WOLFSON ECONOMICS PRIZE MMXVII

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WOLFSON ECONOMICS PRIZE MMXVII FINALIST

# Solving congestion by rewarding people for changing their driving habits

## Executive summary

Clearways

KPMG

# Jamye Harrison & Russell King

## Customer-Led Demand Management

Jamye Harrison has over 20 years of experience in strategy, design and delivery spanning customer experience, technology and business architecture. He is a former Partner with Deloitte in Australia where he led the firm's national Transport practice. As Co-Founder of Clearways, Jamye is passionate about addressing traffic congestion along with integrating our roads with broader transport networks – ultimately enabling people and goods to move easily through cities and regions. Jamye is an Adjunct Professor at the University of NSW in the Faculty of Engineering's Research Centre for Integrated Transport Innovation and Chair of the Transport Taskforce at the Committee for Sydney - an independent policy think tank.

Russell King's experience spans policy development, strategic planning and program delivery in transport, education and financial services. For more than 20 years Russell has pursued a passion for economic and social policy reform, most recently in Sydney as Policy Director for the NSW Minister for Transport & Infrastructure. As a Cabinet Member for Strategic Planning & Transport at Wandsworth Borough Council, he led significant policy innovation and service delivery reforms in inner London.

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The Wolfson Economic Prize invites entrants from around the world and all sorts of backgrounds to propose original, well-argued and informed solutions to big national challenges. The aim is to bring forward fresh thinking to help people, governments and businesses develop practical policies.

This year the prize addresses an issue at the heart of every country's economic future: road infrastructure, and

how can we pay for better, safer, more reliable roads in a way that is fair to road users and good for the economy and the environment?

The way cars are powered, driven and owned is being revolutionised. Soon a world of cleaner, automated vehicles will arrive and old annual charges and petrol taxes will no longer work. A new kind of driving will take a new kind of road and a new kind of funding – ideas needed not just in Britain but around the world.

The five shortlisted submissions – of which this is one – show that it is possible to come up with potential answers that can help road users, improve safety, protect the environment, and support our economy.

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The Clearways scheme architecture and smart mobility platform is patent pending

(Australian patent reference 2017901399).

# 5 Years from now

In just five years across the UK, people spend significantly less time stuck in traffic and more time with their friends and families as the roads are used more efficiently. People no longer suffer the stress and cost of traffic jams. In short, chronic congestion is a relic of the past.

People breathe much cleaner air as reductions in congestion and higher adoption rates for Electric Vehicles have dramatically reduced vehicle emissions.

People experience fewer injuries from road incidents and lower insurance costs as a result.

Freight is no longer held up on congested roads, lowering costs to business and improving customer service.

Roads are maintained thanks to sustainable funding that is fair for all.

A better transport system has increased productivity and led to increased jobs and prosperity.

# 2030 and beyond

People enjoy low cost, on-demand transport delivered by Autonomous Vehicles and shared mobility operators.

As private car ownership gives way to shared mobility, transport costs fall dramatically, saving families thousands of pounds a year.

