Executive summary

ICE welcomes the Government's green paper, especially the focus on skills and infrastructure woven through it: places with well-functioning infrastructure, good rates of investment and skilled people, have higher levels of productivity.

We further commend the restatement by Government that infrastructure drives growth, supports job creation and creates thriving, sustainable societies. Nevertheless, we also need to acknowledge that it can be capital intensive, disruptive during construction, and requires fine political judgement so resources are best used to meet the country's needs.

Areas where connectivity is weaker tend to have lower levels of productivity. We need to target investment in infrastructure to improve capacity and reliability. This takes more than funding new developments – it will also require a skilled workforce.

The industrial strategy provides the UK with a once in a generational opportunity to address this. Clear and committed pipelines of regional infrastructure projects, similar to the National Infrastructure and Construction Pipeline should be used to identify where these opportunities exist and enable government at all levels, industry and academic institutions to invest in the training needed.

Many areas of the country are successful through developing specialisations, for example high value manufacturing in the Midlands. However, their ability to realise economic growth is hampered by poor transport and digital networks. To rebalance the economy we should consider asset-to-asset connectivity rather than the city-to-city as emphasised at present.

Infrastructure is interdependent. One system relies on others and, increasingly, they are all dependent on digital. Continued investment in digital infrastructure will help address the issues the industrial strategy seeks to resolve.

As digital infrastructure becomes ubiquitous, dependence on energy systems also increases. To ensure they continue to function well, we should not look at technologies or responses but rather consider whole-systems: energy policy should continue to focus on the trilemma of affordably decarbonising while maintaining energy security.

In addition to physical infrastructure, ICE considers that to maximise the prospects of developing a new industrial strategy, there is a need to define the roles of institutions that will deliver it. The devolution agenda based on establishing combined authorities, sub-national transport bodies and regional concepts such as the Midlands Engine present opportunities to do so.

Such bodies should draw together forums with stakeholders to develop regional infrastructure strategies that determine the infrastructure required to drive sustainable growth. ICE recommends the Midlands Engine and Transport for the North are used to demonstrate how the public and private sectors can collaborate to decide their region's priorities and related skills development.

High quality, well performing infrastructure is vital for economic growth and as a catalyst for social and economic inclusion. During uncertain times, a commitment to developing a new industrial strategy will help provide economic stability, enhance productivity and facilitate inward investment.

e: gavin.miller@ice.org.uk

Key recommendations

Each of our responses to individual pillars set out ICE's recommendations for that area. Of these, we advocate the following five as central to delivering the Government's new industrial strategy:

> **Regional infrastructure pipelines should be developed to address local skills gaps** (*Pillar 2, page 5)*

Realising the growth through infrastructure agenda of the new industrial strategy will require improved skills provision. To give a fuller picture of demand scenarios, regional infrastructure pipelines identifying upcoming projects, and providing foresight on skills needs should be established.

> **Regional infrastructure strategies should be put in place across the country** *(Pillar 3, page 10)*

In each region, stakeholder forums should develop cross-sector regional infrastructure strategies. The strategies should highlight challenges and benefits providing investors with a degree of certainty. The Midlands Engine Strategy with its Partnership of stakeholders provides a model.

> **Digital delivery and smart infrastructure should be embedded across all infrastructure** *(Pillar 3, page 12)*

Digital transformation is a cost-effective way of adding value. Traditional, physical augmentations generally add 'more of the same', while digital enhancements can transform them. The sharing of data between different infrastructure sectors will be key to maximising performance and ensuring resilience.

> **The approach of tackling energy security, decarbonisation and affordability together should be maintained** *(Pillar 7, page 14)*

The goal of secure, clean, affordable energy can only be achieved through a whole-systems approach: prioritising affordability means deprioritising energy security and decarbonisation. There have been achievements in these areas but without continued effort, this is not assured.

> **Government should develop and implement a new energy efficiency strategy** *(Pillar 7, page 14)*

Energy efficiency offers cost savings, carbon reductions and improvements in energy security. Using less energy will mean the economy decarbonises quicker, is more secure while being affordable: a win-win-win.

Context – a sector deal for construction

In addition to our response to the consultation questions, we applaud the Government's willingness to strike sector deals to support industrial sectors with a clear agenda for change. ICE Vice President Andrew Wolstenholme is leading the Construction Leadership Council's negotiations with Ministers on a sector deal around manufacturing, digital transformation and whole life asset management. Beneath those headline strands, industry leaders are guiding significant strategic change programmes. We refer at several points in this response to Project 13[1], a collaboration between leading clients and their suppliers that is operating out of ICE. This project is seeking to transform the procurement and delivery process for infrastructure projects and programmes and is feeding directly into CLC's work on new business models in the sector.

[1] ICE (2016) 'From Transactions to Enterprises'

Pillar 2 – Developing Skills

Pillar 2 response summary:

It is widely accepted that the STEM sectors - in particular engineering and IT - face a skills crisis[2]. The consequences of which include declining industry competence to deliver quality products and services combined with increasing costs, placing further stress on budgets. This could lead to major projects being postponed or even cancelled, subsequently resulting in the loss of UK plc's competitive advantage in the global marketplace.

The focus on infrastructure and desire to attract investment provides the UK with a once-in-a-generational opportunity to grow the skills of the domestic workforce. This will help to meet the demand for increased capital and maintenance of infrastructure projects through attracting and training new workers but also re-skilling existing employees. Nevertheless, we must recognise that businesses such as engineering and construction are global. People, ideas, innovation and skills move around the world.

Clear and committed regional infrastructure pipelines of projects should be used to identify where these opportunities exist and enable local and regional authorities to work with industry and academic institutions to provide bespoke training to deliver a vast range of infrastructure projects.

While continuing to encourage imported skills, over the long term the UK should be able to train and equip local populations to compete for these new opportunities. However, our ability to do so is held back by a continuing sense that technical education is somehow inferior to academic. This is reflected in schools where ICT is treated as something additional rather than cross cutting and in the college application process when it is compared to universities

Pillar 2 recommendations:

- As ICT is becoming vital for a wide range of employment it should be included alongside maths and literacy as a 'basic skill'
- As students in sectors such as engineering move between technical and academic education, Government should work with education providers to ensure there is no binary divide between the two
- A UCAS-style scheme with clear advice for technical education is essential and should be introduced as soon as practicable
- Regional infrastructure pipelines should be developed to address local skills gaps.

Pillar 2 question responses:

Q.10: What more can we do to improve basic skills? How can we make a success of the new transition year? Should we change the way that those resitting basic qualifications study, to focus more on basic skills excellence?

