Creating confident investors and competitive advantage for the UK nuclear supply chain

November 2017
Increasing levels of renewable power from wind and solar, complemented by baseload low carbon nuclear power, are driving the UK towards a low carbon future. Our dependence on the power system will continue to increase as we electrify heating and transport and, as the UK’s existing nuclear power stations approach their end of life, the challenge will be to maintain the proportion of low carbon power connected to the grid.

The UK is progressing with a new nuclear build programme and the combined track record is mixed. These projects are challenging, requiring significant investment to get to the point of final

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<th><strong>The UK has a strong nuclear industry and there is a growing international market.</strong></th>
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<td><strong>60 years</strong> of secure and low-carbon nuclear electricity in the UK¹</td>
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<td><strong>21% of electricity</strong> generated today in the UK is from nuclear energy¹</td>
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<td><strong>15 reactors</strong> operating and supporting UK communities¹</td>
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<td><strong>65,000 skilled jobs</strong> across the UK civil nuclear industry¹</td>
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investment decision and overcoming many obstacles to get broad acceptance to proceed. The approaching decade will be critical for the UK nuclear supply chain if it is to increase capacity and capability to meet the demands of the developers.

This is an ideal time to act with significant investment from the first three projects at Hinkley Point C, Wylfa Newydd and Moorside; a new Nuclear Sector Deal; and an Industrial Strategy to establish the UK for strong international trade after leaving the EU. Our report is based on a series of interviews conducted across the UK nuclear industry on how to capture the opportunity of a new nuclear power build programme, in the UK and internationally, to deliver a world-class UK supply chain capability.

Our recommendations focus on the UK’s role in an international nuclear market, commitment to nuclear new-build programme and the Nuclear Sector Deal. The time to act is now.

Chris Lewis, Partner
Energy and Infrastructure Lead
EY UK&I

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Executive summary

Nuclear in the UK accounts for 21% of electricity generated and it has been providing secure low carbon electricity for over 60 years.\(^1\) The UK has 8.7GW of installed nuclear capacity and it is expected that all but one of the UK’s nuclear plants will close (i.e., 7.5GW will close) by the end of the 2020s.\(^2\) The Government has announced the Industrial Strategy as an opportunity to build the economy after leaving the EU. The nuclear sector has been identified as a key component to deliver economic growth, as it resonates with many of the Industrial Strategy’s 10 pillars.

This report highlights the urgent requirement for clarity in the UK nuclear sector and a commitment from the UK Government which, in order to achieve the environmental targets of the Climate Change Act 2008,\(^3\) must facilitate the development of low carbon technology. It is expected that there will be a 20% increase in UK demand for electricity over the next two decades and the UK may require almost 140GW of electricity generating capacity by 2035.\(^2\)

The civil nuclear sector has an established supply chain in the UK and a strong track record of developing plants which deliver safe, available and capable operations for power generation. The nuclear new-build programme offers a significant opportunity for the UK supply chain to demonstrate capability and realise economic benefit. The Government estimates investment alone of more than £45bn to develop the first three nuclear power plants at Hinkley Point C, Wylfa Newydd and Moorside.\(^3\) Furthermore, the potential for new opportunities, such as Small Modular Reactors (SMRs) or international nuclear activities, provide an opportunity to upskill and increase the capacity of the UK nuclear supply chain. The Government predicts that, during the next decade, international investment will include approximately £930bn to build new reactors and approximately £250bn to decommission closed reactors.\(^4\)

The UK nuclear industry has set out proposals to develop 18GW at six sites. This is as part of the wider National Infrastructure Delivery Plan (NIDP) which, excluding social infrastructure, contains over 600 projects with a combined value of £425bn, of which over half of the NIDP projects are within the energy sector. The UK nuclear supply chain must ensure that it is ready to capture maximum value. The Nuclear Industry Council (NIC) has been reconstituted to deliver the Nuclear Sector Deal, a joint industry and Government initiative, and facilitate the success of the nuclear sector within the Industrial Strategy.

