TramForward

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Dear Sir

The Light Rail Transit Association (LRTA) was established in 1937 by a group of people concerned about the proposed closures of tramways in London. The Association has grown over the intervening 78 years into an international body with around 4 000 members around the world, half outside the United Kingdom. Although the LRTA's members come from all walks of life, they share a common concern with the development of good quality public transport through the use of light rail and tramways. Many are professionals working in the transport industries. The Association's monthly magazine, "Tramways & Urban Transit" is widely regarded as essential reading around the world by those concerned with the development, building, operation and use of light rail and tramway systems.

The Association's objectives are to educate people about light rail and modern tramways and to advocate the adoption of such systems as core components of modern integrated transport systems. The Association carries out its campaigning under the banner *TramForward*.

TramForward would like to respond to your consultation questions as follows

Priorities

1 *Do you agree that these themes reflect the most pressing priorities for development of our Appraisal and Modelling guidance? If not, what other themes do you think we should be exploring?*

TramForward believes that there should be a theme that considers the sustainability of future transport scheme including all three pillars. Firstly, the full environmental consequence of transport schemes including accessibility, availability, environmental and health impacts, both positive and negative. Then the social benefits of transport mode for all ages, income levels and mobility. Finally, the economic benefits of permanency and reliability that creates the certainty required by business to invest as an enabler of growth.

2 *What considerations should inform the scope and priorities of our strategy, particularly over the first 18-24 months?*

The inclusion of the wider economic, social and environmental benefits particularly with respect of fixed rail-based transport such as trams so that they can be assessed fairly against other modes over the full economic lifetime of the tramway system rather than just weighted to first cost and little cognisance of non-financial benefits that currently are not monetised in business case appraisal. This should include recognition that some modes such as trams are better at creating modal shift from polluting and inefficient personal transport eg cars and taxis, than traditional bus and BRT modes. The Multi Criteria

Assessment approach suggested by the Sintropher Project (Hickman, 2015) should be considered as a means of fairly assessing these issues

People and Place: capturing the range of impacts relevant to transport policy today

3 What should be our priorities for improving the appraisal of people and place and why? Please select up to three areas.

1 **Environment and Health**. Currently WebTAG considers tailpipe emissions in the forms of NOx, SOx and PM_{10} but largely ignores non-tailpipe emissions, sometimes called the "Oslo Effect". The residues from road and tyre wear together with brake pad dust produce and extremely toxic particulate matter in the $PM_{2.5}$ as well as the PM_{10} size range. In a paper "Non-Exhaust PM Emissions from Battery Electric Vehicle" (Timmers, Achten, 2018) the table below shows how significant the non-tailpipe PM emissions are from cars.

