

ICE policy position statement: What should be in the second National Infrastructure Assessment?

October 2021

Executive summary

Between the National Infrastructure Commission's (NIC) first National Infrastructure Assessment (NIA1) in 2018 and today, much has changed in society and the environment, not just in the UK but around the world.

The forthcoming second assessment (NIA2) will need to have a firm grip on those changes to ensure that infrastructure development meets societal needs while minimising environmental impacts.

NIA1 was a cornerstone of the UK's strategic infrastructure planning regime and represented the first cross-sector assessment of its kind in the UK. As a clear, well-evidenced analysis, it provided certainty to both policymakers and industry during periods of political turmoil caused by Brexit and Covid-19.

In August 2021, ICE launched a consultation seeking views on what should be in NIA2, including changes to demand drivers, core considerations for infrastructure by sector and region, and alignment with the Sustainable Development Goals (SDGs).¹

This policy position statement draws on the evidence received from the infrastructure and engineering communities and makes a number of recommendations on areas that NIA2 should consider. NIA2 is due for publication in the second half of 2023. Having supported the work of the NIC since its inception and produced the blueprint for NIA1 with our own National Needs Assessment in 2016, this ICE policy position statement seeks to provide the direction of travel for the second iteration of this important document and, in doing so, help to improve the framework for long-term infrastructure planning while ensuring the public get the infrastructure that they need.

In the broadest sense, the long-term assumptions around future demand that sat behind the first NIA are still valid. The UK's population is still expected to grow and age, our infrastructure sectors will still need to decarbonise and become more climate resilient, and regional inequalities will still need addressing through infrastructure interventions. However, the policy direction and impetus behind some of these demand drivers have changed and therefore require review, while new demand drivers have emerged.

ICE has identified four main changes to infrastructure demand drivers since NIA1 that must be considered in NIA2:

1. The climate emergency and net zero
2. The Covid-19 pandemic
3. The need to address regional socio-economic inequalities
4. The impact of digital infrastructure availability and new digital technologies

¹ ICE (2021) [ICE Green Paper: What Should be in the Second National Infrastructure Assessment?](#)

The NIC has confirmed that climate resilience, net zero and 'levelling up' will all form part of NIA2.² As these three areas are intimately related, they should be considered holistically. Outcomes cannot be addressed in silos – they need joined-up policies to improve all of them. For example, net zero offers the opportunity to create the necessary infrastructure to meet carbon reduction targets, but also has the potential to create internationally competitive industries that provide local employment at a large scale, and thus help to address regional inequalities.

The coming decades will require us to sustainably implement complex infrastructure changes to meet population growth, demographic shifts, imbalances in socio-economic prosperity across the nation and, of course, removing carbon from the economy – all while ensuring costs are distributed fairly.

The recommendations below, explored further in this paper, help to ensure that NIA2 reflects the most important challenges the infrastructure system faces not just now, but in the decades to come.

Recommendations

Climate action and sustainability

The second National Infrastructure Assessment should:

- 1. Align with the Climate Change Committee's (CCC) Sixth Carbon Budget and consider the governance required to deliver net-zero infrastructure systems.** The scale of the climate emergency has gained greater prominence since the first NIA, most notably through the 2050 net-zero greenhouse gas emissions target. The CCC's Sixth Carbon Budget represents a significant and evidence-based step forward, identifying pathways to decarbonise the economy and the need for new infrastructure sectors to mobilise quickly to meet decarbonisation targets. There are myriad complex, interconnected challenges that need to be navigated to enable a coherent, cost-effective net-zero transition – delivering on these targets will require coordination across both government and industry at multiple levels. NIA2 should consider what governance models are best suited to provide the leadership and guidance needed for infrastructure systems to meet the net-zero target.
- 2. Fully consider the carbon impacts of proposed infrastructure interventions to the same extent that fiscal and economic impacts are considered.** The reduction of carbon emissions is one of the most important policy objectives the UK has. The carbon impacts of infrastructure decisions exist through the whole life of every asset, meaning this needs to be addressed both for existing infrastructure systems and all infrastructure assets of the future. To this end, the upkeep and improvement of existing infrastructure should be reviewed within NIA2 to avoid rebuilding where possible and minimise the impacts of embodied and operational carbon.
- 3. Explore how infrastructure investment can be used to drive wider efforts towards achieving the Sustainable Development Goals (SDGs).** The UK has long-term social, economic and environmental goals, notably the 2030 UN SDGs. The SDGs all link to tackling recognised long-term challenges in the UK, including climate change, regional economic inequalities, poor productivity and a workforce lacking the right skills. There is broad alignment between the SDGs and at least two of the NIC's current objectives. NIA2 should explore how infrastructure investment can be used to achieve the SDGs through a framework approach, testing whether the interventions proposed in NIA2 will maximise the positive contribution of infrastructure to the SDGs. At a project level, putting the SDGs at the heart of early decision making will help improve social and environmental outcomes.

