

THE NATIONAL INFRASTRUCTURE ASSESSMENT

PROCESS AND
METHODOLOGY

A CONSULTATION

CHAIR'S FOREWORD



Developing the National Infrastructure Assessment will be an enormous piece of work.

Every aspect of the UK's economic infrastructure will need to be studied, assessed, and understood. But just as importantly, the National Infrastructure Commission will need a firm grasp on the inter-relationships between and across sectors as well as within them.

The Commission will seek to draw together expertise across every relevant sector, alongside unique and independent analysis to develop an assessment of the nation's infrastructure of the highest possible standard.

We do not take this task lightly. Indeed, the final assessment will represent a world first.

But the prize is great. Infrastructure governs every aspect of our lives from where we live, to how we work, and the ways in which we keep in touch with our friends and family.

What's more we spend billions on maintaining and improving our national infrastructure every year.

An objective, holistic analysis of the UK's infrastructure needs, and a strategic plan to address them, can help secure better infrastructure for us all, better value for money for the taxpayer, and certainty and security for investors.

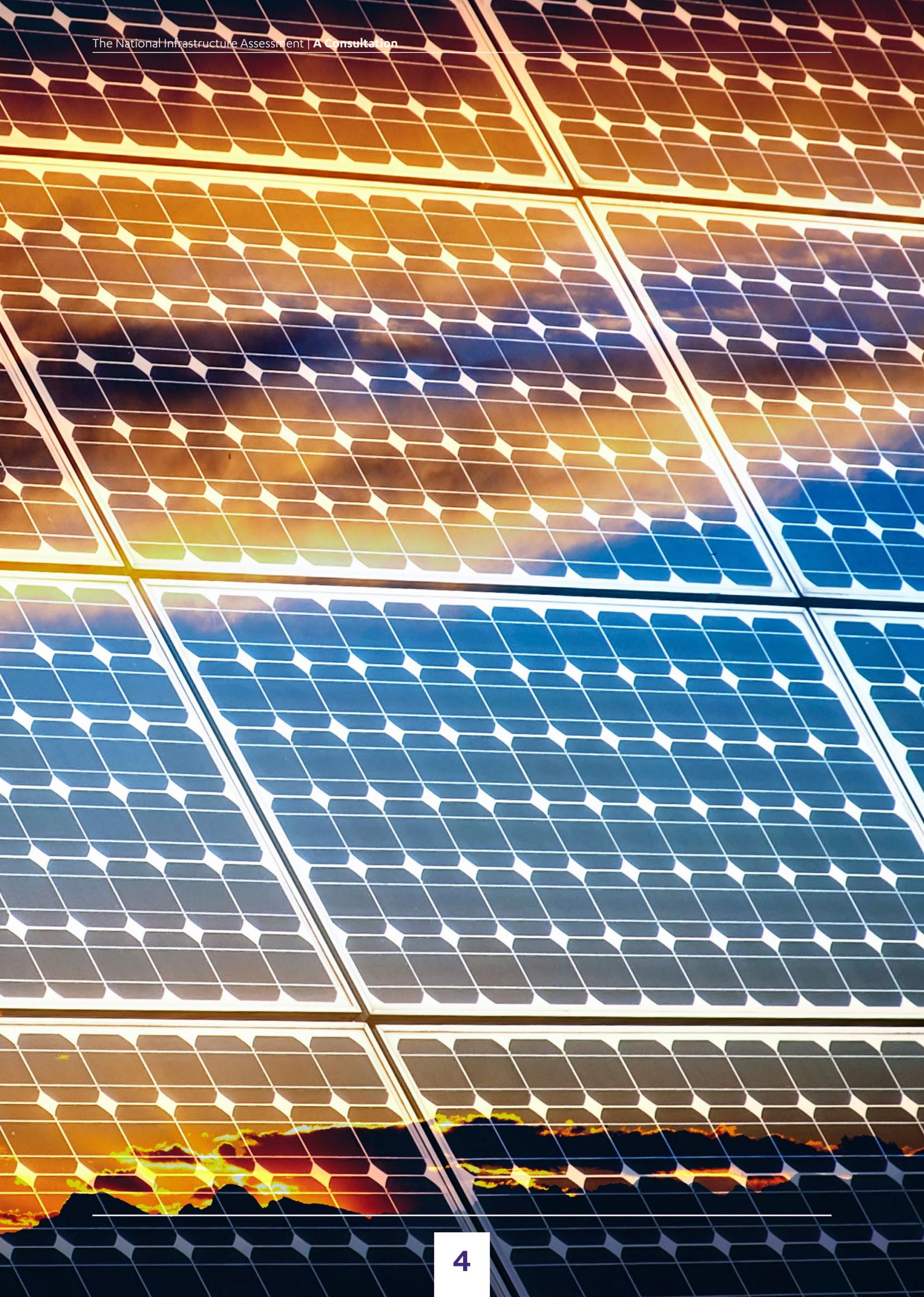
This document sets out a plan for producing a National Infrastructure Assessment. We welcome all contributions.

**Lord Adonis,
Interim Chair of the National Infrastructure Commission**



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EXECUTIVE SUMMARY

1. Although operationally independent, the National Infrastructure Commission is currently in interim form until being established in legislation. The interim Commission (referred to as 'the Commission' in this document) is functioning within the terms of reference laid out by the Government¹, which set out a central responsibility for the National Infrastructure Commission to produce a National Infrastructure Assessment (NIA) once a Parliament.
2. This document is a consultation on a possible approach to developing a NIA and represents views of the interim Commission, not Government Ministers. Since the legal establishment of the National Infrastructure Commission is still subject to Parliamentary process the final body may choose to review the way it undertakes its work. However, in order to assist in the development of the NIA, the interim Commission has decided to consult on a possible approach.
3. The first section of this document introduces the NIA and outlines its proposed aims and objectives. The second section then explores the possible scope and the stages in which its findings will be published. Section 3 sets out a possible methodology for the NIA, including a wide-ranging work programme and how these strands will be pulled together to form a suitable evidence base. Section 4 outlines the possible approach to external engagement and the opportunities for stakeholders to input into the process. Finally, Section 5 makes clear the governance and management of the NIA, including how the Government will treat its findings.

