

The use of infrastructure systems – insights into the new normal

May 2020

Purpose of this paper

The purpose of this insights paper is to examine the impacts that the Covid-19 lockdown measures have had on infrastructure demand across the UK. Building on this analysis, the paper also explores attitudes towards public life after the lockdown measures have been lifted, in order that assumptions concerning future infrastructure demand can be made.

The paper supports the call for evidence that ICE is running on behalf of the Infrastructure Client Group (and by extension the Construction Leadership Council) in order to identify how infrastructure delivery should be reinvented in the UK following Covid-19. Further details of this work are included at the end of this paper.

The paper provides insights into the following areas:

- infrastructure network demand before the Covid-19 pandemic
- the impact of Covid-19 on infrastructure demand and operations
- attitudes towards public life after lockdown and social distancing measures have been lifted
- potential impacts on planned major infrastructure programmes.

Infrastructure network demand before the Covid-19 pandemic

In order to appreciate the scale of the impact that Covid-19 has had on infrastructure use, it is first necessary to build an understanding of the demand picture before the outbreak of the pandemic.

The following statistics cover transport, energy and water network use before Covid-19 broke out in the UK.

For transport, they generally show that there was growing demand across key modes (with the exception of bus journeys). In energy and water, the statistics illustrate that there had been growth in overall consumption, but a steady decline specifically in electricity supply and a downward trend in the household consumption of water.

Transport

Public transport use in Great Britain for the year 2018/19 was as follows:¹

¹ Department for Transport (2019) [Transport Statistics Great Britain: 2019](#)

- 4.8 billion local bus journeys
- 1.8 billion national rail journeys
- 0.3 billion journeys on trams and light rail systems.

For rail, this represented a 156% increase on mid-1980s figures, while for trams and light rail the number of journeys was the highest since records began. Bus use has steadily dropped since the mid-1980s, but the 4.8 billion journeys made during 2018/19 still equated to 58% of all public transport journeys.

On Great Britain's roads, 328 billion vehicle miles were driven, with cars accounting for 78% of all miles travelled. In the same year there were 292 million airport passengers and 2.2 million air transport movements recorded at UK airports. On the airport passenger measure, this represented an increase of 3% on the previous year.

The utilities: energy and water

Total energy consumption in the UK for 2018 sat at 142.7 million tonnes of oil equivalent, representing a 1.1% increase on the previous year.² Consumption was spread as follows:³

- coals and manufactured fuels: 1.9 million
- gas: 43.8 million
- oil: 63.6 million
- electricity: 25.8 million
- bioenergy and heat: 7.7 million.

Total electricity supply in the UK for 2018 was recorded at 352 TWh (terawatt-hour), which marked an overall decrease of 8% since 2010.⁴

A total of 14,000 million litres of water is supplied for public use on a daily basis in England, while a further 1,000 million litres is supplied to industry (including farming) and power generation.⁵

From the mid-1980s through to 2004, household water consumption grew from roughly 130 PCC (litres/head/day) to 155 PCC.⁶ From that point to 2016 there was a downward trend to approximately 140 PCC.

The impact of Covid-19 on infrastructure demand and operations

The impact of Covid-19 on infrastructure networks has been significant, particularly on transport use across Great Britain. Less has been documented publicly in the context of energy and water demand levels, but members of the Infrastructure Client Group (ICG) have confirmed that there have been significant impacts on operations.

² Department for Business, Energy and Industrial Strategy (2019) [UK Energy in Brief 2019](#)

³ Ibid

⁴ Ibid

⁵ Environment Agency (2020) [Meeting our Future Water Needs: A National Framework for Water Resources](#)

⁶ Ofwat (2018) [The Long Term Potential for Deep Reductions in Household Water Demand](#)

Transport

Transport use across modes in Great Britain has significantly declined as a direct result of the Covid-19 pandemic and the introduction of social distancing and lockdown measures.

As of late April, motor-vehicle use was down more than 60% compared to the first week of February, while bus use had fallen by 88%. For national rail and London Underground journeys, the decline by the end of April was even more severe, at 99% and 96% respectively. Table 1 illustrates this unprecedented decline in transport use across Great Britain.

Percentage decline in transport use during March/April 2020 versus first week of February 2020			
Mode	16 March	6 April	25 April
National rail	23%	95%	99%
London Underground	40%	95%	96%
Buses	12%	89%	88%
All motor traffic	2%	63%	62%

Table 1: Decline in GB transport use (Cabinet Office, 2020)

Collectively these percentages represent a reduction of millions of surface transport journeys that would have ordinarily taken place in pre-Covid-19 Great Britain, both for business and leisure purposes.

There has also been a significant decline in air traffic, with departures from the UK's largest 10 airports having rapidly reduced since the introduction of lockdown measures. In the week before the measures were introduced (w/c 15 March) there were 7,865 departures, while from 12 April through to 19 April there were just 711.⁷

Coinciding with the profound decline in the use of all transport networks has been a significant fall in air pollution levels. For example, in London nitrogen dioxide levels fell by more than half during the period 23 March to 5 April 2020 versus the same period in 2019.⁸ The same trend was also present in other large UK cities, including Bristol and Glasgow.

