

THE NATIONAL INFRASTRUCTURE ASSESSMENT

PROCESS AND
METHODOLOGY

CONSULTATION RESPONSE

The National Infrastructure Commission is currently operating in interim form until it is formally established on a permanent basis in January 2017.

On 12 October 2016, the government published its Charter for the National Infrastructure Commission. The Charter states that the Commission is a permanent body that “will operate independently, at arm’s length from government, as an executive agency of HM Treasury.”¹ The Commission will continue on an interim footing until it – and the Charter – formally comes into force. (The National Infrastructure Commission is and will remain operationally independent throughout the process. As such no distinction is made between the Commission’s interim and permanent forms. It is referred to as ‘the National Infrastructure Commission’ or ‘the Commission’ throughout this document.)

It is functioning within the terms of reference laid out by the government, which set out a central responsibility for the Commission to produce a National Infrastructure Assessment (NIA) once a Parliament. While the government sets the overall remit for the Commission (and the terms of reference for the in-depth studies that it carries out), in all other respects the Commission has complete discretion to independently determine its work programme, methodologies and recommendations, as well as the content of its reports and public statements.

This document is a response to the Commission’s consultation on a possible approach to developing a NIA; it represents the views of the Commission, not government ministers.



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EXECUTIVE SUMMARY

1. On 26 May 2016, the National Infrastructure Commission (the Commission) published a consultation on the process and methodology for putting together the first ever National Infrastructure Assessment (NIA). The consultation closed on 5 August, with the Commission receiving over 170 responses to the questions posed (see Appendix A). These were largely supportive of both the Commission and the proposed approach to the NIA.
2. Since then, the government has published the Charter for the National Infrastructure Commission, which confirms that the Commission “is a permanent body which will provide the government with impartial, expert advice on major long-term infrastructure challenges.” In the Charter, the Commission commits to delivering “a National Infrastructure Assessment once in every Parliament, setting out the Commission’s assessment of long-term infrastructure needs with recommendations to the government.”
3. This document sets out the Commission’s response to its consultation and further details on the process and methodology for the NIA. Alongside this, the Commission is launching a [call for evidence](#) and encourages stakeholders to make submissions relevant to the full range of sectors and issues covered by the NIA. This will be complemented by a programme of stakeholder engagement (further details are set out below).
4. The Commission believes that the NIA will only be a success if it is undertaken in an open and transparent way, engaging a wide range of stakeholders. This means making sure there is an ongoing engagement process that is able to capture the expertise and opinions of people from across industry, business, central and local government, regulators, academia, civil society and the wider public. The consultation was a first step in this process and the Commission welcomes the positive reaction and input that it received.
5. The consultation set out the possible scope of work and a methodology for how the final NIA would be pulled together, including the plan of engagement, as well as proposals for when its findings would be published.
6. There was broad and extensive support from respondents for both the formation of the Commission and the detailed proposals for developing and delivering the NIA. There was strong agreement that the NIA had the potential to improve long-term planning for the UK’s infrastructure and would support a holistic approach to delivering against future need. There was also an acceptance that producing an assessment which looked thirty years ahead across all economic infrastructure sectors would be a significant challenge, and that staying focused on the most important issues would be essential.

7. The Commission received responses that broadly fell into three different categories:
 - a) Process and methodology of the NIA
 - b) Set up and governance of the Commission
 - c) Suggestions on content and substance
8. In its consultation, the Commission was seeking views on its approach to the process and methodology of the NIA. This response is therefore focused on the Commission's reply to comments falling into this category. Contributions on the set up and governance of the Commission are primarily matters for the government, to whom a summary of the relevant contributions will be passed on.
9. Suggestions on content and substance will be taken into account as the Commission pulls together its evidence base for the NIA, following the launch of its call for evidence.
10. As is reflected in many responses received to the consultation, the NIA represents an ambitious programme of work. The Commission has decided to include a wide range of issues within and between sectors in the scope of its work for the NIA, including many of those highlighted by respondents. This will ensure the Commission has the flexibility to identify and explore what it considers to be the most pressing areas for action. It will, however, be important for the Commission to narrow its focus and prioritise as its work progresses, if it is to make effective recommendations that gain traction with decision-makers.
11. For this first NIA, the Commission will focus on the most pressing issues of strategic national importance – placing particular emphasis on identifying long-term infrastructure needs, and highlighting the priority areas for action over the medium-term. In identifying priority areas, the Commission will seek to maximise its impact by focusing on key systemic gaps in the evidence base and decision-making functions. This will include identifying and working to address significant cross-sectoral issues and interdependencies, as well as the most pressing issues in each individual sector. Other issues, although important and pressing to some interest groups, may be addressed more closely in subsequent NIAs and specific studies.
12. This response takes each part of the consultation in turn and is divided into the following areas: objectives and principles, sectors and interdependencies, cross-cutting issues, methodology, the drivers and engagement. Key themes and comments are summarised for each of these areas, and followed by the Commission's response.
13. Whilst the main body of this consultation response summarises the key themes and comments from respondents, the Commission will publish an Annex on its website that goes into greater detail on comments and views submitted on each area. The Commission hopes that this detailed table demonstrates its willingness to listen to, consider and respond to a wide range of views. This is also in response to calls for the Commission to respond to as many views as possible, both where it agrees and disagrees.

OBJECTIVES AND PRINCIPLES

BACKGROUND

14. The government has outlined the objectives of the Commission's work, including for the National Infrastructure Assessment (NIA). Although it is the government that sets these objectives, the Commission asked for views on the issues that stakeholders thought would be particularly important to consider as it tried to achieve them. Furthermore, with these objectives in mind, the Commission also set out the key methodological principles that would guide its work as it undertakes the NIA and develops its conclusions and recommendations.

Related Consultation Questions

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?