REMIT AND SCOPE

4. In developing its plan to establish the National Infrastructure Commission, the Government has set out a responsibility for the Commission to analyse the UK's long-term economic infrastructure needs, outline a strategic vision over a 30-year time horizon and set out recommendations for how identified needs should begin to be met. To meet this obligation the Commission intends to develop a National Infrastructure Assessment in two key stages:
 - **VISION AND PRIORITIES:** The first stage of the NIA process will be to determine a 'vision' of the UK up to 2050, to identify long-term infrastructure need in light of that vision and to highlight priority areas for action over the medium-term. This report will be published in summer 2017.
 - **A NATIONAL INFRASTRUCTURE ASSESSMENT:** The Commission will consult widely on the Vision and Priorities report to inform its final conclusions on the UK's infrastructure needs and priorities to 2050. The National Infrastructure Assessment will be published in 2018, containing recommendations for how the identified infrastructure

needs and priorities should be addressed. Government will be required to formally respond to the recommendations made.

5. The Government has clearly outlined the purpose and objectives of the National Infrastructure Commission:
6. “The National Infrastructure Commission will provide expert, independent advice on pressing infrastructure issues, and produce an in-depth assessment of the UK’s major infrastructure needs on a 30-year time horizon. Its objectives will be to:
 - Foster long-term and sustainable economic growth across all regions of the UK
 - Improve the UK’s international competitiveness
 - Improve the quality of life for those living in the UK”
7. The Commission will develop a NIA in line with these objectives, whilst ensuring that the recommendations are consistent with the UK’s carbon and environmental commitments. In developing an NIA the Commission will be:
 - Open, transparent and consultative
 - Independent, objective and rigorous
 - Forward looking, challenging established thinking
 - Comprehensive, taking a whole system approach, understanding and studying interdependencies and feedbacks
8. The Commission’s remit covers economic infrastructure. In line with this, the NIA will look across transport, energy, water and sewerage, flood defences, digital and communications and waste. The Government has decided that the Commission’s remit will not include housing supply directly. However, infrastructure can affect the viability of housing projects both large and small, and housing supply is an important driver of infrastructure need. As such, the Government envisage that “the commission will consider the potential interactions between its infrastructure recommendations and housing supply”. The NIA will not focus directly on ‘social’ infrastructure, such as schools, hospitals or prisons which are outside the remit that the Commission has been given by the Government.
9. In developing the NIA, the Commission will consider the demand and supply of infrastructure services, such as journeys or communication, as well as infrastructure assets, such as roads or fibre optic cables. This will allow the NIA to consider approaches, such as smart metering or peak time charging, that enable more effective use to be made of existing assets, as well as the case for new assets.

10. The NIA will assess the infrastructure system as a whole. It will look across sectors, identifying and exploring the most important interdependencies and resilience implications, showing both the opportunities and risks associated with the interactions between different sectors. The Commission will also look at cross-cutting issues which affect the delivery of infrastructure including governance, sustainability, funding and financing, costs, resilience, performance measurement and project appraisal methodology.
11. The Government has stated that the Commission will not re-open decision-making processes where programmes and work have been decided, or will be decided in the immediate future; and will not re-open closed price control settlements in regulated utilities. These areas are therefore out of scope for the NIA.

METHODOLOGY AND ENGAGEMENT

12. The Commission's work on the NIA will be taken forward in a number of stages. The Commission will begin by building a better understanding of the UK's existing infrastructure assets and the pipeline of projects across sectors. In addition, the Commission will assess the key drivers of demand and supply for infrastructure services, such as economic growth and technological change, to better understand their relationship with and impact on infrastructure. Alongside this, sector evidence reviews will be undertaken allowing the examination of existing plans alongside outputs from the various economic and engineering models which project long-term infrastructure need.
13. To build on this evidence base, the Commission will engage with a wide variety of stakeholders to make sure it has the necessary input in order to understand the needs and issues which affect each sector and infrastructure development as a whole in the UK.

ABOUT THIS CONSULTATION

14. Sections 2 to 4 of this document set out the Commission's proposed scope for and approach to the NIA and it is these sections which the Commission is consulting on. Although these consultation sections include targeted questions, the Commission would also welcome general responses relating to how the first NIA should be taken forward.
15. Responses to this consultation should be sent to NIAEvidence@nic.gsi.gov.uk by 5 August 2016. Following the close of this consultation the Commission will publish a response containing a summary of the evidence received and the Commission's intended approach in light of this evidence.
16. Please note that Section 5 outlines the governance and management of the NIA. These are principally matters for the Government rather than the Commission and so do not form part of this consultation.



1. INTRODUCTION TO THE NATIONAL INFRASTRUCTURE ASSESSMENT

17. Producing a National Infrastructure Assessment once a Parliament is a central responsibility of the National Infrastructure Commission. The NIA will analyse the UK's long-term infrastructure needs, outline a strategic vision over a 30-year horizon and set out recommendations for how these long-term needs should begin to be met. These recommendations will be made within the context of a fiscal remit set by the Government.

Government consultation document²: “The Commission will set out a clear picture of the future infrastructure we need, producing an in-depth assessment of the UK's major infrastructure needs on a 30-year time horizon. The Commission will build on the work of individual actors, including government departments, sub-national and regional bodies and regulators, using a robust, common methodology to develop needs assessments that take account of strategic cross-sector considerations.”

18. National Infrastructure Assessments will be laid before Parliament and HM Treasury will be required to respond on behalf of the Government. The Government will endeavour to respond within six months and will set a statutory deadline of 12 months for responding to all recommendations.
19. Commission recommendations accepted by the Government (‘Endorsed Recommendations’), will become Government policy. The Commission will have a duty to report annually on the Government's progress in delivering Endorsed Recommendations.

