

Spotlight

TRANSPORT AFTER COVID: GREENER, SAFER, BETTER?

Grant Shapps / Sadiq Khan / Raquel Velasco / Jim McMahon



Spotlight



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The quest for safety and sustainability



As the UK prepares to return to some semblance of normality in the wake of the Covid-19 pandemic, few sectors will be as keenly watched as transport. Usage has dropped precipitously across Britain's transport networks throughout 2020 and 2021. But as hard as it's been on the operators, this forced pause is also a rare opportunity to rethink – and not just because new commuting patterns established during the pandemic might well become permanent. The rethink is needed because changing the way we move around is one of the most pressing conundrums on our way to addressing climate change.

Some of these long-term changes are already under way. In London, the Ultra Low Emission Zone – ULEZ – has expanded eighteen-fold, pushing to the North and South Circular roads and building on its success in cutting 30-50 per cent of emissions in central London alone, even as £2bn is set to be pumped into expanding cycling infrastructure nationwide. Nationally, the London model of a public authority tightly controlling competitive private franchises is enjoying a surge of interest both from mayors and from government, with a new TFL-like national authority recently announced for railways nationwide (see Shapps, pages 4-5.) This sudden pivot away from privatisation might read as a backhanded compliment to Labour's own policies, but it is posing a new set of challenges for Keir Starmer, too.

The quest for safer and greener transport, of course, extends beyond trains, bicycles and buses: about 20 per cent of all greenhouse emissions in the UK come from road vehicles. But uptake of electric cars in the UK has been painfully slow. The wider public perceives electric cars as prohibitively expensive, the essential infrastructure – especially charging points – as undersized and overpriced, and the government support for acquisition as painfully insufficient. They are correct. This government has shown it can take sweeping and decisive action on the long-overdue reform of the national rail network. It's hard to see how it will reach the ambitious goal of attaining zero emissions by 2050 without committing to similarly decisive action on Britain's vehicles and roads. ●

4 / Grant Shapps

The Secretary of State for Transport sets out his vision for a new public body and the future of the UK's rail travel

6 / Sadiq Khan

The Mayor of London on the benefits of the capital's Ultra Low Emission Zone

8 / The view from the opposition

Transport is the latest area in which the government is treading on Labour's toes

16 / Cycling infrastructure

Will Butler-Adams, Brompton Bikes CEO, on how to promote active travel

24 / The public ownership debate

Transport for London's more regulated model is proving attractive in other areas

30 / Electric vehicle take-up

The popularity of EVs is increasing, and diesel cars will be phased out – but the charging infrastructure lags behind

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“Full-fat privatisation is a flawed model”



Transport Secretary Grant Shapps sets out plans for Great British Railways – the biggest transport shake-up in a generation



Railways are one of Britain’s greatest contributions to human progress. They changed this land forever, cutting journeys from days to hours, feeding the growing centres of the Industrial Revolution and creating towns and suburbs from scratch.

We eulogise and romanticise them, harking back to the golden era of steam, imagining lazy journeys on bucolic branch lines or regaling our children with tales of plucky humanised locomotives. But our relationship with this great invention is ambiguous. In the modern world travelling by railway can be a satisfying experience, but it can also be a source of frustration because of ticket complexity and overcrowding, and, of course, delay.

A century ago next month, the Railways Act received royal assent. It heralded major consolidation, merging most of the country’s 120 railway companies into the “Big Four”: Great Western Railway (GWR), London, Midland and Scottish Railway (LMS), London and North Eastern Railway (LNER), and Southern Railway. The 1921 act rejected nationalisation but sought to build on the economies of scale witnessed in the First World War, when railways were placed under state control.

Complete consolidation and full nationalisation came in 1948 with the creation of British Railways. The 1960s would see the network slashed as Dr Beeching wielded his axe, recommending the despatch of 5,000 miles of track and almost 2,400 stations. And then, from 1994, this reduced network was divided up again under privatisation, some two dozen franchises being awarded to train operators who had bid for them. Infrastructure, meanwhile, was hived off into Railtrack.

This fragmentation of the rail network was by no means a failure. The past quarter of a century has seen the number of passengers rise to its highest level since the 1920s. In 2018-2019, before Covid curtailed mass travel, some 1.8 billion journeys were undertaken. Private investment also resulted in the widespread introduction of new rolling stock, and network infrastructure has been substantially upgraded, with the result that railways in the UK are among the most popular and safe in Europe.

But full fat-privatisation has clearly turned out to be a flawed model – just as full-fat nationalisation was. That is why we created Great British Railways (GBR).

The chaotic timetable changes three years ago showed all too clearly that



Commuters disembark a train at King's Cross station, London

the old ways were not working. Years of fragmentation, confusion and unnecessary complexity have seen passengers failed time and again.

Simply buying a ticket can be an ordeal. Who has not stood on a concourse worrying that they may have bought the wrong ticket from the wrong train operator and that a fine in the form of a full-price single ticket is awaiting them after boarding? And why are we still buying paper tickets anyway, when the rest of the world has moved to mobile phone purchase, contactless and pay-as-you-go?

And don't ask about the madness that had train operators billing each other for the knock-on effects of delays. A whole bureaucracy was created to apportion blame under the franchise system, dealing with such Alice-in-Wonderland enquiries as deciding on the size of the

GBR marks a new era for the UK's railways

bird that had caused a delay by colliding with a service. Yes, really.

Enough of this nonsense. We have got to bring the railway kicking and screaming into the 21st century.

Perhaps to the disappointment of some *New Statesman* readers this government – currently engaged in the biggest rail infrastructure upgrade in memory – is not in favour of a return to a single, monolithic state enterprise via nationalisation. Because we all know what will happen: the slow withering of standards, innovation and customer-responsiveness; the gradual re-emergence of a railway that runs not for passengers but for itself.

We need something in between nationalisation and unfettered franchising, a system that incorporates the best aspects of both – a strong national umbrella organisation that can control the timetable, consolidate ticketing under one banner and police private companies operating not as franchises but as management companies, in much the same way that London Overground is overseen and branded by Transport for London but operated by a private company under a concession contract. Do a good job – run clean, comfortable trains on time and innovate to improve the “passenger experience” – and you'll keep your contract. Fail and it's goodbye. GBR will provide the continual high standards across the board that the franchise system lacked.

The Williams-Shapps Plan for Rail – the centrepiece of which is the creation of GBR – marks a new era for our railways. It is intended to be flexible, allowing some concession holders more freedom if that works – possibly on intercity routes – while keeping others on a tighter leash.

There will be no doubt as to who is in charge, who is accountable. GBR will integrate the railways, own the infrastructure, collect fare revenue, plan the network and set most fares and timetables. There will be one clear brand for our trains, and a GBR website selling tickets across the network. And a single compensation system in England when trains are late

or cancelled. Renationalisation? No. Simplification? Yes.

We are starting with flexible season tickets. Now on sale and ready to use, for homeworkers and part-time commuters, they mean potential savings of hundreds of pounds. In all cases a flexible season ticket will offer a minimum 20 per cent discount on an equivalent monthly season ticket.

There will be real-time information on seat reservations and services, and open data will link trains with buses and bikes for seamless journeys.

The private sector has played a central role in improving our railways and we don't want to let go of that know-how. But there will also be a stronger voice for mayors and council leaders to ensure services and stations meet local needs.

We'll deliver a fully costed environment plan setting out ambitious proposals to make our trains cleaner and greener. A full accessibility audit will make sure our upgraded stations and services are open to everyone. And for the first time, a long-term strategy will identify priorities for the whole rail network over the next 30 years.

Covid has seen the government take unprecedented action to protect railway services and jobs. It has posed serious challenges, with train use still far below pre-pandemic levels. Our strategy re-emphasises our commitment to growing not shrinking the rail network. That network is being transformed with tens of billions of pounds of investment in electrification, track upgrades and new and re-opened lines (the latter under our popular Beeching reversals).

I have no doubt that in the happier times we will return in force to the railways. We need them and retain a great affection for them. And we need to meet in 3D not 2D.

Do these reforms offer a practical compromise based on long experience? Yes. There's nothing wrong with pragmatic compromise. Ideology belongs to armchair warriors. I want our railways to work for people who rely on them every day, and deserve a reliable, efficient service. They come first. ●

“Tackling air pollution is a matter of life and death”

Expanding London’s Ultra Low Emission Zone is key to reducing toxic emissions, but the government must step up for the whole country, says Sadiq Khan, Mayor of London

As we recover from the pandemic, major cities around the world are struggling to tackle another public health crisis – one that has been many years in the making. Around 90 per cent of people worldwide breathe polluted air every day, with air pollution claiming the lives of an estimated seven million people across the globe every year. We know that toxic air pollution is causing life-changing illnesses, such as cancer, lung disease and asthma, and potentially increasing the risk of dementia and diabetes. It’s especially dangerous for children, who are growing up with stunted lungs.

In London, traffic emissions are the biggest source of poor air quality. That’s why we introduced the world’s first Ultra Low Emission Zone (ULEZ) in 2019, which operates 24 hours a day, seven days a week. This has already made a swift and significant difference in central London. In the first ten months of operation (before the pandemic) it had already helped reduce the levels of some harmful pollutants in the zone by almost half, and up to 30 per cent in some areas outside the zone.

But the job is far from done. There are two main air pollutants of concern in London, based on their impact on human health: nitrogen dioxide (NO₂) and particulate matter (PM_{2.5}). And while significant progress has been made on NO₂, we must go further – tens of thousands of Londoners are still breathing air that’s more polluted than the legal limits, and 99 per cent of Londoners live in areas exceeding the recommended guidelines from the World Health Organisation (WHO), which are much tighter than the legal standards.