Summary of Contributions

15. There was broad agreement with the high-level objectives that the government has set for the Commission, although some highlighted the potential trade-offs that exist between them and questioned whether there is, or should be, an order of priority. Others asked how progress against the objectives would be measured and assessed.
16. Geographic and spatial considerations were raised, with calls that the Commission should take account of the UK economy as a whole and aim to support balanced growth across the country. It was suggested that the NIA should have a spatial element and focus on regional and local priorities, including the delivery of the Northern Powerhouse and the Midlands Engine, the balance of investment between rural and urban areas and the impact of devolution deals.
17. Some responses highlighted the importance of climate change, the environment and sustainability, with some saying that these should be more prominently integrated into the Commission's objectives and work. Related to this, some asked for clarification of the definition of 'sustainable economic growth', with others questioning whether the Commission's work would be compatible with environmentally-related targets and objectives (such as the Climate Change Act).
18. The Commission was also encouraged to ensure that infrastructure was linked to key issues such as housing, social and industrial policy, public health, UK growth, Brexit and international trends. Some thought that the Commission's scope should be explicitly widened to include housing and the built environment. Some responses highlighted the importance of maintenance of the existing infrastructure stock.
19. There was broad support for the principles the Commission proposed. Some respondents highlighted specific principles as being important, including being 'open', being willing to 'challenge established thinking' and 'taking a comprehensive and whole system approach'. The importance of the Commission being independent was also stressed.
20. The term 'consultative' was challenged. Some respondents were concerned that 'consultative' might imply a limited approach to engagement, focused on formal written consultation. The Commission was asked to consider 'collaborative' or 'engaging' as an alternative.
21. Although the principles were broadly supported, some additional potential principles were suggested. These suggestions fell into two categories, additional methodological principles (such as 'evidence-based' and 'outward looking') and new policy principles (such as 'flexible' and 'options-neutral').

The Commission's Response

22. The generally positive response to the objectives set by the government is welcomed by the Commission. The Commission understands that in certain instances there may be trade-offs between these objectives; in these cases the Commission will make conclusions based on rigorous evidence, set out the reasons for these conclusions and the likely benefits and costs.
23. Given the complex and multi-faceted nature of these high-level objectives, it will be extremely difficult to directly measure the Commission's impact and progress against each of them. However, the Commission will take robust evidence into account and, as part of its planned work, will look to measure the performance of the UK's infrastructure. Progress against these performance measures will provide a proxy for progress against the objectives.
24. The Commission agrees that geographic considerations will be important to the NIA. The Commission intends to work with organisations and people across the country, and will continue to have geography and local growth as a key cross-cutting issue within the NIA. As a first step to pulling together the evidence in this area, the Commission has asked, as part of its call for evidence on the NIA, for local government, LEPs and other organisations to share local and regional infrastructure plans from across the UK.
25. The Commission agrees that climate change and the environment are relevant issues in long-term infrastructure planning. These issues are included in the NIA process and methodology. The Commission intends to interpret the term 'sustainable' in its objectives ("...sustainable economic growth...") as meaning environmentally, economically and fiscally sustainable. The Commission will also remain mindful of the need to ensure its recommendations are compatible with legally binding environmental targets (such as the Climate Change Act 2008).
26. The Commission agrees that maintenance of the existing stock should be within the scope of the NIA as well as proposals for new investments.
27. In response to the comments received on the methodological principles, the Commission will strengthen the principle 'open, transparent and consultative' to 'open and transparent, engaging with a wide range of stakeholders'. The Commission recognises that 'consultative' can imply engagement would be limited to set piece consultations, which could leave it somewhat detached and on the margins of some of the key debates. The new wording should make clear the Commission's intention to have a more in-depth and ongoing engagement with a broad range of stakeholders.
28. In addition 'evidence-based' will be added to the principle of being 'Independent, objective and rigorous', becoming 'Independent, evidence-based', objective and rigorous'.
29. The Commission believes that these principles should refer to the methodological approach to producing the NIA, rather than to the policy conclusions it might reach. A number of proposals for additional principles fell more into the latter category. The Commission proposes to take these suggestions into account, alongside other contributions on the potential conclusions, as part of the evidence for the NIA.

SECTORS AND INTERDEPENDENCIES

BACKGROUND

30. The Commission's remit, defined by the government, is economic infrastructure. In the consultation document, the Commission set out its proposals for how it would cover each of the economic infrastructure sectors and their interaction with the built environment. It also set out its intention to look across sectors, identifying the most important interdependencies. 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.
31. The government has stated that the Commission will not reopen decision-making processes where programmes and work have been decided, or will be decided in the immediate future; and will not reopen closed price control settlements in regulated utilities. These areas therefore remain out of scope for the NIA.

Related Consultation Questions

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?

Summary of Contributions

32. The Commission received broad support for covering the economic infrastructure sectors as outlined in the consultation document.
33. Some respondents argued that infrastructure need should be defined at the system level and that by outlining sectors at the start of the NIA process, the Commission was falling into the trap of becoming siloed. Others encouraged the Commission to explicitly consider carbon emissions, and management and the integration of regulatory funding cycles across the sectors.

34. There was support for considering the links between infrastructure and health, housing and fuel poverty, with some contributors wanting the Commission to be tasked with covering housing and social infrastructure in detail. In particular the omission of housing was cited as a potentially serious flaw, and the Commission was encouraged to make sure the interaction between housing, utilities and transport provision was considered.
35. There were responses that questioned the Commission's approach to green infrastructure and natural capital (including as assets and solutions to infrastructure need), with some putting them forward as a sector in their own right and others suggesting they should be more prominently considered under each of the sectors.
36. **Key interdependencies** – A range of interdependencies between sectors were identified as likely to be important over the coming decades. Among the interdependencies cited were:
- The increasing dependence on digital communications infrastructure across all other sectors, and the resilience implications associated with this.
 - The effects on the energy sector of increasing electrification of transport.
 - Water, wastewater and flood risk management, and the role of whole catchment-based approaches.
 - How resources from the waste and water sectors can be used to generate energy.
 - Water supply and energy, both because certain energy futures (such as those with increased CCGT power station capacity) could have implications for water demand, and conversely some water strategies (such as increased use of desalination plants) could have implications for energy demand.
 - The importance of infrastructure corridors.
37. There were also comments on the detail of the scope within each sector. These more sector-specific responses are summarised below.
38. **Transport** – Many respondents reacted positively to the Commission adopting a 'multi-modal approach' but some thought it would be more appropriate simply to consider 'mobility'. The Commission was urged to have a focus on and a good understanding of both inter-city and intra-city, and city-region, transport strategy. Some contributors suggested that the Commission cover public transport as well as walking and cycling. Some respondents thought that it was important to focus on the 'international gateways' of ports and airports whilst not disrupting well-functioning markets delivering capacity in these sub-sectors. Some respondents also encouraged the Commission to look at current issues with airspace arrangements, while others urged the Commission to consider freight transport as well as passenger transport.

