Nuclear Skills Strategic Plan

Government and Industry working together to build excellence in nuclear skills
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1 Nuclear Skills Strategy Group

The Nuclear Skills Strategy Group is an industry-led strategic group working with employers, government and trade unions. It comprises:

- major employers who have the plans and the expenditure to drive the major developments in the nuclear sector
- government departments responsible for nuclear development and skills leadership
- a representative of the trade unions in the nuclear industries

It is the UK’s lead strategic skills forum for the nuclear sector, representing both the civil and defence nuclear sectors, and is accountable for developing a strategic approach to nuclear skills, addressing the skills infrastructure, processes and training provision needed to secure the required supply of qualified and competent people. It will continue to develop the pool of existing skilled people whilst also considering the transfer of those from other sectors.

As the employer members of the Nuclear Skills Strategy Group, we present this Strategic Plan as the collective actions we believe will best provide the skilled workforce we need to meet the challenges of the sector. We will work within our own organisations, with others in the sector and with government to ensure delivery of this Strategic Plan.

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2 Foreword from the Chair of the Nuclear Skills Strategy Group

This Strategic Plan has been developed by the UK’s nuclear industry, working together with government and trade unions, to set out how we can prepare skills and resources for our industry’s future.

For the first time in decades, we have the prospect of building a new fleet of power stations as we move towards a low carbon economy. This means that we will need increased numbers of highly skilled people to build and operate the new fleet, at the same time as generating power at existing stations, decommissioning the older ones, maintaining the nuclear defence programme, safely processing waste, and retaining our place as a world-leader in research, development and engineering.

The task is challenging, but achievable through engaging public and private sector partners alike. Over the past few years, we have seen successes from a number of skills groups and organisations involved in our sector, but now it is time for a step change. As new build and the Dreadnought programme become a reality, we need to put our plans into action and deliver the step change required in capacity. The leadership of the Industry through the NSSG is well placed to make this happen with active collaboration from partners ready to support what is needed. Financial investment and technological developments will only drive the sector forward in conjunction with the best use of competent and well-trained people. The nuclear skills agenda is an industry imperative to ensure we have the right skills, in the right place, at the right time.

This is an exciting time to be launching our Strategic Plan, as we recognise emerging government strategies that will support industry in meeting our challenges. We have engaged with government and other public bodies who understand the national importance of getting this right, and we want this involvement to continue as we implement our actions. We are working together to help address priorities for nuclear skills; aligning government, defence and civil sectors. As part of this engagement, we are set to play a prime role on nuclear skills thought leadership, supporting the developing Industrial Strategy. As the thinking on the Industrial Strategy develops, our Strategic Plan will be modified to take any new elements of Government thinking into account and continue to progress the priority skills challenges ensuring a successful nuclear sector.

As chair of the Nuclear Skills Strategy Group, I call upon everyone in industry, defence, government, national laboratories, education and training to play their part in delivering this Strategic Plan, and enable a vibrant future for our sector.

Dr Fiona Rayment CChem, FRSC, FNucl
Chair of the Nuclear Skills Strategy Group,
Director, UK National Nuclear Laboratory
3 Executive summary

The nuclear industry has been working collectively on building a sustainable and competent workforce for many years now. There have been many groups, alliances and organisations, working closely with Government, focused on building the necessary infrastructure to support the recruitment and training required; and to date, have been successful in balancing the supply and demand to create a stable, suitably sized workforce. In particular, the National Skills Academy for Nuclear has developed products, services and undertaken activities that have been instrumental in supporting the nuclear skills agenda to date.

Today, the industry is in the spotlight with unprecedented growth planned over the next decade. This will inevitably result in pressure points in the regional skills infrastructure, competition for skills and unfilled demands across the nuclear sector.

In March 2015 the government published the nuclear sector skills strategy ‘Sustaining our Nuclear Skills’, which outlined the following common goals for the industry:

i. Aspire to meet 90% of the sector’s skill demands from the UK workforce by developing the right profile and pipeline of skills to meet the future demands of the sector.
ii. Ensure the nuclear workforce’s expertise is unsurpassed globally by developing training, development and certification programmes of the highest quality.
iii. Cultivate a more diverse nuclear workforce, including by increasing the proportion of the sector's workforce who are women to 40% and the proportion of women in senior management to 25% by 2030.

Whilst the industry has delivered excellent work in the past, principally via the Nuclear Industry Council (NIC), National Skills Academy Nuclear (NSAN) and the Nuclear Energy Skills Alliance (NESA), the above presented a new challenge. To meet it, a revised Operating Model was developed by employers, in late 2015. The aim is for the industry to develop collective, proactive plans to mitigate the risks it faces and put in place the necessary infrastructure, processes and systems to meet this skills challenge.

In particular, the Nuclear Skills Strategy Group (NSSG) formed to represent all parts of the industry, working with government and trade unions, setting out the strategic skills priorities.

Nuclear activities in the UK today are diverse. Ranging from design to remediation, they support decommissioning, electricity generation, fuel storage and processing, research and development, design, construction, commissioning, operation and maintenance of nuclear submarine propulsion and weapon systems, and the regulation of all of these activities.

Construction of five sites for 16 GWe new generation capacity has a significant employment impact that will last a decade or more. Demand for competent people is forecast to rise from 78,000 full time equivalent people (FTEs) in 2015 to 111,000 by 2021, requiring a total industry inflow of 9,000 per year, once replacement demand is taken into account.
The recruitment or transfer of people to meet this demand is not a simple uniform process, when one takes into account the diversity of skills needed. This becomes more manageable by considering the skills of the workforce as being in three distinct groups, namely; subject matter experts (a relatively small number of experts with specialist skills which take a long time to acquire), nuclear skills (specialist skills which are only required in the nuclear industry, such as nuclear safety case engineers), and generic skills (ready market skills, principally for the construction activities).

![Figure 1 - Categories of skills required in the nuclear sector](image)

In the civil sector, the new build programme means that the main challenge is in the “generic skills” element. For defence, and research and development, the challenge is more located in the area of subject matter experts. Different approaches to implementation are therefore needed.

In terms of sizing the problem; the labour market intelligence (LMI) data¹ suggests that over the next five years, 90% of the skills gaps are in the generic skills category. In determining the solutions and infrastructure needed to support industry, the interventions have considered these different markets, competence requirements and career paths.

A key consideration in meeting the demand is the use of contractors or agency supplied workers (ASW). The nuclear industry has always operated with a healthy mix of staff and ASWs, as this leads to a highly flexible workforce which can rise and fall to meet the changing needs of an individual business. This Strategic Plan acknowledges and accommodates both permanent and temporary labour in that the strategic actions support either category of resource.

A wide ranging risk analysis has been undertaken to identify and quantify the risks, blockers and issues the industry faces in meeting the demand. This has involved individual discussions, full risk workshops, detailed analysis of the LMI and gathering of underpinning evidence. From this work, twelve top risks emerged which need to be addressed in order to

¹ Nuclear Workforce Assessment – NESA, 2015
prevent a skills shortage that would delay new build, decommissioning or commissioning activities, and hence have a significant impact on the overall nuclear programme.

By analysis of the risks and evidence developed, three strategic themes and two enabling themes emerged:

Key strategic themes

- **Meeting the demand** (including attracting and recruiting a diverse range of people into the sector and retaining them with the appropriate level of knowledge transfer in order to minimise the number of fragile skills)
- **Training infrastructure and provision** (including enabling the best nuclear training provision in required regions)
- **Training Standards and Qualifications** (including an appropriate and consistent approach across the UK)

Enabling themes:

- **A clearly defined and NSSG endorsed skills delivery model** (including refining and developing the skills operating model and supporting groups for simplicity, completeness and clarity)
- **An agreed nuclear timeline and clarity of demand requirements** (including providing clarity on the current nuclear programmes to enable the industry to develop and deliver against a firm set of requirements)

These themes have been used to develop strategic actions directly aimed at mitigating the risks identified by the industry, to provide the necessary national infrastructure necessary to meet the rise in demand. Nineteen strategic actions have been developed, which will subsequently be turned into a detailed action plan to allow full programme management to be applied.

