ice
Institution of Civil Engineers

STATE OF THE NATION 2018: INFRASTRUCTURE INVESTMENT

Foreword

Lord Mair
President, Institution of Civil Engineers

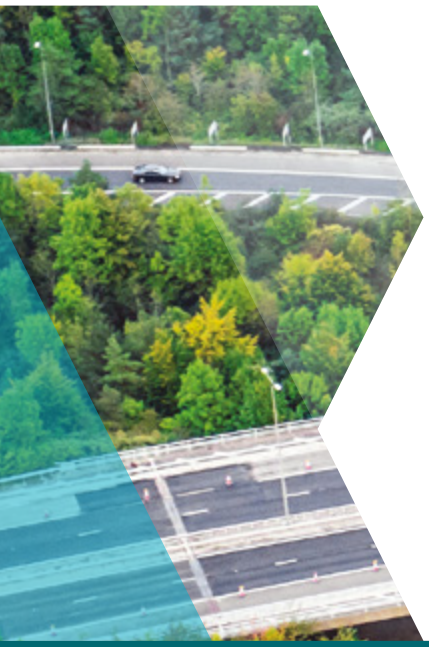
Good infrastructure helps transform our society for the better. However, the way we use and interact with this infrastructure is shifting. We face vastly changing demographics, along with increasing urbanisation and digital transformation. We want projects that are built bigger, better and quicker not to mention more resilient. The UK's strategic infrastructure network is what helps make our country run, and politicians from all parties have acknowledged this. As the UK re-positions itself on the global stage, improving the performance of our networks has never been more important.

Analysing the performance of our infrastructure systems in the long-term will help us create future infrastructure that is efficient, affordable and sustainable. This year's State of the Nation: Infrastructure Investment builds on the thinking outlined in our National Needs Assessment and goes one step further – by asking how we are going to fund and finance it.

The report offers insight and recommendations about how to respond to two key issues facing UK infrastructure: the challenges the nation faces in terms of future need and the interventions that the Government can make in order to attract greater private investment. It recognises the importance of cross-cutting interventions and focuses on policy solutions tailored to specific sectors. Put into practice, these recommendations will enable a more wide-ranging and stable landscape for infrastructure investment.

We have debated and discussed the issues explored in this report with over 150 organisations and professionals, over the course of numerous regional workshops, focus groups and interviews. Alongside civil engineers, experts from across the wider infrastructure sector and the investment community have given their time to help us shape this report.

I would like to thank everyone who has contributed to the production of this report. In particular, I reserve special thanks to Paul Sheffield and his Steering Group. I hope its publication marks the start of a broader conversation about how the UK can fund and finance the infrastructure that it requires in the future.



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Executive Summary

The UK's infrastructure needs are becoming increasingly complex. Demographic changes, which will see the population hit 75m by 2050,[1] pose questions around the capacity, reliability and performance of the nation's core infrastructure networks.

Global challenges, such as climate change, require a cleaner and smarter approach to the generation and consumption of energy. Likewise, extremes in weather are increasing the risk of drought, forcing a new approach to the way in which water resources are managed. Efforts to decarbonise will influence how we travel and work, with further implications for how we manage demand.

This report examines the scale of these challenges and their impact on the UK's infrastructure need within the context of investment. It sets out a series of recommendations for better utilising existing methods of funding and financing infrastructure, while making the case for fresh approaches. It also highlights the importance of improving the long-term planning of infrastructure and, in doing so, the way in which such planning is translated into an attractive proposition for the investment community which also provides value for money for the taxpayer.

An approach is required which will enable greater and more effective investment in infrastructure. Part of this should focus on policy solutions tailored to specific sectors like roads, energy, water and rail. However, it is also important to recognise that there are cross-cutting interventions that can make a significant difference as well.

Roads

The Government's income from fuel duty, as a result of the proliferation of electric vehicles, is projected to decrease in the coming decades. It is imperative that proper consideration is now given to the introduction of pay as you go on certain parts of the road network; to ensure that there is adequate funding for both maintenance and future upgrade works.

Energy

If we are to continue to encourage the development of emerging technologies within the energy sector, Contracts for Difference or equivalent initiatives should continue to be used in a targeted way. Unlocking the vast potential for energy storage in order to manage the intermittency of renewable energy could transform the way in which the energy sector works at a fundamental level. Models which support the future repurposing of our gas and heat networks should also be explored.

Water

At present water companies deliver their investment plans through five-year asset management periods (AMPs). Addressing demographic and climatic changes and taking a whole-systems approach necessitates planning over increasingly long-term horizons and the investment cycle must be flexible enough to allow water companies to respond to this need. It is also desirable that investment cycles in the water sector match other programmes issued by organisations such as the Environment Agency or the Department for Environment, Food and Rural Affairs.

Rail

Like the UK's road network, the rail industry relies heavily on public funding. Policy initiatives to increase the level of involvement that the private sector has in the development of the UK's rail industry are welcome. However, to boost participation, the current framework for market-led proposals requires simplification and reform so that the intellectual property associated with different bids is fairly rewarded.

Overarching policy solutions

The UK infrastructure sector has been a major recipient of finance from the European Investment Bank (EIB). Indeed, the EIB invested approximately €31.3bn between 2012 - 2016[2] with much of this targeted at key energy, transport and waste-management projects. The EIB is considered as a source of competitive finance and an anchor investor, providing finance to projects with risk profiles that are initially less appealing to other institutional investors. Exploratory work to allow for a contingency in the shape of a UK investment institution to compensate for the loss of this type of finance should be developed.

1 ICE (2016) National Needs Assessment
2 EIB (2017) The EIB in the United Kingdom

Recommendations

There is also a need for alternative funding and financing approaches to help ensure that gaps in infrastructure investment do not appear in the future. These include asset recycling, land value capture and crowdfunding. However, beyond these new approaches there is an onus on Government to better plan infrastructure investment opportunities and to make these more visible to the investment community.

Placing the National Infrastructure Commission on a statutory footing would give investors confidence in long-term planning, while including more detail on the risk and viability of individual projects in the National Infrastructure and Construction Pipeline would enhance investment planning.

About the production of this report

This report is the product of an extensive evidence-gathering process. The report steering group, with the support of ICE policy staff, conducted seven regional workshops and five focus groups with infrastructure and investment experts across the UK. A written call for evidence was also held.

Through focus groups and a national opinion poll conducted by YouGov, members of the public have also been consulted for their views on the recommendations contained within this report.

ICE has engaged over 150 individuals or organisations during the production of this report.

Sector-specific interventions to enhance infrastructure investment

- The Government should give serious consideration to replacing the existing generation of road taxes with a pay as you go model for the busiest roads in England.
- Energy storage and other emerging technologies should receive enhanced Government support through appropriate mechanisms drawing on the successful impact of Contracts for Difference on the renewable energy market.
- Water Asset Management Periods should be flexible enough to enable the planning and delivery of long-term programmes, which meet future demand caused by demographic and climate changes and enable more effective financial planning.
- Market-led proposals in rail should be reformed in a way which simplifies applications and respects the sharing of intellectual property from all bidders.

Overarching policy recommendations for Government

- The feasibility of establishing a UK Investment Bank should be explored as a contingency against a loss of access to low-cost anchor finance from the European Investment Bank and to maintain domestic expertise in infrastructure investment.
- Active steps should be taken to facilitate the use of alternative funding and financing mechanisms, including asset recycling, land value capture and crowdfunding.
- The National Infrastructure Commission should be placed on a statutory footing in the long term to ensure its permanence and enhance its ability to give independent expert advice.
- The National Infrastructure and Construction Pipeline should support the investor community through providing increased detail of the risk and viability of individual projects.

Section 1: Infrastructure need and the investment context

The UK's need for new and improved economic infrastructure has to be considered over the long-term. ICE published the *National Needs Assessment* (NNA) in 2016, which took stock of the performance of the UK's infrastructure and set out steps needed for a national infrastructure system which is efficient, affordable and sustainable.

The National Infrastructure Commission (NIC) has built on this work, using the NNA's findings, data and recommendations to develop and promote its own datasets culminating in the National Infrastructure Assessment (NIA). Published in July 2018, the NIA has set out recommendations for public spending to 2050. It is critical that the nation plans based on known facts, promotes certainty and long-term thinking.

Drivers of future demand

There are several drivers of future demand; demographic, environmental, technological and the need to maintain and upgrade existing infrastructure, which will have individual and interlinking impacts on future need. We will need to plan to ensure future provision is designed and built to be more adaptable, resource efficient and responsive to greater numbers of people with diverse needs as well as bring existing provision up to standard.

The Office for National Statistics (ONS) predicts that the UK population will increase by 5.5% within the next ten years from 65.6 million in 2016 to 69.2 million in 2026[3] with the Infrastructure Transition Research Consortium (ITRC) projecting that the UK population will be 75m by 2050.[4]

In 2016 18% of the population was aged 65 and over, a figure expected to rise to 25% of the population by 2046.[5] GDP could be as high as £3.7tn by 2050,[6] driving demand for energy, transport and expectations of an improved standard of living even as demographics predict a smaller percentage of the public will be of working age. By 2050, 4m people will face sight loss and many more will face infirmity,[7] meaning that our infrastructure will need to adapt to better serve greater numbers of people with diverse accessibility needs.