I also see tackling air pollution as an urgent issue of social justice. Londoners on lower incomes are more likely to live in the areas most badly affected by air pollution and least likely to own a car. The fact that 99 per cent of London does not meet WHO recommended limits adds to the growing evidence and cross-party consensus that the government needs to commit to legally binding WHO recommended targets, to be achieved by 2030 through its Environment Bill, rather than consulting on new standards.

So, we will be expanding the ULEZ from 25 October this year, increasing



The Ultra Low Emission Zone in Brixton Hill



I see this as an urgent issue of social justice

the size of the zone so that it goes out to, but does not include, the North and South Circular roads. This will create a zone 18 times larger than the current central ULEZ.

We've worked hard to ensure Transport for London's entire core bus fleet meets ULEZ standards and includes 500 electric buses and the brand new hydrogen double-deck models that launched this month. This complements our efforts to get more Londoners cycling, walking, using public transport or investing in newer, cleaner vehicles, such as electric cars. I'm proud to say London now has the largest network of electric vehicle charging points anywhere in Europe.

Improving air quality in our cities is a necessary goal in its own right but it is also an opportunity to support the green jobs and skills the UK needs for a clean, green and fair recovery. Earlier this year, I visited an electric bus factory in Yorkshire where 50 per cent of its revenue comes from Transport for London contracts, helping to create high-quality jobs and boosting the local economy. There are similar stories across

the country, including Scarborough, Falkirk and Ballymena.

It's fantastic to see other UK cities following London's lead. Bath's Clean Air Zone began operation in March and Birmingham launched a similar scheme in June this year. The evidence is clear that low-emission zones work in tackling toxic emissions, not just within the zone but also in the surrounding areas, as monitoring from the central ULEZ has shown. This means improvements are shared beyond the boundaries, rather than diverting the problem elsewhere.

The decisions we make now to tackle air pollution in our cities are a matter of life and death. It took decades before action was taken to protect children from toxic cigarette smoke. We cannot make the same mistakes by turning a blind eye to the clear evidence showing the dangers of toxic air pollution. That's why I'm more determined than ever to continue taking bold action in London to accelerate our efforts to clean up our air, and I encourage other cities in the UK and around the world to do the same. Everyone has a right to breathe clean air – and we must not stop until this becomes a reality. ●

Transport and Labour's pains

Great British Railways will increase government control and demolish the failed franchising model. But how much further into Labour's territory will the Tories go? By [Jonny Ball](#)

Earlier this year, Manchester Metro Mayor Andy Burnham won plaudits from Labour's left by announcing he would create a new public body to establish more public control over private bus operators. (Some even applauded this move for taking Manchester buses "back into public ownership". In fact, private operators will still run services in Manchester, albeit more strictly coordinated and regulated.) But curiously, Burnham's move towards a more interventionist franchising model was less a triumph of "what Labour can do in power", in the words of Keir Starmer, and more an implementation of former Conservative transport secretary Chris Grayling's 2017 Bus Services Act. At the same time, the recent *Bus Back Better* strategy, published by the Department for Transport, explicitly encourages local transport authorities to embrace the very same franchising model that the Labour left has claimed as its own.



Manchester Mayor Andy Burnham catches a tram out on the campaign trail with Angela Rayner and Keir Starmer

Some thought Burnham had renationalised the buses

On the railways, this kind of cross-pollination between seemingly irreconcilable ideologies has emerged in the form of Great British Railways (GBR) – a new government-controlled public body announced in the recently published *Williams-Shapps Plan for Rail*. The White Paper, commissioned in the wake of 2018’s chaotic timetable changes, which left swathes of the North in a state of “service meltdown”, was drawn up by Secretary of State Grant Shapps and Keith Williams, a former CEO of British Airways and head of the long-awaited

review (Shapps writes about his *Plan for Rail* on pages 4-5 of this issue).

Diagnosing the issues with the current, operator-led franchising model, the *Plan for Rail* regrets that privatisation’s failures “have remained all too obvious”. The sell-off of the old, state-owned British Rail – begun in 1994 and completed by the time the Conservatives left office after Blair’s 1997 landslide – was intended, it says, to “bring greater efficiency and innovation” by introducing competitive, free-market principles into the rail system. But “little of this has happened”, and fragmentation, confusion and fare increases have ensued.

Over 20 private operators, many of them owned by foreign governments – Arriva, for example, is a subsidiary of Germany’s state-owned Deutsche Bahn – run services in competition with each other across the country. The system is complex, with “no leader or organisation at local, regional or national levels”, a dearth of coordination

governed by “a costly, inflexible spider’s web of adversarial relationships”, and no authoritative body to take responsibility or provide accountability to passengers.

Shapps’s solution, set out in the White Paper, is for the creation of GBR (a moniker that bears a more than passing resemblance to the “GB Rail” proposed by Jeremy Corbyn’s Labour in their own renationalisation plans), which will “run and plan the rail network, own the infrastructure, and receive the fare revenue”. Private operators will still have a role to play, and will bid for concessions, the terms of which will be strictly controlled and limited by GBR. The rail system will be brought “under a single, national leadership”, with a unique brand and identity (the old double-arrow livery of British Rail). That leadership will set fares and timetables, ending the confusion of multiple operators charging different fees for different tickets that are specific to their own routes and invalid on other trains. ▶

► The new system in the proposed Williams-Shapps plan has been compared to a national roll-out of Transport for London, the public body that operates under the auspices of the Greater London Authority and manages the capital’s transport network (London was the only place in the UK to escape Margaret Thatcher’s deregulation of transport services – see Sarah Dawood on municipal buses, pages 22-25). Rather than allowing operators to make profit by collecting passenger fares – the current system across much of the national rail network – TfL instead collects ticket revenue itself, decides on routes, ticket prices and timetables, and awards tightly specified concessions to private companies, which bid competitively on controlled, monitored contracts. It is hoped that scaling up the TfL-style system nationwide, with the umbrella body GBR, will also simplify efforts to digitise ticketing and introduce Oyster card-style pay-as-you-go, as well as flexible season tickets.

Shadow transport secretary Jim McMahon told *Spotlight* that the GBR plans demonstrate that “the Tories have moved far closer to us”, but says he remains “nervous that we’re not going to see the type of investment we need” in projects like electrification and high-speed rail. “They’re still not being clear about their commitments,” he says, especially for “local transport schemes that are critical for actually connecting our towns and getting people access to good employment.”

McMahon isn’t the only one who remains sceptical. In a statement, Mick Lynch, general secretary of the National Union of Rail, Maritime and Transport Workers – a union that campaigns for full renationalisation of the railways – acknowledged that the Williams-Shapps *Plan for Rail* represented “a substantial change for our industry”, but said it was also a “huge missed opportunity”. The government had “listened primarily to the big business community and designed a system that leaves the private companies in place, guaranteeing them

profits while shifting all the risk onto taxpayers”, said Lynch.

We Own It, an anti-privatisation pressure group, told *Spotlight* that the review amounted to little more than “rearranging the deckchairs on the Titanic, with merely cosmetic changes that will leave private operators running rampant”. Campaigns officer Johnbosco Nwogbo called on the government to “ditch the ideological obsession with privatisation” and create a system in which “profits are re-invested directly into the service, not siphoned into the bank accounts of shareholders”.

Lynch and McMahon fear that the Williams-Shapps proposals will leave the state with the liabilities of running train services, while the private operators get the rewards regardless of whether passenger numbers are sufficient. “Under the old, privatised franchise model, the private operator took the risk and the reward,” says McMahon. “They were responsible for ticket sales, and they were responsible for making sure that they could cover the overheads and deliver profit. When you read the Williams-Shapps paper, it sets out really clearly how the current system is broken and doesn’t deliver. But then in the same breath says, ‘but we’re going to continue to allow the same companies to run it and then we’ll take the revenue risk.’” And in the post-Covid world of homeworking, revenues are no longer guaranteed.

As with much of current Conservative policy, the GBR plans seem to reside in a halfway house between muscular, big-spending, Labourite statism, and market-oriented, business-minded Toryism. Ghosts of Labour manifestos ridiculed and dismissed by Conservatives in the 2017 and 2019 elections abound. But according to polls – where the Conservative Party enjoys a steady and handsome lead – this so far looks to be a winning strategy.

Even before the Covid spending bonanza, Chancellor Rishi Sunak had announced a Budget that brought capital investment to its highest level since the 1970s, and the government’s Brexit



negotiators had spent months locked in talks with Brussels over the UK’s right to opt out of state aid rules. Per-pupil spending in schools has been restored to pre-austerity levels. The NHS has seen a funding increase unmatched since the days of New Labour. The Tory Mayor of Tees Valley, a traditional Labour heartland, won re-election in May after he successfully nationalised Tees Valley airport (a move that was opposed by the local Labour MP, whose constituency has also now turned blue for the first time in 85 years). Earlier this year, the government voted through a rise in corporation tax (which Labour, again, opposed) and it is currently arranging for parts of the civil service to move from plush Whitehall to new offices in



Passengers board an old, nationalised British Rail train service in Paddington, London, in 1975

The Tories have embraced watered-down Labour policy

the north of England. The Treasury's Green Book, which governs rules on best-value government spending, will be altered to privilege projects in poorer areas, and a new state-owned National Infrastructure Bank will spend on "Green Industrial Revolution" projects to support regional economies.

This adoption of much of its political reasoning leaves Labour in unfamiliar territory, and perhaps understandably hoping that this strange era will conclude with a return to the kind of austerity-driven policies that generations of party stalwarts have grown up attacking. The alternative, of casting themselves as more fiscally responsible (read austere) than the Conservatives does not hold much appeal among the membership.

