

NATIONAL  
INFRASTRUCTURE  
COMMISSION

# ANNUAL MONITORING REPORT 2019



# Contents

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Foreword	3
In brief	4
Executive summary	6
Partnering for Prosperity	11
Data for the Public Good	14
Connected Future	17
High Speed North	20
Transport for a World City	23
Smart Power	26

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# Foreword

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This year marked the publication of the United Kingdom's first ever National Infrastructure Assessment, a major milestone for the National Infrastructure Commission. The Commission's work over the previous three years had been leading up to the publication of the Assessment, which sets out a clear, long term strategy for the UK's economic infrastructure from 2020 to 2050. I am proud of the work the Commission has delivered to date, and the Assessment is the pinnacle of its achievements so far.



I welcome the government's commitment to respond to the National Infrastructure Assessment by publishing a comprehensive National Infrastructure Strategy this year. I hope that this will set out a clear long term plan for the UK's economic infrastructure around which a broad consensus can be secured, backed by stable funding in line with the fiscal remit that informed the work of the Commission.

While we await the National Infrastructure Strategy, this Annual Monitoring Report assesses the government's progress against the recommendations set out in the Commission's six published studies. I hope that the government can learn from its successes and challenges in implementing the recommendations from the studies and take these into account in its development of the National Infrastructure Strategy. This can enable government to rise to the challenge of realising the Commission's vision for the future of the UK's infrastructure.

Overall, government has made good progress. That is why, in this report, we are closing ten of our 45 study recommendations which we believe to be complete. However, it is notable that the government has made the most progress in areas where the changes were most straightforward to make, and relatively little progress where the recommendations are complex to tackle. In part, this is inevitable. But the infrastructure challenges the UK is faced with are not always straightforward.

Departments and delivery bodies need to be able to work together to deliver changes that are not the sole responsibility of one part of government. Controversial problems still need to be resolved promptly. And domestic policy priorities must not be forgotten against a complex international backdrop, despite a challenging legislative timetable. The UK can deliver infrastructure well. But government and industry need to work together effectively to do so, with long term planning, stable and realistic budgets and proper governance.

This will be a critical year. The establishment of the Commission was an important step forward, but a positive response to its National Infrastructure Assessment, and real progress against its wider suite of recommendations, is still needed. This will be crucial in demonstrating the government's commitment and credibility on infrastructure and to securing the benefits to the UK's economy and international reputation from the Commission's work. I look forward to seeing the government rise to the challenge in the year ahead.

**Sir John Armitt CBE**  
**Chair, National Infrastructure Commission**

# In brief

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**The government established the National Infrastructure Commission to assess the United Kingdom's long term infrastructure needs, provide impartial, expert advice on how to meet these, and hold the government to account for delivery. The government's Industrial Strategy calls for a major upgrade to the UK's infrastructure. The Commission's work sets out how this can be achieved, and its recommendations have already been influential in driving improvements across the key infrastructure sectors.**

The Commission has published six studies so far and, in 2018, it published the first National Infrastructure Assessment, an assessment of the UK's infrastructure needs up to 2050. The Commission awaits the government's formal response to the Assessment this year, in the form of a National Infrastructure Strategy. The Annual Monitoring Report sets out the Commission's views on the government's progress over the past year in response to the six studies.

The government's initial response to the recommendations in the studies has been promising, with several programmes of work mobilised. Progress is being made towards delivering the new East West Rail between Bedford and Cambridge, and the Expressway between the M1 and Oxford. The government and Ofgem are working to enable a more flexible electricity system. And digital infrastructure has been prioritised by the government in the renamed Department for Digital, Culture, Media and Sport.

These successes are welcome, but there are opportunities to go further. Where the Commission has made recommendations that are complicated or controversial to tackle, or which need departments and delivery bodies to work together in new ways, there has been significantly less progress: for example, legislating to explicitly define electricity storage or integrating transport and housing across the Cambridge-Milton Keynes-Oxford arc. The limited progress in improving digital connectivity on the UK's road and rail networks is an area of particular concern. The Commission intends to undertake an in depth review of progress on the issue this year to help drive the programme forward.

The government must rise to the challenge posed by the establishment of the Commission to operate differently on infrastructure – particularly as it prepares the National Infrastructure Strategy. Making progress in these areas will boost connectivity, capacity and productivity in London, the North and the Cambridge-Milton Keynes-Oxford arc. It will enable the UK to use more renewable energy and make the transition to electric vehicles. And it will improve mobile coverage across the country. These will all prepare the UK for the challenges ahead.

# PROGRESS ON OUR RECOMMENDATIONS

The Commission was established in **2015**

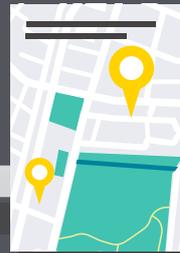
To date, the Commission has published six in-depth studies at the request of Government:



**1**  
**SMART POWER**  
which looked at the UK electricity market



**3**  
**HIGH SPEED NORTH**  
on transport connectivity in the North

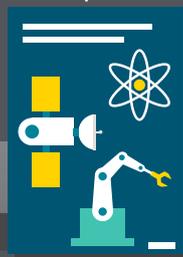


**2**  
**TRANSPORT FOR A WORLD CITY**  
which considered the case for further large scale transport infrastructure in the London region

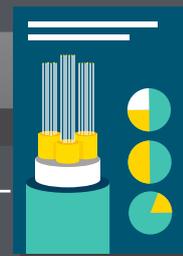
**4**  
**CONNECTED FUTURE**  
on 5G deployment and applications



**5**  
**PARTNERING FOR PROSPERITY**  
which considered housing and transport in the Cambridge-Milton Keynes-Oxford arc



**6**  
**DATA FOR THE PUBLIC GOOD**  
which looked at how technology can improve infrastructure productivity



...and one National Infrastructure Assessment

**45**

recommendations have been made by the studies

**42**

of these recommendations were accepted by government

**10**

have now been completed

# Executive summary

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**The National Infrastructure Commission was established in 2015 to assess the UK's long term infrastructure needs, provide impartial, expert advice on how to meet these, and hold the government to account for their delivery. Our objectives are to support sustainable economic growth across all regions of the UK, improve competitiveness, and improve quality of life.**

To date, the Commission has published six studies on pressing infrastructure challenges, as set by the government:

- **Smart Power**, which looked at creating a smart and flexible electricity system (published March 2016)
- **Transport for a World City**, which considered the case for further large scale transport infrastructure in the London region (published March 2016)
- **High Speed North**, on transport connectivity in the North (published March 2016)
- **Connected Future**, on 5G deployment and applications (published December 2016)
- **Partnering for Prosperity: a new deal for the Cambridge-Milton Keynes-Oxford Arc**, which considered housing and transport in that area (published November 2017)
- **Data for the Public Good**, which looked at how technology can improve infrastructure productivity (published December 2017).