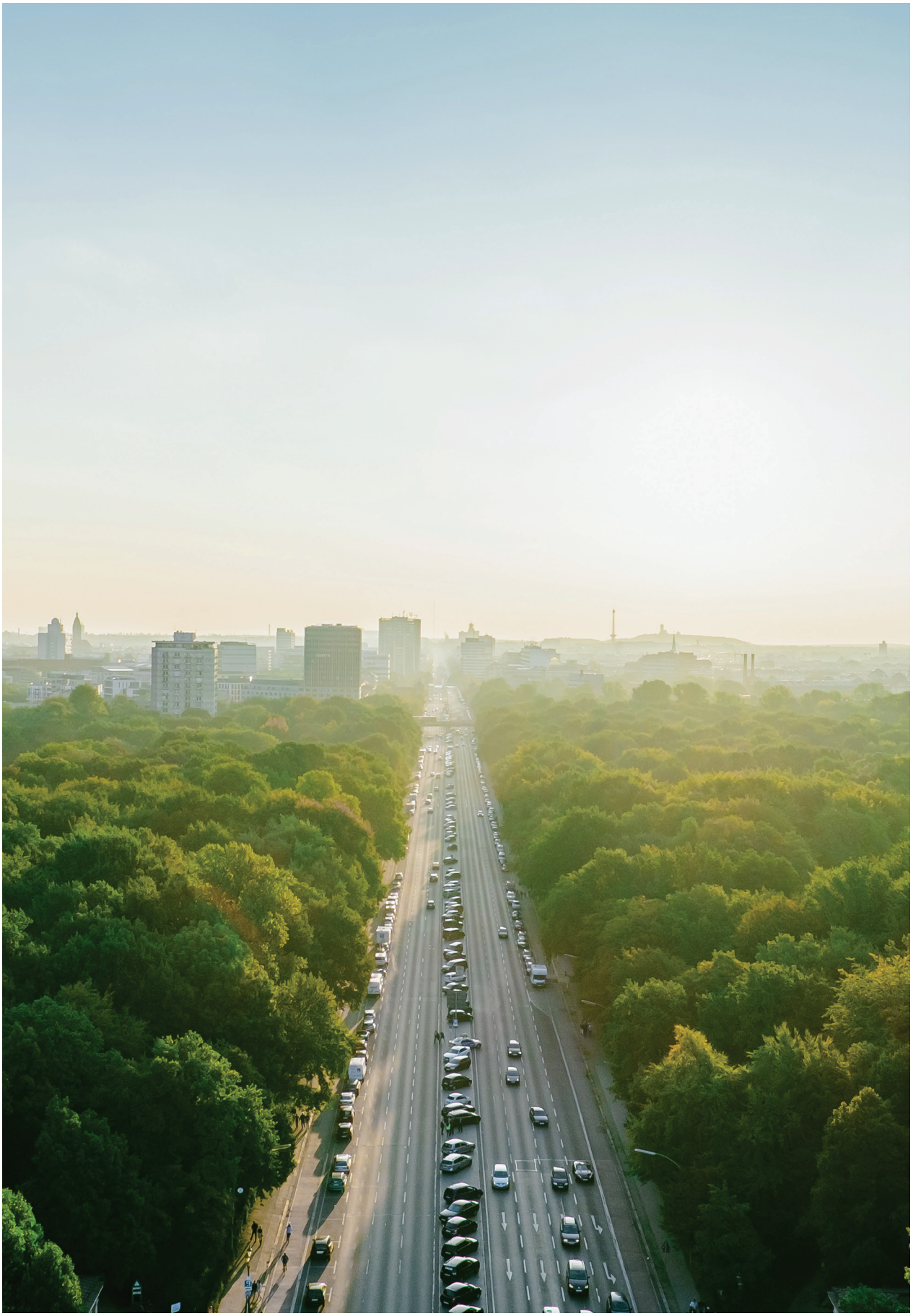
Autonomous Vehicles dramatically reduce road injuries and deaths.

Our roads are integrated with rail and new mobility solutions - seamlessly connecting people, whether for work or play.

Our cities and towns become more pedestrian-friendly. Autonomous Vehicles and shared mobility operators no longer require parking in urban centres, creating public space for walking, running and cycling, leisure and the arts. As a result our physical and mental health, and sense of community, is significantly enhanced.

Congestion is a distant memory.

This vision is possible with Clearways - a new solution that transforms how we use our roads.