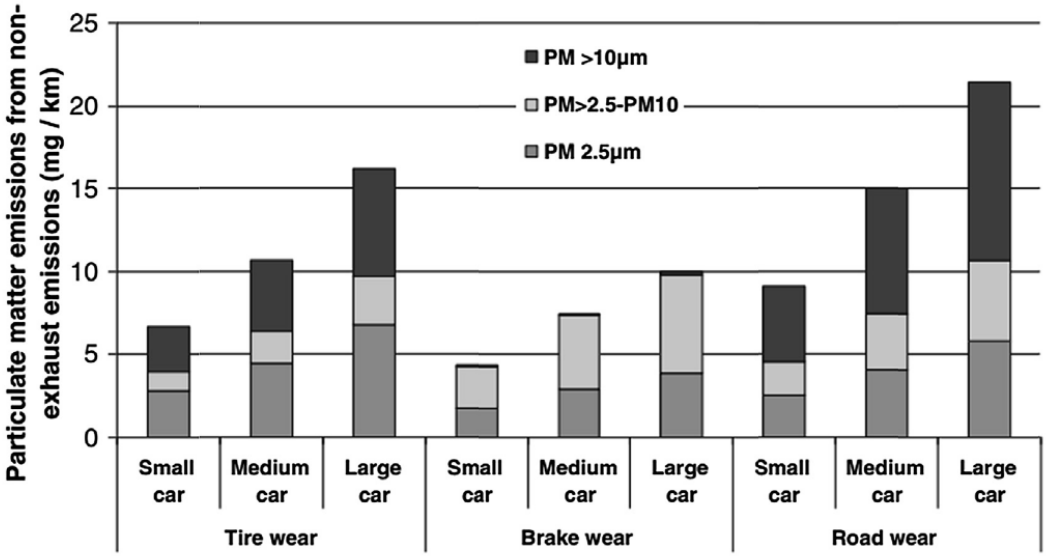

FIGURE 12.2 Non-exhaust particulate matter (PM) emissions by source and car size. *From Simons (2013) based on Ntziachristos and Boulter (2009).*

In Table 12.2 of this paper they detail the difference in weight between electric vehicles (EVs) and their internal combustion engine (ICEV) counterparts showing that EVs are between 14.6% and 28.7% heavier. The paper also notes the resuspension of the PMs as vehicle re-lift PMs already lying on the roadway.

In the Conclusions of this paper it notes that there is a consensus that whilst there has been a strong reduction in tailpipe PM emissions over the past decades and this will continue in the coming years, non-tailpipe emissions will account for 90% of PM emissions from traffic by the end of the decade. It also notes that claims that EVs are emission free are unjustified as the increase in weight is linked to higher non-tailpipe emissions. (Timmers, Achten, 2018)

This paper really brings together research into non-tailpipe emission and puts to bed the assertion that electric vehicles are the answer to transport

emissions and the weight gain argument applied to electric buses as well as cars.

Trams running with steel wheels on steel rails eliminate both the tailpipe emissions and road and tyre wear emissions and the majority of brake pad wear as electric braking is used for the most of the slowing of the vehicles.

The outcome from the above is that Trams will eliminate both tailpipe and non-tailpipe emissions produced by vehicles with rubber types and that these PM_{10} and $PM_{2.5}$ are particularly harmful to health as noted in the World Health Organisation paper "Health Effects of Particulate Matter" which concludes:

"*PM is a widespread air pollutant, present wherever people live.*

The health effects of PM10 and PM2.5 are well documented. There is no evidence of a safe level of exposure or a threshold below which no adverse health effects occur.

Since even at relatively low concentrations the burden of air pollution on health is significant, effective management of air quality aiming to achieve WHO AQG levels is necessary to reduce health risks to a minimum.

Monitoring of PM10 and/or PM2.5 needs to be improved in many countries to assess population exposure and to assist local authorities in establishing plans for improving air quality.

There is evidence that decreased levels of particulate air pollution following a sustained intervention result in health benefits for the population assessed. These benefits can be seen with almost any decrease in level of PM. The health and economic impacts of inaction should be assessed." (WHO, 2013, page 12).

Defra have just concluded a consultation into non-tailpipe emissions which should provide more evidence on these issues.

2 **Permanency.** In order to create sustainable housing and other developments that are not solely dependant cars for transport there needs to be a form of public transport that can be relied upon and thus be perceived to be permanent. History has shown that buses routes change and tend to be reduced and thus are perceived as transitory and thus cannot be relied upon into the future. Permanency can be provided by fixed rail systems as the investment in a tramway show commitment to the future. Trams, where introduced have been a catalyst for development and one of the few transport types to actually promote modal shift away from personal transport.

In Manchester it has been reported that "The increase in non-car trips since 2014 has been principally due to growth in rail journeys, Metrolink and walking trips (2% growth for each), with a slightly lower increase in cycling (1%)" and "Since 2002, car trips in the morning peak have decreased by 22%, despite an overall increase in all trips of 12% over the same period. In the off-peak, the number of cars coming into the City Centre has reduced by 19%." (Manchester City Council, 2015, page 5).

This effect should be properly appraised in WebTAG as a benefit for trams over other modes where the potential size of a Development could justify a tramway.