In July 2018, the Commission published the first National Infrastructure Assessment, its assessment of the United Kingdom's infrastructure needs up to 2050. The government has committed to a comprehensive response to the recommendations in the Assessment in the form of a National Infrastructure Strategy; some of them have already been adopted. Many of the Assessment's recommendations build on, support or complement the recommendations set out in the studies. In line with the 'fiscal remit' set by the Chancellor in November 2016, the Assessment demonstrated how the Commission's recommendations could be delivered within a funding envelope of 1 per cent and 1.2 per cent of GDP.

A key part of the Commission's role is to hold the government to account for delivery. The Annual Monitoring Report sets out the Commission's views on the government's progress against its commitments over the past year and sets out the Commission's priorities for the government over the coming year.

## Infrastructure for the future

Infrastructure is essential to the country's future growth and prosperity: it can support growth and innovation. Good infrastructure will help to futureproof the country against the challenges ahead. The government's Industrial Strategy, which cites "a major upgrade to the UK's infrastructure" as one of its five foundations to support the government's vision for a transformed economy, further shows that first rate infrastructure is a priority for the government.

The creation of the Commission showed the government's commitment to addressing the lack of a long term infrastructure strategy, siloed decision making in infrastructure sectors, fragile political consensus and short termism. And it underlined the importance of a new approach to infrastructure for the UK.

Alongside the government's work to prepare for the UK's exit from the EU, it is important that the longer term is not forgotten. The UK has the opportunity to create world class infrastructure, by focussing on delivery in the short term, and putting a clear strategy in place for the future. Long term projects require a long term vision, lasting plans, and stable funding. The UK must take decisive action. The Commission has provided advice to government for the period between now and 2050; in turn the government must keep to its commitments and make the right decisions for the future.

## Progress in 2018

The government has accepted the majority of the recommendations from the Commission's six studies so far, however the progress made to deliver them has been mixed. The Commission has made 45 recommendations in its studies over the past three years, of which 42 were accepted by government. Of these, the Commission is closing ten recommendations which it believes are now complete. The government's progress against the recommendations in each study is set out in more detail throughout this report and in the annex. This report also sets out the priorities for the coming year for government to deliver their objectives in that area.

There have been some notable successes over the past year. Work has begun on the Cambridge-Milton Keynes-Oxford arc, in particular on the route for the new East West Rail between Bedford and Cambridge and the Expressway between the M1 and Oxford. Ofcom has adopted new methods for measuring mobile coverage and is taking steps to improve coverage across the UK; 66 per cent of the UK's land area now receives good 4G coverage from all four mobile operators, up from 49 per cent last year. And government and Ofgem are working to enable a more flexible electricity system, as recommended in Smart Power.

These successes are welcome, but there are opportunities to achieve more that have not yet been taken. The areas where greatest progress has been made have tended to be where changes were relatively straightforward to make: where the Commission's recommendations aligned well with existing government policy, for example in making progress towards delivering the new East West Rail between Bedford and Cambridge, or where the action was delivered by other public bodies such as Ofcom and other regulators. Areas that are more complicated or controversial to tackle have seen less progress.

Much more could also be done to drive progress across departmental and organisational boundaries, which was a key objective when the Commission was established. Reforming the electricity system to enable a level playing field for flexible technologies requires coordination between many different organisations, changes to regulations and legislation, and is part of the ongoing negotiations with the EU. Integrating transport and housing delivery on the Cambridge-Milton Keynes-Oxford arc requires joint working between the Department for Transport (DfT) and Ministry of Housing, Communities and Local Government (MHCLG), as well as between local authorities. This will be challenging but necessary to achieve the economic potential of the area and unlock the maximum strategic benefits from the major transport schemes currently under development.

For the same reasons, improving digital connectivity on the UK's road and rail networks has become an issue of particular concern. It requires common approaches and integrated strategies across departments and delivery bodies, with DCMS, DfT, Network Rail and Highways England all playing a role. Consensus seems to be slipping, however, and little has been achieved beyond small scale trials. No overall strategies have been developed, nor have the government's preferred commercial models been identified. The Commission intends this year to carry out an in depth review of progress on this issue to help drive the programme forward.

## Building on solid foundations

In July 2018, the Commission published the first National Infrastructure Assessment, setting out the Commission's plan of action for the country's infrastructure over the next 10-30 years. The government's response is expected in 2019. The Assessment set out a pathway for the UK's economic infrastructure, including:

- nationwide full fibre broadband by 2033
- half of the UK's power provided by renewables by 2030
- three quarters of plastic packaging recycled by 2030
- £43 billion of stable long term transport funding for regional cities
- preparing for 100 per cent electric vehicle sales by 2030
- ensuring resilience to extreme drought
- a national standard of flood resilience for all communities by 2050.

The recommendations in the Assessment build on or complement those set out in the Commission's previous studies. In particular, the recommendations in Smart Power will be a vital part of enabling the transition to renewable energy and preparing for the switch to electric vehicles, and nationwide full fibre broadband will support the objectives of Connected Future. Together, the Commission's full body of work delivers an ambitious plan to modernise and enhance the UK's economic infrastructure. It is important that the government continues to meet its commitments and deliver on recommendations which have been accepted.

The government is already making progress. The recent Resources and Waste Strategy sets a target of recycling 65 per cent of municipal waste by 2035, in line with the Assessment's recommendation. DCMS published the Future Telecoms Infrastructure Review in July 2018, which was broadly in agreement with the Assessment's recommendations on digital. In the government's Water Conservation Report it has also set an objective for the water industry to halve leakage by 2050.

As the government develops its National Infrastructure Strategy, which will provide its full response to the Assessment, it will be important to heed the lessons from the implementation of the recommendations in the studies published so far. A willingness to work across departmental boundaries, for example, will be all the more important in driving forward the much broader policy agenda set out in the Assessment, as will be a commitment to think afresh about existing policies. The Commission looks forward to seeing how the government will address these important challenges in its response.

## Maintaining momentum on infrastructure

Aside from progress on the recommendations of the Commission, the past year has seen timetable and budget overruns on Crossrail 1, which has seen a rise in budget of 7 per cent, and is now not expected to open until 2020, potentially impacting progress on Crossrail 2. Any cost or phasing risks for HS2 would also need to be carefully managed; the National Audit Office has highlighted that the estimated cost of acquiring land and property has increased significantly since the start of the programme.

