will only succeed commercially if consumer expectations of range, comfort, safety and speed continue to be met*" [l, p.44]. In

this framing, EVs need to mimic ICEVs and are to be sold as a technological substitute, minimising required institutional, infrastructural and behaviour change. This does not necessarily play to the strengths of EVs, which compete on ICEVs terms, nor does it explore their full potential.

Car club explorations imagine a more heterogeneous public. One London study forecasts potential car club market by neighbourhood, considering income, education, age distribution, population density, public transport accessibility and car ownership per household [b]. Another draws on a stated-choice survey to model a population with varying parameters around ownership of car, bicycle or public transport seasonal ticket, and strategies regarding joining a car club, as well as individual journey choices [c].

4.2. Imagining behaviour

The behaviours of adopters/users are constructed in narrow terms, with rational economic actor models prevailing and insights from psychological theory drawn upon only very selectively. People are primarily imagined as consumers whose transport behaviour is a set of choices that maximise their utility. It is also assumed that driving a car will remain the norm. Even the most recent explorations take little to no account of peak car, which has been on the radar of the UK's Department for Transport since 2005 [22].

Reliance on rational actor models is particularly prevalent in documents with a technological focus, in the context of vehicle purchase. Specifically, there is a need to understand the low level of EV penetration when the model suggests purchasing an EV would be the rational choice. Low uptake is most commonly interpreted as consumers weighing high upfront prices of EVs over their low running costs, i.e., having 'high discount rates' on vehicle purchase. Some documents call this behaviour 'sub-optimal' [m] or 'myopic' [o], or even suggest consumers need education about whole life cost [e]: "*People tend to discount heavily (or not take into account) future cost savings from fuel economy at the time of purchasing a car, even though it would seem to be in their own interests as well as those of the environment*" [l, p.57]. This imagining has a financial focus, assuming that increased EV uptake can be achieved through shorter payback times or reduced upfront costs, leading to a search for new business models. Government and industry are encouraged to develop and support new financial arrangements, such as battery leasing, to reduce upfront cost, as these could "*better align the time profile of costs and benefits from electric car purchase*" [o, p.165]. On the other hand, one study [n] explicitly mentions that consumer behaviour in vehicle purchase simply does not follow the rational economic model, implying that reducing upfront costs does not guarantee uptake; another [h] critiques the focus on cost and fuel efficiency, highlighting how car symbolism (status, identity, etc.) can override these 'rational utility' considerations.

Drawing on rational actor models, many explorations analyse behaviour in terms of barriers and incentives to purchase. Common assumptions in the documents are that consumers lack knowledge or awareness of EVs (or car clubs), or of their longer-term (financial) benefits, and that they take time to respond to new technologies, being biased towards the familiar. This leads to conclusions that increasing uptake requires increasing public awareness

through marketing and other interventions [d,r,h]. In other words, behaviour change can be achieved through educating consumers, matching the idea of consumer engagement as provision of information and addressing concerns [23]. An example is the conundrum of how to respond to 'range anxiety', people's fear of not being able to charge EVs frequently or quickly enough. There are broadly two responses: The first emphasises the need to increase battery range, often portrayed as a necessary technological breakthrough if EVs are to succeed. The second is informed by psychological theory and focuses on attitude and behaviour change, e.g., studies showing that familiarity with EVs and experience driving them reduces range anxiety.

As consumers' main role is seen as adopting new technologies, it is not surprising that there is a focus on behaviour as a choice of *which car they will buy*, not whether they buy a car or make other changes to mobility practices. For example, the National Grid study [s] suggests an ambitious society could adopt more environmentally friendly behaviours; but in transport this is interpreted only as buying 'greener' cars. Documents exploring EV penetration perpetuate this narrow behaviour focus: one model [k] has consumer choice affect the percentage of different car types sold, while total annual sales and even mileage per vehicle are held constant over time; another varies vehicle types by scenario, but not vehicle numbers [j]; a third study discusses average car journey lengths in the context of EV range, but not modal shifts or changes to driving patterns [e].