39. **Digital communications** – Respondents stressed the role of digital communications infrastructure in collecting data and managing demand in other sectors, stressing how this could lead to ‘smarter’ infrastructure across the sectors. Some responses pointed to the importance of upload speeds as well as download speeds. Others focused on the level of access and capability of broadband and mobile services both in urban and harder to reach, mainly rural, areas. Associated with this, some respondents asked whether the current regulatory and market conditions would deliver the required infrastructure effectively.
40. **Energy** – There was support for the Commission taking a whole systems approach. A range of respondents called for energy efficiency to be a key theme of the NIA, with some suggesting it should be linked to a strategy for decarbonising the UK’s heating supply. Additional issues raised included energy security, the future roles of Carbon Capture and Storage (CCS) and hydrogen, storage, and electricity network investment and regulation. Some respondents questioned why the Commission proposed to exclude upstream energy extraction and processing given the interdependencies with downstream supply.
41. **Water and wastewater** (i.e. drainage and sewerage) – Some respondents suggested the Commission should focus on the question of long-term resilience in water supply across the country. Some also pointed to a link with flood risk management, and the Commission was encouraged to take a whole catchment approach to dealing with the sectors. Some respondents suggested there should be a greater focus on the role of natural capital in terms of water supply, water quality and water re-use. On wastewater, respondents highlighted the complex nature of ownership, accountability and governance in the sector and proposed this as an area for the Commission to tackle.
42. **Flood defences** – The Commission was encouraged not to overlook coastal erosion, or rising sea levels resulting from climate change. Some respondents commented that this sector should be considered on a longer timescale (80 to 100 years) than the 30 years outlined for the NIA. As for water and drainage, there were responses that highlighted the role of natural capital and green infrastructure as solutions to flood risk. Finally, there were also responses that proposed ‘flood risk management’ as a more appropriate scope for this sector rather than focusing purely on ‘hard’ defences.
43. **Solid waste** – The Commission received some responses suggesting that it should look at strategies for moving towards a more circular economy² and consider consumer behaviour and incentives for industry to reduce solid waste. Some respondents called for a focus on whether the UK should be self-sufficient in its solid waste management infrastructure. Some responses pointed to the opportunities for solid waste to be used as an energy source.

The Commission's Response

44. The government has given the Commission a mandate to examine economic infrastructure. Some of the comments received in this section (such as the suggestion that the Commission should cover housing or extend its scope to cover social infrastructure) relate to issues that are not in the Commission's remit set by the government. The Commission does intend, however, to consider the interactions between infrastructure and housing, in line with its remit.
45. It is the Commission's view that one way in which the NIA can add value will be by focusing on the interdependencies between sectors. The Commission welcomes the support for this approach and agrees that it should seek to avoid becoming siloed in its approach to sectors. However, a wide range of stakeholders are still sector-specific and the Commission recognises the importance of being upfront and clear about what is covered within each sector. Cross-cutting issues (such as carbon emissions and funding issues) will be considered across the sectors, as outlined in the next section.
46. The suggestions that natural capital and green infrastructure are defined as infrastructure sectors in their own right is beyond the Commission's remit. However, where these areas are relevant to and have a relationship with economic infrastructure, the Commission will take them into account. So, for example, the Commission will consider where infrastructure impacts on natural capital and where natural capital can impact on or contribute to infrastructure.
47. The Commission agrees that many of the issues highlighted by respondents are within the scope of the NIA and will be considered accordingly (although this does not necessarily mean that the NIA will contain recommendations in these areas). Two exceptions to this are:
 - **Upstream energy extraction** – The impacts of upstream energy extraction and processing on infrastructure service demand will be taken into account, but the Commission does not believe that extraction of globally traded commodities in its own right is a priority area to cover in delivering against its objectives. This will remain out of scope.
 - **Investments beyond 2050** – The Commission has been given a remit of looking up to 30 years ahead, and therefore the NIA will focus on a pathway to 2050. In doing this the Commission understands that infrastructure assets will last longer than this timeframe and will take this, including whole-life costs and benefits, into account in considering options for this NIA. Although this point was explicitly raised with regard to flood risk management, it is true for a wider range of infrastructure assets. However, infrastructure investments that may need to be made beyond 2050 will not generally be in the scope of this first NIA. The Commission is tasked with producing an NIA once a Parliament, in each case looking 10 to 30 years ahead. Therefore, investments that may need to be made beyond 2050 will be in the scope of subsequent National Infrastructure Assessments.
48. The Commission was also receptive to responses that highlighted 'flood defences' as too narrow a term, and will now seek to cover the sector as 'flood risk management'.

CROSS-CUTTING ISSUES

BACKGROUND

49. The consultation document set out a number of systemic and cross-cutting issues that the Commission proposed to consider as the NIA is developed. These issues are to be considered across the sectors to allow a cross-sector assessment to be undertaken.

Related Consultation Questions

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?

Summary of Contributions

50. There was wide support for the NIA to cover the cross-cutting issues identified, with respondents commenting on various elements and details of the specific issues. Some respondents highlighted funding and financing, resilience, and geography and local growth. A summary of responses received for each of the cross-cutting issues proposed for the NIA is provided below.
51. **Geography and local growth** – Two themes came through from respondents in this area. The first was concerned with ensuring that the NIA would deliver against its objectives for all parts of the country. The second theme was the importance of understanding local and regional roles, governance and perspectives. Some respondents urged caution in making recommendations on specific projects, citing the need to respect local decision-making and priorities, particularly given the potential impact of devolution on how infrastructure is planned, delivered and managed. The Commission was encouraged to draw on the knowledge of local bodies and communities, and to take into account local people’s rights and priorities, as well as the role of local democracy. Responses also encouraged the Commission to recognise the value of ‘place’ as they undertake the NIA.
52. **Funding and financing** – Some respondents encouraged the Commission to be ambitious in its consideration of alternative funding mechanisms, noting that a high degree of independence is essential for undertaking work in this area. The roles of public and private investment and general taxation in the context of affordability were also raised as issues to be studied. Investor certainty was highlighted as an important issue, as was the role of local authorities and the potential implications for funding and financing of different devolution arrangements.