The UK has a unique knowledge base; there is a broad range of nuclear expertise in the UK supply chain as the first generation plants enter decommissioning, the existing fleet receive plant extension investments and the new-build programme commences. EY has interviewed senior representatives, including CEOs and managing directors of the UK’s key nuclear players and wider infrastructure sector, to understand the current state of the UK nuclear supply chain and the actions required. This report will explore eight key themes with recommendations, in the form of clarity (i.e., decisions that need to be taken immediately) and commitment (i.e., how the Government can support these decisions on a longer term).

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## Recommendations

EY has interviewed leaders from across the supply chain and the UK’s infrastructure sector to form recommendations. This report explores eight key themes, from **supplying affordable nuclear power** to **optimising UK infrastructure delivery**, with recommendations in the form of **clarity** and **commitment**. These provide the necessary short-term and long-term recommendations for the Government and industry.

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£1 trillion international new-build and decommissioning market over the next 10 years

**Question 1:**
Can the UK nuclear supply chain compete?
1. Supplying affordable nuclear power

The UK has a competitive market that has the ability to deliver affordable nuclear power.

There are great opportunities for the nuclear sector in the UK. The UK will host some of the world’s largest civil construction projects, including Hinkley Point C, Wylfa Newydd and Moorside. The energy sector in the UK has a track record of delivering projects through an open and transparent market. This has been achieved through the competitive environment in the UK that enables the efficient delivery of infrastructure projects, such as world-leading offshore wind farms. The Industrial Strategy represents an opportunity to deliver affordable nuclear power.

“There's a lot of sense in the ten pillars and we must keep a focus on that. Nuclear is going to be a key contributor to the low carbon economy, whilst creating high-value sustainable jobs.”

CEO, Manufacturing organisation

It is accepted that new nuclear build has a distinct investment profile; significant capital construction costs, decades of operational income and large costs for deconstruction, as part of the commitment to wider decommissioning activities. The Electricity Market Reform (EMR) package included a programme of policy interventions, such as the capacity market and the contracts for difference mechanism, the latter of which has delivered the guaranteed strike price for Hinkley Point C. This has resulted in nuclear programmes agreed with subsidy above the current market price.

“Government’s approach to new-build is flawed – ‘the market will decide’ is an abdication of responsibility. The market cannot decide on things as fundamental as the energy supply. It is the role of the Government to ensure energy security.”

CEO, Decommissioning organisation

It is essential that nuclear in the UK is delivered at a viable cost to ensure economic competitiveness, whilst also minimising consumer cost. Our interviewees commented that there has never been a successful nuclear programme without Government backing. Furthermore, our research highlighted the importance of a clear Government intervention, as opposed to the current independent strike price negotiations. It was suggested that the current strike price through the EMR package, which is essentially an underwriting by Government, could be more explicit. This could be done through a competition that delivers an equity stake, offering an opportunity to lower the cost of nuclear new build.

“Government must set a view for nuclear power and enable the market to achieve that outcome, rather than ask the market what it can achieve based on free market principles.”

CEO, Professional development body

The common view of our interviewees was that the NIC is a critical component to deliver an appropriate level of domestic content at Hinkley Point C, following the strike price agreement and future new-build programmes at a competitive cost. Our research noted that the previous attempt at the NIC was well intended, but became less coordinated as the NIC grew and subgroups were conflicting or duplicating efforts. Therefore, the new NIC needs to ensure that it presents one consolidated strategy for the sector, which is aligned to the Industrial Strategy and ensures that the Government supports the progression of a world-class sector.

“The impetus of the NIC was not maintained. We now have a new NIC who must keep the focus at a national level on strategic issues. They must ensure the right representation and appropriate interventions through Department for Business, Energy & Industrial Strategy (BEIS).”

CEO, Manufacturing organisation

Clarity

Utilise the UK’s competitive market to deliver affordable nuclear power.

Commitment

Create a competition that delivers the lowest power cost to consumers.
The UK is recognised as a world leader in the nuclear sector, demonstrated through the record-breaking safety and operational performance achieved in the existing fleet, and the inward international investment in new-build programmes. In addition to building upon the strong nuclear development record, the UK is home to some of most advanced and ambitious decommissioning programmes in the world, including Sellafield and Dounreay.