Labour MPs hope that once the "vaccine bounce" recedes, the post-lockdown feel-good factor fades, and Starmer's opposition gets more visibility, something like politics as usual will return. "I think Keir's doing a fantastic job in very, very difficult circumstances," McMahon says. "I'm very happy about his leadership."

The forecast of an imminent end to the spending spree is not unreasonable. Come autumn, with the Comprehensive Spending Review due, more traditional Conservative instincts could kick in as Sunak reigns in No 10's pandemic splurge. Once furlough ends, unemployment could skyrocket, and runaway inflation could even kick in as pent-up demand is unleashed, interest rates are held down, and QE continues. But for now, the Tories seem content to borrow from their rivals – a hallmark trait of the party that prides itself on pragmatism over ideology. Disraeli "caught the Whigs bathing and walked away with their clothes" by extending the franchise to working-class voters. Churchill acquiesced in Labour's post-war nationalisations and Beveridge's welfare state. And now the Conservative response to Covid-19 has been to break every rule of long-held Thatcherite orthodoxy on the role of government, the financing of debt and fiscal restraint.

On transport, even McMahon concedes the Tories have embraced watered-down Labour policy not out of a desire to "nick our manifesto", but in order to fix a system that "wasn't fit for purpose". But whether this is an ideological conversion to social democracy or a technocratic policy tweak is immaterial: what's certain is that it fits a wider pattern of shifts that have Labour on the back foot. GBR will be a litmus test of how likely the fleet-footed new Conservative agenda is to stumble on the party's ideological roots – and how much further into Labour territory it is likely to venture if the scheme's interventions fall short of solving Britain's railroad woes. ●

There's more than one road to a zero-carbon future

Johnson Matthey's **Andy Walker** on why the use of battery electric vehicles will be vitally important, but won't be enough to clean up our roads on their own

The appetite for electric cars is accelerating. In the five months to May 2021, battery electric vehicles (BEV) sales in the UK were up more than 145 per cent year-on-year, reaching a market share of 7.5 per cent. Globally, there are now more than ten million electric cars on the roads.

Britain's policymakers are also enthusiastic. The government has announced a £1.3bn funding provision for a vehicle charging network, a centrepiece of its "Green Industrial Revolution". Production, too, is speeding up. Carmakers including Nissan are planning "gigafactories" for the production of car batteries in the UK, while Jaguar pledges to go all-electric by 2025.

Johnson Matthey is one of the British technology companies supporting this activity. It is building a new plant in Poland that will be producing eLNO, its new-generation battery cathode material developed at its Oxford research base, within the next three years. Another plant is planned in Finland. eLNO should reduce battery costs, boosting range and consumer confidence. The plants, powered by renewable energy, will also help carmakers decarbonise their supply chains.

But while the electric revolution looks promising, it is only one part of a wider revolution that is needed to cut carbon emissions. The Intergovernmental Panel on Climate Change warns that "no single solution or option can enable a global transition to 1.5°C". If the world is to achieve the G7 leaders' pledge to halve emissions



by 2030, more technologies will be needed, and fast.

Fuel cell future

Current battery technologies are improving but have limitations. This is particularly true for the competitive HGV market, where time spent charging and refuelling is lost revenue.

"Businesses need their long-haul commercial vehicles to have a long range between fuelling stops," explains Johnson Matthey's technical director, Andy Walker. "Very big batteries are required to provide this range, and such batteries are very expensive and heavy, so you're penalising the operator up front. Bigger batteries also take longer to recharge."

Ironically, the solution to this modern-day problem could be a 19th-century technology – fuel cells.

Electrochemical fuel cells were first invented in 1839 by a Welsh judge, Sir William Grove. One hundred and thirty years later, fuel cell technology helped the first humans reach the

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moon. In both cases, Johnson Matthey supplied vital materials: platinum for Grove's fuel cell; electrocatalysts for the fuel cells used by Apollo 11.

Fuel cells use hydrogen – the most abundant element in the universe – to generate power electrochemically. The only emission is water.

As well as being clean, a report produced by McKinsey for the Hydrogen Council claims that fuel cell buses, trains, trucks and even SUVs could be cost-competitive with diesel by the end of the decade.

Given this potential, Johnson Matthey has opened a new facility in China with the capacity to make enough membrane electrode assembly (MEA) components to power more than 10,000 hydrogen buses and commercial vehicles. It complements the company's dedicated MEA manufacturing site in Swindon.

Companies are also pooling their resources. IMMORTAL – a Europe-wide scheme with a goal of developing high-performance fuel cell components

– connects a consortium of academia and industry leaders, including Bosch and Johnson Matthey.

Nonetheless, despite the considerable advantages of hydrogen, it is still only an emerging technology. More research and investment is required – and the right conditions will be needed for it to take off. “Take the hydrogen refuelling infrastructure,” says Walker. “You need that in order to build a nascent industry. We've seen big battery technology investments like the Faraday Battery Challenge, which is really helping the advancement of battery technology in the UK. We'd like to see a Faraday for fuel cells to keep the UK at the forefront of fuel cell technology.”

Catalysing change

These limitations on both fuel cells and batteries mean that the almost 40 million vehicles currently on British roads – most still with internal combustion engines (ICEs) – must be part of any solution. Especially since the 2030 ban on new ICE vehicles will still

allow used cars to be resold.

Catalytic converters will therefore continue to play a crucial role. These use precious metal catalysts – typically platinum and palladium – to convert harmful emissions from vehicle exhaust gases into carbon dioxide, water and nitrogen.

Vehicle manufacturers have also achieved significant reductions in average CO₂ emissions by pairing advanced catalyst systems with hybrids and more efficient engines.

Today, one in three new cars on the planet uses Johnson Matthey's catalytic converters, which prevent an estimated 20 million tonnes of pollutants being emitted annually.

One solution that's proven valuable in polluted urban areas is retrofitting. A programme that started during the 2012 London Olympics has to date seen around 1,400 of the UK capital's older buses fitted with emissions control catalysts and filters developed by Johnson Matthey and its partners. The benefits include reducing emissions of dangerous nitrogen oxides by up to 80 per cent. A further 2,150 buses around the UK have also had their emissions controls upgraded.

Catalytic converters are also part of a highly efficient process. “We sometimes say that we pioneered one of the world's first circular economies,” says Walker. “The precious metals in emissions control catalysts are very expensive. So we recycle them, and get as much of that recycled material back into supply chains going forward.”

The right road

We still have a long way to travel on the road to zero emissions. A lower-carbon future relies on us pulling on all of the technologies available, and working together to bring new ones into play.

“It's not about the type of hydrogen we use,” says Walker. “It's not about battery electric vehicles, or fuel cell electric vehicles. We're going to need everything. Net zero is a tremendous challenge, and we've got to throw everything we can at it.” ●

Using AI to unclog urban traffic

Raquel Velasco, head of product at Vivacity Labs, discusses how video and data analytics are being used to tackle everything from air pollution to dangerous junctions.

By Sarah Dawood

Air pollution is generally assessed by clouds of exhaust engine smoke or levels of pollutants, such as nitrogen dioxide, in the air. But there is another key metric by which we can measure its extent: time. Road congestion and standstill traffic have been shown to increase vehicle emissions and degrade air quality significantly. In Greater London alone it is estimated there were approximately 4,000 deaths attributed to air pollution in 2019, with traffic being the prime culprit.

One firm looking to tackle pollution through traffic management is London-based Vivacity Labs. It is one of many start-ups using smart tech to address congestion, alongside companies such as Canada-based Miovision and Israel-based Waycare. It works with local authorities to incorporate artificial intelligence (AI) into road infrastructure to improve traffic flow and reduce emissions caused by standstill and crawling traffic.

The company's core product is its smart video sensors, which collect millions of pieces of anonymised data, such as model, frequency and speed of vehicles, to assess flow and develop algorithms that can predict future traffic patterns.

This information can help policymakers and urban planners make decisions that address safety weaknesses, congestion or pollution; for instance, by improving a road that is dangerous for cyclists, making traffic adjustments for lorries – which typically have higher emissions than cars – or increasing rates of active travel.

As an example, Vivacity Labs worked with Westminster City Council in 2020, using sensors to analyse pedestrian behaviour and assess whether increasing footpath space would encourage more people to walk. Two months after footpaths were expanded, a 25 per cent increase in pedestrians was calculated.

“Our sensor data can help councils measure the impact of their interventions and address any unforeseen issues,” says Raquel Velasco, head of product at Vivacity Labs. “For instance, they can see whether a new cycle lane impacts the flow of traffic or whether cyclists are actually using the lane or not.”

A more recent advancement is the company's smart junctions, which act as autonomous traffic lights – these analyse data collected by the sensors and learn from the patterns to control traffic flow themselves, a technique known as “reinforcement learning”.

“During the pandemic, there's been a shift in priority for pedestrians and cyclists who have not traditionally been taken into account in traffic signal control,” says Velasco. “The junctions can prioritise different modes of transport and optimise for movement of people, as well as cars.”

The AI-powered junctions are programmed to act on a particular aim. In what Velasco describes as a “policy-driven algorithm”, policymakers can set a priority, whether that be reducing waiting time for pedestrians or speeding up car flow, and the tech commits it to memory.



While it might seem intuitive to prioritise pedestrians and cyclists, this is not necessarily the case – there is a delicate balancing act to be made, complicated by the fact that emissions vary depending on vehicle, speed and other factors.

“Reducing the time that pedestrians have to wait sounds great but the impact is congestion and therefore emissions from idle traffic,” Velasco says. “You can set the algorithm to optimise to reduce emissions as well, to try to balance it out.”

Many of Vivacity Labs’ clients are local authorities, with whom the company has a symbiotic relationship – often funded through innovation programmes, authorities receive access to the tech while their findings provide valuable research on how Vivacity Labs’ products work in real-world environments.