3 ONS (2017) National Population Projections: 2016-based statistical bulletin
4 ITRC (2018) National Infrastructure Assessment
5 ONS (2017) Overview of the UK Population: July 2017
6 ICE (2016) National Needs Assessment
7 RNIB (2017) 4.1 million people will be affected by sight loss in the UK by 2050
8 ICE (2016) National Needs Assessment
9 Guardian (2018) Most overcrowded trains in England and Wales revealed

Climate change and population growth will require additional water, energy, storage and flood-defence capacity to enable a larger population to manage more extreme and frequent weather events. Elongated high-pressure weather events may result in lower wind speeds, while extremes in hot summers and colder winters will increase the need for more cooling and heat capacity throughout the year. More frequent periods of drought will require higher capacity water generation and storage facilities.

Disruptive technologies are likely to change our working practices and the way that we interact with one another on a social level. Automation and artificial intelligence will free up human capital from mundane or repetitive tasks and instead enable a greater focus on problem solving across different economic sectors. Likewise, electric and driverless vehicles will transform how we travel, freeing up transit time for more productive working or social uses while requiring adaptations and further resilience in the electric grid.

> “The demand for infrastructure is growing. By 2050 the UK population will be 75m.”

The cost of inadequate infrastructure

A lack of high-performing infrastructure can hinder productivity, growth and quality of life. For example, the direct cost of strategic road congestion was estimated at £2bn in 2010 and is anticipated to rise to £8.6bn by 2040 without action.[8] Overcrowding on Britain's railways continues to be a major issue, with trains averaging 5.4% above capacity in London, 4.8% above capacity in Cambridge and 4.3% above capacity in Manchester,[9] although this masks peak load factors as high as between 167% and 250% on the busiest routes.[10]

To stave off future drought, the NIC estimates that an extra 4000 megalitres of water per day is needed in the UK's networks through a twin-track approach of increasing supply and managing demand.[11] This would be a 24% increase in capacity on the 16.6 billion litres of water delivered per day in 2015.[12]

Increased energy demand, from economic and population growth, autonomous and artificially intelligent systems, wholesale electrification of entire sectors, including an electrified vehicle fleet and hydrogen generation for fuel and heat will push need for energy generation an additional 34.2GW;[13] the equivalent of ten and a half Hinkley Point Cs.[14]

To meet these many, varied and substantial challenges the UK needs to ensure that investment in our infrastructure is equal to the task in both volume and intelligent use. A failure to do so will see the quality of the nation's infrastructure provision stand still, or more likely, deteriorate.

64% of Adults

believe that the UK should spend money on infrastructure to improve public services.

YouGov (2018)

10 DfT (2018) 'Top 10' overcrowded train services
11 NIC (2018) Preparing for a drier future
12 Department for International Trade, 2015, Water and treated water
13 ICE (2016) National Needs Assessment
14 An estimated 34.2GW of additional generation capacity is based on ICE's National Needs assessment finding that the UK will need an additional 300 TW/h/y of generation capacity by 2050. Hinkley Point C will have a generation capacity of 3.2 GW, this is equivalent to 0.0032 TWh or 28 TWH/year. To meet this additional generation capacity need the UK would need to build the equivalent of 10.7 Hinkley Point C's, even if older capacity did not need to be replaced.

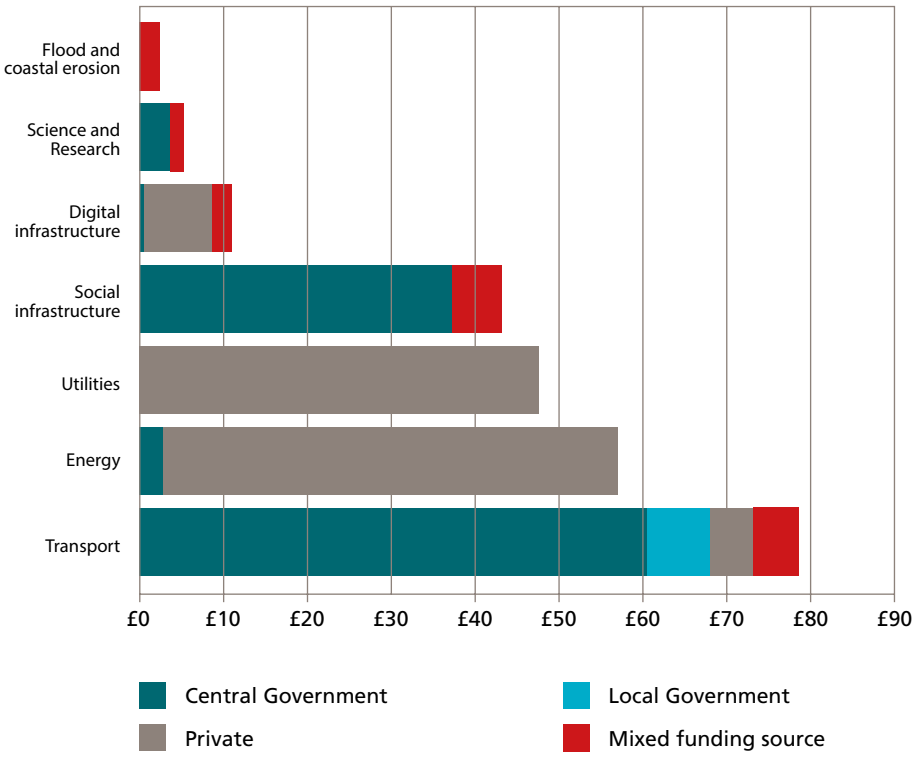
The current investment landscape

The OECD have stated that by 2030 global infrastructure spending will need to reach $71tn, which represents 3.5% of world annual GDP between 2007 to 2030.[15] The fiscal envelope for public investment in UK infrastructure between 2020 and 2050 sits at 1.0%-1.2%, with any further investment to come from the private sector.

The current mix of investment in infrastructure is derived fairly evenly from public and private sources. Over 45% of the National Infrastructure and Construction Pipeline (NICP) to 2020/21 is financed through the private sector; this is mostly concentrated in the regulated energy and water sectors and digital infrastructure. The remainder is sourced from national (45%) and local (5%) public spending, with approximately 5% funded through vehicles which combine public and private money.[16]

It is important that there continues to be a healthy mix of public and private investment. This mix brings benefits through the utilisation of the high availability of liquidity, ensuring diversified financing streams to meet individual project needs, while enabling the benefits of delivering socially important infrastructure to be fully realised.

National Infrastructure and Construction Pipeline funding mix (2017/18 to 2020/21) (£bn)



15 OECD (2015) Fostering Investment in Infrastructure
16 IPA (2017) Analysis of the National Infrastructure and Construction Pipeline

Investor sentiment

Interest from the investment community in public infrastructure is high, as is liquidity. The UK continues to be perceived as a stable investment environment. The National Infrastructure Delivery plan has 88% support from the investor community, whilst energy and transport are both seen as key areas for further development and investment.[17]

Infrastructure is seen as a desirable core asset of many financial portfolios, however, the attractiveness of the sector as a destination for private investment faces risks.

- Whilst the UK has a strong regulatory, legal and business environment, finance is internationally focused, fluid and mobile. Other countries can and are becoming more attractive as they learn lessons and adopt practices from the UK and other world leaders.
- There are early warning signs of increasing risk; market spreads in the sector have increased and some traditionally domiciled funds have begun to see a preference for Euros.
- Decision making remains slow, with time to main gate decisions measured in years, as with the Swansea Tidal Lagoon or even decades (the protracted decision making on a third runway at Heathrow being the stand out example).
- The political environment remains fraught, with concerns about the politicisation of economic infrastructure and private finance, discussion about nationalisation of private assets, uncertainty arising from Brexit and activism by regulators all serving to cool sentiment.

Public perception of the infrastructure sector

ICE commissioned an independent review,[18] through focus groups and polling, to examine public attitudes towards infrastructure investment. This found almost universal support for investment in infrastructure driven by an understanding of the need to address climate change, boost productivity and encourage economic growth. There is also a strong appetite for, and general interest in, greater efforts to improve public awareness to ensure a population better informed about infrastructure.

However, the public's desire to see more investment in infrastructure is tempered by the cost and need to link additional investment to clear improvements in service and performance. In this respect investment should provide 'something for something' and it is important that owners and operators demonstrate clearly that, when they ask the user to pay more, there is a tangible and visible benefit as trade-off.

There are many examples of substantial investment in infrastructure that have delivered significant benefits to society. Since 1989 the private water industry has invested some £150bn of capital investment in upgrading, improving resilience of and reducing leakage within the pipe network, alongside some £10bn of public money.[19] As a direct result, according to OFWAT, water leakage has reduced by a third since the mid 1990's with bills £120 lower than they otherwise would have been.[20] Effectively communicating the value of such investment is key to the public's perception of the importance of infrastructure to their everyday lives.

Ultimately the public believe that the Government is responsible for ensuring provision of infrastructure, regardless of the method of investment or ownership, and that Government should play a co-ordinating role for infrastructure projects. This includes ensuring value for money, curbing or capping what many consider excessive profits and re-investing profits into improving infrastructure further. There are important takeaways both for government and the investment community, about the importance of making the clear case for an appropriate risk and reward profile for private investors and communicating both the potential and realised benefits of a mixed investment strategy, as well as being candid about the challenges. Where the public understand the need for infrastructure there is generally greater support for the solution.