The Commission's view is that with long term planning, stable and realistic budgets and proper governance, the UK can restore its reputation for delivering major projects on time and to budget. This should be a matter of priority, as infrastructure fundamentally underpins the UK's future growth and economic competitiveness. Delays to complex major infrastructure projects should not undermine the case for investing in infrastructure.

## Looking forward to 2019

The government's decisions in 2019 will be critical to the UK's credibility on infrastructure over the long term. The Spending Review 2019 and the government's National Infrastructure Strategy will be significant milestones. By creating the Commission, the UK has established a world leading approach to infrastructure planning; the government should take this opportunity to deliver the infrastructure to match.

In 2019, the Commission would like to see government progress its work in response to its commitments from each of the Commission's studies to meet the recommended deadlines. Where deadlines have already been missed, the Commission has endeavoured to set out a realistic extension in this report. The recommendations in the National Infrastructure Assessment build upon those in the studies; the government must not fall behind at this early stage.

The Commission looks forward to the government's response to the Assessment in the National Infrastructure Strategy this year. While delays and budget increases could put public and political support for future infrastructure projects under threat, the Commission's work can help government to reduce these risks in future. The Commission has set out a long term, fully costed plan for the UK's infrastructure, that is affordable within the resources set out by government. This plan should enable

the government to develop an affordable strategy to deliver the infrastructure the UK needs. This strategy, accompanied by realistic cost estimates for infrastructure projects to enable them to maintain stable budgets over the long term, can help ensure that the UK is equipped with the infrastructure it needs, when it needs it.

# Partnering for Prosperity

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**The National Infrastructure Commission was asked to provide government with proposals and options to maximise the potential of the Cambridge-Milton Keynes-Oxford arc as a connected, knowledge-intensive cluster that competes on a global stage. The proposals were to protect the area's high quality environment, and secure the homes and jobs that the area needs.**

Partnering for Prosperity: a new deal for the Cambridge-Milton Keynes-Oxford Arc was published on 17 November 2017. Its central finding was that rates of house building would need to double those at the time of publication if the arc were to achieve its economic potential. The Commission called for a new deal between central and local government, aligning public and private interests behind the delivery of significant east-west infrastructure and major new settlements, and seeking commitment to faster growth through a joined up plan for jobs, homes and infrastructure.

The government published its response in the Autumn Budget 2018. The Commission supported the measures announced in the response but also noted that these commitments alone will not deliver new homes and transport links at the pace or quality required. A clearer vision and better joined up working from government will be needed to deliver growth in the Cambridge-Milton Keynes-Oxford corridor.

## Successes

In October 2018, the Commission received the first annual update from government on developing the arc. The Commission welcomed the government's response, which was supportive of the Commission's recommendations. Since the publication of the report:

- There has been good progress on the East West Rail and Oxford-Cambridge Expressway transport schemes.
- The independent East West Rail Company is working on the business case for the central section of East West Rail between Bedford and Cambridge, with the route currently under consideration and passenger services expected to begin in the 2020s.
- Government is developing proposals for the new Cambridge South station and is undertaking an Oxfordshire Rail Corridor Study.
- The likely corridor for the 'missing link' in the Expressway between the M1 and Oxford was announced in September 2018 and is expected to open in 2030.
- The government response to the Commission's work endorsed the recommendation to remove section 106 pooling restrictions.

Integrating transport and housing schemes was a critical part of the Commission's recommendations. The Commission looks forward to the outcome of MHCLG's analysis on the strategic case for significant housing growth across the Arc. The Oxfordshire Housing Deal, announced in 2017, was an encouraging first step, and the Commission would like to see further initiatives to boost housing growth across the arc.

## Risks and challenges

Increased commitment and involvement from government will be necessary in order to maximise the potential of the Cambridge-Milton Keynes-Oxford arc:

- A number of key dates are at risk of being missed in the coming 12 months, including the development of a spatial vision for the arc and the designation of locations for new settlements.
- The Commission remains concerned about the overall level of integration between the planning of new housing and transport schemes to ensure that both East West Rail and the Expressway unlock sites for new development.
- The government's response did not set out a timeline for making decisions on proposals for housing growth in the arc.
- While the Commission welcomes the Oxfordshire Housing Deal as a first step, the Milton Keynes Housing Deal has been delayed.
- There have been no requirements made of local authorities to develop long term transport strategies to complement strategic east-west connections and enable the development of the arc's towns and cities, nor has government moved to establish pipelines of long term infrastructure projects, conditional upon housing delivery milestones.
- Progress on the governance arrangements recommended by the Commission has been minimal; the government missed the recommended target date of summer 2018 to establish an arc-wide 'Strategic Partnership Board'. A governance structure is now expected to be finalised by Spring 2019. Given the delay against the original recommendation, the Commission looks forward to these developments.
- The government's response made no commitment to developing a spatial vision for the arc and has not required local authorities to work together to develop joint statutory plans. It seems unlikely that a joint spatial vision will be produced by summer 2019, and the proposed vision statement will only be produced by spring 2019. Without the spatial vision, local authorities do not have the clarity required to make plans capable of ensuring transformational development.

## Priorities for 2019

In 2019, the Commission would like to see more progress on the recommendations, particularly around housing. The current rate of progress will not deliver new homes and transport links in an integrated way, or at the pace or quality required to meet the government's objectives.



# Data for the Public Good

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**In November 2016, the government asked the Commission to identify which new technologies had the greatest potential for improving the productivity of the UK's infrastructure, and what steps government should take to support the deployment of these technologies.**

The Commission responded in December 2017, publishing its report *Data for the Public Good*. The Commission found that new technologies like artificial intelligence and machine learning could help cut delays and disruptions across the UK's infrastructure networks. But these benefits will only be fully realised if steps are taken to improve the quality, consistency and availability of data, with companies and agencies securely sharing the data they have on how well their infrastructure operates.

The government accepted the majority of the report's recommendations, and since the publication of the report, good progress has been made on the recommendations accepted by government, the Digital Framework Task Group, the Infrastructure Client Group (ICG) and the UK Regulators Network (UKRN). Government and industry must maintain this momentum to deliver the benefits of improved data standards and better data sharing across the infrastructure sector.

## Successes

There has been good progress on the recommendations of the study this year:

- The Centre for Digital Built Britain (CDBB) set up a Digital Framework Task Group which has set out a roadmap to an information management framework to set standards and enable interoperability of infrastructure data and models. The overall programme to deliver this is expected to start early this year.
- The ICG has set up a Digital Transformation Task Group (DTTG), which has made progress in reporting on regulatory barriers and enablers to sharing data, particularly considering commercial confidentiality as a barrier to data sharing.
- In its response, the government asked that the UKRN coordinate work with regulators to address regulatory barriers to improve the quality and openness of infrastructure data. The UKRN has commissioned a report into the barriers and opportunities in this area, which will be published alongside a progress report in spring 2019.

