

ICE Green Paper: Why do major infrastructure projects cost so much and take so long?

May 2025

Executive summary

Time and cost overruns are costing countries money and public trust

Trust in government in the UK, as in many countries across the world, is low.¹ In many jurisdictions, governments' ability to deliver major, and mega, projects consistently falls below expectations, contributing to this lack of trust. One of the central ingredients to rebuilding it will be the successful delivery of infrastructure globally.

While smaller projects are often successfully delivered to time and cost expectations major projects, which are most often driven by public sector clients, given their scale, uniqueness and use of taxpayer funds, struggle to do the same.

This is something the public recognise, too. Recent polling commissioned by the ICE reveals the public's lack of trust in the UK government's ability to oversee major infrastructure projects. Almost half (44%) of respondents believed public sector projects are often delayed or go over budget and 40% believed they end up costing more than necessary. The private sector was seen as better at delivering infrastructure projects efficiently and quickly (45% of respondents thought the private sector could deliver projects with efficiency and speed, compared to just 13% who thought the public sector could achieve this).¹

Unless public sector major project delivery is improved, the public may lose faith that they will get the infrastructure they have been promised, and the private sector is likely to invest less than it otherwise would as a result of a loss of investor confidence. Ongoing delivery challenges will also jeopardise the net zero transition, which needs to progress at pace.

Additionally, the opportunity cost of budget and time overruns on individual projects comes at the expense of other infrastructure and wider state investment that could deliver substantial benefits and an improved quality of life for the public. Late and non-delivery, as well as the stop-start nature of project prioritisation, also further discourage private investment – and cost the public more as investors price in additional risk to their expected returns.

In an era of populism, improving infrastructure delivery – which is often seen as a physical manifestation of the state's ability to deliver for local communities, couldn't be more important². Delivering more effectively and efficiently will be central to governments' ability to meet citizens' needs, and transition their countries to net zero.

As an important part of that challenge, this ICE Green Paper focuses on global governance and assurance structures and processes to embed best practice for major project delivery. It acknowledges that while the UK leads in many areas of project delivery, some countries deliver projects cheaper and faster. This consultation asks why this might be, and how improved project governance and assurance practices can be embedded in global governments' programmes of major projects to improve delivery.

¹ ICE (2025) [Paying for Britain's Infrastructure System](#)

² Stonehaven (2024) [Moving hearts and minds: Delivering infrastructure for the age of populism](#)

The paper builds on previous work undertaken by the ICE on closing the gap between forecasts and outturns in major project delivery, and the ICE's recommended priorities for the recently established National Infrastructure and Service Transformation Authority (NISTA).

The ICE's 2019 paper on major project delivery³ outlined the need for infrastructure owners to complete scope, design and exploration before work is commenced and to involve contractors early, as well as recommending that the government mandates principles in the Construction and Sourcing Playbooks on a 'comply' rather than a 'comply or explain' basis. In particular, it advocates for the use of should-cost modelling – or a forecast of what a project 'should' cost over its whole life, used to help the government move away from awarding contracts on a lowest-cost basis, and passing on all risk to the private sector.

Importantly, it also reflected the need for the government and infrastructure owners to move away from capital cost as the most important metric when assessing project benefits, recognising the importance of whole-life economic, social and environmental value.

The ICE is also interested in understanding the degree to which the Infrastructure Client Group's Project 13 principles have been implemented. Established as a partnership initiative between the ICE, the World Economic Forum and the Civil Engineering Contractors Association, Project 13 holds the view that the transactional model for delivering major infrastructure projects and programmes is broken.⁴ It prevents efficient delivery, prohibits innovation and therefore fails to provide the high-performing infrastructure networks that businesses and the public require. Instead, the group advocates for a shift to an enterprise model for infrastructure delivery.

This Green Paper focuses in part on whether the recommendations from the ICE's 2019 paper and the principles of Project 13's enterprise model have been implemented by governments, and adopted by industry, in the UK and globally. It also looks at which assurance and governance structures work well to embed best practice in project delivery.

Further, the ICE has recently released a paper that outlines priorities for NISTA.⁵ These include the need to ensure the independence of its advice so it is able to proactively challenge the government, oversee a credible pipeline, build cross-party and cross-government support, enable long-term strategic infrastructure planning, mandate the implementation of the Construction Playbook and Constructing the Gold Standard by government departments on a 'comply' basis, and inform and engage the public alongside a continuation of the Infrastructure and Projects Authority's (IPA) international work programme.