One project nearing its end is a three-year Innovate UK initiative where the company’s smart junctions were introduced across 12 junctions in Greater Manchester. Evaluation is ongoing but the intervention is showing positive signs of decreasing journey times across the city.

Working with public sector bodies comes with its challenges, particularly around securing ongoing funding. Council budgets are often decided year-by-year, making commitments for long-term projects difficult, says Velasco.

The company has had to adapt its client management, where the norm is to sell subscription services.

“The public sector is strapped for cash, so as a private company, guaranteeing ongoing revenue is not always possible,” she says. “It’s not an insurmountable challenge, but it’s a very different way of doing business.”

A pertinent question around embedding video technology into road infrastructure is around data privacy – where does all this footage go once it’s been captured? In Vivacity Labs’ case, it gets deleted, according to Velasco. The sensors themselves contain a computer that processes and encrypts the data. The findings are anonymised and aggregated into trends, which are sent to dashboards for the Vivacity Labs team to present to clients.

We need to drive data analysis in the public sector

The main hurdle is therefore not around security, but the disconnect between data and the skills required to interpret it. Vivacity Labs includes analysis as part of its service, but the long-term aim is to empower councils to interpret the findings themselves and make independent decisions.

The company regularly runs educational workshops, but Velasco feels there needs to be a long-term strategy to instil “data-driven decision-making” into the transport sector. Vivacity Labs has met with the Department for Transport and combined authorities to discuss this.

International expansion is on the agenda for Vivacity Labs, including negotiating how the tech will integrate with different traffic control systems across the world. The company will also explore self-driving vehicles, as it navigates how dual systems of autonomy could work together. But ultimately, while AI can help to innovate city planning, its potential can only be fully realised if the workforce is upskilled. “There’s so much information out there and unlocking it needs specialist knowledge,” Velasco says. “We need to drive data analysis within the public sector.” ●



BROMPTON



Will Butler-Adams,
CEO of Brompton, on
climate change, fitness, and
the future of urban transport.
Interview by Rohan Banerjee

“Most people can ride a bike, so what’s stopping them?”

Will Butler-Adams is not a “hardcore cyclist”. But, according to the CEO of folding bike manufacturer Brompton, “that’s exactly the point. . . I’m not, but I bloody love my ‘Brommie’. This little thing is a game changer for people living in cities.”

Butler-Adams, who completed an integrated master’s degree in mechanical engineering and Spanish at Newcastle University, says he “sort of fell” into the company. Studying in Valladolid, Spain, he worked for Nissan in Madrid as part of his course’s third year. After graduating in 1997, he took up management roles with chemical companies ICI and DuPont in the Teesside area of the UK. In 2002, a chance encounter with Brompton’s then chairman Tim

Guinness on a London bus led to a “chat with the bike’s inventor [Andrew Ritchie]” and eventually a job offer. By 2005, he was the company’s engineering director. He took over from Ritchie as CEO in 2008, and since then Brompton has grown from a company with a £2m turnover and 27 staff to one with a £70m turnover and 600 staff.

Butler-Adams was used to working with and around “world-class” engineering. He admits he wasn’t initially impressed with the Brompton operation – specifically its cramped and cluttered warehouse in Brentford, which had “very little” in the way of machinery. “It was hugely inefficient. Walking around the factory felt like I’d travelled back in time,” he recalls. ▶

► The company was making around 6,000 bikes a year when Butler-Adams joined. It was profitable, he says, but unable to satisfy the demand he thought its “clearly great product” was bound to create. A change in strategy, including outsourcing some of the “non-core” parts of the manufacturing process, has led to rapid growth. As of 2020, Brompton makes approximately 75,000 bikes a year and is exploring the electric market.

Butler-Adams, whose family are originally from North Yorkshire, confesses he has never been a “London guy”. He is happiest “when in mountains and wilderness”, and yet “this weird little bike made living in London a complete and utter blast... You know, unlike my friends, who were stuck on the Tube or on a bus, I was just whizzing across the city. I knew every backstreet, every canal, every park. It made urban life fun. And, you know, I got pretty fit, too. This product genuinely makes people feel better, and that’s very addictive. That’s why I’m still here today.”

Brompton bikes are made of a mix of steel and titanium and can fold compactly to fit in a luggage rack on a train or in the boot of a car. They retail from £850 (the B75) to £3,500 (full-spec electric). Butler-Adams says the prices are a reflection of quality, and he rejects the idea that they are inaccessible. Holding up his smartphone, he asks assuredly: “Do you have one of these?”

He doubles down. “People will find a way of affording something, if it’s useful.” A Brompton bike, Butler-Adams points out, isn’t “some frivolous pair of trainers that costs 150 quid. This thing is actually a transport tool. It is my life. I don’t go to the gym. I don’t pay for the Tube. That’s how I live – on my bike. It lasts 20 years. The thing is awesome.”

Just as phones or cars are available on finance, Butler-Adams says that many similar instalment schemes are available for Brompton bikes and believes they are a worthwhile investment. “There are plenty of interest-free options. If that means you pay 30 or 40 quid a month...

People will find a way of affording useful things

It’ll change your life for the better.”

Butler-Adams says the target audience for Brompton is “anyone who can ride a bike”. Regular cyclists, he estimates, make up “around 4 per cent of Londoners”, but Brompton is as interested in “the people who know how to ride a bike, whose parents ran behind them and felt that they’d be crap parents if they didn’t... That’s not 4 per cent, that’s 96 per cent. Why aren’t they riding a bike? What’s stopping them? Is it confidence? Is it fear? How do we find ways to make cycling easier?”

Butler-Adams thinks that the coronavirus pandemic could catalyse bike usage. The lockdown restrictions have led to many more people working from home and travelling less, and made policymakers “rethink” transport, both in terms of its environmental impact and in relation to public health. “We do not need congested roads, five days a week, in rush hour,” he says. As people travel into city centres less frequently, Butler-Adams argues that cycling offers a “less pollutant, healthier, and more cost-effective way” of making those journeys.

He lauds the likes of Anne Hidalgo, the Mayor of Paris, who has invested in cycling infrastructure – explicitly at the expense of motorists – and would like the UK to follow suit. “She has put in 650km of cycle lanes, and she’s taken out 80,000 car parking spaces. You need to rethink how you want society to live. And on the basis that, in the world, most of society live in cities... That’s where the densest congregations of human population are. If human beings are the apex [species] on



the planet – which they are – why would you design a system where the places where the most humans live are in the unhealthiest, most polluted areas? It’s going to lead to much higher rates of mortality, of obesity, much higher rates of poor mental health, and the poorest air quality.”

There is “absolutely no need”, Butler-Adams adds, to have a “two-tonne square piece of metal” roaming around a city centre. “If a car hits a child, it will kill them. If it hits a person, it kills them.” Clearly exasperated, he raises both of his hands. “Just take it out. Take it out now.”

That said, Butler-Adams is not anti-car. He accepts there are times when one is necessary, and has his own Nissan Leaf, a battery-electric vehicle, but, particularly for short-range trips, he would prefer to cycle. “It’s good for my brain, as much as anything else,” he says.

According to Butler-Adams, Covid-19



has led to the “acceleration of the humble voter”. As the status quo around work and travel has been turned on its head, more people have “got a taste” for a flexible lifestyle and quieter roads. “People have realised they have a right to live in an environment that’s good for them.”

For Butler-Adams, investing in cycling infrastructure in the UK makes total sense. “It’s not cheap,” he admits, “but it’s a lot cheaper than HS2. You know, it’s a lot cheaper than sticking another Underground line across London, to shave off, what, a few minutes of travel time? Crossrail has cost billions and billions of pounds. And it’s still not done. And it’s just in London, anyway. You could transform every city in the UK [with cycling infrastructure], and you could transform the lives of people for the next 50 years. You could do that for less than £10bn in total.”

BROMPTON

In general, we need to consume less energy

While Butler-Adams certainly has views on politics – he describes Brexit as a “pain in the arse” from the point of view of Brompton’s supply chain – he insists that investing in cycling, and the issues that such action aims to address, are not bound by any particular party’s ideology. Pressed as to whether he thinks a Labour or Conservative government is more likely to recognise the value of cycling, he won’t comment. “It doesn’t

matter. I’m not a lobbyist. The point here is that there are certain things – like public health or climate change – that affect everyone. Any party in power has to recognise that.”

The “reality” of climate change, Butler-Adams says, is that humans all over the world need to be more efficient about how they produce and use energy. Light, electric vehicles are key to lowering carbon emissions, he notes. “In general, we need to consume less. One of the biggest consumptions [of energy] we have is driving around in a two-tonne vehicle to carry an 80-kilo human being.”

And where do bikes fit in? “A bike might weigh 14 kilos, but it can carry an 80-kilo human. Now you can extrapolate that and say that instead of having a white van that weighs a couple of tonnes, why not have a cargo bike that weighs 40 kilos? In any case, once you hit a city boundary, something that weighs several tonnes... That’s not the right vehicle. If you hit someone on a 14-kilo bike, travelling at 15 miles an hour, yeah you might hurt them. But at least you’re not going to kill them.”

Is more infrastructure alone enough to increase enthusiasm in cycling? Or do people need active incentives? Butler-Adams says that policies, such as tax breaks, “are good and can help but aren’t the be-all and end-all”. If the cycling infrastructure is well-built and high-functioning, he explains, then uptake will happen naturally. “That’s numero uno,” he says. “Of course, you can do the other stuff, on top of it, but that’s the main thing. If every school had safe cycle lanes within a one or two-mile radius, then every parent would take their kids to school [on a bike].”