² National Infrastructure Commission (2021) [Timeline for Second National Infrastructure Assessment Announced](#)

Existing infrastructure assets and networks

The second National Infrastructure Assessment should:

- 4. Set out the state of existing infrastructure networks and the maintenance required to bring them up to an acceptable level that meets national goals.** Most infrastructure that will support the UK to 2050 already exists and will do so for many years after 2050. But with large parts of this infrastructure dating back to the post-war or even Victorian eras, there is a growing risk of failure as they are put under additional pressures due to the impacts of climate change, such as heat stress and increased surface water run-off. To be able to address this, we must better understand the current condition of assets and their structural integrity, the maintenance measures needed to improve them and their resilience, as well as the impacts of new infrastructure on these existing systems.
- 5. Undertake scenario analysis on a systems basis in order to account for the potential impacts – short, medium and long-term – of Covid-19 on infrastructure networks.** The Covid-19 pandemic has driven changes to how people live and work, which has in turn affected demand for infrastructure services. The choices of people and businesses in regard to this affect demand and spatial profiles for almost all infrastructure sectors within the NIC's remit. NIA2 should build on the NIC's existing analysis in this space, drawing on new evidence as required and identifying the impacts and behavioural changes most likely to occur so that infrastructure planning is more robust.
- 6. Ensure nationwide digital connectivity to allow fair opportunity for all, alongside improving connections for future use.** The pandemic showed that the UK can remain competitive and innovative with home-based employees utilising existing fibre digital infrastructure. However, it has also highlighted areas of poor digital infrastructure, depriving employees living in those areas of the opportunity to match the productivity of others. Connectivity needs – both fibre and mobile – should be reviewed against the needs of future homeworking demands and agile businesses.
- 7. Explore the growing role and impact of individually owned assets as part of the infrastructure system.** NIA2 should consider the potential for the public to customise their use of infrastructure as a result of digital technology via, for example, mobility-as-a-service or for private assets such as electric vehicles to become active parts of the infrastructure system.

Delivering infrastructure

The second National Infrastructure Assessment should:

- 8. Make recommendations for how infrastructure decision-making governance should evolve, in order to enable local government to commit to clear pathways for infrastructure interventions over the long term.** Some forms of national infrastructure will always require centralised decision-making. However, given recent trends for greater devolved responsibility for delivery, local engagement in the infrastructure that underpins communities, and the need to demonstrate inclusive decision-making, a stronger role for subnational actors is essential. Key to achieving this is the development of strong governance models. ICE has previously recommended that capability in infrastructure planning and prioritisation should continue to be built at the subnational level by evolving subnational transport bodies to become subnational infrastructure bodies, tasked with creating regional infrastructure strategies, backed up by spatial strategies.
- 9. Provide guidance and benchmarks to the government on how long investment programmes should take to complete.** Given the scale and pace required to meet national objectives, particularly for infrastructure that meets the net-zero target, it is important that NIA2 considers the infrastructure capacity that must be built, as well as how best to deliver it. This approach should inform the government of the scale of the challenge, and the need for a plan of the programmes and projects required to achieve national objectives.