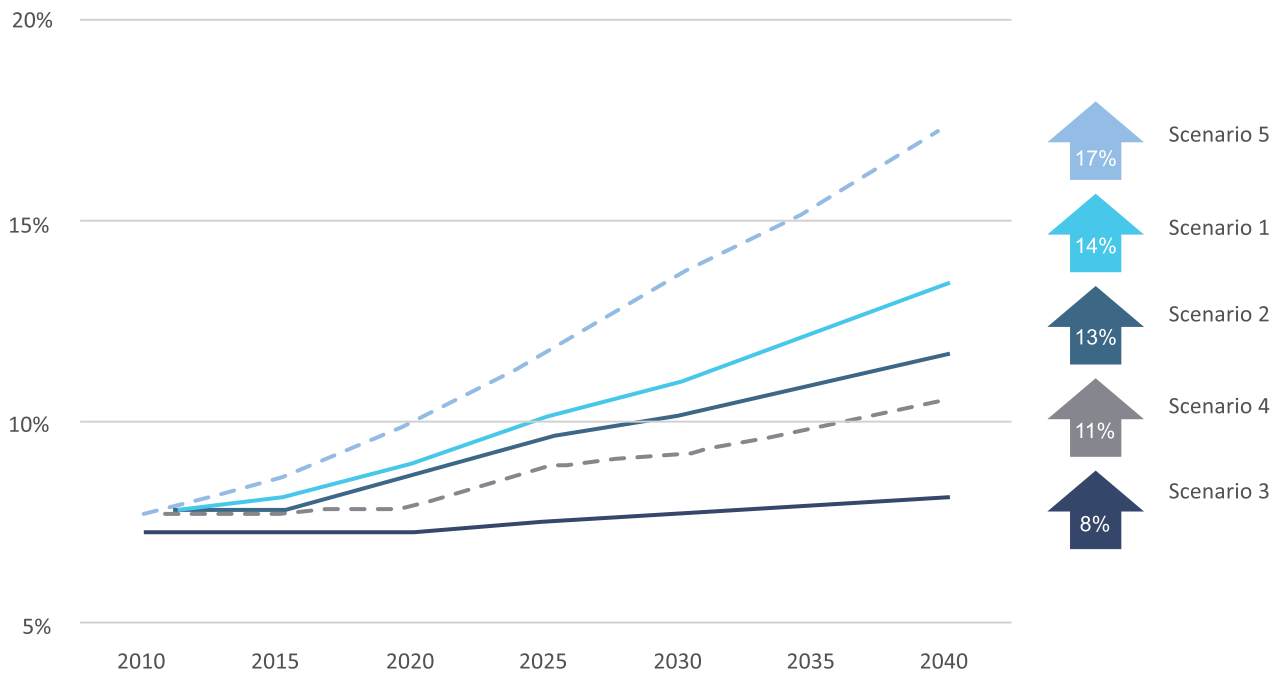
# We need a new way

The United Kingdom faces significant challenges in managing its roads. Traffic congestion continues to escalate, reducing people's quality of life and increasing costs to business.

Too much time is spent stuck in traffic — unproductive time that could and should be spent with friends and family, or studying, exercising or playing. Freight costs are increasing due to congestion, imposing additional costs on our businesses.

## Figure 1: Congestion (proportion of traffic in congested conditions)

Source: UK Department for Transport, "Action for Roads: A network for the 21st century", July 2013.



Congestion is a major contributor to poor air quality, reducing our quality of life. Road safety outcomes have stagnated.

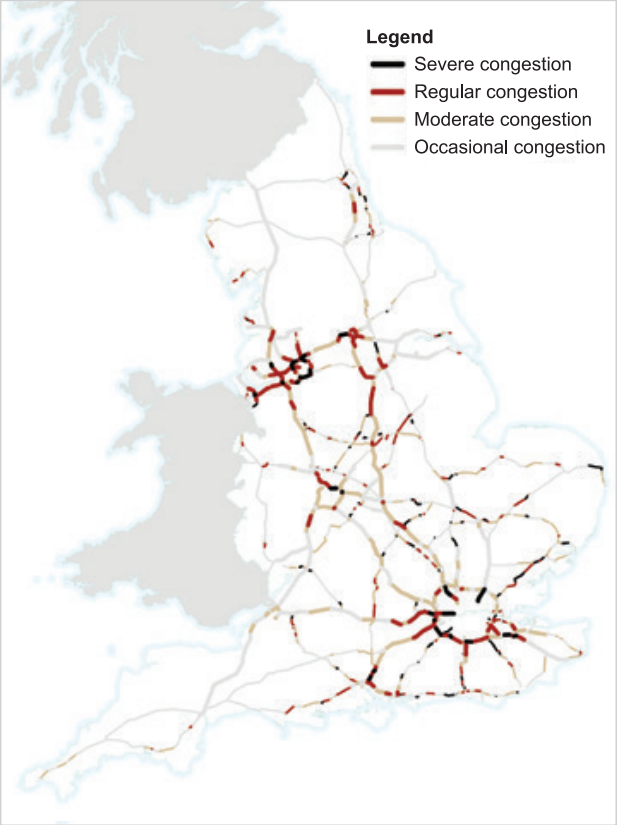
The UK's road network is an important asset that is vital to the nation's prosperity.