True political leadership, Butler-Adams suggests, means having the foresight to make a “potentially unpopular decision” on the basis that in the long run it will yield more benefits than problems. “Vocal minorities may push back, but if something, like cycling, can be proven to be in the public interest, which it is, then you’ve got to press on with it. It’s healthier and it’s cleaner.” ●

A dream that requires drive

The West Midlands is at the heart of an electric vehicle revolution, says **Jim O'Boyle**, cabinet member for jobs, regeneration and climate change at Coventry City Council

The future of automotive is electric. The government has, quite rightly, committed to phase out petrol and diesel vehicles in the UK by 2030. In fewer than ten years, all new cars sold will be electric.

This is the biggest change to our automotive sector since the internal combustion engine. It is a fundamental threat, but it is also an opportunity for this iconic British industry. In Coventry and Warwickshire, we are leading the way in electrification and delivering for UK PLC.

Within an electric vehicle, the battery makes up around 40 per cent of the value. They are also difficult and expensive to transport. As a result, future manufacturing and supply chains will be fundamentally reconfigured to bring car manufacturing closer to battery production.

This is the primary threat to the UK automotive sector. If we do not secure battery production in the UK, the automotive sector will gradually leak away to those countries that can meet its needs. This will not happen in one "big bang", but will be a gradual effect that mirrors the decline of British manufacturing since the 1970s.

The answer lies in "gigafactories". The term has been popularised by Elon Musk and Tesla but refers to any facility that manufactures batteries at scale. They are extremely specialised, and hugely expensive to deliver – with potential investments of around £2.5bn needed to become operational.

The Faraday Institution, a leading independent research institute, has estimated the UK will need between



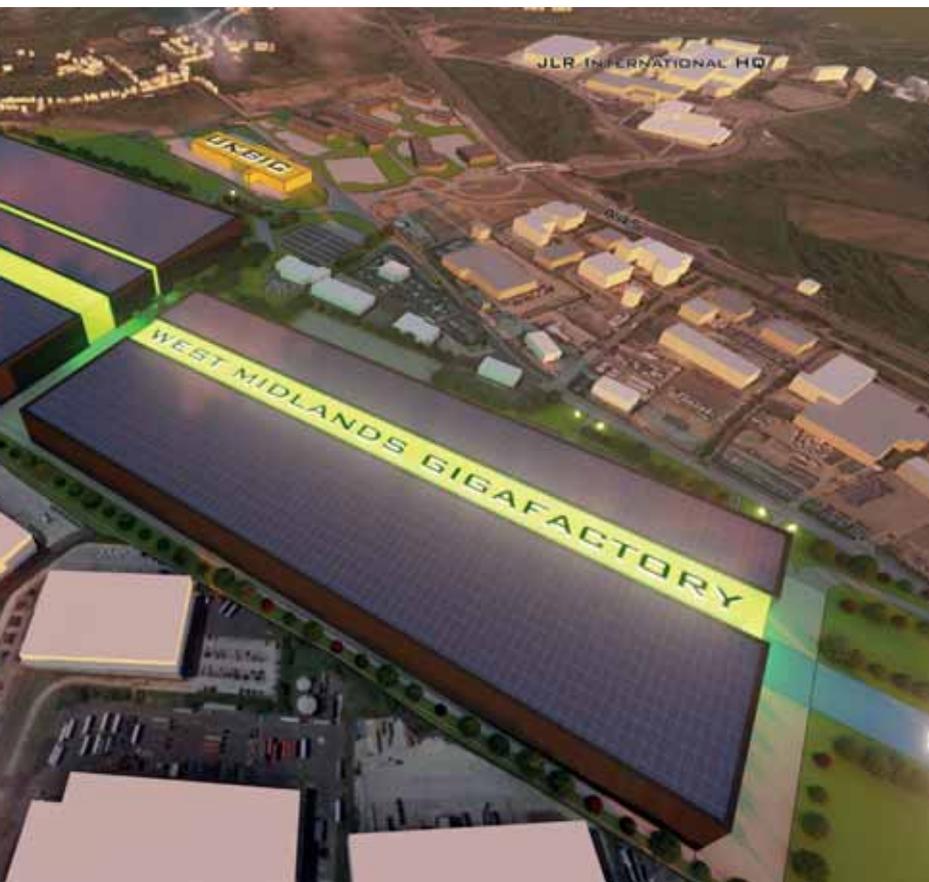
five and eight gigafactories to meet domestic demand. According to the organisation, if we do not secure battery production in the UK, we will miss out on 105,000 jobs by 2040. However, if we can secure a gigafactory, 78,000 new jobs will be created. There are currently no such facilities in the UK, and we are behind our international competitors in Europe, Asia and America.

The West Midlands is the beating heart of the UK automotive sector. The region employs around 46,500 people in automotive manufacturing, with an economic value of £3.2bn gross value

A gigafactory could create thousands of new jobs

IN ASSOCIATION WITH





added (GVA). Around one-third of cars come from West Midlands' production lines, along with one-quarter of engines.

The region is home to 20 vehicle manufacturing sites and 35 automotive manufacturers, while more than 20 per cent of all UK automotive parts and accessories are manufactured there – the most of any UK region. More recently, the West Midlands has been rapidly building specialisms in future mobility technology. It is the UK's first Future Mobility Zone. Connected and autonomous vehicle trials have taken place in the region, including the UK's first self-driving vehicles taking to roads in Coventry city centre.

The result is a powerful automotive cluster and skills ecosystem that is ready and willing to be reskilled and upskilled to take advantage of electric vehicle technology. If the West Midlands is the home of UK automotive, Coventry and Warwickshire is a centre of excellence in battery technology, research and development. This is a result of years of

hard work from Coventry City Council and the local partnerships.

The Advanced Propulsion Centre (APC) is located at the University of Warwick and is a joint venture between the UK government and the automotive industry. Warwick Manufacturing Group is a partnership between the University of Warwick, Jaguar Land Rover and Tata Motors.

Jaguar Land Rover's global headquarters are in Coventry and Warwickshire, along with others including Aston Martin Lagonda, London EV Company and Lotus Engineering. Critically, Coventry is home to the UK Battery Industrialisation Centre (UKBIC), which is the centre of battery research and development in the UK. The facility is being delivered by a consortium made up of Coventry City Council, Coventry & Warwickshire Local Enterprise Partnership (LEP), and WMG, an academic department at the University of Warwick. The purpose of UKBIC is to scale up and commercialise technology

central to the manufacture of batteries, thus supporting the development of gigafactories in the UK.

The consortium secured government funding in 2017 through the Faraday Challenge, and its delivery has reinforced Coventry and Warwickshire as the heart of the UK's response to battery research. UKBIC proves that Coventry and Warwickshire can deliver for UK PLC. Coventry Airport has been identified as the preferred site for a West Midlands gigafactory, backed by Coventry City Council, Coventry and Warwickshire LEP, West Midlands Combined Authority, Warwick District Council, and Warwickshire County Council – as well as the private sector.

A gigafactory at Coventry Airport would create at least 4,500 jobs directly as well as protecting and creating tens of thousands more in the supply chain. The airport's location – a stone's throw from UKBIC, and at the heart of an advanced automotive ecosystem – makes it an ideal location for up to 5.7 million square feet of manufacturing space. Coventry City Council has seized the initiative by forming a joint venture partnership with Coventry Airport to secure planning permission for a gigafactory. This is being funded at risk by both parties because we understand how critical this is for our economy and future job creation. We have made huge progress in understanding what is needed to secure a gigafactory and early discussions are already under way with potential manufacturers and customers.

Local government is playing its part, alongside the private sector. We now need ministers to back our vision. The government has made £500m available to secure battery manufacturing in the UK. The time is right to work with us to develop an attractive package of support to secure investment in a gigafactory at Coventry Airport.

We have the site, we have the skills, we have the experience, and we have the innovation. We are the obvious location for the first UK gigafactory and will work with the government to make it happen. ●

Tackling sexual assault on public transport

As commuting makes a comeback, viruses are far from the only threat.

By Samir Jeraj

There is a myriad of differences between public transport experiences worldwide, but one remains almost ubiquitous, especially for women and other vulnerable people: sexual assault. London is no exception. A 2020 YouGov survey found 55 per cent of women and 21 per cent of men had experienced harassment or assault on public transport in London, although 90 per cent of harassment is still not reported. And despite campaigns to increase awareness and enforcement, a Freedom of Information inquiry by *Spotlight* has shown that reporting of assaults across the UK went up only slightly compared with the most recent preceding years, while the conviction rate has barely budged.

Public transport, with its rushed and crowded spaces, presents unique opportunities for harassers. Shola Apena Rogers, a lecturer in forensic psychology at Birmingham University, wrote her PhD research on perpetrators of assault and harassment on the London Underground. She looked at the “scripts”, the patterns, that characterised offenders and offered an insight into how to intervene, such as training staff to spot prolific offenders. Most offenders travel with the intention of offending, rather than doing so opportunistically. “In that [Tube] environment there are certain things that allow behaviours that

wouldn’t necessarily happen in another environment,” she explains. For example, a crowded rush hour tube is a lot like a nightclub in some respects. Bystanders also play an important role, and Apena Rogers believes changing how they view and respond to incidents could have the most powerful impact on preventing sexual assaults and harassment.