As a result, the UK has significant capability across the nuclear value chain. In order to drive economic growth in the sector, it is critical to understand the attributes of the UK supply chain. This will allow the optimisation of domestic content in nuclear new-build programmes. Our interviewees highlighted the following strengths and weaknesses within the UK supply chain.

“The UK Government needs to be a lot clearer and firmer on what the expectation is for the UK content. We can easily achieve 60% UK content using facilities contracts, catering, laundry and ancillary services, but this is not the reactor core engineering.”

CEO, Skills body
Our research repeatedly noted that the UK is far too humble about capability. It was suggested that, due to the poor marketing of the industry, the current UK supply chain contribution to new nuclear is in the lower value civil requirements, such as earthworks, as opposed to the higher-value work in technology. The common view was that quotas for UK content, particularly percentage of work as opposed to value, can be unhelpful, as they encourage gaming rather than the goal of advancing supply chain contributions. Interviewees identified the following capabilities across the value chain.

The common view was that the industry should be held accountable and collaborate in a strategic manner, as there could be a stronger approach of how to become a capable country and positively market the capabilities. Our research noted that international nuclear nations do not desire piecemeal contracts when engaging in nuclear and they seek a broad-based international partner; the UK is in an advantageous position to offer a cross value chain capability.

“There is no UK nuclear leader; BNFL was the clear industry leader that everyone rallied behind. In BNFL’s absence, no one has stepped up. UK companies need to therefore start getting together.”

Managing Director, Engineering firm

There is a continued requirement for a single voice which has the ability to unite organisations in what all interviewees identified as a confusing sector landscape; the Nuclear Industry Association (NIA) is in a position to provide this service. This is in addition to the belief that most organisations, ex-government by nature, require a cultural change to improve their commercial appetite. Ultimately, this is about recognising the extensive capability and capitalising on this for the benefit of the UK supply chain.

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3. Becoming an international nuclear partner

The UK has a strong export capability that can strengthen our trade relationships.

“The UK has the opportunity to become a global exporter. It has the right companies with a world-leading reputation. However, they need to develop capabilities to take those opportunities.”
- Supply Chain Lead, Regulatory organisation

“The UK has a mature and flexible supply chain across the value chain, and hosts world-leading companies that have a desire to grow. Because of the UK’s strong capability throughout the value chain, the UK supply chain has an ability to compete internationally for future global nuclear contracts. The Government predicts that, over the next decade, international investment will include approximately £930bn to build new reactors and approximately £250bn to decommission closed reactors.¹

“Decommissioning is a growing market and we should be able to export that in spades. International organisations don’t want our capability; they want our experience. Capability suggests we are better than them.”
- Director of Strategy, Engineering firm/Parent Body Organisation

Fundamentally, international developers, operators and those particularly in decommissioning can de-risk their projects through capitalising upon the UK’s deep experience. Furthermore, developers in the UK are arguably keen to strengthen domestic supply chains to ensure that their projects are delivered on time. This can be achieved through international partnerships, which combine the foreign direct investment (FDI) for new build with a strong export relationship. However, there is the concern that the current uncertain landscape for nuclear in the UK is threatening the British brand.

“If we were to target realistic opportunities and understand what we could achieve, then there is still a huge amount of value for the UK supply chain.”
- CEO, Manufacturing organisation

The common theme gathered identified that the UK is utilising international capabilities to secure affordable manufacturing, as a result of limited domestic capacity and a requirement to seek international suppliers who are fast overtaking the UK’s capability. The UK, due to its track record, should perform the difficult tasks, such as safety-related analysis and advanced technology systems. In order to develop the supply chain and create an attractive international offering, the UK must focus on the higher-value work. Our research concluded key export offerings across the nuclear value chain.