75% of Adults
believe that more money should be spent on improving the UK's core infrastructure networks.
YouGov (2018)

17 DLA PIPER (2018) UK Infrastructure: Defining the Future
18 This refers to five focus groups that Copper Consultancy ran on ICE's behalf with members of the public.
19 Water UK (2018) Financing the industry
20 OFWAT (2018) Profits and Dividends

Section 2: Maximising private investment across infrastructure sectors

ICE has examined four major infrastructure sectors where specific policy interventions have been identified which could boost funding, support strategic policy decisions and improve delivery or fix market failures. These sectors are: road, energy, water and rail.

Recommendations

- The Government should give serious consideration to replacing the existing generation of road taxes with a pay as you go model for the busiest roads in England.
- Energy storage and other emerging technologies should receive enhanced Government support through appropriate mechanisms drawing on the successful impact of Contracts for Difference on the renewable energy market.
- Water Asset Management Periods should be flexible enough to enable the planning and delivery of long-term programmes, which meet future demand caused by demographic and climate changes and enable more effective financial planning.
- Market-led proposals in rail should be reformed in a way which simplifies applications and respects the sharing of intellectual property from all bidders.

Interdependencies between sectors

While separate Infrastructure sectors each have specific challenges, they should not be viewed in isolation. The different sectors have always been reliant on each other to some extent, and as the nation's infrastructure continues to evolve and adapt the increasing importance of digital technology, connectivity and whole-system approaches will serve to deepen these interdependencies.

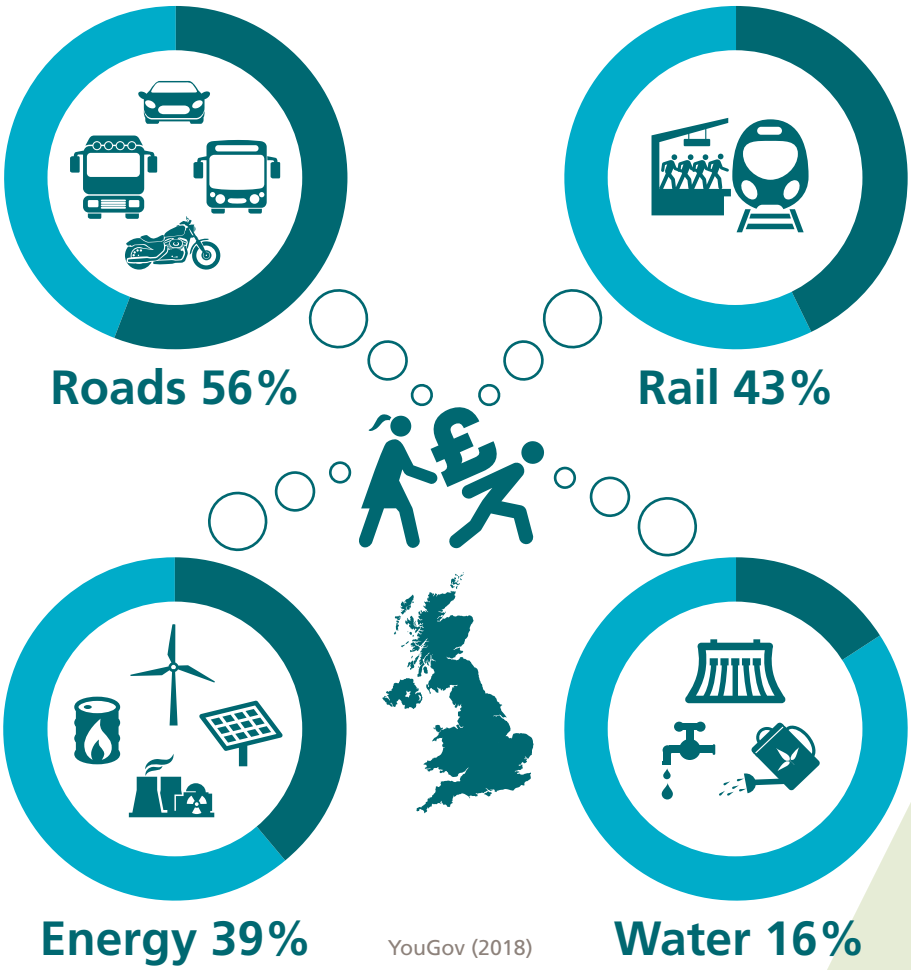
Some interdependencies have existed for centuries and are well accounted for. Delivery of most projects requires transport infrastructure to transport material and labour; it is therefore no surprise that early railways, such as the mainline Manchester to Leeds railway, run alongside the Rochdale canal.

Others are emergent. The electrification of road vehicles and, eventually, connected and autonomous vehicles will demand new connective infrastructure requiring greater amounts of energy for both the vehicles and smart tolls, traffic monitoring and live internet connectivity. This technology is with us today, with the Transport Research Laboratory conducting a 'lorry platooning' trial in Kent, allowing lorries to travel more efficiently, with increased traffic flow and safety, using communicative technology.[21] Delivering this will require road planners, the automotive industry, the energy sector and telecommunications to work together, find new synergies and consider how cross-sector approaches to investment can support this transport revolution.

Waste facilities and factories are already finding ways to use their runoff through biogas to serve local residential and business heating needs. It is also necessary to continue finding innovative solutions for how assets can have multiple uses in our communities. Covering a reservoir with floating solar panels provides a large surface area which can be used to generate renewable energy while also reducing the evaporation rates of the stored water, improving water resilience.

Intelligent understanding and exploitation of interdependencies can deliver financial and operating cost benefits which greatly outweigh the marginal extra cost of exploration of this theme. Critical thinking in this area could also increase revenue resilience through multiple use and reduce the overall demand impact on other sectors. More efficient demand management of water will, for instance, have a significant impact on the demand for wastewater disposal and treatment. It is vital that both industry and government seek measures to identify and exploit these where possible.

When asked to pick one or two, if any, of the below sectors as the main priorities for infrastructure spending the public chose:



YouGov (2018)

21 Kent Messenger (2018) Trials of semi-automated lorry convoys could take place along M20

Number of Projects

65

Programmes and other investment

11

Pipeline spending, 2017-2021

£10.8bn

Identified pipeline spending beyond 2021

£0.2bn

Total committed pipeline

£11.1bn

Infrastructure Projects Authority (2017) Analysis of the National Infrastructure and Construction Pipeline

Proposed public spending on Highways England between 2020 and 2030

£37.5bn

National Infrastructure Commission, 2018, National Infrastructure Assessment

Roads

The public perception of the road sector

Public sentiment[22] supports the principle adopted by Government and Highways England that the focus on investment in road should be on upgrading the capacity of the existing road network and improving road maintenance, rather than the creation of new roads. This is linked to a clear perception that the UK's roads are poorly maintained and overcrowded. There is strong support for the transition to electric and autonomous vehicles and for investment to facilitate this market.

There is also some public support for a pay as you go system that is coupled to clear and tangible benefits, particularly on improved maintenance and condition of roads, and if there was no overall increase in the tax burden.

The value of the UK's roads

Roads are an important feature of most transport networks. Approximately 89% of journeys are made by road[23] with England's Strategic Road Network (SRN) carrying a disproportionate load. Every day four million vehicles use the SRN travelling the equivalent of 92 billion miles per year.[24] The network moves 1 billion tonnes of freight annually keeping shops stocked and bringing goods to market.

The Road Investment Strategy (RIS) covering the first road period (2015-2020) had £15.2bn of funding committed to it[25] with RIS2 to be decided soon. Highways England is deploying these resources through capital programmes which will 'increase capacity, transform connectivity and improve the condition of the network' rather than building additional capacity.

According to the RAC Foundation there are 24,000 miles of local roads in need of essential maintenance.[26] The NIC believes that the cost of eliminating this backlog to bring these roads up to reasonable condition is some £5bn over 10 years.[27]

The changing road funding policy environment

The logistics which support the road transport network and the vehicles which use it will change radically by 2050. The Government's Road to Zero Strategy, setting a target of banning the sale of non-zero emission cars by 2040, is welcome and, ICE believes, deliverable. However, there will need to be a radical step change both in the delivery of electric charging infrastructure and in the development of vehicles that are affordable to a wide range of consumers. Strategic policy leadership will also be required to support, direct and encourage collaboration between the automotive, construction and energy sectors and local government to deliver workable solutions.

ICE welcomes the NIA's focus on a charging infrastructure network which will enable the use of more electric vehicles, through reductions in range anxiety and greater provision of on-street charging by 2030.

Further, the Government's Construction Sector Deal commits to support electric vehicles viability through a £400m charging infrastructure investment and support to extend the plug-in car grant. This is a necessary and constructive step towards a zero-emission fleet.