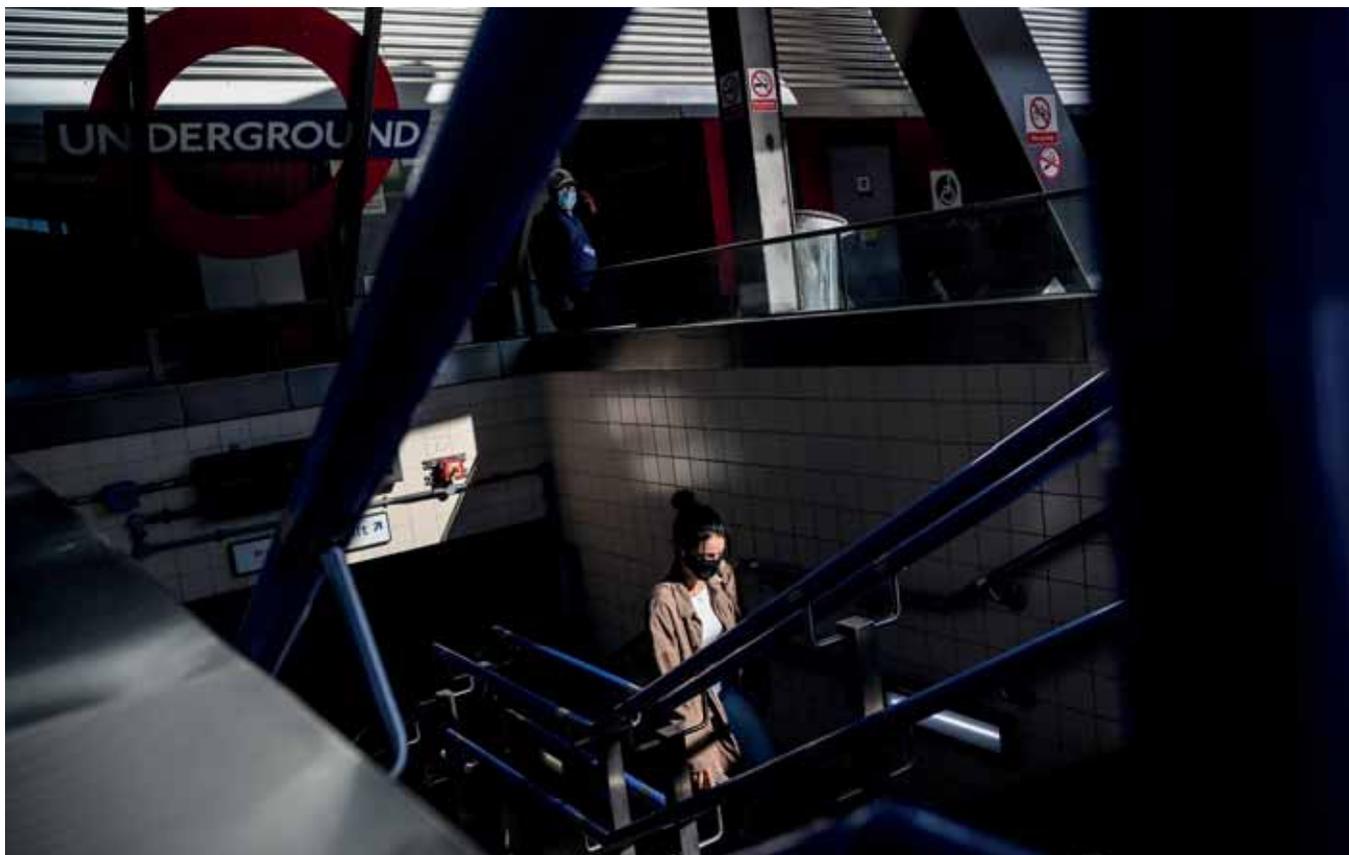
In the capital, the most concentrated attempt to turn back the tide has been Project Guardian, launched by Transport for London in 2013. The scheme involved the Metropolitan Police and British Transport Police, with women’s organisations such as the Ending Violence Against Women coalition (EVAW), Hollaback! UK and Everyday Sexism advising on how to best support victims and survivors of incidents and encourage them to come forward and report. “The initial response to a report of sexual offending is really important to get right,” says EVAW director Andrea Simon. “If they [the victim] have a negative first experience it really impacts on them and their confidence around the system.”

Plain-clothed police were deployed as part of Project Guardian to patrol public transport, processes were reviewed, and officers and transport staff were trained specifically on how to respond and ensure victims felt believed and supported. Reports of harassment and assault went up by 20 per cent while the project was running and detection of

sexual offences on the public transport network increased by 32 per cent.

On the national level, British Transport Police commissioned a review of the evidence in 2015 to identify some strategies to help it tackle sexual harassment across the UK’s trains, trams, underground systems and buses. The authors argued that no single intervention would be effective, but that a “coordinated package” of measures – such as increased surveillance (human and CCTV), design improvements to increase visibility, awareness campaigns, easier reporting mechanisms, and using technology to identify hotspots – would be needed. These are not the only potential solutions, however.

“A lot of the initiatives that are tried on public transport are not evaluated, or assessed, in any way as to their effectiveness,” Miranda Horvath, one of the authors of the review, tells *Spotlight*. The authors found that while many public transport agencies in the UK and around the world were trying a variety of approaches, they were not able to point to tangible impacts because most were not evaluated, so the results are hard to trace. This remains an issue, Horvath says. “More often than not, they [interventions] are not very well-publicised and one of the things the literature seems to suggest is that for these things to be effective, the public needs to know what’s going on.”



No report is too small or trivial

At the time of writing, the net results of the UK schemes offer less consolation than one might hope. In response to a Freedom of Information request submitted by *Spotlight*, the British Transport Police said that reported cases dropped by about two-thirds during the 2020-2021 lockdowns – in absolute numbers, from around 1,600 a year to just below 500. Charging and summons rates rose from around 11 per cent in 2018/19 and 2019/20 to 17 per cent in 2020/21. But conviction rates barely went up – from around 5 per cent in 2018/19 and 2019/20 to 6 per cent in 20/21.

Commenting on the findings, detective chief inspector Sarah White of the British Transport Police, says: “We are absolutely committed to reducing

sexual offending on the rail network, and victims and survivors remain at the heart of our strategy. We are working tirelessly to deter and identify offenders, increase positive judicial outcomes, provide increased reporting mechanisms and engage with victims on how we can improve. This year we have almost tripled the number of officers who are specially trained to investigate sexual offences across England, Scotland and Wales.

“We would urge anyone who has been a victim of any sexual offences or unwanted sexual behaviour to report it to us in the confidence that we will extensively investigate and do everything possible to support them,” she adds. “No report is too small or trivial, and we will always take you seriously.”

Deploying more law enforcement officers is one of the most common responses, and is effective to an extent, but is not without its own problems. Evidence from across the world shows that law enforcement is often biased against women (particularly survivors

of sexual assault), ethnic minorities and LGBTQ people.

Jorge Arteaga, deputy director of the US-based Hollaback!, says the organisation does not support criminalisation, as it often results in the police continuing to disproportionately target people of colour. Instead, Hollaback! has focused on educating and training people to make bystander interventions and develop grassroots solutions to harassment and violence.

Horvath, for her part, would like to see more trials of schemes tried across the UK, such as request stops for buses in more rural and remote areas. These would enable transport authorities to collect the data on what works and spread those practices across the network. “With a lot of these things you’re actually not talking about a very difficult or costly thing to try and just test,” she says. With transport usage slowly creeping up closer to pre-pandemic levels, this would seem a good time to explore and deploy new strategies, to ensure the number of assaults do not rise accordingly. ●

Can transport be run by government?

London has one of the most cohesive transport networks in the world, in part due to being governed by Transport for London. But could the model work in other UK cities?
By Sarah Dawood

You need to get across town, and Google Maps tells you exactly what to do. You walk 500m to a bus stop and wait for five minutes; your bus arrives and, during your short ride, traffic lights give you priority; you hop off the bus and onto a train for ten minutes; a final 200m walk takes you to your end destination. Each part of your journey is paid via contactless card, capped at a daily limit.

Sound seamless? This is an integrated transport system, where different transport modes are combined cohesively to make getting from A to B as quick and cost-effective as possible.

London is known for its integrated system, which is owned by Transport for London (TfL), an umbrella government body. Certain services, like bus operations, are franchised to private companies, but still operate within TfL's control.

Elsewhere in the UK, wholly privatised systems mean there is no overarching owner, and several operators run competing services. Regions such as Greater Manchester are now seeking more joined-up networks and are looking to London's public ownership model. The model has also recently inspired the Department for Transport to propose a similar state-owned body for national rail called Great British Railways, which is set to launch in 2023.

The argument for this is compelling.

It is estimated that more than 16 million people in England and Wales travel to work by car, including two-thirds of city dwellers, but London's car ownership is comparatively low – 55 per cent of London households own a car compared to 80 per cent of households across the rest of England. Increasing the use of public transport can positively impact the environment and people's health – but is state ownership the best way to convince people to ditch the car and take the bus?

The London model

Admittedly, London's transport model is not straightforward or totally state-controlled. The London Underground is operated entirely by TfL, but buses, trams and the London Overground are franchised, so while TfL oversees fares, routes and timetables, competitive contracts are awarded to operators to run services, which includes hiring staff and buying or leasing vehicles.

The franchised model simplifies travel for the customer, says Geoff Hobbs, director of public transport service planning at TfL. Bus fares are consistent at £1.55 with a daily cap of £4.65, payment is all contactless, and there are travel cards for use across all buses or multimodal travel. All other transport modes are capped as well – you can travel all over town for 24 hours and not pay much more than a single average taxi ride.



The capital's overground and bus networks are run by franchises

Integration also means design is consistent and information centralised. The TfL website is a one-stop shop for all travel information – up to and including offering you advice on which streets are best suited for cyclists – and staff on the ground tend to have comprehensive knowledge.

There is a further benefit: TfL's timetable control means a fairer spread of services. Different bus operators are not competing for the most popular routes and neglecting less busy areas, unlike in cities such as Manchester, where a focus on profit has seen several routes cut over recent years.