“You have to bring the country brand with the company brand. We can do this in soft nuclear services, regulation, operations and security. However, we haven’t designed a reactor for over 30 years and that’s the issue – there’s a lack of brand associated with the products that we wish to market.”
- CEO, Professional development body

Our research emphasised that the UK has to be realistic on the ambitions for growth. As outlined previously, the UK does not have a strong capability in manufacturing large components. Whilst China is developing its manufacturing capability, the UK must decide its investment strategy for national capability with great urgency. Interviewees suggested that the ability for the UK to develop a manufacturing capability is questionable. Furthermore, it was highlighted that British nuclear engineering cannot just be ‘reassuringly expensive’ and it is imperative that, if the UK wishes to design and export an SMR product, it is produced at a price which is competitive internationally and ensures the correct targeted value for the UK supply chain.

“The UK industry has the skills, but the rest of the world has more of an international appetite. Why would China seek British partners when they are building six reactors, at a time when the UK is struggling to build one? There is no longer the appetite to pay a premium for the British brand.”
- Nuclear Sector Director, Construction Company

The UK’s decision to leave the EU was highlighted by interviewees as both a positive and negative. It is suggested that Brexit could reduce FDI attractiveness for the UK. However, the UK could have an opportunity to target domestic development, similar to other nations, and therefore focus on the capability of the UK supply chain. It is a chance to understand the UK’s ambitions for the Industrial Strategy and the opportunity to partner internationally.

“There is a view that the larger UK companies feel that, in order to secure large value international clients, they have to collaborate in JVs with existing client subcontractors and sacrifice intellectual property in the process.”
CEO, Professional development body

Our research suggested ambiguity as to whether the Industrial Strategy is a strategy for domestic content or creating IP through enabling partnerships. Interviewees noted that the UK needs to ensure it retains IP in international partnerships in order to recover investment and continue to compete internationally. This is important in a competitive market where countries are currently partnering to create an SMR design and export globally.

“It’s an easy opportunity in SMRs to export technology, as it hasn’t been done and the UK can be first to market with new IP.”
CEO, Industry body

It was unanimously acknowledged that the global nuclear industry has a culture of sharing knowledge through operational experience (OPEX) to ensure continued nuclear safety. It was suggested by an interviewee that the UK is fearful of putting up a counter-productive boundary. Therefore, it is important that UK companies recognise that international partnerships may help the mobility of skills and economies of scale, whilst creating valuable IP, in the post-Brexit environment.

“We need to be clear where we own the value, understand our value proposition in nuclear and where the supply chain can improve competitiveness.”
CEO, Manufacturing organisation

Interviewees noted that, in order to capitalise on future export potential, the UK should decide its export offering and ensure an established customer base, whilst critically protecting IP. It was suggested that the range of technologies in new build, operation and decommissioning present an opportunity to view the UK as a centre of nuclear excellence of many technologies.

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18GW ambitious nuclear new-build programme to provide low carbon power in the UK.

Question 2: Can the UK nuclear supply chain capture value?
4. Defining a national nuclear programme

The UK is developing 3.2GW of new nuclear as part of a pledge to an 18GW programme.

“We’re coming out of coal, gas and growing renewables. We need baseload power for system services. The Government doesn’t understand the burning platform that it’s sitting on top of. We don’t understand the reality of blackouts yet.”

Managing Director, Reactor vendor

“Companies need certainty. We haven’t had an order book, so we haven’t been able to maintain capability. We need to allow companies to invest in capability through a confidence that the market is there.”

Managing Director, Regional business organisation

It is imperative that the Government provides project pipeline visibility to ensure that the supply chain has the increased confidence to invest in the collective national capability. The UK is developing 3.2GW of new nuclear and further power plants are critical to ensure security of supply. It is expected that all but one of the UK’s nuclear power plants will close by the end of the 2020s; at the same time there is a 20% increase in demand for electricity over the next two decades.¹

“Nothing breeds risk easier than uncertainty.”

CEO, Manufacturing organisation

Our research stressed the importance of a clear view from the Government on the approaching nuclear new-build projects. This is to ensure that suppliers are able to deliver the required capability. It was suggested by an interviewee that there is significant development required to upskill capability and suppliers do not have the confidence that the work will arrive.

“We live in a capitalist market – the market responds when it sees the opportunity there and the company has to take the risk.”