One key consideration in developing the action plan will be to take into account the particular subtleties of the devolved governments, specific regional variations, civil and defence differences and the differing timescales across the sector.

In summary, at this point the industry does not have significant skills shortages in critical areas. However, future programmes for new build, submarines and decommissioning may result in critical skills shortages. This Strategic Plan is a key document aimed at preparing and supporting the industry in meeting this future challenge.

By working in collaboration with government, skills bodies, supporting organisations and employers, the industry is confident that these actions will address the underlying issues and allow employers to recruit at the required rate to meet the ambitious forward programme. Through adopting this approach, we will:

1. Ensure that the UK is positioned to deliver the future increase in workload without over reliance on foreign labour
2. Build a nuclear legacy of competent people resources in areas of nuclear development suitable to meet the local needs into the foreseeable future

3. Enhance long-term career opportunities for STEM apprentices and graduates

4. Provide the base-load of training requirements to allow confident investment in facilities and training provisions

5. Ensure a more flexible and mobile nuclear workforce

6. Provide opportunities for continued professional development of the existing workforce, particularly people who are mid-career

7. Ensure the UK has a powerful nuclear skills capability and is able to respond to international opportunities.

8. Invest in skills to drive productivity and economic success

9. Facilitate and encourage cross-sector movement between civil and defence and by non-nuclear personnel

10. Support highly skilled individuals in greater job satisfaction, which will improve sector retention

11. Facilitate highly skilled individuals in passing on their knowledge and mentoring the next generation, thus future proofing the sector’s skills and competence base

12. Reduce costs to industry and to the tax payer associated with the need to train and re-train the workforce
4 Background and context

4.1 The UK nuclear industry
The UK is a key player in the world nuclear market with a strong global reputation of excellence, incorporating international best practice in training and development.

Over the past 60 years, the UK nuclear sector has built an enviable position for safe, high quality and reliable civil generation and defence nuclear propulsion, with a capable supply chain, a world class regulator and a highly specialist workforce.

This strategic leadership and economic track record is ensuring the sector is well placed to face considerable and continued challenge, including the nuclear new build programme of five civil nuclear plants by 2030, a large programme of decommissioning work and the building of the Dreadnought Programme. This is all in addition to safe running of the UK’s existing nuclear operations, both civil and defence.

The government is also committed to the safe clean-up of the UK’s earliest nuclear sites over a 100-year-plus programme, managing all waste and implementing geological disposal for the safe and secure management of higher activity radioactive waste, over the long term.

The sector growth that will result from the UK’s ambitious nuclear programme, and the economic opportunities that will arise, are driving a significant expansion of the workforce. This means demand is forecast to rise from 78,000 full time equivalent staff (FTEs) in 2015 to 111,000 by 2021, requiring a total industry inflow of 9,000 FTEs per year, once replacement demand is taken into account.

The nuclear industry has a long held commitment to building a sustainable and competent workforce and to minimising future skills shortages. We have been working with government and partners on this agenda, particularly during the renaissance of the sector over the past decade.

4.2 The Strategic Plan
This Strategic Plan did not of course start with a blank sheet. In March 2015, the government published ‘Sustaining Our Nuclear Skills’, a skills strategy that provided the opportunity to assess the current skills provision across the sector and highlight the progress made over recent years in delivering a world-class nuclear workforce for the future.

However, the report also made clear the challenges we still face in realising that vision, and threw down something of a gauntlet to industry and partners in education and skills.

The formation of the Nuclear Skills Strategy Group (NSSG), and of this Strategic Plan, is the response to this challenge. The NSSG essentially takes on the baton from the Nuclear Industry Council (NIC) Skills Workstream. The Skills Workstream laid solid foundations on which we can build, and this refreshed approach is providing the detailed risk analysis and action plan the sector now requires.
A new nuclear skills delivery model will see all parts of the industry coming together to identify any pinch points and ensure collective actions. We will identify, evaluate and mitigate the risk of skills shortfalls that would constrain the delivery of the UK’s nuclear programme.

The model also emphasises a continued partnership between the sector, government, industry representative organisations, regulators and the research and development community, as well as skills bodies and providers.

4.3 Sector priorities

Nuclear power last year provided 21% of the UK’s electricity from nine nuclear sites2, and almost all of these plants are scheduled to reach the end of their lives by 2030. The government has initiated a new nuclear programme to replace them, to maintain secure, affordable and low-carbon power supplies for the UK population.

Managing the nuclear waste legacy also remains a priority, and the Nuclear Decommissioning Authority (NDA) has the mandate to deliver safe, sustainable, and publicly acceptable solutions to the challenge of nuclear clean-up and waste.

The NDA is responsible for the effective and efficient management of waste legacy at 17 nuclear sites, contracting the work to Site Licence Companies. As existing nuclear power stations reach the end of their operational lives, they too will need to be decommissioned.

The UK will need a long term skills plan to ensure the continued safe, secure and cost-effective lifecycle management of nuclear materials and spent fuels. The initial focus will need to be on spent fuel management as the nation changes its strategy from reprocessing to long term storage and disposal. There is also the legacy waste and plutonium to be processed at Sellafield. These waste management issues will need high level skills and dedicated research capability, together with talented project teams to deliver the ultimate solutions.

The Naval Nuclear Propulsion Programme manages nuclear submarines including the nuclear propulsion aspects, from initial design and manufacturing, through support in service, to decommissioning and disposal.

The VULCAN Naval Reactor Test Establishment (NRTE) at Dounreay has been used to prototype naval nuclear reactors for UK submarines since the 1950s, to give notice of any potential issues that might occur on board. The prototyping mission is now complete and work has begun on the defuelling of the reactor, clearance of fuel from the site and preparations for future decommissioning and disposal of both the reactors on the site, expected sometime after 2022.

The Submarine Dismantling Project is the MOD’s programme to deliver a safe and environmentally responsible solution for dismantling 27 defuelled submarines.

Regulation is critical, with the challenges ahead including hazard reduction and remediation at Sellafield, the assessment of generic safety cases for potential new reactor designs, regulation of existing reactors, waste management, decommissioning, the Naval Nuclear Propulsion Programme and waste transportation.

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2 UK Energy Trends – DECC, March 2016
The demands on regulation will therefore be substantial and unprecedented, particularly in the light of new technologies. The Office for Nuclear Regulation (ONR) has a reputation as a world class regulator and works with the environmental agencies across the UK to ensure that all nuclear activities in the UK meet high standards of safety, security and environmental protection.

4.4 New reactors
The development of new civil nuclear plants is scheduled to deliver 16GWe by 2030. This will see new nuclear reactors across five different sites: Hinkley Point C, Sizewell C, Wylfa Newydd, Oldbury and Moorside.

The existing UK Advanced Gas-cooled Reactor (AGR) nuclear reactor technology will be phased out as the existing stations are decommissioned – although some have been and will continue to be granted life extensions.

A key consideration in the new build agenda is the country’s move from Magnox gas-cooled graphite moderated reactors and AGRs to light water reactors (LWRs). This not only places greater demand for new knowledge and understanding in the industry, but also issues with knowledge retention and transfer before the gas- and graphite-based skills are lost.

This challenge is compounded with the adoption of potentially three different types of LWRs, all being constructed within a common timescale. All of this will need to be built into our learning and development pathways.

The UK new nuclear build programme will be based on proven international designs which will have been built elsewhere in the world before they are developed in the UK, but this still represents a considerable skills challenge. Each design has its own unique mix of skills required to design, build, operate and eventually decommission. Although expertise can be brought in from abroad where they have been built before, the aim of this Strategic Plan is to ensure that as far as possible, this is not needed because the UK skills pipeline will be robust enough to meet the needs.