Climate action and sustainability

The climate emergency

At the time of NIA1, much less was known about the UK's route map for decarbonisation. A raft of policy measures, from broad ambitions such as the 2050 net-zero target through to more specific commitments on energy generation and transport, have been announced since.

The Climate Change Committee's Sixth Carbon Budget outlined that energy, transport and utilities currently contribute to the majority of the UK's emissions, with transport and energy alone accounting for 60% of the UK's CO₂ emissions.³

Given the urgency of the climate emergency and the long lead times and life cycles of infrastructure, the challenge of transitioning these systems over the next 30 years – and paying for them – is immense.

Policy certainty, strong frameworks and a major investment programme across the country are required to deliver this change. The evidence shows that the changes required are feasible and affordable, but only if led by ambitious and swift action from the government, supported by industry.

Since NIA1, the sense of increased urgency for change is profound. Over the next 30 years, we can expect to see a substantial roll-out of new technology such as hydrogen infrastructure, electric vehicle charging infrastructure, significantly more renewable power generation, carbon capture and storage, energy storage technology, commercial heat pumps, and more besides. Assumptions will need to be re-baselined to address these changes.

Hydrogen does, however, remain an area that requires further detail. With the recent publication of the government's hydrogen strategy, there is now a better understanding of the expectation of the role hydrogen could play in future energy, transport and heating systems, but significant questions remain about the timescales, funding and feasibility of developing the UK's hydrogen capacity and capability.

Meanwhile, the Intergovernmental Panel on Climate Change's (IPCC) Sixth Assessment report has confirmed that extreme weather events are becoming more frequent and that global temperatures are rising at an unprecedented rate.⁴ This increases the risk from flooding, droughts, storms and fire, with potential impacts on infrastructure systems. Climate risk and resilience must be built into all decisions on future infrastructure investment, becoming a fundamental part of investment, planning and design.

ICE recommends that NIA2 should be strongly aligned with the CCC's Sixth Carbon Budget. This analysis represented a huge step forward in outlining the specific actions needed to decarbonise the economy, and identified whole new infrastructure industries that need to mobilise radically in order to meet net zero. The targets outlined within the Sixth Carbon Budget have been enshrined into UK law, and upcoming strategies will shed more light on the actions needed to achieve net zero.

Net-zero governance

There are many potential ways to deliver net zero, all challenging, but the outcomes must be affordable and deliver a wider array of benefits – environmental, social and economic – rather than simply impose costs.

In the immediacy, there must be recognition that the infrastructure required to meet net zero by 2050 is unlikely to materialise without sound governance. Reaching net zero is an objective unlike previous political and policy challenges. It requires transformation across several vital and interconnected systems of infrastructure, regulation, finance and human

³ Climate Change Committee (2020) [Sixth Carbon Budget](#)

⁴ Intergovernmental Panel on Climate Change (2021) [Sixth Assessment Report](#)

behaviour. The UK's system of legislative governance on carbon reduction targets, built around the CCC, is world leading. However, while there are many processes which govern net zero, there is no formal system of governance or guidance for translating high-level targets into net-zero governance at a policy or local level.

There will be examples where particular policies fall between government departments and would benefit from better cross-departmental working. Rapid decarbonisation of electricity supply will provide a platform for the decarbonisation of other sectors such as heating and transport, but for optimum outcomes the sector strategies must be aligned. For example, policy on electric vehicles is separated between those responsible for roll-out of charging infrastructure, those encouraging switch-over, and those dealing with the impacts of increased demand on the energy system.

With infrastructure needing to be considered on a systems basis, NIA2 should consider the governance required to deliver net-zero infrastructure. Below strategy-setting, which will remain the government's domain, there are myriad complex interconnected delivery challenges that need to be navigated to enable a coherent, fair, cost-effective net-zero transition. It would be worth NIA2 considering whether an additional body is required to provide the guidance needed.