Managing Director, Engineering firm

It was a common view amongst interviewees that the supply chain will only respond when the demand arises and developers cannot expect the supply chain to absorb the risk to develop their capability. Therefore, it is arguably the responsibility of the Government to commit to the project pipeline and deliver the certainty to suppliers that is essential to upskill and invest in capability.

Clarity
Commit to the 18GW programme through a planned delivery of capacity.

Commitment
Set a target volume of nuclear power to ensure future security of supply.

5. Choosing a nuclear reactor technology

The UK has multiple bilateral site-based deals that do not support the UK supply chain.

In order to provide the economies of scale required for nuclear through a fleet approach, our research highlighted the importance of selecting a single reactor technology. At present, the UK has multiple bilateral site-based deals and, although these form part of global fleets, the lack of a single technology UK fleet is preventing economies of scale. It is widely acknowledged that the current market constructs encourage international state-backed organisations to make additions to their fleet in the UK. This is whilst simultaneously approving their international technology, through the respected UK regulatory regime, and thereby opening other international markets.

“The concept of a GDA is good, but it has lost its way as we are not building a fleet. Our bespoke plants are driving up costs and reducing competitiveness.”

CEO, Decommissioning organisation

Each new technology presented to the UK market must progress through robust design assessment process of the ONR (Office for Nuclear Regulation), the GDA (Generic Design Assessment). This legitimises international designs of non-nuclear companies’ technologies to ensure their suitability for the UK with the objective of reducing project risk and avoiding unnecessary spend. The GDA process is most effective when applied to a fleet of nuclear reactors, due to the intensive and costly approval process, and it additionally reduces supplier investment cost as it capitalises on asset delivery repeatability.

“The UK has less risk tolerance than any other national regulator. If we designed a reactor in the UK with the national regulator to license it, then it would be marketable anywhere in the world.”

Managing Director, Reactor vendor

The alternate option for the UK, as opposed to developers importing international technology, is for the UK to develop its own reactor technology. The common view was that the UK has missed the opportunity to supply large-scale reactors (i.e., Gen III & Gen III+), as these supply chains are now extensively mature in international markets. Therefore, in order for the UK to enter the large-scale reactor market, it would have to produce a product that is of higher performance or at a reduced unit cost, all of which would be a considerable challenge.

Our interviewees overwhelmingly highlighted that it is essential to modularise technology. Therefore, a potential offering would
be jumping ahead to Gen IV with a more economic design, such as SMRs. It was widely-accepted that Gen IV offers a technology for both domestic application and UK export growth, but it was noted that success would be subject to a national industry that supports one reactor design.

“If we choose a domestic SMR design, there’s every possibility that we can become a global exporter.”

CEO, Decommissioning organisation

It would be essential for a UK reactor vendor to understand the market requirements for SMRs to ensure commercial success. Our research highlighted that there is an international desire for a uniform fleet of SMR plants and uncertainty where the UK would be successful within the global market. The significant investment required would prove to be exceptionally difficult for a reactor vendor to design and license a technology without a certainty of market.

“Under the public sector, we were technology, rather than commercial, led in the past. We then flipped to the private sector. However, 10 years on, there is still no nuclear concrete. Therefore, it needs to be a public and private partnership that ensures the right technology, as opposed to what the market dictates.”

Managing Director, Reactor vendor

Ultimately, this is a decision that cannot be left to the market and the UK Government must be clear on the strategy, selecting a programme which satisfies the Industrial Strategy objectives. Intervieweess commented that a potential nuclear plan must act as a private and public partnership. This is due to the public sector being technology-led and the private sector being commercially led; a combination would ensure the right technology decision, as opposed to what the current market constructs dictate.

Clarity

Limit the number of reactor technologies to support the UK supply chain.

Commitment

Demand fleet efficiency as a stated condition in the nuclear competition.
6. Ensuring UK supply chain competitiveness

The UK supply chain is competing internationally and must support SME competitiveness.

“The UK Government must create an environment for UK suppliers to benefit, thrive and win business. This will be through Government investing in supplier capability to ensure that they win competitions.”