This programme seeks to gather evidence and views from decision-makers, infrastructure professionals, civil engineers, civil society groups and other interested stakeholders on a selection of key questions on major infrastructure delivery and enduring barriers to closing the gap between time, cost and benefit forecasts and outturns.

³ ICE (2019) [Reducing the Gap Between Cost Estimates and Outturns for Major Infrastructure Projects and Programmes](#)

⁴ Project 13 (n.d.) [About Project 13](#)

⁵ ICE (2025) [What Should NISTA's Priorities Be?](#)

Summary of key questions for consultation

We are seeking to hear from interested stakeholders regarding the following key questions:

Providing an update on implementation of the ICE's 2019 recommendations on closing the gap between forecasts and outturns and the use of Project 13's enterprise model

1. How effectively have the ICE's 2019 recommendations and the principles of Project 13's enterprise model been implemented in the UK and globally?

1.1 In particular, is should-cost modelling being applied consistently?

Embedding major project-delivery best practice

2. Are governance and assurance structures fit for purpose to support improved forecasting and delivery?

Ensuring assurance and governance best practice examples are relevant

3. How do different international governments, industries or contexts vary in ways that contribute to major project delivery outcomes which may be relevant to the examples this project might look to as best practice assurance and governance?

The role of NISTA

4. Building on the ICE's priorities for NISTA, how can the UK system improve cross-government coordination to support improved assurance and guidance implementation?

Driving further digitalisation and incentivising innovation as tools for planning and delivery improvements

5. Which countries have implemented best practice digitalisation, and what can be learnt from them?

The consultation will close on **Friday 11 July 2025**.

Responses should be submitted by emailing policy@ice.org.uk. When responding, please include your name and whether you are responding individually or on behalf of an organisation or group. Please provide evidence or case studies to support your response. All responses will be treated confidentially, and respondents will not be published.

The findings from responses to this paper, alongside further evidence gathering, will be formed into an ICE policy paper later in 2025, with a series of options and solutions for policymakers to consider when advising on and delivering major infrastructure projects.

The nature of time and cost overruns globally

Research by Saïd Business School demonstrates that delays to major project delivery timelines and increased costs compared to original forecasts are global issues. Of a sample of 3,022 projects, 27% were on budget or better, 2.8% were on budget and on time, while only 0.2% of projects were on budget, on time and delivered the stated benefits.⁶ Put simply, a typical project anywhere in the world is significantly more costly than expected, delivers significantly less than the benefits promised at inception and at a much later date than scheduled.

Similarly, and in relation to megaprojects, a McKinsey and Co. study reviewed a dataset of more than 500 global projects above US\$1 billion in resource industries and infrastructure and found that only 5% of projects were completed within their original budget and schedule. In the completed projects, the average cost overrun was 37%, and the average schedule overrun was 53%.⁷

In the UK, the National Infrastructure Commission (NIC) has suggested that, on average, major infrastructure projects could reduce cost overruns by 10 to 25% if best practice delivery approaches were adopted. The NIC identified four key cost drivers – a lack of clear strategic direction, challenges with project clients and sponsors, inefficient consenting and compliance, and a constrained supply chain.⁸

It's not that the UK is worse at delivering major infrastructure projects than other countries. Rather, this programme recognises that there are opportunities to refine the way that the UK assures and governs its projects to deliver more effectively for the public in an era of fiscal constraint and a focus from governments worldwide on the role of infrastructure to deliver on their priorities.

Why do these projects encounter difficulties?

There are a wide range of reasons that projects take longer, cost more and don't deliver the initially forecast benefits; these include, but are not limited to, the following factors:

- Funding decisions being too short term and restrictive, leading to stop-start pipelines, driving higher whole-life costs and undermining delivery planning. This is often because of a lack of strategic direction and a clear vision at the national level.
- Insufficient flexibility to reallocate funding within and across departments to expedite the delivery of projects.
- The cost and time overruns of megaprojects have a knock-on impact on all the other projects a department is running, and the megaproject's risks are too large for a department to manage.
- Excessive optimism in the initial estimates of the cost and timeline of projects, which means decisions to proceed are not accompanied by sufficiently robust and realistic assessments of affordability.
- Projects being initiated before they are ready, locking in costs and timings before the scope and benefits are defined. Commitment to performance specifications too early in a project is a particular issue to be aware of.