- The government asked the Digital Framework Task Group (DFTG) to set up a working group to consider what programme of work is needed to enable the development of digital twin models, and how government and the private sector can support this work. This working group has also made good progress: it has developed the Gemini principles, which explain the definitions and uses of digital twins; agreed the need for a digital twin hub to act as a coordination point and knowledge sharer on digital twins; and developed a set of criteria for potential digital twin pilot projects.

## Risks and challenges

The work on the recommendations has progressed well and there has been widespread support for improved quality and openness of data across industry and government. Significant progress has been made, driven forward by the DFTG, alongside other key organisations. In 2019, it will be important that this work continues to progress beyond the initial stages with the same momentum.

While progress has generally been positive, there needs to be more momentum behind the digital twin pilot project. The government response indicated further scoping needed to be completed before this could be progressed. If the UK is to be a leader on digital twins, this pilot should be progressed sooner rather than later.

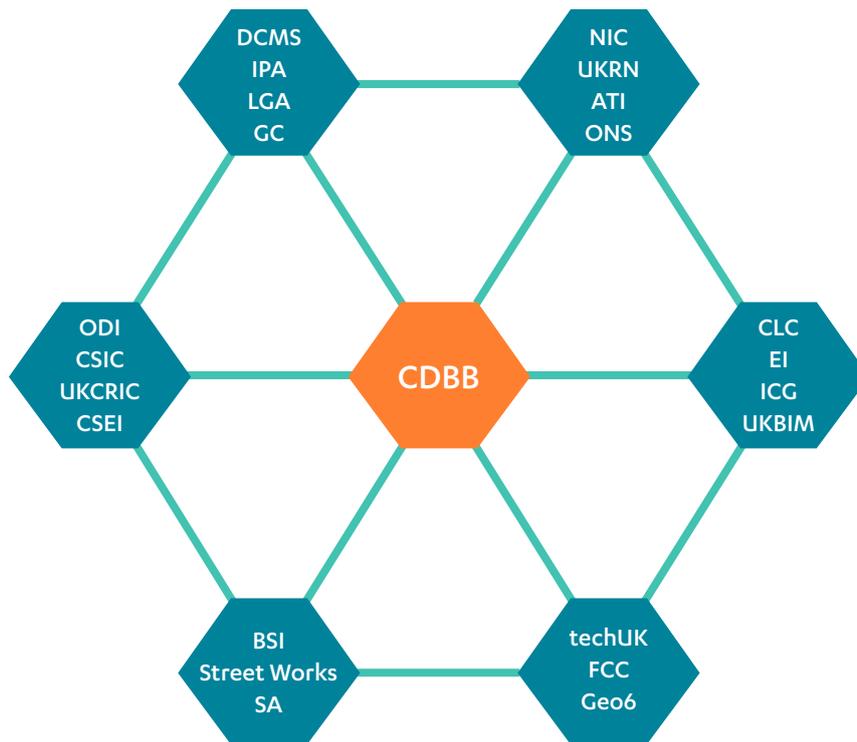
Commercial confidentiality remains a big barrier to increased data sharing in the infrastructure industry. Progress made by the DFTG has highlighted this, but change will require a significant culture shift across infrastructure sectors, industry and government.

## Priorities for 2019

In 2019, the government should continue to support and progress work on the recommendations of this study:

- The key priority for the Digital Framework Task Group will be to agree funding and governance for the Information Management Framework programme and digital twin pilot project, and to begin work on the programme itself by the end of the year.
- CDBB is in a position to develop itself as a centre of excellence and learning for digital twins and should be supported to do so.
- The UKRN should continue to progress work on addressing commercial and regulatory barriers to data sharing throughout 2019.

Figure 2: Institutions integral to the digital framework



**Evolving list of participating organisations**

- Centre for Digital Built Britain (CDBB)
- Department for Digital, Culture, Media and Sport (DCMS)
- Infrastructure and Projects Authority (IPA)
- Local Government Association (LGA)
- Geospatial Commission (GC)
- National Infrastructure Commission (NIC)
- UK Regulators’ Network (UKRN)
- Alan Turing Institute (ATI)
- Office for National Statistics (ONS)
- Open Data Institute (ODI)
- Centre for Smart Infrastructure and Construction (CSIC)
- UKCRIC
- Centre for Systems Engineering and Innovation (CSEI)
- Construction Leadership Council (CLC)
- Engineering Institutions
- Infrastructure Client Group (ICG)
- UK BIM Alliance/Building SMART (UKBIM)
- Security Adviser (SA)
- British Standards Institution (BSI)
- Street Works UK
- techUK
- Future Cities Catapult (FCC)
- The Geo6

# Connected Future

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**In March 2016, the Commission was asked to advise government on the steps the UK should take to become a world leader in the deployment of 5G mobile telecommunications networks, and ensure that the UK can take early advantage of the applications those networks may enable.**

Connected Future was published in December 2016. The Commission's central finding was that mobile connectivity has become a necessity. Great advances have been made since the advent of the mobile phone but government must now play an active role to ensure that basic services are available wherever people live, work and travel. The UK's roads, railways and city centres must be made 5G ready as quickly as possible.

While there have been successes on the majority of the recommendations, the Commission is concerned at the slow rate of progress on improving mobile connectivity on the UK's road and rail network, which has advanced very little since the Annual Monitoring Report 2018. The government must accelerate its plans over the next year; in 2019, it should, at the least, set out a new approach for improving rail connectivity, and develop a plan for scaling 5G motorway connectivity beyond the existing trials. The Commission will carry out a more in depth review of progress to strengthen mobile connectivity on the UK's road and rail network to help drive the programme forward.