Supply Chain Lead, Regulatory body

The safety of the UK nuclear sector is imperative and, as a result, the UK’s existing generation fleet builds upon Institute of Nuclear Power Operations (INPO) and World Association of Nuclear Operators (WANO) international standards to deliver a nuclear safety culture, which ensures accountability and respect. Therefore, safety is the prominent driver for all practices in the nuclear sector.

“Getting the balance of cost-effective ALARP is a real art.”

Director of Strategy, Engineering firm/Parent Body Organisation

In addition to the physical safety, interviewees noted that over-embedding a strong nuclear safety culture may be an obstacle to SMEs who, at present, do not have a forum in the UK to engage in nuclear safety culture practices. These SMEs, who must deliver the same strict safety standards undertaken in large suppliers to ensure accountability and traceability throughout the supply chain, have the potential to significantly increase capacity in the nuclear supply chain. The requirements for SMEs must be simplified and made fit for purpose.

“The barriers to entry for new suppliers are multifaceted and not always transparent. It’s very difficult to give a new supplier a training manual in how to be effective in nuclear. It’s more of a mindset that you develop over time.”

CEO, Professional Development body

The high standards demanded from suppliers can result in increased costs in order to achieve the strict safety standards. Our research highlighted that the UK nuclear sector must reduce the risk of ‘gold plating’, which involves over-engineering beyond the required safety standards, to ensure a competitive market. This can be achieved through utilising existing industry principles, such as As Low As Reasonably Practicable (ALARP), that ensure safety is upheld at a reasonable cost. However, it was noted that the diversity of work approaching from multiple reactors, which is increasing the range and quantity of suppliers, would potentially stretch the, already fully utilised, ONR.

“The regulator has the responsibility to balance fit-for-purpose over-engineering. The regulator must support suppliers to engage in the supply chain and not put an overabundance on their requirements so that they become uncompetitive through high costs and can’t deliver.”

Supply Chain Lead, Regulatory body

If it is assumed that the SMEs have engaged in the nuclear safety culture, the secondary requirement to supplier success, identified by interviewees, is the certainty to invest in their people and equipment of service provision. This is currently delivered in the existing nuclear generation fleet through the operation of through-life contracts.

“Progressive procurement models should be the norm and provide a definite benefit to UK plc. These are ones that consider through life, as opposed to just construction or operation. Strategic partnerships for life provide sustainable outcomes. A supplier can put skin in the game if they have client commitments for long-term contracts.”

CEO, Professional Development body
The unanimous view from interviewees was that through-life contracts enhance confidence in the supply chain and allow investment in upskilling. However, there is a risk that this cannot be applied to planned new nuclear as the majority of developers are not operators, which means that they cannot make the required long-term commitment to suppliers.

“We want BEIS to invest strategically in key capabilities.”

Nuclear Sector Director, Construction company

Our research highlighted that international suppliers possess comparatively larger financial backing, i.e., stronger balance sheets, than UK suppliers. As a result, the UK supply chain is in a less favourable position to absorb the risk required to innovate and grow. Innovation is seen as a risk within the sector and this is at a time when the UK must adopt leadership in innovation through the Industrial Strategy. Interviewees commented that there may be an opportunity for Government investment in capabilities or mechanisms to support SMEs to share risk at the delivery side. This would consequently encourage innovation for the benefit of national capability.

“The accreditation of excellence in our supply chain should be something that all suppliers, no matter how big or small, drive to achieve. It should be seen as a badge of honour for suppliers and should be supported loudly by the sector as a whole.”

Senior Manager, Professional services firm

Clarity
Deliver fit-for-purpose requirements for SMEs to compete against international suppliers.

Commitment
Aid through-life contracts and ensure that the ONR is adequately resourced.
Nuclear Sector Deal: a Government and industry collaboration through the Industrial Strategy

Question 3:
What are the strategic actions required?
7. Delivering a cross-sector skills plan

The UK has a rich knowledge base that requires urgent action to ensure national delivery.

"It’s easy to recruit high-quality graduates. We have a huge interest for positions and they are extremely bright."