⁶ Bent Flyvberg (2014) [What You Should Know about Megaprojects and Why: An Overview](#)

⁷ McKinsey and Co. (2017) [The Art of Project Leadership: Delivering the World's Largest Projects](#)

⁸ National Infrastructure Commission (2024) [Cost Drivers of Major Infrastructure Projects in the UK](#)

- Governance and accountability arrangements put in place at the set-up stage of projects not reflecting the scale and nature of the risks involved, and then not evolving as the project develops. A lack of clarity on leadership arrangements is also a persistent problem.
- A constrained supply chain – a fragmented industry creates inefficiencies.
- Inefficient planning and consenting systems, as well as wider regulation that constrains successful delivery.
- Benefits that are more difficult to assess – including distributional, environmental and social effects of projects – are not valued equally to financial benefits. The ICE has previously called for a standardised scorecard to be developed to prioritise, identify and weight non-financial outcomes for major projects.
- A lack of collaboration and limited use of outcomes-focused delivery models, which disincentivises innovation, cost-effectiveness and digitalisation.

Building on the ICE's previous recommendations on major project delivery

In 2019, the ICE published a paper focused on how more collaborative working, better governance, data-led frameworks and the sharing of best practice could support improvements in project delivery and outturn forecasting.⁹

Notably, the report acknowledged that although efficiency in delivery is and should be a key determining factor of project success, there should be recognition of the broader whole-of-life and whole-of-society benefits that infrastructure, delivered properly, can achieve.

The UK is not alone in this. In many jurisdictions, business case and cost-benefit frameworks tend to favour status quo or incremental improvements achieved via project outcomes due to the discounting of longer-term benefits and the lack of attention to less-quantifiable benefits like climate resilience or urban development.¹⁰ Improvements to project selection and forecasting will require improvements to the way these benefits are conceptualised.

The recommendations of the ICE's 2019 report cover the following areas:

Scoping projects

Scope change, scope creep or incomplete designs often occur once work has commenced. Too often designers, risk adjusters and contractors work separately or are not brought together at an early stage.

Infrastructure owners should complete scope, design and exploration before commencement of work is allowed, to avoid scope creep or retroactive changes, taking steps to include contractors in design at an early stage.

Judging success

The government relies too much on cost (and, to some extent, time) to determine project success and frequently reduces contingency to 'save' money – limiting room for manoeuvre if new information comes to

⁹ ICE (2019) [Reducing the Gap Between Cost Estimates and Outturns for Major Infrastructure Projects and Programmes](#)

¹⁰ Infrastructure New Zealand (2023) [Delivery of Megaprojects](#)

light, or if economic conditions change. Scrutiny of projects often focuses on the process of completion against arbitrary budgets and not the wider benefits infrastructure can deliver in the long term.

The government and infrastructure owners must move away from capital cost as the most important metric when assessing project benefits, recognising the importance of whole-life economic, social and environmental value.

Estimating and tenders

Estimates are often set at a fixed price point, before full project or programme scope and complexity are known. Tenders are approved based on these early estimates and contracts allocated, potentially years before scope and complexity are understood.

Principles set out in the Outsourcing Playbook (now the Sourcing Playbook) should be mandatory for government infrastructure project owners, this includes undertaking should-cost modelling to help inform expectations and knowledge of appropriate tender prices during the procurement process. The ICE has since recommended that the Construction Playbook be mandated on a 'comply' basis, rather than 'comply or explain'¹¹.

It should also be mandatory for all public infrastructure owners undertaking procurement to award contracts based on a cost estimate range, using a should-cost estimate as a reference point, with an amount of contingency allocated appropriate to the level of project maturity.

As part of the development of this Green Paper, the ICE is seeking to understand the degree to which the recommendations from the 2019 paper have been implemented both in the UK and globally – in particular, whether should-cost modelling is being used consistently.

A should-cost model (SCM) provides a forecast of what a service, project or programme 'should' cost over its whole life. The use of this approach aids the government, as the client, in providing the information necessary to judge what a project's true cost should be when evaluating contracts, moving away from awarding contracts on a lowest-cost basis and apportioning risk on an equitable and incentivised payment basis to project partners best placed to manage it, rather than attempting to pass on all risk to private contractors.

A 2013 report on the procurement of the UK's rural broadband programme provides an interesting case study of an early application of the benefits of should-cost modelling, and the challenges departments may encounter when developing an SCM.

The Department for Culture, Media and Sport (DCMS) commissioned an SCM as a benchmark for the reasonableness of industry bids to deliver the programme. However, it was developed late in the programme timeline – when half of the local authority contracts had already been finalised. When used to benchmark the bids, DCMS was able to reduce the estimated cost of some of the forthcoming contracts as project management services had been overestimated compared to available benchmark costs.