22 This refers to five focus groups that Copper Consultancy ran on ICE's behalf with members of the public.
23 DfT (2016) Road Use Statistics Great Britain 2016
24 Highways England (2017) Strategic Road Network Initial Report
25 DfT (2015) Road investment strategy: 2015 to 2020
26 RAC Foundation (2018) Potholes on the rise
27 NIC (2018) National Infrastructure Assessment

Both policy leadership and practical delivery of infrastructure are vital to realise the vision of a zero-emission road network by 2040. However, close working between road maintenance organisations (at a local and national level), the energy and automotive sectors and sustained leadership and direction from Government will also be required.

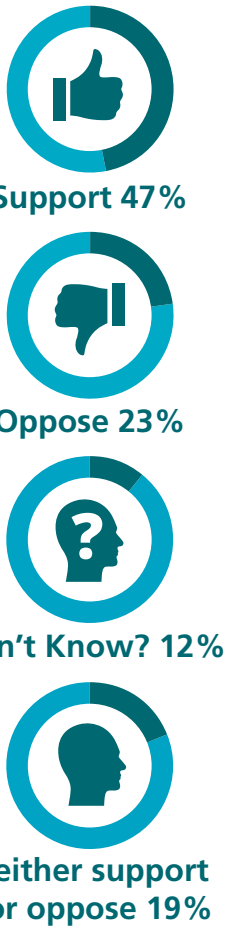
The shift to electric vehicles does, however, have implications for the current generation of road and vehicle taxation. While Vehicle Excise Duty (VED), and its various derivatives and levies (especially Fuel Duty) are not hypothecated to road maintenance, they do contribute to the public perception that they are the gateway payments to the road network. However, there is an impending tax revenue crunch which has both short - and medium-term considerations.

One consideration is that ultra-low emission vehicles, typically electric vehicles, with a value less than £40,000 are VED exempt.[28] Of more concern, as fuel duty is tied to traditional vehicle fuel sources, as these are phased out the value of this revenue-raising measure will diminish further. This is the case even when taking into consideration the deflationary impact of the continuing eight-year freeze of the fuel escalator announced at the Autumn 2017 Budget, which alone has left a £850 gap per driver in public finances.[29]

Nearly 50% of GB Adults would support the introduction of 'pay as you go' if it replaced both Vehicle Excise Duty and Fuel Duty.

YouGov (2018)

Nearly 50% of GB Adults would support the introduction of 'pay as you go' if it meant more money would be spent improving and maintaining local roads.



YouGov (2018)*

28 OLEV (2018) Tax benefits for ultra-low emission vehicles
29 HM Treasury (2017) Autumn Budget 2017

*Slight decimal variations mean that the numbers on this graphic do not total 100%, but the figures still reflect the YouGov polling sample accurately.

Alternative approaches

A pay as you go scheme would likely rely on a technological solution. There are various examples of how this could work; however, an alternative tax regime should seek to replace the existing generation of road-related taxes, rather than add to the overall tax burden.

Distance-based approaches

The most efficient way to implement this system is on a distance-based approach, using electronic, real-time and location systems. Real-time road monitoring of vehicles is already deployed in the UK with insurers using telematics technology to monitor distance and average speed. The Government has announced the creation of a taskforce between the automotive industry and the insurance industry to promote this use in the Road to Zero Strategy.[30]

This technology, alongside infrastructure supporting connected and autonomous vehicles, could be adopted to monitor a distance-based pay as you go scheme. Crucially, however, it could also incentivise behaviour which rewards efficient driving, at speeds which maintain traffic flow, by passively adjusting the distance charge for drivers maintaining a speed which supports traffic flow.

A system connected with real-time road traffic monitoring could also better manage traffic flow by advising drivers or vehicles of routes which are not congested, have road works or have suffered an accident, encouraging re-routing and making better use of the capacity of the whole network.

Heavy goods vehicles

The Government already recognises the additional road maintenance costs heavy goods vehicles cause via a specific form of VED for these vehicles. ICE has also noted the Government's ambition set out in Budget 2017 to 'work with industry to update the Levy so that it rewards hauliers that plan their routes efficiently, to encourage the efficient use of roads and improve air quality.'[31]

A distance-based pay as you go scheme would more effectively incentivise and reward this behaviour than any agreement reached on VED. Introducing pay as you go would also create a direct – and linked – funding source which could allow for the SRN to become an investable option for private finance. This in turn would allow for innovations which increase capacity and traffic flow or development which increases capacity through new roads; to be delivered directly by the private sector with a funding stream which can be incorporated into the system.

Displacement

Pay as you go has the potential to address both congestion and maintenance. By incentivising a shift to more efficient modes of travel, or encouraging the use of car-pooling, existing capacity can be better utilised to reduce the number of individual vehicles making journeys relative to the population.

Pay as you go could also be tied directly to maintenance through 'funding displacement'. A system where heavy goods vehicles, as happens in Germany, or all vehicles, as is the case in France, are charged for using expressways in England. This would be on the SRN, based on distance, at a price point which reflects the type of vehicles wear and tear maintenance costs and rewards efficient use.

Under such a scheme the local road network would remain free to use, a situation not dissimilar to the French road network. ICE recognises that this could potentially reduce demand for the SRN and increase load capacity on the local road network, but also recognises that the local road network has both been underutilised and underfunded in favour of the SRN.

As such, any scheme of this nature would need to be priced at a point which enables maintenance and improvements in design and capacity to the SRN and enables additional funding to the local road network by transferring any surplus to local road authorities – the 'funding displacement' element of this proposal.

It should be noted, however, that the noise and environmental cost reductions of an electric fleet, and the potential savings to maintenance and congestion costs of a connected and autonomous fleet of vehicles, could be substantial compared to the existing vehicle fleet. This would reduce the need in the future to raise the amount of revenue that is needed today for the same purposes. Between the current RIS and central Government spending on local roads, maintenance costs for England's network amount to a total of £19.9bn over a 5-6 year period (£15.2bn allocated to RIS1[32] and £4.7bn to the Needs Based Formula[33]). Fuel duty alone will raise an estimated £28.2bn in 2018-19.[34]

30 DfT (2018) The Road to Zero
31 HM Treasury (2017) Autumn Budget 2017
32 Gov.UK (2015) Road investment strategy: 2015 to 2020
33 Department for Transport (2017) Roads Funding: Information Pack
34 Office for Budget Responsibility (2018) Fuel Duties

Linking pay as you go road use to outcome value

To increase levels of acceptability any pay as you go system should be developed in relation to long-term economic outcomes and public benefits. This means network upgrades and maintenance where there is a demonstrable value in terms of performance, for example. capacity, reliability and resilience.

The objective should be to link the payment of a charge (whether this be a fixed price or distance based) to improvements in the overall service that road users receive; road users most highly value well-maintained roads and efforts to reduce congestion. The development of innovative engineering solutions should go together with this to reduce the need for repeat maintenance operations to be undertaken in the future. Eventually the level of investment required should fall and with it the financial cost road users can expect to pay.

Case Study – The German **LKW-Maut** system

Germany has successfully used a distance-based road pricing scheme since 2005 – the LKW-Maut. This road pricing scheme is applied to heavy goods vehicles based on the distance driven, the number of axles the vehicle has and the emissions category of the vehicle.

The system also taxes based on the use of the most efficient route, the wear and tear inflicted to the road from heavy goods vehicles and environmental externalities.

This scheme has an average charge of €0.135 per kilometre and uses an on-vehicle electronic system to monitor distance against road side markers. The scheme raises some €2.4bn (£2.1bn) per year.[35]

35 Road Traffic Technology (2018) LKW-MAUT Electronic Toll Collection System

Number of Projects

89

Programmes and other investment

19

Pipeline spending, 2017-2021

£57.1bn

Identified pipeline spending beyond 2021

£134.1bn

Total committed pipeline

£191.2bn

Infrastructure Projects Authority (2017) Analysis of the National Infrastructure and Construction Pipeline

Proposed public spending on energy efficiency between 2020 and 2040

£4bn

National Infrastructure Commission, 2018, National Infrastructure Assessment

Energy

The public perception of the energy sector

Security of supply and climate change, alongside widespread acceptance of the need for additional investment, are high in the public imagination[36] when considering energy generation, although there is a general lack of enthusiasm for higher bills which are not also tied to improvements in energy efficiency and carbon reduction.

There is also resistance to any new large-scale infrastructure programmes involving new nuclear and a strong preference for investment in renewable energy, particularly wind, and the storage technologies which would allow for renewable generation to provide round-the-clock coverage regardless of weather conditions.

Supporting additional renewable generation and emerging technologies

Energy will play an increasingly important role in achieving the UK's economic and environmental ambitions in the decades to come. Decarbonisation of the energy sector is crucial to achieving environmental and air pollution targets. Increasing population sizes, further reliance on technological solutions and expanding economic growth, alongside the electrification of road vehicles will only increase demand for energy.

ICE's NNA found that peak energy capacity would need to reach1200 TW/h/years by 2050.[37] This is a 33% increase on current capacity. At the same time, we will need to replace our ageing coal, gas and nuclear capacity.

It is imperative that the UK meets its decarbonisation targets and ensures security of supply to match future demand; this will require heavy investment in renewable energy in particular. Renewable energy currently makes up almost 30% of the UK's energy generation capacity and, since seed capital first supported renewable offshore wind capacity, the strike price has fallen from £114 per MWh to £57.50 per MWh[38] within two years.