At ICE's evidence-gathering workshops for this response, it was expressed several times by employers that what the engineering sector see as basic skills for school leavers does not necessarily match the Government's outlook.

[2] House of Commons Science and Technology Committee (2016) 'Digital Skills Crisis'

While ICE welcomes the recently announced Digital Strategy[3] and its focus on skills, as ICT in particular is becoming vital for a wide range of employment, consideration should also be given to including it alongside maths and literacy as a basic skill. As such, there should be the same requirement that every 16 to 18-year old who achieves a 'D' grade or below should continue to study the subject.

An emphasis on more vocational approaches to developing basic skills would be welcome and is potentially useful but depends on its application. There are various part-grant funded organisations such as STEM Learning[4] and the Education Business Partnerships[5] who have pots of money for local initiatives. However, a more coherent approach to discretionary funding would be beneficial, as would clearer information on what is available, where.

Q.11: Do you agree with the different elements of the vision for the new technical education system set out here? Are there further lessons from other countries' systems?

While commending the focus on a credible technical route, a binary divide with technical education as an alternative to academic is fundamentally wrong. In engineering, students and apprentices move between vocational courses such as HNC at FE colleges and degree level study at universities. Therefore, we would not want two discrete routes.

The green paper highlights an earlier Government announcement for £170m capital funding to create a network of Institutes of Technology. It appears this money will be spread around those FE colleges that are identified through the Area Review Process as addressing particular sectoral skills needs and be used to upgrade and develop facilities.

ICE has a role in advising on education and training curriculums[6], and supports more funding for technical education. However, to create a network of Institutes of Technology, £170m in capital funding would need to be an initial amount as it would build, perhaps, only three small IoTs, with more required for current funding. Therefore, it would be better for such funding to be channelled to existing FE colleges rather than creating new institutions.

Q.12: How can we make the application process for further education colleges and apprenticeships clearer and simpler, drawing lessons from the higher education sector?

As an organisation closely involved in encouraging young people to take up technical occupations[7], ICE considers, the commitment set out in the green paper to give technical education learners clear advice is essential.

During evidence gathering for this consultation, ICE heard from recent graduates that the current system is uninspiring, confusing and off-putting. A UCAS-type scheme for technical courses would be useful. This would need to be more than simply putting information online if it is likely to be successful – as a minimum it would need to also include a way of searching and applying for courses similar to the UCAS process.

[3] DCMS (2016) 'UK Digital Strategy'
[4] STEM Learning
[5] Education Business Partnerships national
[6] For example as part of the cross-sector E4E
[7] See, for example, Tomorrow's Engineers and Big Bang Fair

The creation of clear and effective pathways from school into work, training, further and higher education will require much closer joint working at all stages and proactive involvement of employers. Parity of esteem with university qualifications with clear messaging about the attractiveness of technical qualifications and the importance of STEM subjects should also be at the heart of the application process.

Q.13: What skills shortages do we have or expect to have, in particular sectors or local areas, and how can we link the skills needs of industry to skills provision by educational institutions in local areas?

ICE supports the green paper commitment for Government to work towards a joined-up, authoritative view of the sector specific skills gaps. Currently, skills shortages are most significant among engineering professionals, followed by IT professionals[8]. This is a problem for the infrastructure sector where there is a heavy reliance on both.

In a recent survey of engineers carried out on behalf of the UK's Professional Engineering Institutions (including ICE), skills shortages were reported by 84% of respondents. These were sector-wide but particularly affecting SMEs. 'Engineering specialist' was the role most often mentioned by respondents as the level at which skills shortages and gaps can currently be found in their sector. This was followed by Apprentice and Graduate engineer. There was little regional variation in reporting overall shortages.

To address such gaps and link industry need to provision, pipelines of regional infrastructure projects should be developed in conjunction with regional infrastructure strategies (see response to Q. 16). As set out in ICE's State of the Nation: Devolution report[9], the regional infrastructure pipelines could identify where opportunities exist and facilitate Government, industry and academic institutions to invest in the training required to meet them.

The regional infrastructure pipelines should be similar to the regularly updated National Infrastructure and Construction Pipeline (NICP), and combined authority-level reports such as the Greater Manchester Construction Sector Pipeline Analysis (latterly developed to cover the North West[10]). As with the regional infrastructure strategies set response to Q.16, it is recommended the pipelines are developed by regional infrastructure forums alongside regional infrastructure strategies.

Better visibility of investment pipelines will provide the infrastructure sector with the ability to plan and respond more effectively in partnership with training providers, industry leaders and sector bodies.

There is also a growing need for employers to understand how engineering skills and knowledge can be transferred across disciplines and sectors, particularly when trying to recruit for highly specialist roles. Here, industry should work with government at all level to get a realistic assessment of future skills needs.

[8] UKCES (2015) 'Reviewing the requirement for high level STEM skills: Evidence Report 94'
[9] ICE (2016) State of the Nation: Devolution
[10] Greater Manchester Chamber of Commerce (2015) 'Greater Manchester Construction Sector Pipeline Analysis' and Greater Manchester Chamber of Commerce (2015) 'Chamber Launches Construction Pipeline Analysis for the North West'

Q.14: How can we enable and encourage people to retrain and upskill throughout their working lives, particularly in places where industries are changing or declining? Are there particular sectors where this could be appropriate?

The UK's long-term productivity plan, Fixing the Foundations[11] and the National Productivity Investment Fund (NPIF)[12] identified infrastructure as a catalyst for enhancing economic growth, skills and innovation. Engineers make things; make things work and make things work better[13]. Therefore, they will be crucial to delivering growth through infrastructure.

An increased engineering workforce that is flexible and can easily be redeployed across a range of infrastructure sectors will be required to deliver programmes and projects in the NICP[14]. Indeed, an additional 36,000 workers will be required every year to meet the demands created by our infrastructure programme[15].

The future NICP must be used as a platform to upskill/reskill and create a talent pool, which should include increasing the quality of apprenticeships and technicians schemes to grow a new workforce and retrain the current. This will involve attracting new apprentices, technicians and graduates alongside skilled people from related sectors. In turn, this will mean the upskilling/reskilling and retraining of workers. Here, Professional Engineering Institutions such as ICE are already playing their part, for example through mandating continual professional development[16].