Often, SCMs are able to provide clarity on the whole-of-life costs of the assets, helping departments award contracts on a better-informed basis and avoid reverting to the lowest cost as the main driver of bid success.

¹¹ ICE (2025) [What Should NISTA's Priorities Be?](#)

However, DCMS wasn’t able to use an SCM for all of its projects as part of the programme due to a lack of data availability – pointing to the value of technologies like Building Information Modelling (BIM) platforms, and interoperable data standards.

The ICE is also interested in understanding the degree to which the Infrastructure Client Group’s Project 13 principles have been implemented. Project 13’s enterprise model for infrastructure delivery focuses on a set of pillars, with accompanying principles as below. While clear, these pillars and principles don’t constitute a tick-box exercise. Rather, their application will clearly vary in line with the required outcomes, organisations and relative starting points.

P13 Pillars	Principles
Capable Owner	<ul style="list-style-type: none"> Owner develops Enterprises built on long-term b2b relationships. The Enterprise is set up to deliver: <ul style="list-style-type: none"> clearly articulated customer outcomes long-term asset performance.
Governance	<ul style="list-style-type: none"> Value is defined at outcome level (through baselines, benchmarks or affordability). The Enterprise is rewarded for outcome performance. Risk allocation is aligned with capability. Commercial arrangements provide the potential for sustainable returns.
Organisation	<ul style="list-style-type: none"> All parts of the Enterprise are aligned with the outcomes to be delivered. Suppliers are engaged early in developing solutions. The Enterprise integrates capability in high-performing, collaborative teams.
Integration	<ul style="list-style-type: none"> The Integrator brings together capabilities that translate solutions into production systems. The Integrator enables a platform approach to delivery. Strategic suppliers within the ecosystem are organisationally and commercially aligned with the outcomes. The Enterprise has a common and committed approach to health, safety and wellbeing.
Digital Transformation	<ul style="list-style-type: none"> The Enterprise’s digital transformation strategy enables an integrated digital approach to asset management and delivery. The Enterprise effectively integrates engineering and digital technology to deliver intelligent solutions.

This Green Paper focuses in part on whether the recommendations from the 2019 paper, and the principles of Project 13's enterprise model have been implemented by governments, and adopted by industry, in the UK and globally. It also looks at which assurance and governance structures might be worth learning from to embed their use.

Question 1: How effectively have the ICE's 2019 recommendations and the principles of Project 13's enterprise model been implemented in the UK and globally?

1.1 In particular, is should-cost modelling being applied consistently?

There is plenty of guidance available on major project delivery

Around the world, governments have released plenty of guidance focused on improving major project outcomes.

In 2020, the UK government launched the Construction Playbook to improve the quality and cost efficiency of major public works, lead industry transformation and embed best practice through the scale benefits of government procurement¹².

Professor David Mosey's independent review 'Constructing the Gold Standard – An Independent Review of Public Sector Construction Frameworks' then laid out recommendations for further improvement of the Playbook and its use across government¹³.

In 2022, the Playbook was updated to include a focus on digitalisation, sustainability, building safety, frameworks, contracts and contract management.

The UK government also has other guidance available, including on cost estimation via the IPA (now merged with the National Infrastructure Commission to create NISTA) and the Green, Orange, Magenta and recently released Teal books on project and programme appraisal, risk management, evaluation and project management respectively (among other sources of government guidance).

An ICE roundtable in 2021 identified that the uptake of the Playbook hadn't happened as quickly as many in the industry had hoped.¹⁴ Participants identified that those who are using the Playbook have acknowledged its usefulness; however, it appears that this engagement is mainly from prominent organisations and central government departments in Whitehall. Capacity and capability have also varied from department to department.

In New Zealand, the Better Business Case framework and wider investment management system provide resources for departments and stakeholders. In Australia, Infrastructure Australia's Assessment Framework helps prepare projects for the assurance process. France's infrastructure procurement processes rank among the best in the world.¹⁵

When projects implement best practice guidance and engage with supply chains early, the likelihood of cost and time overruns can be reduced.

These resources provide best practice guidance, but they can be generic and subject to interpretation by project teams. Well-informed implementation will require experienced project leaders and an understanding of how the guidance maps onto the specific challenges associated with a given major project.

The ICE is interested in the quality of implementation of this guidance at the project level, and in the role governance and assurance structures should play in improving this.