Last year the then Chancellor of the Exchequer announced that at least £250m would be spent by 2020 on an ambitious programme to position the UK as a global leader in innovative nuclear technologies. There will be a competition to identify the best value design of small modular reactors (SMRs) paving the way towards building one of the world’s first SMRs in the UK in the 2020s.

The research and development skills base is critical in making such an analysis, and up-to-date research and technology to support the nuclear fuel cycle is an ongoing sector requirement. We will need scientific support in areas including waste management, fuel cycle performance and reactor operations.

4.5 The skills needed
All of this activity is only possible with the right workforce – in the operating organisations themselves, and in the contractors and supply chain companies. These national programmes must be seen in the context of a nuclear renaissance in other parts of the world.

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3 Spending Review & Autumn Statement – HM Treasury, November 2015
as countries including China, India, United Arab Emirates and Russia seek to establish or bolster their civil nuclear power. The World Nuclear Association's figures show that there are currently 448 nuclear power stations operating in the world, with another 225 planned or already being built\(^4\). There are therefore opportunities for UK expertise to be taken abroad where skills are also needed.

The skills pool will need to grow substantially; this challenge will be compounded by attrition from the ageing existing workforce as well as the long lead time to develop nuclear specialists. Getting the right skills in place presents a major opportunity to be a key player on the global stage in terms of nuclear expertise. Such expert capability is in high demand around the world where nuclear activity is prevalent.

This Strategic Plan presents the key actions designed to close skills gaps and ensure the sector is gearing up to secure a world class talent base and establish training provision that allows for continual replenishment of such skills and expertise.

Its aim is to make a real difference and deliver the nuclear sector's continued success through its people.

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\(^4\) World Nuclear Association, November 2016
5 The sector’s requirement for skills

The diversity of the nuclear sector’s activities is demonstrated in the following map of regulated nuclear sites in the UK.

Figure 2 Locations of principal nuclear activities in the UK (Office for Nuclear Regulation)
Data collected for the Nuclear Workforce Assessment 2015 identify around 60,000 full time equivalent posts distributed across the principal sites identified in Figure 2, with a further 18,000 in the supporting supply chain. Over the entire industry around 90% of the workforce are employed for their generic (non-nuclear) skills, and around 10% for nuclear specific skills. A small percentage of the latter may be further defined as Subject Matter Experts; those holding niche skills and experience built up over ten to fifteen years, or even longer.

5.1 Major nuclear milestones

While uncertainties exist in the timing of new major civil and defence activities, and the operation and decommissioning of existing assets is also subject to constant review, there is clearly a programme of work to be carried out that covers many decades. Figure 3 presents the latest published plans for major nuclear milestones at the time of publication. It covers the end point of a number of existing operations, milestones for the Dreadnought Programme, the completion of the Astute submarine fleet and the construction of new electrical power generation capacity. (Industry planning extends beyond the range of Figure 3 but is not considered significant for industry-wide skills planning at this stage.)

Alongside the existing estate, new technologies are needed for supply decarbonisation beyond 18 GWe, for fuel cycle management and for long term waste disposal. These are associated with a long pipeline for the growth of skills and the accumulation of relevant

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\(^5\) Since the establishment of the NIA timeline, and the collation of data for the 2015 Nuclear Workforce Assessment, a new nuclear power plant at Bradwell has been added to the list under consideration by the Office for Nuclear Regulation – bringing the total of proposed new nuclear generating capacity to 18 GWe across 6 sites.
experience, and will be an important consideration in the development of strategic interventions.

One technology to highlight is that of Small Modular Reactors (SMRs) for local generation of combined electricity and heat. Although their position in the UK energy strategy is less well defined than for conventional plant, the potential for rapid technical development could make them available on a similar time scale.

5.2 The age profile of the workforce – replacement demand

The first resource to help meet the immediate programme is the knowledge and experience embedded in the existing workforce. As a proxy for the industry as a whole, the age distribution for the NDA estate is shown in Figure 4. These were the most comprehensive data available at the time of writing, although other parts of the industry may be more heavily weighted to the 45 to 60 age group.

The data suggest that around 20% of today's workforce will pass the age of 65 in the next 10 years, the equivalent of around 1,580 FTEs per year. Alternatively, for a nominal retirement age of 60, this rises to 2,800 FTEs per year. Evidence of extended average working lifetimes since the removal of the default retirement age complicates the forecast. Nevertheless, the age profile gives a clear indication of the need to guard against the loss of valuable skills and knowledge as experienced workers leave the industry.

Figure 4 The age distribution of the NDA workforce.

Based on the Nuclear Workforce Assessment 2015, current activities, including defence, are forecast to leave the overall workforce demand largely flat until 2021, followed by a decline at a rate of 2,000 FTEs each year for the following decade.

5.3 Forecast recruitment requirement

Construction of five sites⁵ for 16 GW of new generation capacity, following the schedule outlined by the NIA in 2012 and included in Figure 3, has a significant impact on total demand, causing it to rise from 78,000 FTEs in 2015 to 111,000 by 2021.
Figure 5 Required industry inflow - existing trend, and forecast to include civil new build.

The cumulative recruitment required to meet replacement and expansion demand is illustrated in Figure 5. The green line shows the industry inflow to support existing nuclear activities without new build, a rate of around 3,800 FTEs/year. As a continuation of activities that are already supported, this provides a benchmark for sustainability.

In contrast, the red line shows the combined civil and defence inflow with the addition of civil new build, a rate of 9,000 FTEs/year and an increase of a factor of 2.4 over the benchmark. The curve flattens out beyond 2021, since expansion recruitment demand ceases once the peak in programme demand is passed. These data represent a forecast for recruitment that will ultimately be met by individual organisations’ resourcing plans, and will include a range of strategies from early career pipelines to experienced hires. For example, the Royal Navy plans to recruit 220 personnel per annum to fill nuclear suitably qualified and experienced personnel (NSQEP) positions, and the NDA approximately 200 apprentices per annum into its workforce. This analysis averages across the industry and will not reflect movement within the industry, notably from the defence sector to the civil sector.

Figure 6 shows the 9,000 annual inflow broken down by resource type and role level (Technical – RQF level 2 and level 3, Professional - RQF level 4 and level 5/5+). Predictably the demand for engineering is high (46% of the total), with 38% at the professional level.
Figure 6 Summary of industry inflow required to meet forecast demand

Further subdividing the resource types and role levels, ordered by total recruitment requirement, gives a set of occupations in Figure 7 where the implied rate of recruitment may be challenging.

Figure 7 Forecast required inflow for high level resource code by role level

The magnitude of recruitment is, of course, only one aspect. Time to competence, ease of transitioning from other sectors, retraining and retention rates will all affect how easily the programmed demand can be met. In many cases the necessary nuclear specific training is rapid, while for a smaller number it may take several years. For the specialist minority, experience is gathered over a decade or more.

These factors need to be considered when developing interventions to address projected skill shortages. Acceleration or deceleration of the build programme has the potential to change the balance of supply between experienced transitions and new workers direct from education and training. The supply and demand for skills in the nuclear industry is very significantly determined by the time scale for civil new build (based here on the NIA’s 2012 assumptions), and its overlap with other programmes. Changes to either, or both, may reduce or exacerbate skill gaps.
5.4 High Level Skills
Where the time to competence is significant, the detail of the new build schedule will have a large influence on the demand for experienced workers. This becomes clear in Figure 8.

Assuming a period of five years for professional levels 4/5+, new graduates recruited in the shaded area will not have time to acquire all of the necessary experience. Using this fairly coarse definition, 14,700 FTEs would need to transition from related sectors as experienced engineers and scientists. For levels 2 and 3 the equivalent figure is 4,900 FTEs.