Better visibility of national and regional programmes of planned infrastructure developments will provide employers and trainers in the industry with the capacity to respond more effectively to required need, reducing lag and, therefore, increasing efficiency and delivery times. In addition, visibility and continuity will give individuals confidence to invest in growing their skills for a career in infrastructure. The NICP and regional infrastructure pipelines (see response to Q.13) should consider skills demand from both economic infrastructure and social infrastructure programmes and projects.

Delivering infrastructure has to facilitate the adoption of digital technologies within new infrastructure and the processes of designing and building it. As a sector, infrastructure owners need a better understanding of the skills and business relationships needed to implement digital technologies and the time it will take to acquire them[17].

ICE commends the recently announced 'Digital Skills Partnerships'[18] to coordinate various programmes and best practice improving digital skills provision at a local level. A number of technology companies have supported the initiative and there is scope for the construction industry sectors to use these Partnerships to share best practice. In the meantime, organisations should consider how Apprenticeship Levy funding might be used for the purposes of upskilling existing staff in these skill sets.

[11] HM Treasury (2015) 'Fixing the Foundations'
[12] HM Treasury (2016) 'Autumn Statement 2016: some of the things we've announced'
[13] Cebr (2016) 'Engineering and economic growth: a global view'
[14] HM Treasury (2016) 'National Infrastructure and Construction Pipeline 2016'
[15] ICE (2017) 'Securing the Benefits of Infrastructure in a post-Brexit World'
[16] Engineering Council (2017) 'Continuing Professional Development'
[17] ICE (2016) 'From Transactions to Enterprises'
[18] DCMS (2017) 'Digital Strategy to make Britain the best place in the world to start and grow a digital business'

Pillar 3: Upgrading infrastructure

Pillar 3 summary:

High quality, high performing infrastructure is vital for economic growth and is a catalyst for social and economic inclusion across the country. In particular, during uncertain economic times, continued investment in UK infrastructure - with clear Government commitments including support for the private sector - will help provide economic stability, enhance productivity and facilitate inward investment.

Infrastructure is capital intensive but investment in it provides a strong economic stimulus with a multiplier effect that can help to rebalance growth around the country. An investment of an additional 1% of GDP increases output by 0.4% in the year that investment is made and a further 1.5% in the four years following the investment[19]. However, investors and developers require confidence that governments will continue to support and incentivise infrastructure investments.

Infrastructure development often requires nuanced political judgement so that finite resources are best used to meet the needs of society. Local knowledge of cause and effect combined with a regional understanding of interdependencies is vital to make infrastructure work both for the end user and for the country.

The ambitions for every infrastructure sector are interdependent and contingent on an adequate level of digital connectivity. Continued investment in digital infrastructure in addition to policies already announced will go some of the way towards addressing the issues the industrial strategy seeks to resolve.

Pillar 3 recommendations:

- Local and combined authorities, and sub-national transport bodies should have access to flexible financing options for infrastructure development
- Smaller infrastructure schemes should be bundled together to attract financing from large institutional investors
- To ensure continued development of large infrastructure projects, it is essential that the UK's status with the European Investment Bank clarified and if necessary replaced
- Regional infrastructure strategies should be put in place across the country
- All infrastructure sectors should adopt a total expenditure method (TOTEX) to enable a whole life approach to investment
- Digital delivery and smart infrastructure solutions should be embedded across all infrastructure.

[19] IMF (2014) 'IMF Survey : The Time Is Right for an Infrastructure Push'

Pillar 3 question responses:

Q15: Are there further actions we could take to support private investment in infrastructure?

Between 2010-11 and 2014-15, an average of £49bn per year from a combination of public and private sources was invested in infrastructure. While undoubtedly commendable, this is likely to fall short of the OECD recommended target of £80bn per year by 2020-21[20].

This is important as in a recent survey of engineers carried out on behalf of the UK's Professional Engineering Institutions (including ICE), 84% reported that rail and road infrastructure is constraining economic growth. In addition, in the same survey, 77% of respondents said they thought Government should be involved in supporting private sector involvement in infrastructure.

ICE welcomed the 2016 Autumn Statement's announcements on infrastructure investment, such as the National Productivity Investment Fund and the Housing Infrastructure Fund[21]. Studies have estimated that when part of a major infrastructure investment for every £1 invested by Government £3.20 is returned through increased GDP, resulting in an increase of up to 108,000 jobs per annum[22]. Therefore, as part of its industrial strategy Government must as a minimum maintain this level of funding and incentives.

Government is the biggest single infrastructure client and it, therefore, drives private client behaviours. Being a genuinely intelligent client – one based on outcomes rather than lowest cost and having a better understanding of risk and its mitigations – will force the industry to behave differently.

In the UK, the majority of development and operation of infrastructure is by the private sector. Private funding accounts for about 50% of the total planned investment between 2016-17 and 2020-21. The public sector is responsible for 43% and a mix of public and private money funds the remainder[23].

With this level of investment, the private sector's knowledge and expertise – for example in risk management and contracting – should be used to ensure projects are delivered on time and budget. A good example of innovation in delivering the UK's infrastructure that will produce better outcomes and reduce waste is provided by the Infrastructure Client Group/ICE's Project 13[24] (see Appendix).

Private investment in regulated sectors – energy, communications and to a lesser extent, water – derive the majority of their revenue from user charging. While there are some issues around affordability, in general, the principle is accepted[25]. However, there are other sectors where user charging has struggled to gain traction. For example, road user charging is rarely applied in the UK; the technology exists for its implementation (and its subsequent role in demand management) but popular and political acceptance is some way off[26].

Funding for infrastructure at the local and regional level is expected to remain constrained in the near-to-medium term. Therefore, while bearing in mind the need for value for money; new financing

[20] The Guardian (2017) 'Old, overcrowded and underfunded: it is time to overhaul our railways'
[21] HM Treasury (2016) 'Autumn Statement 2016: some of the things we've announced'
[22] Verco/Cambridge Econometrics (2014) 'Building the Future: The economic and fiscal impacts of making homes energy efficient'
[23] House of Commons Library (2017) 'Infrastructure policies and investment'
[24] ICE (2016) 'From Transactions to Enterprises'
[25] ICE (2016) 'National Needs Assessment - A Vision for UK Infrastructure'
[26] ICE (2016) 'National Needs Assessment - A Vision for UK Infrastructure'

streams are required to deliver growth through infrastructure. Some innovative financing schemes are already being put in place, for example, through the issuing of municipal and green bonds, pooling of business rates[27], 'earn back'[28] and Non-Profit Distributing programmes[29].

