Infrastructure and Projects Authority

Reporting to HM Treasury and Cabinet Office

# National Infrastructure Delivery Plan 2016–2021

March 2016

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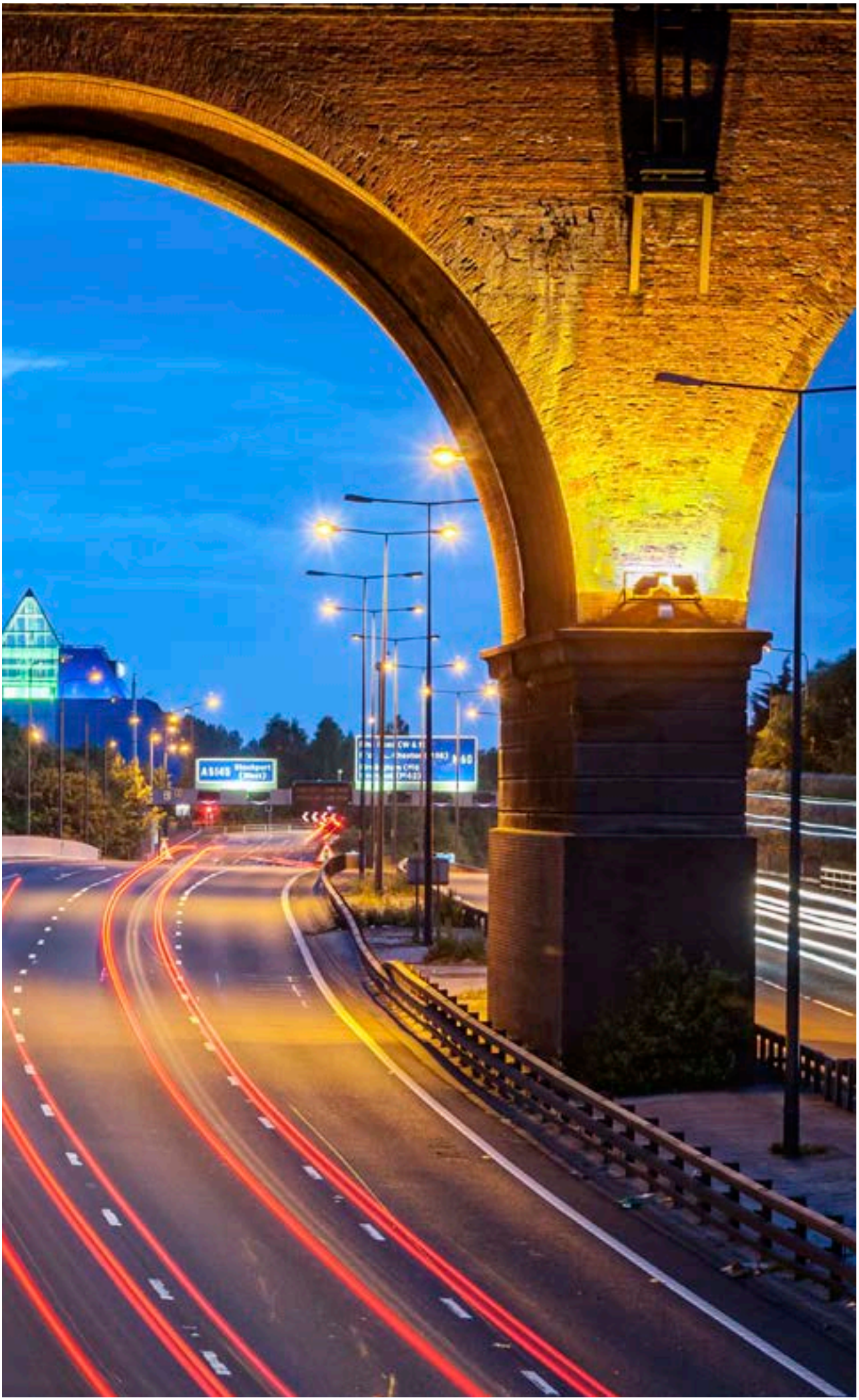
# Contents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# Foreword

Infrastructure shapes our lives. Transport links get us where we need to be, energy systems power our homes and businesses, and digital networks allow us to communicate. Infrastructure supplies us with clean water, takes away our waste and helps protect us from the elements. It is vital to improving our quality of life and integral to the creation of vibrant new places to live and work.

Over the last Parliament we are proud of the progress made to improve the planning and delivery of UK infrastructure. This included implementing the first-ever National Infrastructure Plan, helping to increase investment and accelerate project delivery.

In this Parliament we will be bolder, with public capital investment of over £100 billion committed to 2020-21, part of a £483 billion project Pipeline. The government is laying the foundations for improved infrastructure, a more productive economy and a better society for decades to come.

More areas are benefitting from devolution of powers to target infrastructure investments that will deliver local economic and social benefits. The Northern Powerhouse will connect our great cities of the North, alongside growing numbers of City and Devolution Deals.

We will improve our ability to understand needs and make decisions on future infrastructure; renew our efforts to encourage private investment; and continue to bear down on the drivers of delay, high costs and inefficiency in delivering these ambitious investment plans.

We will put the right organisational framework in place. The National Infrastructure Commission, led by Lord Adonis, will enable long-term strategic decisions to be taken on future infrastructure needs. It has already produced 3 exciting and challenging reports (Smart Power, High Speed North and Transport for a World City) and later in this Parliament will set out priorities for the next 30 years through its National Infrastructure Assessment.

The new Infrastructure and Projects Authority brings together the expertise of Infrastructure UK and the Major Projects Authority to improve delivery of major government projects. It has a renewed mandate to set out and help deliver our infrastructure priorities for the next 5 years in this refreshed National Infrastructure Delivery Plan, and will report annually on progress.

The challenge to industry is to be confident in these plans. The government is better placed than ever to work with project owners, investors and the supply chain to ensure effective and timely delivery of our infrastructure priorities. Working together we can achieve these goals and grow our economy.

**George Osborne**
Chancellor of the Exchequer

**Lord O'Neill of Gatley**
Commercial Secretary to the Treasury

# Executive Summary

Infrastructure is the foundation upon which our economy is built. The government remains determined to deliver better infrastructure in the UK to grow the economy and improve opportunities for people across the country.

For the first time this new National Infrastructure Delivery Plan brings together the government's plans for economic infrastructure over the next 5 years with those to support delivery of housing and social infrastructure. This is reflected by the government's commitment to invest over £100 billion by 2020-21, alongside significant ongoing private sector investment in our infrastructure.[1]

This investment will drive wider economic benefits, including:

- supporting growth and creating jobs in the short term as projects are built – especially where public investment is used to attract private investment
- raising the productive capacity of the economy in the long term as the benefits of new infrastructure are felt; reduced transaction costs; larger and more integrated labour and product markets; and better opportunities to collaborate and innovate
- driving efficiency – enabling greater specialisation and economies of scale
- boosting international competitiveness – attracting inward investment and enabling trade with foreign partners

## Progress to date

Excellent progress has already been made to improve the UK's infrastructure. The publication of the first-ever National Infrastructure Plan (NIP) in October 2010, and subsequent updates, provided an integrated strategy for how the government would plan, prioritise, finance and deliver critical projects and programmes in key economic infrastructure sectors: (transport; energy; communications; flood defence; water and waste; and science).[2]

[1] Spending Review 2015 prioritised long-term investment over day-to-day spending. Budget 2016 accelerates the government's commitment to invest £100bn in infrastructure by 2020-21.

[2] 'National Infrastructure Plan', HM Treasury, 2010.

In this context, average annual infrastructure investment (public and private combined) rose by 17% in real terms in the last Parliament, when compared to the preceding one.[3] In total more than a quarter of a trillion pounds has been invested in UK infrastructure since 2010.

This investment has translated into substantial activity on the ground. Around 3,000 individual projects have now been completed across the country, including dozens of major road and local transport schemes, improvements to hundreds of rail stations and more than 20GW of new electricity generation capacity. Over 3.5 million premises have access to superfast broadband for the first time and over 175,000 homes are better protected from floods. Transformational projects such as Crossrail and the Mersey Gateway Bridge are well into construction.

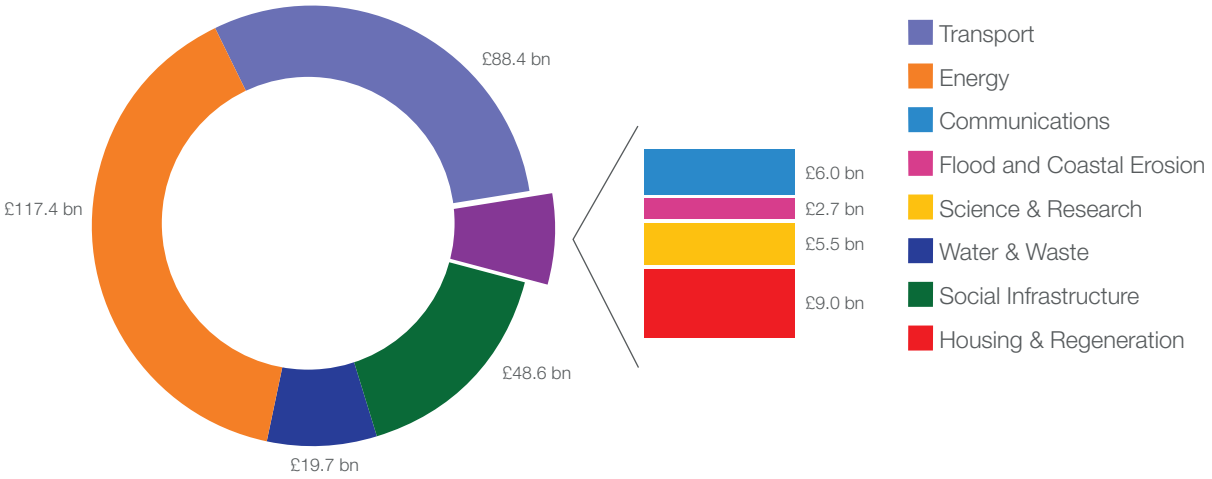
## National Infrastructure Delivery Plan 2016

The NIDP updates and replaces the previous NIP, outlining details of £483 billion of investment in over 600 infrastructure projects and programmes in all sectors and spread across the UK, to 2020-21 and beyond.[4] [5]

Alongside economic infrastructure, for the first time this plan includes sections on how infrastructure will support large-scale housing and regeneration projects alongside key social infrastructure (schools, hospitals and prisons), in line with the government's £100 billion commitment.

The NIDP sets out what will be built and where, focusing specifically on nearly £300 billion of the Pipeline that will be delivered over the next 5 years to 2020-21.

### Chart ES.1 Infrastructure investment, by sector, spend from 2016-17 to 2020-21




Source: Infrastructure & Projects Authority, Major Infrastructure Tracking Unit

[3] £49 billion in 2010-11 to 2014-15, compared with £42 billion in 2005-06 to 2009-10 (in 2014-15 prices). HM Treasury estimates, based on published sources. These figures are not comparable to Pipeline data presented in this document, which is a forward-looking bottom-up assessment of planned infrastructure investment. Please refer to 'Methodology and Sources for National Infrastructure Delivery Plan 2016-21' for further information on how these estimates are calculated.

[4] The Pipeline contains both individual projects over £50 million and programmes over £50 million containing multiple individual projects. This includes over 4,000 individual projects when including those grouped within active programmes.

[5] The NIDP covers infrastructure across the UK where it is not a devolved responsibility to the Northern Ireland Assembly, Scottish Parliament or Welsh Assembly. For more information see Chapter 13 Regional Infrastructure.

**The structure of the document and key highlights are summarised below:**

Chapter 1 Laying the Foundations outlines how the government is taking steps to ensure successful infrastructure planning, prioritisation and financing, both for the next 5 years through the NIDP, and for decades to come. This means:

- establishing the right framework – through 2 newly-created bodies, the Infrastructure and Projects Authority and an independent National Infrastructure Commission which will complement each other to provide a comprehensive approach to infrastructure in both the relatively short term (to 2020-21) and the very long term (to 2050)
- identifying the right priorities – by focusing on priority investments and underlying key projects and programmes in each sector that deliver nationally significant infrastructure, drive growth and unlock private investment
- getting the right finance in place – recognising that around 50% of the Pipeline will be delivered through private investment, the government is taking steps, alongside substantial public investment, to identify and support sources of private finance

Chapter 2 Infrastructure Pipeline provides a forward look at investment plans across the public and private sectors worth more than £483 billion in total (of which £57.6 billion billion is in social infrastructure), and including over £297 billion to 2020-21.

Chapter 3 Roads sets out how the government is investing £15 billion to support Highways England in transforming the Strategic Road Network with over 100 major schemes completed or in construction by the end of 2020-21, including the A14, A1, A303 and rolling out further Smart Motorways. Plans for the second roads period will also be developed, supported by legislation to provide a new Roads Fund, directly using revenues from Vehicle Excise Duty to provide long term funding certainty for strategic roads.

Chapter 4 Rail explains how the government is supporting the largest rail modernisation programme since Victorian times, including getting High Speed 2 into construction, completing Crossrail, giving the green light to Crossrail 2 and for High Speed 3 between Leeds and Manchester, investing in new rolling stock and, following Sir Peter Hendy's review, delivering Network Rail's revised programme of over £38 billion expenditure.[6] Planning is also underway for the enhancements to be delivered in Control Period 6, starting in 2019.

Chapter 5 Airports and Ports sets out how the government will deliver a package of road and rail projects to support private sector investment in airport and port capacity. The government has now accepted the case for expansion of South East aviation capacity, and the shortlist of options at Heathrow and Gatwick. A decision on the preferred scheme will follow further work on air quality, noise mitigation, and community measures.

Chapter 6 Energy explains how the government is taking a new direction for energy policy which puts consumers first, delivers more competition, ensures enough energy to power the nation and pushes a decarbonisation agenda. This includes support for electricity generation through gas, new nuclear at Hinkley Point C, offshore wind and interconnectors. The government is also reforming support for energy efficiency and heat supply, and working to ensure that the potential of shale gas is explored in a safe, environmentally sound way, that maximises benefits to local areas.

Chapter 7 Communications sets out how the government is facilitating private sector rollout of improved broadband and mobile networks through targeted investment, legislative and regulatory reform and increasing the amount of spectrum available to mobile operators. The government will also deliver a 5G strategy in 2017, based on a National Infrastructure Commission assessment of how the UK can become a world leader in 5G.

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[6] Report from Sir Peter Hendy to the Secretary of State for Transport on the replanning of Network Rail's Investment Programme', Network Rail, November 2015.

Chapter 8 Flood Defence outlines how the government is better protecting more homes and businesses from flooding, including through the £2.3 billion 6-year capital programme which will deliver more than 1,500 schemes, as well as increased funding of £700 million for flood defences and resilience. To ensure the best possible plans are in place for flood prevention, the government is also conducting a National Flood Resilience Review.

Chapter 9 Water and Waste sets out economically regulated investment in the water sector, including construction of the Thames Tideway Tunnel, financed by an independent infrastructure provider using a government support package. In the waste sector the market is delivering sufficient capacity to meet the UK's existing EU landfill diversion targets. Future waste infrastructure requirements will become clearer in 2018 when current EU negotiations are expected to conclude.

Chapter 10 Science and Research outlines how the government is providing £5.9 billion to ensure UK researchers have access to world-class scientific infrastructure to enable them to be at the forefront of scientific discoveries and pioneering innovation. A network of Catapults will help provide businesses with technology, innovation capability and expertise they need to succeed.

Chapter 11 Housing and Regeneration sets out how the government is supporting large-scale housing supply and regeneration by: selling public sector land with capacity for 160,000 homes; legislating for a package of planning reforms to get the nation building; providing £2 billion of support to unlock large sites; and delivering new infrastructure such as road and rail links to deliver housing growth.

Chapter 12 Social Infrastructure provides further details on how the government has committed over £48.6 billion to major capital investment in new and existing schools, new hospitals and healthcare facilities and a programme of new prisons.

Chapter 13 Regional Infrastructure describes how the government is investing in nationally significant infrastructure to support regions across the UK. It outlines the devolution revolution currently underway including in London, the Northern Powerhouse, and the Midlands Engine.

Chapter 14 Improving Delivery and Performance explains in detail the action the government is taking to identify the right projects, improve the planning and consenting process, reduce infrastructure costs and build a more skilled and productive construction industry.

Chapter 15 Monitoring and Reporting Progress sets out how the government will continue to monitor progress against the NIDP using the insight provided to support ministers, the IPA, and other government bodies in ensuring that priority projects and programmes remain on track. Reporting will take place in 5 key areas:

- regular updates to the infrastructure Pipeline
- policy milestones to enable better infrastructure
- accelerating and improving delivery and performance
- priority project and programme milestones
- major projects in development

The IPA will provide annual updates on progress against the NIDP, starting in 2017.

Further information can be found on the IPA website at:
www.gov.uk/government/organisations/infrastructure-and-projects-authority

## Table ES.1: Key Budget 2016 announcements on infrastructure

Roads Investment Strategy 2 – The government is launching the process for setting the Second Roads Investment Strategy, to determine road investment plans for the period from 2020-21 to 2024-25.

Highways England Innovation Strategy – The government and Highways England will:

- carry-out trials of driverless cars on the Strategic Road Network by 2017
- launch a consultation on reducing regulatory barriers in summer 2016
- establish a £15 million 'connected corridor' from London to Dover to enable vehicles to communicate wirelessly with infrastructure
- trial truck-platooning on strategic roads
- start trials of comparative fuel price signs on the M5 between Bristol and Exeter by spring 2016

Northern Roads improvements – The government will accelerate the development of the Lofthouse and Simister Island junctions, capacity enhancement to the M1 at J35a-39 Rotherham to Wakefield, and begin upgrades to the M56 at J6-8 south of Manchester in this Parliament.

Accelerating improvements to the M62 – The government will provide an additional £161 million to Highways England to accelerate the delivery of 2 major projects to upgrade the M62 to a 4-lane smart motorway between J10-12 Warrington to Eccles and junction J20-25 Rochdale to Brighouse.

Northern Road Studies – The government will allocate £75 million to Highways England to further develop the case for a potential Trans-Pennine tunnel between Sheffield and Manchester, as well as options to enhance the A66, A69 and the north-west quadrant of the M60.

Large Major Transport Projects – The government will provide £151 million to fund new river crossings at both Lowestoft and Ipswich (subject to final business case approval), and is now inviting further bids for the £475 million Local Majors Fund announced at Autumn Statement and Spending Review 2015.

Pothole Action Fund – The government is setting out how the Pothole Action Fund will be allocated across England in 2016-17, with £50 million allowing local authorities to fill nearly a million potholes.

Midlands Roads – The government will carry out feasibility work on 4 major roads in the Midlands in this Parliament: upgrades to the M1 to provide a continuous smart motorway from London to Yorkshire, improvements to the A46 Newark bypass junction with the A1, upgrading the single carriageway on the A45 Stanwick to Thrapston and upgrading the M42 and M5 around Birmingham to smart motorway.

Crossrail 2 – The government will provide £80 million which, together with a contribution from London, will allow Crossrail 2 to be fully developed with the aim of depositing a Hybrid Bill within this Parliament.

Northern Rail improvements – The government will take forward the recommendations from the National Infrastructure Commission and allocate £60 million to develop options for High Speed 3 between Leeds and Manchester, as well as options for improving other major city rail links. The government will also allocate a further £4 million to develop HS2 Growth Strategies for Manchester Piccadilly, Manchester Airport, and Leeds stations as part of an integrated long-term plan for HS3.

Shaw Review of Network Rail – The government welcomes the recommendations of the Shaw Review of Network Rail and will respond in full later this year.

NIC energy study – Following the National Infrastructure Commission's report Smart Power:

- the government will allocate at least £50 million for innovation in energy storage, demand-side response and other smart technologies over the next 5 years
- ofgem will consult on opening up £100 million of funding innovation competitions to better enable innovation by non-licensed companies from 2017
- the government has increased its ambition for greater electricity interconnection by 80%, now supporting at least an additional 9GW of interconnection

Small Modular Reactors – The government is launching the first stage of a competition to identify a small modular nuclear reactor (SMR) to be built in the UK, and will publish an SMR delivery roadmap later this year. It will also allocate at least £30 million of funding for R&D in advanced nuclear manufacturing.

Support for renewable electricity – The government will auction up to £730 million support for offshore wind and other less established renewable technologies this Parliament for projects generating electricity in 2021 to 2026. The first auction will offer £290 million.

Shale Wealth fund and Community Benefits – The government will consult later this year on the priorities and delivery models for the Shale Wealth Fund, and how it can be deployed in local communities and the North as a whole.

Broadband Investment Fund – The government will, in partnership with the private sector, establish a new Broadband Investment Fund. The fund will operate on a commercial basis to support the growth of alternative network developers by providing greater access to finance.

5G Study – The government has asked the National Infrastructure Commission to consider by the end of 2016 what the UK needs to do to become a world leader in 5G infrastructure deployment, and to ensure that the UK can take early advantage of the potential benefits of 5G services.

5G strategy and planning tool – The government will deliver a 5G strategy in 2017, based on the National Infrastructure Commission assessment of how the UK can become a world leader in 5G. The government will also support development of a network planning tool, to be trialled in Bournemouth.

Public Sector Spectrum – The government will make available 750MHz of valuable public sector spectrum in bands under 10GHz by 2022, of which 500MHz will be made available by 2020.

Mobile Communications Infrastructure – Following a call for evidence published alongside the Productivity Plan, the government will announce details of greater freedoms and flexibilities in England to support the deployment of mobile infrastructure.

Flood defence package – Flood defence and resilience funding will be increased by more than £700 million by 2020-21, funded by a 0.5% increase in the standard rate of Insurance Premium Tax. In addition to this, the government will spend a further £130 million on repairing transport infrastructure damaged by Storms Desmond and Eva.

Compound Semiconductor Catapult – The government will invest £50 million up to 2020-21 to establish a new Compound Semiconductor Applications Catapult in Wales.

Growth Corridors – The government has asked the National Infrastructure Commission to develop proposals for unlocking growth, housing and jobs in the Cambridge – Milton Keynes – Oxford corridor. The commission will produce a final report for Autumn Statement 2017.

Stations Regeneration – The Homes and Communities Agency will work in partnership with Network Rail and Local Authorities to bring forward land around stations for housing, commercial development and regeneration, and will announce proposals for specific sites shortly.

Local Authority Land – Local Authorities will collaborate with central government on a local government land ambition, working with their partners to release land with capacity for at least 160,000 homes. The government will continue to work with the sector to look for opportunities to go further.

Midlands Connect – Midlands Connect will be established as a statutory sub-national transport body with statutory duties by the end of 2018.

Financing London transport infrastructure via land value uplift – The government invites Transport for London to bring forward detailed proposals on how it could capture a proportion of future land value increases around proposed local infrastructure projects funded by the public sector, in order to provide a source of financing to support the construction of such projects.

Compulsory Purchase Order Reforms – The government will consult on a second wave of reforms with the objective of making the Compulsory Purchase Order process clearer, fairer and quicker.

Secretary of State planning decisions – The government will set statutory 3 month deadlines for Secretary of State decisions on called-in applications and recovered appeals to prevent time-delays on decisions on infrastructure, housing and regeneration projects.

Digital Standards in Construction – The government will develop the next digital standard for the construction sector – Building Information Modelling 3 – to save owners of built assets billions of pounds a year in unnecessary costs, and maintain the UK's global leadership in digital construction.

# Chapter 1: Laying the Foundations

1.1 The creation of the National Infrastructure Plan was a step-change in the government's approach to the planning and delivery of infrastructure, but it was only the start. During this Parliament, the government will lay the foundations for successful infrastructure planning, prioritisation and delivery, both over the next 5 years and for decades to come.

1.2 This means ensuring the right projects and programmes can be identified and prioritised, and the expertise and finance are in place to get them underway. To achieve this will require:

- establishing the right framework: to ensure the right projects are delivered well
- identifying the right priorities: determining the project and programme delivery milestones that the government should focus on
- getting the right finance in place: recognising that both public and private investment is required to deliver UK infrastructure

## Establishing the right framework

1.3 Getting the right framework in place means having organisations with a clear purpose and clear responsibilities that can work together to plan the development of UK infrastructure. To support this, the government has set up 2 new bodies – the Infrastructure and Projects Authority and an independent National Infrastructure Commission – to ensure the right infrastructure projects are identified and delivered successfully.

1.4 These organisations are complementary and together will ensure a comprehensive approach to infrastructure planning across both the relatively short term (to 2020-21) and the very long term (to 2050), through the National Infrastructure Assessment.

### Infrastructure and Projects Authority

1.5 In January 2016, the government established the new Infrastructure and Projects Authority (IPA), led by Tony Meggs. The IPA brings together Infrastructure UK and the Major Projects Authority into a single organisation that will report to and carry the combined weight of HM Treasury and Cabinet Office ministers. It will have a renewed mandate to ensure timely and cost effective delivery of the government's infrastructure priorities alongside other major government projects and programmes.

1.6 The IPA will build on the capability established in the previous Parliament to track and report regularly on the progress of the government's infrastructure priorities including the commitment to invest £100 billion in infrastructure to 2020-21. It will also continue to

publish regular updates to the National Infrastructure Pipeline, alongside the Government Construction Pipeline.

1.7 To support delivery the IPA will maintain and develop the commercial and finance capability built under Infrastructure UK. It will continue to act as the government's centre of excellence for project finance and expert support. This includes the administration and delivery of the UK Guarantees Scheme and overseeing PF2 policy and delivery.

1.8 The IPA will also continue to lead and coordinate the government's collaborative efforts with industry to accelerate delivery and reduce infrastructure construction and whole life costs, getting more for less for the UK's consumers and taxpayers.

1.9 The new organisation is better placed to measure and improve the performance of major projects, to intervene earlier and more effectively through robust assurance processes and to ensure projects are set up to succeed with properly tested plans. It will continue to build and maintain the government's own project management profession and capability, for example through the successful Major Projects Leadership Academy.