However, our roads are struggling to keep up with the demands that we are placing on them and the way that we use them. Our ability to sustain investment in road improvements and maintenance is threatened by declining fuel tax revenues, the result of technology disruption.

Fuel excise is declining from more fuel efficient vehicles such as hybrids. Whilst the advent of Electric Vehicles (EVs) - and other alternative fuel vehicles - enables people to opt out of paying fuel excise altogether .

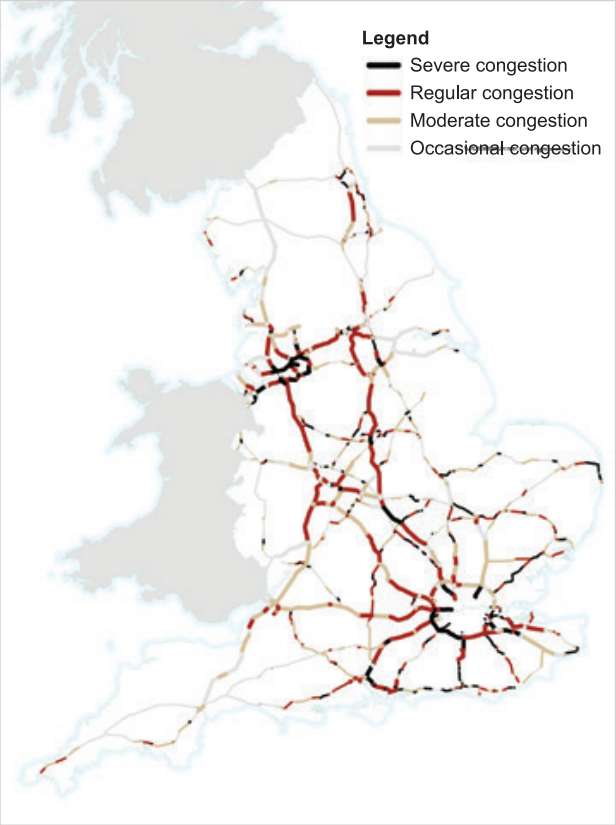
## Figure 2: Congestions on the strategic road network in 2010

Source: UK Department for Transport, "Action for Roads: A network for the 21st century", July 2013.



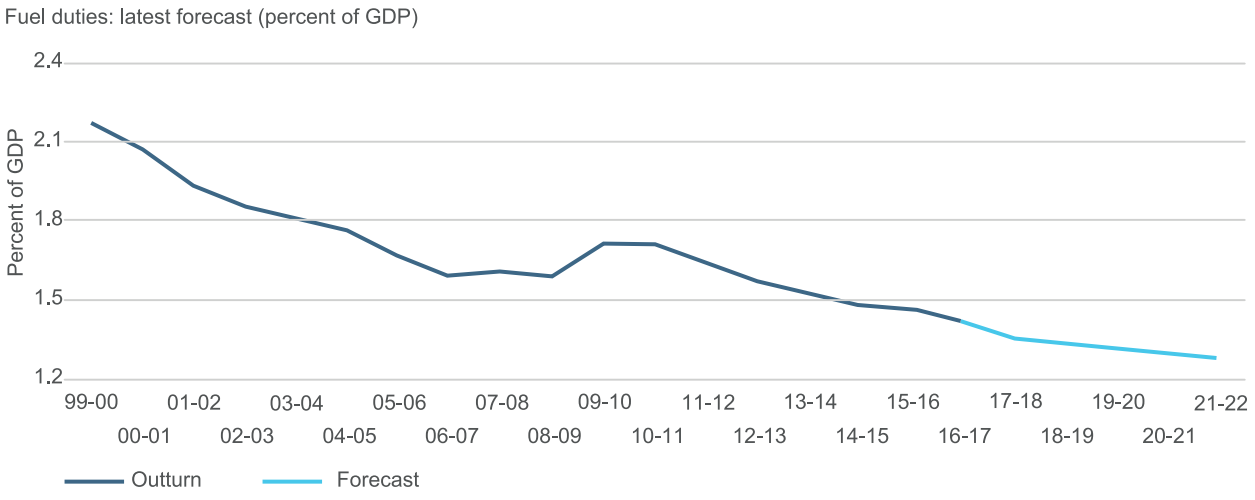

## Figure 3: Predicted congestion on the strategic road network in 2040

Source: UK Department for Transport, "Action for Roads: A network for the 21st century", July 2013.