Other behaviour change is also explored, for example through the Smarter Choices policies [24], which encourage rationalisation of car trips (e.g. through switching to public transport). While emphasis and projections vary, these are for the most part presented as marginal or complementary to the main (technological) shift, with significant change constructed as difficult or uncertain, with low expectations, e.g.: "*more people choosing to take public transport, walk or cycle could mean up to a 5% reduction in urban car trips. However, uncertainties around the impact of individual initiatives, and barriers such as convenience, safety and appropriateness to journey, may prevent the highest levels of abatement from being realised*" [p, p.55].

Car clubs are seen as part of these 'soft' policies in some explorations. However, some car club focused-documents [b,d] assume policy intervention, such as raising public awareness, can lead to growth in car clubs and a non-trivial reduction in car travel demand, with 'car-light' lifestyles: "*Car clubs will play an important role in reducing the need to have a car because they offer an alternative to conventional car use models and can reduce habitual car use while still enabling access to a car for essential journeys*" [d, p.15]. These explorations focus on systemic change, experience and habit; this does not necessarily contradict the rational actor approach if a broader focus is taken.

4.3. Imagining mobility

Most of the technologically focused explorations imagine a future with an ongoing, car-centric, car-owning automobility, as "*road transport underpins our way of life*" [l]. They ignore the emerging discourse of peak car and rather place themselves in a much longer existing and more powerful discourse that sees economic growth and mobility, particularly

road transport, as intimately interlinked. Mobility (demand) is seen as underpinning growth [l], and economic growth as leading to increased demand [f,q]. Moreover, ULEV production is seen as an opportunity for jobs and growth [i,p], and conversely, lower growth would reduce innovation and investment in ULEVs [s]. This neoliberal understanding of the links between economy and car-centric mobility is translated into a vision of the future that can be defined as a business-as-usual extrapolation of past trends and discourses.

Technological progress is often presented as an integral part of future mobility, enabling continued high travel demand and car use, while ensuring energy security and furthering sustainability goals. So, while the UK's emission reduction targets are often portrayed as challenging but achievable with a mix of ULEVs and efficiency improvements to ICEVs, only one exploration [s] constructs scenarios where the targets are explicitly missed. Technology can be seen as part of a three-way equation: "*Technological progress has been fundamental to furthering the universal objectives of growth and mobility*" [l, p.8].

While there is a common assumption that technological progress will act as a driver, especially around ULEVs, uncertainty around *specific* technologies is common. For example, EVs' role in the future is contested, with explorations as recent as 2013 suggesting there is a need for improvement, perhaps even a breakthrough, in battery technology before EVs can reach a significant market share. The earliest exploration [k] is highly pessimistic about EVs (and considers hydrogen to be promising). There is more optimism later, with 2009-2010 documents [f,g,o] suggesting EVs have promise, with rollout depending only on price coming down, although there is also acknowledgement of hype around EVs [f]. Perhaps post-hype, and following low uptake, the Committee on Climate Change (CCC) pushed back its 2010 estimate [o] of EVs reaching cost-effectiveness in the mid-2020s to 2030 in a 2013 estimate [q]. Nonetheless, in recent years there is more optimism that some role for ULEVs in the transport system, including EVs, is inevitable [i].

In contrast, three of the four car club-focused explorations show a qualitatively different imagined mobility [a,b,d], with a more integrated, service oriented transport system. They consider, and draw on, greater changes in society, e.g., suggesting the sharing economy could benefit car clubs; raising questions of equality, with clubs increasing car-access for non-owners; and stressing local benefits of car clubs, including reduced congestion and air pollution, and benefits for local economies. These visions assume we would benefit from moving away from private car ownership, with reduced ownership leading to reduced car-based mobility and increased integrated transport; this framing sees demand reduction and modal shift as integral to reducing emissions. While current levels of car ownership and travel are not assumed necessary for sustained economic growth, there is still an assumed need for access to mobility, and the economic framings remain similar: a reliance on choice means a focus on raising awareness in order to increase membership and overcome barriers to adoption, with attachment to private cars and the difficulty of behaviour change seen as the most significant barriers.

Finally, the Foresight work [t] is an outlier. It builds scenarios around two uncertainties: whether technological progress will deliver a low-carbon transport system, and whether people will accept intelligent infrastructure. Imagining futures in which people reject technology, or in which technology does not deliver, leads to fundamentally different

scenarios from other explorations: Society, economy and travel change significantly, with some scenarios portraying travel as greatly reduced and mostly limited to local; societal change means mobility is no longer seen as a right. Such scenarios might seem outlandish, but they highlight the many business-as-usual assumptions most imagined futures carry.