Director of Engineering, Manufacturing company

The UK hosts a significant number of world-leading universities and produces a constant stream of high-quality graduates. The nuclear sector, as well as employing many graduates, is also actively progressing the development of apprenticeship programmes to provide the vital vocational skills. It is widely-acknowledged that the UK has an aging demographic within the nuclear sector and the high attrition rates means that the sector must recruit 8,600 people each year. In order to maintain the UK nuclear capability and high level of suitable qualified and experienced person (SQEP), suppliers must continue to invest in their capability.

"We stand up in front of investors and say that we have skills shortage in the UK – we’re not selling ourselves a disservice."

Managing Director, Engineering firm

Interviewees noted that the fragmented approach to skills planning across sectors is creating an impending pinch point. It is imperative that the UK Government recognises how to optimise a finite workforce that will deliver commercial needs, societal requirements and infrastructure delivery. Our research highlighted that the key threat to delivering infrastructure programmes across sectors is the lack of strategic skills planning – ensuring the right people, in the right place and at the right time.

"The reality is that the skills gap is never as bad as the numbers say. We need to stop playing the nuclear card and recognise transferability of skills. Why can’t we hire high hazard oil and gas people?"

Director of Strategy, Engineering company/PBO

The primary concern of interviewees is that the overall skills gap is not a concern, but the shortage of highly-skilled nuclear regulators. As a result of too few regulators, it is challenging for senior stakeholders to action decisions quickly and effectively, which can cause expensive regulatory delays. This is exacerbated as the industry loses SQEP capability and there is, therefore, great pressure on the ONR. Therefore, it was suggested that the UK Government should take immediate action, not necessarily through investment, but a defined mechanism with a clear opportunity.

"The Government is in the best place to identify what will make the industry fail, such as the skills pinch point, and ensure a plan B."

Director of Development, Reactor vendor

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The nuclear sector is a great strength for regional productivity due to the dispersed range of locations that employ over 65,000 people. These locations stretch from Hinkley Point C, Somerset, to civil decommissioning activities at Dounreay, Scotland. This demonstrates the capability of the sector to achieve regional growth, an importance aspect of the Industrial Strategy, but presents serious concerns for workforce mobility.

“We need to think imaginatively on how we use the skills at existing plants and we need to consciously feed people into sites and develop regulators with operational experience. We will start to see the migration of people to new build from decommissioning, and it’s important that we see all of this as a continuum of the life cycle, rather than as competing elements.”

CEO, Decommissioning organisation

Our view is that it is crucial to align skills across the value chain. This approach must not be focused on one single project or industry, but across all sectors. As an example in the nuclear sector, it is necessary to align the skills at current sites decommissioning with the requirements to deliver new build. An interviewee noted the alignment of the site rundown with the delivery of new build, which requires recruiting existing talents in operations and ensuring they are SQEP for the new build.

“The timing is not great – decommissioning was going to feed into new build, but this is not happening. People are leaving decommissioning before the new build is arriving. Where are the big projects? New build is five years from those skills.”

Director of Strategy, Engineering company/PBO

Because of the international partnership nature of the nuclear sector, the UK will rely heavily on international skills for both construction and advanced research. Our interviewees noted that the UK’s vote to leave the EU has the potential to impact the mobility of labour from Europe. The general view of interviewees is that existing difficulty to access labour, both skilled and unskilled, will affect the UK’s ability to deliver new nuclear projects and continue the UK’s position as a nuclear leader.

“Excellence in nuclear is underpinned by having the right quantity of people who are not only trained well enough to know what to do, when to do it and how to do it, but are educated to a level where they understand why. The development of such skills takes time and requires considerable investment. The supply chain is more likely to make that investment if it has assurances around the consistency and longevity of demand. That is something we need to resolve sooner and irreversibly.”

Senior Manager, Professional services team

Clarity

Agree on a cross-sector national skills plan between the Government and industry.

Commitment

Deliver a skills plan that enables geographic and through-value chain mobility.
8. Optimizing UK infrastructure delivery

The UK has multiple infrastructure projects that must optimise UK supply chain content.

“The competition between major infrastructure programmes will definitely be an issue in the 2020s and the ability to service those programmes will be the challenge.”

