Call for Evidence: The future of smart road user charging
Intelligent Transport Systems UK, February 2023

Intelligent Transport Systems UK (ITS UK) is the national membership association for transport technology. We provide a national platform to support the roll out of technology for a cleaner, safer and more effective transport network, both at home and abroad.

ITS UK has 150+ members, from both the private and public sector, and covering all sizes and disciplines, with members working in areas like Road User Charging, Mobility as a Service (MaaS), traffic management and enforcement, integrated transport, connected and autonomous vehicles, public transport services, smart ticketing and much more. More information on ITS UK and the intelligent transport sector can be found at www.its-uk.org.uk

We believe that intelligent transport has a vital role to play in supporting the UK Government's ambitions:

- **Economic growth:** The sector is conservatively valued at £1.5bn and generates £15bn a year for the UK economy. It is an important export, with UK businesses integral in the roll out of intelligent transport overseas, and there is potential for the UK to develop a competitive advantage in the sector in the future, with the global market expected to be worth £900bn by 2025. The industry also supports highly skilled jobs and training opportunities.
- **Decarbonisation:** The intelligent transport sector is vital in incentivising the travelling public to low carbon forms of transport and decarbonising the road, rail and wider transport network. The sector is ready to support Government in reaching Net Zero by 2050.
- **Supporting Zero Harm:** Intelligent transport systems can help reduce road deaths, such as by helping local and national transport authorities, through data, to identify potentially hazardous junctions. Similarly, the implementation of new operational and enforcement technology can help ensure we continue to make our roads safer for all who use them.
- **Opimising capacity & cost efficiency:** Intelligent transport has a key role in optimising the usage of our transport network, by making best use of current infrastructure assets, incentivising behaviour change and through the predictive maintenance of infrastructure, to name a few. Ultimately, this ensures the best possible usage of our limited road and rail network and can provide cost effective increases in capacity.

Our response to the questions raised in the call for evidence is as follows.

1. Do the current road user charging systems in London require reform?

Current road user charging systems in London were implemented to address the specific objectives of reducing road traffic congestion (congestion charge) and improving air quality (ULEZ). If it is the wish of the Greater London Authority (GLA) to take forward other policy objectives then other forms of charging may be appropriate. For example, if the GLA wishes to optimise use of the road network and/or create a more equitable scheme that charges more for those using the network more, then it may be appropriate to consider distance-based charges. In many countries heavy vehicles are charged for road use based on distance travelled due to the wear and damage which these vehicles cause to road surfaces, and the need to introduce road safety improvements.

2. How might smarter road user charging differ from the current daily charges for driving applied in London?

The current daily charges do not take into consideration the amount of travel made by each vehicle during the day for which it is charged. So a vehicle making one short journey is charged the same as a vehicle which spends the whole day travelling around within the zone. For small charging zones, this has limited impact but for a larger charging zone e.g. whole cities or whole countries, a distance-based charge is fairer. Such a distance-based charge does not overly penalise, for example, those making occasional short journeys such as the elderly driver, compared to vehicles that have above average mileage. The key to success would be to keep any new scheme simple with a clear rationale that is easy to communicate and understandable by different groups of road users.

3. How might charges for driving in London be varied for different types of journeys, such as travelling for work, caring responsibilities or essential services?

The Eeuity of the scheme is important, however overly complex scheme rules risks confusion across the customer base. Varying the charge for different purposes of journey is very difficult to implement. Any system of charging should use automatic technology to verify the correct charge has been applied to a journey made in the charged zone. It should be possible to check using electronic equipment any parameters used to derive the charge. In general, it is recommended only to use parameters related to aspects of a vehicle class or category which can be easily verified. Use of other parameters will create requirements to register specific vehicles for specific purposes and this will greatly increase the administrative burden of any scheme.

4. What strategies and targets could smarter road user charging support?

Smarter road charging could be used to establish sustainable funding for road maintenance, influence the shift to zero emission vehicles, improve optimisation of the network, and influence greater use of alternative (low carbon) transport options (such as mass public transit).

5. What technology could be used to support smarter road user charging?

Three main technologies are involved:

- Dedicated short range communications (DSRC) which uses radio frequency tags operating in the 5.8GHz band and which provide a secure ID for the road user which can be linked to a payment account.
- GNSS-CN (satellite positioning combined with cellular network communications) sometimes referred to as telematics which enables vehicles to report their journey through a charged road network.
- Automatic Number Plate Recognition (ANPR) which is used to verify that vehicles within a charged road network have a valid means of payment. Sometimes this is also used to identify vehicles for payment purposes but this is not recommended for schemes covering large areas or with high traffic (vehicle-km) volumes.
- Roadside equipment for enforcement which is able to automatically determine the class of a vehicle by a making a 3-dimensional laser scan of each vehicle in order to provide information to check if the vehicle has paid the correct charge.

Other technologies required relate to account management and billing systems which form the commercial back office for a road use charging system, as well as enforcement back-office systems for generating penalty notices that are issued to non-payers.

It is possible to reduce this administrative burden by using electronic technologies such as radio frequency tags which are issued to owners of specific vehicles and recognised by equipment forming part of the system. So, for example, emergency service vehicles could be issued with tags which are included in a specific list that is held in the system. Radio frequency tags are quite often used internationally within toll collection systems, such as Mersey Gateway in the UK, for specific user groups.