53. **Cost, delivery and resilience** – Issues raised by respondents included long-term cost impacts; trade-offs between costs and quality; maintenance; and barriers to delivery. Some stakeholders felt that resilience should be given more prominence in the NIA. It was also suggested that security should be a standalone issue rather than falling under resilience. A range of delivery-related issues were raised by respondents, including skills, education and innovation in the construction sector, and material/mineral resource supply.
54. **Sustainability and the environment** – Different aspects of sustainability including carbon emissions, air quality, biodiversity, water quality and ecological resilience were all highlighted as particularly important to consider as part of the NIA. A whole-life approach for environmental impacts was also recommended. Contributors commented that the economic case for environmental and natural capital-compatible projects should be examined, as well as the scope to incorporate environmental restoration with routine maintenance.
55. **Governance and decision-making** – Respondents commented on the need to consider governance structures and the appropriate allocation of risk over the lifecycle of projects. There was broad support for looking at the current institutional planning frameworks. Some stakeholders asked for clarification on the interaction with National Policy Statements, and respondents also suggested looking at an integrated approach to land use.
56. **Evaluation and appraisal methodology** – Respondents encouraged the Commission to look for ways to improve the appraisal of infrastructure projects. Some felt that the HM Treasury Green Book is outdated and that fundamental reform is required to government appraisal techniques. Others pointed to the importance of recognising optimism bias. Some respondents suggested that the Commission should look to see if there is scope for developing new metrics for quantifying the costs and benefits of potential investments.
57. **Performance measures** – There was general agreement with the Commission’s proposal to tackle this issue. Some noted that performance should be measured by the level of service delivered.
58. In addition to these responses on the specific cross-cutting issues proposed by the Commission, additional cross-cutting issues were put forward as being worthy of consideration. These included market design, consumer behaviour, business models, temporal and spatial sector mapping, street works, nature, co-ordination of local and national priorities, quality of life and UK competitiveness.

The Commission’s Response

59. The Commission welcomes the general endorsement of the proposed cross-cutting issues and will consider the additional evidence provided as it undertakes this work.
60. On local growth, the Commission recognises the importance of place and will continue to look at its work through a ‘place lens’. It also recognises that there are local representative bodies leading programmes of work in this area and will seek to work with these bodies as the NIA is developed.

61. In terms of the implications of NIA recommendations on local issues, those recommendations related to specific projects will focus on projects of strategic national importance, rather than those of purely local importance. The Commission agrees that it will be important to understand and take account of local plans that are relevant to nationally strategic infrastructure in considering such projects, and to work with relevant local bodies in understanding the evidence base. However, in keeping with its independence, the Commission will ultimately reach its own conclusions and make recommendations as appropriate. That may involve making recommendations to local decision-making bodies, including local and combined authorities, in which case it will be for those bodies to decide how to respond.
62. For cost and delivery, the Commission recognises that some of the issues raised (such as skills, innovation and material supply) could produce a barrier to delivering against its recommendations. However, the Infrastructure and Projects Authority is delivering a programme of work in these areas, which the Commission will not seek to duplicate.
63. The Commission is receptive to the proposal that *resilience* should be treated as a cross-cutting theme in its own right. However, given the breadth and complexity of this issue, in the context of an already extremely broad NIA scope, the Commission is minded to maintain a tight scope for this work and avoid overlaps with bodies such as the Centre for the Protection of National Infrastructure (CPNI). After completion of the first NIA, there may be a case for carrying out a more in-depth analysis of resilience as a theme, working with key stakeholders, to inform a future approach ahead of the next NIA.
64. As outlined in the objectives section of this document, the Commission recognises the importance of factoring in *sustainability and the environment* as it undertakes the NIA, and will consider these issues where infrastructure impacts on them and where they can impact on or contribute to infrastructure services.
65. The Commission welcomes the suggestions for further cross-cutting issues. However, as noted above, the scope of the NIA is already extremely broad and the Commission is content that it has identified the highest priority areas on which to focus within this scope. The Commission does not therefore intend to introduce any further cross-cutting issues, although it will seek to include relevant issues where practical within existing priorities. The prioritisation of cross-cutting issues will be reviewed and refreshed for each future NIA.

METHODOLOGY

BACKGROUND

66. The consultation set out the proposed methodology for the NIA. The initial stages of this methodology would be to establish the infrastructure baseline, study the key drivers of infrastructure, use scenarios, model and analyse each sector, and undertake sector and geographical reviews. On the basis of this work, the Commission then intended to pull together potential portfolios of interventions, seeking in the process to capture the interactions between different policies and investments, and test these against future uncertainty.

Related Consultation Questions

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?

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?

Summary of Contributions

67. There was broad endorsement for the methodology set out by the Commission as being logical, comprehensive and sensible. Some respondents emphasised that the NIA represented an ambitious programme of work, especially for a newly established body. Some respondents suggested that the Commission should set out a clear quantitative methodology for portfolio determination, while others thought the Commission should make its methodology more transparent.
68. The use of scenarios to help determine future need was generally supported, but responses warned against purely relying on modelling that would use past trends to predict future demand. The Commission was encouraged to ensure that a qualitative as well as quantitative approach is taken, and to set out alternative pathways with consideration given to what society wants the future to look like.



69. The Commission was also encouraged to ensure the assessment took into account the regional context, with contributors commenting that an NIA would be better delivered through working with sub-national partnerships rather than being run as a Whitehall-centric process. Some respondents asked the Commission to ensure that environmental aspects were sufficiently accounted for in the methodology.
70. In response to the specific question on examples of other successful models (Q.9), a wide selection of suggestions were made. Respondents referenced specific economic and engineering analytical approaches and models (such as the DECC 2050 Calculator), as well as different theories of problem solving (such as system loop modelling), and more wide ranging methodologies used to address long-term prioritisation (such as that used to pull together Water Resource Management Plans).
71. The Commission received a variety of views on both the nature of potential NIA recommendations and the method for bringing them together. Respondents noted that NIA recommendations should be specific, clear and tangible and that, given the uncertainty inherent in long-term forecasting, they should be flexible enough to remain relevant in a range of possible futures. Respondents also pointed out that it would be important to identify 'least or no-regrets' solutions, and argued that these were most likely to be on the demand side initially, including behavioural and regulatory solutions.
72. Some respondents emphasised that the Commission would need to understand how different solutions would impact on different regions of the UK, cross-sections of the population and quality of life. Alongside this, some thought the most important thing would be to understand which investments would deliver greatest benefits in terms of UK economic performance, new jobs and housing. Others pointed to the importance of taking optimism bias into account. It was also proposed that the Commission should not, through its recommendations, open up regulated settlements or committed schemes, such as Network Rail's Enhancement Delivery Plan.
73. In terms of the methodology to determine the optimum portfolio of solutions, respondents commented that the portfolio would need to start with clear objectives and have buy-in from a wide range of stakeholders. It was also suggested that an appropriate method of determining the best range of potential solutions would be to have a good understanding of what investments might be funded from institutional capital and what the barriers to financing were. Some respondents suggested the Commission needed to be technology-neutral, and others suggested that the Commission should focus on market design rather than specific investments.
74. It was suggested that a post-NIA review should be carried out shortly after the publication of the NIA to capture lessons learnt.