## Figure 4: Fuel excise

Source: UK Office of Budget Responsibility forecasts, March 2017.



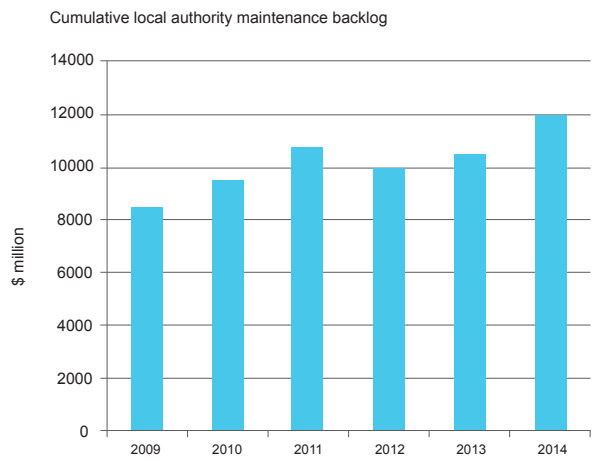

Air quality in the UK presents major challenges in terms of public health, over and above our compliance obligations at home and abroad. Recent analysis cites almost 40 million people in the UK are living in areas where levels of air pollution from diesel vehicles pose significant health risks.

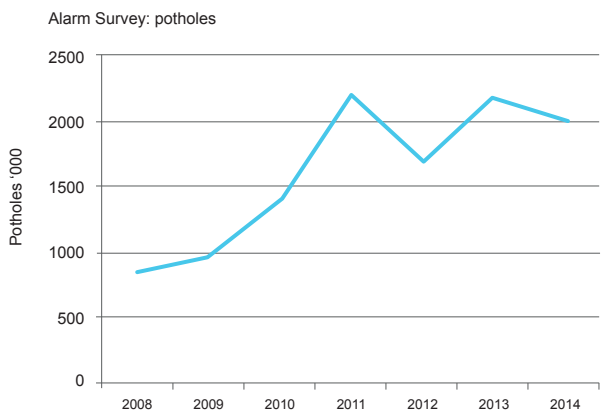
Road safety steadily improved between 2005 and 2014 with road related deaths falling by 45% during that period. However this trend has now stalled, with road safety outcomes remaining largely stagnant.

The UK has continued to invest in the national and local road networks, with £95.5 Bn spent between FY06 - FY16 on road improvements and road maintenance. Despite this investment, Local Authorities have struggled to maintain the local road network, leading to a backlog of £12 Bn in road maintenance .

## Figure 5: Trends in road maintenance

Source: Local Government Association (Centre for Economic and Business Research analysis), "Better Roads for England", September 2014."



Expenditure on road improvements and maintenance is principally funded through fuel excise receipts. This revenue stream has steadily declined from 2.2% of GDP in FY2000 to 1.5% of GDP in FY2016. This decline is driven by the adoption of fuel efficient vehicles, hybrids and EVs along with the political sensitivity of indexing fuel excise in line with inflation. The Office of Budget Responsibility predicts that fuel excise will continue to decline, reaching 1.3% of GDP in FY2022 (see Figure 4 on Page 12).

Hence the UK's road network faces numerous challenges: declining economic productivity, declining air quality and stagnant road safety outcomes. This negatively impacts people's lifestyles, the competitiveness of our businesses and our health. However demand for road improvements and road maintenance continues, despite the drop in funds from fuel excise.

Ongoing technology innovation promises to further disrupt the way we travel. Autonomous Vehicles (AVs) will provide mobility for an increasing proportion of our population, and reduce the inconvenience of sitting in congestion or travelling long distances - factors that will increase demand for road use. However AVs will dramatically improve road safety.

Shared mobility will shift vehicle ownership from individuals to mobility operators, who will offer a variety of transport options, service levels and price structures.

This combination - AVs and shared mobility - will transform the utility, amenity and cost of road usage. This will tip the scales towards road travel, at the expense of some public transport options.