THE NEED FOR A NATIONAL INFRASTRUCTURE ASSESSMENT

20. In the Government’s consultation on establishing the National Infrastructure Commission² it said “The provision of new infrastructure in the UK has historically relied on an often fragile and incomplete political and public consensus. This has led to changes of direction and a lack of certainty. In the past, individual infrastructure proposals were discussed and assessed at length. The UK’s strategic infrastructure has suffered over recent decades from a legacy of under-investment and a poor record of long-term planning”.
21. Infrastructure is critical to the success of a strong, productive and competitive economy. It allows businesses to grow, develop supplier networks and deliver products and services efficiently. High quality infrastructure also helps to attract international investment. The UK needs to make sure that, given limited public and private funds, investment takes place in such a way as best to:
 - Foster long-term and sustainable economic growth across all regions of the UK
 - Improve the UK’s international competitiveness
 - Improve the quality of life for those living in the UK
22. Recent reviews of the UK’s approach to infrastructure³ have argued that the UK lacks a clear, long-term strategic vision for infrastructure. The Armitage Review made clear that “we urgently require a coherent 25-30 year national infrastructure strategy. This should be underpinned by an evidence-based assessment of our needs and clear plans as to how these needs will be fulfilled.” Reviews point to shortcomings in the UK’s approach, including policy uncertainty, reversals and prevarication, planning delays, ‘silo thinking’ and an inability to secure impartial advice and assessment.
23. Political considerations may mean that decisions on controversial projects are delayed or taken in the absence of objective evidence. Private investors may not always take the long-term view that the economy needs to ensure that infrastructure provision keeps pace with demand. Decisions can be taken in a siloed way and without consideration that choices in one sector can have profound effects in another. For example, electrifying transport and heat to meet the UK’s carbon targets could more than double demand on the power sector from today’s levels, meaning much more capacity would need to be built. There can also be lost opportunities, for example, maximising the use of energy from waste. Complementary project planning is rarely embraced.

24. The figure below sets out some of the problems which have been identified with long-term infrastructure planning in the UK and how the NIA can address them.
25. Long-term planning in a complex and ever changing world is difficult. No one can predict the future precisely but preparing for the future is essential. The Commission intends to analyse the likely paths going forward, create and debate credible scenarios, and open up an informed discussion about infrastructure needs and priorities.

The case for an independent National Infrastructure Assessment

PROBLEMS	NIA SOLUTIONS
Lack of long-term strategy leading to a piecemeal approach	A clear strategic vision, encompassing all infrastructure sectors
Siloed decision-making with no common approach between sectors	A structured methodology to consider interdependencies and prioritise across sectors
Fragile political consensus and short-term considerations cause uncertainty for investment	Propose recommendations consistent with a long-term objective
Lack of transparency, inadequate consultation and engagement which hinder consensus	Wide engagement and consultation
Innovative solutions and risky ideas are politically difficult decisions to take	Consider all potential solutions, including challenging ones
There needs to be better consideration across sectors of the UK's carbon targets	Our work will be compatible with all legally binding and long-term obligations including carbon targets
Government not held to account for delivering infrastructure	Objectively scrutinise Government action



2. REMIT AND PLAN

Sections 2 to 4 of this document set out the Commission's proposed scope for and approach to the NIA and it is these sections which the Commission is consulting on. Although these consultation sections include targeted questions, the Commission would also welcome general responses relating to how the first NIA should be taken forward.

OBJECTIVES OF THE NIA

26. The Government has outlined the objectives of the National Infrastructure Commission as follows: "The National Infrastructure Commission will provide expert, independent advice on pressing infrastructure issues, and produce an in-depth assessment of the UK's major infrastructure needs on a 30-year time horizon. Its objectives will be to:
 - Foster long-term and sustainable economic growth across all regions of the UK
 - Improve the UK's international competitiveness
 - Improve the quality of life for those living in the UK"
27. The Commission will develop a NIA in line with these objectives, whilst ensuring that the recommendations are consistent with the UK's carbon and environmental commitments.
28. As part of delivering the NIA, the Commission propose to identify infrastructure needs and priorities; assess current and likely future plans for infrastructure investment; highlight areas where further action is needed; and make recommendations for next steps.
29. In developing these recommendations, the Commission will need to identify through the NIA process solutions which are good value for money for those who rely on, and ultimately pay for, infrastructure. NIA recommendations will not only consider what new physical infrastructure is needed, but also how to be more efficient through managing demand or increasing the capacity of existing assets to provide infrastructure services.
30. Recommendations set out in the NIA will be made within the context of the remit letter set by the Government.

The remit letter: The Government will set out in legislation the Commission's main duties, and its remit to identify needs and make recommendations in relation to economic infrastructure. The legislation will also impose a duty on the Government to issue a remit letter to the Commission once in every Parliament. The remit letter will be a public document, sent from the Chancellor to the chair of the Commission once a Parliament. In this letter, the Chancellor, on behalf of Government will set a fiscal remit for the Commission. This fiscal remit will apply to all Commission recommendations which have public spending implications, whether set out in the NIA or in specific studies. It will ensure that the Commission considers the affordability of different options and delivers recommendations that are realistic. The legislation will give the Chancellor flexibility over the design of the fiscal remit. For instance, the Chancellor will be able to choose whether to give the Commission a single fiscal envelope or a range of fiscal scenarios to base its work around.

PRINCIPLES

31. In developing an NIA consistent with the objectives given above the Commission will be:
- **Open, transparent and consultative:** The Commission wants to capture the expertise and opinions of people from across industry, business, central and local government, academia, civil society and the wider public.
 - **Independent, objective and rigorous:** The Commission will form a clear, dispassionate assessment of the UK's infrastructure needs, built on extensive expertise and a robust methodology.
 - **Forward looking, challenging established thinking:** Technological and social change is taking place rapidly, creating challenges and opportunities for the UK. The Commission will assess the impact of technology and social change on the supply of and demand for infrastructure services and look to make recommendations which are affordable in and robust to multiple future scenarios.
 - **Comprehensive, taking a whole system approach, understanding and studying interdependencies and feedbacks:** The NIA will assess the UK's infrastructure system as a whole. It will look across sectors, identifying and exploring the most important interdependencies and resilience implications. Only by doing this will it be possible to facilitate proper planning and prioritise investment across the full range of infrastructure sectors.

Q1. The Government has given the National Infrastructure Commission objectives to:

- foster long-term and sustainable economic growth across all regions of the UK
- improve the UK's international competitiveness
- improve the quality of life for those living in the UK

What issues do you think are particularly important to consider as the Commission works to this objective?

Q2. Do you agree that, in undertaking the NIA, the Commission should be:

- Open, transparent and consultative
- Independent, objective and rigorous
- Forward looking, challenging established thinking
- Comprehensive, taking a whole system approach, understanding and studying interdependencies and feedbacks?

Are there any principles that should inform the way that the Commission produces the NIA that are missing?