While this analysis reflects the volume requirements, other pinch-points are associated with high-level niche skills. These are small in number (potentially under 5% of the total workforce) but often relate to critical positions, occupied by workers with ten to fifteen years' experience at a high level. Broadly, the group includes subject matter experts and others with high-level knowledge and experience, without whom work programmes may not continue. Close monitoring, and the development of strategies for filling gaps which necessarily have a small supply pool, need to be an explicit part of the skills management process, irrespective of other vulnerabilities. To date, those associated with subject matter experts have been managed by individual organisations. The Strategic Plan however recognises the importance of their identification and auditing, and the potential value of collaboration with other bodies, such as the Nuclear Innovation and Research Office and the National Nuclear Laboratory, to ensure an on-going pipeline of skills.

5.5 Temporary or Agency supplied workers
A key consideration in meeting the demand is the use of contractors or agency supplied workers (ASW). The nuclear industry has always operated with a healthy mix of staff and ASWs, as this leads to a highly flexible workforce which can rise and fall to meet the changing needs of an individual business. The use of ASWs will inevitably rise as the
industry moves forward into new build activities, as a large number of the skills needed are in the generic skills category, which is dominated by ASWs and temporary workers.

ASWs provide transferability from other sectors, along with knowledge and ideas from non-nuclear projects, but can sometimes lack the understanding and culture required to work on nuclear licenced sites. Moreover, their approach to training and development can sometimes be different, as they may not stay the sector once their contracts end. This Strategic Plan acknowledges and accommodates both permanent and temporary labour in that the strategic actions support either category of resource.

5.6 Disciplines currently viewed as vulnerable

In volume terms, the science and engineering requirement for the UK nuclear industry is small compared to the national pool of graduates and experienced workers. The central challenge is the nuclearisation of new entrants, the upskilling and transitioning of current staff and planning of the “experience pipeline” necessary for complex nuclear specific tasks in both civil and defence sectors.

Data from the Nuclear Workforce Assessment 2015, together with other intelligence, led to the following list of disciplines that are currently considered vulnerable, given the accelerated demand arising from civil new build:

- Mechanical Engineering
- Electrical Engineering
- Construction and Decommissioning Trades
- Control and Instrumentation Engineering
- Project and Programme Management
- Steel fixing
- Specialised concreting
- Civil Engineering
- Scaffolding
- Safety Case Specialists
- Commissioning Engineering
- Heavy Electrical Engineering
- Chartered Status Administrators in Purchasing and Supply
- Regulation

These are subject to review and may change as new data is collated. In any event, challenges exist both in generic skills, in terms of the potential mobilisation of large numbers to meet an expanding demand, and in niche areas of the nuclear and expert skill sets. Both will require interventions, but the unavoidably long experience paths required for niche nuclear and expert skills is of particular note.

5.7 Productivity

Whilst the demand can be met by recruitment, retraining and development, another key factor to consider is the productivity or output of the existing and newly recruited workforce. This does not impact the range of skills needed but can affect the numbers and timing requirements of the workforce. It is hard to judge the impact of any increased productivity on
the forward demand, as it is unlikely to be uniform across the sector. In addition, any increase is more likely to impact the generic skills rather than the more specialist skills and may vary between sites.

For these reasons the LMI model has not factored any productivity improvement into the current model. There will be a drive to improve productivity throughout the industry, for economic reasons as well as resource availability issues, but this will be matter for individual companies rather than a national strategic initiative.

5.8 Note on skills supply

Of several approaches to identify pinch-points, the simplest to interpret is the measurement of the gap between the forecast supply and forecast demand. Accurate prediction of future skills supply provides invaluable direct information about the size of future skills gaps and the magnitude of the interventions required to correct them.

However, such extrapolations are problematic because of the interplay between a number of factors; sector attractiveness, time-to-competence, other national infrastructure demands, and the overall economic context.

In its most general form, the supply of skills and of skilled employees to the sector can be considered in three parts:

- The existing workforce and its continued upskilling and reskilling (quantified in previous Nuclear Workforce Assessment analyses)
- New employees starting their careers upon leaving full time education or training (at school, Further Education or Higher Education level)
- Transitioning employees who have experience and existing skills from their background in strongly related occupations. Examples include engineering, construction, scientific, and engineering construction skills. These employees have the general technical background required, but will need “nuclearisation” by training in specific technical skills and the behaviours required to work in the nuclear sector.

Comprehensive data covering the second and third supply routes is not available as a single source. However, the Strategic Plan captures the need to collate training provider data, SLC historical recruitment data and sector-switching forecasts during 2016 in order to provide a better view of supply capacity. In pursuit of a more comprehensive and structured supply-side model, the NSSG has supported the creation of a System Dynamics stock and flow model. This will further the understanding of the supply routes and forecast likely levels of supply. It will be developed for use by March 2017.

5.9 Future Labour Market Intelligence

Information on the demand for skilled people will continue to be refined and refreshed where necessary, with an added emphasis on identifying vulnerabilities associated with subject matter experts and other low-volume key skill groups. Combining qualitative and quantitative data inputs, and time-dependent supply data, the aim will be to generate a comprehensive list of vulnerabilities and the routes and timescales over which they are most likely to be influenced. In using a dynamic model of both supply and demand, a more strategic use of LMI should be achieved.
6 Government skills policies

6.1 Skills policies in the UK
The skills policies of Scotland, Wales and Northern Ireland are devolved to their respective Parliament and Assembly bodies, so the UK government retains control only over England’s skills matters. Responsibilities for energy and defence are not devolved, so policies continue to take a UK-wide view. Given that the nuclear sector (civil and defence) needs a skills workforce from across the UK, this means that it is affected by multiple policies.

A person remains competent no matter which UK nation he or she is in, and in practice qualifications and standards are often recognised across the industry. However, differences in funding, systems and terminology do mean that employers need clarity about how the systems support their skills needs.

The rest of this section highlights some of the skills policies that we need to take into account while developing and implementing this Strategic Plan. They are numerous and do not necessarily complement each other, which brings the risk of impeding progress. While the industry recognises devolution of policy as a settled fact, there is a lot more that can be done to improve co-operation across the UK and to apply general policies to the specifics of nuclear.

6.2 Skills policy in England
The UK government’s overall skills policy (for England) continues to be based on a principle of removing intermediate skills bodies, and involving employers and individuals in driving and funding their workplace skills development.

In July 2015, the government published ‘Fixing the Foundations’, a productivity plan for the UK workforce, announcing the intention to reduce the number of qualifications and re-focus on vocational training, with local devolution and the National College for Nuclear. It committed to three million apprenticeship starts during the lifetime of this Parliament and a network of technical institutes to deliver high-standard provision.6

Later that year, the 'National Infrastructure Plan for Skills' was published, highlighting the need for improved visibility of investment and skill demands to help training providers, industry and sector bodies to make plans. It set out a focus on better coordination of skills across sectors, and transferability of qualifications, stating that “high levels of bespoke training limit mobility”7.

All of this significant policy attention and investment around skills and infrastructure is welcome, and such strategic levers across the broader economy help the nuclear sector’s own historical, significant and ongoing efforts to meet its own skills challenges.

6 Fixing the Foundations – HM Treasury, July 2015
7 National Infrastructure Plan for Skills – HM Treasury, September 2015
6.3 Sustaining Our Nuclear Skills

Three government departments - DECC, BIS and the Ministry of Defence - published the Nuclear Skills Policy ‘Sustaining Our Nuclear Skills’ in March 2015\(^8\), in collaboration with the Nuclear Industry Council (NIC).

It recognised that “Decisive collaborative action is needed to build the right pool of nuclear skills” given that, for first time in decades, the sector’s workforce is set to expand significantly. It set out the following common goals:

- Aspire to meet 90% of the sector’s skill demands from the UK workforce by developing the right profile and pipeline of skills to meet the future demands
- Ensure the nuclear workforce’s expertise is unsurpassed globally by developing training, development and certification programmes of the highest quality
- Cultivate a more diverse nuclear workforce, including by increasing the proportion of the sector’s workforce who are women to 40%, and the proportion of women in senior management to 25%, by 2030

In writing this Strategic Plan, we continue to recognise ‘Sustaining Our Nuclear Skills’ as the skills strategy for the sector, and are setting out our strategic skills-related risks and themes in the light of these goals.