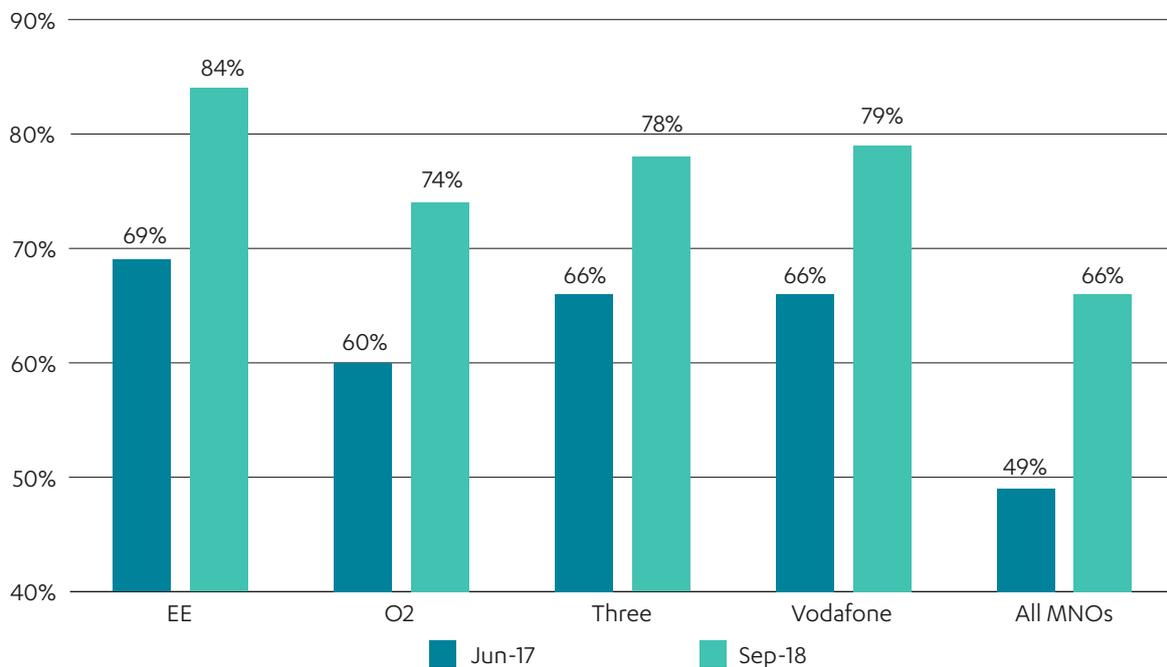
## Successes

The majority of the recommendations in the Connected Future report have now been completed or have seen good progress. 66 per cent of the UK's land area now receives good 4G coverage from all four mobile operators, up from 49 per cent last year, and the area without any coverage at all has dropped from 20 per cent to 9 per cent. This has been supported by a number of successful initiatives by the government:

- The DCMS Telecoms Directorate, set up in 2017, is now the Digital Infrastructure Directorate.
- The Digital Infrastructure Directorate's 5G trials programme is working with range of sectors to demonstrate 5G applications.
- DCMS have set up a 'barrier busting' taskforce to support local authorities and departments with the delivery of digital infrastructure.
- Local authorities are now working together to develop coordinated local mobile connectivity delivery plans; government is supporting this, and has set up the Local Connectivity Group to share best practice.

- Since the Annual Monitoring Report 2018, Ofcom’s new ways of measuring mobile coverage have been adopted, and it has set out a plan to improve mobile coverage across the UK; further consultation on requirements to increase coverage in new spectrum licences will support this, and is expected in 2019.
- There has also been clear progress by Ofcom and government to identify regulatory barriers to the sharing of telecoms infrastructure, and they are beginning to put in place solutions, particularly for new telecoms infrastructure.
- Government and Ofcom have begun to review the regulatory regime to ensure that spectrum allocation keeps pace with the rapid evolution of the mobile communications market; the Commission will continue to monitor progress, but is content with the current trajectory.

**Figure 3: Outdoor area coverage of 4G mobile services in the UK**



Source: Ofcom (2018) Connected Nations

## Risks and challenges

Despite the good progress on the Commission’s other recommendations, the Commission is concerned that there has been no visible progress towards improved digital connectivity on the road and rail network since the Annual Monitoring Report 2018. Conversations with stakeholders suggest that the consensus on the importance of delivering road and rail connectivity is slipping.

Little progress has been made to deliver connectivity on the roads. Government has begun trialling an urban and interurban ‘connected’ road corridor on the A2 and M2 between London and Dover, but this is only contracted to deliver 12 miles of wifi enabled road. However, nothing further has happened in the past year; the government is still yet to express a firm view on how any future roadside network

should be installed, managed, owned or funded, despite the commitment in its response to the Commission's report to carry out work on commercial delivery models and report back by the end of 2017.

Even less progress has been made on rail connectivity. The mobile part of the Trans Pennine Initiative, trialling new infrastructure for high capacity mobile connections on rail, has now been cancelled on grounds of higher than forecast costs. Since the 2017 call for evidence, the government has not made further announcements on how it intends to progress rail connectivity, and without further work to resolve these issues it will continue to lag behind, causing continued detriment to productivity and frustration to rail users .

## Priorities for 2019

The government must accelerate work to improve mobile connectivity on the UK's road and rail networks over the next year in order to deliver its manifesto commitments on nationwide mobile coverage and enable the benefits of new and emerging technologies. If the case for carrying out the Commission's recommendations has changed, this must be acknowledged so that alternatives can be considered. The Commission intends to carry out an in depth review of progress on these issues this year to help drive the programme forward.

As first steps:

- The government should set out its next steps on mobile connectivity for rail in 2019. This is necessary to establish a preferred model for the deployment of trackside infrastructure, providing clarity for suppliers. This infrastructure will need to be in place on main rail routes by 2025 at the latest, if delivery is to take place on a timescale consistent with the wider deployment of 5G networks.
- The government should develop a plan by the end of 2019 for scaling motorway connectivity beyond the existing trials in order to enable delivery by 2025 at the latest and meet the long term connectivity needs of passengers and connected and autonomous vehicles.

# High Speed North

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**In October 2015, the Chancellor asked the Commission to carry out a study into the long term inter-urban transport needs of the north of England, drawing upon Transport for the North's (TfN) developing plan to radically improve connectivity between northern cities, including potentially through high speed lines.**

High Speed North was published in March 2016. Its central finding was that transport networks in the north of England needs both significant short term investment and a plan for longer term transformation to reduce journey times, increase capacity and improve reliability.

The High Speed North recommendations have received ongoing and widespread political support, and progress has been good. However TfN and government still need to take some big decisions, such as the preferred route between Leeds and Manchester, the structure of Manchester Piccadilly, and the phasing of the overall programme. The establishment of a clear long term funding envelope will play an important role in enabling this.