On top of this, it should also be recognised within NIA2 that new evidence could emerge that causes the 2050 net-zero target to be accelerated. The consequences this may have for infrastructure provision and delivery should be considered.

Carbon impacts of new infrastructure

Projects committed to now will determine a locked-in spend and associated carbon emissions to 2050 and beyond. Currently there is an estimated £650 billion pipeline of projects committed to be delivered in the next decade.⁵ However, the carbon impact of those projects and the knock-on effects of meeting carbon budgets and the 2050 net-zero target is unknown.

While there has been good progress on understanding life-cycle carbon accounting in buildings, there is little information across the diverse range of infrastructure projects.

The upkeep and improvement of existing infrastructure should be reviewed within NIA2 to avoid rebuilding where possible and minimise the impacts of embodied and operational carbon. To this end, ICE recommends that NIA2 should fully consider the carbon impacts of new infrastructure to the same extent that fiscal and economic impacts are considered, and emphasise the importance of infrastructure maintenance in meeting national goals, including net zero, resilience and addressing regional socio-economic inequalities. The principles of the circular economy in achieving this should also be considered.

UN Sustainable Development Goals (SDGs)

The UK has long-term social, economic and environmental goals, notably the 2030 UN SDGs. The SDGs all link to tackling recognised long-term challenges in the UK, including climate change, regional economic inequalities, poor productivity and a workforce lacking the right skills.⁶

Infrastructure has a crucial role to play in achieving the SDGs: not only is there an infrastructure-specific SDG, but research has shown that 72% of the SDG indicators are linked to networked infrastructure investment and 92% when all forms of infrastructure are considered.⁷ This includes job creation, the ability for infrastructure to generate economic activity, protecting the environment, and the manifold benefits to society that infrastructure can bring through safe, reliable, affordable and accessible systems. But despite this important role, few developed countries use the SDGs

⁵ Infrastructure and Projects Authority (2021) [Analysis of the National Infrastructure and Construction Pipeline 2021](#)

⁶ ICE (2020) [Covid-19 and the UK's Sustainability Challenges – Lessons for the New Normal](#)

⁷ ICE (2020) [ICE Strategy Sessions: How Can Infrastructure Help Achieve the UN Sustainable Development Goals?](#)

or reference them as part of their infrastructure plans.⁸

ICE's recent review of the UK strategic infrastructure planning system recommended that the objectives for the NIC should be updated to include net zero and the SDGs.⁹ The recent *Transforming Infrastructure Performance: Roadmap to 2030* from the Infrastructure and Projects Authority also references the SDGs in relation to the outcomes society needs and the decisions required to build, maintain and renew infrastructure.¹⁰

There is broad alignment between the SDGs and at least two of the NIC's objectives, namely supporting sustainable economic growth across all regions of the UK and improving quality of life. NIA2 should explore how infrastructure investment can be used to drive wider efforts towards achieving the SDGs. This should be through a framework approach, testing whether the infrastructure proposed in NIA2 will maximise the positive contribution of infrastructure to the SDGs.

Global approaches to infrastructure assessment

Infrastructure Australia conducts its Australian Infrastructure Audit every four years, which identifies challenges, opportunities, gaps, problems and untapped potential across the country's infrastructure systems. The most recent audit was published in 2019 and covered transport, energy, water, telecommunications, waste and social infrastructure.¹¹ The 2019 audit identified a number of shifts in demand drivers since the first audit, which fed into the creation of the 2021 Australian Infrastructure Plan. This included faster-than-expected population growth, rising energy prices and an increased risk of drought.¹² The Australian Infrastructure Plan outlines new approaches to infrastructure governance, such as an implementation pathway for departments, regulators and other stakeholders, providing clarity on who needs to take leadership to deliver infrastructure that serves the public.