ICE recommends such examples are expanded to allow local authorities, combined authorities and new institutions like sub-national transport bodies to have access to flexible financing options for infrastructure development. This will help to give a clear, long-term outlook to potential investors and the supply chain, provide stimulus for investment in innovation and a platform for sustainable skills development, helping to reduce the industry's cyclical fluctuations.

Opportunities exist amongst local and regional projects to accelerate delivery but this potentially risks coming at the costs of inefficiency and reduction in value for money. ICE believes strategic bundling[30] of smaller schemes combined with incentivised partnerships across public and private sectors would support both efficient delivery, value for money and potentially attract financing from large institutional investors[31].

At the national level, the NICP and the National Infrastructure Delivery Plan (NIDP) have provided investors and the supply chain with a forward view of upcoming programmes and projects. This long-term approach is welcome as it reduces exposure to stop-start investment issues. It is vital that this is continued post-Brexit to provide an element of certainty.

Recent policy announcements by Government such as the £100m a year for the Digital Infrastructure Investment Fund[32] in tandem with a renewed commitment to provide world class digital infrastructure[33], are encouraging. Continued investment in digital infrastructure should spread benefits across the country, increasing productivity and bolstering the economy. This is highlighted by the UK Broadband Impact Study[34], which estimated that the availability and take-up of faster broadband speeds will add £17bn to the UK's annual Gross Value Added (GVA) by 2024. These interventions are projected to return approximately £20 in net economic impact for every £1 of public investment.

Amongst the larger projects, there are several that are at advanced stages of planning but require timely decisions, for example on renewable energy from tidal lagoons and 'HS3' from Leeds to Manchester. ICE believes the promotion and development of such nationally strategic energy and transport projects should be accelerated to increase UK sustainability and productivity. In turn, these developments will attract the skills, resources and capital required to deliver future projects.

Brexit has the potential – at least in the short term – to reduce levels of investment in infrastructure. One element that will need to be addressed early in negotiations is the UK's status with the European Investment Bank (EIB). The EIB invested €31bn between 2012 and 2016, acting as an anchor investor mostly in infrastructure projects. Receiving funds from the EIB is not contingent on being an EU member state but being a shareholder in the Bank is and shareholders receive the vast majority of investment.

[27] ICE (2016) State of the Nation: Devolution
[28] Centre for Cities (2012) 'City Deal #2 – Manchester earning back tax'
[29] Scottish Futures Trust (2017) 'Non-Profit Distributing (NPD)'
[30] ICE (2016) 'State of the Nation: Devolution'
[31] CBI (2015) 'Financing our Future Economy'
[32] HM Treasury (2016) 'Autumn Statement 2016'
[33] DCMS (2017) 'Connectivity - building world-class digital infrastructure for the UK'
[34] DCMS (2013) 'UK Broadband Impact Study'

As set out by the ICE-led Brexit Infrastructure Group[35], clarity on the UK's future relationship with the EIB should be an immediate priority in forthcoming negotiations. The loss of UK shareholding could badly affect levels of investment in UK infrastructure. As maintaining confidence in the sector is crucial, the Government should start consulting with industry now on alternative options. This should include the potential for a UK investment bank to replace EIB funding for future infrastructure projects

Q16: How can local infrastructure needs be incorporated within national UK infrastructure policy most effectively?

ICE considers that rather than trying to incorporate local infrastructure needs into national policy it would be better to devolve such decision making. Devolution of powers can help rebalance the UK's economy – vital at a time when there is still great disparity between the economic performance of the south east of England and much of the rest of the country.

In London and more recently in Greater Manchester, programmes of devolution with greater policy focus, investment and decision-making have shown locating power closer to those it affects can lead to economic growth and prosperity[36]. Hopefully, the trend will continue with the new combined authorities such as the West Midlands and Liverpool. Furthermore, the recent survey by the UK's Professional Engineering Institutions showed that among engineers, 67% thought such initiatives would improve infrastructure provision.

In our 2016 State of the Nation: Devolution report[37], ICE recommended regional infrastructure strategies should be developed to identify infrastructure need and the skills required for their delivery. This would be more efficient and effective at by providing transport, infrastructure and coordinating skills at the geography at which the economy operates.

The regional infrastructure strategies' aim should be to determine ongoing infrastructure needs to coincide with aspirations to build major new economic regions. We therefore commend the recent Midlands Engine Strategy[38] and urge government at all levels to work together with regional stakeholders to develop similar plans across the country.

In each region, key stakeholders should come together in forums to develop regional infrastructure strategies on a cross-sector basis. The Midlands Engine with its Partnership of key stakeholders and its industry board, which links it to central government at a ministerial level, provides a potential model[39] (see response to Q.36).

The strategies' aim should be to determine ongoing infrastructure need. While they should have regard to the NIC's work, they should not duplicate it, but focus on appropriate regional infrastructure for delivery by bodies including combined authorities, sub-national transport bodies and local councils.

The strategies would highlight key infrastructure challenges, economic, environmental and social benefits and provide potential investors with a degree of certainty around future planning and

[35] ICE (2017) 'Securing the Benefits of Infrastructure in a post-Brexit World'
[36] Centre for Cities (2016) 'The next London mayor can be a global ambassador for all UK cities' and University of Manchester (2015) 'On Devo'
[37] ICE (2016) State of the Nation: Devolution
[38] DCLG (2017) 'Midlands Engine Strategy'
[39] DCLG (2017) 'Midlands Engine Strategy'

development within the region. For an integrated picture of infrastructure, the forums, as with the Midlands Engine Partnership, should have clear linkages to central Government.

Q17: What further actions can we take to improve the performance of infrastructure towards international benchmarks? How can government work with industry to ensure we have the skills and supply chain needed to deliver strategic infrastructure in the UK?

One of the roles of the Infrastructure Projects Authority is looking at how we measure performance of infrastructure and it is the case that many UK infrastructure and engineering consultancies are world-leading. Nevertheless, to improve the UK's performance against international benchmarks there is a need to enable a whole life approach to infrastructure investment to ensure maintenance spending does not fall behind the level necessary.

Realising the growth through the infrastructure agenda as set out in the Fixing the Foundations productivity plan[40] and more recently in the National Productivity Investment Fund[41] will require improved skills provision: there is little sense in planning new railways or power stations if there is not a trained workforce to build and maintain them.

Energy, water, flood risk management, transport and digital all have capital infrastructure programmes that reach to 2020 and beyond. To address shortfalls in maintenance spending, which tends to operate on annualised budgets, ICE recommends that all sectors adopt a total expenditure method (TOTEX)[42].