## National Infrastructure Commission

1.10 The government has set up a National Infrastructure Commission, to produce a clear picture of the future infrastructure the country needs and provide expert, independent, analysis and advice on pressing infrastructure issues. The commission is currently operating in interim form under its chair Lord Adonis, and is already advising on the UK's most complex infrastructure challenges.

1.11 The commission has begun work on a National Infrastructure Assessment, which will establish the UK's infrastructure needs and put forward priorities for the next 30 years. It will set out an overarching, long-term vision and recommendations to which the government will be obliged to respond formally.

1.12 Alongside this, the commission has already completed detailed studies on 3 complex infrastructure challenges, making recommendations on the future of energy infrastructure, London transport and northern connectivity:

- Smart Power: recommends that interconnection, storage and demand flexibility could save consumers up to £8 billion a year by 2030[1]
- Transport for a World City: recommends that Crossrail 2 should be taken forward as a priority, with the aim of submitting a hybrid bill by autumn 2019[2]
- High Speed North: recommends the development of a long-term strategy for HS3, beginning with the Leeds-Manchester corridor, combined with more immediate action to improve the performance of key road and rail links in the north[3]

1.13 The government welcomes these ambitious and decisive proposals and the Chancellor announced at Budget 2016 initial plans for taking the commission's recommendations forward.

1.14 The commission will carry out 2 new studies on specific infrastructure priorities:

- an assessment of how the UK can become a world leader in 5G infrastructure deployment, and how to ensure that the UK can take early advantage of the potential benefits of 5G services

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1 Smart Power', National Infrastructure Commission', March 2016.

2 'Transport for a World City', National Infrastructure Commission, March 2016.

3 'High Speed North', National Infrastructure Commission, March 2016.

- proposals for unlocking growth, housing and jobs in the Cambridge – Milton Keynes – Oxford corridor

1.15 While the commission is responsible for articulating a long-term vision for infrastructure, the government will continue to determine which projects are delivered. However, the commission will hold the government to account for taking forward the plans that result from its work.

1.16 The government has now consulted on the structure, governance and operation of the commission and will set out a formal response in due course.

### The role of the National Infrastructure Delivery Plan

1.17 The National Infrastructure Plan (NIP) ensured the UK had an integrated strategy for how it would prioritise, finance and deliver critical projects and programmes in the key economic infrastructure sectors; transport, energy, communications, flood defence, water, waste, and science. Through successive updates the NIP developed, responding to feedback from investors and the supply chain, to become a more mature and effective plan for UK infrastructure, underpinned by the National Infrastructure Pipeline.

1.18 This new NIDP represents a further milestone. Reflecting a new approach to long-term infrastructure planning, with the creation of the commission, the NIDP is now a more focused plan for the 5 year period to 2020-21.

1.19 For the first time the NIDP brings together the government's plans for economic infrastructure with those to support delivery of housing and social infrastructure, as part of a commitment to invest over £100 billion in infrastructure by the end of the Parliament.

1.20 These economic infrastructure networks are vital to improving quality of life but also integral to the creation of new places to live and work alongside plans for major housing and regeneration schemes and social infrastructure.

1.21 The IPA will work to support the implementation of the NIDP and will publish interim progress reports on an annual basis. Future NIDP documents will also articulate and report on how the government is taking forward recommendations arising from the National Infrastructure Assessment, which the commission will produce once every 5 years.

## Identifying the right priorities

1.22 To support tracking and delivery of its strategic objectives, the NIDP sets out the government's priority infrastructure projects and programmes to 2020-21. A full list, including details of anticipated progress can be found in Chapter 15.

1.23 Priority investments are selected based on the following criteria:

- they are nationally significant and deliver substantial new or replacement infrastructure of enhanced quality, sustainability and capacity
- they have the potential to drive economic growth or unlock significant private investment
- they make a significant contribution to the government's strategic objectives

1.24 Given the expanded scope of the NIDP to include key social infrastructure, this refreshed list builds on the Top 40 priority investments and underlying key projects which were previously identified within the National Infrastructure Plan. The vast majority of the priorities remain consistent, but with more focus on specific milestones over the next 5 years.

1.25 Where projects or programmes have been removed from the list, it is either because:

- they have now been completed; this includes 5 major roads projects; 2 large local transport schemes; rail stations in Birmingham and Manchester; and, 2 communications programmes to rollout broadband and mobile services
- they no longer reflect current government policy; this refers primarily to energy investment programmes (carbon capture and storage, onshore wind and biomass) where the government is taking a new policy direction which puts consumers first, delivers more competition, ensures enough electricity generation to power the nation and pushes a decarbonisation agenda

1.26 Chapter 15 also outlines a number of priority projects in development. These are projects which are still at an early stage of development and for which further scoping work is required before construction can start – in many instances post 2020-21.

1.27 The government will continue to monitor and support delivery against its infrastructure priorities through the Major Infrastructure Tracking Unit within the IPA.

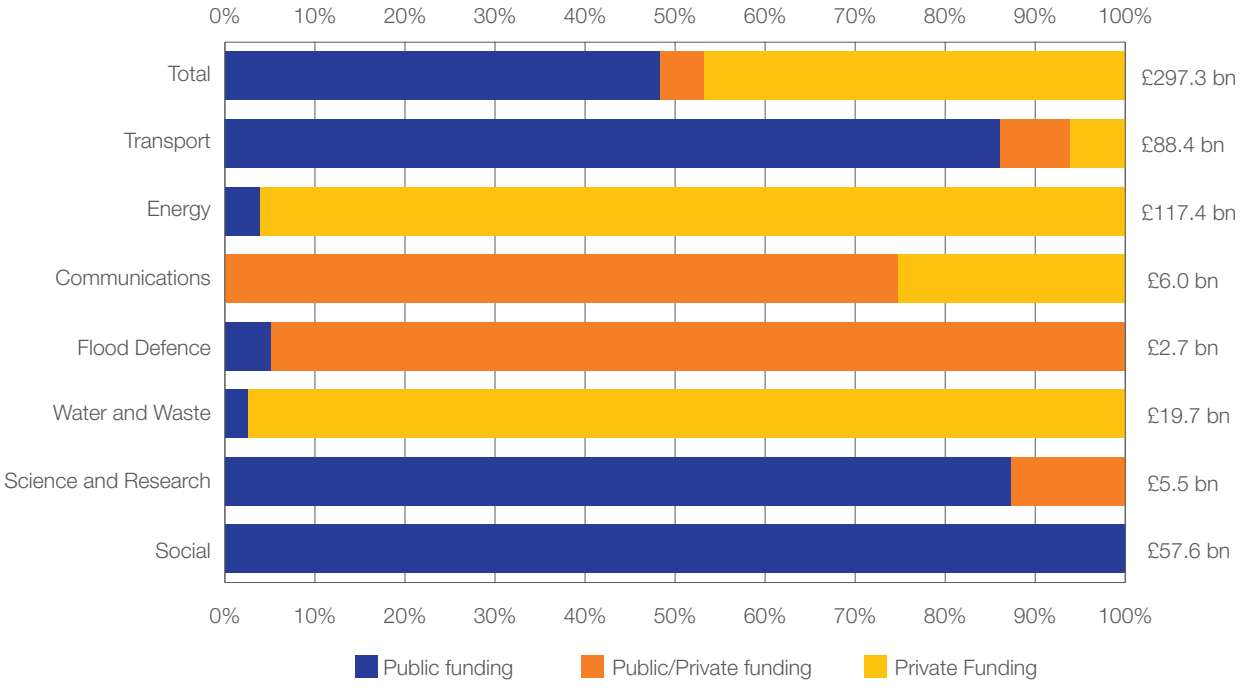
## Support for funding and finance

1.28 The UK has developed a mixed model approach to funding and finance, using both public and private sector investment to deliver infrastructure in the most efficient way possible. Infrastructure is ultimately paid for (funded) through consumer bills, user charging, public funds from taxation, or a combination of these mechanisms.

1.29 These sources provide revenues that will ultimately cover the costs for construction, operation and maintenance, but upfront capital investment (finance) is needed to get projects underway. This can also be provided either through public or private sources.

1.30 The funding source for each sector over this parliament is set out in Chart 1.A. below:

### Chart 1.A: Funding mix of National Infrastructure Pipeline[4]




Source: Infrastructure & Projects Authority, Major Infrastructure Tracking Unit

[4] Social includes public sector investment only. The proportion of public spend on economic infrastructure excluding public sector social funding is 36%.

1.31 Around 50% of the infrastructure Pipeline to 2020-21 will be financed and delivered by the private sector. With this in mind, the government will continue to engage with investors and will produce a dedicated infrastructure finance and investments document later in 2016.

1.32 The government seeks to create the right environment to encourage private investment in infrastructure and is supporting this in a number of ways, as outlined below.

## Economic regulation

1.33 Over 20% of the Pipeline by value will be financed and delivered by private companies through an established system of independent economic regulation covering; energy transmission and distribution; water; some communications; and some airports.

1.34 Although the precise regulatory mechanics in each sector vary, the extent of the investment undertaken by firms in these sectors is testament to the success of a world-leading regulatory framework that protects consumers, rewards efficiency and innovation, and gives confidence to investors – particularly long-term investors, such as pension funds.

1.35 This confidence is reflected in the ability of regulated firms to access both debt and equity at lower cost, a benefit that is in turn passed through to customers in the form of reduced bills. The credit rating agency, Moody's Investors Service, rates the Water Services Regulation Authority (Ofwat) and Office of Gas and Electricity Markets (Ofgem) price regulation regimes as amongst the most stable and predictable in the world, awarding the highest score (AAA) in their sector ratings.

1.36 The government and regulators continue to ensure regulated infrastructure networks remain an attractive place to invest. For example:

- both Ofwat and Ofgem have introduced new measures in their latest regulatory periods which incentivise regulated utilities to consider whole life expenditure (TOTEX) in their investment plans to minimise costs to consumers
- for energy networks, the length of regulatory settlements has increased to 8 years, with a mechanism for annual updates with movements in the cost of debt and to set allowances for major projects agreed during the price control period, removing the need to delay capital investments until the next price review period
- Ofwat and Ofgem have introduced new mechanisms to award 'enhanced' status (water) or 'fast-track' status (energy) to companies whose business plans are high-quality, ambitious, engaged with customers and well justified. Companies achieving this status are subject only to 'light touch' regulatory review, freeing them to focus on delivering their business plans
- offshore energy transmission assets are currently competitively tendered, but this is being extended to new, separable and high value onshore transmission assets. This would deliver better value for consumers, to reduce costs and drive innovation. Ofgem has committed to introducing competition from 2017, subject to the necessary arrangements being in place
- Ofgem will consult in spring 2016 on providing innovation spaces for experimentation, giving more regulatory certainty for innovative approaches and products to be trialled within the existing regulatory framework

## UK Guarantees Scheme

1.37 The UK Guarantees Scheme (UKGS) supports infrastructure projects to raise private investment in the market. It can provide up to £40 billion of guarantees in total to help finance projects. To date, guarantees have been approved for 10 projects with a capital value of around £23 billion. The government is extending the UKGS to March 2021 to continue to support private investment in projects for the duration of this Parliament.

## Private Finance 2 (PF2)

1.38 PF2 reaffirms the government's commitment to the use of private finance to deliver public sector assets and infrastructure. 4 PF2 batches of the Priority Schools Building Programme (PSBP) have reached financial close, with a further batch yet to come and 39 new schools in construction. The £340 million PF2 Midland Metropolitan Hospital has also reached financial close and is due to be opened to patients in 2018. These projects have demonstrated that PF2 is an attractive contracting approach for both the public and private sectors.

1.39 The IPA is working with HM Treasury and other departments to identify a Pipeline of public sector projects which could be delivered via PF2.

## Encouraging institutional investment

1.40 The European Investment Bank (EIB) continues to be a significant source of finance for UK infrastructure projects. The EIB increased lending to the UK in 2015 to €7.7 billion of which two thirds (€5.5 billion) was provided to infrastructure.

1.41 In 2015, the EU also established a new €21 billion European Fund for Strategic Investment (EFSI) aimed at mobilising €315 billion of infrastructure investment across Europe. The UK has been the second largest recipient of funds allocated to date, supporting projects including smart meters and offshore wind. The government is continuing to work to ensure UK projects are well placed to access funding from the EIB and EFSI, including through a cooperation agreement with the EIB signed in July 2015.

1.42 The Pensions Infrastructure Platform (PiP) helps to make infrastructure investment more accessible to UK pension schemes. HM Treasury assumed an advisory role in helping the National Association of Pension Funds and the Pension Protection Fund to set up the PiP, which has £2 billion investment target. PiP now has 3 established funds, including the recently launched multi-strategy infrastructure fund, a combined investment of over £1 billion.

1.43 To date local government pension schemes have not invested significantly in infrastructure, despite having total assets of over £190 billion. The government has published guidance for pooling Local Government Pension Scheme Fund assets into British Wealth Funds, containing at least £25 billion of scheme assets each.[5] The government has now received ambitious initial proposals to establish a small number of British Wealth Funds across the country. These will deliver annual savings of at least £200 to 300 million, and the government will work with authorities to establish a new local government pension scheme platform to boost infrastructure investment.

1.44 The Insurers' Infrastructure Investment Forum was set up to give members of the Association of British Insurers a direct communication link to the government, with a view to maximising opportunities to invest in UK infrastructure. In 2013, as a result of the new certainty over Solvency II, 6 insurers (Aviva, Friends Life, Legal & General, Standard Life, Scottish Widows, and Prudential) committed to work alongside partners with the aim of delivering £25 billion of investment in UK infrastructure over 5 years.[6] To date they have already invested over £5 billion in infrastructure projects with a £200 million investment in new rolling stock for the Govia Thameslink Railway in 2016.

[5] 'Local Government Pension Scheme: Investment Reform Criteria and Guidance', Department for Communities and Local Government, November 2015.

[6] 'The UK insurance growth action plan', HM Treasury, December 2013.

# Chapter 2: Infrastructure Pipeline

## Pipeline overview

2.1 The Infrastructure Pipeline is a comprehensive forward-looking assessment of the planned investment in UK economic infrastructure across both the public and private sectors. It contains over 600 projects and programmes with a combined value of £425 billion excluding social infrastructure.

2.2 The Pipeline gives an overview of what, when and where infrastructure will be built, which in turn provides:

- certainty to the construction supply chain to support capacity planning
- visibility of potential finance opportunities for investors
- transparency for the wider business community and general public about how the infrastructure they rely on is being maintained and improved
- a strong evidence base to inform analysis of future skills demand, inflationary drivers and investment profiles in sectors and regions

2.3 It includes economic infrastructure projects and programmes of over £50 million across the transport, energy, communications, flood defence, water, waste and science and research sectors, set out in Table 2.A below.

### Table 2.A: Infrastructure Pipeline, by sector, 2016-17 onwards[1]

| Sectors | Projects (number) | Programmes (number) | Pipeline Value (£ billion) |
|---|---|---|---|
| Communications | 2 | 4 | 6.0 |
| Energy | 109 | 58 | 255.7 |
| Flood | 6 | 23 | 4.1 |
| Science and Research | 25 | 7 | 5.5 |
| Transport | 166 | 163 | 134.5 |
| Waste | 10 | 0 | 0.5 |
| Water | 1 | 28 | 19.3 |
| ***Total*** | ***319*** | ***283*** | ***425.6*** |

Source: Infrastructure & Projects Authority, Major Infrastructure Tracking Unit

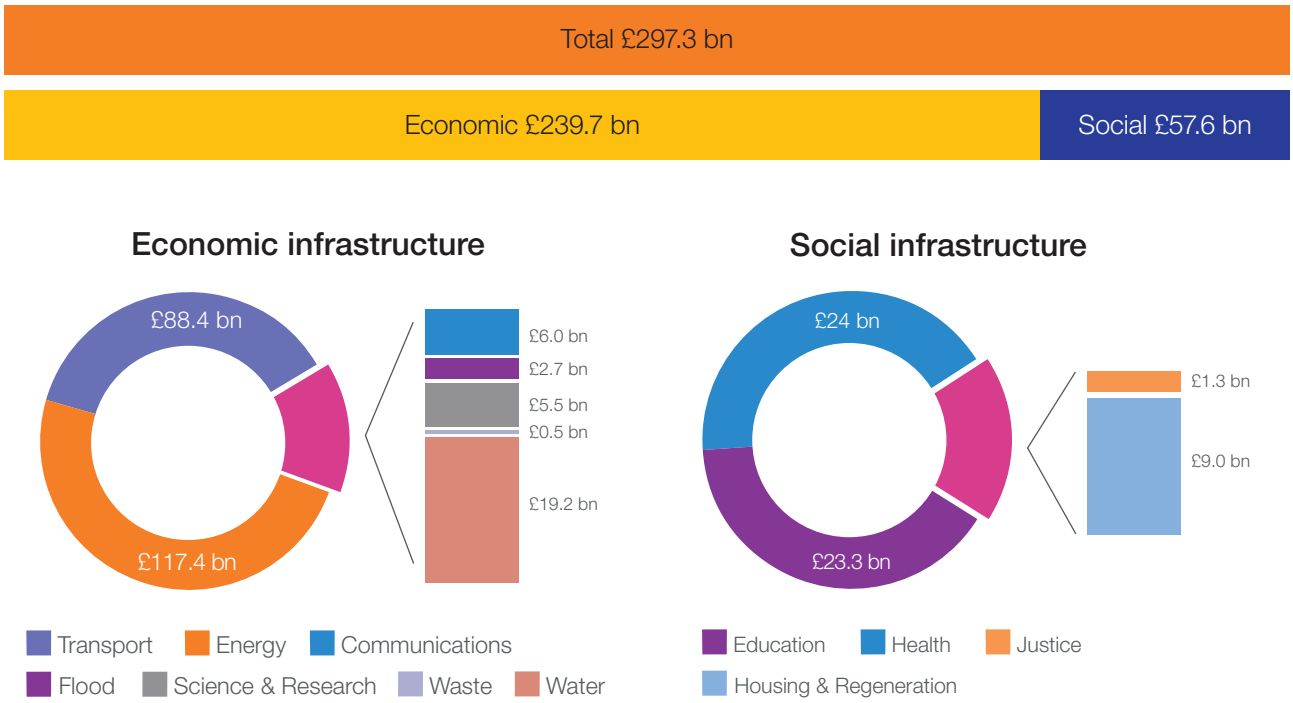
[1] The Pipeline includes individual projects over £50 million and rolls-up investments of less than £50 million into programmes

2.4 Reflecting the government commitment to invest over £100 billion in infrastructure to 2020-21, the NIDP details spending plans for both economic and social infrastructure in the period to 2020-21 with a combined value of £297 billion, around £59 billion per year on average.

2.5 The total includes £58 billion of social infrastructure providing for the first time an overview of key investments across housing and regeneration, education, health and justice.[2] [3] (see Chart 2.A below). The average annual investment excluding social infrastructure is around £48 billion.

### Chart 2.A: Overview of economic and social infrastructure spend to 2020-21

Total Pipeline values




## Changes to the Pipeline

2.6 This updated pipeline of £425 billion from 2016-17 onwards compares with the July 2015 Pipeline of £411 billion from 2015-16 onwards. Following Spending Review 2015, all of the central government-funded investment in this update now represents a firm and specific commitment.

2.7 Coverage of economic infrastructure spend is increasingly comprehensive and now includes: projected figures for expenditure on rail Control Period 6 to 2020-21; rail rolling stock where trains are directly purchased by the government; and £5.9 billion of Science and Research Capital Expenditure to 2020-21 and full science and research capital expenditure to 2020-21.[4]

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[2] Social infrastructure investments are set out separately in Chapters 11 and 12 and further details are set out in the Government Construction Pipeline.

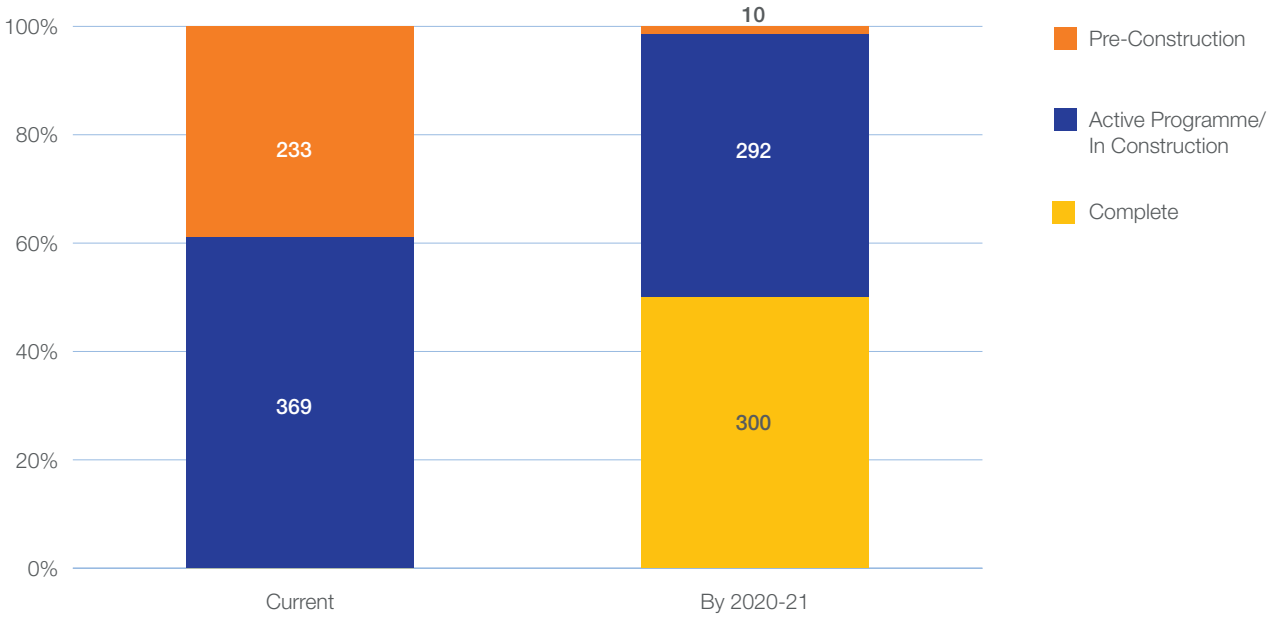
[3] Number of projects and programmes only includes economic, whereas value contains social and economic.

[4] Around £50 billion of spend relating to the financial year 2015-16 is excluded as the Pipeline figures used in this document refer to expenditure from 2016-17 onwards.

## Status of projects

2.8 Chart 2.B shows the current status of projects and programmes within the Pipeline and the projected status by the end of 2020-21.

### Chart 2.B: Project Status, current and projected




Source: : Infrastructure & Projects Authority, Major Infrastructure Tracking Unit.

2.9 50% of current projects and programmes are expected to be complete by 2020-21.[5] However, the Pipeline always reflects the latest investment plan data available and as it develops through this Parliament new projects and programmes will be added.

2.10 Further details on the Pipeline can be found at www.gov.uk/government/collections/national-infrastructure-plan

## Development of the Pipeline

2.11 Through the Major Infrastructure Tracking unit in IPA, the government will publish regular updates of the infrastructure Pipeline throughout the Parliament, reporting against:

- the investment levels set out in the Pipeline
- project statuses and specific milestones (including more focus on outcome metrics)

2.12 The Pipeline will continue to be refined to add detail to ensure it remains a useful tool for stakeholders. Activity to support this will include:

- providing improved detail on the financing of projects to support investors with a specific finance and investments update planned for later in 2016
- stronger engagement with industry to build understanding of forthcoming opportunities
- further analysis of future skills demand, inflationary drivers and investment profiles in sectors and regions
- working with key organisations in the regions to promote the development of regional pipelines

[5] This is indicative of current plans. Some projects may be subject to finalisation of statutory process. Final decisions on private-sector projects will be taken by the project developer.

# ROADS

## Progress by the end of 2020-21...

Over 100 major roads projects either completed or in construction…

...including work to add over 1,300 lane miles and improve over 60 problem junctions…

...and work to unblock the most notorious traffic hotspots including on the A14, A1 and A303

Ambitious plans for Roads Period 2 (2020-2025), which could include the A1 East of England, Oxford to Cambridge Expressway and Trans-Pennine schemes following strategic studies

...to be supported by a new Roads Fund, using revenues from Vehicle Excise Duty

## Infrastructure Pipeline to 2020-21: £12.6bn

# Chapter 3: Roads

## Sector overview

3.1 Roads are fundamental to modern society. They keep people connected, making it possible to travel for work and leisure. The road network brings communities closer together, providing users with freedom and flexibility that is unrivalled by any other mode of transport. That is why roads are the backbone of the transport system, used for 90% of passenger journeys and almost 70% of freight – almost all journeys start or end on a road.[1]

3.2 The Strategic Road Network (SRN) of motorways and A roads is vital to businesses and the successful functioning of the economy. The SRN not only includes England's main freight arteries, but also helps to put more people within reach of a wider range of jobs. Despite only accounting for 2% of the network as a whole, the SRN is the most heavily used part, carrying over 4 million vehicles a day.[2]

3.3 A reliable and high-performing road network helps improve productivity, but over decades, the quality of the network has declined and congestion, noise and poor air quality have become problems at certain hotspots. Poor or missing links mean cities which are close together do less business with one another.

3.4 The government is committed to addressing these challenges by building a better network with smarter roads that use technology and modern road building techniques. In this way it can ensure the country has a road network that drives, instead of constrains, growth.

## Delivery strategy

3.5 The government established Highways England in 2015, to operate, maintain and improve England's motorways and major A roads – around 4,300 miles in length. In doing so it took a number of steps to ensure its investment is delivered efficiently and effectively, and represents best value for taxpayers. Ministers have established a clear regulatory framework for Highways England, setting up investment periods with legally-guaranteed funding levels. The first of these, Road Period 1, runs from 2015 to 2020.

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1 'National policy statement for national networks', Department for Transport, December 2014.

2 'Road Traffic Estimates: Great Britain', Department for Transport, December 2015.