The Government of Canada is currently undertaking its first National Infrastructure Assessment. Once in place, this will help identify Canada's evolving infrastructure needs and priorities and enable evidence-based long-term planning.¹³ Pathways to net-zero infrastructure systems and building resilience to climate change have been identified as core priorities.¹⁴

The New Zealand Infrastructure Commission's 'State of Play' reports assess the country's infrastructure sectors, the issues they face, as well as those they need to prepare for.¹⁵ These reports have fed into a draft New Zealand Infrastructure Strategy, a final version of which will be published in early 2022.¹⁶ As well as making recommendations on infrastructure interventions to address long-term challenges, the draft strategy also advises on measures for planning and funding infrastructure.

It is clear, then, that the challenges and opportunities facing infrastructure are not unique to the UK. The assessments undertaken by the above organisations all identify similar trends of increased population growth and urbanisation, an urgent need to decarbonise infrastructure systems, and for infrastructure to be made more resilient to the effects of climate change. The assessments and plans serve as a solid blueprint for other countries on how to develop robust infrastructure interventions based on sound evidence and continuous improvement.

⁸ Principles for Responsible Investment (2020) [Are National Infrastructure Plans SDG-Aligned, and How Can Investors Play Their Part?](#)

⁹ ICE (2021) [Policy Position Statement: Evolving the UK Strategic Infrastructure Planning System](#)

¹⁰ Infrastructure and Projects Authority (2021) [Transforming Infrastructure Performance: Roadmap to 2030](#)

¹¹ Infrastructure Australia (2019) [Australian Infrastructure Audit 2019](#)

¹² Ibid

¹³ Infrastructure Canada (2021) [National Infrastructure Assessment](#)

¹⁴ Infrastructure Canada (2021) [Building Pathways to 2050](#)

¹⁵ New Zealand Infrastructure Commission Te Waihanga (2021) [State of Play](#)

¹⁶ New Zealand Infrastructure Commission Te Waihanga (2021) [New Zealand Infrastructure Strategy](#)

Existing infrastructure assets and networks

Prioritising maintenance and asset adaptation

The UK's climate is changing. From flooding to wildfires, infrastructure is facing pressures that, for the most part, it was not designed to withstand. Without adaptation and improved emergency response to build in greater resilience, our infrastructure will lose its value, repairs will be costly and increasingly frequent, and infrastructure users will face high levels of disruption. The case for maintenance and adaptation on these grounds alone is clear, but this will require investment.

The CCC has highlighted a climate adaptation and resilience deficit.¹⁷ The effects of climate change are becoming more evident, with more frequent extreme weather events likely to impact the infrastructure sectors that serve the public, potentially leading to cascade failure across interdependent infrastructure systems. However, the CCC has warned that climate resilience remains 'a second-order issue', under-resourced despite the UK having the capacity to respond effectively.

Most infrastructure that supports the UK's national resilience through to 2050 already exists and will do so for many years after 2050. Maintenance of infrastructure assets and systems must be further up the agenda. With much of the UK's infrastructure dating back to the post-war or even Victorian eras, this poses a growing risk as they are put under additional pressure due to climate change, such as heat stress and increased surface water run-off in urban environments.

There is a need to better understand the current condition of assets and their structural integrity, the maintenance measures needed to improve their operation and resilience, as well as the impacts of new infrastructure on existing systems. NIA2 should set out the state of existing infrastructure networks and the maintenance required to bring them up to an acceptable level that meets national goals.

Additionally, schemes such as the National Underground Asset Register could be promoted and used as a catalyst for improvement and maintenance of other existing assets, such as highways, in an effort to unlock funding.

There is a wider awareness from both policymakers and the public of how to meet national challenges through infrastructure interventions, including the crucial questions of which projects to promote and how to promote them. In some cases, policymakers are already shifting their requirements away from the presumption that infrastructure solutions require new assets to be built. The NIC should look to the Scottish Government's Investment Hierarchy, as part of its Draft Infrastructure Investment Plan. The Investment Hierarchy 'prioritises enhancing and maintaining assets over new build' – seeking to maximise use of extant infrastructure assets in line with future need, with replacement or new build considered where upgrading existing infrastructure would be unsuitable.¹⁸

NIA1 recommended the government should develop a long-term strategy to deliver a nationwide standard of flood resilience by 2050. While the government did not fully endorse this recommendation in its response to NIA1, ICE believes that the 2050 date should be reviewed and challenged against the Sixth Assessment Report of the IPCC, with the standard of flood resilience tested against expected temperature rises.