The Commission's Response

75. The Commission agrees that there is a benefit in transparency over methodology, although the Commission does not believe this can be reduced purely to a mechanical 'scoring' system.
76. In the consultation document, the Commission set out the types of recommendations it expects to make in the NIA:

"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".*

77. NIA recommendations will ultimately reflect the judgement of the Commissioners. That judgement needs to be underpinned by a robust evidence-base. Making an assessment of infrastructure need over the next 10 to 30 years is difficult, so a range of sources of evidence will be used. These will include:

- **Developing 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 on quantitative and qualitative forecasts of changes in the economy, population and demography, climate and environment, and technology. The Commission proposes to develop scenarios that reflect both ongoing trends and past surprises in these drivers. These will balance the likelihood that the future will contain both surprises in some variables and incremental change in others.
- **Quantitative modelling** of 'baseline' outcomes in these scenarios, and of packages of policy proposals in the most relevant scenarios, to allow an assessment of the robustness of policy options to future uncertainty.
- **Capturing the expertise and opinions of a wide range of stakeholders**, including through:
 - a formal call for evidence; and
 - face-to-face engagement events.

- **Social research** to understand the views of the general public, using a mix of deliberative techniques and potentially survey data.
- **Requesting local infrastructure plans and strategies** from relevant local and combined authorities and LEPs, and national infrastructure plans and strategies from relevant government departments and economic regulators.
- **Holding roundtables with experts** relevant to a sector or issue on which focused input is required. The Commission will invite experts from a diverse range of backgrounds so that it captures a broad spectrum of independent views. The Commission is also establishing expert advisory panels to enable it to access leading-edge thinking in a range of relevant areas, and to provide support and challenge for its overall work programme.
- **Commissioning new analysis or literature reviews** on key topics.
- **Cost-benefit analysis of individual projects and proposals.** Cost-benefit analysis can be a powerful way of bringing together multiple dimensions of differing projects in a broadly comparable way. However, the Commission recognises the limits of standard cost-benefit analysis approaches, and will also be exploring improvements that can be made to current methodologies.
- **Identifying and learning from international best practice.** For example, the Commission recently ran a roundtable with the OECD, which brought together a number of international stakeholders to discuss best practice in infrastructure planning. A report of this event will be published shortly.

78. In creating scenarios out to 2050, the Commission agrees that these shouldn't be based purely on projecting forward current trends. The Commission will draw together a broad range of quantitative and qualitative evidence to understand what the future might look like.
79. The Commission recognises that it is not appropriate to base decisions on future need purely on projections of future demand. Options to improve efficiency or manage demand will be considered in the NIA alongside options for new build. Nor, however, is it sufficient to assume that demand can be managed to some 'preferred' level. Instead, an evidence-based assessment needs to be made of the scope, costs and benefits of demand management options and the potential for behavioural change.
80. The importance of both the regional context and of environmental issues have been outlined in previous sections of this response, and both will be considered as part of the Commission's work to pull the NIA together.
81. The Commission is grateful for the wide range of examples submitted by respondents of other successful models used to look at long-term and uncertain futures.

82. The Commission recognises the importance of having recommendations that are specific, clear and tangible, but also flexible enough to be appropriate to a range of possible futures. The Commission will include, but not be limited to, consideration of 'least or no-regrets' solutions that may be more robust to future uncertainty. The Commission recognises the potential value of technology-neutral and market design approaches, but also recognises that market structures vary considerably across the sectors it covers and the right level of granularity of recommendations may therefore vary too.
83. In its recommendations, the Commission will aim to set out the pathway to meeting identified long-term needs, particularly where lead times are long and critical paths complex. That may include explaining what early decisions will be needed and by when, and what steps need to be taken now to facilitate future decisions, such as the gathering of critical data or evidence, or investments in new technologies or approaches.
84. The Commission will consider how its recommendations will further its objectives, including sustainable growth across all regions and quality of life.
85. The Commission agrees that a 'lessons learnt' review should be carried out following publication of the NIA.
86. The Commission proposes to set out further details of its methodology as the NIA progresses.



THE DRIVERS

Background

87. Part of the Commission’s proposed approach to the NIA was to study four key drivers of infrastructure supply and demand: population and demography, economic growth and productivity, technology, and climate change and environment. The Commission proposed that, at an early stage of the NIA process, the relationship of these key drivers with long-term infrastructure needs, including feedback loops, would be examined. This would then help inform the long-term view and scenario-building of the Commission’s 2050 vision.

Related Consultation Questions

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?

Summary of Contributions

88. Responses showed broad agreement that the Commission had identified the most important drivers of infrastructure supply and demand, but each of the drivers was cited, by different respondents, as being the most important to future infrastructure need. Respondents offered a range of views on what the Commission should cover under each driver, including:
89. **Population and demography** – The challenges of an ageing population and the needs of people at different ages were stressed. Some respondents proposed that behavioural change and social change should be considered.
90. **Economic growth and productivity** – ‘Agglomeration economies’ that can boost skills and productivity from clustering of businesses, particularly through effective and affordable transport networks, were noted in some responses as important considerations.
91. **Technology** – There was an acceptance that looking at the potential impacts of technology was complex, and that it might be most appropriate to carry out detailed analysis of a smaller number of the most likely changes. Respondents also proposed that there should be analysis of how technology changes people’s relationship with infrastructure (especially through digitisation and ‘smart’ solutions).
92. **Climate change and environment** – Respondents commented that both adaptation and mitigation should be considered within the analysis, whilst some proposed that the scope of this driver should be widened to incorporate biodiversity, nature conservation, air pollution, noise and land use.