There are also many lessons to be learnt from previously delivered projects

The UK, and other jurisdictions, could do a better job at highlighting where projects have successfully been delivered on time, to budget and have realised the benefits they promised. In May 2022, the UK's Public

¹² Cabinet Office (2020) The [Construction Playbook](#)

¹³ Mosey (2021) [Constructing the Gold Standard](#)

¹⁴ ICE (2021) [Presidential Roundtable Summary: The Construction Playbook, One Year On](#)

¹⁵ Global Infrastructure Hub (n.d.) [France – Country Overview](#)

Accounts Committee reported that only 8% of £432 billion spent on major projects had robust impact evaluation plans in place.¹⁶ This would imply that Magenta Book guidance could be better embedded into the system and project sponsors better incentivised to require proper ex-post evaluation.

For example, project owners often try to solve the funding issue before solving the design. This can see projects handed early on to special-purpose vehicles led by equity investors who aren't equipped to develop well-defined projects.

By contrast, the Thames Tideway Tunnel (TTT) project led the way in considering engineering and sustainability aspects upfront. The project was initially estimated to cost £80 per London household; it is instead being delivered at £20 per household.¹⁷

The success and novelty of TTT lie in transforming a potentially high-risk construction project into a low-risk utility-type investment, thus increasing the attractiveness of the project to investors and reducing costs at every stage.¹⁸

This transformation was achieved by focusing on three key elements of the transaction structure and procurement process early in project design:

- The use of a Regulated Asset Base model to structure the regulatory treatment and remuneration.
- Tailoring the risk profile of the investment to target investors with a low cost of capital.
- Maximising private sector competition and involvement at each stage of the procurement process.

In Canada, the Ontario Darlington nuclear power station refurbishment programme also demonstrates the value of early thinking – spending approximately 20% of its capital expenditure budget in the planning phase, with the refurbished Unit 1 coming in five months ahead of schedule.¹⁹

In Spain, Madrid's metro rail network expansion might be looked at as an example of a project that was delivered at a lower cost than international comparators. The 35-mile (56km) programme of expansion between 1995 and 1999 cost around US\$2.8 billion (in 2024 prices). London's Jubilee Line Extension, built at the same time as Madrid's expansion, cost nearly ten times more per mile than Madrid's programme.²⁰

The World Bank has described Madrid's costs as 'substantially below the levels that were internationally considered possible'. Since the 1990s, Madrid, and Spain as a whole, has continued to build infrastructure at some of the lowest costs in Europe.²¹

Decentralisation of project decision-making, tied to political incentives for more efficient delivery at the local level, benefited the Madrid project.

¹⁶ Public Accounts Committee (2022) [Use of Evaluation and Modelling in Government – Committee of Public Accounts](#)

¹⁷ ICE (2025) [Paying for Britain's Infrastructure System](#)

¹⁸ The Infrastructure Forum (2024) [Thames Tideway Tunnel](#)

¹⁹ Ontario Newsroom (2024) [Ontario Marks Completion of Darlington Unit 1 Refurbishment Project Five Months Ahead of Schedule](#)

²⁰ Ben Hopkinson (2024) [How Madrid Built its Metro Cheaply](#)

²¹ Ibid

Other success factors included:

- Streamlined environmental and planning processes at the regional level. The project was further expedited by 24/7 tunnelling.
- The metro planners recognised the trade-offs that exist between station design and cost, signalling complexity and how much testing is required, including the use of tried-and-tested technology versus innovation. Design standardisation and replicability was preferred over aesthetic value.
- A pipeline of projects enables investment in state capacity. Madrid built the necessary state capacity to deliver the project, with experienced engineers and managers working in-house to deliver the technical design and oversee construction. The public company tasked with construction could pay extra to hire experts and procure based on cost and quality instead of just the lowest-cost bid.

Similarly, there is also plenty to learn from projects that face delivery challenges.

One of the key insights from the cancellation of the northern leg of High Speed 2 (HS2) relates to the influence of shifting political priorities on the success of a project.

The ICE has found previously that Prime Minister Rishi Sunak's 'captain's call' on the cancellation of the northern leg, without primary legislation, was more reflective of the political realities of an upcoming election than cost and time overruns²².

A lack of well-embedded strategic story for HS2 meant that a significant cohort of the public was indifferent to the project. Therefore, it did not take much for them to become detractors, particularly as planning approval and then construction for Phase 1 started.