THE KEY PUBLICATIONS

Summer 2017: Vision and Priorities

32. The first stage of the NIA process will be to determine a 'vision' of the UK up to 2050, identify long-term infrastructure need in light of that vision and to highlight priority areas for action over the medium-term. This will be set out in an initial report published in summer 2017.
33. Given the uncertainties associated with any long-term forecast, the Commission will consider a range of possible scenarios to better understand long-term needs and challenges. The vision will aim to put into context where the UK is headed, identify gaps and issues which are present across a number of scenarios, and highlight the most critical interdependencies. Alongside this, the report will consider the critical drivers of infrastructure need and how these might develop over the long-term. The Commission has identified the critical drivers as:
 - Economic growth and productivity
 - Population and demography
 - Technology
 - Climate change and environment

34. This first report will also look at key infrastructure sectors over the medium-term, examining current strategies and pipelines, identifying the potential capacity constraints and assessing compatibility of existing plans with long-term needs. The priorities identified will be analysed against the NIA's objectives and, where relevant, the importance of ensuring the current strategic direction is compatible with 2050 scenarios.
35. Alongside this analysis of the demand and supply of infrastructure services, the Commission will also look to understand the cross-cutting issues which are critical to infrastructure development and investment; such as funding and financing, sustainability, resilience, inter-sectoral dependencies, and project appraisal methodology.
36. The Vision and Priorities publication will set out the Commission's emerging position. It will then be publically consulted on before recommendations to the Government are finalised for the National Infrastructure Assessment.

2018: A National Infrastructure Assessment

37. The second stage of the NIA process will be to develop a final view of the UK's infrastructure needs and priorities out to 2050 and to put forward recommendations to address them, drawing upon responses to the consultation on the initial Vision and Priorities document. The Commission will consider the full range of possible measures to address infrastructure gaps including considering the right balance of spend; for example between new construction and maintenance. Therefore recommendations may include:
 - Policies – such as a change to regulation or new financing regimes
 - High level priorities – such as better demand management or different levels of spending on maintaining existing assets
 - Specific projects – such as a new bridge, increased water capacity or pilot schemes
 - Further areas of work – such as:
 - a new taskforce to do more detailed work on an infrastructure priority
 - further study of assumptions underpinning the Commission's vision of the future
38. On publication of the NIA in 2018 a copy will be laid before Parliament and the Government will be required to respond formally. The Government will endeavour to respond within six months, and will set a statutory deadline to respond to National Infrastructure Commission recommendations within 12 months.

WHAT THE NIA WILL COVER: SECTORS

39. The remit which the Government has given to the Commission is focused on economic infrastructure. This can be defined in terms of both physical assets and the infrastructure services that they provide. Infrastructure assets (which includes natural assets like rivers and flood plains) operate in networks and systems to provide infrastructure services. For example, roads, rail, ports and airports (infrastructure assets) allow the movement of people and goods (infrastructure services). In turn, these enable people to get to work, businesses to interact with supply chains, and goods and services to reach their customers.
40. Infrastructure services enable a wide range of economic and social activities to take place; for example it allows the movement of goods around the country and means that friends and family can keep in touch over large distances. It is the network characteristics of infrastructure and the wide range of activities it supports which make it so important.
41. The Commission will cover all economic infrastructure in the NIA but sectors will not be tackled independently from each other. The NIA will be developed by assessing the infrastructure system as a whole. It will look across sectors, identifying and exploring the most important interdependencies and resilience implications, showing both opportunities and risks of interaction between different infrastructure sectors. In terms of the individual sectors, the Commission propose to cover these in the following way.
42. **Transport:** The Commission will adopt a multi-modal approach to the analysis of transport need, looking at how key road, rail, ports, airports and other transport arteries support the movement of people and freight into and across the country. A critical interdependency which the NIA will aim to better understand is the impact of future transport provision on the energy sector; in particular the potential implications of large-scale car, lorry and rail electrification.
43. **Digital and communications:** The NIA will cover all areas of infrastructure needed in the deployment of next generation digital communications, looking across the range of data transmission technologies. Digital communications are particularly important given that digital infrastructure has the potential to deliver more efficient use of infrastructure assets across different sectors (such as in energy through the internet of things).
44. **Energy:** The NIA will cover the energy system as a whole, including the interaction between electricity, heat and transport. It will build on the work of the 'Smart Power' report which was delivered in March⁴ and continue to consider how the energy system as a whole will function. The Commission are particularly aware of the importance of looking at the future of heating and the shift to low carbon solutions in the context of the UK's carbon targets, and the important role that increasing energy efficiency could potentially play. The intention is that the NIA will not cover upstream energy extraction and processing (such as North Sea oil and gas or refineries).

45. **Water and drainage:** The NIA will look at both the public water supply and water used across other sectors (such as agriculture, energy and food processing) to make sure that long-term plans are consistent with the future needs of people, businesses and the environment. This is especially important when considering the effect of climate change on the availability of water. The need for water supply will be considered directly alongside the issues and needs of the waste water and sewage sector.
46. **Flood defences:** The NIA will assess the level of flood risk across the UK and how it might change over the period to 2050. It will consider whether the current strategy is consistent with a value-for-money approach for dealing with the issue of floods in the long-term. The Commission also intends to consider how current plans allow the protection of key strategic pieces of infrastructure in other sectors, and if plans for new large scale infrastructure (such as a new road) could be developed jointly with flood defence.
47. **Waste:** The NIA will review long-term objectives and strategy in both waste reduction and management, ensuring they represent a cost-effective approach as the UK moves towards a more circular economy. The Commission will consider whether the current strategy is suitably forward looking, taking account of the adoption of more circular business models (which produce much less waste) and changes in technology and consumer behaviour.

The built environment: The Government have decided that the Commission’s remit will not include housing supply directly. However, infrastructure can affect the viability of housing projects both large and small, and housing supply is an important driver of infrastructure need. As such, the Government’s remit envisages that “the Commission will consider the potential interactions between its infrastructure recommendations and housing supply. Information about the potential locations of strategically important housing allocations, such as new settlements and urban extensions when they come forward, will be an important component of the evidence base collected by the Commission, which it may use to assess infrastructure needs and make recommendations that co-ordinate the timing and delivery of new infrastructure with the delivery of new housing.”

Q3. Do you agree that the NIA should cover these sectors in the way in which they are each described?

Q4. Are there particular aspects of infrastructure provision in these sectors which you think the NIA should focus on?