3.6 Highways England is subject to a performance monitoring regime consisting of:

- Office of Road and Rail (ORR) the remit of which has been expanded to include monitoring the performance and efficiency of Highways England. The ORR published its first report into Highways England in December 2015, covering the 6 month period from April to September 2015. It also advises the government on the levels of funding and performance requirements for future road periods
- Transport Focus has been asked to ensure that the needs of road users are being heard and responded to. It has been tasked to replace the National Road User Satisfaction Survey and is currently developing proposals

3.7 The government is committed to delivering a step-change in investment in the SRN, and to introducing significant additional road capacity. It has committed £15.2 billion for Highways England to spend during Road Period 1, and the first year of Road Period 2, with annual funding on enhancements tripling to £3 billion per year by 2021 – the biggest investment in the SRN since the 1970s.

3.8 Highways England's focus will be to enhance, renew and transform the network during Road Period 1. As well as asset renewal and maintenance, more than 100 major road schemes will either be completed or start construction by the end of 2020-21. Highways England's Delivery Plan is available at: www.gov.uk/government/publications/highways-england-delivery-plan-2015-2020

3.9 Highways England has 8 objectives during Road Period 1:

- making the network safer: with a target of 40% reduction in the number of people killed or seriously injured on the SRN against the 2005-09 period by the end of 2020
- improving user satisfaction: by 31 March 2017, 90% of people responding to the National Road Users' Satisfaction Survey need to be either fairly or very satisfied
- supporting the smooth flow of traffic: minimise delay and inconvenience to road users and ensuring at least 97% of the SRN is available to road users and ensuring at least 85% of incidents are cleared within 1 hour
- encouraging economic growth by working to minimise delay on the SRN
- delivering better environmental outcomes
- helping cyclists, pedestrians and other vulnerable users of the SRN
- achieving real efficiency: delivering total capital savings of at least £1.2 billion by the end of the Road Period 1
- keeping the SRN in good condition; including an ambitious resurfacing programme

3.10 As part of the Highways England Innovation Strategy, the government and Highways England will also: carry-out trials of driverless cars on the SRN by 2017; establish a £15 million 'connected corridor' from London to Dover to enable vehicles to communicate wirelessly with infrastructure; trial truck-platooning on strategic roads and start trials of comparative fuel price signs on the M5 between Bristol and Exeter by spring 2016.

3.11 Local roads are a crucial element of the transport system and their maintenance and improvement is the responsibility of Local Authorities. To support this, the government is providing over £5 billion to 2020-21 for maintenance, including a £250 million pothole action fund.

# Priorities to 2020-21

## Key projects and programmes

3.12 The government is committed to increasing capacity on the SRN and throughout the course of this Parliament will start work to add 1,300 extra lane miles and improve over 60 problem junctions, to address existing bottlenecks, and transform regional connectivity across the UK. Key projects and programmes include:

- Smart Motorways: these support the economy and tackle congestion by providing much needed capacity and improving journey time reliability on the busiest motorways, opening up the hard shoulder and using new technology to keep traffic moving. This Parliament will see the opening of new Smart Motorway capacity around the country, including on the M1, M3, M6 and in Manchester as well as the start of a £650 million project on the M4 between Reading and London
- Road Period 1 Major Schemes: a number of high value schemes delivering new capacity, better connectivity and enhanced junctions, predominantly on key A roads. They include the A556 Knutsford to Bowdon, A5-M1 Link Road, A2 Bean and Ebbsfleet and the M1 Junction 19 improvement
- A14: up to £1.5 billion to upgrade the 21 mile stretch between Cambridge and Huntingdon. This is one of the busiest parts of the SRN linking the Midlands to East Anglia and the Port of Felixstowe, and has been a longstanding congestion hotspot. Through widening sections, improving junctions, creating a new Huntingdon Southern Bypass and de-trunking a large stretch of the old road, the scheme will provide benefits to both road users and local communities, keeping heavy through-traffic away from villages and relieving congestion on a critical route
- A1 (North): over £1 billion for a package of improvement and maintenance works. This includes completion of projects to create a motorway link from the North East to the rest of England and start of construction on both the dualling of the section north of Newcastle between Morpeth and Ellingham, and a widening scheme on the A1 Newcastle-Gateshead Western Bypass
- A303 / A30 / A358 Corridor: a long-term programme to transform this route into an Expressway extending to within 15 miles of Land's End. A £2 billion investment will see the start of construction of 3 major improvements including a tunnel of at least 1.8 miles at Stonehenge

## Policy milestones

3.13 The government will create a new Roads Fund by 2020-21, using revenues from Vehicle Excise Duty, to ensure continued high and stable long-term investment in the SRN.

3.14 It has also launched the process for setting the second Roads Investment Strategy, which will determine plans for the period from 2020-21 to 2024-25. Highways England will update their route strategies to assess needs and opportunities across the network and identify places where action is most needed. This will involve extensive engagement with cities and local areas, as well as Transport for the North and Midlands Connect.

## Projects in development

3.15 Lower Thames Crossing – A new crossing to reduce congestion at the Dartford Crossing and support economic growth. After careful assessment, Highways England has proposed connecting Junction 1 of the M2 to the M25 between junctions 29 and 30. This crosses under the River Thames just east of Gravesend and Tilbury. A consultation on routes north and south of the river is currently open ahead of a final decision.

3.16 Strategic Study Updates – In December 2014 the government announced a series of strategic studies looking at major gaps and challenges facing the network. These studies are due to report later this year, but early findings suggest these may form an important part of the next Road Investment Strategy. They are:

- Trans-Pennine Tunnel
- North Trans-Pennine (linking the A1 with the M6)
- Manchester North West Quadrant
- A1 East of England
- Oxford to Cambridge Expressway
- M25 South West Quadrant


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# RAIL

Progress by the end of 2020-21...

Major rail improvements delivered across the country including the Northern Hub, East-West Rail Phase 1 and electrification of the GWML to Cardiff

Construction started on HS2 Phase 1 from London to Birmingham

Crossrail in service and plans for Crossrail 2 underway

The new London Bridge Station opened and the Thameslink programme finished

Over 800 new carriages in operation through the Intercity Express Programme

## Infrastructure Pipeline to 2020-21: £46.2bn

# Chapter 4: Rail

## Sector overview

4.1 Every year, Britain's rail network enables millions of people to travel quickly and safely for work and leisure. Millions of tonnes of freight are also moved by rail, relieving road congestion and reducing carbon emissions.

4.2 But the rail network does more than transport passengers and goods. It brings people and businesses closer together, which creates new jobs, supports housing development, opens up new markets and stimulates economic growth. Overall, the railway network generates £10 billion for the UK economy each year.[1]

4.3 Railways have enjoyed strong and sustained growth during the last 2 decades. Passenger numbers have doubled and are currently rising at over 4% every year while the volume of rail freight has risen by 70%.[2] The UK has one of the fastest growing railways in Europe and the second most intensively used.[3] Demand for travel into and between urban areas, and to ports and airports, is set to increase further.

4.4 However, half of Europe's most congested rail infrastructure is now in the UK and parts of the network are full to capacity.[4] This makes it hard for people and business to move freely and isolates parts of the country.

4.5 A well-targeted programme of improvements such as the development of high speed rail and further electrification can address capacity issues and also help to re-balance the economy. Investing in the rail network also encourages inwards investment, signalling to international companies that Britain is 'open for business'.

## Delivery strategy

4.6 The government's vision is to provide world class train services that drive economic growth and exceed passenger expectations. To support this, it remains committed to carrying out the largest rail modernisation programme since Victorian times.

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1 'What is the contribution of rail to the UK economy?', Oxera, July 2014.

2 'Rail trends factsheet: 2014 to 2015', Department for Transport, December 2015.

3 Ibid.

4 'Report from Sir Peter Hendy to the Secretary of State for Transport on the replanning of Network Rail's Investment Programme', Nertwork Rail, November 2015.

4.7 Network Rail is the not-for-profit company which runs, maintains and improves Britain's rail infrastructure including track, signalling, bridges, tunnels, level crossings and many key stations. In September 2014, Network Rail was reclassified as a public sector body meaning it is now accountable to Parliament for its activities and finances.

4.8 Network Rail is funded through a mix of public and private investment and its income comes from 3 different sources: direct grants from government; track access charges paid by Train Operating Companies and freight companies; and commercial property. Previously Network Rail issued government-backed bonds to raise debt finance to fund its capital expenditure, but after reclassification it now borrows direct from the government.

4.9 Network Rail is regulated by the Office of Rail and Road (ORR), which is responsible for ensuring passengers are provided with a punctual, reliable service and enhancement projects are delivered as promised and at the price agreed.

4.10 Network Rail will now spend more than £38 billion in the 5 years to 2019 as part of regulatory Control Period 5, with over £15 billion on enhancements. The government appointed Sir Peter Hendy as Chairman of Network Rail and asked him to review the enhancement programme, with the benefit of a better understanding of cost and delivery challenges, to ensure the most efficient and effective plan is executed and maximum value is derived for passengers, freight users and taxpayers.

4.11 The conclusion of the review is that the vast majority of programmes and projects will go ahead for delivery by 2019. The government is minded to accept his report subject to the outcome of the current consultation. The remaining projects will still be delivered after 2019. The full Network Rail revised Control Period 5 Delivery Plan is available at: www.networkrail.co.uk/Hendy-review/

4.12 To fund the revised programme, the government will allow Network Rail to raise around £1.8 billion through non-core asset sales, subject to a value for money assessment. This includes options for the sale of property (for example railway arches), and non-core rail assets such as depots. The government has also agreed to increase Network Rail's borrowing limit by £700 million.

4.13 Train Operating Companies run rail passenger services, leasing and managing stations from Network Rail on a franchise basis. The Department for Transport is responsible for designing and procuring new and replacement rail franchise services.

4.14 The government will soon launch a £1.2 billion boost to rail services with the new Northern and TransPennine Express franchises beginning 1 April. This will provide 500 brand new carriages, room for 40,000 more passengers, 2,000 extra services a week and lead to the phasing out of Pacer trains. The full franchise schedule is available at: www.gov.uk/government/publications/rail-franchise-schedule

4.15 Despite the ongoing improvements to the rail network, some parts are full to capacity. The government is therefore committed to investing £55.7 billion to build High Speed 2 (HS2); a new high speed rail line from London to Birmingham, Manchester and Leeds (with stations in the East Midlands, Sheffield and Crewe). Investing in HS2 will help free up transport networks and bring our country closer together.

4.16 As well as Network Rail delivering extra infrastructure capacity, train operators are building new trains to boost capacity and drive economic growth, supporting ever-increasing passenger numbers. Rolling stock leasing companies (ROSCOs) own most of the coaches, locomotives and some of the freight wagons, which they lease to train operating and freight operating companies. ROSCOs have replaced many of the older trains that were being used at privatisation with modern vehicles.

4.17 The government may also procure rolling stock directly. The largest of these new orders is the Intercity Express Programme (IEP) valued at £5.7 billion which will see Virgin Trains, East Coast and Great Western Railway replace trains that are 40 years old.

4.18 The Rail Delivery Group, representing Britain's train operators and Network Rail, estimates that over the next 4 years more than 3,700 new carriages will be built, worth at least £9.3 billion and supporting 2,000 British jobs including at least 100 apprenticeships.[5]

4.19 To support its vision for a sustainable transport system, the government believes there is a need for an expanded network of Strategic Rail Freight Interchanges (SRFIs), to facilitate the transfer of freight from road to rail. SRFIs are commercial projects and new developments at Daventry and in North Leicestershire have recently been granted planning permission.

## Priorities to 2020-21

### Key projects and programmes

- HS2: the government's key strategic investment in the national transport network over the medium to long term will transform the capacity and connectivity of UK rail infrastructure. HS2 will link 8 of Britain's 10 largest cities, serving 1 in 5 of the UK population; it will also generate jobs and help to rebalance the economy between North and South. During construction, HS2 is anticipated to support up to 25,000 jobs and up to 2,000 apprenticeships.

[5] 'Rail passengers to benefit from £9.3bn boom in train building', Rail Delivery Group, November 2015.

- Crossrail: Europe's largest construction project, and one of the most ambitious infrastructure programmes ever undertaken in the UK, is now 70% complete. The new 118 kilometre line will increase London's rail capacity by 10%, linking its main employment areas from Heathrow in the West, to the City and Canary Wharf in the East, boosting the UK economy by billions of pounds. When services start in 2018, Crossrail will be renamed the Elizabeth Line, in honour of Her Majesty The Queen.
- Network Rail enhancement programme – designed to provide necessary extra capacity, more services and better journeys, Network Rail will deliver route improvements across the country, including electrification which remains a key part of the programme:
  - Great Western: a £2.8 billion electrification of the route from London to Cardiff and associated branch lines, upgrades to accommodate new and cascaded rolling stock and capacity improvements at Oxford and Bristol. Electrification to Swansea is being developed in CP5 for delivery in Control Period 6.
  - North of England: passengers will benefit from extra capacity into Liverpool, Manchester, Leeds and Sheffield, the new Ordsall Chord linking Manchester stations, replacement of old Pacer trains and continued Transpennine electrification works.
  - Midland Main Line: improvements mean the route to Kettering and Corby will be electrified by 2019, with ongoing development work to allow further electrification to Nottingham, Derby and Sheffield in Control Period 6.
  - East West Rail: completion of Phase 1 from Bicester to Oxford (in partnership with Chiltern Railways) with a new direct service from Oxford to London by December 2016. Phase 2 linking Oxford to Bedford and Milton Keynes is being developed and construction will start as soon as possible.
  - South West Main Line: peak capacity improvements including the re-opening of new platforms at London Waterloo to benefit commuters.
  - East Coast Main Line: station, signalling and track works to facilitate longer new Super Express Trains, with more opportunities to overtake slow services.
  - European Rail Traffic Management System: a long-term programme to replace traditional signals with in-cab systems, reducing maintenance costs, improving performance and enhancing safety. This Parliament will see deployment on the Thameslink core, Great Western and East Coast Main Lines.
- Thameslink: work continues to transform north-south travel through London on one of Europe's busiest stretches of railway. This means new track, rolling stock and more frequent services, major improvements to London Bridge and more stations outside of London connected to the route. With work scheduled to finish by the end of 2018, thousands of daily passengers will benefit from improved journeys.
- Intercity Express Programme: £5.7 billion programme to provide the new infrastructure and rolling stock needed to support growth and improvements on some of Britain's busiest intercity routes, replacing the current fleet on the Great Western and East Coast Main Lines with new electric and bi-mode trains.

## Policy milestones

4.20 Nicola Shaw, Chief Executive of High Speed 1, has now published the Shaw Report on the future structure and financing of Network Rail, including recommendations for greater devolution to the routes and the creation of a new, dedicated northern route.[6] The government welcomes the recommendations, and will respond in full later this year.

4.21 Reporting in November 2015, Dame Colette Bowe recommended a review into the ORR's role and responsibilities in respect of enhancements planning; an integrated governance for major and complex projects such as Crossrail; and the Department for Transport resetting the formal framework of rail enhancements planning, implementation and oversight.[7]

4.22 The Secretary of State accepted the Bowe Report recommendations and the government consulted on the ORR's role and remit. The consultation showed strong support for the continuation of its role as an independent economic and safety regulator. It also identified a small number of areas for government actions to support a strong, independent ORR, on which the government will work with the ORR as part of wider reforms. The Department for Transport is also aligning its resources to monitor Network Rail's enhancement programme more effectively.

4.23 Planning is underway for enhancements that will be delivered in Control Period 6. As part of this, the government is considering how the recommendations made in the Shaw Report on long term enhancements planning can be implemented.

## Projects in development

4.24 The government is giving the green light to High Speed 3 between Leeds and Manchester, committing to reduce journey times to around 30 minutes. £60 million will be provided to develop plans for both the Leeds-Manchester route by 2017 and to improve transport connections between cities of the North.

4.25 The National Infrastructure Commission has recommended that Crossrail 2 is the priority transport investment required to meet the needs of the capital over the decades to come and that Transport for London (TfL) should urgently undertake the work necessary to update the business case. It advises the project will simultaneously relieve the worst congestion on the London transport network and unlock the potential for hundreds of thousands of new homes.

4.26 The government fully accepts the commission's recommendation and is giving the green light for Crossrail 2 to proceed to the next stage. The government will therefore provide a contribution of £80 million to fund the development of Crossrail 2, and asks TfL to match that contribution to ensure that the project can be fully developed with the aim of depositing a Hybrid Bill within this Parliament.

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6 'Shaw report: the future shape and financing of Network Rail', Department for Transport, March 2016.

7 'Bowe review into the planning of Network Rail's enhancements programme, 2014 to 2019', Department for Transport, November 2015.

# AIRPORTS AND PORTS

Progress by the end of 2020-21...

A decision on a preferred new runway in the South East and preparation of a new Airports National Policy Statement

New airport infrastructure at Manchester, Luton, Heathrow and Gatwick...

... and new port capacity in Liverpool, London and Hull

Improved rail access to Manchester, Gatwick and Heathrow

A dozen road projects to support access to ports and airports either complete or in construction

## Infrastructure Pipeline to 2020-21: £5.4bn

# Chapter 5: Airports and Ports

## Sector overview

5.1 The UK has always been an outward-looking nation – an island economy that for centuries has owed its prosperity to its links with the rest of the world. With the increasing globalisation of its economy and society, the future of the UK will undoubtedly continue to be shaped by the effectiveness of its international transport networks.

5.2 Airports and ports are the gateways providing the international connections the UK needs to grow and prosper. They facilitate the movement of goods, people and ideas around the world, to support trade and investment and allow knowledge and innovation to be shared. They also provide social benefits, enabling UK citizens to visit family and friends overseas, experience different cultures or simply enjoy a well-earned holiday.

5.3 Airports and ports also play a very important role across the UK, providing vital domestic and international connections, and making a significant contribution to the growth of regional economies.

5.4 The UK has the third largest aviation network in the world, after the USA and China.[1] However, there is a capacity and connectivity challenge, particularly in the South East. It is because of this that the government accepted the case for expansion of airport capacity in the region. In the shorter term, a key priority is to make better use of existing runway capacity at all UK airports.

5.5 The UK also has world leading ports. Maritime transport is essential to international trade as it facilitates the shipment of large volumes of goods at comparatively low transport costs. This has resulted in a rapid rise in world seaborne trade in recent decades. The provision of sufficient port capacity and the ability to handle the largest and deepest vessels in the world will remain an essential element in ensuring exports are increased and shops are filled with products.

## Delivery strategy

### Airports

5.6 Aviation in the UK is largely privatised and operates in a competitive international market. The government's objectives are to:

- ensure that the UK's air links continue to make it one of the best connected countries in the world

[1] 'Aviation policy framework', Department for Transport, March 2013.

- ensure the aviation sector makes a significant and cost-effective contribution towards reducing global emissions
- to limit, and where possible reduce, the number of people in the UK significantly affected by aircraft noise

5.7 The government supports competition as an effective way to meet the interests of passengers and other users. It also welcomes the significant levels of private sector investment in airport infrastructure and establishment of new routes to developed and emerging markets.

5.8 Airports with substantial market power are regulated by the Civil Aviation Authority (CAA). In practice this means that the CAA licences both Heathrow and Gatwick. In addition, it also manages the NATS licence which the government awarded to NATS for the provision of the UK's en-route air traffic services in 2001.

5.9 As well as accepting the case for expansion in the South-East, the government has also decided that it agrees with the Airports Commission's shortlist of options at Heathrow and Gatwick, and that the appropriate mechanism for delivering planning consents is through an Airports National Policy Statement (NPS). The government is already preparing the building blocks for this NPS.

5.10 The decision on the location for additional airport capacity is of huge importance. Given this, the government is further considering the environmental impacts, including air quality, noise and carbon, and developing the best possible package of measures to mitigate the impacts of expansion on local communities and the environment. This further work will conclude by the summer. The Airports Commission advised that additional capacity was required in the South-East by 2030 and the government intends to meet this timetable.

5.11 Smaller airports are vital for local economies, opening up opportunities and connecting the UK. The government is backing new regional routes to drive investment and benefit people across the country. 11 new routes (including from Carlisle, Dundee, Derry, Newquay, Norwich, Oxford, and Southampton) are supported by £7 million from the Regional Air Connectivity Fund. It is now for airlines to take these routes forward in 2016.

5.12 The government is working to ensure that there are sufficient and effective connections to airports to handle current and future capacity requirements and through Highways England and Network Rail is bringing forward a number of road and rail projects to improve surface access.

5.13 The general position for airports, as set out in the 2013 Aviation Policy Framework, is that developers should pay the costs of upgrading or enhancing road, rail or other transport networks or services where there is a need to cope with additional passengers travelling to and from expanded or growing airports.[2] Where the scheme has a wider range of beneficiaries, the government will consider, along with other relevant stakeholders, the need for additional public funding on a case-by case basis.

## Ports

5.14 Approximately 95% of the UK's goods trade by weight and 75% of its value is handled by ports, which operate on a commercial basis.[3] Many of the largest are owned by the private sector, with privately owned ports accounting for 68% of total UK major port traffic, meaning development of capacity is driven by private investment.

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2 'Aviation policy framework', Department for Transport, March 2013.

3 'National policy statement for ports', Department for Transport, February 2012.

5.15 The government seeks to encourage sustainable port development that will cater for long-term growth in import and export trade volumes by sea and continue to support domestic freight movements. Its role is to facilitate a competitive and efficient port industry which is cost effective and operates in a timely manner, and which will contribute to long-term economic growth and prosperity.

5.16 With two thirds of all freight being carried on the Strategic Road Network, effective road links to ports are vital to allow goods and services to be moved into and around the country efficiently and reliably.[4] The first Road Investment Strategy set out a number of projects for delivery and development during this Parliament that will improve port access. A study to assess how best to manage 'last mile' road access to international gateways is currently underway and will inform development of the second Road Investment Strategy.

## Priorities to 2020-21

### Key projects and programmes

- Airport Capacity Investment – substantial investment is underway at airports around the UK including a £1 billion investment programme at Manchester Airport and over £4 billion at Heathrow and Gatwick as part of their regulatory commitments
- Port Capacity Investment – there is also significant investment activity at ports including the new Liverpool 2 deep-sea container berths, construction of a third berth at London Gateway, a major acquisition of land that will allow expansion at the Port of Tilbury, ongoing improvements at Teesport, as well as the Dover Western Docks Revival scheme and the development of the Green Port Hull project
- Surface Access Improvements – to ensure that airports and ports are better integrated into the wider transport network. This includes road and rail measures:
  - A6 Relief Road to Manchester Airport
  - M42 Junction 6 supporting access Birmingham Airport and also HS2
  - M23 Junctions 8 to 10 Smart Motorway which serves Gatwick Airport
  - Gatwick Airport rail station will also see significant improvements and new £145 million trains with 108 carriages to specifically cater for airport traffic
  - A5036 to the Port of Liverpool
  - A14 Cambridge to Huntingdon – to improve access to the Port of Felixstowe
  - A160 / A180 Port of Immingham Improvement
  - A63 Castle Street to the Port of Hull

5.17 The government is also providing up to £250 million for a major new permanent lorry park to increase resilience in Kent, by taking pressure off the roads in the event of Operation Stack and reducing disruption to local people and the economy.

### Projects in development

5.18 Network Rail is continuing to develop the Western Rail Link to Heathrow scheme, and will seek planning powers during CP5 (2014-2019), to enable construction to begin early in CP6 (2019-2024). Funding for construction of the scheme is subject to a satisfactory business case and the agreement of acceptable terms with the Heathrow aviation industry.

[4] 'Road Traffic Estimates: Great Britain', Department for Transport, December 2015.

# ENERGY

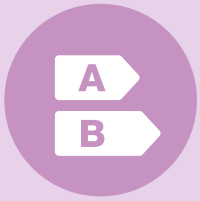
Progress by the end of 2020-21...

Construction started on Hinkley Point C – the first new nuclear power station in a generation

Major gas, biomass and offshore wind projects completed to provide at least 5GW of new capacity

New interconnectors built to Norway, France and Belgium

Smart meters installed in more than 50 million homes and businesses around the UK




More than 1 million homes helped to cut carbon emissions through the new energy efficiency measures

## Infrastructure Pipeline to 2020-21: £117.4bn

# Chapter 6: Energy

## Sector overview

6.1 A modern society and economy are built on energy infrastructure. Our homes and businesses could not function without the power stations, electricity and gas networks which allow us to stay warm, keep the lights on and support day to day activity.

6.2 Today a reliable energy supply is almost taken for granted. However, much of the existing infrastructure which has served us well is now old, inefficient and in need of replacement – particularly our thermal electricity generation capacity.

6.3 The electricity grid is resilient and the right mechanisms are in place to manage tight margins in the short term as it undergoes this transition – security of supply remains the first priority. However, a system of affordable, clean energy infrastructure is required to safeguard future economic security. Modernisation is also needed to take advantage of digital technology – developing smart grids that are much more responsive and can deliver cleaner energy more flexibly and higher energy savings.

6.4 This means creating an environment for business to invest in clean and secure energy, but crucially so in a way that is affordable, for UK households and businesses.

## Delivery strategy

6.5 The UK operates a liberalised energy market, in which the private sector finances and delivers most infrastructure, funded by consumer bills and supported by levies.

6.6 The Ofgem regulates the companies which run the gas and electricity networks. It takes decisions on price controls and enforcement, acting to protect the interests of existing and future energy consumers and helping industry to achieve environmental improvements.

6.7 However, this takes place in the context of government action to encourage appropriate investment. The government is taking a new direction for energy policy which puts consumers first, delivers more competition, ensures enough energy to power the nation and pushes our decarbonisation agenda.

### Electricity

6.8 To ensure security of electricity supply, the government has introduced the Capacity Market, with payments to providers (both demand reduction and interconnectors, as well as generators) in return for a commitment to maintain system reliability when needed. After successful auctions in 2014 and 2015, the government recently reviewed the

Capacity Market to ensure it continues to provide the capacity needed in a cost-effective way for industry and consumers alike. The government is consulting on detailed changes ahead of the 2016 auction, together with a new proposal to bring forward the Capacity Market by 1 year, with a separate auction in January 2017 for delivery in 2017-18.