This demonstrates that renewable capacity is capable of generation both at scale and at an affordable price for consumers. By way of comparison, the strike price for Hinkley Point C is £92.50/MWh.[39]

Whilst onshore wind may soon reach the point where government support is no longer a standard requirement, Contracts for Difference (CFDs) may still have a role to play in facilitating the delivery of decarbonised generation to meet future demand scenarios; and replacing ageing oil, gas and coal facilities. The Government's rationale that CFDs provide long-term price stabilisation, allowing for investment to come forward at a lower cost of capital and therefore at a lower cost to consumers, remains sound. Therefore, CFDs should remain a tool to increase supply if deemed necessary.[40]

59% of GB Adults

would not be happy to spend more money on household bills even if it meant better utility services.

YouGov (2018)

36 This refers to five focus groups that Copper Consultancy ran on ICE's behalf with members of the public.
37 ICE (2016) National Needs Assessment
38 BEIS (2018) Oral Statement to Parliament by the Rt Hon Greg Clark MP
39 BEIS (2018) Hinkley Point C
40 Hansard (2018) Fifth Delegated Legislation Committee, 11 July 2018, Andrew Griffiths MP (The Parliamentary Under-Secretary of State for Business, Energy and Industrial Strategy)

There is also a strong case for supporting the establishment of battery and storage technologies which will help to balance intermittent renewables generation. It is also important to explore smart-grid technology to coincide with an expanding electric vehicle fleet in the future. There is also the potential to use individual electric vehicles as dynamic fleet storage or find second lives for batteries which are not road worthy but still hold significant charge. This may revolutionise how and when we generate energy, reducing the magnitude of generation needed to meet peak-demand periods.

Heat also needs to be considered, with additional support needed to explore alternatives to natural gas, which is time-limited in terms of economical extraction. Biogas, an extension of the electric grid to provide heat, district heat networks and hydrogen are all potential replacements which the Government should seek to develop and which might benefit from a form of CFDs.

ICE would support the continuing use of Pot 1 CFDs to increase renewable capacity in the next pricing round. There is also a viable case for expanding support through Pot 2 CFDs to support emergent technologies. This should aim to favour projects which will ensure security of supply through increased use of energy storage technologies, taking care to pursue a model which rewards the efficient end use of generated capacity, finding solutions to the probability of double subsidy for generation and storage.

Number of Projects

1

Programmes and other investment

27

Pipeline spending, 2017-2021

£16bn

Identified pipeline spending beyond 2021

£0.2bn

Total committed pipeline

£16.2bn

Infrastructure Projects Authority (2017) Analysis of the National Infrastructure and Construction Pipeline

The cost of not supporting boosted supply resilience

£40bn

National Infrastructure Commission, 2018, Preparing for a drier future

Water

The public perception of the water sector

There are concerns[41] with waste and leakage within the water sector. While there is some appreciation that the current water sector's capacity mostly avoided the need for water control measures in 2018, despite a prolonged drought, potential water shortages in the future remain a concern.

There is appetite for enhanced investment to reduce leaks and address climate change. There is also a willingness for demand-side measures to combat water scarcity, including broad acceptance of water meters and conscious measures to reduce water usage. Public sentiment favours the argument that the private sector should re-invest a greater percentage of profits into asset upgrades to ensure a resilient water network.

The initial responses to the seventh Asset Management Period (AMP)from water companies demonstrate they are taking this sentiment seriously, with bills largely reducing or being kept flat in real terms, whilst investment in resilience has been increased. Tied to this there is considerable reluctance for the public to pay more for assets which do not meet customers high expectations for quality of service and continuity of supply.

Challenges for the water industry

The water industry faces the combined pressures of population growth and climate change. The UK will need both demand- and supply-led drought-resistance measures in place by 2050 which are extensive. Indeed, the NIC estimates the need at 4000 megalitres per day of extra capacity.[42] There is also a need to protect supply and ensure adequate drainage for extreme weather events where flooding is a risk.

In England the industry operates under the Regulated Asset Base (RAB) model with privately owned assets and is organised through AMPs of five years in length. This provides certainty to the private investment community that has made £150 billion of capital investment since 1989.[43] However, given the increasingly complex long-term solutions which are necessary to tackle these challenges, the regulatory cycle needs to be sufficiently flexible to allow investment plans to span longer periods.

41 This refers to five focus groups that Copper Consultancy ran on ICE's behalf with members of the public.
42 NIC (2018) National Infrastructure Assessment
43 Water UK (2018) Financing the industry

Review of regulatory periods

A five-year regulatory period is often not sufficient to allow for large-scale upgrade projects and programmes of work to be undertaken, through a planned and more strategic whole-systems approach. Such projects and programmes are generally favoured by institutional investors, such as pension funds, who value longer-term investments, with greater certainty, and can lend at lower rates on this basis.

An extension of regulatory periods or more flexibility in applying specific concessions for specific programmes of work, like the Tideway model, would also allow for more co-ordinated planning within Government. For example, this could have applied to the Environment Agency's National Infrastructure Plan, which places some demanding compliance requirements on water companies and which was arguably published at a point that made it difficult for water companies to fully consider its implications as part of their submissions for the next AMP.

There is a general concern that long-term investment, even at the accelerated pace the sector has seen over the last 30 years, is not sufficient to replace assets as they wear out. Industry experts estimate that replacement rates for mains pipes is in the region of 200-400 years and for sewers 600-900 years.

A choice needs to be made about whether additional investment is enabled in the immediate future – while debt finance interest rates are historically low, or later, which may have a much greater cost. Either way, ICE agrees with the NIC's assessment that a failure to ensure resilience through early investment will cost more than it otherwise should further down the line.

Number of Projects

13

Programmes and other investment

19

Pipeline spending, 2017-2021

£40.5bn

Identified pipeline spending beyond 2021

£49bn

Total committed pipeline

£89.5bn

Infrastructure Projects Authority (2017) Analysis of the National Infrastructure and Construction Pipeline

Proposed combined public spending on already identified rail projects between 2020-2040

£158bn

National Infrastructure Commission (2018) National Infrastructure Assessment

Rail

The public perception of the rail sector

There is reluctance for commuters to pay more for a service they perceive as substandard, overcrowded at peak, unreliable and with substantial maintenance issues.[44] There are concerns that the comparative cost and unreliability of railways drives people to use road over rail, with a belief that commuters already pay too much, and a concern that this cost continues to rise above inflation and pay.

There is strong support for a departure from the current hybrid system with either direct government control of the rail system or for a fully privatised system run in a way closer to other sectors under a regulated model, which would see profits directly re-invested, strongly preferred. An ownership model that incorporates both private and public elements, like that which exists now, was considered counterproductive and therefore undesirable.

Investment and demand in rail

Rail receives the highest per project or programme investment within the NICP, a reflection of the heavy investment in High Speed Two, Crossrail and schemes to improve connectivity between northern cities.

The rail industry has been subject to a renaissance in demand in the last 50 years. Journeys have more than doubled since 1997, yet despite the increased footfall, rail fares remain the highest in Europe, up to five times more expensive than comparative fares in Europe, with the average UK passenger spending 13% of their salary travelling to work by train.[45] Passenger numbers are expected to increase by 40% by 2040[46] which will require increases in capacity, both through increased numbers of services enabled by the digital railway and new routes.

Part privatisation of rail, where concessions for services are given to private companies which run the service while Network Rail is responsible for track and maintenance, has produced mixed results. ICE welcomes the announcement in September 2018 of a 'root and branch' review of how the rail sector operates[47] and will input into the review to achieve an outcome which improves this record. Even though services are privatised, and rail companies can make a profit from these fully, 82% of spending comes from the public sector with the private sector investing £925m in 2016-17 (the majority of this on rolling stock) compared to £4.2bn of Government support in 2016-17.[48]

Despite sustained above-inflationary rises in funding for more than a decade and record amounts of investment, satisfaction rates remain mixed, with some individual companies scoring as low as 69% for overall satisfaction, 27% for satisfaction with value for money, 49% for satisfaction for punctuality and 56% for satisfaction with overcrowding.[49]

That said, improvements have been made, delay minutes have reduced by 20% over the past decade and operating and maintenance costs of passenger journeys have reduced by 40%.[50]

Market-led proposals

The Department for Transport (DfT) and HM Treasury have indicated that they are keen to increase private instigation, design, delivery and operation of new rail capacity, issuing a call for ideas on proposals to enhance the railway which are financially credible without government support and guidance in March 2018.[51]

The Government has also taken steps to end the operational divide between track and train through its strategic vision for rail,[52] relaxing rules on who provides improvement for maintenance work for track and allowing for private companies operating a line under a concession to lead on maintenance. ICE welcomes steps to integrate the disparate teams providing the overall service.

44 This refers to five focus groups that Copper Consultancy ran on ICE's behalf with members of the public.
45 The Times (2018) Rail fares five times higher than in Europe
46 Network Rail (2018) How the Digital Railway will grow capacity on the railway
47 Gov.uk (2018) Government announces 'root and branch' review of rail
48 ORR (2017) Rail Finance: 2016-17 Annual Statistical Release
49 Transport Focus (2018) National Rail Passenger Survey
50 Network Rail (2018) A better railway for a better Britain
51 DfT (2018) Rail market-led proposals
52 DfT (2017) A strategic vision for rail

Opening infrastructure and engaging with the private sector is to be commended. A culture of recognising and supporting routes to market for private delivery and ideas which should help to increase capacity, can improve business and commuter experiences and drive up spending works well in countries around the world. The success of market-led proposals in Australia is a case in point.