Reflecting uncertainty over the future of travel

4 *What should our priorities be for improving our understanding and treatment of uncertainty in modelling and appraisal and why? Please select up to three.*

1 **Reliability.** Uncertainty in travel can be a response to unreliability of services. Where transport modes are shown to be reliable and permanent ridership tends to increase, even in times of economic uncertainty. Full credit in the benefits should be given to modes that offer permanency and reliability.

2 **Economic recovery.** The economic cycle is well known and has a period that is much shorter than the life of a transport investment. The resilience of the mode should be assessed along with the ability to provide a service that will encourage economic revival rather than a mode where the service could disappear and not be reinstated when the upturn occurs.

3 **Shift in Working Practice.** It has been predicted that working from home and virtual meetings will supersede traditional office life. This has yet to become true for various reasons such as thee need for face to face interaction, team working and work management. Also, the human need to interact has limited the amount of home working.

For non-office employees in factories and retail the need to attend work will always remain. Even the rise in on-line retail has created transport needs for deliveries, often in a non-sustainable way that needs attention.

Accordingly, the modelling of uncertainties created by changes in economic activity and online retailing may result in changes to, rather than reduction in, the transport need. Transport is the engine of commerce and economic recovery and has a life that spans many economic cycles, so resilience and adaptability within the permanence of transport infrastructure is the challenge. Fixed rail transport systems can provide such resilience so that they are ready for upturns where required and the assessment should recognise that quality.

5 *What do you see as the main challenges to adopting a more sophisticated approach to uncertainty in Business Cases and what suggestions do you have for overcoming these?*

Uncertainty analysis traditionally has led to conservatism which, with the lead time for new transport infrastructure, has led to under provision that has been unable to satisfy the demand when the recovery happens. Cross departmental and forward-looking planning is required to ensure that the transport provision is ready when required. This will require evaluation of the benefits of provision with allowance for the uncertainty against the cost to the UK businesses if the transport requirements are not available when needed.

Modelling and appraising transformational investments and housing

6 *What should our priorities be for improving the modelling and appraisal of transformational investments and housing and why? Please select up to three.*

1 **Sustainability.** Ensuring that the investment follows the three pillars of sustainability so that the investment minimises the impact on the environment and health whilst promoting social inclusion and economic development. Reliance solely on private cars and buses is not sustainable in many cases and the appraisal should give prominence to fixed rail systems such as trams where the main traffic flows are suitable.

2 **Whole lifecycle appraisal.** It is easy to reject modes that require larger up-front investment whilst they may have a lower lifecycle cost. Everywhere where trams have been introduced, the popularity and ridership numbers have exceeded predictions and proved to be high value for money. This has often been against cost uncertainty and initially a poor apparent business case. Whereas bus-based investments do not have the same popularity or satisfaction levels. Lifecycle cost and benefits must be assessed rather than just first cost and decisions based on a fair assessment. Sorting inadequate provision later is always more expensive than correct provision from the start.

3 **Housing needs to be connected.** Sounds obvious and it is, but the correct mode is essential so as to promote health, the environment, accessibility and connectivity with work, shopping and leisure facilities. Provision of fixed track and reliable transport can promote regeneration and sustainability of cities. It should be seen as safe, reliable and available to all sectors of the community. The young, the old and those with mobility impairment are often limited to using public transport. Trams achieve these criteria whereas other modes do not and particularly when the health aspect of clean air are considered on main transport corridors and the assessment should fairly consider these benefits. See the evidence noted above on pollution and health issues.

7 *What transformational impacts do you currently find it difficult to represent in a scheme appraisal? What are the barriers to their inclusion and how would you suggest these are overcome whilst maintaining a consistent and robust approach?*

A robust approach is required to appraise pollution and health issues. Currently only some pollution aspects are monetised leaving the other aspects to comments in the narrative of a business case. As Number are what seem to count in determining value for money a better way is required in monetising all emissions, particularly the very damaging $PM_{2.5}$ and toxic non-tailpipe emissions. This may require research to evaluate the cost of ignoring the effect of these emissions on peoples' health, the NHS, lost production, mortality and wellbeing for current and future generations. As traffic increases and populations rise, the impact of these health issues will grow exponentially and if not addressed now, future generations will pay.