Q5. The NIA will seek to pull together infrastructure needs across sectors, recognising interdependencies. Are there are particular areas where you think such interdependencies are likely to be important?

CROSS-CUTTING ISSUES

48. The previous section outlined the current intended areas of focus for each of the sectors of economic infrastructure which the NIA will cover. In addition, there are a number of systemic or cross-cutting issues which will need to be considered as the NIA is developed as set out below.
49. **Geography and local growth:** The NIA will seek to understand how economic and physical geography relates to infrastructure provision and development and in turn how infrastructure can shape economic geography. It will look at the role of economic devolution in infrastructure development and consider how its recommendations affect the entire country and local areas.
50. **Funding and financing:** The NIA will consider the existing funding and financing models in place for large scale infrastructure and consider whether there are alternatives which could help to deliver infrastructure in a more affordable way.
51. **Cost, delivery and resilience:** The NIA will consider what drives the cost of infrastructure projects in the UK and whether those costs could be reduced, drawing on international evidence. The NIA will also consider how cost relates to the quality and resilience of infrastructure and the level of risk taken across different sectors.
52. **Sustainability:** In developing the NIA the Commission will analyse whether the existing approach to infrastructure is compatible with the UK's carbon and environmental commitments and consider if different or further action is needed.
53. **Governance and decision making:** The NIA will consider the current institutional frameworks for infrastructure investment and planning in both Government and in regulated utilities and will assess if these are fit for purpose to meet the infrastructure needs of the future. It will also consider the planning system and how this interacts with decision making to facilitate delivery.
54. **Evaluation and appraisal methodology:** The NIA will assess current appraisal methods for large infrastructure projects and test whether wider benefits, such as system effects, are effectively captured. The NIA will therefore examine existing frameworks and consider if they are suitable for large and nationally significant infrastructure projects. The case for alternative models will also be considered.
55. **Performance measures:** The NIA will examine existing performance measures for infrastructure assets and the services they provide. Some widely used metrics such as levels of public infrastructure investment or physical indicators of service or coverage (e.g. kilometres of road or number of phone lines) are proxies that fail to account for the value and quality of the services provided. The NIA will try to bring together the evidence available and identify the most appropriate way of systematically measuring the performance of infrastructure assets and services.

Q6. Do you agree that the NIA should focus on these cross-cutting issues?

Q7. Are there any other cross-cutting issues that you think are particularly important?



3. METHODOLOGY

56. This section sets out a possible methodology for the NIA, including a wide-ranging work programme and how these strands will be pulled together to form a suitable evidence base.
57. Making an assessment of infrastructure need over the next 10 to 30 years is difficult. To help in looking over the long-term, the NIA will consider a range of scenarios to help understand how the UK's infrastructure requirements could change in response to different assumptions about the future. These scenarios will be based on available empirical evidence about past trends and quantitative and qualitative forecasts of changes in the economy, population and demography, climate and environment, and technology.
58. Scenarios are a widely-used approach to addressing the inherent uncertainty in planning for the future as they can help answer 'what if' type questions and understand how the future might look based on different assumptions. In turn, this provides insight into questions of the form 'what would you have to believe to prefer one choice over an alternative?'
59. Many existing infrastructure models are designed around scenario analysis. However, not all scenarios are equally likely. A disadvantage of the approach is that it does not provide a probability distribution for the range of possible outcomes. This will be important for the Commission to bear in mind in considering the results of any scenario analyses.
60. The NIA will also look in detail at each sector, analysing the information available from expert bodies (including government departments, industry, academia, civil society and others) and engage widely to understand stakeholders' views on the UK's infrastructure needs and priorities. Through this engagement and examination of sectors, the Commission will highlight major infrastructure challenges in sectors and across them.
61. The NIA will then consider how the range of infrastructure needs and priorities should be met, for example, through the maintenance of the existing stock, investing in new infrastructure, developing new and innovative strategies for capacity and efficiency enhancement, or through demand management strategies (such as incentivising people to use transport at non-peak times to reduce congestion). It will look at the costs and benefits of different strategies including wider economic, social and environmental benefits.
62. Given the level of uncertainty in predicting the future, the NIA will need to consider strategies which are sensible across a wide range of possible futures; for example by allowing supply to respond more flexibly to different patterns of demand.



BUILDING THE EVIDENCE BASE: VISION AND PRIORITIES

63. The first stage of the NIA process, which will aim to establish the UK's future needs and to understand key issues, will incorporate the following main elements:
64. **Understanding the infrastructure baseline:** To be able to predict future infrastructure needs, the NIA needs to appraise the quality and condition of the UK's existing infrastructure assets. To do this, relevant information on infrastructure will be brought together to map the baseline stock. This will be complemented by data on the existing pipeline of projects such as that already provided by the National Infrastructure Pipeline and, in more detail, by the National Infrastructure Delivery Plan.
65. **Studying the key drivers of infrastructure:** The Commission has identified four key drivers: economic growth and productivity, population and demography, climate change and environment, and technology. The NIA will investigate the relationship between these drivers and infrastructure, as well as how the most likely trends and projections in each case could affect infrastructure demand. These drivers cannot be analysed in isolation, so the interdependencies across them and their interaction with infrastructure will be explicitly considered and examined. This interaction includes the feedback loops by which infrastructure can also affect each of the drivers. The outcome of this analysis will help the Commission take a long term, thirty-year view and support the development of the Commission's vision, alongside the output of its modelled scenarios.
66. **Modelling and analysis:** Developing the NIA will require detailed modelling across each of the sectors: infrastructure systems are too complex to avoid the need for analysis of this kind. However, modelling can never provide a definitive answer: models are representations of the real world which add insight but necessarily simplify. Modelling will therefore provide context for the Commission's judgements but is not a substitute for them. In the time available, the Commission is unlikely to be able to build anything other than simple models of its own. This first NIA will therefore predominately rely on existing models. The Commission will work with infrastructure experts, including government departments and public bodies as well as the industry leaders, to establish how current investment in infrastructure is determined, analyse their methodological approach, and develop best practice guidelines where necessary. Alongside this, the Commission will also explore models capable of looking across sectors and which are able to explicitly account for interdependencies and synergies.
67. **Sector and geographical evidence reviews:** Throughout this process the Commission will speak to industry, central and local government and regulators about their projections and plans. The Commission will pull together and scrutinise the existing evidence base and compare and contrast how current strategies stack-up against its assessments of long-term need and priorities.
68. **Prioritisation:** The NIA will consider how the identified demand for infrastructure can be met most cost-effectively and in line with the

Commission's governing objectives, including by direct capital expenditure, changes to regulatory or market structures, strategies for capacity and efficiency enhancement, or demand management strategies. The Commission will work closely with relevant Government departments on this, making use of their existing evidence base. The Commission will establish how different options requiring public expenditure stack up within its fiscal remit and look at the impact on consumers of options in other sectors. This will include sub-national analysis as well as consideration of national priorities. To do this, the Commission will evaluate current appraisal methodologies and proposals for methodological development. It will also work with experts in the field to ensure the analytical robustness of potential choices and to test these choices against uncertainty. As with the entire development of the NIA, all results and conclusions will be tested in public and with key stakeholders, allowing the Commission to take in a wide range of views before making any judgment.