93. Although most respondents thought the Commission had recognised the most important drivers, a number of others were suggested, including policy and political risk and international instability, the end user, consumer behaviour and general attitudes, social and cultural developments, defence policy, and constitution and legislative change.

The Commission's Response

94. The Commission notes that respondents were broadly supportive of its assessment of the key drivers of infrastructure need in the long-term.
95. The Commission will cover ageing within the population and demography work.
96. The Commission recognises the importance of 'agglomeration effects' for economic growth and the links to transport investment.
97. The Commission is working to understand the potential impact of technology on infrastructure supply and demand. As part of this, it will examine the available evidence of how technology can change people's interaction with infrastructure services. However, the Commission is conscious this is an area of great uncertainty.
98. A wide range of issues, including mitigation of impacts and adaptation, were raised under the climate change and environment driver. The Commission proposes to discuss these issues further with relevant stakeholders as part of its work on this driver and the related sustainability cross-cutting theme. In parallel, the Commission will work with the Committee on Climate Change to select robust adaptation scenarios based on existing climate modelling to understand the consequent impact on infrastructure need (such as increased risk of drought requiring increased water supply).
99. In terms of additional drivers, many of those suggested are being covered as part of the wider methodology. The Commission agrees that changes in individual behaviour or government policy can be important drivers of future outcomes. However, these are extremely difficult to forecast and the Commission does not therefore propose to develop scenarios based explicitly on behavioural or policy change. Instead, the Commission will consider the extent to which its scenario-based modelling is sensitive to key parameters that might change through behavioural or government policy change. In considering its recommendations, the Commission will draw upon this to ensure that it takes into account the social and policy context, the possibilities for behavioural or policy change, and the consequences of this.

ENGAGEMENT

Background

100. One of the Commission's proposed principles was that it would be 'open, transparent and consultative' in its work. As stated earlier, this principle will now change to being 'open and transparent, engaging a wide range of stakeholders.' A programme of engagement (with a variety of engagement tools) was put forward for the NIA, to ensure views and input were captured from across industry, business, central and local government, regulators, academia, civil society and the wider public. In addition to set piece consultations such as this one, publications and calls for evidence, the Commission also intends to use expert input (through establishing panels and hosting roundtables) and to carry out a programme of social research.

Related Consultation Questions

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?

Summary of Contributions

101. There was extensive support from respondents for the Commission's desire to ensure that the NIA process is both open and transparent, including for the engagement plan set out in the consultation. In particular there was considerable support for the Commission's proposed expert groups and plans for social research.
102. Respondents pointed out that the NIC should not rely on traditional methods of communications, but should use all avenues (such as social media, online forums and face to face hearings) to reach as wide an audience as possible. There was encouragement for the Commission to capture as many views as possible and engage in a timely manner. The importance to respond both positively and negatively – adopting a 'you said, we did' approach – was also stressed.
103. A significant number of respondents emphasised the importance of working with local partnerships, communities and sub-national bodies to identify infrastructure need, and to make recommendations on how best to meet this need. It was recognised that a wide range of stakeholders would have an interest in the Commission's work, and it was suggested in some responses that an efficient means of engagement would be to actively use trade associations, cross-sectoral organisations and bodies that already have links to consumers, communities and regions.

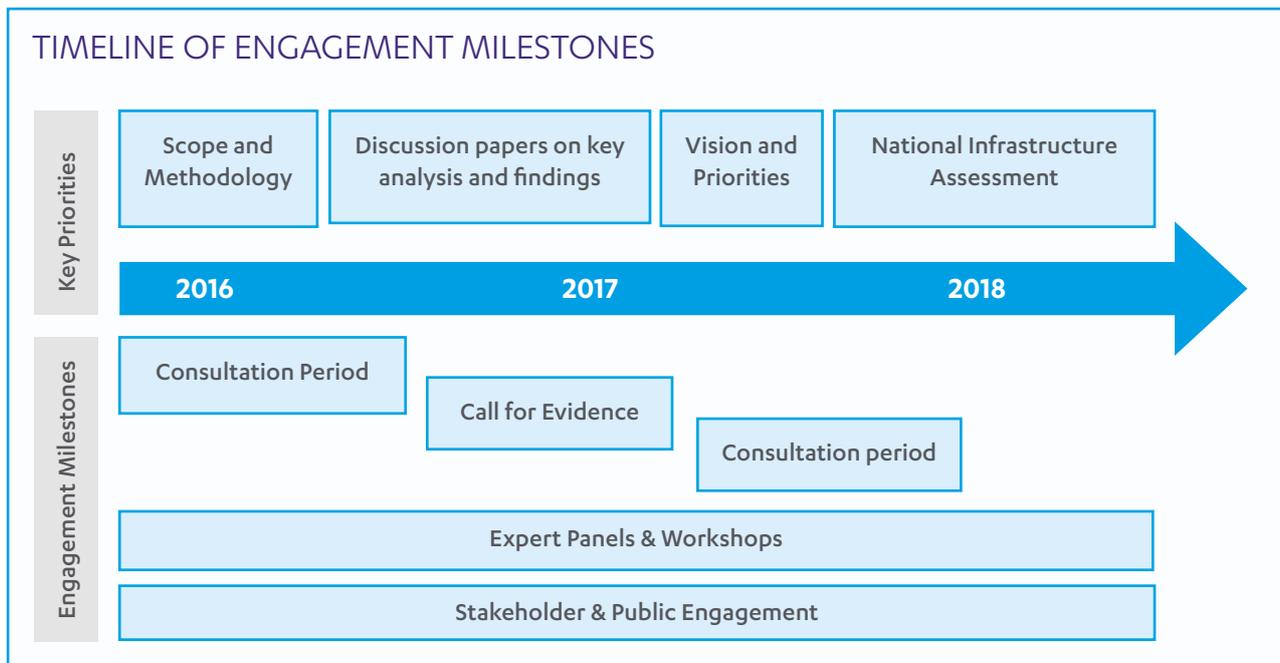
104. Other proposals that respondents made in this section included:
- All correspondence and minutes of Commission meetings should be published.
 - An 'Infrastructure Select Committee' should be established to ensure transparent scrutiny and challenge.
 - The Commission should work closely and possibly hold a hearing or public debate with the Committee on Climate Change and Natural Capital Committee.
 - The Commission should consult on its recommendations ahead of publishing the NIA.