CEO, Manufacturing organisation

The NIDP has identified 600 public and private projects, excluding social infrastructure, valued at £425bn, of which almost half is in the energy sector. The UK has world-leading nuclear projects approaching, including Hinkley Point C, Wylfa Newydd and Moorside, and wider infrastructure programmes, including Heathrow Airport’s third runway, High Speed 2 and the Smart Motorways Programme. Each sector has specific supply chain requirements and there are opportunities for collaboration.

“There needs to be an assessment of the market requirements, not just as a component but as a totality of people, construction, transportation, etc.”

Director of Corporate Affairs, Nuclear plant developer

Interviewees unanimously acknowledged that the UK has substantial capability in nuclear, but there is simply not the capacity to deliver. This is both due to the internal industry demands, and exacerbated by the aforementioned wider infrastructure programmes. Our research highlighted that there is an urgent requirement to assess the approaching supply chain demands across each of the sectors and identify suppliers that will receive demands beyond their capacity.

“Nuclear projects are beginning to bunch together – there was an idea to work sequentially, but this is unlikely to happen. There will be a very concentrated period where demand outstrips supply.”

CEO, Industry body

It is imperative to grow national capability by understanding capacity limitations, capability requirements and the ability to deliver across the value chain. The Nuclear Sector Deal should provide an opportunity for cross-sector supply chains to maximise utilisation and increase capability through the alignment of plans and optimisation of assets. An interviewee noted that if projects are not phased, which must be performed at a high level, then projects will potentially cost more.

“The elements of individual infrastructure projects require phasing – it’s what good supply chain and Government policy does. Collaborative supply chain and Government strategy should be about optimising the assets and increasing utilisation.”

CEO, Professional development organisation

Our research suggested that collaboration across infrastructure projects is not just a cost-reduction opportunity, but also a chance to share best practice. Interviewees noted particular learning opportunities for the nuclear sector included: target cost, incentivisation and project management in the rail industry; the application of modularisation in submarine construction; and supply chain plans for the Government to assess economic value in the offshore wind industry.

“If you want to improve procurement in nuclear, there are a lot of lessons to be learned from other sectors. Particularly in the rail, which has progressed more than other sectors.”

Managing Director, Engineering firm

Our interviewees unanimously stated that there is a requirement for clarity on what the Government desires to achieve in infrastructure delivery and its long-term strategic goals, such as in the form of a national infrastructure imperative. This could be delivered through financial or nonfinancial mechanisms, but ultimately, it is about providing a clear vision across sectors and providing suppliers with the confidence to upskill their capabilities and collaborate to optimise domestic content.

“In a perfect world, sectors would collaborate. You need an authority that has a pragmatic approach and forces collaboration.”

Managing Director, Engineering firm

Clarity
 Coordinate major infrastructure programmes to optimise UK supply chain content.

Commitment
 Create a body to plan demand, optimise capacity and share best practice.
## Glossary

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<tr>
<th>Acronym</th>
<th>Description</th>
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<tbody>
<tr>
<td>ALARP</td>
<td>As low as reasonably practicable</td>
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<tr>
<td>BEIS</td>
<td>Department for business, energy &amp; industrial strategy</td>
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<tr>
<td>BNFL</td>
<td>British Nuclear Fuels Ltd</td>
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<tr>
<td>EMR</td>
<td>Electricity market reform</td>
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<tr>
<td>FDI</td>
<td>Foreign direct investment</td>
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<tr>
<td>GDA</td>
<td>Generic design assessment</td>
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<tr>
<td>IP</td>
<td>Intellectual property</td>
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<tr>
<td>NIC</td>
<td>Nuclear industry council</td>
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<td>NIDP</td>
<td>National infrastructure delivery plan</td>
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<tr>
<td>ONR</td>
<td>Office for nuclear regulation</td>
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<tr>
<td>SMEs</td>
<td>Small and medium enterprises</td>
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<td>SMR</td>
<td>Small modular reactor</td>
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<tr>
<td>SQEP</td>
<td>Suitable qualified and experienced person</td>
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Creating confident investors and competitive advantage for the UK nuclear supply chain

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