Similarly, senior decision-makers on the project had different ideas of why HS2 was important, with some seeing it as a project focused on either speed, capacity, economic growth or demonstrating Britain's modernity. These value judgements will have informed the decisions made by senior politicians. Over time, this meant decisions were no longer aligned to any central purpose, and the narrative over the need for HS2 constantly shifted. Ministerial changes and a lack of commercial capability in the civil service have also been consistent issues, including on HS2, that have impacted delivery effectiveness.

The political re-prioritisation and lack of narrative consistency on HS2 has negatively impacted the UK's reputation as a major project deliverer.²³

The challenge is embedding best practice guidance as well as lessons learnt from both successfully delivered and less successfully delivered major projects in the UK and abroad.

Early engagement for this programme has suggested that the UK's assurance processes and structures are some of the most rigorous globally, but may require further clarity on the purpose of each approval point. It has also been reflected that the level of turnover in the civil service, and at the ministerial level in recent years, has hampered the delivery of major projects. Stakeholders have noted that in the private sector, organisations will go bankrupt rather than repeat the same mistakes in major project delivery – while the civil service lacks the same consequences for the repetition of major project delivery mistakes.

²² ICE (2024) [The Cancellation of HS2's Northern Leg – Learning Lessons](#)

²³ Ibid

The ICE is interested in stakeholders' views on whether the UK's governance and assurance structures and processes are fit for purpose to embed best practice.

Ensuring assurance and governance practices are relevant

Considering alternative models and processes to embed improved governance is an important part of this research. However, policy transfer of any kind requires an awareness of how different industry, government and geographical contexts (among other factors) affect the relevancy of the institutional or policy model to another jurisdiction.

For example, early engagement for this programme has suggested that while many projects in Hong Kong come in under budget – by an average of around 15% – this may be influenced by the authorising environment that dictates how budgeting is approached. If projects are likely to build in substantial contingency to their initial costing, because getting further approval from the Legislative Council is a key challenge, this may lead to perverse outcomes towards the end of the project when unspent funds are allocated less effectively.

However, this isn't to say that building to budget isn't a key lesson that may be worth being taken forward. In the private sector, design and construct contracts with little room for unfunded variation provide a valuable example of financial discipline that public sector deliverers may be able to learn from. The ICE is interested in the contextual factors around models and processes for assurance and governance that we should consider in this work programme.

Question 2: Are governance and assurance structures fit for purpose to support improved forecasting and delivery?

Question 3: How do different international governments, industries or contexts vary in ways that contribute to major project delivery outcomes which may be relevant to the examples this project might look to as best practice assurance and governance?

The opportunity for NISTA to embed best practice

In the UK, the recently established NISTA has the opportunity to embed best practice and improve the UK's infrastructure assurance and governance.

The new body will have end-to-end responsibility for infrastructure, from long-term strategy through to project prioritisation, creation of a credible project pipeline, and driving delivery. This gives it a cross-cutting view, and a system leadership role in improving the way the UK delivers the infrastructure it needs.

Many of the processes by which best practice will be embedded will be stewarded by NISTA, but there is a risk that merely combining the previously separate functions of strategy (NIC) and assurance (IPA) will not be enough for NISTA to deliver transformational change.

The ICE has recently made a set of recommendations on the priorities NISTA should take forward.²⁴

It recommends the following:

Provide independent advice and challenge to the government

Ensure that an independent voice is part of NISTA's governance structure to proactively challenge the government and ensure it does not shy away from difficult questions.

Enable long-term strategic infrastructure planning

Build cross-party and cross-government support to enable long-term strategic infrastructure planning.

Oversee a credible pipeline

Hold the government accountable for developing and committing to a prioritised, stable pipeline of investible projects aligned with society's needs.

Embed best practice and raise capability across government

Mandate the implementation of the Construction Playbook and Constructing the Gold Standard by government departments on a 'comply' basis, rather than 'comply or explain'.

Inform and engage the public

Ensure the public understands the benefits of infrastructure investment and that decision-makers understand the needs of infrastructure users.

Engage globally

Retain the current IPA International function to continue informing and learning from global best practice on strategic infrastructure planning and delivery.

²⁴ ICE (2025) [What Should NISTA's Priorities Be?](#)

The UK is not alone in re-examining its governance and assurance structures

To embed guidance, and lessons from successful – and less successful – major projects, many countries are considering structural change to their advisory and delivery settings.