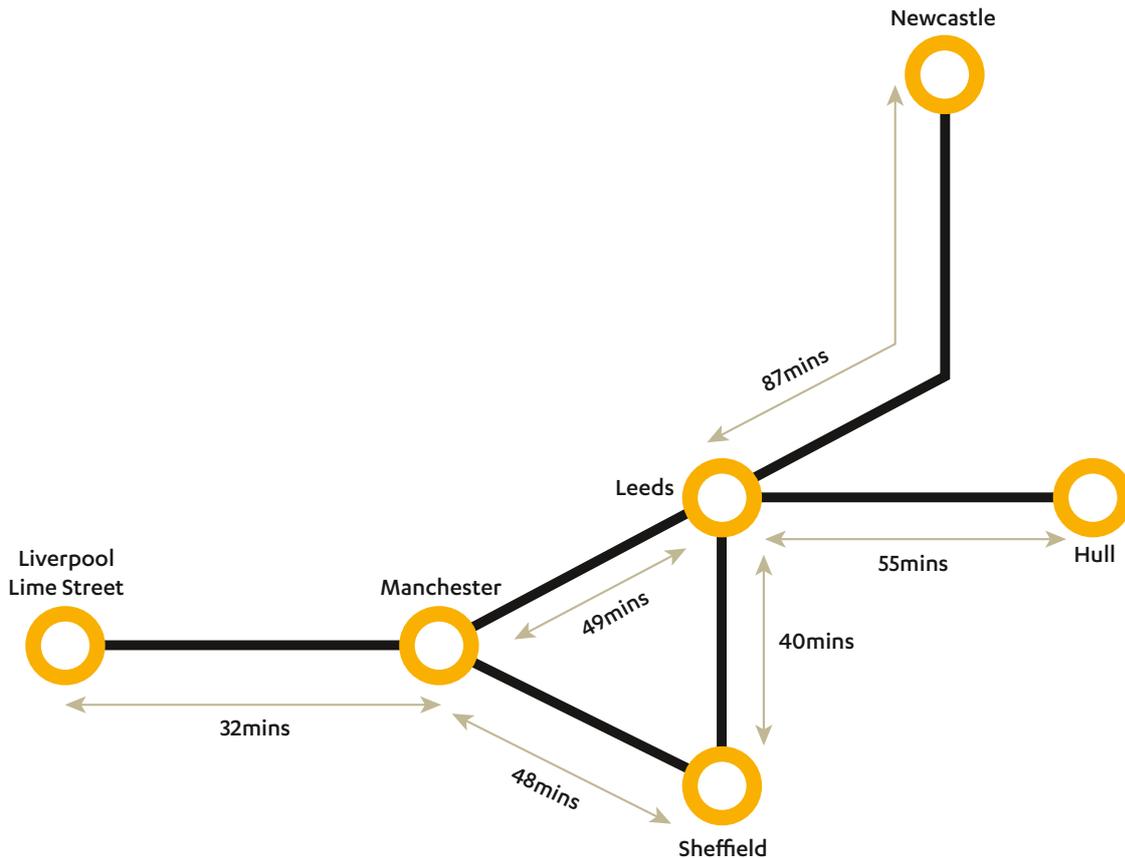
## Successes

The government has made steady progress on the Commission's rail recommendations and good progress on the road recommendations:

- In April 2018, TfN became the first statutory sub-national transport body. Budget 2018 announced up to a further £37m development funding for TfN, principally to deal with the integration of HS2 with Northern Powerhouse Rail (NPR).
- The government has announced a Northern Powerhouse Strategy, alongside transport investments, to be published in 2019.
- TfN's final Strategic Transport Plan, published in February 2019, identified the most important corridors for investment both on road and rail. TfN is also planning to put NPR at the heart of its forthcoming broader transport strategy (due in Spring 2019), which will include both short term capacity and frequency enhancements, to be followed by longer term work to significantly reduce journey times.
- TfN and the Department for Transport (DfT) have developed a Strategic Outline Business Case, including a series of options on routes and stations. This has been approved by TfN's Board and is being considered by DfT.
- HS2 Ltd and TfN have continued to make good progress on both HS2 and NPR – HS2 Ltd now has a central role in the planning and delivery of NPR.

- Network Rail has submitted options to DfT on the Transpennine Route Upgrade in CP6 – this will include electrification and civil engineering along the route between Manchester and Leeds.
- Highways England has begun work on junctions 10-12 of the M62, and completed the upgrade of the M62 between junctions 18 (Simister Island) and 20.
- Good progress has been made on the M56, with a completion date set for 2020.

**Figure 4: Northern intercity train routes and current journey times**



## Risks and challenges

TfN and the DfT have developed a Strategic Outline Business Case (SOBC) for NPR. However, there are still no clear preferred solutions in a number of key areas – for example, the phasing of NPR delivery; the redevelopment of Manchester Piccadilly station; and the new lines between Liverpool and Manchester, and Manchester and Leeds.

Even with the SOBC completed, it is unlikely that firm decisions will be able to be reached on route and station options and on phasing until there is clarity on the funding envelope for NPR, at least until 2030. Therefore the priority should be for government to establish the funding available as part of its wider consideration of long term infrastructure investment through the National Infrastructure Strategy. This will provide the framework needed for TfN to prepare and agree a finalised NPR strategy.

Once the funding envelope is agreed, TfN should move without delay towards confirming the preferred route and station options as early as possible in 2020; this should include the preferred Leeds-Manchester Route and the structure of Manchester Piccadilly.

It is important that there is a single integrated approach to transport infrastructure in the North, and therefore it is right that the Transpennine Route Upgrade and other short term interventions are compatible with future NPR plans. Every effort should be made to progress the Transpennine Route Upgrade and any delay due to the interaction with long term decisions on NPR should be minimised.

While progress on the road schemes in the north has been good, a start date for junctions 20-25 of the M62 has not been identified, nor has a targeted date for completion, which means Highways England is unlikely to meet the recommended completion date of 2020. The consideration of options on the Lofthouse interchange on the M56 could also be progressed more quickly.

## Priorities for 2019

The priority in 2019 should be for government to set a long term spending envelope for Northern Powerhouse Rail through the National Infrastructure Strategy. In addition, the government should commit to a long term funding package in the Spending Review for Transport for the North as a sub-national transport body and continue to make progress on the Transpennine Route Upgrade, where that is not dependent on NPR decisions.

Once the funding envelope is announced, TfN should move quickly towards a single option for routes and stations and decide on the phased delivery of those options. These decisions should take into account affordability and supply chain constraints, to deliver maximum value for all northern stakeholders. TfN should move quickly to avoid delaying HS2 legislation and the Transpennine Route Upgrade.

# Transport for a World City

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**In October 2015, the Chancellor asked the Commission to advise the government on the case for additional large scale transport infrastructure in the capital and its region.**

Transport for a World City was published in March 2016. The Commission's central finding was that Crossrail 2 should be taken forward as a priority, with funding made available to develop the scheme with the aim of submitting a hybrid bill by autumn 2019. This would enable Crossrail 2 to open in 2033.

Publicly reported progress on Crossrail 2 has been slow, and this may further be affected by delays and overspends on Crossrail 1. To maintain momentum, the government and Transport for London (TfL) should agree and publish a firm timetable and funding proposal for Crossrail 2 as part of the government's National Infrastructure Strategy, which is due by the end of this year.