The Commission's Response

105. The Commission welcomes the strong support from respondents for its proposed engagement plan. It is consequently pushing forward with many elements of this approach, including establishing its expert panels and setting up programmes of roundtables, stakeholder events and social research. It will also seek to use, as various contributors suggested, a range of communication tools to reach as wide an audience as possible. The Commission proposes an engagement plan that includes:
- Roundtables with local representatives across the country, looking at the cross-cutting infrastructure needs of cities and regions.
 - Larger-scale workshops, with a wide range of stakeholders, focused on specific sectors or sub-sectors. Although some key issues are cross-sectoral, many stakeholders are still focused on specific sectors and sectorally-based events should encourage wide participation.
 - Smaller-scale roundtables and seminars with experts on particular thematic or high-profile issues.
 - Deliberative social research to understand the public's views, possibly supplemented by opinion polling.
106. The Commission agrees it is important to show that it has listened and responded to people's views. That starts with this consultation response, where in the Annex it has attempted to respond to many of the views, comments and questions received on the process and methodology of the NIA
107. As outlined earlier in this response, the Commission agrees that working with local and regional organisations is a vital part of undertaking the NIA. The Commission will also work with the Committee on Climate Change and the Natural Capital Committee, which will help ensure that the interactions between infrastructure and climate change, and infrastructure and natural capital, are understood and appropriately reflected in the Commission's work. As it undertakes the NIA, the Commission will continue to seek input from across industry, business, central and local government, regulators, academia, civil society and the wider public.

108. The Commission has considered the specific additional suggestions raised in responses:

- In order to set out the reasoning behind its reports and recommendations, the Commission will in future publish minutes of its meetings and correspondence with ministers at relevant points.
- The establishment of any new select committee is a matter and decision for Parliament. The Commission would welcome appropriate Parliamentary interest in and scrutiny of its work.
- In order to get representative views from the public, the Commission will work with social research professionals to develop a programme of deliberative social research. The Commission has not ruled out public hearings or debates, but is concerned that such events can result in disproportionate prominence for unrepresentative views. The Commission does not currently plan any public hearings.
- The Commission intends to be open and transparent throughout the NIA process, including through the use of formal consultation, as well as the programme of stakeholder engagement set out above. As part of this, the Commission proposes to formally consult on its Vision and Priorities document next summer, which will set out its proposed long-term vision, the priority areas for action and policy options for addressing the infrastructure needs identified. That formal consultation will be accompanied by further active engagement with stakeholders, as the Commission forms its recommendations and before they are published. Once the recommendations are published, it will be for the government to respond to them, and any further consultation will be a matter for the government.

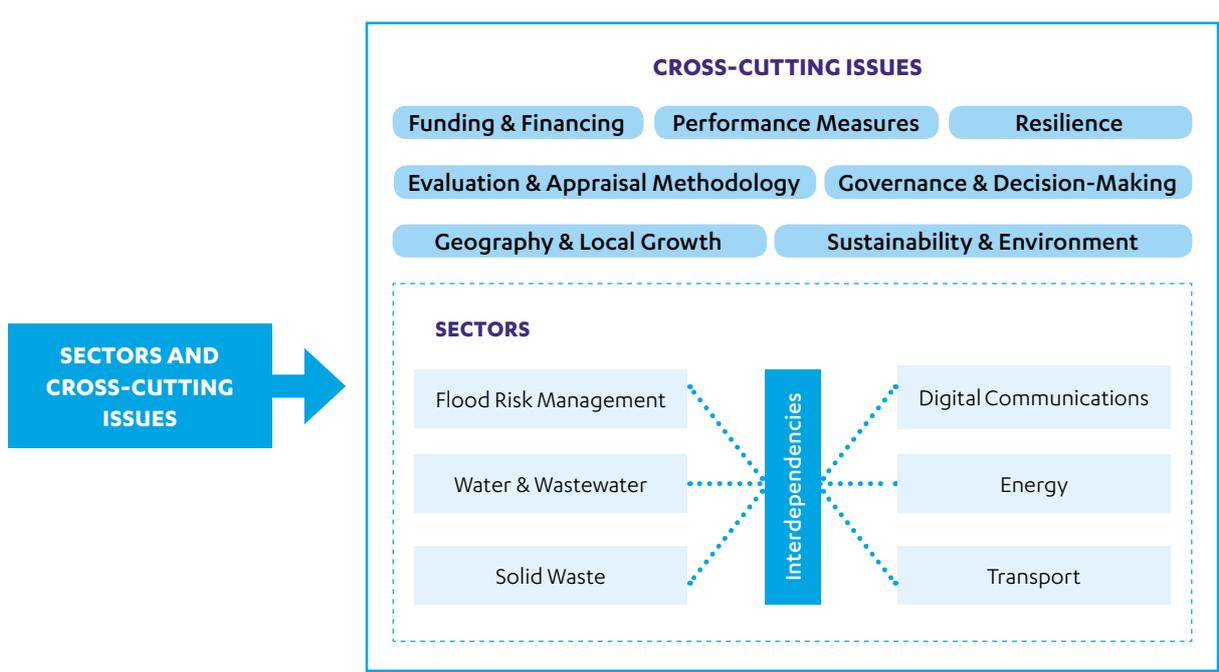
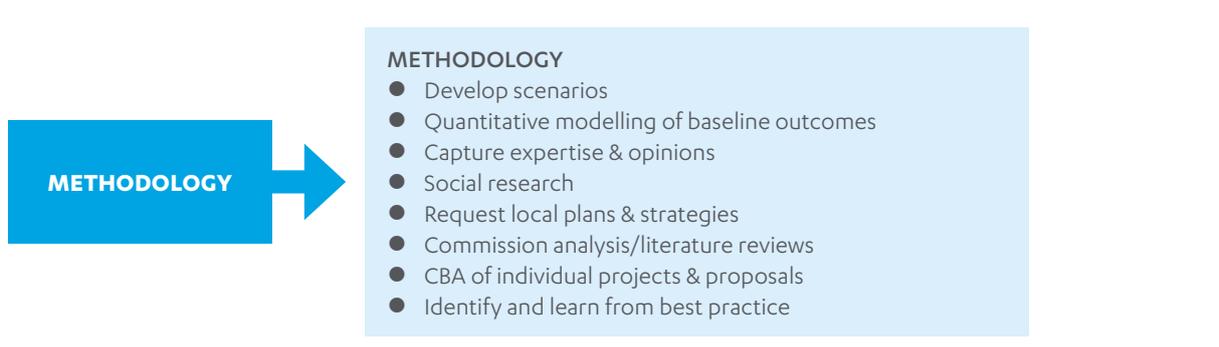