Q8. Do you agree with this methodological approach to determine the needs and priorities?

Q9. Do you have examples of successful models which are particularly good at looking at long-term, complex strategic prioritisation in uncertain environments?

Q10. Do you believe the Commission has identified the most important infrastructure drivers (set out below)? Are there further areas the Commission should seek to examine within each of these drivers?

KEY INFRASTRUCTURE DRIVERS IDENTIFIED BY THE COMMISSION

Population and demography

Population and demography (such as trends in population growth, in where people live and work and in ageing), has a direct impact on infrastructure requirements. For example, holding all else equal, population growth increases demand for infrastructure. Differences in population characteristics and behaviours can also have a significant impact on infrastructure requirements: different people have different infrastructure needs and react in different ways to what is provided. Where people will live, and how they will travel, will be a key determinant for infrastructure needs. This is in turn determined by the infrastructure provided as, for example, people will be attracted to living in areas with good amenities and quality infrastructure. All factors relating to population and demography, including feedback loops, will be considered by the Commission.

Economic growth and productivity

Economic growth can drive infrastructure demand in different ways depending on the composition of the economy, and the type of goods and services that are produced. At the same time, infrastructure may affect economic growth. This is a complex link which the Commission will explore at both a national level and more disaggregated geographical levels, such as regions and cities. To provide just one example, agglomeration – bringing clusters of similar economic activity together in the same place – can increase the productivity of firms and workers. Firms that locate close to similar firms may be more productive for a range of reasons, including access to deeper markets for their products, for hiring workers and for supply chains, and the informal exchange of knowledge between workers. This is a key reason behind the formation of ‘central business districts’ where very large numbers of people work in small geographic areas. Infrastructure can play a key role in enabling agglomeration benefits to be realised.

Technology

Technology can have profound and diverse impacts on markets for goods and services, and how infrastructure is delivered and used. The impacts range from increasing efficiency, such as smart ticketing and smart meters, to providing entirely new functionality and availability of services (new forms of transport such as autonomous vehicles, new means of energy provision). New technologies may create a need for entirely new infrastructure systems: the 20th Century saw the development of airports, container ports, motorways and broadband, none of which existed in the previous century, but equally developments in technology – such as new storage technologies in the energy sector – may enable radical improvements in the usage of existing infrastructure. Rather than providing predictions around which technologies will become prevalent, the Commission will seek to understand how the most important technologies can affect supply and demand for infrastructure services; and how to ensure decisions are robust to different future scenarios to minimise asset stranding and facilitate smooth transitions to effective technological scenarios.

Climate change and environment

The Commission will examine climate change mitigation and the associated targets to reduce emissions, and the need to enhance our environment when choosing what and how infrastructure services are delivered. The physical effects of a changing climate will have an increasingly strong impact on our living environment and infrastructure. This will present an infrastructure resilience challenge. The future state of the environment including the effect of climate change will also change the supply of environmental services we require such as water abstraction. A key question for the NIA will be how resilient we want our infrastructure to be to potential future extreme events.

FINALISING THE NATIONAL INFRASTRUCTURE ASSESSMENT

69. The Vision and Priorities document, to be published in summer 2017, will set out the Commission's proposed long-term vision, the priority areas for action and options to address the needs identified. This document will form the basis for a full public consultation, with the responses used to both test judgments made and to further input into the development of recommendations.
70. There is a large amount of inherent uncertainty that must be dealt with due to the long-term horizon of the NIA. Strategies will need to be tested across scenarios to allow the Commission to determine a portfolio that is as robust as possible to these uncertainties. With this in mind, during the second stages of the NIA process the Commission expects to undertake the following tasks.
71. **Modelling and analysis:** The Commission will continue to develop and refine its modelling capability, informed by the responses to the public consultation. The focus will begin to shift away from determining long-term need and towards developing specific recommendations that address the issues identified and consulted upon in the Vision and Priorities publication. The Commission will seek to model portfolios of interventions, so as to capture the interactions between different options, rather than simply looking at each option in isolation. This will also require consideration of how the costs and benefits of potential options vary across scenarios. For example, options that are mildly beneficial in virtually all circumstances will need to be balanced against those which are strongly beneficial in some circumstances but much less so in others. Constructing portfolios will help the Commission determine how to prioritise within the fiscal remit for public expenditure which the Government has set, how to balance the scale of investment in other sectors against its impact on consumers, and which recommendations offer the best approach to meet its objectives.
72. **Sector and geographical evidence reviews:** The Commission's sector and geographical analyses will continue to assess how the range of strategies currently presented in the sectors and in cities and regions can address the needs and priorities being identified in the NIA.
73. **Detailed analysis of specific issues:** It is likely that while the Commission undertakes the work on the Vision and Priorities, particular issues will arise for which targeted detailed scrutiny is justified. In these cases, the Commission may take forward in-depth reviews which could feed into the final NIA.

Q11. The NIA will aim to set out a portfolio of investments that best meets the demands of the UK in the future. Do you have a view on the most appropriate methodology to determine that portfolio?

Q12. In your view, are there any relevant factors that have not been addressed by the Commission in its methodological approach?