## Successes

There have been two areas of significant progress in 2018:

- TfL and the Greater London Authority (GLA) have put Crossrail 2 at the heart of the new London Plan alongside other infrastructure. Consultation on the draft London Plan closed in March 2018, and it should be formally adopted this year. The Commission welcomes the adoption of the plan, although it notes that the greatest housing growth potential from Crossrail 2 will come beyond the 10 year housing target.
- The London Housing Strategy was formally adopted in August 2018, adhering to the Commission's recommended target of 200,000 additional new homes along the Crossrail 2 route. However, without certainty on funding and timetable for the Crossrail 2 project there has been no further progress on delivering these houses.

## Risks and challenges

The main challenge for Crossrail 2 is the continuing delay to decision on the scope, funding and timetable for the project. In the Annual Monitoring Report 2018, the Commission called for the Independent Affordability Review of Crossrail 2 to be published in 2018, with a hybrid bill later this parliament and completion in the early to mid 2030s. The independent review was not published in 2018 and the publication date is yet to be announced. At Budget 2018, the government said it will consider the case for Crossrail 2 at Spending Review 2019. These new deadlines miss even the extended timetable for Crossrail 2.

Further delays to a decision on funding and timetable for Crossrail 2 will make laying a hybrid bill for Crossrail 2 in this parliament challenging and could potentially push back the expected completion date beyond the early to mid 2030s. Delays to the agreement of a route also risk escalating costs as the final route cannot be fully safeguarded. While decisions will need to be made about phasing and affordability, it will be important to ensure that these do not compromise the objectives of the scheme, particularly on the delivery of new housing.

Important decisions should not be rushed; however neither should Crossrail 2 face endless delay. The government and TfL should settle on and stick to an achievable timetable, drawing from the lessons of previous major projects such as Crossrail 1 and HS2.

Cost overrun and delay to Crossrail 1 have implications for TfL's financial position, but they do not affect the overall case for Crossrail 2. The government and TfL will need to work together on how best to resolve this and mitigate any impacts on Crossrail 2.

## Priorities for 2019

The priority for 2019 should be for the government and TfL to agree a decision on the route, and publish a firm timetable and funding proposal. This should be set out no later than Autumn 2019, and reflected in the government's National Infrastructure Strategy.

More work also needs to be done to ensure that the new homes supported by Crossrail 2 will get built. Government, particularly MHCLG and Homes England, should engage with TfL and other local authorities to ensure a strong delivery plan is in place alongside decisions on timetable and funding, which will enable homes to be built as proposed.

Figure 5: Proposed Crossrail 2 route, as of October 2015

Key

- Stations
- ⊖ London Underground
- ⊖ London Overground
- ⊖ Crossrail 1
- ⊖ National Rail
- ⊖ High Speed 1
- ⊖ High Speed 2
- ⊖ London Trams
- ⊖ Tunnel portal
- Intermediate shaft
- ⊖ Tunnelled section depots and stabling
- Central core of route
- Regional branches
- Potential future Eastern branch
- Route previously consulted on via Tooting Broadway
- Newly proposed route
- Option via Turnpike Lane and Alexandra Palace
- Option via Wood Green



# Smart Power

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**In October 2015, the National Infrastructure Commission was asked to consider how the UK could make the most of emerging technologies to balance electricity supply and demand at lowest cost in the future, aiming towards an electricity market where prices are reflective of costs to the overall system.**

Smart Power was published in March 2016. The Commission's central finding was that a smarter electricity system, principally built around three innovations – interconnection, storage, and demand flexibility – could save consumers up to £8 billion a year by 2030, help the UK meet its 2050 carbon targets, and secure the UK's energy supply for generations. The government endorsed all the Commission's recommendations.

Government has been supportive of Smart Power and has made good progress in many areas, as set out in the recent progress update to the Smart Systems and Flexibility Plan. However, there is more to do to unlock the full benefits of a smart and flexible power system, including enabling widespread electric vehicle rollout (one of the key recommendations of the National Infrastructure Assessment).

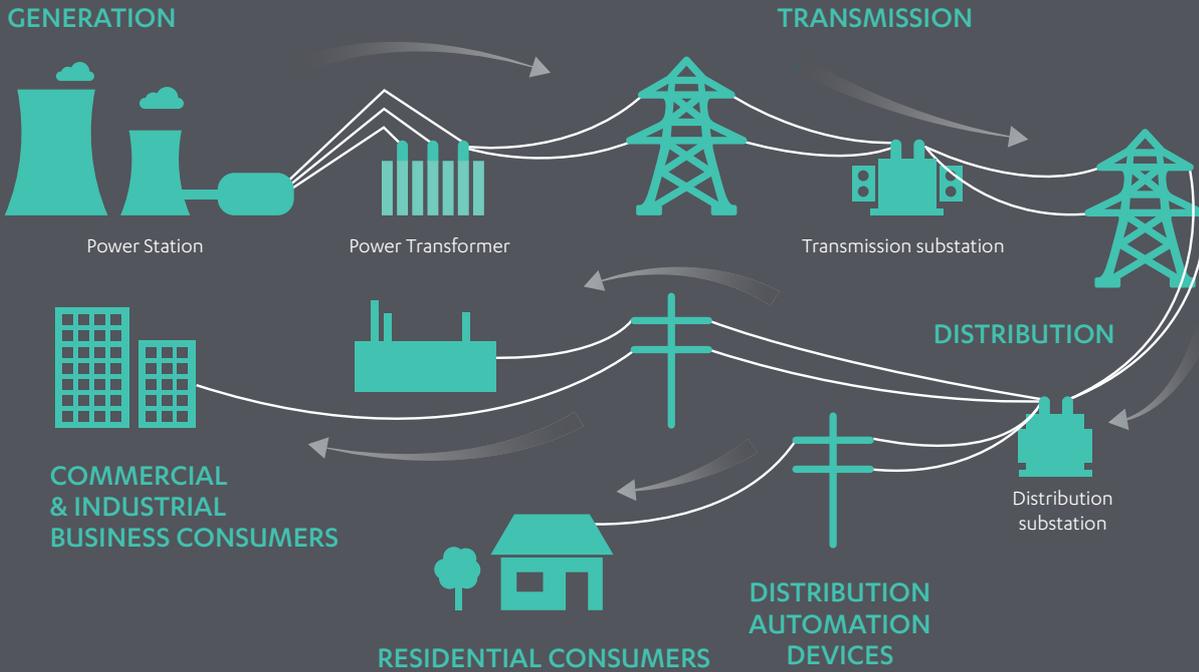
## Successes

Government, Ofgem, the electricity system operator and distribution network operators (DNOs) have all progressed work in line with the Commission's recommendations:

