Article:
Mullen, C orcid.org/0000-0003-2915-5009 (2021) Fairness in transitions to low-carbon mobility. One Earth, 4 (2). pp. 168-171. ISSN 2590-3322

https://doi.org/10.1016/j.oneear.2021.02.001

Fairness in transitions to low carbon mobility

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Summary

Decarbonising transport is vital to prospects of mitigating dangerous climate change, but requires changes in travel which will affect people's lives. Operationalising fair, effective, transitions to low carbon mobility is only possible by focusing on measures enabling participation in social and economic activities with limited reliance on motorised transport.

Introduction

There is no question that rapid decarbonisation of the transport sector, especially in towns and cities, is essential given the scale of associated CO_2 emissions and the urgent need to limit the rise of average global temperatures to well below 2°C. Transportation contributes 24% of direct CO2 emissions from fuel combustion globally.[1] It is widely accepted that global transition toward electric, and potentially also hydrogen vehicles, is necessary to achieve the required level of transport decarbonisation.[2] Yet we cannot rely on this alone for transport decarbonisation as despite massive advancements in electrification, road transport emissions continue to climb.[1] This is due to a combination of a growing demand for combustion vehicles, particularly among the swelling middle-class in the emerging economies of the Global South and the relatively slow rate of uptake of electric and hydrogen vehicles in the Global North. There are additional concerns regarding emissions associated with hydrogen and electricity generation. [3] Thus, while there are hopes that electric, automated and shared mobility services could contribute to decarbonisation by improving efficiency, [4] this is highly uncertain and could actually increase emissions by encouraging higher demand.[5]

International Energy Agency scenarios for limiting average global temperature increase to below 2°C, indicate that 20% of transport decarbonisation would need to come from travel demand reduction and a mode shift to lower carbon mobility, such as public transport, cycling and walking, and a reduction in overall vehicular travel.[6] The need for such changes given our highly mobile world may seem daunting, but it brings with it an opportunity to tackle longstanding harms and inequalities. These include health inequalities related to risks of road traffic collisions, and transport pollution: according to the World Health Organisation, traffic collisions account for approximately 1.35 million deaths each year,[7]and over 1 million deaths are associated with poor air quality,[8] with evidence indicating greater exposure to low income households and ethnic minorities.[9] Furthermore, there are social and economic inequalities related to transport systems which fail to meet mobility needs of many societal groups. [10] Yet, despite this opportunity there is concern that measures to decarbonise transport will be implemented in ways that actually increase rather than reduce inequalities.

Mobility and fairness

To successfully incorporate fairness into transitions to low carbon mobility we must first consider the relationships between mobility, inequalities and fairness. It is important to emphasise that these relationships are complex and interconnected and must be considered holistically. Just as considering only the climatic implications of transport associated emissions (i.e. a transition to electric vehicles) would do little to reduce the health impacts of traffic collisions, focusing policy and measures on only emissions and collisions could create conflicts regarding social inequalities.

Due to the complex ways in which travel is woven into our lives, reducing overall travel and even shifting from conventional modes of transport, such as cars and vans, to lower-carbon alternatives such as public transport, walking and cycling, can affect social and economic participation, opportunities and welfare.

Economic and social practices develop and change in conjunction with developments in mobility, and changes in mobility can disrupt those practices. For instance, availability and affordability of car travel affects expectations about frequency and distances involved in business or leisure travel.[11] Measures to reduce travel or change transportation modes could negatively impact livelihoods, education, access to services, and impinge upon social relations, especially where a vehicle is essential for employment or where families and friends are dispersed over long distances[10]. This could also introduce gender inequalities, that can result from a lack of safety on public transport. The challenge of either mode shift or travel reduction is exemplified by what is called 'forced car ownership', where low (and sometimes median) income households feel forced to retain a car, despite suffering economic hardship in doing so. This is a situation facing households across Europe who suffer what the EU define as 'material deprivation,' and evidence from England found households prioritising costs of running a car over domestic heating and sometimes food.[13] Such a reliance on car travel is exacerbated where low income or precarity limit a households' ability to plan where to live and work.[10]

Mode shifts to other means of transport are not always feasible, particularly where public transport services are insufficient in frequency, coverage, accessibility and safety, or where walking or cycling is unviable, due to distance or lack of safety.[12] Motor vehicle traffic, and the infrastructure accommodating that traffic, frequently acts as a barrier to uptake of other mobility.[14] High levels of traffic usually affect communities by greatly reducing social interactions within and across neighbourhoods, which creates social severance.[14]