¹⁷ Climate Change Committee (2021) [Independent Assessment of UK Climate Risk](#)

¹⁸ ICE Scotland (2020) [State of the Nation Report 2020: Climate Ready Infrastructure](#)

The impacts of the Covid-19 pandemic

The Covid-19 pandemic has driven changes to how people live and work, which has affected demand for infrastructure services and sped up shifts in long-term demand. Most notably, there has been a transformation in the confidence of individuals and businesses in remote working for tasks that do not require a physical presence.

This has had numerous impacts, not least on commuting patterns within and between towns and cities. ICE has previously explored the potential impact of these changes on public transport funding, including the need for operators and policymakers to think differently about service and revenue models, which are currently based on traditional peak commute times.¹⁹ It is also likely that commerce will shift further online, which introduces new demands on freight transport and the need for a coherent low-carbon freight strategy.

At a wider scale, the challenge is in interpreting how durable these changes will be long term, and which will reverse as Covid-19 becomes a managed part of normal life. The choices of people and businesses in regard to this affect demand and spatial profiles for almost all infrastructure sectors within the NIC's remit. This will also impact on reviewing the digital and communication infrastructure that is required for productive remote-working environments and agile businesses.

In light of this uncertainty, ICE therefore recommends that NIA2 conducts scenario analysis on a systems basis in order to account for the potential impacts – short, medium and long-term – of the Covid-19 pandemic. NIA2 should build on the NIC's existing analysis in this space, drawing on new evidence as required and identifying the impacts and behavioural changes that are most likely to sustain.²⁰

As part of this, NIA2 should take a coordinated approach to transport demand, including the interfaces between how the public choose to travel for different purposes (for example, through work and leisure), the associated transport modes they may take for each, and how they can work together to deliver for various scenarios of future demand. This would include consideration of active travel modes, modal interchange hubs and timetabling/ticketing, together with an associated freight strategy.

The impact of digital infrastructure availability and new digital technologies

The Covid-19 pandemic showed that the UK can remain competitive and innovative with home-based employees utilising existing fibre digital infrastructure. However, it has also highlighted areas of poor digital infrastructure, depriving employees living in those areas of the opportunity to match the productivity of others. From a digital infrastructure perspective, the priority within NIA2 should be to ensure nationwide connectivity to allow fair opportunity for all, alongside improving connections for future use. Connectivity needs – both fibre and mobile – should be reviewed against the needs of future homeworking demands and agile businesses.

Additionally, there is huge untapped potential for the public to shape their engagement with infrastructure, providing opportunities for them to personalise and improve services (e.g. mobility-as-a-service), reduce costs and even for the assets of private citizens – such as electric vehicles and microgeneration – to become part of the wider infrastructure system. This potential should be considered within NIA2, exploring the growing role and impact of individually owned assets as part of the infrastructure system, as well as the regulatory structure that may need to develop to account for this evolution.

¹⁹ ICE (2021) [ICE Discussion Paper: Public Transport Funding Post-Covid](#)

²⁰ National Infrastructure Commission (2021) [Behaviour Change and Infrastructure Beyond Covid-19](#)

Delivering infrastructure

Planning and delivering infrastructure at sub-national level

Addressing regional inequalities has always been implicit in the NIC's objective to support sustainable economic growth across all regions of the UK, but has gained a new focus and imperative under the current government's 'levelling up' ambition. Moreover, the value of place-based decision-making has been demonstrated through the devolution success of combined authorities and Metro Mayors. Many local authorities and Metro Mayors have adopted targets on net zero that are more challenging than the government targets, so they need the tools to be able to deliver on the ground.²¹

Locally, actions have long been aimed at the broad ambition of 'levelling up', but are often inhibited by the lack of joined-up approach from central government in relation to timescales, funding and approval mechanisms.