4. ENGAGEMENT: GETTING YOUR VOICE HEARD

The Commission's work will be open, transparent and consultative – capturing the expertise and opinions of people from across industry, business, central and local government, academia, civil society and the wider public

74. The Commission wants to capture the expertise and opinions of a wide range of stakeholders. This includes engaging internationally to look at how other countries approach long-term infrastructure planning and learn from best practice. The NIA will be developed openly and consultatively; stimulating debate, building support and consensus, promoting the benefits of infrastructure, and engaging with public concerns.
75. The Commission intends to use a variety of engagement tools to understand the needs and issues which affect each sector and infrastructure development as a whole in the UK. Getting the views and opinions of people who are active day to day in delivering major infrastructure will be especially important when looking in detail at the issues of geography and regional growth, project delivery, and governance and decision making.
76. It will also be invaluable to have input into potential solutions for addressing the infrastructure need and to understand the critical interdependencies across sectors; including how better coordination across projects could lead to savings or increased opportunities. The Commission will particularly seek to understand what the wider public believes the priorities for infrastructure services should be.
77. The NIA will be developed through an open, transparent and consultative process. All of the work, from considering scenarios to drawing conclusions and making recommendations will be tested rigorously through engagement. The following pages set out how and when the Commission intends to undertake this engagement.
78. **Public consultations and publications:** There will be two formal public consultations, beginning with this document. In addition, the 'Vision and Priorities' document in 2017 will set out the Commission's initial conclusions in developing the NIA and will act as a formal consultation which will inform the final assessment and recommendations. The Commission will also publish details of its analysis and findings in key areas throughout the NIA process, seeking input and feedback on specific areas of work.
79. **Call for evidence:** The Commission intends to run a large-scale call for evidence in the autumn of 2016. This will ask a set of targeted questions which will help plug the gaps in the evidence base, as well as providing a broader opportunity

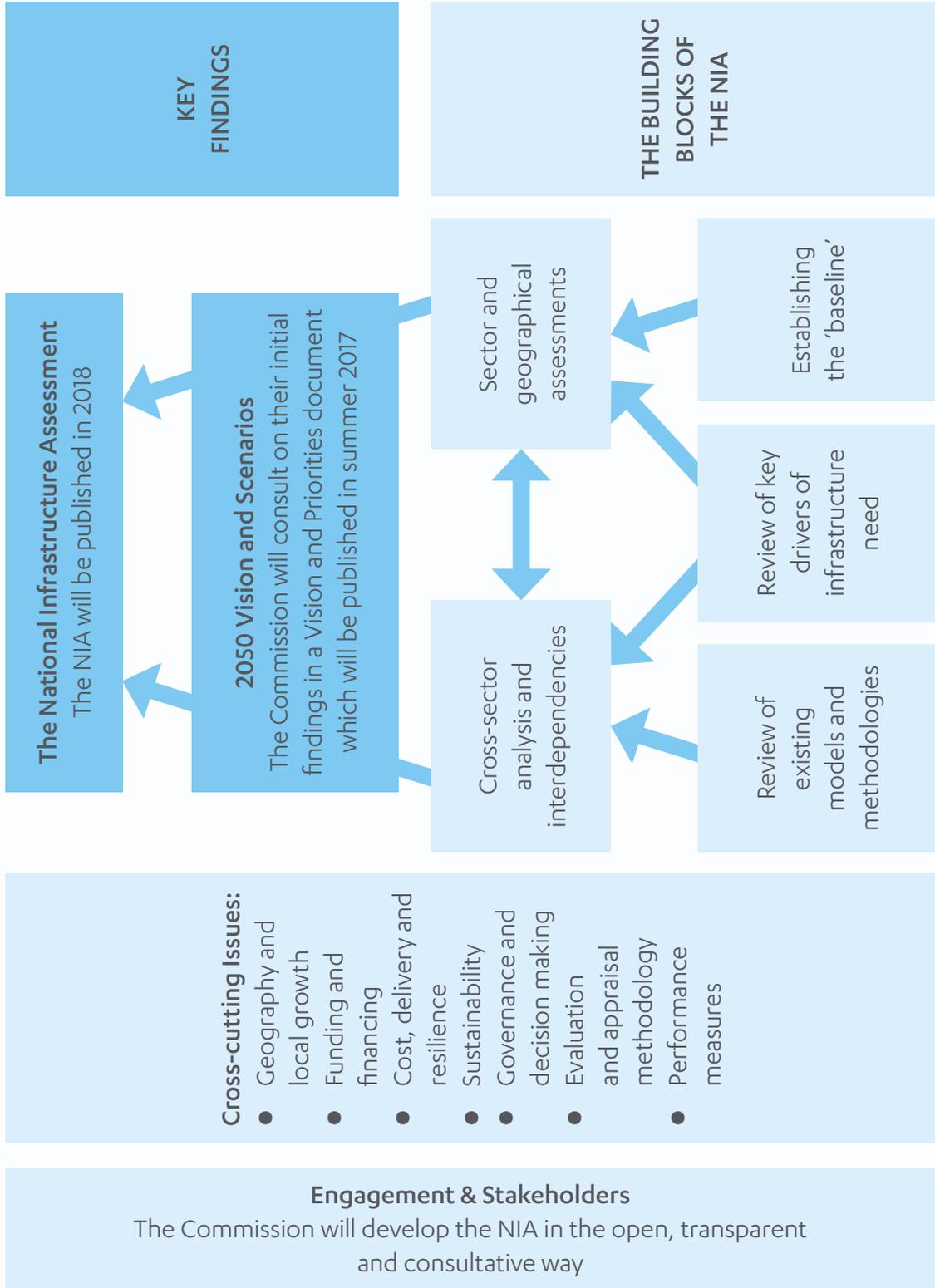
for interested parties to input into the NIA process. All responses will be welcome, whether from industry, government, academia, civil society or the wider public.

- 80. **Expert roundtables:** At key points throughout the NIA process, the Commission will consult expert opinion on specific areas of interest. To help capture this, the Commission will host roundtables with particular experts relevant to the sector or issue on which input is required. The Commission will invite experts from a diverse range of backgrounds so that it captures a broad spectrum of views.
- 81. **Social research:** The Commission will seek to understand the views and opinions of the public, particularly in relation to public support for major projects and potential solutions to address the UK’s infrastructure need. The Commission expect to employ a variety of social research and engagement tools to achieve this.
- 82. **Panels of experts:** The Commission plans to set up expert panels, covering economics and social science, finance and investment, and engineering and science. The panels would help the Commission to access, interpret and scrutinise the evidence base and provide advice on the quality of work produced by, or on behalf of, the Commission.
- 83. Alongside this engagement programme the Commission will identify and meet key stakeholders from across infrastructure sectors and related disciplines as we seek input across the development of the NIA.