The Strategy suggested that workers in the nuclear sector can be placed broadly into three tiers. Ensuring an adequate labour force in each tier poses different challenges:

![Figure 9 - The 3 skills tiers in the nuclear workforce (courtesy HM Government)](image)

The report concluded that a strategic review of cross-sector activity on nuclear skills should be carried out by the NIC Skills Workstream with support from government. The review should evaluate the sufficiency of whole sector skills activities to date and consider whether additional activities, or even a step change in collaborative activity, are required. This Strategic Plan picks up this ambition. In the civil sector, the new build programme means that the main challenge is in the “generic skills” element. For defence, and research and development, the challenge is more located in the area of subject matter experts. Different approaches to implementation are therefore needed.

\(^8\) [Sustaining Our Nuclear Skills – HM Government, March 2015](#)
6.4 Skills policy in Wales

The Welsh Government published its ‘Policy Statement on Skills’ and the accompanying Skills Implementation Plan in 2014\(^9\), and although the Welsh skills system is still centrally co-ordinated, it too is moving towards a requirement for co-investment from employers towards skills costs. It is keen to see maximisation of the economic benefits from nuclear new build, especially Wylfa Newydd on Anglesey, and Hinkley Point C close to the Welsh/English border.

6.5 Skills policy in Scotland

The current Scottish Government has a policy of no new nuclear power, with the aim of the equivalent of 100% of electricity from renewable sources by 2020\(^10\). It does, however, support the extension of nuclear plant lives where appropriate, and Scotland will continue to need nuclear skills for ongoing generation, decommissioning, waste, the defence sector and associated supply chains.

There is a target for Modern Apprenticeships in Scotland of 30,000 per year in 2020, which will be double the 2011 figure\(^11\). There is an aspiration to give priority within the Modern Apprenticeship programme to STEM careers\(^12\).

6.6 Skills policy in Northern Ireland

Nuclear energy and nuclear installations are excepted matters under the Northern Ireland Act 1998 and, as such, are not within the remit of the Northern Ireland Assembly. However, the sector in the rest of the UK does recruit from the Northern Irish population, and the province is home to nuclear supply chain companies, both in civil and defence activity.

The Northern Ireland Assembly introduced a strategy for apprenticeships (‘Securing Our Success’, 2014) that is focused on STEM skills and higher levels of professional and technical occupations\(^13\).

6.7 Apprenticeship Levy

The UK government is implementing the Apprenticeship Levy from 2017, and this is to be used to fund apprenticeship training in England. No plans for changing the apprenticeship funding systems in Scotland, Wales or Northern Ireland have been announced.

As the sector has a strong history of employing apprentices, the levy is likely to have an impact throughout the nuclear supply chain. The larger Site Licensed Companies and contractors (with annual paybills over £3m) will pay it, and will have the incentive to use their levy credits in England with an associated 10% top-up. However, liability to levy is not affected by apprenticeship recruitment, and these large companies do tend to have their plans for apprenticeship recruitment already. At the same time, smaller companies who do not pay the levy will need to contribute 10% of the training costs of English apprentices. These arrangements are subject to change as the levy is introduced.

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\(^11\) First Minister announcement – Scottish Government, April 2014
\(^12\) Developing the Young Workforce, Scotland’s Youth Employment Strategy - Scottish Government, Dec 2014
\(^13\) Securing Our Success – Dept. for the Economy (Northern Ireland), June 2014
The introduction of the levy will affect individual companies differently, depending on their circumstances, but the sector as a whole has contributed to the development of the government’s policy, and its implementation is a fruitful area for collective co-operation as the actions arising from this Strategic Plan are implemented.

6.8 Apprenticeship Standards
The replacement of Apprenticeship Frameworks with new Apprenticeship Standards in England has been the subject of collective nuclear sector action for over a year, with four sector-specific standards officially approved by government. Further work is going on to ready employers and the provider base for delivery of training and assessment. There has also been extensive occupational mapping to assess the need for new Standards and to review those being developed by other sectors. The Standards Advisory Group has agreed that it will take an overview of this area, with a dedicated review group.

Apprenticeship Frameworks will continue to pertain in Scotland, Wales and Northern Ireland, and remain the responsibilities of the Sector Skills Councils to review and maintain them on behalf of their sectors. Although there is no specific requirement or mechanism to have any consistency between new Standards in England, and existing Frameworks elsewhere, this element was considered by nuclear sector employers while designing the sector-specific Standards by reviewing and using elements of relevant National Occupational Standards.

6.9 Technical Education and the Post 16 Skills Plan
In response to the July 2016 Independent Review of Technical Education (the “Sainsbury Review”)\(^\text{14}\), government produced the ‘Post 16 Skills Plan’\(^\text{15}\) setting out plans to reform technical education in England. Its proposals aim to simplify the system by reducing the number of technical qualifications and seeking consistency between industry-led standards for apprenticeships and technical college courses. It sets out 15 “routes”, of which the ones most likely to be relevant to the nuclear programme include Construction, Health & Science, and Engineering & Manufacturing. To oversee this, it proposes to expand the remit of the planned Institute for Apprenticeships to cover all technical education as well.

6.10 Institute for Apprenticeships and Technical Education
The Institute for Apprenticeships and Technical Education will be launched in April 2017. The organisation’s role around apprenticeships in England will be to:

- Develop and maintain quality criteria
- Support the development of standards and assessment plans
- Maintain a public database of apprenticeship standards
- Advise the government on the maximum rate of government funding (funding caps)
- Quality assure the delivery of apprentice end-point assessments
- Review and oversee technical education routes in colleges and training providers

6.11 Regional and local infrastructure
At time of writing, the government is implementing further regional devolution in England, accelerated by the Cities and Local Government Devolution Act 2016, with Local Enterprise Partnerships and Devolution Deals that include strong elements of economic and skills

\(^{15}\) Post 16 Skills Plan – HM Government, July 2016
policies. How this devolution is applied will necessarily vary from area to area, and such policies are overlaid on geographical areas that have differing needs for the nuclear industry.

The aim of this Strategic Plan has been to set out first the overall needs of the nuclear industry across the UK. Although there are regional variations within the sector, these do not necessarily align neatly with areas of devolution. This is most likely to have an impact when more detailed actions arising from this plan are developed, when we will need to engage with different partners in different ways across the UK.

6.12 Industry Training Boards
A significant proportion of the sector, especially decommissioning and new build, is in scope to pay levies to the existing Industry Training Boards (ITBs); the Construction Industry Training Board and the Engineering Construction Industry Training Board. The details of any changes to these levies are yet to be announced, but the ITBs and government are consulting on how the systems should operate in the light of the Apprenticeship Levy. The current position is that companies will pay both levies as long as they are in scope to an ITB and have a paybill that makes them liable to the Apprenticeship Levy.

It is worth noting that the existing ITB levies do contribute to the costs of apprenticeships (alongside government funding), but most of the funds are spent on professional development of employees already in the workforce. There is therefore the scope to rebalance the activities of the ITBs to address needs across the sector, depending on the outcome of their strategic reviews.
7 Risks and challenges

7.1 Risk summary
The summary below has been developed following a series of workshops, meetings and analysis with key stakeholder organisations including the NSSG members, skills bodies and representatives from the NSAN Advisory Board. It now consists of twelve key high-level strategic, skills related risks. Noting that many organisations have already invested a significant amount of resource in addressing future skills demands for the sector, there was a high degree of similarity across the different risk workshops and discussions. This provides confidence that the risks identified are representative of the key residual risks, blockers and issues that need to be addressed and mitigated for a successful nuclear programme.