To learn from this success, it is important to recognise the incentives and route to market that is used. Every state in Australia has a framework for the introduction of market-led proposals. For example, Queensland encourages submissions from the private sector seeking a commercial arrangement with government to provide a service or infrastructure that will meet a community need. Should such a bid meet the state government's criteria, such as it would not result in a better outcome for the state through a competitive process, should be wholly or largely privately funded and meet government policy and community need it can be awarded a direct contract, rather than procurement through a competitive process.[53]

ICE would encourage the Government and other clients wanting to use this model to consider how intellectual property can be protected, or rewarded in the event of a successful bid. Infrastructure clients have adopted an intellectual property reward approach in the past. London Underground introduced an Innovative Contractor Engagement programme in 2011 to ensure 'good ideas the market has in response to project requirements can be brought forward and developed with the client'. This crucially included the protection of contractors' intellectual capital for innovation, through confidentiality agreements and a two-stage procurement model asking first for specifications which they then purchased to put to full competition for delivery.[54]

The alternative is to consider a one-stage model where the proposer of a market-led proposal is awarded a contract so long as they fulfil policy objectives, demonstrate value for money, and have safeguards in place which would ensure any lack of a competitive process is proportional and meets public interests. This would require re-evaluation of existing parameters of state aid after Brexit.

Finally, a culture of openness to ideas is not one which can be imposed but must be actively encouraged. If the Government is to seek to improve private sector involvement and agency in delivering public infrastructure, then it must (in time) adopt a framework for market-led proposals beyond rail.

Case Study – Australian market-led proposals

Australia is a world leader in encouraging the private sector to put forward proposals to government on infrastructure projects, or engage with projects of recognised need, for direct consideration through market-led proposals.

The Australian federal and state governments in Melbourne and Victoria are exploring the delivery of an airport rail link, with a proposed split between the federal government, state government and private investors of a third of the cost each – roughly $5bn AUS.[55] Financiers for Melbourne Airport and Southern Cross Station have led engagement with federal and state governments through the market-led proposal mechanism to ensure this is a priority for delivery and have been awarded contributions toward a $30m feasibility study, which has resulted in a formal proposal.

A mature example is the NorthConnex Tunnel - outside Sydney, linking the M1 and M2 motorways. This is a proposal for a 9km tunnel which would save 15 minutes off the average journey time and ease congestion around the city. The tunnel has a concession length of 33 years, running to 2048 and an estimated completion date of 2019 funded through charging tolls operating at a base of $6 AUS, rising by inflation plus 1%.[56] The finance package includes $820m AUS of funding from federal and state governments, discretionary use of a government-owned quarry for spoil and contributions from the private sector of $2.2bn AUS for a total project cost of $3bn AUS.[57]

53 Queensland Treasury (2017) Market-Led Proposal Guidelines
54 London Underground (2014) Innovative Contractor Engagement
55 The Guardian (2018) Turnbull puts up $5bn for Melbourne airport rail link
56 New South Wales Government Transport Roads and Maritime Services (2015) NorthConnex Project
57 Australian Government (2018) Regional Development and Cities

Section 3: The role of Government in stimulating infrastructure investment

Recommendations

- The feasibility of establishing a UK Investment Bank should be explored as a contingency against a loss of access to low-cost anchor finance from the European Investment Bank and to maintain domestic expertise in infrastructure investment.
- Active steps should be taken to facilitate the use of alternative funding and financing mechanisms, including asset recycling, land value capture and crowdfunding.
- The National Infrastructure Commission should be placed on a statutory footing in the long term to ensure its permanence and enhance its ability to give independent expert advice.
- The National Infrastructure and Construction Pipeline should support the investor community through providing increased detail of the risk and viability of individual projects.

> “The Government has committed to a fiscal envelope of between 1.0 and 1.2% of public spending on economic infrastructure to 2050.”

The current state of play

The Government has committed to a fiscal envelope of between 1.0 and 1.2% of public spending on economic infrastructure to 2050. This represents a substantial increase in public spending within the last decade and a comparative level of spend has not been maintained within the last 40 years. Government expenditure on economic infrastructure was £9.8 billion in 2006 and rose to £16.2bn in 2015.[58] Investment from all sources in 2017/18 will be £62.5bn, of which just over half is funded by through public expenditure.[59]

Government support mechanisms and the risk factor

Risk is an inherent feature of public infrastructure and cannot be entirely negated or fully passed on to the private sector. It is also something which is not consistent, owing to the different challenges and tools for addressing these that exist within individual projects. It remains the case as with all public good assets that the Government is the owner and operator of last resort. It is in the public interest that steps are taken to minimise risk profiles, bring support to bear to prevent infrastructure failures and encourage capital into the system to meet future need.

However, it must be recognised that risk is a major barrier to investment and is multifaceted. It can include

- demand-led risk affecting revenue through miscalculations of footfall
- risk of overrun or unexpected costs
- risk of project failure or unexpected changing of purpose or rationale for need.

It is not always appropriate or even possible, for the private sector to deliver projects where risk is high without support.

The Government deploys several mechanisms to support projects where there is enhanced risk. The UK Guarantees Scheme (UKGS) allows for case-by-case support to enable projects to access debt finance where the market is unable or unwilling to lend at market rates. However, the scheme has had limited use, providing just £1.8 billion of bonds and loans since inception.[60] The Infrastructure Project Authority's (IPA) broadening of the range of the UKGS to offer construction guarantees from June 2017 is welcome.

Other mechanisms have been more successful. CFDs, Feed in Tariffs and the establishment of the Green Investment Bank were all especially effective at driving renewable energy growth, supporting innovation and what was then emergent technology which is now able to compete at near-market rate.

The Government's role can be broader than managing risk. As the nation's largest client, it has responsibilities and agency in deciding how the industry operates, setting the tone and deciding what is delivered, when and how. The Government also has powers to regulate access to new lending practices and legislate to leverage new funding measures or act to provide investment enhancement, rather than simply investment replacement.

58 ONS (2017) Developing new measures of infrastructure investment: July 2017
59 IPA (2017) Analysis of the National Infrastructure and Construction Pipeline
60 IPA (2017) UK Guarantees Scheme

Case Study – Thames Tideway – Investment Enhancement

The Thames Tideway Tunnel in London has received positive endorsement from the financial community for the enhanced support provided to it by Government, something financers have dubbed investment enhancement.

The 'super sewer' is a large, complicated and costly project running for 25km along the river at depths of as much as 66 metres linking up the existing low-level system.[61] Apart from the health and ecological imperatives, part of the policy priority was also aesthetic.[62] Recognising that Thames Water would not be able to deliver this project through the Asset Management Period mechanism, Ofwat made provision for Tideway to be procured through a special purpose company, Bazalgette Tunnel Ltd, which is ring-fenced from Thames Water, although it is effectively a subsidiary.

Tideway received enhanced guarantees from Government, recognising the intrinsic risk and difficulties inherent in a project of this nature.Unusually, provision was also made to fund the project before completion through Thames Water bills, providing additional support for investors if cost overruns are encountered and reducing the risk of the capital invested.

The debt equity cost was also supported through governmental support – the project's guarantees are indexed to inflation; guarantees of cash flow last for 15 years, enabling institutional investors to offer reduced-cost investment at a target of 2.497%;[63] and £700m was secured through a 35-year loan from the European Investment Bank.[64]

Britain's exit from the European Union and a UK investment bank

While Britain's possible exit from the European Union has dampened investor confidence, given the current political uncertainty, the UK and the City of London remain world centres for finance and financial instruments, with the wealth of expertise and liquidity this brings. Retaining this position in all foreseeable Brexit scenarios is vital.

The UK has benefited greatly from inward investment from the EU, with the European Investment Bank (EIB) investing some €31.3bn in the economy between 2012 and 2016.[65] This represents around one tenth of the financing for the current National Infrastructure Delivery Plan running to 2021.[66] However, finance from the EIB has declined greatly since the UK's vote to leave the EU, with just €1.8bn invested in 2017 – a 72% drop from 2016.[67]

EIB financing has several advantages, including:

- Providing low-cost financing for new infrastructure projects.
- It is one of the few large-scale organisations which prioritises investment for social and regional infrastructure.
- The EIB acts as an anchor investor, supporting projects by attracting other sources of financing. It is off balance sheet, which supports the Government's fiscal priorities.
- It is also considered an expert investor, with specialist knowledge when it comes to due diligence of a project's viability and an early entrant into emerging markets (e.g. supporting the growth of renewable energy).