6.9 Electricity interconnection is the physical linking of transmission systems across borders, allowing trade in electricity to take place. The UK currently has 4GW of capacity via interconnectors with other countries and the government recognises the important role they play to support energy security, affordability and decarbonisation objectives.

6.10 Following the National Infrastructure Commission's report on Smart Power, the government will lay the foundations for a smart power revolution, which the commission estimates could unlock benefits to UK consumers of up to £8 billion per year.

- allocating at least £50 million for innovation in energy storage, demand-side response and other smart technologies over the next 5 years
- Ofgem will consult on opening up £100 million of funding innovation competitions to better enable innovation by non-licensed companies from 2017
- the government has increased its ambition for greater electricity interconnection, now supporting market delivery of at least 9GW of additional capacity

6.11 The government uses a range of policy mechanisms to support the transition to an affordable, clean energy system, this includes:

- Renewables Obligation (RO), which requires UK electricity suppliers to source an increasing proportion of electricity from renewable sources. The RO will close to all new generating capacity of any technology on 31 March 2017
- Contracts for Difference (CfDs), are long-term, legally-binding agreements that stabilise prices for low-carbon plant (including nuclear). They provide generators with protection from wholesale electricity price fluctuations and give more certainty about future revenues, reducing risk and helping to lower the cost of capital. CfDs protect consumers from high bills through competition and clawing back money from generators if the market price rises above a set level called the strike price. For the majority of contracts, support is auctioned to ensure consumers get the most generation for the lowest price
- Feed in Tariffs (FITs), which are designed to promote the uptake of a range of small-scale renewable and low-carbon electricity generation technologies. FITs require suppliers to make tariff payments on both generation and export of low carbon electricity. The scheme now supports over 850,000 installations with a total of 4.7 GW of renewable electricity generating capacity across all supported technologies

6.12 The Levy Control Framework (LCF) places limits on the aggregate amount levied from consumers by energy suppliers to implement government policy to support clean electricity generation. In effect, it specifies the maximum annual expected spending on levy-funded policies and allows the costs added to energy consumer bills to be monitored and for government to take steps to limit costs.

6.13 On 18 June 2015, the government announced it will end new public subsidies for onshore wind by closing the RO to new schemes from 1 April 2016, 1 year earlier than planned. A grace period is proposed for projects meeting certain planning, grid and land ownership criteria, or affected by a hiatus in finance agreements while the legislation goes through Parliament.

6.14 Following a review, the government has decided to keep the FITs scheme open until 2019, but with cost control measures in place. The government believes that new tariffs that provide appropriate rates of return within a capped budget will allow deployment to come forward while providing significantly better value for money to bill payers.

## Tackling climate change

6.15 The UK has a legally-binding goal of reduce emissions by at least 80% by 2050, against 1990 levels.[1] To ensure regular progress towards this long-term target, the Climate Change Act established a system of 5-yearly carbon budgets. The government will propose draft legislation for the fifth budget (2028 to 2032) by the end of June 2016.

6.16 The government has also announced its aim to phase out unabated coal by 2025, subject to new gas plant coming forward, which would significantly reduce $CO_2$ emissions. Currently, coal contributes just under a fifth of electricity generation in the UK.[2]

## Energy efficiency

6.17 The best way to cut bills and carbon emissions is to reduce energy use. The government is committed to ensuring households see lower bills via its support for low-cost measures on energy efficiency, with the goal of insulating a million more homes over the next 5 years. From 2017 it will introduce a new cheaper domestic energy efficiency supplier obligation which will run for 5 years.

6.18 Smart meters will help put households and businesses in control of their energy use and drive energy saving behaviour. They will also lever industry efficiencies, provide energy networks better information to manage and plan activities and be a critical part of the platform for smart grids and demand side response to support sustainable energy supply.

6.19 The government has also allocated £295 million to invest in energy efficiency measures in schools, hospitals and other local public services.

## Heat

6.20 The use of heat to keep warm in our homes and support industrial processes accounts for around 45% of energy consumption and a third of all carbon emissions.[3] Reforming how we energy is used for heating is critical to secure, affordable and clean energy for families and businesses.

6.21 The Renewable Heat Incentive is a government financial incentive to promote the use of renewable heat for both domestic and non-domestic purposes. The latter can include small and large businesses, hospitals, schools, and organisations with district heating schemes where one heating system serves multiple homes.

6.22 The government will more than double the support it gives to households and businesses in this Parliament to decarbonise their heating supply. Funding for the Renewable Heat Incentive will increase to £1.15 billion by 2020-21, but the scheme will be reformed to deliver better value for money and stronger cost control. The government is also providing over £300 million of investment support for up to 200 heat networks which will generate enough heat to support the equivalent of over 400,000 homes and leverage up to £2 billion of private and local capital investment.

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1 'Climate Change Act 2008', UK Parliament, November 2008.

2 'Energy Trends: electricity', Department of Energy and Climate Change, December 2015.

3 'Energy Consumption in the UK', Department of Energy and Climate Change, 2015.

## Transmission and distribution

6.23 RIIO (Revenue=Incentives+ Innovation+Outputs) is Ofgem's performance-based framework for setting price controls for network companies. In the current Parliament and beyond, they face an unprecedented investment challenge to maintain a reliable, secure network, and deal with changes in demand and generation that will occur in a low carbon future. RIIO is designed to help ensure this is delivered at a fair price for consumers.

- RIIO-T1 sets out what transmission network companies are expected to deliver for energy consumers over 8 years from 2013 to 2021. Ofgem have approved up to £19.4 billion of spend for gas and electricity transmission networks over the period.
- RIIO-ED1 sets the outputs the 14 electricity Distribution Network Operators need to deliver for their consumers and the associated revenues they can collect for the 8 years from 2015 to 2023, and will deliver around £24 billion of spend over the period.
- RIIO-GD1 sets the outputs the 8 Gas Distribution Networks need to deliver for their consumers and the associated revenues they can collect for the 8 years from 2015 to 2021, and will deliver around £14.9 billion of spend over the period.

## Oil and gas

6.24 The government is committed to ensuring that the UK Continental Shelf attracts the right investment and has the right infrastructure in place to maximise economic recovery as the basin matures. It will work with the Oil and Gas Authority to ensure that value is maximised from existing infrastructure and critical hubs are protected. This includes developing regional development plans and improving third party access to infrastructure.

6.25 The government believes that shale gas has the potential to provide the UK with greater energy security, growth and jobs, and is working to understand the potential for shale gas by encouraging safe and environmentally sound exploration.

6.26 The UK has over 50 years of experience in regulating the onshore oil and gas industry.[4] A strong regime for exploration activity, will help to ensure site safety, prevent environmental contamination, mitigate seismic activity and minimise emissions.

6.27 The government is determined that local communities benefit from shale gas, and will consult later this year on the priorities and delivery models for the Shale Wealth Fund, and how it can be deployed in local communities and the North as a whole.

## Priorities to 2020-21

### Key projects and programmes

6.28 The government is supporting the market to deliver a diverse range of technologies to provide the new electricity generation capacity our energy system needs. This includes:

- new nuclear – a package of reforms and regulatory measures have removed barriers to investment, and 3 consortia – EDF and CGN, Horizon Nuclear Power, and NuGen – have set out proposals to develop 18GW at 6 sites. The most advanced project, Hinkley Point C, would be the first new nuclear plant in a generation and provide low carbon electricity to 6 million homes – 7% of the UK's needs
- gas – the gas used to heat our homes is amongst the cheapest and most secure in Europe. New plant are now coming forward, including the 880MW Carrington plant, which will enter commercial operation in 2016. Built using the latest natural gas combined cycle technology, it will be one of the UK's most efficient power stations
- offshore wind – following the signing of CfD and investment contracts, a number of large-scale new offshore wind projects are currently expected to come forward during this Parliament including; 402MW Dudgeon; 1,200MW Hornsea 1; 664MW Beatrice; 660MW Walney Extension; 258MW Burbo Bank Extension; 714MW East Anglia 1; and the 450MW Neart na Goithe project

6.29 Interconnectors – 5 projects have received initial regulatory approval, in addition to a 1GW pilot project, Nemo to Belgium. In total these will provide 6.7GW of new capacity by the early 2020s. Ofgem will open a second window for applications to its cap and floor regime later this month. The government will work with its international counterparts, developers and regulators to support further delivery.

6.30 Smart Meters – energy companies have now installed over 1.6 million smart meters in premises across Britain.[5] The programme will ultimately replace over 53 million gas and electricity meters by 2020, involving visits to over 30 million homes and small businesses.

6.31 Transmission & Distribution – major investment is required to accommodate new generation and replace ageing assets and maintain the reliability of the networks. Successful energising of the Beauly-Denny line in Scotland in late 2015, following the replacement of 220 kilometres of overhead power cables, marked completion of 1 of 3 key projects due to finish during this Parliament. The others are:

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4 'Guidance on fracking: developing shale oil and gas in the UK', Department of Energy and Climate Change, January 2016.

5 'Smart Meters, Great Britain, Quarterly report to end of September 2015', Department of Energy and Climate Change, December 2015.

- Western HVDC – which will bring renewable energy from Scotland to homes and businesses in England and Wales via a subsea cable
- London Power Tunnels – a new 32 kilometre electricity superhighway deep below the capital, helping to ensure safe and reliable electricity supplies

## Policy milestones

6.32 The government is committed to driving down the costs of decarbonisation. This includes setting out that support will be provided for up to 10GW of new offshore wind capacity in the 2020s, if costs fall. The government will auction CfDs of up to £730 million this Parliament for offshore wind and other less established renewables with a first auction of £290 million. Support for offshore wind will be capped initially at £105/MWh (in 2011-12 prices), falling to £85/MWh for projects commissioning by 2026.

## Projects in development

6.33 The UK could play a leading role in development of Small Modular Reactors (SMRs), which would help revolutionise the civil nuclear sector and contribute low carbon baseload electricity. The government has commenced the first stage of a competition to identify an SMR to be built in the UK, and will publish a delivery roadmap later this year.

6.34 Tidal lagoons have the potential to provide the UK with clean and secure energy, but more work needs to be done to determine if they represent value for money. Starting this spring, the government has commissioned a review to improve understanding of how tidal lagoons could contribute to the future energy mix cost effectively. The review will help establish an evidence base to ensure all decisions made regarding tidal lagoon energy are in the best interests of the UK.

# DIGITAL COMMUNICATIONS

Progress by the end of 2020-21...

Superfast broadband available to 95% of all UK premises…

…4G available to 98% of UK premises…

…and voice coverage available to 90% of UK geographic area (all by 2017)

500MHz of high value public spectrum released

A new 5G strategy published to ensure the UK can take early advantage of the potential benefits

## Infrastructure Pipeline to 2020-21: £6bn

# Chapter 7: Digital Communications

## Sector overview

7.1 Digital communications are now a crucial component of everyday life. Technologies such as mobile phones and broadband have revolutionised the way we work, socialise and enjoy our leisure time. Improvements in connectivity mean the UK is rapidly embracing a vibrant digital economy, currently worth around £120 billion a year.[1] Over 30% of UK premises have taken up superfast broadband and there are more than 23 million 4G subscriptions.[2]

7.2 Reliable and high quality fixed and mobile broadband connections support growth in productivity, efficiency and labour force participation across the whole economy. They enable new and more efficient business processes, open-up access to new markets and support more flexible working practices.

7.3 Faster broadband has already empowered many businesses. A recent report from the Federation of Small Businesses stated that 94% of small business owners consider a reliable internet connection critical to the success of their business. As many as 14% of small businesses consider lack of reliable and fast broadband connectivity to be their main barrier to growth.[3]

7.4 Demand for digital services and applications will continue to rise rapidly, with a consequent acceleration in the amount of data being carried over networks. Over the next decade we can expect the emergence of new services, applications and devices which will create additional demands on networks. To support this demand, the UK needs infrastructure that is high capacity, reliable, resilient, secure, affordable and fast.

## Delivery strategy

7.5 The government's role is to facilitate private investment, provide policy stability and support the market. It has created a favourable, competitive climate that encourages companies to develop innovative new services. The government's digital infrastructure strategy is based on helping the market deliver better broadband through competition.

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1 'Digital Sector Economic Estimates Statistical Release', Department for Culture, Media and Sport, January 2016.

2 'Facts and Figures', Ofcom, 2015.

3 'The fourth utility: Delivering universal broadband connectivity for small businesses across the UK', Federation of Small Businesses, July 2014.

7.6 Ofcom is the communications regulator in the UK and regulates fixed line and mobile telecommunications, plus the airwaves over which wireless devices operate. Ofcom is responsible for monitoring the competitive environment, and for ensuring that the regulatory regime remains appropriate as the market develops.

7.7 The government remains committed to ensuring that the benefits of better broadband are felt across the UK and has invested £790 million in the £1.7 billion rural broadband programme. By 2017, superfast coverage will have reached 95% of premises. Mobile network operators (MNOs) are expected to have achieved 4G coverage to 98% of UK premises. This has been achieved thanks to a balance of components: a competitive private market, a strong independent regulator and targeted government intervention.

7.8 In addition, the government allocated £10 million to market test innovative solutions for delivering superfast broadband services to the most difficult to reach areas of the UK. 7 market test pilots are now in deployment, and are generating evidence about the costs and challenges, with initial findings reported in February 2016.

7.9 The government has improved legislation to support the rollout of digital communications infrastructure. For example, in England changes to legislation now allow planning permission through permitted development rights for the installation of broadband street cabinets, telegraph poles and overhead lines, in any location other than Sites of Special Scientific Interest.

7.10 The government will work to provide greater freedoms and flexibilities for the deployment of mobile infrastructure, including reducing planning restrictions for existing telecoms infrastructure and allowing taller new ground based masts to be built.

7.11 The success of the superfast programme has shown what can be achieved when local authorities are engaged in facilitating the delivery of digital infrastructure. The government is calling on all local authorities to be supportive of: planning applications which will result in improved digital connectivity in their area; requests from infrastructure providers to use local government infrastructure, including street furniture; and sharing best practice in operating planning processes and street work management.

7.12 Competition has proved a powerful driver of innovation, faster services and improved customer experience. Ofcom has helped deliver competition in the broadband retail market. More than 95% of homes are able to receive telecoms services from BT exchanges which have been unbundled by other providers, who now have a significant share of the residential broadband market.[4] Without the right regulatory and competitive environment, this investment could not have occurred.

7.13 Significant investment is also taking place in developing ultrafast services. Virgin's network is already capable of providing ultrafast speeds of up to 300Mbps and the company is investing £3 billion to extend its network to a further 4 million homes over the next 5 years. BT is considering building more fibre to the premise (FTTP) broadband, and is carrying out trials of its G.Fast technology, which delivers ultrafast speeds over copper lines. BT has suggested it will use G.Fast to deliver ultrafast speeds of up to 500Mbps to most of the UK within a decade.

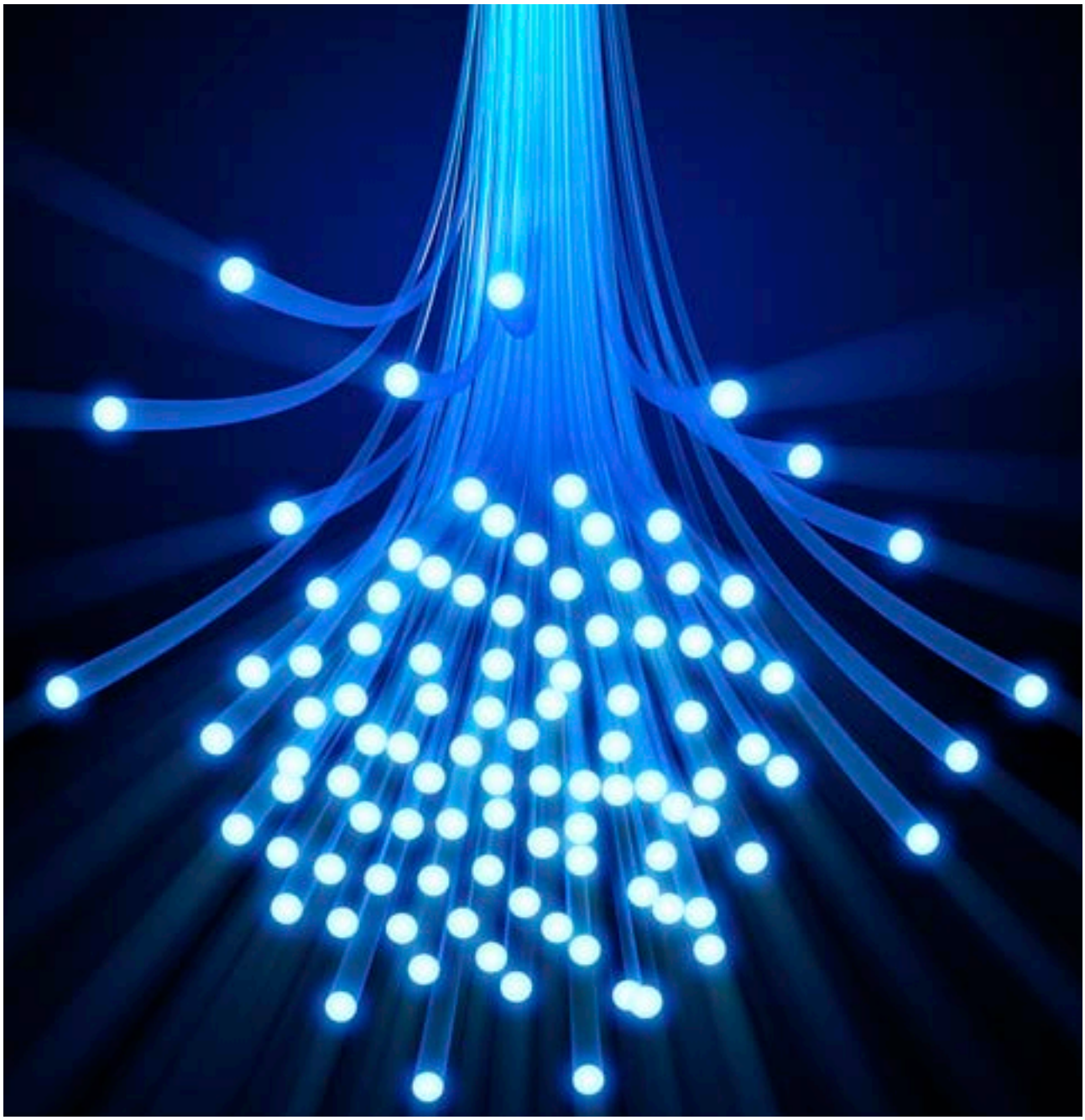
7.14 There are also a growing number of smaller providers, such as CityFibre, Gigaclear and Hyperoptic, who base their business models around providing 1Gbps connections via FTTP. The role of these providers is growing rapidly, helped in part by partnership agreements such as that between CityFibre, Sky and TalkTalk, which is resulting in FTTP

4 'The Communications Market 2015', Ofcom, August 2015.

being rolled out to 20,000 premises across York, with the potential for similar ventures in other cities.

7.15 Ofcom has published initial conclusions to its strategic review of digital communications, signalling a strategic shift towards increasing the provision of fibre networks, including fibre to the home. It sets out how proposals to improve the quality and coverage of broadband, landline and mobile services, will ensure consumers and businesses receive the best possible services in years to come. These include improved access for providers to BT's existing infrastructure, reforming and strengthening Openreach's governance, and promoting greater independence from the BT Group in investment decisions.

7.16 To help deliver greater ultrafast broadband deployment, the government will, in partnership with the private sector, establish a new Broadband Investment Fund. The fund will operate on a commercial basis to support the growth of alternative network developers by providing greater access to finance.



7.17 The Electronic Communications code regulates the relationship between network operators and site providers. It supports and enables the rollout and maintenance of the physical networks throughout the UK. The government will legislate to reform the Code. These reforms are essential to help expand network coverage across the UK, encouraging investment and innovation in infrastructure, and ensure there is a sustainable physical network underpinning a choice of consumer services.

7.18 The public sector uses a considerable amount of valuable radio spectrum. To ensure this is managed in the most efficient manner possible, the government has set up a new centralised management unit for public sector spectrum and has adopted a challenging new target for spectrum release: 750MHz of valuable spectrum in bands under 10GHz to be made available by 2022, of which 500MHz will be made available by 2020.

7.19 The government is also making up to £550 million available to support the change of use of 700MHz spectrum. The funds will support the infrastructure costs of clearing the spectrum frequency, including support to consumers where appropriate.

## Priorities to 2020-21

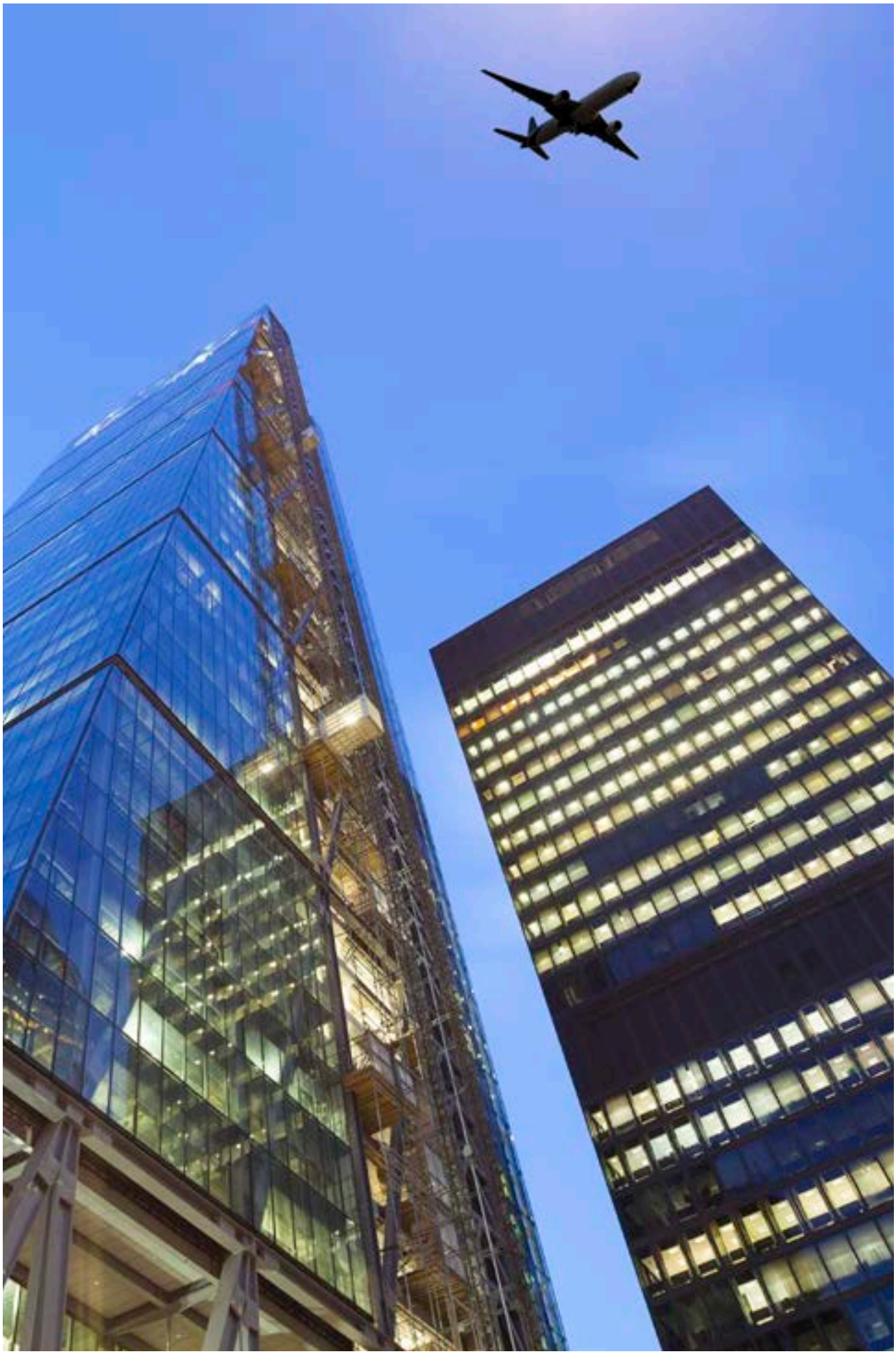
### Key projects and programmes

- superfast broadband to 95% of premises by 2017
- voice coverage to 90% of the UK geographic area by the end of 2017. The government has secured a landmark agreement with the 4 MNOs which will also deliver significant improvements to mobile internet coverage
- 4G rollout: By 2017, 98% of premises should have access to 4G mobile broadband
- spectrum clearance to further enhance mobile broadband connectivity by helping to future-proof the coverage, capacity and quality of the UK's mobile networks, the government is committed to releasing 700MHz spectrum for mobile broadband use. Ofcom plans to hold an auction before the end of the Parliament
- the government will make available 750MHz of valuable public sector spectrum in bands under 10GHz by 2022, of which 500MHz will be made available by 2020

### Policy milestones

7.20 The government intends to create a broadband Universal Service Obligation (USO), which would provide a legal entitlement to broadband. The government's ambition is for the minimum speed for a USO to be 10Mbps, which we will look to raise over time and it will consult soon on the next steps for this proposal.

7.21 The government is committed to delivering a 5G strategy in 2017, and has asked the National Infrastructure Commission to assess how the UK can become a world leader in 5G infrastructure deployment, and how to ensure that the UK can take early advantage of the potential benefits of 5G services.



# FLOOD AND COASTAL EROSION

Progress by the end of 2020-21...

Over 1,500 projects supported…

…to ensure 300,000 homes are better protected from flooding...

…and avoid £23 billion of household damages

Major projects in Oxford, Lincolnshire, London and on the Fylde Peninsular

A National Flood Resilience Review undertaken to ensure the best flood prevention plans are in place across the whole country

## Infrastructure Pipeline to 2020-21: £2.7bn

# Chapter 8: Flood and Coastal Erosion

## Sector overview

8.1 Flooding can have a devastating effect on communities, causing significant damage to homes and businesses. It can cause severe disruption to energy, transport, water and communications networks and have a major effect on local economies.