This is only a summary taken from a live risk register which includes RAG status of the unmitigated and mitigated risks, outstanding actions, owners and next steps.

7.2 Key risks

<table>
<thead>
<tr>
<th>Risk Topic</th>
<th>Owner</th>
<th>Risk Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Speed of Recruitment</td>
<td>Mark Rouse</td>
<td>Risk that employers (directly in the industry, and in the supply chain) are unable to recruit sufficient numbers of suitably qualified people in a timely manner to meet demand. This is of particular concern regarding High Level Skills and Subject Matter Experts due to the long path to competence. It could result in increased competition for these skills across the sector – potentially increasing the labour rates in the short term until supply catches up with demand.</td>
</tr>
<tr>
<td>2 Insufficient work available to train the workforce</td>
<td>Helen Shide</td>
<td>Risk that a lack of appropriate paid work will result in a workforce that is insufficient to meet the known resource requirements. This potentially includes lack of capacity, capability and quality.</td>
</tr>
<tr>
<td>3 Slow to adapt to changing technologies</td>
<td>Fiona Rayment</td>
<td>Risk that industry fails to develop suitable understanding, training courses, development opportunities and facilities quickly enough to respond to changing technologies.</td>
</tr>
<tr>
<td>4 Reduction in professional development</td>
<td>Richard McMeekin</td>
<td>Risk that professional development is insufficient to meet the demands and may reduce even further due to the focus on funding apprentice schemes.</td>
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<tr>
<td></td>
<td>Risk Area</td>
<td>Author</td>
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<tr>
<td>5</td>
<td>Lack of workforce transferability</td>
<td>David Vineall</td>
</tr>
<tr>
<td>6</td>
<td>Critical skills gaps</td>
<td>Fiona Rayment</td>
</tr>
<tr>
<td>7</td>
<td>Supply chain not ready or lack of resilience</td>
<td>Richard McMeekin</td>
</tr>
<tr>
<td>8</td>
<td>Insufficient Regulator capacity</td>
<td>Dave Caton</td>
</tr>
<tr>
<td>9</td>
<td>Insufficient training places</td>
<td>John Male</td>
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<tr>
<td>10</td>
<td>Differing standards</td>
<td>Joanna Woolf</td>
</tr>
<tr>
<td>11</td>
<td>Poor knowledge capture</td>
<td>Dave Caton</td>
</tr>
<tr>
<td>12</td>
<td>Robustness and use of Labour Market Intelligence</td>
<td>Simon Earp</td>
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</tbody>
</table>
Having identified the key risks, a further review was undertaken to look at the extent to which they apply across the sector and, where they have already been recognised through earlier work, what actions are in place to address them and how far this has been progressed. This work will be further developed to provide greater clarity of actions required and target dates for completion.

Each risk has an NSSG point of contact who will monitor and report on progress.

7.3 Regional variance:
The risks as listed above are stated as if they are generic, however they will in reality be applicable to a varying degree across the country due to the localised nature of the skills demand – generally in areas away from cities and HE / FE institutions and in areas of lower population density, such as Cumbria, the South West and North Wales.

Where significant regional issues exist – such as in Cumbria or the South West - there is already a high degree of activity, supported by organisations such as the Centre of Nuclear Excellence (in Cumbria), Nuclear South West and the National College for Nuclear. We recognise that the solution may not just consist of building new localised facilities, but also the use of training facilities outside the immediate area. Potential solutions to regional issues will go beyond training interventions, to include increased visibility of alternative options and breaking down barriers to the re-location of trained personnel by communicating and promoting job opportunities, earning potential and quality of life.

The development of the National College for Nuclear, with its northern and southern hubs, is specifically directed at addressing the needs of the nuclear industry. It will direct its activities by working with nuclear operators in all fields to address national and regional skills requirements that require more structured or endorsed solutions. It will also identify any current and future gaps in the area of skills provision in support of the nuclear industry to ensure timely provision of solutions.
8 Strategic actions
With the NSSG in place and coordination of government, industry, skills bodies and academia, the sector is well placed to implement strategic actions to ensure that it will have the right resources in place doing the right things at the right time.

Whilst the primary focus will be on the next five years, the strategic actions will also address the future rundown of resources in line with the LMI resourcing model.

These actions are building on the ‘Sustaining Our Nuclear Skills’ aspirations, whilst ensuring they fully meet the requirements of the civil and defence employers and the regulators.

By analysis of the risks and evidence presented above, key common themes emerge, which need to be addressed in order to achieve our skills and resource requirements for the UK. In summary, there are three strategic themes that have emerged from the risk analysis, and two enabling themes:

Key strategic themes

- **Meeting the demand** (including attracting and recruiting a diverse range of people into the sector and retaining them with the appropriate level of knowledge transfer in order to minimise the number of fragile skills)
- **Training infrastructure and provision** (including enabling the best nuclear training provision at required regions)
- **Training standards and qualifications** (including an appropriate and consistent approach across the UK)

Enabling themes

- **A clearly defined and NSSG endorsed skills delivery model** (including refining and developing the skills operating model and supporting groups for simplicity, completeness and clarity)
- **An agreed nuclear timeline and clarity of demand requirements** (this includes providing clarity on the current nuclear programmes to enable the industry to develop and deliver against a firm set of requirements)

Developing these further and considering the risks and evidence that support them, the following strategic actions have been developed. These actions are the culmination of inputs from the NSSG members, the key employers via the NSAN Advisory Board, supporting skills bodies and government. They are articulated here with confidence that they are achievable and appropriate for the industry to achieve its future programme.
### Themes

<table>
<thead>
<tr>
<th>Rationale/Background</th>
<th>Risks mitigated</th>
<th>Strategic Actions Proposed</th>
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<tbody>
<tr>
<td><strong>A clearly defined and NSSG endorsed skills delivery model</strong></td>
<td></td>
<td>1. Implement a skills delivery model that supports this Strategic Plan by undertaking a comprehensive organisational design process. This is to take into account:&lt;br&gt; - Potential delivery bodies and/or organisations within the model&lt;br&gt; - the needs of SLCs through to the supply chain&lt;br&gt; - existing supporting groups and bodies&lt;br&gt; - regional needs and devolved governments&lt;br&gt; - civil, defence and regulatory requirements</td>
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<tr>
<td>Although the new delivery model aligns existing groups, alliances and organisations, there needs to be an ongoing review and refinement of their role and Terms of Reference. Clarity is needed to prevent overlap and gaps, and to present a comprehensive and co-ordinated model for the industry. Clear reporting lines will also make the risk management process more visible and effective. NSSG needs to bring organisational clarity and endorse the structure that sits beneath it.</td>
<td></td>
<td>2. Publish a government- and industry-agreed nuclear calendar/timeline which can be used with confidence for planning and needs analysis and is updated in a controlled manner</td>
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<tr>
<td><strong>An agreed nuclear timeline and clarity of demand requirements</strong></td>
<td></td>
<td>3. Create a nationally agreed nuclear workforce assessment of supply and demand at local and national levels which clearly defines skills vulnerabilities for both generic and nuclear specific skills</td>
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<tr>
<td>To provide confidence and clarity on the timescales and resulting skill demand requirements, the industry needs to agree to a nuclear timeline which will form the basis of the future LMI modelling work. The demand and supply requirements need underpinning with robust, owned, quantitative data. This is particularly true for the construction phase of new build, where the demand data is robust but the supply information is less well informed. A skills shortage that delays build or commissioning will potentially have a significant impact on the overall nuclear programme.</td>
<td>12</td>
<td>4. Simplify the entry process by reviewing all barriers to entry to the sector, including security clearance, time to competence and induction training</td>
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<tr>
<td><strong>Meeting the Demand</strong></td>
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<tr>
<td>The unprecedented growth in the industry will need a step change rise in recruitment rate that has not been previously achieved. This is compounded by the difficulties in transferring resources from other industries (and from other parts of the industry). There is a need to recruit and retain a diverse range of people.</td>
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The complexity of the picture across nuclear sector companies means that the demand for some key skills will exceed the UK’s capacity to supply suitable competent people at a given point in time, without pre-planned interventions.