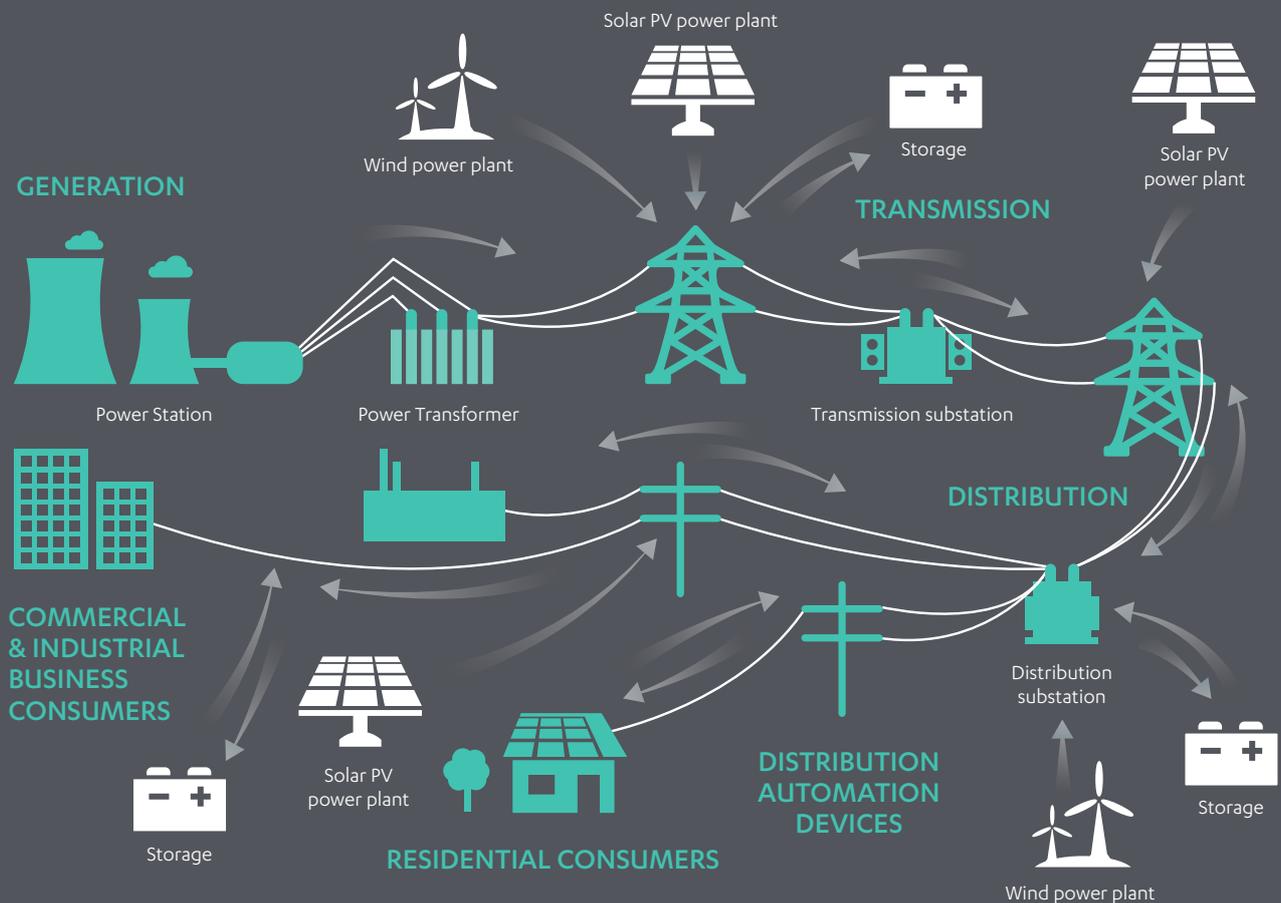
- Ofgem has clarified when storage can be co-located with renewables, set out that DNOs cannot own or operate storage, and consulted on modifying the generation licence to include storage.
- Government has consulted on the planning framework for storage, launched a number of innovation competitions and has made new regulations to allow DNOs to charge assessment and design fees to recover the cost of providing connections.
- The 1GW Nemo interconnector to Belgium successfully entered commercial operations in January 2019. Three further interconnectors (NSL, IFA2 and Eleclink) are under construction and a further project has taken its final investment decision (Viking).
- The more independent electricity system operator has taken significant steps to open up balancing services markets to allow competition between all providers.
- There have been promising initial steps in the transition to more actively managed local networks: DNOs have committed to opening up network requirements to competition and have all put out flexibility requirements to the market.

Figure 6: The power system is undergoing fundamental change

## TRADITIONAL POWER SYSTEM



## FUTURE POWER SYSTEM



## Risks and challenges

While progress has been made on the Smart Power recommendations, more needs to be done, and faster, in some areas:

- Many measures to remove barriers to storage competing fairly with generation are in various phases of consultation processes; government, Ofgem and DNOs (via the Energy Networks Association) should conclude these and ensure their findings are implemented. The industry codes have increasingly become a barrier to change in the energy sector and need to be reformed.
- Although progress has been made towards completion of some interconnector projects, several others have stalled – there is a risk that the outcome of the EU exit negotiations will create barriers to future interconnector projects, or affect the UK's access to power markets and current market coupling arrangements.
- While DNOs have made significant progress in the transition towards a more actively managed energy system, more can be done, faster – the government and Ofgem need to have more oversight to consider issues that arise during the process, such as conflicts of interest for the DNOs, and to set a timetable for the transition, both providing support to the DNOs to meet the timetable and pushing them to be more ambitious.

Ofgem's RIIO-ED1 mid period review concluded that the current arrangement will allow for adequate investment until 2023. Government should work with Ofgem to ensure that a proactive approach is taken to prepare for future reinforcement, including that anticipated for charging points.

## Priorities for 2019

In 2019, work needs to continue to enable demand side response, storage and other flexible technologies to compete fairly across the various electricity markets. The following areas should be priorities for 2019:

- The government should look to remove barriers to future interconnector projects from being taken forward as part of its negotiations with the European Union. Retaining access to power markets and current market coupling arrangements should be a priority.
- The government should also ensure that the Electricity Act 1989 is amended as soon as possible to explicitly define electricity storage as a subset of generation.
- The government and Ofgem need to have oversight of the transition to a more actively managed system, set a deadline for the completion of the transition, and provide support to DNOs in delivering it. The government and Ofgem should also ensure that lessons are learned from National Grid's transition to a more independent system operator, and applied to possible conflicts of interest arising at the distribution network level.

While progress is being made across the actions set out in government and Ofgem's Smart Systems and Flexibility Plan, the Commission thinks that the next priority for government should be to set out criteria and a process for evaluating their combined impact and what potential savings consumers are on track to realise.

# NATIONAL INFRASTRUCTURE COMMISSION

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