5. DISCUSSION AND CONCLUSIONS

The analysis above reveals interesting points on how visions of our future are shaped by assumptions about the public, technological progress, economic growth and transport.

First, in line with previous work, we see the public imagined primarily as rational actors. We further see an unresolved tension between this imagining and more complex and realistic models of behaviour. On the one hand, many of the explorations invoke the idea that consumers can be seen as rational actors, especially regarding vehicle purchase. On the other, a variety of behaviours described do not conform to the model: there are habit related behaviours, with people preferring tried and tested technology and even having brand loyalty; there is also an attitude-behaviour gap between people's understanding of the environmental consequences of driving and their travel behaviours and modal choices. These behaviours are acknowledged as 'non-financial barriers', with solutions offered including provision of information and EV driving experience, and even a call for the industry to engage in appropriate marketing. There is a dissonance in using the dominant rational actor narrative in assumptions about car purchase, despite evidence of its inaccuracy, and a discrepancy in preference of other behaviour models when discussing behaviour change such as reduced travel or modal shift.

Second, behaviour change is portrayed primarily in terms of (consumer) *choice*, where this choice is often limited to modal choice or even vehicle purchase choice. We suggest that rather than opening up behaviour change, this narrow agenda *limits* behaviour change. Despite the rhetoric of choice, some explorations [i,n] suggest government policy is the most important factor in determining the future of EVs, which begs the question why consumer choice is stressed. One possibility is the difficulty in changing car-based transport behaviour, with ULEVs seen as a "*relatively painless form of behaviour change*" [25], which will succeed with the right policies, whereas reduced car-based mobility is seen as more difficult. A more radical suggestion [25] is that that individual decision making and choice models dominate policy discourse not because decision-makers have faith in its effectiveness, but because of a broader individualist discourse and *opposition* to significant behaviour change; rather, the focus is on the perceived imperative of economic growth.

Third, several industry and government based explorations make explicit connections between travel and economic growth. One explanation for insisting on a growth-travel connection lies in the neoliberal agendas that underpin many of the visions, which see existing patterns of mobility both as an end in itself – a presumed need and right to travel – and a necessity for continued economic growth. However, the evidence for investment in transport infrastructure as a means of economic growth is contested and the links are complex [26]. We suggest this highlights the tensions between an economic growth focus and the power of status quo actors, which narrows transport sustainability to emissions reduction, and a deeper sustainability agenda which favours systemic change. Car club explorations offer a useful counterpoint here.

They question one part of the dominant paradigm, the link between car ownership and economic prosperity, and offer a vision of a different transport system, possibly with lower travel, but with *mobility* intact. However, they are quick to suggest economic advantages of their own visions, and so keep with the growth and progress paradigms. Nonetheless, it is worth considering whether their deviation from the status quo, in terms of rejecting a techno-fix, is the reason they carry less weight in visioning documents.

Pulling these threads together, we suggest a large group of explorations, written or commissioned by government or industry actors, imagine minor variations on one future vision, implying *la pensée unique* where 'there is no alternative'. In this future, technology allows a business-as-usual focus on economic growth by minimising the environmental burden such growth will cause. This framing appears to reinforce currently prevailing understandings of the relationships between economy, transport, technology and environment. Future visioning might therefore act more to legitimise the status quo than to genuinely empower innovations and systemic changes that might significantly reduce emissions from UK transport. This implies that the imagined public are invoked for the agendas of technological and policy actors [12], with people and behaviour imagined in a way which is consistent with the status quo and appropriate behavioural theories invoked. Given the limitations of the status quo focus (e.g., simple technological substitution does not play to EVs strengths), this raises questions over the extent to which these explorations, and their imagining of people and behaviours, will really help to diffuse the innovations they discuss.

REFERENCES

[1] CCC, *Meeting Carbon Budgets – 2014 Progress Report to Parliament*. 2014, Committee on Climate Change: London.

[2] Schwanen, T., *Automobility*, in *International Encyclopedia of the Social and Behavioral Sciences*, J.D.Wright, Editor. 2015, Elsevier: Oxford. p. 303-308.

[3] Goodwin, P. and K. Van Dender, *'Peak car'—themes and issues.* Transp. Rev., 2013. **33**(3): p. 243-254.