8.2 Recent years have seen serious flooding in many parts of England both inland and on the coast. The latest climate projections indicate that sea levels will rise, and there will be increasingly severe and frequent rainstorms. This means the risk of floods will increase further if more is not done to manage it.

8.3 There are currently around 2.4 million properties at risk of flooding from rivers and the sea in England. 748,000 of these have at least a 1% annual likelihood of experiencing flooding. About 3 million properties are at risk from surface water flooding in England, around 772,000 of which are at or above the 1% annual likelihood level. About 600,000 properties are at risk from both sources of flooding.[1]

8.4 While it is not possible to prevent all flooding or coastal erosion, measures can be taken to reduce the risks and improve protection to help keep families and businesses safe from the damage that can be caused.

## Delivery strategy

8.5 The Environment Agency (EA) takes a strategic overview of all sources of flooding and coastal erosion in England. It also has operational responsibility for managing flood risk from rivers and the sea. In 2014, the EA published its Long Term Investment Scenarios which examined future levels of flood risk in England under a range of scenarios based on variables including climate change and floodplain development. This identified the optimal level of investment for each scenario, to maximise risk reduction whilst ensuring that all investment was economically worthwhile.

8.6 At Spending Review 2015, capital flood defence funding was protected at £2.3 billion from April 2015 to March 2021, supporting more than 1,500 projects to reduce the risk of flooding or coastal erosion across England. The flood defence maintenance budget of £171 million per year was also protected in real terms over the Spending Review and Autumn Statement period.

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1 'Flood and coastal erosion risk management: Long-term investment scenarios', Environment Agency, December 2014.

8.7 At Budget 2016, the government announced that flood defence and resilience funding will be increased by more than £700 million by 2020-21, funded by a 0.5% increase in the standard rate of Insurance Premium Tax. The flood defence maintenance budget will be increased by £40 million per annum, and additional capital schemes will be delivered – including over £150 million for schemes in Calder Valley, York, Leeds, Carlisle and wider Cumbria. In addition to this, the government will spend a further £130 million on repairing transport infrastructure damaged by Storms Desmond and Eva.

8.8 The government has set out how its capital investment will transform flood and coastal erosion risk management over a 6-year period[2] to 2021 and will be used to meet specific targets. The 6-year capital programme aims to drive down overall flood risk in England by 5%, better protecting at least 300,000 households. Overall it will deliver lifetime benefits of over £30 billion to society:

- £23 billion in household damages avoided
- £5 billion in long-term benefits to transport, infrastructure, commerce and industry
- £1.5 billion in benefits to the agriculture sector through flood risk reduction
- £600 million benefits through improved biodiversity and local environments

8.9 Alongside public investment, the EA will require around £660 million of funding from local partners of which approximately 50% has already been secured to deliver the full programme. To support partnership funding, the government has changed the rules to allow business contributions to flood and coastal erosion works to be tax deductible. This means businesses that contribute to schemes pay less corporation or income tax. The new rules apply to contributions made from 1 January 2015.

8.10 The programme of flood and coastal defence improvements is built up of schemes developed and promoted by the EA and Lead Local Flood Authorities, in collaboration with communities.

8.11 To support the process, 12 Regional Flood and Coastal Committees have been established in England. These include local authority representatives and are responsible for overseeing flood and coastal defence activity and promoting efficient targeted investment. This allows greater local influence on which schemes proceed each year. Each committee can also raise money themselves through a local levy, voted for and paid for by its county and unitary local authority members, if there are more schemes seeking funding than can be paid for nationally.

## National Flood Resilience Review

8.12 To ensure the best possible plans are in place for flood prevention and protection across the whole country, the government is also conducting a National Flood Resilience Review, which is chaired by the Chancellor of the Duchy of Lancaster, Oliver Letwin. This will assess how the country can be better protected from future flooding and increasingly extreme weather events.

8.13 The review will first look at the flood risk that England faces from extreme rainfall, to make a new assessment of the possible damage to communities and infrastructure including roads, bridges, energy infrastructure, water treatment plants, communications networks and hospitals. This will provide a 'stress test' of the nation's resilience to flooding, improving understanding of the possible implications of extreme events. In doing so the government will also check whether assumptions in current modelling remain sound.

[2] 'Reducing the risks of flooding and coastal erosion: An investment plan, 2014', Department for Environment, Food and Rural Affairs, December 2014.

8.14 With this evidence and analysis in hand, the government will then turn to considering the longer term strategy on flood risk management. It will look at temporary and flexible responses as well as hard flood defences beyond the current 6-year programme. This will include the balance between protection and resilience, an assessment of risk in England's core cities and will consider the role of both government and wider society in reducing flood risk.

8.15 The first findings of the review are set to be published this summer and the team includes the government's Chief Scientist, Defra, DECC, DCLG, HM Treasury and the EA Chief Executive. During the autumn, the government will begin implementing any short-term measures identified, and will start work to review the longer term strategy, which will include close consultation with the National Infrastructure Commission.

## Efficiency improvements

8.16 The EA has committed to improving how the capital programme will be managed and delivered, to ensure the benefits of long-term funding certainty are maximised. Enhancements to programme management carried out since April 2015 include:

- using a project packaging approach to procurement. The EA has already awarded construction/design and build packages with the first one, the Somerset Package, forecasting approximately 13% of efficiency savings in construction costs
- introduction of a Programme Management Office within the EA. This builds on the EA's own experience plus learning from Highways England and a workshop coordinated by the Major Projects Association
- having the key outcome of homes better protected on the EA scorecard alongside a measure to track partnership funding contributions. Progress is overseen through the EA's Efficiency and Effectiveness Programme Board
- working closely with Defra, HM Treasury and Cabinet Office on the challenges in attracting partnership funding with a view to developing a partnership funding strategy

8.17 Over £300 million of targeted savings to be delivered by the EA through new, more efficient, working will be reinvested in managing flood risk. The EA has committed to 10% efficiencies across maintenance activity by 2019-20, with all savings recycled back into maintenance alongside efficiency across the capital programme of 10%. This will generate around £230 million of savings that can then be reinvested in capital schemes.

8.18 The EA is currently in the process of implementing a new flood warning system, which is expected to become available in December of 2016. The enhancements that have been developed will enable a more efficient, consistent and improved quality warning service for communities.

## Priorities to 2020-21

### Key projects and programmes

- Lincshore: this scheme covers beaches from Mablethorpe to Skegness and maintains protection against a 1 in 200 chance in any 1 year of tidal flood (0.5%) for 30,000 properties and 35,000 hectares of land. Sand is dredged from the sea bed and pumped onto the beach, replacing levels lost to the sea during the winter. This reduces the risk of waves reaching and overtopping the main sea defences, preventing against their deterioration and erosion

- Thames Estuary Asset Management (TEAM 2100): the first 10-year programme of asset management work to protect London and the Thames Estuary from tidal flooding. The project is carrying out detailed engineering and structural investigations into the condition of flood defences, including the Thames Barrier and 350 kilometres of walls and embankments, smaller barriers, pumping stations and flood gates. This system of defences protects 1.25 million people and £200 billion worth of property

- Rossall and Anchorsholme: these 2 schemes have been packaged together for delivery into a single programme of works. The EA is working with local authorities to replace 3 kilometres of existing sea walls and promenade to reduce the risk of sea flooding. The scheme will better protect over 14,000 homes and businesses and reduce flooding of local roads, a tramway network, a major sewage pumping station and public utilities. The new sea defences will provide an improved promenade and recreational areas. Construction began in spring 2014 with a targeted completion date of November 2017

- River Thames (Datchet to Teddington): this scheme will help protect the largest area of developed floodplain in England without flood defences, with over 15,000 homes and businesses at risk. It consists of a new flood channel, improvements to 3 existing Thames weirs, installation of property level products for up to 1,200 homes (to make them more resistant to floods) and improved flood incident response plans. The flood channel will be between 30 and 60 metres wide and 17 kilometres long, built in 3 sections

- Boston Barrier: the east coast tidal surge in December 2013 flooded over 800 properties and businesses and approximately 500 acres of agricultural land. The Boston Barrier (and associated work to existing defences) will reduce the risk of flooding to around 15,000 properties over the next 100 years. The EA is working closely with local authorities and key stakeholder groups with construction scheduled to start in 2017 with an anticipated completion date in late 2019

- Oxford Flood Alleviation: there are 4,500 properties in Oxford at a 1% or higher annual risk of flooding and major roads, railway lines, schools and businesses could also be affected. The EA is investigating flood reduction measures including a new channel to the West to allow water to pass through and around Oxford more efficiently, reducing the risk of flood water entering homes and businesses and disrupting transport links. The project is expected to be complete and operational by 2021
- Leeds Flood Alleviation Scheme: phase 1 started construction in January 2016 and is due to complete in March 2017. Budget 2016 announced that £35 million will be provided for phase 2 by 2020-21, which will help to better protect over 500 residential and commercial properties. The EA will provide funding to support delivery of a final phase in later years subject to business case approval
- Portsea Island: initial work indicates 4,500 residential properties and 1,000 commercial properties are currently at a significant and direct risk of flooding from the sea, along the 4.5 kilometre Southsea frontage. The scheme will improve the existing ageing sea defences, to provide at least a 1 in 200 standard of protection (0.5%) for the next 100 years to take account of predicted sea level rise. Construction dates are not yet finalised, but estimates are for completion in autumn 2022

# WATER AND WASTE

Progress by the end of 2020-21...

Start of construction on the Thames Tideway Tunnel

…a 15 mile ‘Super Sewer’ to prevent millions of tonnes of sewage flowing into the river

Reductions in average bills of about 5% in real terms

…and plans for further expenditure from 2020 with the start of Asset Management Period 7

England is currently on track to meet the existing landfill diversion 2020 targets

## Capital investment to 2020-21: £19.7bn

# Chapter 9: Water and Waste

## Sector overview

9.1 Water and waste infrastructure are essential for health and wellbeing, environmental sustainability and economic stability.

9.2 Water services are likely to come under increasing pressure because of population growth and a changing climate, whilst wastewater treatment infrastructure is essential for public health and a clean environment.[1] Sufficient capacity is also required to safely and effectively recycle or dispose of all household and commercial waste produced.

## Delivery strategy

### Water

9.3 Water, sanitation and sewage services in England and Wales are provided by the private sector. The government sets the strategic policy framework for the industry to ensure resilient, sustainable and affordable water and sewerage services. Ofwat, the economic regulator, sets the framework within which companies are licensed and regulated to ensure consumers receive a safe, reliable service at a fair price.

9.4 The Drinking Water Inspectorate ensures water supplies in England and Wales are safe and drinking water quality meets acceptable standards. The Environment Agency also regulates the industry to protect the environment and promote sustainable development.

9.5 Ofwat conducts a price review every five years, setting limits on the prices that water and sewerage companies can charge their customers. In line with this, the water industry operates on 5-yearly investment cycles called asset management periods (AMPs). The sixth (AMP6) is underway and will run until 2020. Ofwat estimates it will deliver:

- £44 billion of total expenditure[2] on delivering, maintaining and improving services
- over 370 million litres of water a day saved through efficiency and tackling leakage
- reductions in average bills of about 5% in real terms
- a 40% average reduction in the time lost due to supply interruptions

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1 'UK National Ecosystem Assessment', http://uknea.unep-wcmc.org/

2 Ofwat uses an innovative total expenditure approach in which capital and operating expenditure are assessed together to allow greater flexibility and efficiency.

9.6 The next price review is set for 2019 and Ofwat will begin to consult on how they set their price controls in 2017.

9.7 Water companies produce Water Resources Management Plans to set out how they will balance the long-term demand and supply of water, considering population growth, economic growth and climate change. These include options ranging from developing new sources of supply, such as reservoirs, to demand management. The plans are subject to public consultation and government approval. Companies will begin consulting on their next plans in 2018.

9.8 The current sewer network in London was built 150 years ago to serve a city of 4 million people; half of the capital's current population. In recent years an average of 39 million tonnes of sewage a year has overflowed into the Thames.[3] The £635 million Lee Tunnel – which opened in January 2016 – is the first of 2 major infrastructure projects that will help tackle the problem.

9.9 The second is the Thames Tideway Tunnel, which will run for 15 miles and will ensure a healthy river environment for future generations. The Thames Tideway Tunnel will also boost the economy by creating thousands of skilled jobs and hundreds of apprenticeships during construction. The project will be built and operated by a company called Tideway, independent of Thames Water, with its revenues being determined through a separate licence from Ofwat.

9.10 To help finance this project at a lower price for customers, the government has agreed a package designed to support the project should exceptional, highly unlikely risks happen, which the private sector could not cover at an acceptable cost, or at all.

### Waste

9.11 The government aims to have the right infrastructure in place to deal with waste as efficiently as possible, with an ambition to move towards a 'circular economy' where material resources are valued and kept in circulation. It believes these outcomes should primarily be driven by the market, operating within a policy and regulatory framework that provides the right economic incentives, including use of the tax system to bring about behavioural change where appropriate (e.g. through the landfill tax).

9.12 Private companies build and run waste infrastructure to treat and divert Municipal Solid Waste (MSW) from landfill. To meet its landfill diversion target, the Government provides financial support through PFI to local authorities and this has helped fund waste infrastructure contracts with private sector suppliers.

9.13 England is currently on track to meet the existing landfill diversion 2020 targets. As such the government is not currently planning to fund any new waste infrastructure projects beyond those already in the Pipeline.

## Priorities to 2020-21

### Key projects and programmes

9.14 Thames Tideway Tunnel: preliminary construction work is now underway on the key element of the programme to modernise London's aging sewerage network. Construction on the main tunnelling sites is anticipated to start in late summer 2016 with physical completion scheduled for 2023.

[3] 'Why does London need the Thames Tideway Tunnel?', Thames Water, September 2012.

# SCIENCE AND RESEARCH

Progress by the end of 2020-21...

More than £1bn investment per year in science and research infrastructure

Opening of the new Francis Crick Institute...

...and completion of the new Polar Research Ship, Diamond Light Source III and Pirbright II

£235m of funding for the new Sir Henry Royce Institute for Advanced Materials in Manchester

The Catapult network expanded to 10 with a new Compound Semiconductor Catapult in Wales

## Infrastructure Pipeline to 2020-21: £5.5bn

# Chapter 10: Science and Research

## Sector overview

10.1 Science and research underpin innovation and have a vital role to play in building a technologically advanced economy that supports growth and productivity, enables the UK to stay ahead of its international competitors, and delivers wider benefits to society.

10.2 The UK remains a world leader in science and research. The Global Competitiveness Index and the Global Innovation Index rank the UK second for the quality of its scientific research institutions and the quality of innovation respectively.[1]

10.3 But cutting-edge science cannot happen without high quality facilities and equipment. The UK's research and science infrastructure has been a key to success so far and will be crucial in building on this momentum to remain globally competitive.

## Delivery strategy

10.4 The government will invest £5.9 billion in the UK's research infrastructure between 2016-17 and 2020-21 – the longest commitment to science capital in decades. This funding is underpinned by the government's 10-year Science and Innovation Strategy, developed in consultation with key stakeholders including academia and business groups.

10.5 £2.9 billion will go towards funding large scale scientific investments to address the grand challenges of our time. These will help to answer the big questions currently facing society such as how to develop cost effective low carbon power sources and storage solutions.

10.6 The remaining £3 billion will support individual capital projects and maintenance in existing world class laboratories at our universities and institutes, funded through partner organisations including the Research Councils and the Higher Education Funding Council for England (HEFCE). It will deliver on the concept of the 'well found' lab, equipped with instruments and facilities to support the science that is required in the future. This investment also funds our contribution to international facilities such as CERN, and enables the UK research base to undertake its underlying, core research.

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[1] 'The Global Competitiveness Report 2015-2016', World Economic Forum, 2016; 'The Global Competitiveness Index 2015: Effective Innovation Policies for Development', Dutta, S. et al, September 2015.

10.7 The government recognises the vital role that the commercialisation of science and technology can play in our future growth. This includes investment in the '8 great technologies', where the UK is set to be at the forefront in accelerating commercialisation, including space, big data, robotics and autonomous systems and energy storage.

10.8 To provide businesses with the environment and infrastructure necessary to generate large scale innovation in areas with higher risks and wider benefits, the government has gradually expanded its network of catapults. These centres provide technology and innovation capability and expertise, bringing together business, researchers, scientists and engineers focusing on areas with the best market potential including global opportunities.

10.9 The government will also strengthen the UK's research base by implementing Sir Paul Nurse's recommendations, outlined in his review of the Research Councils.[2] A new body, Research UK, will be created subject to Parliamentary approval, and will take the lead in shaping and driving a strategic approach to science funding, ensuring a focus on the big challenges and opportunities for UK research.

[2] 'Nurse review of research councils: recommendations', Department for Business, Innovation and Skills, November 2015.

10.10 The government is also looking to integrate Innovate UK into Research UK to strengthen strategic collaboration between the research base and the commercialisation of discoveries in the businesses community. Innovate UK would still retain its business focus and a separate funding stream.

## Priorities to 2020-21

### Key projects and programmes

10.11 The government is supporting investment in major new scientific facilities including:

- The Francis Crick Institute: a world-leading centre of biomedical research and innovation in the heart of London helping to develop new treatments for illnesses such as cancer, heart disease, stroke, neurodegenerative conditions and infectious diseases. The new facility is due to open in 2016
- The Sir Henry Royce Institute for Advanced Materials: £235 million of funding for the new Institute, to be based at the University of Manchester.[3] Covering 10 component areas of materials research, it will be supported by satellite centres at the universities of Sheffield, Leeds, Liverpool, Cambridge, Oxford and Imperial College London
- Polar Research Ship: a £200 million, state-of-the-art vessel to maintain the UK's position at the forefront of climate and ocean research. The new ship will be built in Birkenhead and is scheduled to be in operation by 2019
- Diamond Light Source Phase III: government investment of nearly £100 million at the UK's national synchrotron facility in Oxfordshire is supporting the construction of 10 new beamlines due to be ready in 2018
- Pirbright Development Phase II: following completion of the new Jenner Building, campus redevelopment at this national centre for research into viral disease control in animals, based in Surrey, continues with a new Biological Resources Facility
- The UK Collaboratorium for Research in Infrastructure and Cities: £138 million investment will connect multiple communities of researchers working in areas such as clean water supplies, transport, social interaction and waste management, to develop an integrated view of infrastructure needs, development and delivery

10.12 Catapults: the government will invest £50 million to 2020-21 to establish a new Compound Semiconductor Applications Catapult in Wales.

### Policy milestones

10.13 The Research Partnership Investment Fund (RPIF), funded through HEFCE, gives awards to large-scale projects and can attract at least double the level of public investment from private and charitable sources. HEFCE is inviting bids for a fifth round of RPIF funding (closing in April 2016), to which it will allocate up to £200 million to 2020 to develop research facilities to encourage collaboration and research excellence.

[3] Subject to business case approval.

# HOUSING AND REGENERATION

Progress by the end of 2020-21...

Doubling the housing budget from 2018-19 – the biggest affordable housing programme since the 1970s

Release of enough public sector land to support building of at least 160,000 homes

A Housing and Planning Bill to get the nation building homes faster

Infrastructure delivered to unlock major housing sites including at Northstowe, Bicester Garden Town and Barking Riverside and a new Garden City at Ebbsfleet

£100m Highways England roads fund to support new housing sites

## Infrastructure Pipeline to 2020-21: £9bn

# Chapter 11: Housing and Regeneration

## Sector overview

11.1 A well-functioning housing market is inextricably linked to the wider health of the economy.[1] The availability of housing in the right places means the supply of workers to firms where they are needed the most: areas of economic growth and high labour demand. Housing is therefore vital to our competitiveness and attractiveness to business.

11.2 Housing construction supports around 600,000 jobs in the UK – up to 4.3 for every new home built. The house building industry (and construction more widely) needs skilled workers, but also provides a crucial labour market entry point for young, lower-skilled workers and those moving out of unemployment, and supports significant numbers of apprenticeships.

11.3 However, for decades housing supply has not kept pace with the increasing demand from our growing population. The economic and social consequences of a failure to supply enough houses have affected millions through lower growth and fewer jobs, families living in cramped conditions and young people with little hope of ever owning their own home.

11.4 Therefore, it is vital to take steps to increase the housing supply. Infrastructure can play a key role in supporting this ambition by ensuring that sites are socially and commercially viable and that new developments do not constrain existing facilities.

## Delivery strategy

11.5 The government is committed to the most ambitious plan to build homes since the 1970s and to support this is doubling the housing budget from 2018-19 to deliver 400,000 new homes. Taken together the capital programme, loan schemes, Help to Buy and other measures amount to over £20 billion investment in housing over the Spending Review period.

11.6 The Homes and Communities Agency (HCA) is the government's housing, land and regeneration body. It is responsible for increasing the number of new homes that are built in England (including affordable homes), increasing the supply of public land and speeding up the rate that it can be built on, helping to stimulate local economic growth by using its land and investment, and attracting private sector investment in local areas.

[1] Home Builders Federation, The economic footprint of UK house building, 2015.

11.7 The IPA is providing commercial specialist support to Departments to unlock housing and wider regeneration opportunities, working with the public and private sectors.

## Infrastructure to support housing

11.8 The government can support housing delivery by ensuring that national programmes of investment in infrastructure, including road and rail investments, support local plans and local need. Significant projects which will help to unlock major housing development include HS2 and Crossrail (Old Oak Common), East-West Rail (Bicester Garden Town), the A14 (Northstowe), and extension of London Overground services to Barking Riverside.

11.9 Given its nationwide coverage and the number of people and the amount of freight it carries, the Strategic Road Network is vital to England's growth. To ensure that Highways England is sufficiently equipped and flexible to respond to future development opportunities, including those relating to new housing and enterprise zones, it has established a Growth and Housing Fund. This fund is worth £100 million and will be used to match-fund infrastructure to enable new developments.

11.10 A £2 billion Long Term Housing Fund will provide recoverable government loans to the private sector for infrastructure needed to unlock or accelerate delivery of large housing sites. This builds on the Large Sites Infrastructure Fund through which over 100,000 homes have been unlocked or accelerated to date.

11.11 The government has also launched the Starter Homes Land Fund prospectus, inviting Local Authorities to access £1.2 billion of funding to remediate brownfield land to be used for housing, to deliver at least 30,000 Starter Homes.

11.12 The HCA will work in partnership with Network Rail and local authorities to bring forward land around stations for housing, commercial development and regeneration, and will announce proposals for specific sites shortly.

11.13 The government also wants to ensure that local communities can raise funds to support development of transport infrastructure, schools, health services and recreation facilities. The Community Infrastructure Levy (CIL) was introduced in 2010 to provide a faster and fairer means of collecting developer contributions to local infrastructure.

11.14 Over 100 councils are now charging CIL with over 200 more are working towards introducing it. To ensure CIL is working effectively, and considering its relationship to traditional Section 106 planning obligations, the government has launched an independent review, led by Liz Peace, former Chief Executive of the British Property Federation.

## Housing and Planning Bill

11.15 The Housing and Planning Bill will get the nation building homes faster by giving housebuilders and decision-makers the tools and confidence to deliver more homes, and further streamlining the planning system to promote and accelerate their delivery.[2]

11.16 Brownfield land has a key role to play in meeting the country's housing need. The government wants to go further to maximise its contribution, and the Bill takes forward a commitment to introduce a statutory brownfield register: a standard set of information kept up-to date and made publicly-available to help provide certainty for developers and communities to encourage investment in local areas. The registers underpin proposals to ensure 90% of suitable brownfield sites have planning permission for housing by 2020.

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[2] 'Housing and Planning Bill 2015-16', UK Parliament, January 2016.

11.17 Local areas are best placed to understand their housing and infrastructure needs, and have a key role in determining and ensuring delivery through the planning system. The government is working to ensure every area has a Local Plan. In cases where no Local Plan has been produced by early 2017, it has committed to intervene to arrange for a plan to be written, in consultation with local people.

11.18 To reduce uncertainty in the planning process, the Bill will also enable a new 'Permission in Principle' to be granted for housing-led development on sites allocated in future local and neighbourhood plans or identified in the new brownfield registers. Applicants will be able to apply directly for permission in principle for minor development to secure up-front certainty before investing heavily in the detail.

11.19 The government previously set out a commitment to allow an element of housing within nationally significant infrastructure projects (NSIPs). It is proposing that up to 500 dwellings will be allowed to be included alongside new infrastructure in a single Development Consent Order application, allowing developers to coordinate the delivery of new housing with the development of new infrastructure.

11.20 The government previously expanded the NSIP regime to allow significant business and commercial projects to be routed through it where appropriate. Allowing an element of housing to be included in applications will enhance the ability of the regime to accommodate more mixed use business and commercial developments, which will benefit from streamlined consenting and land acquisition processes.

11.21 Section 106 negotiations and procedures can cause significant delay in the planning process. These delays in granting planning permission slow the rate at which new housing is delivered, and can increase costs to developers. The government is therefore creating a Section 106 dispute resolution process to assist local planning authorities and applicants in agreeing acceptable planning terms within a set timescale.

11.22 Developers and communities need to be confident that applications, which support local housing and other developments will be considered on time and that decisions reached are right the first time. To promote good standards of service and bring more resources into the system, the government has proposed greater flexibility in application fees in return for radical improvements in services, including fast track options and the ability for local authorities and other providers in trial areas to compete to process applications. Decisions would remain with the local council to ensure the democratic link between local people and decision makers is maintained.

### Direct commissioning

11.23 The government will take radical action with the direct commissioning of thousands of new homes. This will lead to up to 13,000 quality homes built at a faster rate. The first wave will start on 4 sites outside of London in 2016 and the approach will also be used at the Old Oak Common site in North West London.

11.24 Currently the top 10 house builders provide 50% of new homes.[3] The direct commissioning approach will create opportunities for new entrants and smaller builders, to get building on government sites.

## Priorities to 2020-21

### Public sector land release

11.25 The government has committed to release public sector land with capacity for at least 160,000 homes representing a more than 50% increase on the last Parliament.