61 Tideway (2018) The Engineering
62 Thames Water (2005) Thames Tideway Strategic Study
63 Oxera (2015) The Thames Tideway Tunnel: returns underwater?
64 Tideway (2017) Investor Event Presentation
65 EIB (2017) The EIB in the United Kingdom
66 This figure is based on EIB lending to the UK between 2012 and 2016, converted to Sterling and adjusted for inflation from a baseline of 2012 set against the total NICP pipeline to 2021 estimated at £297.3bn
67 EIB (2017) The EIB in the United Kingdom

There is a concern that if the Government is unable to negotiate continuing access to finance from the EIB, a vital component of infrastructure financing will be lost, and capital lending costs could increase. This would reduce the competitiveness of the UK and increase the cost to the tax or bill payer of accessing infrastructure provision over the long term.

Continuing access to EIB finance on current terms would be the optimal outcome. ICE has previously called on the Government to achieve clarity on the UK's future relationship with the EIB and to consult on a possible UK investment bank if this is not possible.[68]

Both Government and opposition have considered setting up an infrastructure bank or similar institution such as a fund. ICE is neutral as to where ownership and funding should lie, whether this is a state-owned financial institution funded through general taxation or government-issued bonds or a privately-owned institution with support from Government and an agreement or direction to support infrastructure development.

ICE is aware that there is a concern that such an institution would be added to the Government's balance sheet. The Institution has previously put forward a recommendation for the Government to explore the possibility of supporting a privately owned and financed investment bank, supported by the underutilised UK Guarantees Scheme (UKGS) as an alternative to a state-owned bank.[69]

Such a proposal would use the UKGS, which has a cap of £40bn,[70] to support the capital requirements of a new bank, which some have estimated as requiring up to £20bn in seed capital.[71] The UKGS has thus far provided just £1.8bn of guarantees through nine projects.

A UK investment bank would meet the purpose of the UKGS, which is to encourage the use of debt finance on private markets to support infrastructure development. It would also support the mobilisation of private capital to the scale necessary to deliver nationally significant public infrastructure projects.

Such a bank would also help maintain the UK's international expertise in this field and reduce the cost of private borrowing by transferring the Government's creditworthiness. Further, as a guarantee with sufficiently low risk can be considered a contingent liability, this would have the potential to remain off balance sheet. Other international investment banks, such as Germany's KfW, raise private capital with state support in the form of a guarantee in much the same way.[72]

68 ICE (2017) Brexit Infrastructure Group Investment Briefing
69 ICE (2018) Brexit and infrastructure interconnectivity
70 IPA (2017) UK Guarantees Scheme
71 Financial Times (2017) UK infrastructure bank would face hurdles, says experts
72 KFW (2017) KfW at a Glance

Alternative revenue and ownership models

Asset recycling

It important to recognise that different investors within the financial community have different specialisms and appetites for risk. Some might have expertise at providing capital at one stage of a project's life, but not another. A bank or boutique may have an appetite for high risk and reward profiles, or a preference for investing in mature projects which have a proven and low-demand risk profile, for which they would be willing to pay a premium.

There may be policy circumstances where the Government's best option, financially, is to act as a provider and builder of economic infrastructure assets and institutions, rather than acting in a way which supports private capital to deliver infrastructure, which can then be sold, or licenced for a time-limited concession, creating a virtuous circle of development. These projects can be built and sold on favourable terms by the Government, or to provide a revenue stream, the proceeds of which can then be recycled to provide additional capacity, improve other assets or support the Government's overall balance sheet position. This practice is known as asset recycling.

According to the International Monetary Fund the UK had capital stock worth some $1,254bn in 2015.[73] Australia, with a much more modest stock worth around $364bn, has used its asset base to fund new regional infrastructure. Federal and regional government are aiming to utilise $40bn AUS from its assets by the end of 2019[74] through the sale or concession of older assets, to spend on new transport and housing capacity.[75] Importantly the Australian system mandates that any proceeds must be re-invested in additional infrastructure. If the UK Government were to replicate the scale of the Australian effort, it could raise substantial equity, although this does come with the caveat such an amount would be difficult to realise without undertaking an inventory of assets and with the UK having a more mixed model of ownership than most jurisdictions.

Such circumstances may arise where there is private interest and recognised efficiency savings to be made from private ownership or operation of a public asset, but where there is significant risk which the private sector would not be able to manage in building or developing that project. It is also the case that the Government can manage assets for profit itself, or through a Government company and should not be afraid to operate owned assets in this way where there is a perceived need to do so.

The Government has deployed a similar model, prominently in rail franchising and the Green Investment Bank. The 30-year concession of HS1 raised £2.1bn[76] whilst the sale of the Green Investment Bank raised £2.3bn[77] in total value, representing a return on taxpayer investment. If Government were to consider this route it would be sensible as a first step towards a full audit of Government assets and potential sites for development of commercial interest.

The Government should make greater use of this model provided that this mechanism meets policy objectives, there is a high chance of return for the taxpayer as an investor on new projects built for this purpose and an assurance that any capital raised through this policy is re-invested into further economic infrastructure.

ICE takes on board the concerns of the Public Accounts Committee that UK Government Investments requires additional expertise and capacity.[78] This includes increasing effectiveness in negotiations when pinning down commitments from buyers to ensure that the original ambitions of assets are achieved, and that there is a need to be more proactive rather than reactive. The Government should not be wedded to a policy decision to sell if a suitably priced concession is not achievable, noting that the asset and its ability to seek a return should have a solid business case behind it from inception and can be operated through a Government-owned company if a private operator cannot be found.

Case Study – Asset Recycling

Australia, through its various tiers of government, has entered into a national partnership agreement on asset recycling. This partnership has the aim to "unlock funds from existing state-owned assets to invest in additional infrastructure that will support economic growth and enhance productivity"[79]

This commitment to reinvest released equity is critical to enabling an expansion of overall capacity. New South Wales, for instance, has realised almost $30bn AUS in additional capital for investment through asset recycling transactions, which is helping to part fund a $80bn AUS pipeline of work in all sectors over the next four years.[80] This capital has been realised through a mixture of sales and leases and managed through the New South Wales Infrastructure Agency and Infrastructure Fund, with a prominent example including the 99-year lease of a 49% share ownership of the Poles and Wires network – the State Electricity Grid. New South Wales maintains a majority stake and has an ongoing role as a leaseholder, investor, licensor and regulator, ensuring that money is freed up for new projects. This project alone attracted $34bn AUS of private investment and $23bn AUS of freed equity.

73 Marsh & McLennan (2018) Infrastructure Asset Recycling
74 Government of Australia (2014) The Asset Recycling Initiative
75 Ministry of Urban Infrastructure (2017) Delivering Road and Rail Infrastructure Today and Planning for a Stronger and More Competitive Australia Tomorrow
76 DfT (2010) UK government sells right to operate first high speed railway
77 UK Government Investments (2018) Green Investment Bank
78 Public Accounts Committee (2018) Collapse of Carillion
79 Council of Australian Governments (2014) National Partnership Agreement on Asset Recycling
80 New South Wales Government Treasury (2018) NSW takes infrastructure strategy to the US

Land value capture

Taxation of land value at present concentrates around council tax bands, which have not been updated since 1991, stamp duty and capital gains tax for non-main home properties. This tax regime, however, does little to consider the uplift of value on homes or the creation of new homes, resulting from the development of infrastructure, particularly transport. Capturing the direct benefit to residential, business and land values of infrastructure development is a potential source of revenue which can be directly linked to this phenomenon.

According to Transport for London the uplift in residential values from the completion of the Jubilee Line extension was of the order of 30%, while Crossrail has allowed for new residential development, with a 50% increase in density of new housing within 500 metres of a Crossrail station. Although there is no clear evidence of an uplift of residential land values during the construction phase this has allowed for greater capture of revenue through council tax while commercial land values have increased by around 1-2.5% per year.[81]

The model has been successfully used elsewhere, including Hong Kong through the Rail Plus Property model, and Australia where the State of Victoria region has set out an action plan for reform through charges on development, a tax on property owners in the area of development and betterment levies.[82]

It is important that any implementation of a similar scheme, whether through a reform of, business rates, council tax or an alternative mechanism, is linked to the development in question and fairly levied, being completed at an appropriate time. ICE supports efforts to realise value uplift outlined in the NIA, including investigation of zonal precepts where property value uplifts are realised and removal of ballot requirements to raise business rate supplements. The Government should also consider new primary legislation to enable projects to include land value uplift as part of the funding package for infrastructure development. ICE does, however, have concerns that this funding mechanism would only be suitable for urban areas and should, therefore, be considered as part of a wider toolkit of available policy options.

Case Study – Land Value Capture and Crossrail

Crossrail is a £14.8bn project installing new rail lines and deep-level tunnels in London. It runs between Reading and Heathrow in the west to Shenfield and Abbey Wood in the east of the city. It encompasses 42km of tunnels and is, at time of writing, the largest single infrastructure project in Europe.[83] It is estimated that it will add £42bn to the economy.[84] Almost half of the project has been funded through the Mayor of London's office, including a direct contribution of £1.9bn from Transport for London, £4.1bn from enhanced business rates and £600m through a revenue limited Community Infrastructure Levy (CIL).[85]

The argument for enhanced business rates and the use of the CIL, which aimed to capture some of the uplift in values, stemmed largely from 'the commercial realisation of the value potential from property development opportunities above or in the vicinity of Crossrail stations'.[86] Studies have found that there is an estimated land value uplift of £5.5bn within 1km of a Crossrail station,[87] with the CIL capturing only just over 10% of that value.