As set out in our State of the Nation: Digital Transformation report[43], adopting TOTEX will allow industry to begin to make risk-based interventions other than capital replacement, such as extending the life of an asset. Regulatory frameworks across all infrastructure sectors should incentivise whole life investment decisions based on outcomes for the end user. It would enable the consideration of 'value' beyond cost, effectively redefining 'value' in the industry.

An understanding of value in this context is also important for both public and private sector infrastructure clients. This is not just improving commercial skills - more importantly, it's about the capability of owners of assets and networks to define the outcomes they are trying to achieve and drive that vision through their investment programme with a supply chain who also understand the outcomes required[44].

While continuing to encourage imported skills, post-Brexit and over the long term, the UK should be able to train and equip local populations to compete for these new opportunities. Examples of this approach include the Tunnelling and Underground Construction Academy (TUCA)[45], a purpose-built facility providing training in tunnel excavation and underground construction for example for Crossrail 2, the Thames Tideway Tunnel and High Speed Rail.

Major infrastructure projects have been shown to be effective incubators for both innovation and upskilling the workforce, and Government should consider how this can be further encouraged. For example, Crossrail has implemented a shared innovation scheme - I3P-17[46] with supply-chain

[40] HM Treasury (2015) 'Fixing the Foundations'
[41] HM Treasury (2016) 'Autumn Statement 2016: some of the things we've announced'
[42] ICE (2017) 'State of the Nation: Digital Transformation'
[43] ICE (2017) 'State of the Nation: Digital Transformation'
[44] ICE (2016) 'From Transactions to Enterprises'
[45] TUCA
[46] RailStaff (2017) 'Crossrail Innovation – The Future?'

partners who created an incentive to innovate and the potential for shared gains. Successes in publicly funded projects can demonstrate the benefits of innovation, educate decision-makers and create a skills and evidence base to support future decisions[47].

In terms of the supply chain, a difficulty arises when economic infrastructure sectors are viewed in isolation. The result has been organisations operating in silos and frequently uncoordinated decision making, resulting in the interdependencies between infrastructure sectors not being properly accounted for. This is problematic because each type of infrastructure makes significant demands on others – for example transport requiring energy and digital communications infrastructure to function. The most catastrophic consequences occur when failure propagates from one infrastructure asset to others.

Infrastructure clients need to be 'smarter' by taking ownership of the complexity of their projects and their relationships with their supply chains. Clients need to use competition more creatively. Rather than chasing lowest initial costs, they should create arrangements that enable the parties to work together[48].

Digital infrastructure policies will become more important post-Brexit where our capability will be benchmarked against other European countries to a greater extent than now. The European Commission's Digital Economy and Society Index 2017 ranks the UK 7th, down one position from 2016[49]. The UK is rated as part of a group of countries 'lagging ahead': scoring above the EU average but whose development is now slow, and, as such, is lagging in comparison to the progress of the EU as a whole.

Digital transformation, which includes digital delivery and smart infrastructure, is a more cost-effective way of adding value to infrastructure than traditional approaches. This is true of retrofit as it is of new build. Physical enhancements of existing infrastructure generally add 'more of the same', while digital enhancements can transform them[50].

It offers an opportunity to address this through increased data sharing[51]. Digital delivery and smart infrastructure solutions should be embedded across all economic and social infrastructure, for example by extending the mandated use of BIM by central Government[52] to local authorities. This will not only bring benefits to end-users, but also realise the UK's potential as a world-leader in this sector.

[47] ICE (2017) 'State of the Nation: Digital Transformation'
[48] ICE (2016) 'From Transactions to Enterprises'
[49] European Commission (2017) 'The Digital Economy and Society Index'
[50] Cambridge Centre for Smart Infrastructure and Construction (2016) 'Smart Infrastructure'
[51] ICE (2017) 'State of the Nation: Digital Transformation'
[52] ICE (2016) 'BIM Mandate and BIM in legislation: There is a BIM Mandate, how does it work?'

Pillar 7: Delivering affordable energy and clean growth

Pillar 7 summary:

The transition to a secure, affordable and low carbon future is feasible but requires a clear vision from Government and policy makers, with cross-party support to maintain the necessary policy stability.

A key limitation with electricity infrastructure is that it is set up to transmit power from a small number of large generators to demand centres. While the infrastructure generally works well at present, with more distributed generation in the form or renewables and increasing demand (from the electrification of heat and transport, for example), balancing and maintaining the system will become increasingly complex.

The main challenges for Government and other bodies who will be delivering future networks is that there remains a lot of uncertainty around what that low carbon future looks like. For example, changes to the current prevalence of centralised generation, amount of new distributed, intermittent and required storage capacity at both transmission and distribution levels. The planning for future network infrastructure development needs to accommodate this uncertainty.

The key point is not to look at individual technologies or responses in isolation but rather consider our energy systems as a whole. Even at a basic level, the three elements of the trilemma are clearly interrelated and while progress is being made on each, we are not so far down the path to secure, decarbonised energy that we can refocus on affordability. Rather, energy efficiency, which covers all three elements, should be a central consideration in delivering future energy systems.

Pillar 7 recommendations:

- The approach of tackling energy security, decarbonisation and affordability together should be maintained
- Government should develop and implement a new energy efficiency strategy
- Instead of ending energy subsidies better place to start would be the removal of policy barrier limiting modernisation
- Innovation in energy should include around policy and regulation, with any alterations considered from a whole-system point of view.

Pillar 7 question responses:

Q.27: What are the most important steps the Government should take to limit energy costs over the long term?

The green paper states energy policy should be reprioritised to focus on the affordability and the economic opportunities of innovation. This represents a shift away from a framework based on the trilemma of decarbonising while maintaining security of supply and affordability.

Progress has been made on energy security through mechanisms like Capacity Auctions and Contracts for Difference (CfD) resulting in a capacity margin of 6.6% in winter 2016-17[53]. However, it should be noted other – temporary – factors such as broken interconnectors with Ireland and France, and the operating extension of Eggborough coal-fired power station until March 2017 are also partly responsible[54]. Furthermore, most predictions are for electricity demand to increase in the future, driven, for example, by the electrification of heat and transport[55]. Significant new capacity such as Hinkley Point C are several years away from generating,

The green paper is correct that the UK has - so far - met its obligations under the Climate Change Act and we await the Emissions Reduction Plan. Nonetheless, it is clear current policies are insufficient to meet the requirements of the fourth and fifth carbon budgets to keep us on a cost-effective path to the 2050 target of an 80% reduction in emissions[56].