The utilities: energy and water

The lockdown measures and resulting fall in economic activity have meant reduced electricity demand overall in Great Britain. National Grid analysis suggests that while there has been an increase in domestic electricity demand, this has been offset by reductions in industrial use. The analysis indicates that during the lockdown daily demand has fallen by approximately 10%.⁹

Similar analysis for heating demand has not been carried out. Likewise, there is also little analysis available in the public domain that sets out the impact of Covid-19 lockdown measures on water demand.

⁷ Data given on the Flightradar24 website (www.flightradar24.com) on 6th May 2020

⁸ Department for Environment, Food and Rural Affairs (2020) [Air Information Resource](#)

⁹ National Grid (2020) [What Does Lockdown Mean for Electricity in Great Britain?](#)

Attitudes towards public life after lockdown and social distancing measures have been lifted

To understand attitudes towards public life after the Covid-19 lockdown and social distancing measures have been lifted, ICE commissioned YouGov to undertake a wide-ranging public opinion poll.¹⁰

In relation to public life after the Covid-19 lockdown measures have been lifted, it focused on:

- steps employers should take to bring back workforces safely
- attitudes towards leisure and social activities
- preferences for using different modes of transport.

In relation to public life after both lockdown *and* social distancing measures have been lifted, it focused on:

- the features that respondents would like to see in large cities once the Covid-19 pandemic is over and life returns 'back to normal'.

It is important to recognise that the following discussion focuses on public attitudes at the point at which the YouGov poll was undertaken and that as the Covid-19 landscape shifts, so too will public sentiment. It will be necessary to continue to engage with the public and sector experts to ensure that assumptions drawn about future infrastructure use are based on the latest evidence.

Attitudes to public life after Covid-19 lockdown measures have been lifted

Which, if any, of the following would you expect employers to do in order to bring back workforces safely? (After the Covid-19 lockdown restrictions have been lifted)	
Measure	Support
Increase the frequency of remote working (e.g. working from home)	61%
Incentivise flexible working to limit the number of people in the workplace at all times	59%
Redesign workstations to maintain social distancing measures (e.g. being 2 metres apart)	53%
Invest in more remote-enabling technology (e.g. teleconferencing, easy-to-share digital form, etc.)	49%
Limit business travel where possible (excluding commuting)	48%
Transition to a permanent at-home working environment where possible	32%

Table 2: Representative YouGov poll of UK adults, 2020

¹⁰ YouGov plc. Total sample size was 2,093 adults. Fieldwork was undertaken 28–29 April 2020. The survey was carried out online. The figures have been weighted and are representative of all UK adults (aged 18+).

Table 2 shows that there is strong backing for increasing the frequency of remote working, with 61% of UK adults supporting this measure.

Likewise, more than half of UK adults believe employers should incentivise flexible working to limit the number of people in work places, while 32% think there should be a transition to a permanent at-home working environment where possible.

Table 3 highlights that up to 44% of UK adults are likely to avoid travelling on public transport networks following the lifting of Covid-19 lockdown measures. This table also shows that 41% are likely to avoid entertainment venues in large town and city centres.

Which, if any, of the following are you likely to do after lockdown restrictions have been lifted?	
Measure	Support
Avoid travelling on public transport networks	44%
Avoid entertainment venues in large town and city centres	41%
Do more 'at home' activities (e.g. cooking, watching TV, social media browsing and exercising, etc.) rather than leaving the house	35%
Engage mainly in outdoor leisure and social activities when leaving the house	33%
Limit socialising outside of the household	33%
Choose local entertainment venues rather than those further afield (i.e. venues in close proximity to your home)	18%

Table 3: Representative YouGov poll of UK adults, 2020

Table 4 indicates significant changes in public attitudes towards travel after the Covid-19 lockdown measures have been lifted. Approximately 53% of UK adults (61% in London) have indicated that they will avoid using underground/metro systems. In addition, 52% say they will avoid using buses and 46% trains.

Which, if any, of the following modes of transport are you likely to avoid using immediately after lockdown restrictions have been lifted?						
Mode	Total (UK)	England	Scotland	Wales	Northern Ireland	London
Underground/metro systems	53%	54%	41%	60%	43%	61%
Buses	52%	51%	51%	58%	54%	45%
Trains	46%	47%	40%	52%	42%	40%
Aeroplanes	46%	46%	39%	50%	48%	44%
Ships/ferries	31%	31%	31%	31%	18%	23%
Private vehicles (e.g. taxi, Uber, etc.)	26%	26%	29%	30%	29%	20%
Bicycles	6%	6%	8%	8%	4%	7%

Table 4: Representative YouGov poll of UK adults, 2020

Preferences for working and socialising remotely when the Covid-19 lockdown measures are lifted will result in a move away from the infrastructure demand patterns that existed prior to the pandemic. Specifically, overall transport journeys could decline, while more remote living is likely to decentralise and reduce the demand for key utilities such as electricity and water supplies.