Collective action is needed across the sector to fill the specific skills gaps identified in the LMI report in order to prevent disproportionate delays to the nuclear programme. The higher level skills are of particular concern as the path to SQEP can be long and there is currently insufficient work and formal contracts to begin this process. This would lead to a loss of talent; particularly in the supply chain.

With 20% of the nuclear workforce reaching 65 years old in the next 10 years, there needs to be a concentrated effort to capture and disseminate knowledge in a simple cost-effective way. This will enable transfer of knowledge between retirees and new entrants; between civil, defence and the regulator; and nuclear and non-nuclear sectors.

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<tbody>
<tr>
<td>5. Accelerate experience and learning through group managed placements and secondments to use appropriate apprentice, graduate, and new entrants to address the known skills gaps.</td>
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<tr>
<td>6. Coordinate employers to work with government:</td>
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<tr>
<td>a. to improve industry attractiveness for a diverse workforce</td>
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<td>b. to encourage the use of apprentices in all public and Tier 1 contracts</td>
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<td>c. to increase flexibility in the spending of apprenticeship levy funding with respect to supply chain, group schemes, and traineeships</td>
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<td>7. Identify and channel available funds into bursaries and other specific initiatives to ensure timely recruitment and investment in skills</td>
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<td>8. Proactively facilitate and promote moves across the industry to reflect the changing workload between new build, decommissioning, operations, and R&amp;D; including the relative demands of the defence and civil sectors.</td>
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<td>9. Develop an industry-led mentoring programme (and/or social media networking hub) using cross-company and cross-sector resources that enhances knowledge capture, sharing, and management</td>
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<tr>
<td>Training Infrastructure and provision</td>
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<tr>
<td>There is a need to optimise training provision in the appropriate regions and to maximise the value of existing facilities. This includes sustaining what we have and focusing future investment. The emerging model of the National College for Nuclear, and NSAN’s High Quality Provider Network, need to be at the centre of this issue. The future role of the Industry Training Boards needs to be finalised in order to determine their role in the continuous professional development of the workforce.</td>
<td>10. Monitor the development of the NCfN curriculum and ensure it includes specific skills requirements of new technologies</td>
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<td>11. Employers and training providers work together to support specialist subjects (especially new technologies) and encourage use of industries’ facilities, including developing database of subject matter experts</td>
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<td>12. Encourage and facilitate regional collaboration between training providers and develop a network map of provision and funding; to include consideration of NCfN, University Technical Colleges, colleges and universities</td>
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<td>13. Work at a local level to help prioritise LEP spending on nuclear related activities and training provision</td>
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<td>14. Develop and enhance a range of nationally recognised and NSSG supported nuclear top-up/awareness courses to ease transferability from other sectors</td>
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<tr>
<th>Training Standards and Qualifications</th>
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<tbody>
<tr>
<td>There is a need to provide clear standards, codes, and qualifications to meet the future requirements. This will facilitate timely investment in the training needed. There is a need for common base standards, a simple career framework and sharing of relevant good practice across the UK.</td>
<td>15. Develop and publicise generic career pathways and occupational competences to provide consistency across the sector</td>
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<tr>
<td>16. Identify and map industry requirements for training and apprenticeship standards, and associated qualifications. Oversee and coordinate their development and ensure they are available and funded across the UK</td>
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<td></td>
<td>17. New Build developers and SLCs to publicise their technical standards and quality requirements to enable a review of existing training/apprenticeship standards for their applicability and adequacy, and creation of new ones where required.</td>
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<td></td>
<td>18. Evaluate apprenticeship quality, from underpinning standards to delivery, and take appropriate action to ensure that they continue to meet industry skills and competency requirements.</td>
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<td></td>
<td>19. Influence the technical vocational pathways in terms of adequacy for the nuclear industry.</td>
</tr>
</tbody>
</table>
8.1 Constraints / dependencies:
Whilst the above strategic actions are proposed to apply UK-wide, it has to be recognised that there are various constraints which are out of the control of the nuclear sector, including:

Devolved governments: differences in funding such as the Apprenticeship Levy, the new Institute for Apprenticeships and the removal of commonly recognised or mandated standards mean that there is no longer a uniform skills landscape across the UK. Clear understanding is essential for all employers – particularly those with people and facilities spread across England, Scotland, Wales and Northern Ireland.

Major infrastructure projects’ skills requirements such as High Speed Rail or fracking have already been recognised by government as having significant skills issues, to the extent that they have supporting National College arrangements. As the nuclear programme becomes firmer, more work is needed on the geographical and skill set overlaps between these industries, and how we can work with them to increase the potential source of employees.

Personnel mobility / housing and infrastructure: ensuring that there is sufficient domestic infrastructure to support major projects, training and recruitment initiatives is essential to maintain progress. Clear and timely communication of the implication of interventions in these areas to government must be maintained.

Government policy / funding arrangements: We need a strong voice to government on the implications of changes to strategy and funding upon the medium to long term training and recruitment plans of technical employers with long training pipelines such as in the nuclear industry. Joining up with other engineering and science based industries will strengthen this message.

8.2 Benefits
A lot of work has been done to set up the infrastructure for nuclear skills, via the two principal plans by NSAN and the Nuclear Energy Skills Alliance (NESA). The real task ahead is for industry to grasp the recruitment and training challenge. It is difficult in a climate of limited contracts and work for industry to take the risk unaided. However, implementing this skills Strategic Plan will drive a number of benefits for government and industry alike.

Through adopting this approach, we will:

1. Ensure that the UK is positioned to deliver the future increase in workload without over reliance on foreign labour
2. Build a nuclear legacy of competent people in areas of nuclear development suitable to meet the local needs into the foreseeable future
3. Enhance long-term careers opportunities for STEM apprentices and graduates
4. Provide the base-load of training requirements to allow confident investment in facilities and training provisions
5. Ensure a more flexible and mobile nuclear workforce
6. Provide opportunities for continued professional development of the existing workforce
7. Ensure the UK has a powerful nuclear skills capability and is able to respond to international opportunities
8. Invest in skills to drive productivity and economic success
9. Facilitate and encourage cross-sector movement between civil and defence and by non-nuclear personnel
10. Support highly skilled individuals in greater job satisfaction, which will improve sector retention
11. Help highly skilled individuals to pass on their knowledge, mentoring the next generation, thus future proofing the sector’s skills and competence base
12. Reduce costs to industry and value to the tax payer associated with the need to train and re-train the workforce

8.3 What will success look like?
This Strategic Plan has not detailed definitive timescales, as these will be developed in the next stage, but within five years it hopes to achieve the following:

<table>
<thead>
<tr>
<th>Theme</th>
<th>Achievement</th>
</tr>
</thead>
<tbody>
<tr>
<td>A clearly defined and NSSG endorsed skills delivery model</td>
<td>• A simple, universally accepted model which represents all aspects of the sector where all associated organisations and groups are aligned and working together • CEO ownership from across the industry recognising, endorsing and using the skills delivery model for their needs</td>
</tr>
<tr>
<td>An agreed nuclear timeline and clarity of demand requirements</td>
<td>• An NSSG agreed, and regularly updated, nuclear programme and workforce assessment model which the industry uses to make strategic resource planning decisions • Clarity on the options and the available resource pool to ensure competence can be achieved at the right time</td>
</tr>
<tr>
<td>Meeting the Demand</td>
<td>• UK nuclear programme delivered using UK resources in the right place, at the right time, doing the right things • A truly diverse working population and recruitment profile from across UK’s social and economic spectrum, with the nuclear industry being seen as “the place to work” • Clear, concise and agreed entry standards, qualifications and criteria for the nuclear industry with barriers to entry drastically reduced • Clear career paths with built-in flexibility between civil and defence • Strategically managed moves brokered across the sector to fulfil specific skill gaps • Shared knowledge management systems being used across industry</td>
</tr>
</tbody>
</table>
| Training Infrastructure and provision | • A nationally available skills programme with accessible regional collaborative delivery of widely approved courses  
• Training provision developed with collaborative education-employer models  
• A nationally recognised network of visiting experts to train and support lecturers and trainers  
• Flexibility of delivery models to address anytime, anywhere provision and allow “step on/step off” career frameworks |

| Training Standards and Qualifications | • Training standards and qualifications recognised and funded across England, Scotland and Wales  
• National Nuclear Curriculum of standards, qualifications and programmes supported by nuclear employers and aligned to their pathways to competence  
• Requirements for codes and standards published and available to all |
9 Delivery Model and Implementation arrangements