“When timetables are decided commercially, services are piled on popular routes and times of day,” Hobbs says. “If our system wasn't integrated, you would see bus operators competing with the London Underground rather than resourcing quieter areas. We can make things complementary rather than competitive.”

Services are timed to avoid long waits between two modes, such as Tube and bus, and walking paths and

bike facilities are placed near stations, encouraging more people to incorporate active travel into their journeys.

TfL also has the power to push private operators to be more sustainable. Under government regulation, all contractors need to ensure their buses meet Euro 6 and Ultra Low Emission Zone (ULEZ) standards, and the model helps government “accelerate the rate of change” to alternative fuels, says Hobbs. Six per cent of London's 9,000-strong bus fleet is currently electric and hydrogen, with Mayor Sadiq Khan aiming to make all buses zero-emission by 2030.

There is a consensus that the most valuable thing transport leaders can do to tackle climate change and air pollution is make services more desirable and efficient. Road management falls under TfL's integrated system, so buses are given priority through designated lanes, and even traffic lights are programmed to turn green as they approach.

“I can turn the fleet green, but if there are no passengers riding it it's all for nothing,” says Hobbs. “The biggest single contribution is to transfer trips from private car to public transport.” ▶

We can make things complementary rather than competitive



► Manchester looking to integration

Currently, 250 million car journeys of less than 1km are taken every year in Greater Manchester. Chris Boardman, the region's transport commissioner, hopes that a new integrated transport system – including a franchised bus model bringing services under the control of Transport for Greater Manchester (TfGM) – will encourage more people to ditch the car, as set out in the Greater Manchester Transport Strategy for 2040.

“To tackle climate change and the health crisis, it is essential we give people a viable alternative to driving,” says Boardman. “You have to ask: what would make people get out of their cars? It's got to be easy, reliable, affordable and roughly as quick.”

By 2040, the city hopes to introduce standardised fares with a daily price cap, a coordinated bus service and a comprehensive cycle and walking network, with 100km due to be ready to ride this year. Cycle hire will be included within the daily cap – something London is yet to do. Greater Manchester has also pledged to deliver the UK's biggest cycling network, at 2,900km long.

The new system will help towards achieving Greater Manchester's climate target of net zero by 2038 and aims to encourage people to exercise – physical inactivity is responsible for one in six UK deaths and costs the country £7.4bn per year. Electric cars might help tackle pollution but do not solve issues such as road congestion or sedentariness.

“The sheer cost of [inactivity] to the NHS is enormous,” says Boardman. “Electric cars are not a panacea – they don't encourage people to change their habits so are not the priority.”

Designing a complex integrated system will come with challenges, including funding in the billions, decades of work and keeping up with changing technology. But Boardman says the biggest hurdles are not financial or logistical but sociopolitical.

“The person on the street is dealing with getting two kids to school and themselves to work, and that dominates their life,” he says. “We have to show



Greater Manchester has pledged to build the UK's biggest cycling network

them that short-term inconvenience is going to lead to something better.”

There will need to be a strong communication strategy to demonstrate the long-term positive impacts of the new system to the Greater Manchester community, says Boardman, from money saved on fuel that can go towards holidays to the health benefits for children of walking and cycling.

A “partnership approach”

The proposed change is not without its critics, who say that Manchester's existing multi-operator bus model is sufficient and question whether money spent on franchising could be better spent on tackling specific issues, like traffic congestion.

Gary Nolan, chief executive at OneBus, which represents Manchester's bus

operators, says that franchising will be a “huge cost to taxpayers”. The Greater Manchester Combined Authority (GMCA) expects the cost of transitioning to the new franchising system to be £134.5m, and fares are forecasted to increase above inflation.

A publicly owned system can certainly place financial burden on the government – TfL is normally majority funded by fares, but a drop in passenger numbers during the pandemic has meant the government has given it more than £4bn in bailout money to keep services running.

“[This] shows that franchising is no panacea,” says Nolan. “It is vital we make the best use of scarce public funding and work together on practical improvements that will help restore the region's transport networks.” He argues



You have to ask: what would make people get out of their cars?

that a “partnership approach” between bus operators and local authorities through individual schemes could achieve the same aims as franchising without the cost.

Nottingham’s bus operator

Nottingham’s transport set-up is an example of such a partnership. Distinct from the franchising model, Nottingham City Transport (NCT) is the main operator within the city and is majority-owned by Nottingham City Council. It runs alongside other operators and sets its own fares, but council ownership means there are standards around emission ratings and vehicles.

“Nottingham’s system is deregulated, therefore commercially focused,” says David Astill, managing director at NCT. “There’s no drain on local taxation but

we still operate in close partnership with the council.”

The bus network is not dependent on local authority budgets, meaning NCT was able to invest £20m into low-emission buses in 2019. “If we’d been competing with other expenditure demands on the local authority, we probably would not have received this investment,” Astill says. “It takes the politics out of bus service provision.”

The deregulated system means there is competition between operators to serve popular routes, but he says this can be positive as it encourages them to learn from each other and improve their customer service. For less commercially viable routes, the council operates a link bus service to fill network gaps.

For a partnership like this to work, there needs to be “mutual trust”

between operators and government, Astill says – which could perhaps be what is lacking in other cities. A Greater Nottingham Bus Partnership meets regularly with the council to discuss issues of concern.

So which is the best option? There is no doubt that a joined-up transport network made possible through public ownership encourages people to get out of their cars. Government regulation is also a powerful tool that can be used for societal inclusion and environmental standards. Equally, the public sector has its financial difficulties and challenges around innovating outside of budgets. There is no one-size-fits-all approach, but a green and sustainable transport system requires the public’s needs to be placed ahead of short-term commercial interests. ●

Why global sustainability starts at home

Government, academia and industry must pull together to combat the climate crisis effectively, says **Christine Ennew**, provost at the University of Warwick

Research-intensive universities are global assets playing a leading role in responding to the world's major challenges. The climate emergency is one such challenge – a wicked problem without respect for borders or politics. University of Warwick researchers are undertaking ground-breaking research to address the climate emergency, working collaboratively across disciplines to bring new perspectives, ideas and solutions forward. We are partnering with industry, other universities, and public bodies to ensure real-world impact is realised.

While we know that a global approach is critical to addressing climate issues, we recognise that universities also have explicit social and civic responsibilities in the towns, cities and regions in which they are based. By using Warwick's campus as a "living lab" for real-time innovation and research, we can uncover and respond to issues at the heart of our communities and build meaningful responses; we can discover and test what solutions are effective in addressing real-world challenges and share our solutions across the UK and the globe. To solve global problems, we need to work globally, but we must also deliver locally.

Green transport

A climate emergency has been declared across the West Midlands. The West Midlands Combined Authority set a

regional target of net-zero emissions by 2041, and the University of Warwick made a commitment to reach net-zero carbon by 2030 from our direct emissions and the energy we buy, and to achieve net-zero carbon for both direct and indirect emissions by 2050. Achieving these targets holds the key to creating jobs, improving regional connectivity and delivering economic opportunity – contributing to the levelling-up agenda in the West Midlands.

Green, clean transport is a priority if we are to achieve net zero. The expansion of local rail services, enabling the adoption of active travel modes, and increasing provision for advanced electric charging networks are all currently being supported and delivered regionally. However, it will take a generational effort to redesign and repurpose our regional networks to ensure they're clean and green. It takes technology, which in some cases is not commercial, or even conceived of yet, to deliver the change we need.

At Warwick, green and clean transport is an important driver for campus planning and development, for our research, and for our relationships with industrial partners. From battery technology to disruptive new tech known as Very Light Rail (VLR), our work will be critical to delivering a clean, regional transport system, and leveraging it to deliver economic growth.

Leading by example

According to 2017 figures, the University of Warwick contributed over £1bn to the regional economy and is one of our region's largest employers, employing almost 7,500 staff directly, and over 9,400 indirectly within the West Midlands.

The campus is as big as a town, in terms of size and population, and offers a great location to trial cutting-edge transport solutions. We can engage highly mobile students and staff in testing new transport strategies and approaches. In 2020 we launched the

IN ASSOCIATION WITH



Future Transport Showcase, a two-year pilot in partnership with Transport for West Midlands and partners, which involved the introduction of new sustainable transport modes to campus, creating incentives for nudging changed travel behaviours, and undertaking behavioural analysis to understand what approaches are proving effective and why. The data and insight will help to inform regional and national policy.

Working in partnership

We cannot reach net zero, and beyond, without the private sector playing its part. The University of Warwick has pioneered partnerships with the private sector, particularly through academic department WMG's successful collaborations between academia and the public and private sectors, which have delivered battery packs for hybrid buses, digital security for autonomous vehicles, and autonomous transport pods for short journeys.

WMG has also been working closely with regional and industrial partners to deliver the UK Battery Industrialisation Centre (UKBIC) in Coventry. The facility is funded by the government as part of the Faraday Challenge and has been set up to commercialise battery technology for electric vehicles, which will be critical to the phasing out of petrol and diesel engines. In aviation, we have been working with Rolls-Royce and partners to develop energy storage systems for planes. Its £80m investment into energy storage solutions is expected to create around 300 jobs by 2030.

WMG has also been working with industrial partners to develop VLR, which could provide a lightweight, energy-efficient rail service with low manufacturing and operating costs. Not only will this technology increase mobility in urban areas, it could also allow us to re-open disused branch lines across the West Midlands and the UK. Our research and insights are being tested in Dudley before a planned roll-out in Coventry.



Delivering real-world solutions

None of this matters unless it can be transferred into the real world to power the real economy, meeting the demands of society at large.