However, we first need a clear definition of what 'levelling up' is. To date, the policy has lacked a clear strategy, desired outcomes or metrics to measure success. Without this overarching direction, the investment directed towards addressing regional inequalities could be wasted, as could the opportunity to support delivery of other national objectives such as net zero. While 'levelling up' currently remains undefined by the government, a White Paper later this year will provide more detail, which NIA2 will need to consider.

Given the urgency of the coming decade's major challenges, there will be little time to waste. Strengthening the ability for the infrastructure planning and prioritisation system to get it 'right first time' is imperative and a stronger role for subnational actors is essential.

ICE's developing work on defining and measuring 'levelling up' through the SDGs has identified a need to focus specifically on productivity, wellbeing and earnings potential through infrastructure interventions. Within this context, a number of key considerations have emerged that policy should consider:

- Granularity of comparison – large regions can conceal significant inequalities within smaller areas
- Specific strengths and weaknesses of different regions – not all regions should be 'levelled up' in the same way
- Timescale of changes – some longer-term initiatives may not provide immediately obvious benefits

Some forms of national infrastructure will always require centralised decision-making. However, given trends to greater devolved responsibility for delivery, local engagement in the infrastructure that underpins communities, and the need to demonstrate inclusive decision-making, NIA2 should make recommendations for how infrastructure decision-making governance should evolve, taking into account the above considerations.

NIA2 could provide frameworks to guide this responsibility, accountability and decision-making, enabling local government to commit to clear pathways over the long term.

ICE has previously recommended that capability in infrastructure planning and prioritisation should continue to be built at the subnational level by evolving subnational transport bodies to become subnational infrastructure bodies, tasked with creating regional infrastructure strategies, backed up by spatial strategies.²²

²¹ ICE (2021) [The Role of Subnational Leadership in Achieving Net-Zero](#)

²² ICE (2020) ['Levelling Up' and the Role of Infrastructure](#)

Guidance on infrastructure programmes and projects

Despite the progress made in reducing emissions from energy generation in the last decade, the CCC forecasts that low-carbon electricity generation will still need to quadruple to replace existing fossil-fuel generation and meet the expected increased demand from the electrification of transport and heating.²³

To decarbonise the UK's power generation within the timescales required means building 9–12GW of new or replacement capacity every year between now and 2050.²⁴ There is no realistic scenario for decarbonising energy demand in the UK without a significant contribution from nuclear and offshore wind. Within this model, managing the intermittency of offshore wind requires either more nuclear capacity or CCGT (combined cycle gas turbines) with CCUS (carbon capture utilisation and storage), or both.

Trying to establish what the exact electricity generation mix will look like in 2050 is unlikely to be a productive exercise given the vastness of the challenge and the unknown potential of some technologies. Alongside reducing energy demand, it is likely that we must simply build as much energy generation infrastructure as we can – primarily nuclear and offshore wind – and build faster than ever before.²⁵

Within the current framework, the UK would rely on the privatised energy market to build and pay for the required infrastructure. In reality there is an extremely limited supply of organisations with access to the available finance that would be willing to fund such projects. Therefore, the real challenge is not just what to build and how to build it, but how it is paid for.

It is important that NIA2 considers the infrastructure capacity that must be built to meet net zero, as well as how best to deliver it. Given the scale and pace required to meet national objectives, particularly for infrastructure that meets the net-zero target, NIA2 should provide guidance and benchmarks to the government on how long investment programmes should take to complete.

This approach should inform the government of the scale of the challenge and the potential benefits that it can bring, and the need for a plan of the programmes and projects required to achieve national objectives.

About ICE

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

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²³ Climate Change Committee (2019) [Net Zero – The UK's Contribution to Stopping Global Warming](#)

²⁴ Atkins (2019) [Engineering Net Zero](#)

²⁵ Ibid