Attitudes to public life after Covid-19 lockdown *and* social distancing measures have been lifted

Table 5 describes the attitudes of UK adults to large cities when the Covid-19 pandemic has concluded and life returns 'back to normal'. It highlights that 48% of UK adults think social distancing measures should continue on public transport even after the pandemic is over.

Which, if any, of the following features in large cities will be important for you to see once the coronavirus pandemic is over, in order to help you return 'back to normal'? (i.e. cities with a population of over 300,000)	
Measure	Support
More teleworking (e.g. working from home, flexible working, remote working, etc.) being enabled to prevent crowding on public transport and in city centres	55%
Measures in place to prevent the spread of disease in public meeting places and entertainment venues (e.g. stadiums, arenas, convention centres, performing arts centres, etc.)	55%
Social distancing measures being continued on public transport	48%
Vital infrastructure being modified to prevent the spread of infectious diseases (e.g. public transport networks)	43%
Building more key anchor institutions (e.g. medical centres, hospitals, universities, etc.)	30%
New buildings and public transport being designed from the outset to limit disease transmission	27%

Table 5: Representative YouGov poll of UK adults, 2020

Table 5 also highlights that 43% of UK adults think that vital infrastructure (including transport networks) should be modified to prevent the spread of infectious diseases.

Upgrading existing transport networks and designing future ones to accommodate modifications of this nature would reduce the space available on certain modes of transport; doing so would likely come at a significant cost.

Potential impacts on planned major infrastructure programmes

Prior to the outbreak of the Covid-19 pandemic, the demand drivers for UK infrastructure seemed relatively clear. They included (among others): the predicted population growth to 75 million by 2050, the increasing

urbanisation and ageing of the population, plus more frequent incidents of flooding and drought brought about by climate change.¹¹

Covid-19 represents a new driver as social distancing and lockdown measures have significantly impacted infrastructure demand profiles. Public attitudes indicate that these impacts could last well into the future.

The implications for transport could be most severe if there is a significant reduction in journeys across all major modes when the lockdown measures are lifted. More decentralised working and living is also likely to affect the supply of key utilities like electricity and water.

Question marks therefore exist over the appropriateness of investments detailed in the National Infrastructure and Construction Pipeline¹² to meet the short-, medium- and longer-term challenges posed by Covid-19. Transport investments are a case in point.

Major infrastructure projects and programmes coming down the pipeline include: the High Speed 2 rail project (HS2), the second road investment strategy (RIS2) and expansion at Heathrow, to list just a few.

HS2 has been designed to connect eight of Britain's largest cities;¹³ RIS2 will see £27.4 billion invested in England's Strategic Road Network for upgrades and maintenance;¹⁴ while a third runway at Heathrow will raise capacity to 130 million passengers a year.¹⁵

Yet public attitudes describe a future picture of working and engaging in social activities more remotely, with reduced appetite for travel and spending time in large towns and cities. In addition, there is demand for transport provision that continues social distancing measures and is designed specifically to prevent the spread of disease.

We explore the implications of changing public attitudes in the associated Green Paper.

Green Paper and call for evidence

This insights paper, as detailed at the outset, has been produced to help support a wider piece of work around future infrastructure provision in the UK that ICE is progressing on behalf of the ICG.

More specifically, a Green Paper has been published that will enable the ICG to develop a road map, as part of the Construction Leadership Council's Industry Recovery Plan, to determine how infrastructure delivery should be reinvented in the UK following Covid-19.

The Green Paper, which is accessible at this [link](#), contains a call for evidence that is being run until 14 June 2020. Representations can be made directly to policy@ice.org.uk.

¹¹ ICE (2016) [National Needs Assessment](#)

¹² IPA (2018) [National Infrastructure and Construction Pipeline 2018](#)

¹³ HS2 (2020) [Why HS2?](#)

¹⁴ Department for Transport (2020) [Road Investment Strategy 2 \(RIS2\): 2020 to 2025](#)

¹⁵ Heathrow (2020) [Facts and Figures](#)

The questions are as follows:

Question 1: What other factors, or combination of factors, will determine attitudes to public life as we transition to a new normal?

Question 2: What other systemic changes, driven by lessons learned during the lockdown period, can we expect to be important as part of the new normal?

Question 3: Are our assumptions of the new priorities for infrastructure correct?

Question 4: What other changes to infrastructure provision will be needed and what assumptions sit behind that need?

Question 5: Have we made the correct assumptions on the changes in delivery that will be required, to deliver infrastructure as part of the new normal?

Question 6: What are the intermediate steps required to move us towards these new approaches to delivery?

Question 7: What other fundamental shifts are required to deliver concrete and long-lasting change in how we operationalise to deliver infrastructure to achieve societal requirements?

About ICE

Established in 1818 and with over 95,000 members worldwide, the Institution of Civil Engineers exists to deliver insights on infrastructure for societal benefit, using the professional engineering knowledge of our global membership.

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