In summary, fairness in mobility matters because of the far-reaching implications transport has for social and economic participation of different social groups, and for health and welfare. One way of illustrating this importance is to consider mobility and its impacts via the lens of UN Sustainable Development Goals (SDGs), e.g. switching to EVs will create health benefits (SDG3) by improving air quality and mitigate the impacts of climate change (SDG 13) through emission reduction, but limiting access to employment and educations opportunities (SDG 4, SDG 8) could exacerbate poverty, food insecurity, and inequalities

(SDG 1, SDG 2, SDG5, and SDG 10). This complex web of interactions requires a holistic approach.

Designing for Decarbonisation

There are (at least) two approaches to seeking fairness in low carbon mobility transitions. The first begins with decarbonising of our existing mobility systems, and then considers how to limit associated unfairness. The second treats transitions to low carbon transport as a matter of fairness. There are some similarities between the two approaches, but also important differences with far-reaching implications. Unfortunately, it is the first that currently tends to dominate the low-carbon transition path of the transportation sector.

Municipal and national strategies for transport decarbonisation often emphasise a transition to electric and sometimes hydrogen vehicles. There also tend to be ambitions to use technology to improve energy efficiency of vehicles and transport services (i.e. via automation). Second to this are ambitions to encourage a mode shift such as through increasing travel via public transport, walking and cycling. In some cases there are also ambitions to reduce travel demand entirely. There is little doubt that all of these aspects are required for effective decarbonisation. The problem is that in these plans, fairness is a secondary consideration. To get a sense of the problem let us consider each of these ambitions in a little more detail.

In order to accelerate the replacement of combustion engines with EVs, efforts often focus on the improvement of electric vehicle (EV) batteries in order to extract greater mileage per charge, and denser installation of charging infrastructure. However, there is a greater socio-economic concern regarding EV affordability. When compared with conventional vehicles, EVs are relatively inexpensive to run, but at present they are more expensive to buy. One study estimates that in 2020, the overall cost of EVs relative to conventional combustion vehicles exceeded $5,000. It is thought that the future reduction of this significant price difference can facilitate an uptick in EV adoption by 2024,[15] yet while price parity may well benefit those sufficiently affluent to afford a new vehicle, it is unlikely to benefit those with lower incomes, who might rely on older, used vehicles. Data from the UK shows that households in the lowest 20% of incomes own less than 4% of the UK's ultra-low emission vehicles, whereas households in the highest 20% income bracket own over 50%.[16] Transitions to EVs could increase transport related exclusion if infrastructure (such as fuel stations) supporting conventional vehicles is decommissioned. Exclusion or hardship may also occur if taxation – such as that associated with Low Emission Zones or Clean Air Zones which are planned, or already implemented in cities across Europe – is used to penalise conventional, high-emitting vehicles without considering the tax burden imposed on low-income households. Uptake of EVs is also difficult for households without access to private parking spaces where they could charge EVs, and this is exacerbated by patchy provision of public charging spaces. Recognition of these problems has prompted calls for measures to subsidise or support lower income households in buying EVs, and to improve distribution of public charging infrastructure. [16] But while subsidising EVs has potential to mitigate some transport related inequalities, this is highly dependent on the form of subsidy. The £3000 subsidy the UK government offers, is unlikely to make new EVs affordable for low income

groups and a focus on EV purchasing subsidies will not benefit those who are less able to make use of a motor vehicle, such as non-drivers. A frustrating and inconvenient truth regarding the support of an affordable EV transition, is the fact that this will increase road transport and the harms and inequalities associated with high volumes of traffic. These include the obvious risk of collision and a reduction in physical activity and an increase in community severance, but also continued support of carbon industries associated with road infrastructure (i.e. concrete and steel production) and electricity generation. Until the entire transport sector can be considered carbon free or neutral, support of personal motorised transport will continue to contribute to climate change.