Various methods of land value capture are being considered for implementation to part-fund Crossrail 2. These include zonal measures through a stamp duty land tax, more regular revaluations of business rates or a transport premium charge. The latter would be a levy on landowners who purchase land, or who charge tenants, close to Crossrail 2's stations, which could raise £13-28bn.[88] However, Crossrail's experience demonstrates that any new measure would require new primary legislation as the existing suite of levies do not raise revenue on this basis.

81 TfL (2017) Land value capture
82 Ibid
83 Crossrail (2018) Crossrail in Numbers
84 Ibid
85 Crossrail (2018) Funding
86 Crossrail (2018) Crossrail OSD collaboration and property value capture
87 GVA (2017) Crossrail Property Impact & Regeneration Study
88 TfL (2017) Land value capture

Community level crowdfunding

Investment in infrastructure has a high barrier of entry which can limit project and programme financing to investors with a high worth, generally institutional investors and governments. This has led to a tendency to exclude individual investors of more modest means from infrastructure investment; despite this group representing the clear majority of people and who have, collectively, a significant amount of disposable income. Institutional investors, similarly, tend to be more interested in projects with a significant amount of volume, which can mean that lower cash-value projects, especially local community projects or rural projects, can find it difficult to raise affordable capital.

Technological solutions are emerging which could serve to unlock this potential additional investment capital, diversifying routes to capital realisation for all projects. Crowd funding and peer-to-peer programmes enabled by Blockchain offer the potential for projects to seek financing from alternative and non-traditional sources outside of established lines of finance.

According to the Cambridge Centre for Alternative Finance the UK online market for alternative finance was worth £4.6bn in 2016[89] and, according to theCityUK, peer-to-peer and crowdfunded business lending grew by 36% to £1.23bn.[90] In certain sectors crowdfunding can raise significant amounts of capital. For example, in the video gaming market, Star Citizen has raised more than $190m[91] with an initial target of just $2m, proving that, where a project captures the public's imagination, they are both willing and able to invest.

There are good examples of successfully crowdfunded infrastructure projects around the world. Solar Roadways raised $2.2m through a crowd fund in 2014 as a start-up to develop solar panel roadways.[92] On a community level, the Liverpool Flyover project, a plan to refurbish the Churchill Way flyover into an urban park, raised £43,809 from residents and businesses.[93]

Encouraging the development of these models more widely will enable many more individuals to have a stake and encourage local direction of infrastructure that is built in the community interest, meeting needs which might otherwise be difficult to identify. A sense of ownership would also close the gap in perception between those who benefit financially from, or merely use, an asset.

Naturally these sorts of models will need strong regulatory protection and provision of financial advice. The sector at present is relatively free of limiting regulation, especially in comparison to the traditional banking sector. ICE's engagement work found an appetite for these models, but information about them and public knowledge concerning the potential risks is lacking.

ICE would encourage the Government to review the feasibility of local and regional government, including metro mayors, being able to raise finance through crowdfunding for local or community projects and for which an identifiable revenue stream can be established.

61% of Adults

would like more information about how public money is spent on UK infrastructure projects.

YouGov (2018)

89 University of Cambridge, Cambridge Centre for Alternative Finance (2017) Entrenching Innovation
90 TheCityUK (2018) An engine for growth: the role of financial and related professional services in society
91 Roberts Space Industries (2018)
92 Indiegogo (2018) Solar Roadways
93 Spacehive (2014) The Flyover for Liverpool

Case Study – Westmill Solar Co-Operative

Westmill Solar Co-Operative, near Watchfield, Oxfordshire, is a large-scale, community owned, solar farm project. It is operated under a one member, one vote, shareholder co-operative with 1518 members. The project was financed thorough seed capital of £18 million in total, consisting of £5.8 million raised through individual share options with the remainder raised through loans.

The farm, which has operated since 2011, has a total generation of 4.8GWhr/year and a fairly consistent turnover from generation of around £2m, enjoying an operating surplus of £808,278 in 2017. It was able to return dividend value to shareholders of £414,00 in 2016 and £285,000 in 2017.[94]

Share dividends are agreed by the community, considering the financial performance of the co-operative and transfer of funds to the community fund, which was set up to support climate change mitigation, education and other projects which provide a community benefit. Any shareholder can opt to transfer their dividend to the community fund, which had a combined income of £150,000 between 2016 and 2017.[95]

Political reform and statutory status for the National Infrastructure Commission

The NIC currently exists as an executive agency of the Treasury. While in the short to medium term it is more important that the NIC is afforded the time to develop its capabilities as a key advisor to the Government, ICE would support the NIC being put onto a statutory footing in the long term.

It is vital that the NIC moves to a position which enables true independence from the Government of the day and places itself subject to parliamentary oversight so that it can continue to provide impartial analysis and recommendations. Too often economic growth has been constrained by political short termism without the reasoned and expert arguments to allow debate of the development of economic infrastructure on its merits.

Placing the NIC on a statutory footing would provide the organisation with a greater sense of authority and signal to the infrastructure sector that its advice – both impartial and expert – is important to the Government's long-term infrastructure planning strategy. As importantly, it would also demonstrate surety to the financial community – 91% of whom agreed with statutory independence for the NIC.[96] This would also give the NIC a degree of separation from the Government of the day. As an executive agency of the Treasury the NIC can be dissolved without any of the safeguards afforded to a body with a statutory footing, gifting it more permanence, and therefore the ability to provide truly impartial advice without fear or favour.

In addition, funding streams which are tied to Treasury budgetary periods do not give long-term certainty for investors looking to re-coup costs on a project which may take decades. Such funding streams are tied to the fortunes of any one Government and are therefore politically unstable and open to premature cancellation.

ICE would encourage both governing and opposition parties to consider parliamentary or budgetary mechanisms – such as statutory status for the NIC – which can be agreed on a longer-term basis, surviving any individual parliament, which can be agreed on a cross-party basis. While this would require a change in parliamentary convention, the security this would provide would serve to allow for long-term planning, support affordability of finance and match the realistic time frames needed to realise large-scale projects.

The National Infrastructure and Construction Pipeline

The National Infrastructure and Construction Pipeline (NICP) was designed, in part, to provide the built environment sector and investors with a forward view of activity which would allow the sector to plan, give businesses some surety of future work and allow time for private investors to marshal funds to help support long-term projects.

Infrastructure lasts for generations, and this demands long-term thinking which considers how its use will change and evolve, that gives provision for maintenance and consideration for its continued resilience. All these issues are important; without the ability to plan or in a system where projects are green lit on an ad hoc basis, a workforce with a finite amount of labour and expertise will be less able to deliver multiple projects over time. For instance, a situation where the Government attempted to deliver multiple high-speed lines at the same time would see labour shortages, additional costs and an increased risk of failure.

94 Westmill Solar (2018) AGM Papers
95 Westmill Solar (2018) The first community owned solar farm in the UK
96 DLA PIPER (2018) UK Infrastructure: Defining the Future

Surety of future work is also crucial. It allows the sector, where tight margins are a reality of life, to

- plan around long-term skills development
- give some expectation of job security which allows for long-term or permanent contracts (reducing the costs associated with agency work)
- increase regional employment opportunities, over the life of several projects.

With a total pipeline value of £460bn spread over 700 projects,[97] programmes and other investments, infrastructure is a market with relatively high barriers to entry for financiers. Indeed, with the mean cost of each project set at approximately £657m, it is more often the case than not that individual projects will have multiple financiers.

Creating a funding strategy requires time, to evaluate a project, make a business case, run risk profiles and convince financiers to make an investment. Giving investors lead-in time through clear displays of intent allows for the markets to react in a way which is measured and supports the delivery of projects which are well managed, budgeted and realistically financed.

There is a concern that the NICP lacks sufficient detail about projects and that there is not a significant pipeline of works beyond 2021 – with almost half of committed spend on the pipeline due to be delivered within the next three years. It is felt, particularly in the rail sector, that including information about the variability of returns, more detail on known risks and an estimate of the expected scale of different projects and how this might change would be extremely useful in investment planning.

Visibility is also vital. It helps to encourage competitive bids, improve lines of communication for financiers and reduces the hurdles different parties must overcome to participate in a tendering process. There is a need for increased visibility and forthright championing of the NICP by the Government to seek out and secure private investment for major infrastructure projects.

Case Study – Government of Spain Public Sector Contracting Platform

The Government of Spain operates a Public Sector Contracting Platform,[98] which lists available tenders and enables companies to directly bid for contracts through the portal. It also allows for direct discussion of the bids available and publishes the results of tenders, acting as a gateway of visibility which increases transparency and awareness of the Government's ongoing pipeline of work.

This portal was designed with the intention of supporting the Spanish Government's ambition to ensure greater cooperation and coordination with private finance. The system also sets requirements for public bodies contracting firms to publish bids, information and documentation about bids, and responses to questions about award procedures and contracts.

97 IPA (2017) Analysis of the National Infrastructure and Construction Pipeline
98 Govierno De España, la Plataforma de Contratación del Estado (Government of Spain, Public Sector Contracting Platform)

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- Hermes
- Highways England
- HM Treasury
- HSBC Group
- IFM Investors
- Infracapital
- Infrastructure and Projects Authority
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