New Zealand's infrastructure system is undergoing change including to its assurance and government advisory arrangements. National Infrastructure Funding and Financing Limited has been established, and the assurance and advisory mandates of the Infrastructure Commission – Te Waihanga, and the New Zealand Treasury, have been clarified since the coalition government came into power in late 2023. The cost and delivery time increases of recent major projects, such as City Rail Link or the forecast costs of Auckland Light Rail, have led to project cancellations and the ongoing politicisation of the infrastructure pipeline. New Zealand has work underway to develop a 30-year National Infrastructure Plan.

In Australia, a 2022 review of Infrastructure Australia re-examined the body's advisory role. The review touched on issues of assurance, government response to advice, the body's role in post-delivery evaluation and a national planning and assessment framework to provide uniform guidelines based on best practice to support national consistency and coordination in infrastructure assessment, among other focus areas.²⁵ At a state level, New South Wales has recently also re-examined its business case processes with a view to simplifying and fast-tracking projects. Federally, in 2023, more than 50 projects were also cut from Australia's Infrastructure Investment Program following an independent strategic review, which determined that many projects did not provide an adequate business case to justify significant public investment.²⁶

As countries worldwide face continued delivery challenges, this focus on structure and consequent assurance practices isn't surprising. This Green Paper is interested in examples of instances where cross-government coordination and best practice implementation has been improved as a result of structural or process change, or via existing best practice models.

Question 4: Building on the ICE's priorities for NISTA, how can the UK system improve cross-government coordination to support improved assurance and guidance implementation?

²⁵ Nicole Lockwood, Mike Mrdak (2022) [Independent Review of Infrastructure Australia](#)

²⁶ ICE (2024) [How Can Infrastructure Delivery Productivity in Australia be Improved?](#)

Driving further digitalisation and incentivising innovation

Effective project assurance, improved cost and benefit estimation and broader delivery efficiencies should be supported by improved digitalisation. There is substantial opportunity to continue growing the UK's, and other jurisdictions', capability to realise the improved benefit estimation and cost and time efficiencies that an enhanced use of digital technologies can offer.

Today's digital opportunity – whether it's in AI or further use of digital twin and other technologies – provides an opportunity to improve the organisational models used across government, including in major project governance. Siloed governance and processes that fail to bake in compliance, evaluation and assurance (so instead meet these requirements at great time and cost) are not best placed to capitalise on the benefits of joined-up data sharing and technology-driven efficiencies.

Different stages of the major project life cycle can benefit from improved digitalisation.

Benchmarking practices are improved by good availability of high-quality data, for example. In this area, the IPA's benchmarking data service has been an important addition to the landscape in that it enables public projects to have access to high-quality data from previous similar projects on crucial points of interest, like carbon emissions, cost and performance.²⁷

Further digitalisation can also help improve planning at a national level – improving the selection of the right projects.

In Singapore, for example, the Smart Nation initiative translates the country's strong national vision into practice by using data to inform land-use planning, and making it accessible for citizen-level engagement.

As part of this initiative, Singapore has created shared open platforms so that businesses and citizens can access information related to master plans and site-specific planning information, improving coordination between projects.²⁸

At a project level, digital twins and other technologies present an opportunity for cost and time efficiencies to be realised.

In Brisbane, Australia, Cross River Rail demonstrates what is possible when digital tools are employed and invested in early in the project timeline.

The project team engaged early to develop a plan to use digital twin technology effectively. Before contractors were appointed, the Cross River project team had mapped out a strategy for the role of a digital twin in the project to ensure the best outcomes during construction. Then, they built its use into the project's contracting arrangements. The project also included additional contractual provisions relating to 'common data'. These requirements mandated the use of a common data environment for all project-related datasets and the adoption of consistent data formats to create one, unified, Building Information Modelling (BIM) model.

²⁷ Infrastructure and Projects Authority (2022) [Infrastructure and Projects Authority Benchmarking](#)

²⁸ Smart Nation (2024) [Our Refreshed Smart Nation Vision](#)

By creating a digital blueprint of Brisbane's Central Business District (CBD) as part of the project more recent infrastructure builds have been able to leverage the existing digital twin, reducing costs and expediting the development process.²⁹

Similarly, in the UK, digital twin technology has been employed on High Speed 2 to optimise the design, construction, operation and eventual decommissioning of the railway.³⁰

Successful deployment of digital tools relies on a base of high-quality and widely available data

The use of digital technology needs to be supported by high-quality data that is interoperable and freely shared across industry. There are a number of factors that underpin successful digitalisation, including:

- Incentives, or requirements, for upfront investment in digital tools for infrastructure delivery.
- Improved digital skills capability and capacity. In the UK, the National Audit Office has pointed out that there are thousands of digital vacancies across government that will hamstring delivery in this area.³¹
- Incentives, or requirements, for contractors to return data on publicly funded projects. This remains a challenge in many jurisdictions, but if successfully implemented, data sharing among project owners, authorities, consultants, suppliers and contractors through all the stages of the project execution process can better integrate all parties involved in project delivery. This improved integration can enable a 'single version of truth' and improve execution, reduce human error and prioritise data-driven decision-making. However, commercial and technical barriers to data sharing often get in the way.
- Privacy and cybersecurity concerns that, often validly, constrain data sharing and accessibility, but may be able to be appropriately mitigated.
- Risk allocation and assurance processes will need to incentivise innovation. The time and cost of consenting in many jurisdictions mean that projects are effectively encouraged to develop solutions that are most likely to be approved, rather than introduce innovation that may improve project outcomes and push the industry forward.

In 2021, the IPA's Transforming Infrastructure Performance programme acknowledged that industry and the public sector have started to use Building Information Modelling more consistently in the delivery of infrastructure and are beginning to incorporate more categories of data, such as time and cost, into information models.³²

However, there are technical capabilities that are not yet being asked for or applied on government projects. Technology infrastructure and capabilities, from 5G networks to artificial intelligence, can increasingly support far greater use of digital solutions (such as sensor, monitoring and wireless technologies, robotics and augmented reality) in the delivery and operation of our built environment. The IPA pointed out that

²⁹ Russell McVeagh (2023) [5 Key Learnings from the Use of Digital Twin Technology in the Cross River Rail Project in Brisbane](#)

³⁰ UK Parliament (2024) [Digitalisation within and across UK Infrastructure](#)

³¹ NAO (2024) [Improving Productivity could Release Tens of Billions for Government Priorities – NAO Insight](#)

³² Infrastructure and Projects Authority (2021) [Transforming Infrastructure Performance: Roadmap to 2030](#)

effective and more productive delivery and operations will require us to improve and accelerate our adoption of available technologies.

Some countries have set up specific bodies to research and develop innovative construction materials, construction methods and technologies, as well as devise standards, conduct testing and provide accreditation. In Hong Kong, the recently established Building Technology Research Institute seeks to do just this and comes alongside a focus on reducing bureaucracy in major project delivery and driving adoption of modern methods of construction, including modular building.³³

The ICE is interested in where countries have effectively supported improved data quality and data standards, incentivised data sharing and capacity building in the infrastructure sector and across government, and improved consenting and assurance pathways in ways that have led to improved major project delivery through digital innovation and wider digital tool adoption. We are also interested in structures that governments, or the private or third sector, have put in place globally to drive improved digitalisation.

Question 5: Which countries have implemented best practice digitalisation, and what can be learnt from them?

³³ Building Technology Research Institute (2024) [About BRTI](#)

Consultation Questions

Providing an update on implementation of the ICE's 2019 recommendations on closing the gap between forecasts and outturns and the use of Project 13's enterprise model

1. How effectively have the ICE's 2019 recommendations and the principles of Project 13's enterprise model been implemented in the UK and globally?

1.1 In particular, is should-cost modelling being applied consistently?

Embedding major project-delivery best practice

2. Are governance and assurance structures fit for purpose to support improved forecasting and delivery?

Ensuring assurance and governance best practice examples are relevant

3. How do different international governments, industries or contexts vary in ways that contribute to major project delivery outcomes which may be relevant to the examples this project might look to as best practice assurance and governance?

The role of NISTA

4. Building on the ICE's priorities for NISTA, how can the UK system improve cross-government coordination to support improved assurance and guidance implementation?

Driving further digitalisation and incentivising innovation as tools for planning and delivery improvements

5. Which countries have implemented best practice digitalisation, and what can be learnt from them?

This consultation runs until **Friday 11 July 2025**.

Responses should be submitted by emailing policy@ice.org.uk. When responding, please include your name and whether you are responding individually or on behalf of an organisation or group. Please provide evidence or case studies to support your response. All responses will be treated confidentially, and respondents will not be published.

About the ICE

The Institution of Civil Engineers (ICE) is a 97,000-strong global membership organisation with over 200 years of history. It is a centre of engineering excellence, qualifying engineers and helping them maintain lifelong competence, assuring society that the infrastructure they create is safe, dependable and well designed. Its network of experts offers trusted, impartial advice to politicians and decision-makers on how to build and adapt infrastructure to create a more sustainable world.

For more information, please contact: policy@ice.org.uk