The dominant approach to a mode shift and travel reduction can, however, be more challenging than the above technological fix as it involves a focus on encouraging behaviour change by asking people to substitute car travel for other modes, such as walking, cycling or taking public transport. However, such measure are rarely taken in unison, resulting in, sometimes fatal, trade-offs.The United Kingdom has a long history of behaviour change campaigns which encourage people to walk or cycle, sometimes emphasising the benefits of exercise. However, these campaigns have been accompanied by relatively little robust development of walking and cycling infrastructure, and as such walking and cycling levels remain disappointingly low.[12] Furthermore, encouraging walking and cycling without investing in sufficient infrastructure or awareness education results in mixed use of transport networks that are primarily designed for cars and can thus result in tragic conflicts. In 2018, the WHO reported that globally, 26% of road deaths are of pedestrians and cyclists.[7]

Recently transport decarbonisation plans have tended to include ambition for automation and digital technologies to support decarbonisation by improving efficiency. Digital technologies could improve integration of public and shared transport modes, and so help create a comprehensive network of mobility services such that people might not need to rely on private transport. Automation, it is hoped, could enable vehicles to operate more efficiently than if driven by humans and again could improve energy efficiency. Yet, it is also recognised that the mobility enabled by these technologies might increase vehicular traffic and thus further conflict among different transport users. Moreover, many of these initiatives are currently planned for affluent city centres. Unless these services are implemented in areas that are currently subject to poor public transport services, they are unlikely to reduce exclusion. While these concerns have been identified, it's unclear what and how regulations and policies will steer these novel mobility services to improve fairness.

Our current dominant approach to decarbonise the transport sector, be it the expansion of electric and hydrogen vehicles, ambitions for digital technologies and automation, or a mode shift, gives little if any consideration to fairness, which widen existing inequality gaps, or even create new inequalities.

Centring fairness in low carbon mobility transitions

Placing fairness at the centre of planning for a transition to low carbon mobility could help alleviate some of the above concerns. The approach begins with recognizing the

environmental, social, and economic equity implications of mobility systems, and focuses on pathways to decarbonisation which tackle these dimensions together.

It will be no surprise that walking, cycling and public transport feature highly in these efforts. To be effective, the emphasis would need to be on creating conditions where these modes are safe, easily accessible, and are connected to other low-carbon transport alternatives. There's also a need to provide low-carbon, affordable, and more reliable public transportation systems. We could still expect an important role for private or shared vehicles, yet this would be a much reduced role compared to their dominance in existing mobility systems, reducing associated harmful emissions. Nevertheless, there are risks with this approach, and will be a need for monitoring of short and long term impacts on accessibility, connectivity, and distribution of benefits.

Applying this approach, in different locations, requires efforts to understand both barriers to and enablers of low-carbon modes of transport and how their implementation might impact both the built and natural environment and how this in turn affects communities and individuals. To be effective, such efforts must involve participation of different stakeholders and co-design involving people from all social groups. This is partly a matter of increasing legitimacy of decisions which affect communities. It is also because participation and co-design are needed to address important gaps in existing understandings of problems and solutions. While such an approach is not alien to planners, particularly when there is a need to design mobility services for people with disabilities, it is not always practiced.

Many cities have been practising fairness-led low-carbon mobility system designs. For example, over the past decade, Sao Paulo has been making intensive investments on constructing over one hundred kilometres of bus rapid transit (BRT) and cycling lanes, providing numerous sharing bikes and easily accessible pedestrian blocks. These low-carbon mobility services help to reduce about 1.9 tons of CO2 emissions every day, decrease average travel time for passengers around 19%. BRT has also reduced traffic collisions and benefited lower income groups.[17] Numerous other examples exist, but these remain few compared with 'decarbonization-first' approaches.

A major challenge for fair transport decarbonisation, will be identifying and implementing measures at scale. As well as reducing traffic in towns and cities, there is need to focus on reducing car reliance across regions and longer distances. This is not currently happening and. Car dependent mobility is causing economic hardship and social exclusion for people outside urban areas. More attention to sustainable, accessible mobility in rural and peri-urban areas is required.

Conclusion

Transport decarbonisation is an urgent challenge. There is little doubt about the difficulty of achieving the scale of decarbonisation required to mitigate the severe harms and inequalities inflicted by climate change. Our transport systems, around the world, create multiple social, environmental and economic inequalities. Only by bringing fairness to the centre of efforts to decarbonise transport will we have the opportunity to tackle this broad range of inequalities. Doing so would mean mobility contributes rather than damages

prospects of achieving the central ambitious of the Sustainable Development Goals – a sustainable and *fair* future for all.

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