The government made levelling-up the economy a keystone of its legislative agenda, alongside the pursuit of net zero. The reality is that the latter can feed the former and help rebalance the UK economy. As an example, our recently announced proposal for a new 48.8-hectare eco park, incorporating public recreational space, nature reserves and renewable energy generation, is designed to support the shift towards sustainable and active regional transport modes, including an improved connected network of regional pedestrian and cycle routes, and creating a boarding point for any future VLR services to the campus. It will also form part of the university's transport strategy to help champion more sustainable transport links to, and surrounding,

the main campus, including a possible nearby future train station, and roads configured to better support additional environmentally friendly forms of transport.

Whether through UKBIC, VLR, the Future Transport Showcase, or greening our campus, we're helping to create new jobs, improve transport connectivity and deliver economic growth. Battery technology created and developed in our laboratories can be scaled up through UKBIC and commercialised in UK gigafactories to deliver solutions for renewable energy distribution, and for use in land, sea and air transport.

As a university, we believe we're a critical partner and enabler of the green transport revolution as we green our transport system to achieve net zero and support the development of the regional infrastructure, and we'll continue to deliver for our own community because, ultimately, change starts at home. ●

The UK is meant to go fully emissions-free by 2035, but much of the infrastructure for electric vehicles is yet to come.

By **Samir Jeraj**

Powering ahead, or lagging behind?

In November 2020, as the UK lurched towards further lockdowns and the Covid-19 vaccine roll-out was still months away, the government announced it would take the bold step of ending the sale of diesel and petrol cars by 2030. The move would reduce carbon emissions from transport and boost the car manufacturing industry – supporting 169,000 jobs, according to the Department for Transport (DfT).

However, six months later, in May 2021, the Public Accounts Committee came to the conclusion that the government had no clear plan to achieve the 2030 target. One of the most damning findings was that consumers are still not convinced that electric vehicles are affordable, can

travel the distances they need, and have charging points that are available widely enough.

Meg Hillier MP, chair of the Public Accounts Committee, said the government has “a mountain to climb” to convince consumers of the affordability and practicality of zero-emission cars. “What we’re seeing looks more like throwing up a few signs around base camp,” she added. While the number of charging points is increasing rapidly, she observed, “many, many more are required” to meet that target, and her committee are not at all convinced the government is on track.

So what are the challenges to the UK’s electric vehicle transition and how can they be overcome?

The UK currently has around 23,000 public charging points in 15,000 places, but the majority of charging still happens in the home for people fortunate enough to have a driveway or garage. The government currently provides a grant of £350 for installing domestic chargers. The challenge is to ensure affordable access to charging for people who cannot charge at home. People who live in social housing are the least likely to have a driveway or garage, and public charging points are estimated to cost up to 78 per cent more than plugging in at home.

The charging network was recently given a boost when Electric Highway, the operator of the network owned by Ecotricity, was bought out by Gridserve, a company that is backed by



An electric car charges on a London street



Charging at home is still largely a luxury

Hitachi and has pledged to invest more. While Electric Highway had pioneered charging points as early as 2011, it was criticised for not being able to put the money needed to shift consumers en masse to electric vehicles.

The International Council on Clean Transport (ICCT) estimates the UK needs 341,000 to 430,000 charging points across public spaces and workplaces, meaning 30 per cent growth year-on-year to meet the 2030 target. “There are some very encouraging signs in the UK for infrastructure – it just takes continued focus,” says Mike Nicholas, a senior researcher at the ICCT. Local government is particularly important, he explains – “a lot of these strategies can only be enacted on the local level” – with national government providing the appropriately designed incentives.

The maintenance of the network has also come under fire, particularly in Northern Ireland, where a survey by the Electric Vehicle Association NI found 60 per cent of drivers had considered going back to petrol and diesel cars because of the poor condition of charging points.

There is also a speed challenge. Charging can take from eight to 24 hours, depending on the size of the battery and the speed of the charger. That is a very different experience from filling up in minutes at a petrol station. In response, “ultra-rapid” charging points that can charge in as little as 30 minutes have been rolled out. Ofgem, the energy regulator, recently approved £300m of investment in just over 3,500 ultra-rapid charging points, and the aim is to continue to expand this network. The UK is doing relatively better in this area – the ICCT estimates the rapid charging network will need to grow by 18 per cent a year to 2030.

The take-up of electric vehicles, meanwhile, lags behind the infrastructure. There are currently around 500,000 electric and ultra-low emission vehicles on the UK’s roads. They represented around 11 per cent of all new cars registered in 2020, but that compares to more than half of new vehicles sold in the Netherlands the year

before. Research from Ofgem suggests the number of electric vehicles could grow to 6.5 million by 2026 – or around one in four households – as people replace their old cars.

One way to encourage and speed up that process would be through a scrappage scheme, whereby older and more polluting diesel and petrol cars could be traded in for a discount on a new electric vehicle. Such schemes have to be carefully designed, says Nicholas, as it is important to ensure that the right vehicles were being taken off the road and replaced. In June of 2020, Prime Minister Boris Johnson suggested his government would introduce a scrappage scheme, paying people up to £6,000 to replace their cars. However, within a matter of weeks the government had performed a U-turn and confirmed there were no plans for such a scheme. Instead, the government announced a grants scheme a few months later, worth £582m, for people buying electric vehicles.

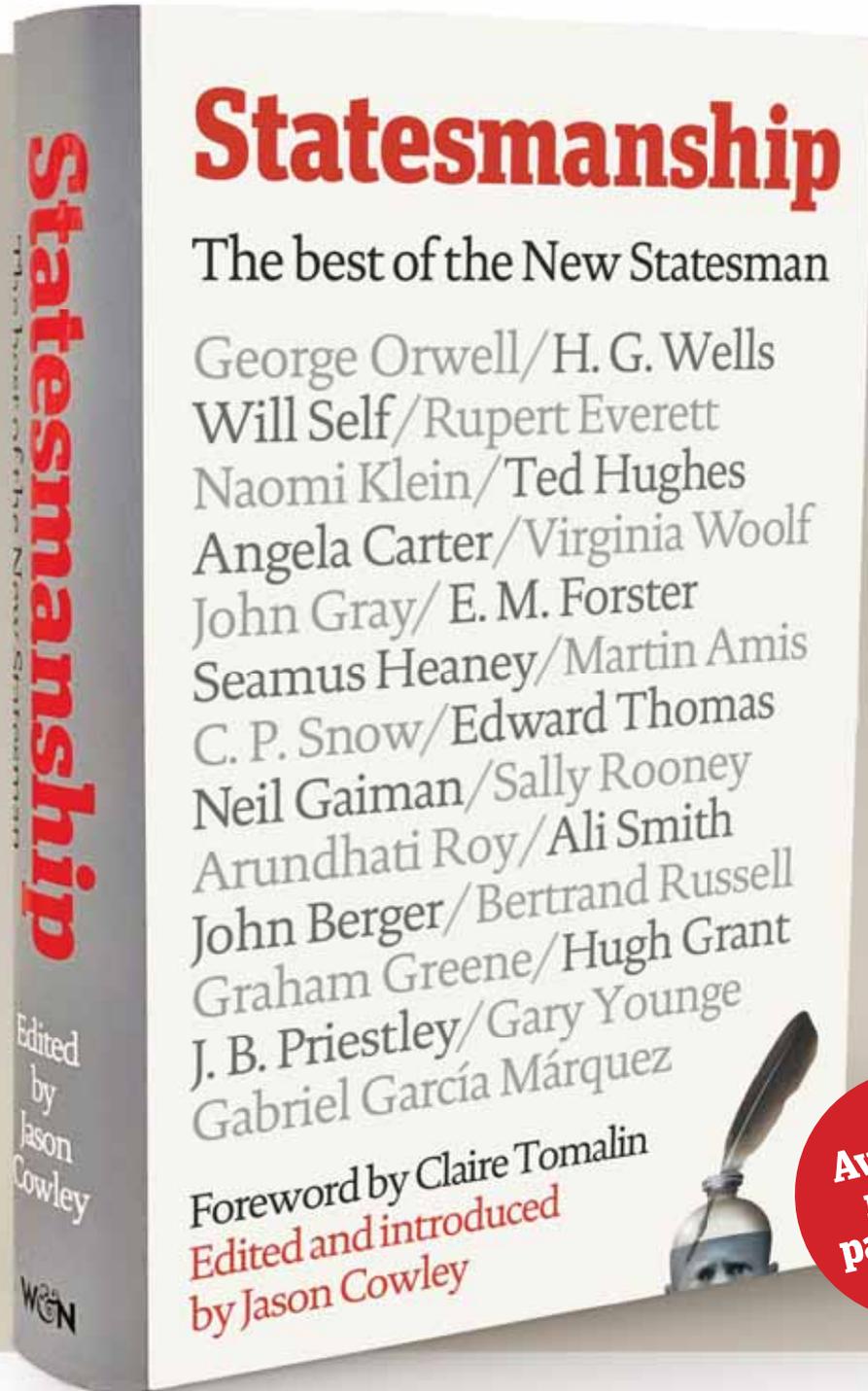
A DfT spokesperson said: “The UK is a global front runner in delivering charging infrastructure and is investing up to £2.8bn to charge up the electric car revolution.” They added that the government is supporting the installation of more than 180,000 charge points, along with funding council grants and research into new technology.

“The elephant in the room is tax revenues from petrol,” says Hillier. “If the government doesn’t have a real plan to meet its net-zero target. . . it certainly doesn’t have a plan to fund the move away from fossil fuel revenues.”

Electric vehicles may be the future, but unless the challenge of providing the appropriate infrastructure in the right places and at the right prices is met, the transition to decarbonised transport may take far longer than planned. Meeting this challenge requires a national strategy, a clear set of government policies, generous funding, and close collaboration with network operators and experienced local leadership. ●

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