### Table 11.A: Public sector land release targets

| Sales of land for housing agreed as part of spending review settlements | Estimated housing capacity of land released by 2020 |
|---|---|
| Ministry of Defence | 55,000 |
| Department for Transport | 38,000 |
| Department for Communities and Local Government | 36,000 |
| Department of Health | 26,000 |
| Ministry of Justice | 5,000 |
| Department for Business, Innovation and Skills | 1,000 |
| Total | 161,000 |

Source: Departmental estimates

11.26 To incentivise public authorities to release surplus land in a timely manner, a new duty to report on surplus land is being introduced. This is a transparency measure, ensuring that when bodies retain surplus land for a specified period that they publish details, including their reasons for retaining that land.

3 Source: HM Treasury estimate

## Major Sites

11.27 The government has identified a number of very large housing sites, each with the capacity to deliver at least 5,000 new homes:

- Ebbsfleet Garden City: with excellent transport links, proximity to London and the Garden of England on its doorstep, Ebbsfleet has huge potential to create not only new homes but also a vibrant place to live and work. The government is investing £310 million to deliver the first new garden city in nearly 100 years. A new Ebbsfleet Development Corporation (EDC) is driving forward plans to provide up to 15,000 new homes based predominantly on brownfield land or former quarries
- The IPA is supporting the EDC to radically accelerate the market provision of homes including through the development of a very early Infrastructure Masterplan, to provide a basis for early engagement with utility providers. The IPA and EDC are working with the utility providers to design and deliver a whole area utility strategy including defined multi-utility corridors, to provide the up-front utility supply reinforcements and local network build-out, servicing development sites and spreading reinforcement cost risks across all developers
- Old Oak Common: the site will deliver 24,000 new homes of mixed tenures. A new high street, schools and leisure facilities will also be part of the development. It will also include commercial and office space around a new Old Oak Common station, providing space for 55,000 new jobs, as well as space for 1,500 businesses on the Park Royal industrial estate
- Northstowe: a proposed new town that will provide 10,000 new homes alongside a town centre, community facilities and commercial space set to be developed on the former Oakington Barracks site to the north of Cambridge. The scheme will be the first new town delivered in a generation and the direct delivery model provides an opportunity to provide the necessary infrastructure and housing at a pace that would not be possible by the private sector working alone
- Barking Riverside: the government has agreed the option for the project to access £55 million of funding via the HCA's Large Sites Infrastructure Fund, to support the extension of the London Overground to Barking Riverside, which will unlock the delivery of 11,000 homes. Work is expected to start in 2017
- Bicester Garden Town: the government is supporting the delivery of a garden town at Bicester, with 13,000 new homes by 2029 and has committed £19 million for the delivery of transport and community infrastructure by 2020. The government has also announced its support for new garden towns and communities at Basingstoke, Didcot and in North Essex and North Northamptonshire. Collectively, these have the capacity to deliver 90,000 new homes
- Brent Cross: the government has approved the full business case for a new Thameslink station at Brent Cross. The development is projected to deliver 7,500 homes and early works (utilities diversions) are scheduled to start in 2017

# SOCIAL INFRASTRUCTURE

Progress by the end of 2020-21...

Investment of £23 billion to deliver 500 new free schools, over 600,000 additional school places…

…and rebuilding or refurbishment of over 250 other schools

5 new prisons completed and 4 more in construction

New hospitals in Brighton, Birmingham and Cambridgeshire

Over £400m to create new world-class public health laboratories in Harlow

## Infrastructure Pipeline to 2020-21: £48.6bn

# Chapter 12: Social Infrastructure

## Sector overview

12.1 Building and maintaining modern and effective social infrastructure is a key part of delivering the government's aims and objectives in health, education and criminal justice sectors.

## Delivery strategy

12.2 The majority of social infrastructure in the UK is directly financed by the government and funded through general taxation. However, where it offers value for money the government may also use private finance via PF2. In these instances, the upfront finance is provided by the private sector who take on the construction and other risks, with the payments from the government funding the projects over their lifetime. The Priority Schools Building Programme and the Midland Metropolitan Hospital projects have highlighted the attractiveness of the PF2 framework to the public sector and investors.

### Education

12.3 The government is committed to the delivery of schools infrastructure to help ensure there are enough high quality school places for all children who need one and every child receives the very best education.

12.4 The government will invest £23 billion between 2016 and 2021 to:

- support delivery of the commitment to open at least 500 free schools by 2020
- support the provision of over 600,000 additional school places
- rebuild and refurbish over 500 schools
- address essential school maintenance needs

12.5 Supporting local authorities to create sufficient good school places is one of the government's top priorities and it has announced £4.8 billion of funding for local authorities across 2015 to 2019 to provide the school places needed by the 2019-20 academic year. These allocations are announced 3 and a half years in advance of the places being needed to give local authorities funding certainty so they can plan ahead and make good, efficient strategic investment decisions.

12.6 The government will also invest at least £200 million in new school places for children with special educational needs and disabilities and invest at least £50 million of capital funding to create additional places in nurseries.

12.7 In February 2015, the government announced £4.2 billion of allocations across 2015-18 to schools, local authorities, academy trusts and voluntary aided partnerships to improve their own schools.

12.8 Free schools are brand new schools set up by parents, teachers, charities, academy sponsors and existing schools in response to demand from the local community, either where there is a shortage of places, or parents are not happy with the places on offer.

12.9 Around half are in the 30% most deprived communities in the country.[1] Free schools are also more likely to be rated 'outstanding' by Ofsted than other schools.

12.10 Over 250 free schools opened in the last Parliament and the government is already on the way to reaching its target of opening 500 more by 2020, having already received more than 300 applications to open a free school in this Parliament.[2]

12.11 The £4.4 billion Priority School Building Programme (PSBP) is transforming those school buildings in the very worst condition across the country. The first phase is rebuilding and/or refurbishing 260 schools, including 46 through PF2. The second phase will target individual buildings where urgent need is the most acute. 277 schools will have the condition met in one or more of their buildings under this second phase, bringing the total number of schools covered by PSBP to 537.


[1] 'A Rising Tide: The Competitive benefits of Free Schools', Policy Exchange, March 2015.

[2] 'Free schools: open schools and successful applications', Department for Education, February 2016.

12.12 PSBP schools are being delivered quickly and at great value. Timescales to start building works have been slashed by up to 2 years compared to the previous school building programme, Building Schools for the Future, and average costs have been reduced by a third, saving millions of pounds per school.

## Health

12.13 To support a strong National Health Service capable of providing 7-day care requires modern well maintained hospitals and facilities that are able to operate efficiently. At Spending Review 2015, the government allocated £4.8 billion capital funding for health every year for the next 5 years.

12.14 This includes at least £500 million to be invested in delivering new hospitals, with new facilities to be built in Brighton, Birmingham and Cambridge over the next 5 years.

12.15 The government will also invest over £400 million to create new world-class public health laboratories in Harlow, which will allow part of Public Health England to relocate from ageing existing facilities, to continue their vital work in tackling some of the biggest issues in public health.

## Justice

12.16 A more effective criminal justice system requires a prison estate which is aligned to the needs of offenders and facilitates the future purpose of prisons. The government wants to transform the prison estate to better support rehabilitation, ensuring it is modern, with sites fit for purpose, and holds prisoners in security appropriate to their risk.

12.17 To support this ambition, 9 new prisons will be built, 5 of which will be delivered over this Parliament, with the government investing £1.3 billion.

12.18 These new prisons will provide new places, with the appropriate security arrangements and facilities for a rehabilitative regime. As these new places become operational surplus parts of the estate will be sold to realise lower running costs, capital receipts and drive local regeneration, housing and jobs.

12.19 This includes completing a new £212 million, 2,100 capacity prison in Wrexham, HMP Berwyn, which is currently in construction and is due to open in 2017.

# Chapter 13: Regional Infrastructure

13.1 Infrastructure can be a powerful force in helping to unlock the economic potential of regions, supporting jobs and helping to rebalance the economy. As already outlined, the government is investing more than £100 billion at a national level in major infrastructure projects and programmes that will benefit people and places across the country.

13.2 Around 45% of the value of the Infrastructure Pipeline to 2020-21 is allocated to English regions. However, this underplays the level of investment which will benefit any particular region as the remaining pipeline value relates to:

- projects in specific regions but where funding profiles are not yet confirmed, or
- projects and programmes which cannot reasonably be allocated either because they cover multiple regions e.g. HS2, or are national programmes which are not easy to break down e.g. the rollout of smart meters

**Table 13.A: Projects and programmes by English region[1]**

| Region | No of Projects | No of Programmes | Total |
|---|---|---|---|
| East Midlands | 16 | 11 | 27 |
| East of England | 26 | 17 | 43 |
| London | 25 | 40 | 65 |
| North East | 16 | 11 | 27 |
| North West | 65 | 23 | 88 |
| South East | 48 | 28 | 76 |
| South West | 16 | 19 | 35 |
| West Midlands | 23 | 17 | 40 |
| Yorkshire and the Humber | 15 | 14 | 29 |

Source: Infrastructure & Projects Authority, Major Infrastructure Tracking Unit.

13.3 Whilst infrastructure projects can support the local economies in which they are physically located, they can also benefit other regions through the creation of supply chain jobs. More than 60% of suppliers for Crossrail are currently based outside of London.[2] Map 13.A demonstrates how infrastructure supports the supply chain across the UK.

[1] Figures do not include projects and programmes in the Pipeline which are not allocated to a specific English region

[2] 'New figures show impact of Crossrail on jobs and growth around the UK', Crossrail, July 2013.

13.4 Over £19 billion is allocated to Northern Ireland, Scotland and Wales combined. However, the split between the responsibility of the UK government and each of the devolved administrations for infrastructure policy and funding varies according to the distinct devolution settlement in place. Table 13.B provides an overview.

13.5 Spending Review 2015 delivered significant real-terms increases to the capital budgets of the Northern Ireland Executive, Scottish Government and Welsh Government meaning funding available for infrastructure investment via the block grant through to 2020-21 rose by £600 million, £1.9 billion and £900 million respectively.[3]

## Table 13.B: Devolved responsibilities for infrastructure

| Sector | Devolved administration | | |
|---|---|---|---|
| | **Scotland** | **Northern Ireland** | **Wales** |
| **Road** | Devolved responsibility | Devolved responsibility | Devolved responsibility |
| **Rail** | The Scottish Government is responsible for internal services. The UK government is responsible for cross-border daytime services | Devolved responsibility | Not devolved |
| **Airports** | Devolved responsibility<br>The regulation of air services is a reserved matter[1] | Devolved responsibility | Devolved responsibility |
| **Ports** | Devolved responsibility, with some minor exceptions | Devolved responsibility | Devolved responsibility, with some minor exceptions |
| **Energy** | Not devolved | Not devolved | Not devolved |
| **Communications** | Not devolved | Not devolved | Not devolved |
| **Water** | Devolved responsibility | Devolved responsibility | Devolved responsibility |
| **Flood Defence** | Devolved responsibility | Devolved responsibility | Devolved responsibility |
| **Waste** | Devolved responsibility | Devolved responsibility | Devolved responsibility |
| **Housing** | Devolved responsibility | Devolved responsibility | Devolved responsibility |

[3] Compared against if the block grant had been held at 2015-16 levels.

[4] The Scottish Parliament is not able to legislate on matters which are reserved.

[5] Legislative authority for reserved matters in Northern Ireland generally rests with the UK Parliament, but the Northern Ireland Assembly can legislate with the consent of the Secretary of State.

# Map 13.A: Regional Supply Chain

## NORTH WEST

- Cammell Laird, in Birkenhead, will start construction of the £200m Polar Research Ship in June, which is expected to provide 100 jobs within the local supply chain
- Watson Steel, based in Bolton, has supplied around 2,500 tonnes of steel to Crossrail project at Farringdon and elements of steelwork to another project at Canary Wharf

## SCOTLAND

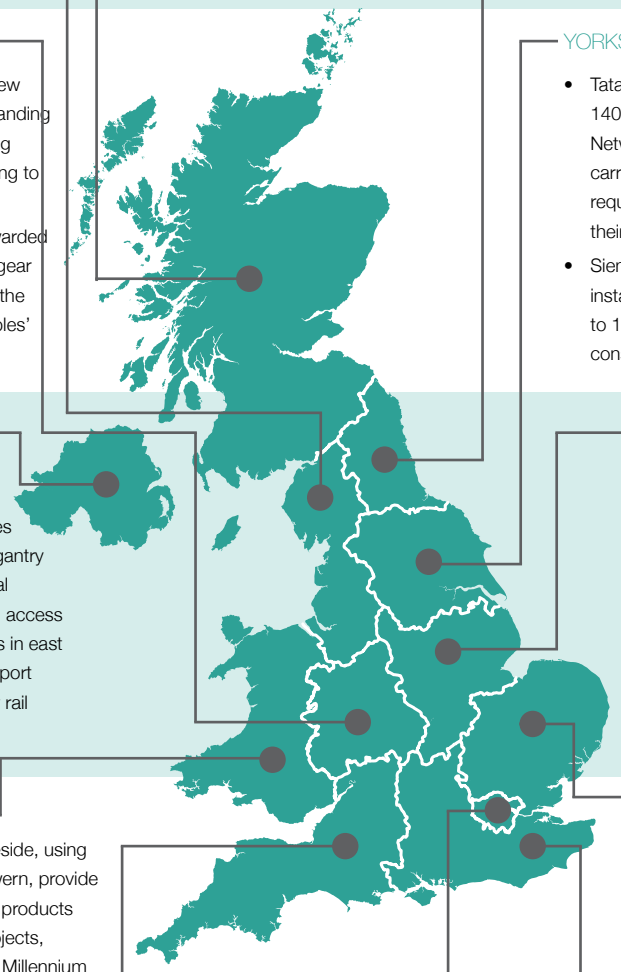
- 58 SMEs, employing more than 3,200 people, have formed a framework of rural contractors supporting Scottish Water's £3.5bn investment programme
- A joint venture including Refrewshire's Doosan Babcock was announced as preferred bidders for works at Hinkley Point C

## NORTH EAST

- A state-of-the-art train manufacturing plant in Newton Aycliffe, as part of the Intercity Express Programme, will create 730 jobs, including skilled and semi-skilled roles for apprentices and graduates
- For the first time ever, a joint venture between Highways England (HE) and Colas is providing a dedicated asphalt plant to a HE Managed Asset Contract, to produce and supply material for resurfacing and construction work in Tyne and Wear, Northumberland, Durham and North Yorkshire

## WEST MIDLANDS

- JCB has invested £148m into new manufacturing facilities and expanding factories in Staffordshire, creating 2,500 direct jobs by 2018, leading to 7,500 jobs in the supply chain
- ABB UK in Staffordshire was awarded major contract to supply switchgear to connect the wind turbines to the grid at Scottish Power Renewables' new Kilgallioch Windfarm



## YORKSHIRE AND THE HUMBER

- Tata Steel in Scunthorpe ensures that 98%, or 140,000 tonnes, of the steel rail procured by Network Rail is made in Britain. This also includes carrying out 50% of Network Rail's welding requirements with the other 50% taking place at their facility in Eastleigh near Southampton
- Siemens' Hull wind turbine production and installation facilities at Green Port Hull will create up to 1,000 jobs directly and additional jobs during construction, from £310m of combined investments

## NORTHERN IRELAND

- Environmental Fabrications Ltd, based in Dromore in Co. Down, has provided 300 tonnes of steel to Crossrail and fitted gantry cranes along with the additional structural support steel, jetties, access platforms and handrails to sites in east London and Kent to help transport concrete segments to line new rail tunnels underneath London

## EAST MIDLANDS

- Laing O'Rourke's Explore Industrial Park factory in Steetley is manufacturing the main structural components for the new Custom House station
- New electric trains for London Overground (180 carriages as 45 four car trains) are being built by Bombardier in Derby. Additional electric commuter trains for the Great Western Railway are being added to an existing fleet of 29 trains

## WALES

- Tata Steel Shotton works in Deeside, using steel from Port Talbot and Llanwern, provide colorcoat coil, facades and roof products used for major infrastructure projects, including the London Olympics, Millennium Stadium, Crossrail and Heathrow
- Tata Steel will provide over 18,000 tonnes of steel pipeline for the Maersk Culzean project – one of the largest discoveries of gas in the central North Sea in the last 10 years

## EAST OF ENGLAND

- ScottishPower Renewables is investing £2.5bn in East Anglia ONE Offshore Windfarm. Through its Supply Chain Plan they have committed to deliver 50% UK content, seeking to engage with local, regional and national companies
- London Luton Airport has confirmed Northern Irish contractor McLaughlin & Harvey as principal contractor on a £51m terminal redevelopment and expansion

## SOUTH WEST

- Schneider Electric, the global specialist in energy management and automation, has been awarded preferred bidder status for a contract to supply its medium-voltage PIX switchgear range for Hinkley Point C
- The government is providing a grant of up to £16m to Dyson to support research and development for battery technology at their site in Malmesbury

## LONDON AND SOUTH EAST

- Around 60% of Transport for London (TfL) expenditure is spent with suppliers based outside London. This supports approximately 60,000 jobs in a supply chain stretching the length and breadth of the country. More than 19,500 jobs have been supported in the Midlands alone while over 5,700 apprenticeships have also been created nationwide by TfL and the supply chain
- 95% of Crossrail's contracts have been awarded to companies based within the UK and 61% of suppliers are currently based outside London. Contracts to a value of around £7.5bn have been awarded so far, including tunnelling, stations, systems and signalling contracts and the contract to deliver our new rolling stock and depot

# Devolution Revolution

13.6 Whilst the government has a leading role to play in delivering nationally significant infrastructure within regions, local people know their own needs and economies best and should be involved in determining what gets built. To achieve this the government is creating a devolution revolution, with power being transferred from Whitehall to the regions, handing decision making and increased influence over infrastructure investment and delivery to the people that will use and benefit from it.

13.7 Local leaders are being empowered to drive growth and shape their communities, with many powers already decentralised through Growth Deals, City Deals and Devolution Deals. This decentralising movement is being underpinned by the right to retain business rates, the creation of new powerful metro-mayors and historic devolution deals with cities.

## Growth Deals and the Local Growth Fund

13.8 Growth Deals are a key pillar of the devolution programme. These devolve spending power from central government to Local Enterprise Partnerships (LEPs are combinations of local authorities and local businesses). Funding is drawn from the Local Growth Fund (LGF) which brings together previously disparate infrastructure, housing and other funding streams. This single pot provides LEPs with more autonomy, allowing them to agree and prioritise how funding is spent locally, free from central government approval.

13.9 The government has committed to a £12 billion LGF between 2015-16 and 2020-21; more than double the combined size of the Regional Growth Fund, Growing Places Fund and City Deals in the last Parliament.

## City and Devolution Deals

13.10 In the last Parliament the government also devolved power through City Deals; bespoke agreements with local authorities, LEPs and other local bodies. These have now been subsumed within Devolution Deals, which devolve further powers to cities and regions. In return for extra control over policy and finances, as well as additional funding, cities must agree to elect new 'metro-mayors' to work with combined or local authorities.

13.11 Each Devolution Deal is agreed on a case by case basis with the city. Some transport powers, including bus franchising and smart ticketing, are being devolved with cities also receiving consolidated multi-year transport settlements to spend at their discretion.

## London

13.12 Greater London is highly productive and sustaining its growth is central to the UK's long-term economic success. London contributes over £360 billion to the UK economy – over a fifth of the total UK Gross Value Added (GVA).[6] The government is committed to building upon this success, so the city continues to thrive as a global centre.

13.13 London has also led the way in terms of devolution, with the Greater London Authority created in 1998 when it voted to have a directly elected Mayor. The key areas that London's local government controls are housing and transport, where the Mayor develops a London Transport Strategy which TfL then implements.

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[6] Regional Gross Value Added', Office for National Statistics, December 2014.

13.14 It is clear that London's continued growth requires strategic, long-term investment in infrastructure. The number of rail journeys to, from or within London has increased by almost a quarter in the past 5 years and the city has the fastest projected population growth of any region.[7]

13.15 The government accepts the recommendations of the National Infrastructure Commission and is giving the green light for Crossrail 2 to proceed to the next stage. It will therefore provide a contribution of £80 million to fund the development of Crossrail 2, and asks TfL to match that contribution to ensure the project can be fully developed with the aim of depositing a Hybrid Bill in this Parliament. The Commission has recommended that clear proposals are identified to significantly reduce and phase costs and that a funding package is developed that involves London funding more than half of the cost of the project. The government will work closely with TfL to ensure that both of these recommendations are met.

13.16 The government is helping London to fund its transport investment programme by supporting TfL in generating revenue from its property assets. This includes consulting on reforms to compulsory purchase orders that will make it easier to take forward joint transport and housing projects, and supporting TfL's private legislation on measures to increase its commercial flexibility.

13.17 The government invites TfL to bring forward detailed proposals on how it could capture a proportion of future land value increases around proposed local infrastructure projects funded by the public sector, in order to provide a source of financing to support the construction of such projects.

[7] 'Subnational population projections', Office for National Statistics, 2012; 'Regional rail usage, 2014-15', Office of Rail and Road, 2015.

### Box 13.A: Transport for London (TfL)

TfL's goal is to keep London moving, working and growing and to make life in the city better. This means continuing the modernisation of its public transport network to reduce delays, boost capacity and take as much hassle out of journeys as possible. It also means investing in roads, streets and urban realm to make London a better place to live and work.

Investing in London's transport systems helps support jobs and growth across the UK. More than 60% of TfL's procurement is with companies outside of London, e.g. new Routemasters from Ballymena or new S stock trains from Derby. It is estimated that TfL's supply chain supports 60,000 jobs outside of the Capital.

The TfL investment programme focuses on the following priorities:

- Returning key assets to a state of good repair
- Maximising the capacity of the existing network
- Expanding the existing network to unlock growth

Alongside Crossrail, major schemes currently include:

- £5.5bn 4Lines Modernisation (Metropolitan, Hammersmith & City, Circle, District)
- £16.5bn New Tube for London (Bakerloo, Central, Piccadilly, Waterloo & City)
- £1bn Northern line extension/Northern line upgrade
- £2bn Tube station capacity upgrades

13.18 Old Oak Common has the potential to be one of the most significant regeneration sites in the country over the next decade, with HS2, Crossrail and the Great Western Main Line all meeting there. The government has agreed a Memorandum of Understanding with the Old Oak and Park Royal Development Corporation on transferring government and Network Rail land into its ownership, subject to the development of a plan for funding, financing and delivering the regeneration.

## Northern Powerhouse

13.19 The Northern Powerhouse is the government's plan to boost the economy across the North of England, which contributes over £300 billion GVA to the national economy and is now seeing faster employment growth than the South. The Northern Powerhouse is built on the idea that whilst individual Northern cities and towns are strong, if brought together they could be greater than the sum of their parts. £19 billion of investment in infrastructure is planned to 2020-21.

13.20 To achieve its vision for the Northern Powerhouse, the government is:

- investing £13 billion to deliver better transport to connect up the North
- investing in housing, science and innovation and culture to make the region a magnet for new businesses and talented people
- devolving powers and budgets from Whitehall and creating powerful new elected mayors who will give people in Northern cities and towns a strong voice

13.21 Manchester and the other cities of the Northern Powerhouse have led the recent wave of devolution. Table 13.C outlines devolved powers relating to infrastructure.

## Table 13.C: Devolved Powers within the Northern Powerhouse

| City | Devolved Powers |
|---|---|
| **Greater Manchester** | • Devolved £300 million housing investment fund<br>• Additional planning powers to make Mayoral Development Corporations<br>• Compulsory Purchase powers for the Mayor<br>• Devolved and consolidated transport budget through multi-year settlement<br>• Responsibility for franchised bus services and smart ticketing across all modes<br>• Exploring opportunities for devolving rail stations |
| **Liverpool City Region** | • Mayor to have power to place a supplement on business rates to fund infrastructure, with the agreement of LEPs, up to a cap<br>• Additional planning powers to make Mayoral Development Corporations<br>• Devolved and consolidated transport budget through multi-year settlement<br>• Responsibility for franchised bus services and smart ticketing across all modes<br>• Responsibility for a Key Route Network of local roads from 2017<br>• Long term Special Rail Grant Settlement for the Merseyrail network, allowing Merseytravel to progress the locally-funded procurement of new trains |
| **Sheffield** | • Additional planning powers to make Mayoral Development Corporations<br>• Enhanced city decision-making on HS2 support infrastructure, and lead negotiator with Highways Agency/Network Rail<br>• Devolved and consolidated transport budget through multi-year settlement<br>• Responsibility for franchised bus services and smart ticketing across all modes<br>• Responsibility for a Key Route Network of local roads to be managed by combined authority on behalf of the Mayor<br>• Work with the government to create a national Institute for Infrastructure in Doncaster |
| **North East** | • Additional planning powers for the Mayor including CPO powers and creation of a North East Planning Development framework to enable housing delivery<br>• Devolved and consolidated transport budget through multi-year settlement<br>• The Mayor and Combined Authority will put forward a business case for the full devolution and management of rail and metro services in the North East<br>• Responsibility for franchised bus services and smart ticketing across all modes<br>• Establish North East Land Board to Review all land and property held by the public sector to review its suitability for housing |
| **Tees valley** | • Government commitment to working with Tees Valley to explore how it can continue to develop its industrial carbon capture and storage proposals towards deployment of this infrastructure for its industrial sites in the 2020s<br>• Devolved and consolidated transport budget through multi-year settlement |

13.22 The government has also agreed another mayoral devolution deal with Liverpool City Region. This builds upon Liverpool's mayoral deal on 17 November 2015, and gives Liverpool additional new powers over transport, pilots the approach to 100% business rate retention across the city region, and commits the city region and government to work together on children's services, health, housing and justice.