NEXT STEPS

109. The Commission proposes to formally consult on its Vision and Priorities document next summer. Between now and then, the Commission's work will focus on building the evidence base of infrastructure needs, and identifying priorities and potential portfolios of interventions (as set out in the Methodology section above) to meet those needs. An extensive programme of engagement will be key to achieving these objectives and to securing buy-in to the Commission's analysis and emerging conclusions. The Commission will therefore continue gathering views and evidence from a broad range of stakeholders and sources of expertise, including through:

- The **call for evidence** for the NIA, which is open until 10 February 2017. It welcomes evidence from contributors to the substantive sector and cross-cutting issues raised there.
- **The engagement plan** set out in the section above.
- **Discussion papers** on emerging issues, beginning with papers on the technology driver and the population and demography driver. These will be published later this year.

THE NIA PROCESS



APPENDIX A - List of questions from NIA Process and Methodology consultation

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?

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 any particular areas where you think such interdependencies are likely to be important?

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?

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?

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?

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?

APPENDIX B – List of respondents to the consultation (excluding individual responses)

AECOM	EEF
Affinity Water	Energy and Utility Skills
Airport Operators Association	Energy Policy Group
Alderney Renewable Energy	Energy Saving Trust
Aldersgate group	Energy Systems Catapult
Anglian Water	Energy Technologies Institute
Arcadis LLP	Energy UK
Arup	Engie UK
Associated British Ports	Engineers Ireland
Association for Consultancy and Engineering (ACE)	Environmental Services Association
Association for Project Management	Friends of the Earth
Association for the Conservation of Energy	Gatwick Airport
Balfour Beatty	Grantham Institute
BAM Nuttall	Green Alliance
Barton Willmore LLP	Green House
Bath & North East Somerset Council	Health and Safety Executive
Birmingham Airport	Heathrow Airport
British Chambers of Commerce	Historic England
British Ports Association	Home Builders Federation
BT	Homes for the North
Campaign to Protect Rural England (CPRE)	Hutchinson Ports
Carbon Capture & Storage Association	iBUILD Infrastructure Research Centre
CBI Minerals Group	IMC Worldwide Ltd
Centre for the Understanding of Sustainable Prosperity (CUSP), University of Surrey	Infrastructure Transitions Research Consortium (ITRC)
Centre for Transport Studies, UCL	Institute and Faculty of Actuaries
Centre for Water Systems, University of Exeter	Institute of Environmental Management & Assessment (IEMA)
Centre on Innovation and Energy Demand, University of Sussex	Institution of Civil Engineers and Faculty of Actuaries joint
Centrica	Risk expert Group
Chartered Institution of Highways & Transportation	InterGen
Chartered Institution of Water and Environmental Management	International Centre for Infrastructure Futures (ICIF)
Citilogik	Isothane Ltd
City of London Corporation	Kent County Council
Civil Aviation Authority	Kingspan Insulation Ltd
ClientEarth	Knauf Insulation
Coastal Group Network of England and Wales	KPMG
Committee on Fuel Poverty	Lloyds Bank
Community Support	Local Government Association
ConnectedCities Ltd	Local Government Association Coastal Special Interest Group
Consumer Council for Water	London Borough of Bexley
Copper Consultancy	London Councils
Cornwall Council	London Forum of Civic & Amenity Societies
DONG Energy UK	Manchester Airports Group
E.ON	Mineral Wool Insulation Manufacturers' Association (MIMA)
E3G - Third Generation Environmentalism	Mutual Energy
East Lancashire Hospitals NHS Trust	National Energy Action
East Midlands Councils	National Farmers' Union
East Riding of Yorkshire Council	National Grid
East West Rail Consortium	National Housing Federation
Economics For The Environment Consultancy Ltd	NATS
Ecotricity	Network Rail
EDF Energy	North Star Solar
	Northern Gas Networks

Northumbrian Water
 Nuclear Industry Association
 Ofgem
 Ofwat
 Open Data Institute
 Orbit City Lab
 Ordnance Survey
 Pension Insurance Corporation
 Pensions Infrastructure Platform
 Providence Policy
 RAC Foundation
 Radioactive Waste Management
 Rail Delivery Group
 Renewable Energy Association
 Renewable Energy Systems Ltd
 Roadchef
 Royal Institution of Chartered Surveyors (RICS)
 Royal Society for the Encouragement of Arts, Manufactures
 and Commerce (RSA)
 Royal Society for the Protection of Birds (RSPB)
 Royal Town Planning Institute
 RST Sport
 RWE npower
 ScottishPower
 Severn Trent Water
 Solent Local Enterprise Partnership
 Solum Developments Ltd
 South Bucks District Council
 South East England Councils
 South East Strategic Leaders
 South West Water
 Southern Water
 Suez
 Suffolk County Council
 Surrey County Council
 Sustainable Energy Association
 Swindon and Wiltshire LEP
 Thames Water
 The Business Services Association
 The Chartered Institute of Building (CIOB)
 The Electricity Storage Network
 The National Infrastructure Planning Association
 The Woodland Trust
 Tidal Lagoon Power
 Tim Marshall, School of the Built Environment, Oxford
 Brookes University
 Town & Country Planning Association
 Transport for Greater Manchester
 Transport for London and Greater London Authority
 Transport for the North
 Transport Planning Society
 Trees and Design Action Group
 UK Green Building Council
 UK Hydrogen and Fuel Cell Association
 UK Major Ports
 UK Power Reserve Ltd
 United Utilities
 Universities Superannuation Scheme
 University of Oxford
 URBED Trust
 Vale of White Horse and South Oxfordshire Councils
 Water UK
 Welsh Government
 West Sussex County Council
 Wetherby Building Systems Ltd
 Wildfowl & Wetlands Trust
 Willmott Dixon Energy Services Ltd

REFERENCES

- 1 https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/559269/NIC_charter_6_final.pdf
- 2 A “circular economy” is an alternative to a traditional “linear economy” (i.e. make, use, dispose) in which products are designed and packaged to minimise waste, and resources are kept in use for as long as possible e.g. through re-use, recycling and greater recovery of materials through the waste management process.