Therefore, ICE recommends that a new policy approach concentrating on affordability and innovation and paying less attention to security of supply and decarbonisation is not the correct direction of travel.

The three elements are inextricably linked – prioritisation of on means deprioritisation of the others. Not tackling energy security, decarbonisation and affordability together could also lead to increased costs for the consumer: household bills in 2016 were below 2008 levels as higher prices resulting from low-carbon policies and network costs were more than offset by reductions in energy use. Bills are now about £115 lower in real terms since the Climate Change Act was passed in 2008[57].

Longer-term planning is an important way to reduce expense but it is important to consider holistic, whole-system costs not just consumers bills. The transition to a secure, affordable and low carbon future is feasible but requires a vision with cross-party support to maintain the necessary policy stability: clear decarbonisation pathways to 2030 that demonstrably put the UK on the road to its 2050 commitments are required.

To create a stable environment for long-term investments and to balance reliability, availability and intermittency, Government should commit to a diverse mix of energy generation based on renewables, nuclear, gas and interconnectors and set out an expectation as to the approximate proportions of different sources of generation[58].

While ICE welcomes the green paper commitment to support further cost reductions in offshore wind, we consider this should not be to the exclusion of onshore wind and solar PV, where costs are rapidly falling and are likely to be cheaper than CCGT within ten years[59]. However, this will require continued Government support - it is essential that the lowest cost technologies such as onshore wind are given renewed access to the CfD support scheme.

Looking across energy systems, energy efficiency, for example through better insulated buildings, smart technologies – including smart grids - and changes in energy consumption, offers the best savings for energy costs over the long-term[60]. As set out in the previous Government's 2012 energy efficiency strategy[61], carbon reductions, improvements in energy security by reducing demand,

[53] National Grid (2016) 'Looking Ahead to Winter 2016/17'
[54] The Guardian (2016) 'Winter Electricity Blackout Risk Recedes, says National Grid'
[55] Utility Week (2016) 'Electricity Demand Could Rise 19 Percent by 2035'
[56] Committee on Climate Change (2016) 'Meeting Carbon Budgets – 2016 Progress Report to Parliament'
[57] Committee on Climate Change (2017) 'Energy Prices and Bills – impacts of meeting carbon budgets'
[58] ICE (2016) 'National Needs Assessment'
[59] BEIS (2016) 'Electricity Generation Costs'
[60] Energy Efficiency Financial Institutions Group (2015) 'Energy Efficiency – the first fuel for the EU economy'
[61] DECC (2012) 'The Energy Efficiency Strategy'

warmer homes and lower bills mean increasing energy efficiency is win-win-win. To this end, Government should look to refresh its Energy Efficiency Strategy and introduce consistent schemes to enable these reductions (see response to Q. 30, below).

In addition, Government and Ofgem should take a more proactive role in enabling a smarter energy system, for example swiftly following through on the recent Smart, Flexible Energy System consultation[62] as a way to reduce the need for major new power projects and lower costs for consumers.

Q.28: How can we move towards a position in which energy is supplied by competitive markets without the requirement for ongoing subsidy?

When subsidies for energy are discussed, it is usually in reference to renewables. However, it is important to note that virtually all forms of electricity generation are eligible for support. Even the cheapest – gas and diesel – can apply for funding through Capacity Auctions, Supplementary Balancing Reserve and Short-term Operating Reserve amongst many mechanisms.

The removal of subsidies is of course possible. However, as the wholesale electricity price is not sufficient to support investment, their removal would have far-reaching effects, potentially increasing bills. Furthermore, as much of the subsidy that is available to electricity generators is to either maintain energy security or to encourage decarbonisation, the removal of support would very likely lead to a weakening of both.

A strong carbon price could remove or reduce the need for support for low carbon generation, but this is not yet in place. As the carbon price rises and low carbon generation costs reduce, the level of additional revenue support will fall to very low levels. However, some form of price stabilisation mechanism is likely to still be needed, because low carbon generation will be exposed to the risk of low gas prices, whereas fossil generators have an inbuilt hedge against this price risk.

Instead of looking at which subsidies could be removed, a better place to start is around the removal of policy barriers that are stifling competition, for example restrictions in the electricity licensing regime and system use charging which do not reflect the way modern networks operate[63]. The policy priority should be to drive cost reduction in low carbon generation. This will reduce the total cost to the consumer of a secure and low carbon generation mix. Nevertheless, to avoid unintended consequences when removing policy barriers it is essential this is done as part of a whole-systems approach.

In addition, there is a need to ensure regulated competition between generators that distinguishes between cost and cost-effectiveness that is, what can be achieved for the price. This will assist the development of supporting capabilities: the efficient delivery of energy infrastructure will require a cost-effective supply chain and skilled workforce.

Q.29: How can the Government, business and researchers work together to develop the competitive opportunities from innovation in energy and our existing industrial strengths?

The UK has a good base and reputation of innovation in the energy sector to build upon. Nevertheless, during evidence gathering for this response, ICE was told there was a need for greater collaboration between universities and industry to improve actualisation from research to

[62] Ofgem/BEIS (2016) 'Smart, Flexible Energy System – a call for evidence'
[63] ICE (2016) 'Electricity Storage: Realising the Potential'

development. Collaborative working is necessary to ensure links are established and objectives delivered – investment should focus on wider industry and holistic gains to deliver real and sustainable cost savings.

Innovation in energy should not be thought of as solely developing new technologies for generation, distribution and storage but also around policy and regulation, for example on current restrictions on the deployment of storage by Distribution Network Operators, licensing and introduction of half-hourly variable pricing for domestic customers.

Q.30: How can the Government support businesses in realising cost savings through greater resource and energy efficiency?

The previous Government's Energy Efficiency Strategy (2012) estimates that socially cost-effective investment in energy efficiency homes and businesses could save a total of 196 TWh[64]. Were all this potential to be realised, final energy consumption in 2020 could be 11% lower than the business as usual baseline. However, it is now clear that the Energy Efficiency Strategy has failed to deliver[65] and needs to be refreshed.

Per unit of energy saved/produced, employment creation from investing in energy efficiency is two to four times larger than in the fossil fuel-based sector[66]. This is because of the higher labour intensity of the energy efficiency industry and its supply chain. Investments in energy efficiency – particularly through retrofit – also compare favourably to renewable energy as investment costs are offset by the energy savings. A study by Frontier Economics[67] calculates that an energy efficiency infrastructure programme could generate £8.7bn of net-benefits to the economy.