13.23 The government established Transport for the North (TfN) as a cornerstone of the Northern Powerhouse. Chaired by John Cridland (former Director General of the CBI) it brings together the Northern City Regions so that they can speak with a single voice to government. TfN will be established as a statutory body by 2017. To support its work, the government has committed total funding of £50 million across this Parliament:

- The government supports the vision set out by TfN in their Northern Transport Strategy and accepts the recommendations from the National Infrastructure Commission on northern connectivity. The government will take forward these proposals with a total of £300 million of funding, including giving the green light to High Speed 3 between Leeds and Manchester, committing to reduce journey times to around 30 minutes. £60 million will be provided to develop plans for both the Leeds-Manchester route by 2017 and to improve transport connections between cities of the North

- accelerating the upgrade of the M62 to a 4-lane smart motorway. The government will provide an extra £161 million on top of the existing road programme to bring forward by 2 years the upgrade between J10-12 Warrington to Eccles, and to accelerate work on J20-25 Rochdale to Brighouse
- developing the future transformation of east-west road connections, including a new Trans-Pennine tunnel under the Peak District between Sheffield and Manchester, as well as options to enhance the A66, A69 and the north-west quadrant of the M60. The government will allocate £75 million, including to develop a business case for these schemes by the end of the year
- accelerating the development of other critical road projects in the North, including Lofthouse and Simister Island junctions, capacity enhancements to the M1 at J35a-39 Rotherham to Wakefield, and delivering on the commitment to begin upgrades to the M56 at J6-8 south of Manchester in this Parliament
- improving the North's major rail stations. The government will allocate a further £4 million to support the development of High Speed 2 Growth Strategies for Manchester Piccadilly, Manchester Airport and Leeds stations

13.24 The government will also launch a £1.2 billion boost to rail services on the Northern and TransPennine Express franchises beginning 1 April. This will provide 500 brand new carriages, room for 40,000 more passengers, 2,000 extra services a week and lead to the phasing out of Pacer trains. The new franchises will be jointly managed by the North and DfT through a partnership with "Rail North Ltd" – a major first for rail devolution.

## Midlands Engine

13.25 The Midlands is the UK's Engine for growth, with an average of 52 new businesses created every single day. The region contributes £210 billion GVA to the national economy and the East Midlands also had the strongest productivity growth between 2010 and 2014 of any region. £9 billion of investment in infrastructure is planned to 2020-21.

13.26 However, the government is building on the region's strengths by devolving powers and has agreed the West Midlands Combined Authority Devolution Deal, based on establishment of a Mayor for the West Midlands metropolitan area, with elections planned for 2017. However the deal also recognises the importance of the wider area, including the work LEPs and Councils do to promote growth in the Midlands. The West Midlands Combined Authority is gaining the following responsibilities:

- for a consolidated, transport budget, with a multi-year settlement
- for franchised bus services, which will support the area's delivery of smart and integrated ticketing across the Combined Authority's constituent councils
- for a new Key Route Network of local authority roads that will be managed and maintained at the Metropolitan level

13.27 A devolution deal has also been reached with Greater Lincolnshire, devolving powers and responsibility to promote to boost growth and autonomy.

13.28 The government has also supported the creation of Midlands Connect a new transport body for the region, which brings together a cross-LEP partnership to develop the strongest possible case for strategic transport investment in the Midlands.

13.29 To boost transport and connectivity in the Midlands, the government will:

- Establish Midlands Connect as a statutory sub-national transport body with by the end of 2018. This will support the development and implementation of a long-term Midlands Transport Strategy with £5 million committed government funding
- carry out feasibility work on 4 major roads in the Midlands in this Parliament: upgrades to the M1 to provide a continuous smart motorway from London to Yorkshire, improvements to the A46 Newark bypass and its junction with the A1, upgrading the single carriageway link on the A45 Stanwick to Thrapston and upgrading the M42 and M5 around Birmingham to 4 lane smart motorway running

## East of England

13.30 The East of England contributes nearly £140 billion in GVA to the national economy and had the highest employment rate of any region at the end of 2015. £5.2 billion of investment in infrastructure is planned to 2020-21.

13.31 Furthermore, the government has now:

- reached a deal with local leaders in East Anglia, devolving powers and responsibility to boost growth and autonomy
- confirmed it will also provide £151 million to fund new river crossings at both Lowestoft and Ipswich (subject to final business case approval)

## South East

13.32 The South East contributes nearly £240 billion in GVA to the national economy, and weekly earnings of an average full-time employee in the South East are the highest outside of London. £11.7 billion of investment in infrastructure is planned to 2020-21.

13.33 Furthermore the government has now asked Lord Heseltine to lead the Thames Estuary 2050 Growth Commission. This will focus on developing high productivity clusters and retaining skilled workers. It will also look at how to make the most of opportunities from planned infrastructure such as the Lower Thames Crossing. It will report back by Autumn Statement 2017 with a clear and affordable delivery plan for achieving this vision.

## South West

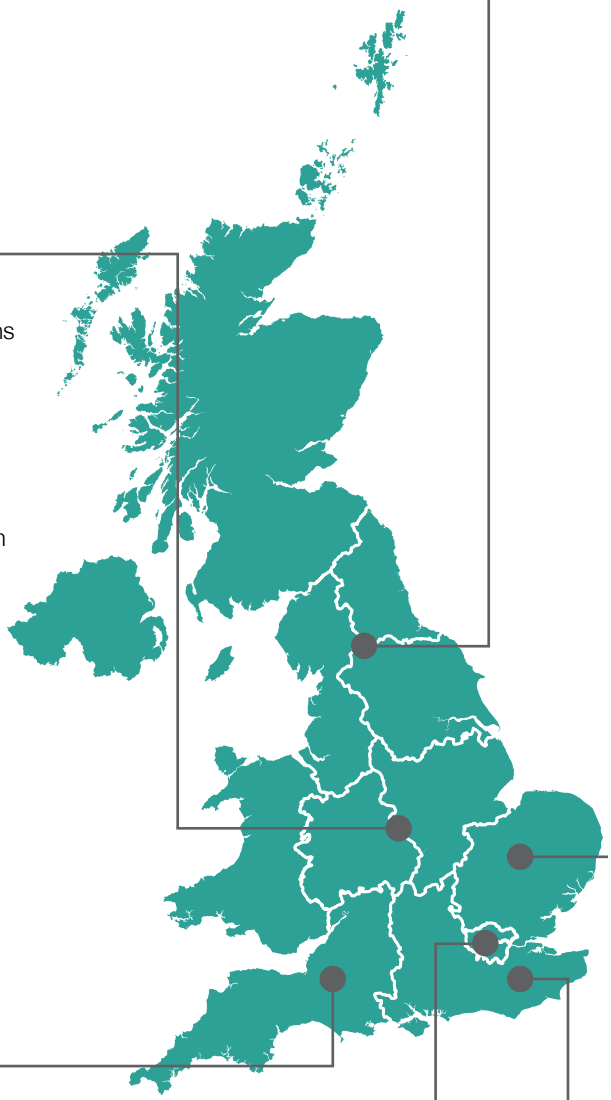
13.34 The South West contributes over £120 billion in GVA to the national economy and at the end of 2015 the South West had the lowest unemployment rate of any region. £10.5 billion in the Pipeline of investment in infrastructure is planned to 2020-21.

13.35 Furthermore, the government has now:

- reached a deal with the West of England, devolving powers and responsibility to boost growth and autonomy
- confirmed it will provide £5 million for the development of options for improving the resilience of the rail line between Exeter and Newton Abbot (via Dawlish), once the current study by Network Rail concludes
- launched the second round of the competitive Local Majors Fund which will offer the opportunity for large local transport projects such as the A391 St Austell to A30 improvements and the North Devon Link Road to bid for funding
- Confirmed £4.5 million additional funding to extend ultrafast broadband in the South West

13.36 Map 13.B shows significant infrastructure projects across the English regions.

## Map 13.B: Regional Projects Map



### NORTHERN POWERHOUSE

- North of England rail enhancements
- Mersey Gateway Bridge
- Smart Motorway projects on M62, M1,M6 and in Manchester
- Heysham to M6 Link Road
- A5036 to Port of Liverpool
- A1 North improvements
- A160/A180 Immingham
- Sunderland New Wear Crossing
- Leeds New Generation Transport
- Carrington Gas CCGT Power Station
- Sir Henry Royce Institute for Advanced Materials
- Teesside and Lynemouth biomass plants
- Manchester Airport investment
- Leeds Flood Alleviation Scheme
- Siemens Green Port Hull

### MIDLANDS ENGINE

- Boston Barrier
- Midland Metro extensions
- Lincoln Eastern Bypass
- Midland Mainline electrification
- A38 Derby junctions
- M6 junctions 13 to 15 Smart Motorway
- National College for High Speed Rail
- M42 junction 6
- HS2 Phase 1 from London to Birmingham
- M1/M6 junction 19 improvements

### EAST OF ENGLAND

- A14 Cambridge to Huntingdon
- Northstowe housing development
- Norwich Northern Distributor Road
- East Anglia 1 offshore wind
- Luton Airport
- New river crossings at Ipswich and Lowestoft

### SOUTH WEST

- Hinkley Point C
- Great Western electrification
- A303/A30/A358 Corridor
- Bristol Temple Meads Station
- National College for Nuclear

### LONDON

- Crossrail and Crossrail 2
- Northern Line extension to Battersea
- Thames Tideway Tunnel
- Francis Crick Institute
- London Power Tunnels

### SOUTH EAST

- M20 Lorry Park (Operation Stack)
- Smart Motorways on M3 junctions 2 to 4A and M4 junctions 3 to 12
- East-West Rail Phases 1 and 2
- Thames Estuary 2100 Programme
- Ebbsfleet Garden City

# Chapter 14: Improving Delivery and Performance

14.1 The government is building on work undertaken in the last Parliament to speed up infrastructure delivery and address the drivers of high cost and inefficiency. This chapter outlines the specific actions the government will take to improve project delivery and performance outcomes. These fall under 4 key areas:

- Identifying and supporting the right projects: by ensuring the full value of infrastructure investment is considered alongside more rigorous prioritisation and testing of project objectives
- Improving the infrastructure planning system: by continuing to streamline the planning and consenting process and mitigating the impact of environmental compliance
- Reducing the cost of infrastructure: by improving project initiation, procurement and delivery, and sharing performance data, innovation and best practice across projects and sectors
- Building a skilled and productive industry: by providing the supply chain with visibility of the investment programme, to build understanding of the key skills, capabilities and competencies required and confidence to invest in them

## Identifying and supporting the right projects

### Improving project appraisal and selection

14.2 Whether it is central government or local bodies who determine infrastructure investment, it is important to ensure its full value is captured during decision making. The principles for the appraisal of proposals for the delivery of public services are set out in the HM Treasury Green Book.[1] The approach of the Green Book is general in nature, setting best practice guidance for projects of all types, not just infrastructure.

14.3 In 2015, the government published supplementary guidance to the Green Book to support effective decision making specifically in infrastructure spending.[2] The purpose of this work is to ensure that the characteristics of economic infrastructure projects, such as interdependencies and resilience, are well understood and more accurately evaluated. It provides a tool kit that helps to identify structured analytical approaches to account for these characteristics in the appraisal process.

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1 'The Green Book: appraisal and evaluation in central government', HM Treasury, April 2013.

2 'Valuing infrastructure spend: Supplementary guidance to the Green Book', HM Treasury, March 2015.

14.4 The government has engaged with academics and stakeholders to improve its understanding of the impact of transport on the economy and develop its methodological approach. On the basis of the recommendations borne out of this process, DfT will be updating its guidance on appraising economic impacts of transport projects, which will be available in 2016.[3]

## Project support and assurance

14.5 Through the newly formed IPA the government is enhancing capability to provide earlier project initiation support and more robust assurance processes. This is a major step forward in seeking to prevent projects from making firm commitments on cost and timescales for delivery before their plans have been properly tested. This is being underpinned by improving the information on major projects, to measure their performance and outcomes. These measures are supported through the development of more effective mechanisms to ensure the government is prioritising delivery of the right major infrastructure projects (including independent advice on future priorities from the National Infrastructure Commission).

## Interdependence and resilience

14.6 Interdependence is a mutual dependence between 2 or more assets or networks, which impacts their efficient and effective functioning. At a detailed level this can involve specific interactions of individual assets. At a higher level, it can relate to relationships between entire infrastructure networks; for example, total demand of the transport network upon the energy network as rail electrification is rolled out.

14.7 The government will ensure that planning for interdependencies are effectively considered through investment appraisals.

14.8 Resilience is the ability of infrastructure to withstand, prevent, adapt to or rapidly recover from disruptive challenges. This includes the 4 approaches to improving systemic resilience:

- Resistance: preventing damage or disruption by strengthening or protecting assets, for example building flood defences to protect transport networks
- Reliability: designing assets to operate under a range of conditions, for example designing electrical cables to operate in extreme temperatures
- Redundancy: making backup installations or spare capacity available in networks and systems to enable operations to be switched or diverted, for example installing back-up data centres
- Response and recovery: understanding the weaknesses in networks and systems and have arrangements in place to respond quickly to restore services, for example ensuring an organisation is prepared to rapidly respond to disruptions[4]

14.9 The case study below sets out how the principles of interdependence and resilience are now being deployed on the Ebbsfleet development.

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[3] 'Transport appraisal in investment decisions: understanding and valuing the impacts of transport investment', Department for Transport, October 2013.

[4] Ibid, p. 18

### Box 14.A: Case study – Ebbsfleet

Developing an infrastructure strategy ahead of the traditional masterplanning process has enabled engagement at a very early stage with utility providers, including agreeing a Memorandum of Understanding between the Ebbsfleet Development Corporation (EDC) and the main utility partners on joint working and the sharing of data. This is allowing:

- The design of multi-utility corridors that are structured to avoid, or drastically reduce, the chances of third party strikes on other utility networks when work is being carried out in the future
- Utility corridors are, where possible, designed in the verge of the planned transport network to reduce the impact of street works on the transport system and to improve the whole life performance of the road network that will not suffer the traditional level of excavation and patching
- A holistic spatial design of utility networks, understanding weak-points and potential areas of common failure at the outset
- Provision of easier, less complex access to networks for utility providers and safeguarding of the multi-utility corridors

The agreement between EDC and the utility providers specifies compliance with PAS128 and the use of Building Information Modelling in the design of networks. This allows for the free exchange of reliable information in standardised forms between all parties, leading to a reduction in the risk of third party strikes on other networks. It also unlocks further benefits through being able to condense the land-take of the corridors, reducing costs to the EDC and by improving certainty of connection, adequate supplies and the spreading of reinforcement cost risk across all developers in the area.

## Improving the infrastructure planning system

14.10 The government has already taken significant action to improve the infrastructure planning and consenting system, reducing bureaucracy and speeding up decisions.

14.11 The more structured approach including a statutory decision making timetable under the Nationally Significant Infrastructure Projects (NSIP) regime supports investor confidence. Since its introduction 48 out of 50 applications made (96%) have been decided within the statutory deadline of 1 year from the start of the examination.

14.12 Other significant improvements introduced during the last Parliament, include:

- simplifying the process for making changes to Development Consent Orders (DCOs) post consent. So far 7 applications for non-material changes to DCOs have been made of which 3 are progressing under the new post consent change regulations
- allowing inspectors to be appointed earlier in the process to allow preparations for the examination of NSIP applications to be made at the earliest opportunity. 7 NSIP applications have already benefited from this measure
- allowing 2 examining inspectors to form an examining authority to let the Planning Inspectorate increase the responsiveness of the process with demand
- expanding the NSIP regime to let business and commercial projects to be directed into it where appropriate. 2 high profile NSIP applications have already benefitted and interest is growing among promoters of other large projects

- designating the National Networks National Policy Statement, providing a robust policy basis for decision making on the road and rail networks the country needs

14.13 The establishment of the Planning Court has greatly increased the speed in which planning cases are dealt with. At the end of October 2015, the average time from lodging to substantive hearing had reduced to 27.3 weeks, down from 46.9 weeks in February 2014, with the number of live planning cases having fallen by almost a third.[5]

14.14 The government will continue to improve the planning system for infrastructure and housing including:

- setting statutory 3 month deadlines for the Secretary of State decisions on called-in applications and recovered appeals to prevent time-delays on decisions on infrastructure, housing and regeneration projects
- bringing forward legislation in the Housing and Planning Bill to allow developers of NSIPs to coordinate the delivery of new housing and new infrastructure – with up to 500 dwellings included alongside infrastructure in a single DCO application
- bringing forward measures to enable a more zonal and 'red line' planning system
- speeding up the process for assessing housing need by accelerating the preparation and adoption of Local Plans. The government welcomes the report by the local plans expert group and will consult on the recommendations
- following the consultation on 'building up' in London and to help increase densities on brownfield land and reduce the need to 'build out', the government will consult with city regions on extending similar powers as part of devolution deals

14.15 The government is also introducing legislation through the Housing and Planning Bill to improve the Compulsory Purchase Order (CPO) process, creating more certainty for acquiring authorities and those affected. Specific measures include:

- allowing compensation to be provided to claimants earlier in the process, to cover the costs associated with relocation
- clarifying the responsibilities of different parties to share information
- introducing guidance to local authorities (as acquiring authorities) to take a more holistic view of the level of compensation offered to claimants, to incentivise parties to come to a negotiated settlement

14.16 The government is also reviewing other potential measures to improve planning and related processes including and will consult on a second wave of CPO reforms with the objective of making the CPO process clearer, fairer and quicker.

## Reducing the costs of infrastructure

14.17 The government's Infrastructure Cost Review programme, showed that despite measured savings of around 15% infrastructure delivery in the UK can still cost more and take longer than in many other European nations.[6] Recent benchmarking of the capital cost of major infrastructure projects in the UK with similar projects in Europe has identified a number of key drivers of higher costs.

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[5] The Lord Chief Justice's report 2015, the number of live planning cases (both "significant" and non-"significant") at the end of October 2015 stood at 222, from 314, at the end of 2013.

[6] 'Infrastructure cost review: measuring and improving delivery', HM Treasury, July 2014.

14.18 Through a work programme developed in partnership with academia and industry and delivered by the IPA and cross-sector bodies such as the Infrastructure Client Group, a number of work streams are tackling the drivers of higher costs. These include:

- improving decisions taken at the front end of projects so they are set up to succeed
- improving procurement so it can deliver better outcomes
- broader understanding of management of risk and contingency
- incentivising lower cost, lower carbon solutions

## Improving project initiation

14.19 The Infrastructure Cost Review identified evidence that showed delivery failures can often be traced back to how a project was initially set up. This suggests the need for a greater focus in the early stages on how the strategic objectives of projects are established how the sponsors articulate these requirements to ensure they are set up to succeed.

## Strategic objectives

14.20 Establishing clear establishing strategic objectives and performance requirements for a project upfront will have a major influence not only on the initial capital cost, but also the whole life cost and the asset performance.

14.21 Defining the purpose and the desired outcomes of infrastructure investment should precede the design of a technical solution, creating opportunities to innovate, to propose alternatives that may improve delivery of the benefits, maximise operational performance and minimise whole life costs.

## Sponsor objectives

14.22 Choices made by project sponsors on how to deliver agreed strategic objectives are not always made consistently across projects and programmes, often leading to the imposition of higher costs, both in construction and operation.

14.23 The perception of increasing the benefits of an investment may be at the expense of disproportionately increasing cost, lowering the overall benefit-cost ratio (BCR). Similarly, sponsor choices which impose a narrow focus on minimising capital costs, may lead to increased whole life costs or reduced benefits lowering the investment's BCR.

### Box 14.B: Case study – Highways England – defining strategic objectives

Under the first Roads Investment Strategy, Highways England have set out its delivery plan focusing on delivering a number of key outputs and key performance indicators, rather than a focus on just efficiency through specifying inputs. These include:

- 97% lane availability
- 85% of all motorway incidents cleared within 1 hour
- 40% reduction in people killed or seriously injured on the network by 2020
- making capital efficiency savings of £1.2 billion by 2020

By setting out its high level objectives, Highways England is able to engage strategically and early with its supply chain to ensure that individual projects and programmes in their forward investment plans can meet these high level objectives, freeing their partners to develop and deliver more innovative solutions.

## Design requirements

14.24 The translation of strategic and sponsor objectives into design requirements and standards will also influence cost. Bespoke architectural or environmental standards can drive up the capital cost. Conversely, design requirements and standards may also encourage lower carbon, more sustainable solutions which may add to initial capital costs, but deliver whole-life savings through lower maintenance or running costs.

14.25 Whilst such decisions may be driven by factors such as planning requirements, they are not always assessed through the lens of whole life costs and asset performance.

14.26 The report, 'Specifying Successful Standards' found that unnecessarily bespoke or prescriptive design specifications, often going beyond the requirements of national and international standards, added cost to projects.[7] The report recommended an optimum level of prescription should be sought to balance initial capital and whole life costs.

14.27 However, in response, major transformational projects such as HS2 are already developing new standards applicable to their project to ensure design requirements and specifications can meet their particular project need. However all clients and projects have the opportunity to ensure that the requirements, specifications and standards – in-house and external – are applied appropriately to their projects and programmes.

## Project Initiation Routemap

14.28 In response to these challenges, the government, working with industry, developed a Project Initiation Routemap; a framework to help identify and address many common problems encountered during the early stages of projects. The tools include a number of

[7] Specifying successful standards', Institution of Civil Engineers, November 2014.

modules to help sponsors and clients, covering; governance; requirements; procurement; execution strategy; and organisational development.

14.29 Over 20 major projects across the transport, water, flood defence and energy sectors have now undergone a routemap assessment, helping to drive successful delivery.

14.30 Building on the success of these applications, the government is currently working with industry to refine the tool and create additional modules on Asset Management and Risk. These will be launched later in 2016 alongside the ambition to broaden application of the tool across a wider range of projects and programmes.

### Box 14.C: Thames Estuary Phase 1

The Environment Agency's (EA) Thames Estuary Phase 1 programme (TEP1) is designed to maintain and sustain the system of flood defences for the Thames estuary floodplains by considering whole life costs of both fixed and active assets and increasing the proportion of refurbishment rather than renewal when work is required. It presents a unique opportunity to deliver a long term planned portfolio of capital works generating significant benefits and savings of at least 20%.

The EA used the Routemap to assess their own status as an organisation and inform the development of their procurement and change management strategies. A series of Routemap workshops provided a structured approach to help identify the key issues which needed to be addressed to ensure the success of TEP1.

## Improving the procurement process

14.31 Effective procurement is an enabler of better outcomes, not just a process to find "the cheapest bid". Procurement should deliver value for money and support wider socio-economic objectives, encouraging investment in jobs, innovation and lower whole life costs. These principles are enshrined in the 2015 Public Contracts Regulations.[8]

14.32 The government wants to maximise the positive impact of public procurement on economic growth, ensuring a level playing field for suppliers by encouraging procurers to take full account of the value they can offer. This builds on best practice from major infrastructure projects such as Crossrail, which have demonstrated how procurement strategies can by constructed to maximise economic impact. These include:

- timely, transparent and inclusive pre-procurement market engagement with suppliers to allow them to gear up to compete, and to ensure optimal specification to take account of market capabilities and the potential value suppliers can deliver
- taking account of economic, social or environmental considerations in procurement design, technical specifications, award criteria and contract performance conditions linked to the subject matter of the contract
- driving good supply chain practice by influencing the behaviour of prime contractors, for example by requiring evidence of supply chain management approaches, requiring suppliers to openly advertise sub-contracting opportunities

14.33 From spring 2016, new procurement guidance will set out a range of considerations for major projects in the form of a Balanced Scorecard. It will be used as a prompt to think broadly and creatively when designing a major procurement about the impacts that might be targeted, and how these should be translated into requirements and an evaluation strategy that identifies the supplier offering best value in that context.

[8] 'The Public Contracts Regulations 2015', UK Parliament, February 2015.

## Managing risk and contingency

14.34 For major one-off capital projects, such as Crossrail, Thames Tideway Tunnel and HS2, a lack of precedent data, both in terms of costs and appropriate scope, can potentially lead to inappropriate levels of risk and contingency being assumed.

14.35 Conversely, the repetitive nature of ongoing programmes of work, such as asset management in the water sector, means there is more likely to be close co-operation with an established strategic supply chain, This often results in greater certainty of both scope and "should cost" meaning levels of risk and contingency are appropriate and understood.

14.36 In response, HM Treasury has set out clear guidance for public infrastructure providers on how project risks should be estimated. This guidance follows the successful launch in October 2013 of a joint report between government and the Industry Risk Group (IRG) and will help infrastructure organisations make the most of their budgets.[9]

14.37 The IRG investigated the management of cost risk and uncertainty and the report set out 9 recommendations to change behaviours and improve outcomes to optimise the approach to managing and providing for risk and optimism bias, drawing on lessons learned from the Olympics and other major projects. It shows project teams how to get earlier sight of key risks, improving the management of their contingency funds with lower delivery costs as a result.

14.38 However, the new guidance brings best practice from the public and private sector to public sector project management and has been successfully piloted by major projects such as Crossrail. The guidance, published as a supplement to HM Treasury's Green Book, is intended for the public sector.[10] However it is expected that industry will adopt much of this as a model for good risk management.

## Reducing carbon, reducing cost

14.39 The Infrastructure Carbon Review identified a clear link between reducing carbon and reducing cost. It set an ambition to reduce carbon emissions by 24 $MtCO_2e$ and save £1.46 billion per year by 2050.[11]

14.40 Over 50 organisations, including infrastructure clients, government departments and suppliers, have signed a pledge to introduce carbon reduction targets into their procurement and business practices. In the first annual review following publication of the Infrastructure Carbon Review, case studies were set out demonstrating 240,000 tonnes $CO_2e$ had been cut from 9 projects of £2 billion value, with £125 million savings from carbon reductions across these projects. The government will continue to measure and report progress against these targets through the Green Construction Board.

14.41 The high level management of carbon in infrastructure needs to be matured rapidly, so that the whole supply chain can engage to create solutions. To achieve this, there must be well understood rules that clients, designers, contractors and suppliers can follow. Through the Infrastructure Working Group of the Green Construction Board, a new Publicly Available Specification (PAS 2080) is now under development to show how carbon in infrastructure can be managed more rationally and strategically. PAS 2080 and associated guidance will be published in spring 2016.

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9 'Managing cost risk and uncertainty in infrastructure projects', Infrastructure Risk Group, October 2013.