## Better use of our roads

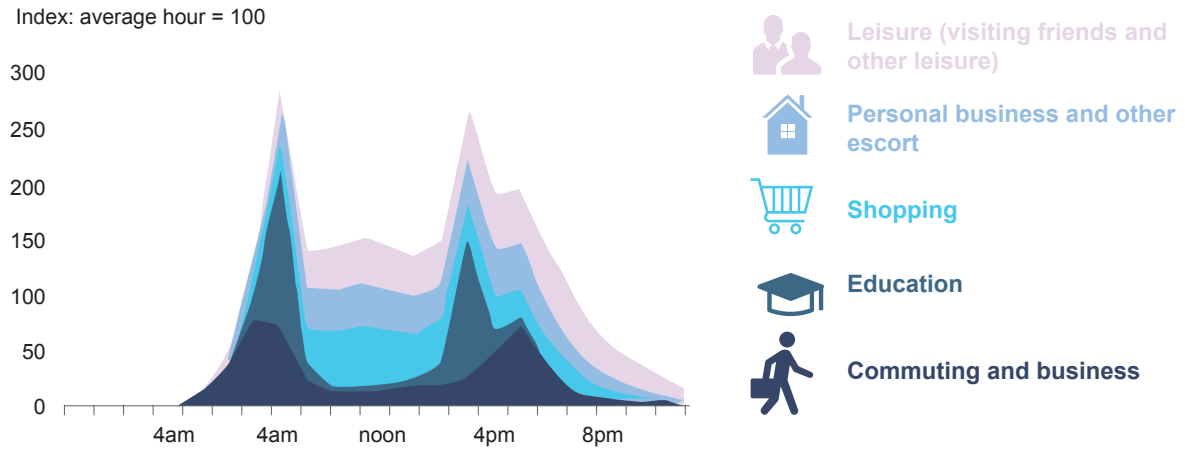
All of these issues could be tackled, if we managed the demand on our roads more efficiently. Demand management works by reducing the demand for road space, especially during the peaks.

Small improvements in road usage can deliver dramatic improvements to traffic congestion due to the non-linear nature of traffic congestion.

Discretionary journeys in the morning peak account for over 20% of all trips. These are the journeys that can be most easily be re-timed.

## Figure 6: Trips by start time and purpose

Source: UK Office of Budget Responsibility forecasts, March 2017.



If we are able to initiate behavior change just a quarter of these trips (i.e. 5% of all trips) then we could be able to achieve a 14.5% improvement in travel times. A 7% reduction in trips would yield a 20% improvement in travel times whilst a 10% reduction in traffic yields a 27.5% improvement in travel times.

We can eliminate congestion if we could better manage demand for our roads overall - but particularly during peak times.

Traditionally, there has only ever been one way proposed to comprehensively manage the demand on roads - road pricing. This approach has never seen widespread adoption as it tries to get people to use the roads more effectively by Governments forcing them onto a new system and sanctioning them in order to get them to change their behaviour. This has made it a political non-starter .

## Pricing approaches

Various jurisdictions have introduced road pricing schemes, however none of these provide broad-based demand management. Some schemes focus on congestion management within a defined CBD cordon. Other schemes have been implemented or are being trialed as replacement or alternatives to fuel excise. Nevertheless none of these schemes provide network-wide demand management either via incentives or penalties.

## Figure 7: Successes in other jurisdictions

### NORTH AMERICA

1. **OREGON**
   Heavy vehicle charging scheme
   OreGo opt-in road usage charge program for light vehicles
2. **CALIFORNIA**
   Road charge pilot under way
3. **WASHINGTON, COLORADO, UTAH**
   Considering user-pays road pricing studies
4. **I-95 CORRIDOR COALITION**
   Proposed user-pays trial across four US states

### EUROPE & U.K.

1. **LONDON, GOTHENBURG AND STOCKHOLM**
   Area/cordon charge implemented
2. **GERMANY, AUSTRIA, BELGIUM, CZECHIA, HUNGARY, POLAND, RUSSIA, BELARUS, SLOVAKIA AND SWITZERLAND**
   Heavy vehicle charge

### ASIA/PACIFIC

1. **SINGAPORE**
   Location and time-of-day-based scheme in place
2. **NEW ZEALAND**
   Heavy vehicle charging in place since 1975
   Road-user charges in place for diesel light vehicles

### POLICY OBJECTIVES

- Congestion management
- Road funding

Source: Transurban: "Changed Conditions Ahead", Melbourne Road Usage Study Report, October 2016

However, fuel excise - the current method for charging people for road use - is a regressive, inefficient, and outdated tax. It is regressive, in that it imposes a greater cost on people on lower incomes. It is inefficient, in that it doesn't differentiate between peak and off-peak use. It is outdated - technology is delivering fuel efficient, hybrid and Electric Vehicles that minimise or avoid the tax altogether.