Longer term investment in energy efficiency technology can also lead to a virtuous circle as innovation leads to cost reductions, which can make it cheaper and easier to invest in energy efficiency in the future. Developing our innovative capacity in technology, materials or business models for energy efficiency opens up the potential for increasingly significant export opportunities for the UK[68].

For non-residential energy efficiency, most businesses and public bodies do not invest in it even when it is cost effective. This so called energy efficiency gap – the wide disparity between what is apparently cost-effective and what is actually implemented in the real world – is thought to be due to perceived risk, lack of information and access to capital[69].

To address this alongside information campaigns to raise awareness among business owners – particularly with SMEs – there is a need for financial support. One potential mechanism is to extend or replicate schemes such as the Salix interest-free loan programme[70] currently only available to public sector organisations. Salix is an independent, publicly funded company, providing funding to the public sector to improve their energy efficiency, reduce carbon emissions and lower energy bills. It has funded £500m worth of projects since 2004 and estimated to save a total of £116m per annum.

[64] Energy Efficiency Financial Institutions Group (2015) 'Energy Efficiency – the first fuel for the EU economy'
[65] Which? (2015) 'A Local Approach to Energy Efficiency'
[66] Rosenow et al (2014) 'Fiscal impacts of energy efficiency programmes – the example of solid wall insulation investment in the UK'
[67] Frontier Economics (2015) 'Energy Efficiency: An infrastructure priority'
[68] Frontier Economics (2015) 'Energy Efficiency: An infrastructure priority'
[69] UCL Energy Institute (2016) 'A new approach to non-domestic energy efficiency policy'
[70] Salix

Pillar 9: Driving growth across the whole country

Pillar 9 summary:

Lack of investment in infrastructure development and maintenance, particularly road and rail, is constraining the UK economy. Where investment has occurred it has tended to be on intercity routes with less within cities and towns. To correct this, there is a need to focus on whole journeys, for both passengers and freight.

Areas where connectivity – physical and digital – is weaker also tend to have lower levels of productivity[71]. There is the need for greater investment in physical and digital infrastructure to improve capacity and frequency. However, to manage this takes more than funding building developments – it will also require a skilled workforce.

Pillar 9 recommendations:

- Vocational training for 16 to 19 year olds and careers advice should be devolved to combined authorities
- More important than comparing the rest of the UK to London in terms of productivity would be to compare individual regions over time
- There is a need for each area to examine the scale, nature and causes of their productivity gaps but also their distinctive capacities, specialisms and prospects.

Pillar 9 question responses:

Q.34: Do you agree the principles set out above are the right ones? If not what is missing?

The main areas highlighted in the green paper – weakness in infrastructure and connectivity, skills and qualifications, R&D investment and institutional leadership – do seem like the right priorities for this pillar.

At ICE's evidence gathering workshops, weakness in transport infrastructure was highlighted as a major issue. There was a feeling that while there has been investment in intercity routes, most notably rail, this still has some way to go to address inadequate linkages between cities and large towns outside the south east of England. As highlighted in the National Needs Assessment there is a need to focus both on end-to-end journeys for passengers and for freight, the linking of key transport hubs, such as ports and airports to centres of population[72].

Skills and qualifications are clearly linked to driving economic growth. A low skills base in many areas is regularly considered to be a factor holding back regional development and could be an increasing problem post-Brexit[73].

ICE recommends the creation of regional infrastructure pipelines identifying specific upcoming projects and providing foresight on skills and education requirements (see response to Q.13). Skills academies like the National Skills Academy Nuclear, the National College for High Speed Rail and TUCA (see response to Q. 17) could be further developed to address skills shortages affecting the delivery of local specialisms.

[71] Place North West (2016) 'Unlocking Growth in the North'
[72] ICE (2016) 'National Needs Assessment'
[73] CBI (2016) 'Getting skills right more vital than ever post-referendum'

ICE agrees local leadership is a crucial element in institutional success in driving growth. To ensure this it is important to have (flexible) frameworks to provide guidance. For example, the insistence by Government that the creation of combined authorities should be contingent on directly elected mayors is holding back their establishment in certain parts of England[74]. A combined authority should be able to develop an effective system of accountability, for example through a cabinet or executive committee, without the need for imposition.

Q.35 What are the most important new approaches to raising skill levels in areas where they are lower? Where could investments in connectivity or innovation do most to help encourage growth across the country?

ICE considers an important new approach to raising skill levels is to utilise the current review and reform of post-16 and adult skills provision in England[75] to address the multiplicity and fragmented nature of small-scale STEM education initiatives and careers advice. Where they exist, vocational training for learners aged 16 to 19 and careers advice should – like post-19 skills – be devolved to combined authorities, as should provision of careers advice.

Working with Local Enterprise Partnerships (LEPs), schools and colleges, local and combined authorities should incorporate skills needs within their plans driven by the requirements of local employers and the practical experience of further education colleges. Closing the skills gap should not be seen solely in terms of training. Innovation, investment in technology and streamlined procurement are all required to meet this challenge.

There is a question on whether it is feasible for all of the country to have levels of productivity similar to London and the South East. In large part its high GVA/income per head (GVA(I)) ratio of is due to financial services which will always be far higher than, say, light manufacturing. Furthermore, as it based on regional resident population and does not take account of inter-region commuting[76] the GVA(I) figures for London are likely to be lower than given.

More important than comparing the rest of the UK to London in terms of productivity is to compare individual regions over time. As shown in the ONS figures quoted in the green paper, all areas (apart from London) have seen a decline in productivity between 1997 and 2014. An understanding of why this is the case will be central to correcting it.

The parts of the country that have poorer levels of connectivity are less productive[77]. There is the need for greater investment in physical and digital infrastructure to improve capacity and frequency of rail and road connectivity. The benefits of the deployment of digital infrastructure to quality of life can be felt on a cross-sector basis, both by service providers and users.

As with Transport for the North's Northern Powerhouse Independent Economic Review[78] there is a need for each area of the country to examine the scale, nature and causes of their productivity gaps but also their distinctive capacities, specialisms and future growth prospects.

[74] ICE (2016) State of the Nation: Devolution
[75] ICE (2016) State of the Nation: Devolution
[76] ONS (2017) 'Regional gross value added (income approach), UK: 1997 to 2015'
[77] Transport for the North (2017) 'International Connectivity Commission Report'
[78] Transport for the North (2016) 'Independent Economic Review'

Pillar 10: Creating the right institutions to bring together sectors and places

Pillar 10 summary:

The Midlands Engine and combined authorities place the development of infrastructure at the heart of driving forward economic growth and rebalancing of the UK's economy.