This will require a change of approach to costings and benefit analysis with the costs of pollution being added to the cost of new road-based schemes and the benefits from reduction of current pollution from the introduction rail-based modes being included. When appraised over the asset lifecycle these ongoing costs or benefits could change priorities and ridership levels where trams become good value for money. Also, beware of discounting future costs and benefits too much as they tend to distort the analysis. Rarely are provisions made for discounted future costs and benefits and when the cost is incurred new

money is required rather than theoretical investments. Repeated investments in new buses will cost more that currently predicted in a typical DCF.

Supporting the application of WebTAG and making it more user friendly

8 *What are the main barriers and challenges to applying WebTAG? How do you think these could be overcome?*

WebTAG need to be seen as fair to all modes, whereas currently it is seen to favour road-based projects. Careful scrutiny is required to ensure that it becomes fair to all modes and that the appropriated mode for the traffic levels will come out as favourite. Also, fair and level costs for infrastructure provision should be included so that road-based solutions not seen as having a low infrastructure cost where in fact frequent repair, renewal and the impact of emissions are fairly assessed against the provision of fixed track modes. Also, but outside this immediate consultation, the cost of moving utilities, randomly placed in carriageways should be investigated considering the need for removal or the impact of future failure together with betterment received by the utility owner where utilities are relocated with tramway providers are required to pay up front.

These challenges to the workings of WebTAG are likely to require an in-depth review that may change established norms for transport appraisal. Such a review and the inclusion of multi-criteria assessments and the evaluation of the wider costs of road solutions could change some fundamentals of the appraisal process, but make for better transport decisions.

9 *What more could be done to articulate the flexibilities in WebTAG and support scheme promoters apply the guidance?*

Much better guidance on the use of the flexibilities but also ensuring they are included in the headline outputs of the appraisal and the declared value for money statement where not all benefits and costs are monetised.

10 *How can we improve the way in which WebTAG is presented? Why? We are particularly interested to hear about how we can improve accessibility and clarity of the guidance.*

Greater use of plain English in overviews whilst it should be expected that the specialist language of expert economists will be required for the detail.

Developing modelling and appraisal tools that meet user needs

11 *What should our priorities be for improving the development of modelling and appraisal tools and why? Please select up to three.*

1 Inclusion of Multi-Criteria Assessment, monetised or with full credit for non-monetised benefits.

2 Inclusion of full costs of Pollution from road-based modes including non-tailpipe emissions.

3 Inclusion of the full benefit of mode transfer to non-polluting modes including the elimination of non-tailpipe emissions.

12 *How can we best encourage innovation whilst maintaining a consistent and robust approach?*

Innovation imports risk and as such has always been penalised. However, the lack of innovation also imports risk and the loss of potential cost reductions or

enhanced benefits. It is already difficult for innovations to bridge the “Valley of Death” between initial research, prototyping and economic production.

If a scheme would benefit from innovation, then different criteria should be used for assessing benefits and cost uncertainty. The value of the “learning” from the innovation when in production in the future should be taken into account in the benefits. Whilst not all innovations will prove successful, conservatism in only using the tried, tested and often sub-optimal solutions will lead to higher overall costs and a loss of advancement for the UK as a whole. Also, an initial perceived failure may, with some refinement, actually lead to a success. WebTAG must not prevent innovation but should have a robust means to review the learning and promoting refinement where appropriate.

13 *What new and emerging techniques and methods should we potentially explore and what specific problems might they solve?*

As noted above, the use of Multi Criteria Assessment to improve the appraisal of non-financial or monetised benefits leading to a positive input into the Value for Money assessment and recommendations for investment.

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