10 'Early financial cost estimates of infrastructure programmes and projects and the treatment of uncertainty and risk', HM Treasury, March 2015.

11 'Infrastructure Carbon Review', HM Treasury, November 2013.

### Measuring and mitigating inflationary drivers

14.42 Recent industry surveys indicate that activity in construction rose for the eleventh consecutive quarter in Q4 2015 led by new building activity in the private housing, commercial and infrastructure sectors.[12] Infrastructure output in the UK could grow by up to 30% to 40% by 2017 based on demand in this latest Infrastructure Pipeline.

14.43 As output increases there is a risk of cost increases above general inflation, driven in part by shortage of skilled labour, which remains the largest threat to the sector in delivering these investments.

14.44 The long-term nature of infrastructure investments requires the government to understand and implement measures to mitigate against both short and long-term inflationary pressures. Through the work of the IPA the government has developed for the first time a long-term econometric view of infrastructure inflation using the published Pipeline. This is already being applied to improve planning and commercial decisions on projects.

## Building a skilled and productive industry

14.45 Driving improvements in delivery and performance will require ongoing development of skills and capability in the supply chain, clients and across government. In addition, government will focus support into research and innovation to drive further productivity growth, unlocking demand for new skills in the workforce.

### Building government delivery capability

14.46 The government, through IPA is coordinating a programme of work across government to develop the project delivery profession. The aim is to attract and retain the best talent, enabling departments to grow capacity to deliver projects efficiently and effectively. This includes:

- Major Projects Leadership Academy: set up to build the skills of senior project leaders for the Government's Major Projects Portfolio (GMPP) and delivered by Oxford Said Business School, nearly 200 participants have already graduated
- Project Leadership Programme: launched to extend established leadership principles to leaders of projects outside the GMPP, many of whom will go on to run major projects. The first 3 cohorts will complete the programme by the end of 2016
- Project Delivery Fast Stream: to attract the next generation of government project leaders, with new graduates ready to start in September 2016
- Project Delivery Fast Track Apprenticeship: to be launched in 2016

### Industry delivery models and skills.

14.47 The UK construction sector is vital to our economy, employing 2.9 million workers directly and worth around £90 billion annually.[13] However, its structure is fragmented, with poor vertical integration and disconnection between the design and construction phases. It is highly competitive and operates on low profit margins, so few suppliers have strong balance sheets, and levels of investment in skills and innovation have historically been low.

[12] Construction Products Association (CPA) Construction Trade Survey 2015 Q4, published 17 February 16.

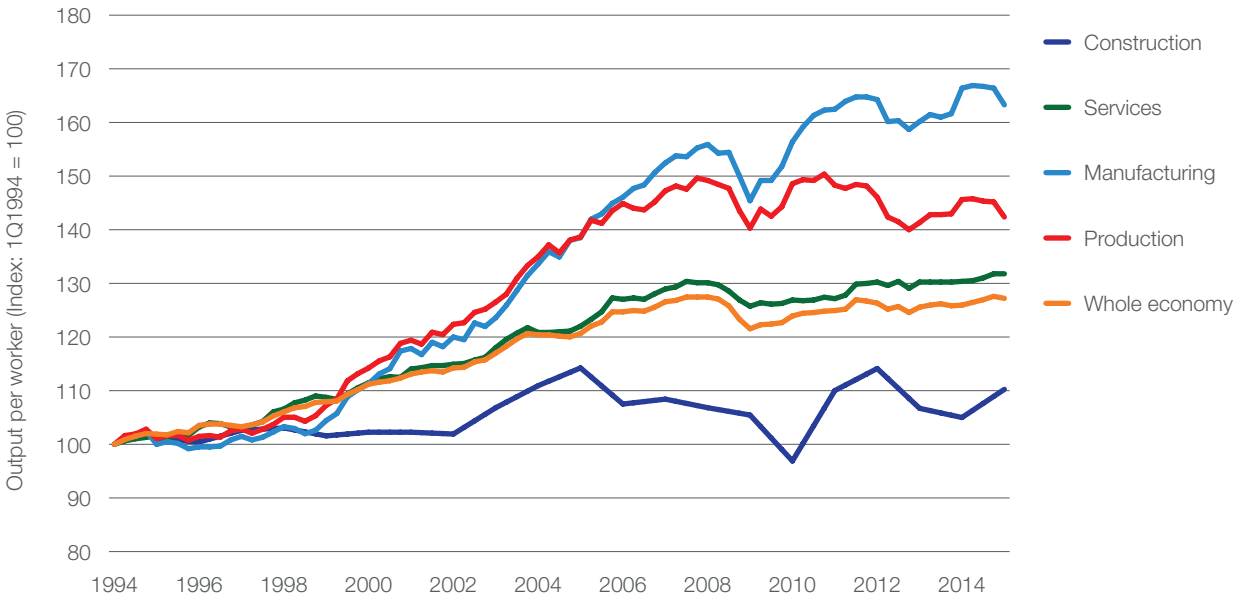
[13] 'UK Construction: An economic analysis of the sector', Department for Business, Innovation and Skills, July 2013.

14.48 Construction productivity growth has lagged behind other sectors of the economy as shown in Chart 14.A below. Addressing this will improve infrastructure delivery and yield significant economic benefits. Ensuring the right skills are in place is a key element to improving delivery outcomes.

14.49 The construction sector lacks diversity and is not always promoted as an attractive industry in which to pursue a career, but sustained infrastructure investment will require continued building of capability and capacity in government, clients and the supply chain. At the same time, the blend of work in the Pipeline is changing and new, more innovative and productive techniques will require a different mix of skills in the future.

14.50 To help address skills challenges, the government has set a target of 3 million apprenticeship starts by the end of this Parliament, supported by a levy on businesses with a wage bill of more than £3 million. The government and industry have also begun to set out detailed strategies for producing high quality apprenticeships in infrastructure.

**Chart 14.A: Productivity by increase in output relative to employment**




Source: Arcadis, ONS

14.51 In September 2015, the government published a National Infrastructure Plan for Skills, which presented an analysis of the skills landscape in the UK and set out the key skills challenges faced by the industry to deliver the Infrastructure Pipeline.[14]

14.52 The findings show that with growth in infrastructure investment, the Pipeline creates a demand to recruit and train nearly 100,000 additional workers by the end of the decade. In addition, the required skills blend to deliver the investment plans will change over time leading to a need to also retrain and up-skill around 250,000 of the existing workforce over the next 10 years.

14.53 Building on this analysis, the government's Transport Infrastructure Skills Strategy, published in January 2016, set a target of creating 30,000 apprenticeships in transport by the end of the decade. It also set out the aim to diversify the workforce, with a goal of women making up 20% of new apprentices by 2020 and a 20% increase in the number of BAME apprentices.[15]

[14] 'National Infrastructure Plan for Skills', HM Treasury, September 2015.

[15] 'Transport infrastructure skills strategy: building sustainable skills', Department for Transport, January 2016.

14.54 The strategy also announced the creation of the Strategic Transport Apprenticeship Taskforce, to allow government and industry to address skills challenges in a collaborative way. Centres of excellence will continue to provide training facilities for transport skills, including; the Tunnelling and Underground Construction Academy, which has provided training to over 10,000 students; a National Training Academy for Rail, which opened in October 2015; and a National College for High Speed Rail, due to open in 2017.

14.55 The Rail Supply Group (RSG), co-chaired by Terence Watson and the Secretaries of State for Business and Transport, building on the Transport Infrastructure Skills Strategy has also published its skills plan for the rail supply sector.[16] Its proposals include developing a network of enhanced quality training facilities and trainers, to be launched in 2016, particularly focused on those skills shortage areas most important for productivity, such as rolling stock engineers, planners and signalling engineers.

14.56 The Government Construction Strategy 2016-20, also sets out an aim, to support the delivery of 20,000 apprenticeships through government construction procurement during this Parliament.[17]

14.57 However, the construction industry is also essential to increasing levels of house building in the UK. However the sector is characterised by recurrent skills pressures, associated with its widespread reliance on extensive sub-contracting and recruiting skilled labour on a project-by-project basis. The government has asked the Construction Leadership Council (CLC) to investigate the labour model in the construction industry and develop an action plan to address the skills pressures and other constraints that limit house building.

14.58 The CLC will engage with construction stakeholders and take account of current practices in the sector, including what factors affect the use of and reliance on native and migrant labour, and what arrangements are in place to support skills in construction including college and Further Education training, levy systems and apprenticeships. It will report in the spring of 2016.

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[16] 'Fast Track to the Future: A strategy for productivity and growth in the UK rail supply chain', Rail Supply Group, February 2016.

[17] 'Government Construction Strategy 2016-20', Cabinet Office, March 2016.

## Improving supplier performance

14.59 An effective approach to measuring supplier performance can support efforts to build a more skilled and productive workforce. However, currently the approaches to measurement of supplier performance are inconsistent across sectors and clients.

14.60 Furthermore, there is little consistency in how outputs from the measurement of supplier performance are being used to drive improved performance. There is also limited sharing of outputs across sectors and clients, reducing the ability to understand common delivery themes or share best practice on performance management and incentivisation.

14.61 Existing performance measurement approaches were compared by IPA which identified a number of consistent headline measurement themes; Safety, Commercial, Sustainability, Relationships, Quality and Programme.

14.62 Taking output from clients' existing measurement systems can be used to provide a simple, comparative snapshot of differential performance, delivering benefits to clients, suppliers and government:

- Client: the client gains the advantage of being able to exchange knowledge and best practice, with opportunities for a more joined up approach to measuring and driving improved delivery performance
- Supplier: through the system of common measurement suppliers can expect reduced levels of bureaucracy and improve their awareness of relative performance and engage collaboratively to focus on key areas for performance improvement
- Government: improved outcomes are realised through collaboration between clients and suppliers, driving efficiency improvements to reduce costs

14.63 The IPA, working with the Infrastructure Client Group, will develop a series of metrics, based on existing measurement systems, to enable comparative performance across sectors and projects to be used as a tool to drive improved performance.

## Research and innovation

## Technology and innovation

14.64 Advances in digital technology have created opportunities for increased productivity and efficiencies in construction. The government will seek to capitalise on these advances to deliver construction projects more efficiently, including through Building Information Modelling (BIM) and improved insight into construction data.

14.65 BIM facilitates efficiencies through improved decision-making capability in design and construction, early contractor involvement, collaboration across the supply chain, and opportunities for standardisation. The government has previously set out its requirement for fully collaborative 3D BIM on centrally procured government construction projects by 2016. BIM Level 2 was developed to meet this mandate.

14.66 The government will develop the next digital standard for the construction sector – BIM 3 – to save owners of built assets billions of pounds a year in unnecessary costs, and maintain the UK's global leadership in digital construction.

## Infrastructure research

14.67 Infrastructure research was neglected for almost half a century in the UK and elsewhere, but the government is supporting 3 organisations to change this trend.

14.68 The UK Collaboratorium for Research in Infrastructure and Cities (UKCRIC) will establish a new global benchmark in world class collaborative research. UKCRIC will connect multiple communities of researchers, across 14 universities, to provide a coordinated multidisciplinary and cross sectoral knowledge base.

14.69 The government committed £138 million of funding to UKRIC, to establish laboratories doing transformative research in innovative science technology and engineering solutions and integrated urban infrastructure observatories to trial solutions at scale and gather data which will be visualised in modelling and simulation facilities.[18]

14.70 The Infrastructure Transitions Research Consortium (ITRC) is a consortium of 7 universities, led by the University of Oxford, which has developed the world's first national scale National Infrastructure System Model (NISMOD), to support infrastructure decision making. The ITRC has been awarded a grant of £5.3 million by Engineering and Physical Sciences Research Council to continue its programme for another 4 and a half years.

14.71 iBuild was launched in 2013 to investigate innovative infrastructure business models and following a review of 100 models, it has constructed a database to allow analysis of the relationship between finance, funding, value creation mechanisms and ownership.

## Table 14.A: Sector specific research and investment

| Sector | Research activity |
|---|---|
| Roads | Technology has the potential to revolutionise how roads are built and used. Highways England has an aspiration to develop a technology-led SRN that supports innovation and industry so the UK can be a world leader in roads development and operations. To help get there, the government has created a £150 million Innovation Fund to allow Highways England to place a greater emphasis on the future technologies that will positively impact users and the network. It will involve the full range of research, development, demonstration, and deployment activities. |
| Transport | The government committed £50 million over 5 years on developing a national hub for transport modelling and monitoring and to help UK businesses to develop solutions to public transport and freight needs. The Transport Systems Catapult, based in Milton Keynes, aims to establish the UK as a world leader in transport systems by driving forward and promoting intelligent mobility and innovation in transport technologies by providing an environment for businesses, researchers and academics to collaborate. |
| Energy | The government has committed to doubling energy innovation funding to over £500 million, which includes £250 million for nuclear innovation and Small Modular Reactors. It is also investing £60 million in the proposal by 6 universities across the Midlands for a new Energy Research Accelerator, a major project to develop the energy technologies of the future. |
| Energy | The Energy Systems Catapult in Birmingham provides small businesses with the capability to deliver research and technological innovation by bringing new products and services in electricity, heat and combustible gases to market. The Catapult helps businesses to collaborate with universities and regulated utility networks, to identify the potential of emerging technology and commercial opportunities with a view to making the UK a global leader in developing new technology based products for energy systems with target growth of £6 billion by 2030. |
| Energy | Offshore wind, wave and tidal power have huge potential for growth. To support this, the government has invested £50 million in the Offshore Renewable Energy Catapult. Based in Glasgow, the Catapult works to accelerate the development of commercially viable technologies, and has strong links with centres across the UK, such as the Wave Hub and the Marine Energy Park, and has an operational centre at the National Renewable Energy Centre (Narec). |
| Communications | By 2025 5G networks are expected to be deployed in the UK and across the world. Over £70 million of public and private funding has already been secured by the 5G Innovation Centre at the University of Surrey involving a worldwide consortium of mobile and fixed operators and equipment suppliers. The Centre is delivering world beating results, including a connection speed of 1 terabit per second in tests. |

[18] Subject to a satisfactory business case and substantial co-funding.

# Chapter 15: Monitoring and Reporting Progress

15.1 Through the Major Infrastructure Tracking team within the IPA, the government will continue to monitor progress against the NIDP and the government's commitment to invest £100 billion in infrastructure to 2020-21. The intelligence and insight provided through this process will support ministers, the IPA, and other government bodies, to intervene as appropriate to ensure priority projects and programmes remain on track.

15.2 Monitoring and reporting will take place in 5 key areas:

- Infrastructure Pipeline: the government will publish regular updates of the throughout the Parliament, reporting against investment plans and project status
- Enabling policy framework: these are policy milestones which will create the right environment to develop better infrastructure such as specific government policy decisions, the introduction of new legislation or the government response to commissioned independent reports
- Improving delivery and performance: these are cross-cutting actions (as outlined in Chapter 14) to be taken forward by the IPA and other government bodies, working with industry, to accelerate delivery and improve infrastructure performance
- Priority projects and programmes to 2020-21: these are the investments in each sector and region which the government is currently prioritising and views as critical elements of its infrastructure plans. A full list including current status and expected status at 2020-21 is included at Table 15.A
- Major projects in development: these are significant projects which are still under development with further work to be taken forward ahead of final decisions on government funding or support. In many instances, they are long-term projects which are not expected to start construction within this Parliament. Table 15.B outlines some of the major projects currently in development

15.3 Previous iterations of the National Infrastructure Plan have also included cost and performance 'outcome' indicators across infrastructure sectors. The underlying data for these performance indicators has been sourced from a wide variety of published sources resulting in inconsistencies from year to year.

15.4 The government will work with academics and other stakeholders to develop and embed an improved set of outcome-based performance indicators across sectors and these will be incorporated into future NIDP updates.[1]

15.5 The IPA will provide annual updates on progress against the NIDP, starting in 2017.

## Table 15.A: Priorities to 2020-21

| Priority | Key projects | Delivery body | Current status | By end of 2020-21 |
|---|---|---|---|---|
| **Roads** | | | | |
| Smart Motorways | M1 Junctions 13 - 19 | Highways England | In construction | In construction |
| | M3 Junctions 2 - 4A | Highways England | In construction | Complete (2017-18) |
| | M4 Junctions 3 - 12 | Highways England | Planning and consents | In construction |
| | Manchester Smart Motorways | Highways England | In construction | Complete (2017-18) |
| | M27 Junctions 4 - 11 | Highways England | Planning and consents | Complete (2020-21) |
| | M6 Junctions 13 - 15 | Highways England | Planning and consents | In construction |
| Road Period 1 Major Schemes | A556 Knutsford to Bowdon | Highways England | In construction | Complete (2016-17) |
| | A5-M1 Link Road | Highways England | In construction | Complete (2017-18) |
| | A2 Bean and Ebbsfleet | Highways England | Scoping | In construction |
| | M1 / M6 Junction 19 Improvement | Highways England | In construction | Complete (2016-17) |
| A14 | | Highways England | Planning and consents | Complete (2020-21) |
| A1 (North) | | Highways England | Scoping /Planning and consents /In construction | In construction |
| A303/A30/A358 Corridor | | Highways England | Scoping /In construction | In construction |
| **Rail** | | | | |
| HS2 | | High Speed 2 Ltd | Planning and consents | In construction |
| Crossrail | | Crossrail Ltd | In construction | Complete (2019) |
| Network Rail enhancement programme | Great Western | Network Rail | In construction | To complete in CP6 |
| | North of England | Network Rail | In construction | To complete in CP6 |
| | Midland Main Line | Network Rail | In construction | To complete in CP6 |
| | East West Rail | Network Rail | In construction | Phase 1 Complete (2016) |
| | South West Capacity | Network Rail | In construction | Complete (2017) |
| | East Coast Main Line | Network Rail | In construction | Complete (2019) |
| | European Rail Traffic Management System | Network Rail | Active programme | Active programme |
| Thameslink | | Network Rail | In construction | Complete (2018) |
| Intercity Express Programme | | Network Rail | Active programme | Complete (2017) |

[1] UK academics and the government are working towards establishing a better framework of infrastructure performance measures more clearly linked to common societal benefits. These metrics are important to support the measurement and tracking of short-term performance in the NIDP and could support the National Infrastructure Commission in monitoring the government's implementation of its recommendations across the infrastructure programme, as well as feed into its long-term infrastructure assessment.

| Priority | Key projects | Delivery body | Current status | By end of 2020-21 |
|---|---|---|---|---|
| **International Gateways** | | | | |
| Airport Capacity Investment | Heathrow Q6 | Heathrow Airport Holdings Limited | Active programme | Complete (2019) |
| | Gatwick Q6 | Gatwick Airport Limited | Active programme | Complete (2020) |
| | Manchester | Manchester Airports Group | Active programme | Active programme |
| Port Capacity Investment | | Various private sector developers | Active programme | Active programme |
| Surface Access Improvements | A6 to Manchester Airport Relief Road | Stockport Council | In construction | Complete (2017) |
| | M42 Junction 6 | Highways England | Scoping | In construction |
| | M23 Junctions 8 - 10 | Highways England | Planning and consents | Complete (2019-20) |
| | Gatwick Airport rail station | Network Rail | Planning and consents | Complete (2020) |
| | A5036 to the Port of Liverpool | Highways England | Scoping | In construction |
| | A160 / A180 Port of Immingham | Highways England | In construction | Complete (2016-17) |
| | A63 Castle Street to Port of Hull | Highways England | Planning and consents | In construction |
| | M20 Lorry Park (Operation Stack) | Highways England | Scoping | Complete (2017-18) |
| **Energy** | | | | |
| Nuclear | Hinkley Point C | EDF Energy / CGN | Consents approved | In construction |
| Gas | | Various private sector developers | Active programme | Active programme |
| Offshore Wind | Various private sector developers | Active programme | Active programme | Active Programme |
| Interconnectors | | Various | Scoping/In construction | Active programme |
| Smart Meters | | Various energy suppliers | Active programme | Complete (2020) |
| Transmission & Distribution | Western HVDC | Scottish Power | In construction | Complete (2017) |
| | London Power Tunnels | National Grid | In construction | Complete (2018) |
| **Communications** | | | | |
| Superfast broadband to 95% | | Broadband UK | Active programme | Complete (2017) |
| Mobile Networks | 90% Voice Coverage | Mobile Network Operators | Active programme | Complete (2017) |
| | 4G Rollout | Mobile Network Operators | Active programme | Complete (2017) |
| Spectrum | 700MHz Clearance | DCMS / Ofcom | Scoping | Complete (2020) |
| | Release of 750MHz sub 10GHz | Shareholder Executive | Active programme | Active programme |

| Priority | Key projects | Delivery body | Current status | By end of 2020-21 |
|---|---|---|---|---|
| **Flood Defence** | | | | |
| Flood and Coastal Erosion Risk Management Programme | Leeds Flood Alleviation Scheme | Environment Agency | In construction | In construction |
| | Lincshore | Environment Agency | In construction | Complete (2019-20) |
| | Thames Estuary Asset Management | Environment Agency | Active Programme | Active Programme |
| | Rossall and Anchorsholme | Environment Agency | In construction | Complete (2017-18) |
| | River Thames (Datchet to Teddington) | Environment Agency | Scoping | In construction |
| | Boston Barrier | Environment Agency | Scoping | Complete (2019-20) |
| | Oxford Flood Alleviation | Environment Agency | Scoping | Complete (2020-21) |
| | Portsea Island Flood Defence | Environment Agency | Scoping | In construction |
| **Water** | | | | |
| Thames Tideway Tunnel | | Tideway Ltd | In construction | In construction |
| **Science & Research** | | | | |
| Science Majors | Francis Crick Institute | Medical Research Council | In construction | Complete (2016) |
| | Sir Henry Royce Institute for Advanced Materials[2] | Engineering and Physical Sciences Research Council | Scoping | Complete (2019) |
| | Polar Research Ship | NERC / Antarctic Logistics and Infrastructure Partition | Active programme | Complete (2019) |
| | Diamond Light Source Phase III | Science and Technology Facilities Council | In construction | Complete (2018) |
| | Pirbright Development Phase II | Biotechnology and Biological Science Research Council | In construction | Complete (2019) |
| | UKCRIC | Engineering and Physical Sciences Research Council | Scoping | Active programme |
| Catapults | | Innovate UK | Active programme | Active programme |
| **Housing and Regeneration** | | | | |
| Public Sector Land Release | | Various public sector bodies | Active programme | Complete (2020-21) |
| Major Sites | Ebbsfleet Garden City | Ebbsfleet Development Corporation | In construction | In construction |
| | Old Oak Common | Old Oak and Park Royal Development Corporation | Planning and consents | In construction |
| | Northstowe | Homes and Communities Agency and Gallagher Estates | In construction | In construction |
| | Barking Riverside | Greater London Authority and L&Q and Bellway | In construction | In construction |
| | Bicester Garden Town | A2Dominion | In construction | In construction |
| | Brent Cross | Brent Cross Cricklewood Development Partners | Planning and consents | In construction |

[2] Subject to phasing and business case approval.

| Priority | Key projects | Delivery body | Current status | By end of 2020-21 |
|---|---|---|---|---|
| **Local Transport** | | | | |
| Transport for London | Northern Line Extension / Upgrade | TfL | In construction | In construction |
| | Major Tube Stations | TfL | Active programme | Active programme |
| | 4 Lines Modernisation | TfL | In construction | In construction |
| | New Tube for London | TfL | Scoping | In construction |
| Northern Powerhouse | Heysham - M6 Link Road | Lancashire County Council | In construction | Complete (2016) |
| | Leeds New Generation Transport | West Yorkshire Combined Authority and Leeds County Council | Scoping | In construction |
| | Mersey Gateway Bridge | Mersey Gateway Group | In construction | Complete (2017) |
| | Sunderland - New Wear Crossing | Sunderland City Council | In construction | Complete (2018) |
| Midlands Engine | Midland Metro Extensions | Centro | In construction | In construction |
| | Lincoln Eastern Bypass | Lincolnshire County Council | Planning and consents | Complete (2018) |
| Other Regions | Norwich NDR | Norfolk County Council | In construction | Complete (2018) |
| | Metropolitan Line Extension | TfL | Consents approved | Complete (2020) |
| | Bristol Temple Meads | Network Rail | Scoping | Complete (2018)[3] |

## Table 15.B: Projects in Development

| Project | Next Steps |
|---|---|
| Lower Thames Crossing | A consultation on routes north and south of the river is currently open ahead of a final decision. |
| Roads Strategic Studies | These studies are due to report later this year, but early findings suggest these may form an important part of the next Road Investment Strategy |
| Crossrail 2 | The government will provide £80 million which, together with a contribution from London, will allow Crossrail 2 to be fully developed with the aim of depositing a Hybrid Bill within this Parliament. |
| Western Rail Link to Heathrow | Network Rail is continuing to develop the scheme, and will seek planning powers during CP5 (2014-2019), to enable construction to begin early in CP6 (2019-2024). |
| New Nuclear (Wylfa Newydd / Moorside) | Proposals for new nuclear plants from Horizon at Wylfa Newydd and NuGen at Moorside continue with the ABWR and AP1000 technologies progressing through the Generic Design Assessment process and both developers preparing to submit planning applications in 2017. |
| Small Modular Reactors (SMRs | The first stage of a competition to identify and SMR to be built in the UK has launched. The government will publish an SMR delivery roadmap later this year. |
| Northern Powerhouse Rail | The government has welcomed recommendations to develop a long-term strategy for HS3, beginning with the Leeds-Manchester corridor, combined with more immediate action to improve the performance of key road and rail links in the north. |
| Shale Gas Exploration | The government is working so the potential of shale gas is explored in a safe environmentally sound way that maximises benefits to local areas. |
| South East Airport Capacity | The government is further considering the environmental impacts, including air quality, noise and carbon, and developing the best possible package of measures to mitigate the impacts of expansion on local communities and the environment. |
| Tidal Lagoons | The government has commissioned a review of the technology to improve understanding of how tidal lagoons could contribute to the future energy mix cost effectively, which will start this spring. |

[3] This is an indicative date.

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This document can be downloaded from www.gov.uk

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