Q13. How best do you believe the Commission can engage with different parts of society to help build its evidence base and test its conclusions?



PULLING THE NIA TOGETHER





5. GOVERNANCE AND MANAGEMENT

84. This section is not subject to consultation as the issues described are principally matters for the Government and not the Commission.

GOVERNANCE

85. The NIA is a long-term strategic assessment covering a broad spectrum of infrastructure issues and sectors. Its successful delivery will require the Commission to be objective, work independently and have a proper governance structure. The Government's consultation response, released on 18 May 2016, has set out the likely governance, structure and operation of the Commission, although the exact details are still subject to Parliamentary approval.
86. The Chair and the Commissioners of the NIC will be collectively responsible for the overall development and production of the NIA. They will take responsibility for guiding the direction of the work programme and ensuring the quality of delivery. The Commissioners will meet on a regular basis to lead discussion and debates, engage with leaders in each sector, provide feedback and guidance, and agree their recommendations and decisions on key issues.

REMIT LETTER

87. The legislation establishing the Commission will set out its main duties and its broad remit to identify needs and make recommendations in relation to economic infrastructure. In addition, the Chancellor of the Exchequer will then send a more detailed remit letter, which will be a public document, to the Chair of the Commission once a Parliament.
88. The Government's response to consultation sets out that in this letter, the Chancellor, on behalf of Government, will set a fiscal remit for the Commission. It states that: "This fiscal remit will apply to all Commission recommendations which have public spending implications, whether set out in the NIA or in specific studies. It will ensure that the Commission considers the affordability of different options and delivers recommendations that are realistic. The legislation will give the Chancellor flexibility over the design of the fiscal remit. For instance, the Chancellor will be able to choose whether to give the Commission a single fiscal envelope or a range of fiscal scenarios to base its work around."

FUTURE ITERATIONS

89. Given that this kind of cross-sector assessment has not been undertaken at a national level before in the UK, the Commission expect the process and methodology to continue to evolve in future iterations of the NIA. These will be able to build on the evidence base underpinning this initial version of the assessment, and to refine and improve the modelling and analytical approaches used. In addition, the content and structure of future NIAs will need to reflect the outputs of the Commission's assessments and its strategic priorities at the time.

DEVOLVED ADMINISTRATIONS

90. In line with the Government's consultation on the governance and remit of the Commission, the NIA will cover the areas of infrastructure under the UK Government's responsibility. The Government is considering options for the Commission, UK Government and the Devolved Administrations to develop arrangements to allow for circumstances where their respective responsibilities interact.

OVERLAP WITH OTHER BODIES AND ORGANISATIONS

91. The Commission will work closely with relevant bodies and organisations (including regulators, central and local Government and arms length bodies), particularly when the Commission's remit overlaps. For further information on how the Commission will interact with Government departments, Devolved Administrations as well as other stakeholders such as regulators, please refer to HM Treasury's response to their consultation³ on National Infrastructure Commission dated 18 May 2016.

TAKING THE NIA RECOMMENDATIONS FORWARD

92. In order to ensure that NIA recommendations are given due consideration by the Government, the Government's consultation response states that the Government will endeavour to respond within six months, and will set a statutory deadline of 12 months. The Government's consultation response sets out the steps the Government will take to reform the planning system to ensure that where recommendations are accepted by the Government, they can be taken forward swiftly.
93. The Commission will then hold the Government to account on the delivery of Endorsed Recommendations. It will have a duty to report annually on the Government's progress, drawing on data collected by the Infrastructure and Projects Authority.



ABOUT THIS CONSULTATION

94. Although operationally independent, the National Infrastructure Commission is currently in interim form until formally being established in legislation. The interim Commission (referred to as 'the Commission' in this document) is functioning within the terms of reference laid out by the Government, which set out a central responsibility for the National Infrastructure Commission to produce a National Infrastructure Assessment (NIA) once a Parliament.
95. This document is a consultation on a possible approach to developing a NIA. It represents views of the interim Commission, not Government Ministers. Since the legal establishment of the National Infrastructure Commission is still subject to Parliamentary process the final body may choose to review the way it works. However, in order to assist in the development of the NIA, the interim Commission has decided to consult on a possible approach.
96. Representative groups responding to this consultation are asked to give a summary of the people and organisations they represent, and where relevant who else they have consulted in reaching their conclusions when they respond.
97. The Commission is subject to legal duties which may require the release of information under the Freedom of Information Act 2000 or any other applicable legislation or codes of practice governing access to information
98. If you want the information that you provide to be treated as confidential, please be aware that, under the Freedom of Information Act 2000, there is a statutory code of practice with which public authorities must comply and which deals, amongst other things, with obligations of confidence. The Commission is within the scope of the Freedom of Information Act. In view of this it would be helpful if you could explain to us why you regard the information you have provided as confidential. If we receive a request for disclosure of the information we will take full account of your explanation, but we cannot give an assurance that confidentiality can be maintained in all circumstances. An automatic confidentiality disclaimer generated by your IT system will not, of itself, be regarded as binding on the Commission.

99. The Commission will process your personal data in accordance with the Data Protection Act 1998 and in the majority of circumstances this will mean that your personal data will not be disclosed to third parties. Individual responses will not be acknowledged unless specifically requested.
100. Your opinions are valuable to us. Thank you for taking the time to read this document and respond. Responses to this consultation should be sent to NIAEvidence@nic.gsi.gov.uk by 5 August 2016.
101. In exceptional circumstances we will accept submissions in hard copy. If you need to submit a hard copy, please send your response to the Commission Secretariat at the following address:

NIA Evidence
National Infrastructure Commission
1 Horse Guards Road
London
SW1A 2HQ

102. Are you satisfied with this consultation? If not, or you have any other observations about how we can improve the process, please contact us at:

National Infrastructure Commission,
1 Horse Guards Road
London
SW1A 2HQ

or by e-mail to: NIAEvidence@nic.gsi.gov.uk

REFERENCES

- 1 National Infrastructure Commission: response to the consultation (May 2016)
- 2 National Infrastructure Commission: Consultation (January 2016)
- 3 The Armitage Review (2013), The LSE Growth Commission report (2013)
- 4 Smart Power, the National Infrastructure Commission (2016)