Automatic Number Plate Recognition (ANPR) technology can also be used but this is more open to risks such as number plate cloning and other administrative issues related to vehicle sale and transfer. Additionally, should ANPR be relied upon to monitor all streets in London, it would be expensive.

6. How could smarter road user charging assist with tackling current challenges such as traffic, air pollution and climate change?

Smarter road user charging can use differentiated tariffs so that vehicles with cleaner engines or emission free powertrains pay less than more polluting vehicles. Additionally a per mile charge incentivises drivers to optimise their travel behaviour and this has a positive impact on CO_2 emissions. For freight vehicles, a per mile charge incentivises load consolidation and reduces empty running. Evidence for all these effects can be found in reports evaluating schemes introduced in other countries.

7. Are road user charging schemes best set up at a city or regional level, or as a national system, and what benefits or difficulties would you expect with either approach?

National systems have the biggest impact and benefit. A distance-based smart road user charging scheme could have significant benefits across the UK in terms of reducing pollution and incentivising the public to take other forms of transport.

The biggest barriers are political; road user charging can often be seen as another road tax, so any implementation would need careful consultation with the public and explanation of why the policy was being implemented. As the Campaign for Better Transport has shown, however, 'pay as you drive' polices are becoming more popular amongst the public, with polling showing that 60% of people believe vehicle taxation needs reforming, with only 6% disagreeing. 69% would be more supportive of pay as you drive if public transport was made more affordable and better connected.

A further consideration is having a national strategy for ensuring interoperability of payment across schemes that might be implemented in different cities or road networks. The administrative burden on road users having to pay multiple road network operators for a single journey can be eliminated by establishing contracts with payment service providers. This approach is taken in other countries, for example in Ireland, where one toll payment account can be used to pay tolls on all motorways and for some other services such as parking.

8. If smarter road user charging is introduced, which charges or taxes should it replace and how should the current taxes and charges be changed?

In some countries distance-based charging is being used to replace or phase out fuel duty. Fuel duty is also charged (effectively) by distance travelled, but does not provide any other policy benefits.

9. What discounts and exemptions would you like to see for any new smarter road charging scheme, for example to help disabled people, those on low incomes, those who need to drive for work, or people who live in areas with low levels of public transport?

This is a question for policymakers and is dependent upon their priorities and aims. From a technology viewpoint, the provision of discounts for specific user groups can be administered by using radio frequency tags which verify entitlement to travel at a discounted rate. This approach is used in the Mersey Crossing toll system in which local residents are able to register for a discount. Once registered a tag fitted to the windscreen of the vehicle provides a secure ID ensuring the user receives a discount on journeys made.

10. If the Government were interested in a national distance-based road user charging scheme, would London be a sensible place for a trial?

Further information regarding vehicle movements would be needed to decide whether London could act as a trial location. Several trials of road use charging schemes have already taken place in the UK sponsored by the Department for Transport, notably DIRECTS in Leeds, and the Time-Distance-Place charging pilot which carried out controlled trials with small fleets of vehicles and multiple service providers.

So the question might not be related to a 'trial' but more to a first phase of a national implementation project. There would be various questions that would need to be answered if London was looking to become the first phase of a national project:

- It is not clear to what extent vehicles that travelling within the London boundary also travel on other roads in the UK. This would need to be determined to understand the appropriateness of London as a trail area.
- Does a 'national distance-based road user charging scheme' intend to refer to the UK as a whole or only to England? In the latter case, to the National Highways managed network or all roads?
- Other cities such as Birmingham have already introduced similar schemes to ULEZ, so London would not need to act as a pilot for other cities.
- Interoperability of payment for the plethora of charging schemes emerging is also a relevant question for consideration at national level, i.e. in some countries it is possible to open a single account to pay tolls and other road use charges to multiple operators through one service provider. This greatly reduces the administrative burden and increases the convenience for road users that travel on roads of more than one operator. Currently TfL does not allow third party service providers to collect charges on their behalf.

11. If distance-based road user charging was introduced, do you think Londoners who drive should pay less in total for vehicle or driving-based charges, the same, or more than they do currently?

Distance-based charging will change the amount paid by road users in total for their road use. Instead of all users paying a fixed time-based charge, those that use the roads more than others will pay more than those that use the roads less. So this means some road users will pay more than they do currently, whereas others will pay less. Road users that pay less will be those that use the roads

less, whilst those that use the roads more (and cause more wear and tear, damage and pollution) would pay more.

12. Mayors and local authorities currently have powers to introduce new road charging schemes. Do you think anything further is required beyond an electoral mandate for these bodies to use those powers (for example a local referendum)?

Mayors are democratically elected based on their manifesto. Referendums are unlikely to endorse road use charging, given public sentiment towards schemes.

13. How are other cities and countries working on similar smarter road user charging ideas faring, and what alternatives are they looking at for achieving similar policy goals?

In other countries for example Poland, Czech Republic and Austria, distance-based charging has been introduced successfully particularly as a replacement for time-based vignette charges for heavy goods vehicles. Time-based charges are seen as not correctly reflecting the costs of road use.

In the US, several voluntary distance-based charging pilot schemes have been introduced with the objective of replacing gas tax revenue, for example in Oregon.

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