## A new way

Clearways is totally different. Instead of forcing people onto a new system, it makes it voluntary. Instead of sanctioning people, it rewards people for changing their behaviour. Instead of being a Government run scheme, it is offered by companies that know how to deliver desirable products and attract people to buy them.

Clearways provides incentives for people to use the roads more efficiently (and hence eliminate congestion) through either retiming their journeys outside of the peak, encouraging them to remode on to public transport or use carpool options, reducing their travel altogether or reroute their trips so that they have less impact on congestion.

Clearways can be rolled out steadily over the next couple of decades in a fiscally neutral way. If implemented in the next twelve months, significant reductions in congestion could be seen within this term of parliament.

## A clear choice

Clearways offers a solution that is compelling. Clearways is fair - with owners of EVs also paying to use our roads. Clearways is effective - providing information, cost savings and rewards that encourage people to use the road efficiently.

Clearways is ready for the future - it works across vehicle technologies (incorporating EVs and AVs), and shared mobility models whereby operators optimise their service to account for road usage costs.

| | Fuel Excise | Road Pricing | Clearways |
|---|---|---|---|
| Provided by | Public Sector | Public Sector | Private Sector |
| EVs integrated into paying for the roads | No | Yes | Yes |
| Supports the introduction of AVs | Neutral | Yes | Yes |
| Supports shared mobility | No | Yes | Yes |
| Political lens | Unpopular | Strong opposition | Opt-in so consumer choice |
| Financial Winners | EV drivers | Those who do not drive very much | People who change their behaviour |
| Financial Losers | People on low incomes who drive inefficient vehicles | Those who drive a lot | No financial losers |
| Fairness | People on low incomes pay more | People on low incomes pay more | People on low incomes pay the same or less and are not disadvantaged by take up of EVs |
| Government Revenues | In decline | Maintains existing revenue levels | Maintains existing revenue levels |
| Impacts on congestion | Makes it worse | Makes it better | Makes it better |
| Impact on the environment | As today | Improves environment by reducing emissions | Improves environment by reducing emissions |
| Impact on road safety | Same as today | Improves road safety | Significantly improves road safety due to incentives to encourage better driving |
| Other connected car products enabled | No | Maybe | Yes |
| Privacy Concerns | No | Yes | No as purely voluntary |

# The Clearways Solution

The Clearways solution has four components, described below:

## Figure 8: An overview of the Clearways solution


| Component | Description |
|---|---|
| Opt-in | Customers are provided with the ability to opt-out of fuel tax (in the case of petrol and diesel vehicles) and to opt-in to Clearways.<br>For EVs, customers can choose to take the EV grant in exchange for opting into Clearways. |
| Retail partners | Clearways is distributed by selected retailers. Our retailers are known brands, giving customers confidence in the product, and are established businesses with the proven ability to market, sell and distribute products. |
| Compelling customer proposition | Price promise<br>Customers who choose Clearways benefit from a price guarantee, meaning they will never pay more than the fuel excise they would have paid. In the case of EVs, customers get a guarantee that they will not pay more than the fuel excise for a low emission vehicle.<br><br>Financial savings<br>Customers choose a Clearways plan that suits their driving needs and habits. All Clearways plans charge a higher rate for peak period driving, with a lower rate for off-peak driving. Customers who minimise or eliminate peak hour driving are able to save a few hundred pounds per year.<br><br>Bundled products<br>Clearways customers can bundle parallel products alongside their plan. For instance, insurance companies will offer the convenience and cost savings of Pay As You Drive (PAYD) insurance.<br><br>Rewards<br>Clearways customers can also participate in a points-based reward scheme. This enables them to maximise the value of their Clearways membership by earning points for safer and more efficient driving. Points can be redeemed for a variety of rewards through Clearways' retail partners and other providers. |
| Phased implementation | Clearways is implemented in phases, designed to mitigate implementation risks and confirm public acceptance.<br><br>Phase 1<br>In the first phase, Clearways works with the Government on the detailed design of a trial. This is so that both parties are clear on how the trial will operate and the outcomes that need to be achieved.<br><br>Phase 2<br>In the second phase, the Government gives permission for Clearways to run a six month trial (for 50,000 vehicles), empowering people to voluntarily opt-out of fuel excise (for petrol and diesel vehicles) and opt-in to Clearways.<br><br>A trial approach allows the Government and the operator to manage risks and validate assumptions so that an informed decision can be made about the full implementation of Clearways.<br><br>A trial approach allows the Government and the operator to manage risks and validate assumptions so that an informed decision can be made about the full implementation of Clearways.<br><br>Phase 3<br>Following a successful trial, the Government makes Clearways available to all road users.<br>As part of this phase, Government may also consider whether to move other vehicle taxes (such as VED) onto the scheme, thereby increasing the price signals that encourage desirable behaviour change, delivering efficient road use. |