[4] Schwanen, T., *Rethinking resilience as capacity to endure: Automobility and the city.* City, 2016. **20**(1): p. 152-160.

[5] Shepherd, S., P. Bonsall, and G. Harrison, *Factors affecting future demand for electric vehicles: A model based study.* Transp. Pol., 2012. **20**: p. 62-74.

[6] Straw, W. and M. Rowney, *Leading the charge: Can Britain develop a global advantage in ultra-low emission vehicles?* 2013, Institute for Public Policy Research: London.

[7] Ryghaug, M. and M. Toftaker, *Creating transitions to electric road transport in Norway: The role of user imaginaries.* Energy Res. & Soc. Sci., 2016. **17**: p. 119-126.

[8] Rogers, E.M., *Diffusion of innovations*. 4th ed. 1995, New York: Simon and Schuster,.

[9] Schot, J. and F.W. Geels, *Strategic niche management and sustainable innovation journeys: theory, findings, research agenda, and policy.* Technol. Anal. & Strategic Management, 2008. **20**(5): p. 537-554.

[10] Kemp, R., D. Loorbach, and J. Rotmans, *Transition management as a model for managing processes of co-evolution towards sustainable development.* Int. J. of Sust.

Dev. & World Ecol., 2007. **14**(1): p. 78-91.
[11] Loorbach, D., *Transition management for sustainable development: a prescriptive, complexity-based governance framework.* Governance, 2010. **23**(1): p. 161-183.
[12] Walker, G., et al., *Renewable energy and sociotechnical change: imagined subjectivities of 'the public'and their implications.* Env. and plann. A, 2010. **42**(4): p. 931-947.
[13] Burningham, K., et al., *Industrial constructions of publics and public knowledge: A qualitative investigation of practice in the UK chemicals industry.* Public Underst. of Sci., 2007. **16**(1): p. 23-43.
[14] Skinner, D., P. Rosen, and D. Horton, *Hell is other cyclists: rethinking transport and identity.* Cycling & Soc., 2007: p. 83-96.
[15] Doughty, K. and L. Murray, *Discourses of mobility: institutions, everyday lives and embodiment.* Mobilities, 2014: p. 1-20.
[16] Cao, X. and P.L. Mokhtarian, *How do individuals adapt their personal travel? A conceptual exploration of the consideration of travel-related strategies.* Transp. Pol., 2005. **12**(3): p. 199-206.
[17] Cao, X. and P.L. Mokhtarian, *How do individuals adapt their personal travel? Objective and subjective influences on the consideration of travel-related strategies for San Francisco Bay Area commuters.* Transp. Pol., 2005. **12**(4): p. 291-302.
[18] Stephenson, J., D. Hopkins, and M. Scott. *Understanding Sustainable mobility: The potential of electric vehicles.* in *HuMoComp*. 2014. Brisbane, Australia.
[19] Harmer, C. and S. Cairns, *Carplus annual survey of car clubs 2009/10.* 2010, TRL PPR 476: Crowthorne.
[20] Temmes, A., et al., *The Emergence of Niche Protection through Policies: The Case of Electric Vehicles Field in Finland.* Sci. & Tech. Studies, 2013. **26**(3): p. 37-62.
[21] Geels, F.W., *A socio-technical analysis of low-carbon transitions: introducing the multi-level perspective into transport studies.* J. of Transp. Geog., 2012. **24**: p. 471-482.
[22] Noble, B., *Why are some young people choosing not to drive?* Proceedings of etc. 2005, Strasbourg, France 18-20 September 2005-Transport Policy and Operations-European Policy and Research-Access to Transport and Future Issues, 2005.
[23] Barnett, J., et al., *Imagined publics and engagement around renewable energy technologies in the UK.* Public Underst. of Sci., 2012. **21**(1): p. 36-50.
[24] Cairns, S., et al., *Smarter choices - changing the way we travel.* 2004, UCL (University College London),: London.
[25] Marsden, G., et al., *Carbon reduction and travel behaviour: Discourses, disputes and contradictions in governance.* Transp. Pol., 2014. **35**: p. 71-78.
[26] Banister, D., *Transport and economic development: reviewing the evidence.* Transp. Rev., 2012. **32**(1): p. 1-2.