The Government recognises that infrastructure is an enabler for economic growth, ultimately helping to deliver more jobs, greater productivity and helps rebalance England's economy. However, beyond transport, other infrastructure sectors and the skills to provide and operate them do not yet have similar bodies operating across such wider regional geographies.

ICE considers that to maximise the economic opportunities presented by devolution there is a need to clearly define the roles and desired outcomes through developing regional infrastructure strategies. To this end, we welcome the recently published Midlands Engine Strategy and encourage other areas to develop similar plans.

Pillar 10 recommendations:

- A key role for Government working with local and regional institutions should be to help develop regional infrastructure strategies on a cross-sector basis
- Emerging regional bodies such as the Midlands Engine should be central to driving growth and rebalancing the economy.

Pillar 10 question responses:

Q.36: Recognising the need for local initiative and leadership, how should we best work with local areas to create and strengthen key local institutions?

Devolution in England is creating new geographies and institutions such as combined authorities and emerging sub-national transport authorities. As acknowledged in the green paper, each area and sector is different. There is a role for institutions to play in developing and implementing infrastructure policy at local and regional levels.

The Government's desire to work with local areas to identify and help develop local specialisms is welcome. To strengthen the development of new (or remodelling of existing) institutions, there should be a focus on mapping each area. Local authorities, universities, and LEPs are regularly mentioned, however, this could be further broadened to unions, councils, charities, and businesses.

Similarly, in reaching devolution settlements, while accountability and leadership are essential, models to achieve devolution should reflect each area's unique identities and preferred approaches[79]. The goal for such new institutions should be ambitious, for example researching and setting strategy, both long and short-term, to improve quality of life in the local area. As some local authorities lack the commercial and technical skills to manage these programmes, this is likely to require capacity building.

From ICE's evidence gathering workshops there was a clear desire for the development of regional plans. Therefore, as set out in our State of the Nation: Devolution report, ICE suggests that a key role for Government when working with local and regional institutions should be to help develop

[79] ICE (2016) State of the Nation: Devolution

regional infrastructure strategies on a cross-sector basis[80]. The strategies' aim should be to determine ongoing infrastructure need in the area[81] (see Q. 16).

The recently published Midlands Engine Strategy[82] is a well-thought through early-stage example that should be used as a reference point for other areas such as the Northern Powerhouse as they progress from concept to concrete institution. In addition, ICE recommends that Transport for the North's development towards becoming the first statutory sub-national transport body[83] could provide salutary lessons.

The Midlands Engine Strategy was largely developed by the Midlands Engine Partnership, which includes Local Enterprise Partnerships, local authorities, businesses and academic institutions, which voluntarily joined forces to deliver a shared vision for the region. A further important element of the Strategy that should be borne in mind in developing others is the that the Midlands Engine Partnership will be linked to the DCLG at Secretary of State level through an Industry Board[84] which will support the Partnership's activities and act as a conduit to central Government.

A key to success for such strategies is to have clear objectives from the outset and the ability of organisational leaders to have both governing and empowering roles to drive the decision-making processes towards their realisation.

Q37: What are the main important institutions which we need to upgrade or support to back growth in particular areas?

Alongside national bodies like the National Infrastructure Commission ICE sees combined authorities, sub-national transport bodies and emerging institutions such as the Midlands Engine and concepts like the Northern Powerhouse as central to driving growth and rebalancing the economy across England.

The Government has identified investment in infrastructure[85] as a key driver of productivity. Understanding where ultimate decision-making over the implementation and delivery of infrastructure policy should be located is, therefore, imperative.

In a changing system of governance comprised of emerging levels of devolved responsibilities, new economic geographies and statutory bodies, this is a complex task. Interpreting the scope, interconnectivity and remit of the different parts of the system requires a strategic approach. This should be both top-down and bottom-up: central Government and local and combined authorities working together as seen with the Midlands Engine Strategy.

As set out in response to Q. 16, the system should be one of collective responsibility where regional infrastructure forums, establish at which level infrastructure need should be decided and, consequently, what that need is[86]. This should be done while paying regard to local authorities plans, the National Planning Policy Framework and the work of the NIC. As each infrastructure sector makes significant demands on others[87], it is important an integrated approach is established. Skills should also be a consideration: trained workforces will be needed to build and maintain any new

[80] ICE (2016) State of the Nation: Devolution
[81] HM Government (2016) 'Northern Powerhouse Strategy'
[82] DCLG (2017) 'Midlands Engine Strategy'
[83] Transport for the North 'Spring 2017 Update Report'
[84] DCLG (2017) 'Midlands Engine Strategy'
[85] HM Treasury (2015) 'Fixing the Foundations'
[86] ICE (2016) State of the Nation: Devolution
[87] ICE (2016) 'National Needs Assessment'

proposed infrastructure. This should link in with the proposed regional infrastructure pipelines as set out in response to Q. 13 and ICE's State of the Nation: Devolution report[88].

Each regional infrastructure forum should identify their area's requirements through collaboration with local communities, relevant government departments, regulatory and delivery bodies, local government, businesses and academia. The outcome should be an infrastructure strategy for that region. In practice, this means following the example of the Midlands Engine Strategy to further develop the nascent Northern Powerhouse Strategy published in 2016[89], followed by the other core English regions as they become ready for this type of strategic approach.

Q38: Are there institutions missing in certain areas which we could help create or strengthen to support local growth?

As set out in responses to Qs 16, 36 and 37, ICE considers the continued creation of combined authorities alongside new regional infrastructure forums as essential for driving forward the Government's laudable aim of driving growth across the country through infrastructure development.

Political and economic geographies are better understood regionally. As a consequence, travel and interconnectivity between regions is enhanced when strategic decisions are taken closer to the service users that they affect.

Transport for the North, the first sub-national transport body to become statutory, provides an exemplar of what can be achieved through creating a 'single voice', partnering local and national Government with private sector developers and operators to create a Strategic Transport Plan[90] for the region in order to align transport investment with wider goals of developing the Northern Powerhouse concept.

Within this context, ICE fully supports the creation of further statutory sub-national transport bodies across England to promote the benefits of needs-based and strategic transport integration. In developing their strategic thinking, it is important they identify the most effective ways of connecting populations within their regions while ensuring a joined-up approach is taken to inter-region connectivity.

[88] ICE (2016) State of the Nation: Devolution
[89] HM Government (2016) 'Northern Powerhouse Strategy'
[90] Transport for the North (2016) 'The Northern Transport Strategy'