# The power of feedback and rewards

Feedback loops have the power to change and moderate people's behaviour in powerful ways. They have been used in different ways for centuries to change behaviour, through sanction or reward. Feedback loops tap into innate human tendencies to moderate behaviour – or change habits – when given timely, relevant feedback along with clear choices to act.

New technology and consumer electronics has made this approach more prevalent. It is what drives the 10,000 steps-a-day fitness movement, and the range of pedometers and fitness trackers that connect our daily activity to our smartphones.

Feedback loops work by:

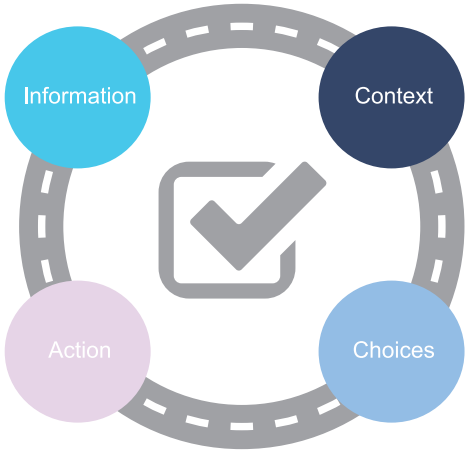
- capturing relevant information.
- providing that information in a meaningful context.
- presenting choices or options.
- encouraging you to take positive action toward a goal.

Clearways uses this approach to encourage efficient and safe driving. Customers receive regular information and feedback about their travel choices and driving habits. Information about peak hour driving, hard braking and hasty acceleration all help customers make smart choices about the times they drive and their driving habits.

Customers quickly learn that they save money by driving outside peak periods. This incentive is reinforced with reward points, which recognise good habits and can be exchanged for discounts and other benefits much like frequent flyer points.

## Figure 9: Feedback loop

Source: Adapted from Thomas Goetz, Wired, 2011.




Regular feedback


Habits clarified

Savings detailed

# Moving together

Managing the demand for our roads and improving the efficiency of how they are used has the potential to:

- Improve people's quality of life by reducing travel times.
- Reduce the costs of doing business by reducing freight costs.
- Improve the quality of the air we breath and help us to meet our climate change commitments.
- Make our roads safer.
- Improve fairness.
- Position the UK to reap the benefits of technology innovation from AVs and smart city mobility.
- Establish sustainable Government revenue for our road network

For the past few decades, transport planners and economists have suggested doing this by implementing road pricing. For a wide range of reasons, this has proven to be politically impossible.

Clearways delivers both demand management for our roads and improves their efficiency. However, because of the voluntary nature of the product, its consumer proposition and the way that it is marketed, it does it without political barriers .

Clearways harnesses the core strengths of private sector organisations to help deliver much needed reform for our roads. Bringing together public and private sector capability means that the Government can focus on delivering sustainable public outcomes, while companies bring innovation and customer service expertise to solve some of our toughest policy challenges.

Clearways can transform how transport works in the UK. By rewarding those people who use our roads efficiently and safely. Within five years, we could achieve significant reductions in  congestion, and establish a sustainable and fair funding mechanism for our roads — ready for 2030 and beyond.

# Other

## Acknowledgements

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Russell could not have been inspired to develop Clearways without the loving support of his darling wife Kate or the boundless joy from his son Albert.

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