9.1 Skills Delivery model
To address the challenges outlined above and to deliver this Strategic Plan, we have developed a new Nuclear Skills Delivery Model. A number of changes have already been made over the past year or so, and the model will continue to be developed to support its detailed delivery plan. This represents a new approach in that it was a decision taken by the industry itself, rather than in response to a government request. The core of the model is industry funded, including the Labour Market Intelligence on which the strategic planning is based.

As stated many times in this document, the excellent previous and existing work will naturally form the basis for action, and therefore is a key to the forward work programme. However, all future work, interventions and products necessary will be considered on a case by case basis. Delivery will be a healthy mixture of regional and national partnerships. Similarly, the delivery model reflects work already being done by employers in the regions surrounding the New Build programme and major decommissioning sites.

**Nuclear Skills Delivery Model**

![Diagram of the Nuclear Skills Delivery Model]

1 – The NSSG Develops the Skills Strategic Plan for the UK

2 – The Programme, Planning and Delivery Group provides Programme Management via collaboration and coordination of employers, regional and national partnerships.

**Figure 10 - Delivery Model**

The key inputs to the strategy will be the risks and future skills demand (from the LMI modelling work), government policies, and the general nuclear work environment.
Supporting the NSSG is the Programme, Planning and Delivery Group (PPDG) which consists of a Nuclear Skills Lead, programme manager, policy and communications support personnel. Its primary functions are to:

- develop the detailed delivery plan by coordinating and recording the actions and interventions of employers, training providers and other supporting groups
- develop a set of key performance indicators to summarise progress against the plan
- monitor progress being made on all the planned activities
- produce summary reports for the NSSG on progress
- maintain the NSSG risk register, updated quarterly with actions being taken and their effectiveness in mitigating the risks
- support the development of business cases to secure funds as necessary
- facilitate workshops and creative sessions to develop appropriate solutions to risks, issues or problems in the skills arena.

With respect to education and training (at all levels), the delivery model is supplemented by the following diagram which shows the relevant high-level delivery responsibilities, all in the context of government policies and the nuclear environment.

**Figure 11 - Education and Training functions model**

In the above diagram:

1. “Standards” includes Competence Frameworks, National Occupational Standards, Apprenticeships and Technical Vocational Pathways
2. “Develop and Deliver” includes interventions and actions, training curricula and training material
3. “Award and Assess” includes assessment of skills, knowledge and competence; and where appropriate, certification
4. “Assure” includes regulation and quality of delivery
5. “Internal Regulators” include employers providing their own assurance

9.2 Local, regional and specific subject partnerships

There is a range of organisations and partnerships which are not necessarily nuclear-specific, but have a bearing on securing the right supply of skills to the sector. The PPDG will have primary responsibility for considering how best to engage the roles of these partners in delivering the Strategic Plan. There are already good links between employers, the various skills bodies, national partnerships and partners such as Local Enterprise Partnerships (LEPs). LEPs have significant devolved responsibility over local and regional funding, including European Structural Funds.

Although not all of the 39 LEPs across England have the nuclear sector as a listed priority, some do see it as significant. Two examples are the Cumbria LEP and Heart of the South West LEP - driven primarily by Sellafield/Moorside and Hinkley Point C, respectively, and the consequent opportunities for their supply chains. Each gives prominence to nuclear support activities in their Strategic Economic Plans and their European Structural and Investment Funds Strategies. In Cumbria, partnerships including the Britain’s Energy Coast Business Cluster and the Centre of Nuclear Excellence (CoNE) group have links with their LEP and are reviewing nuclear skills issues as part of their work.

9.3 Overall approach to deliver the Strategic Plan

A Programme Manager in the PPDG will be accountable for the development and programme management of the actions, activities and initiatives to deliver this Strategic Plan. He/she will have responsibility for developing measurable detailed actions with clearly defined owners necessary to deliver the plan in a timely manner.

Again, we are not starting from scratch and we recognise that all of the organisations involved in implementation will have their own action plans and people strategies, focused on developing workforce skills. These will form part of the overall implementation.

The Programme Manager will work with the assigned strategic theme leads to develop and monitor the detailed actions.

9.4 Overarching principles for Strategic Plan delivery

- Strategic actions will align with key strategic themes and/or risks
- Each action will be supported by evidence to demonstrate the current and aspirational position. Impact of delivery will be measured against these evidence sets
- Before instigating a new intervention, a review of existing products and services will be undertaken, to establish whether there is a gap in the market. This is to include relevant civil/defence collaboration opportunities.
• A decision to progress a new intervention will be based on the “adopt, adapt, develop” philosophy to maximise opportunity from any investments already made
• Specification for a new intervention or acceptance of adaptation or adoption of existing intervention will require NSSG sign-off. Sign-off will imply commitment to the project/service where appropriate for the relevant organisation
• Delivery plans will take into account the respective requirements of the defence and civil sectors
• Delivery plans will balance short term annual objectives and longer term ambition

The process cycle for developing the actions is therefore as follows:

The Programme Manager will work with the theme owner, and/or allocated persons, selected on basis of expertise, to assign ownership of each strategic action, and support the development of a delivery plan for each strategic action.

Each strategic action will be treated as an individual project, and as such will be supported by project management principles. The individual actions will provide an overarching strategic theme delivery plan and progress will be reviewed with the respective strategic theme owner.

Certain themes’ strategic actions will be delivered through already established groups.
Potential links with existing groups/delivery teams

<table>
<thead>
<tr>
<th>Strategic theme</th>
<th>Theme Owner</th>
<th>Potential or existing delivery group</th>
</tr>
</thead>
<tbody>
<tr>
<td>A clearly defined and NSSG endorsed skills delivery model</td>
<td>David Vineall</td>
<td>• Operating model working group</td>
</tr>
<tr>
<td>An agreed nuclear timeline and clarity of demand requirements</td>
<td>Simon Earp</td>
<td>• LMI Working Group</td>
</tr>
<tr>
<td>Meeting the Demand</td>
<td>Mark Rouse</td>
<td>• Nuclear Energy Skills Alliance</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Higher Level Skills Group</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• NSAN Employer Advisory Board</td>
</tr>
<tr>
<td>Training Infrastructure and provision</td>
<td>John Male</td>
<td>• National College for Nuclear</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• NSAN High Quality Provider Network</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Local Enterprise Partnerships and other regional groups</td>
</tr>
<tr>
<td>Training Standards and Qualifications</td>
<td>Joanna Woolf</td>
<td>• Standards Advisory Group</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• National College for Nuclear Curriculum and Qualification Group</td>
</tr>
</tbody>
</table>

Where external bodies/groups are used as a delivery mechanism for a strategic action, their own delivery plans will be incorporated in the strategic theme’s delivery plan.

The Programme Manager will produce regular monitoring reports for each strategic theme for the NSSG.

9.5 Delivery plan

The detailed delivery plan will be managed and resourced as a programme of activities, governed by the principles set out above. Each part of the delivery plan will consist of firm deliverables, owners, timescales and milestones. Additionally, the anticipated impact of each action will be assessed and reviewed. Barriers to progress will be explored and appropriate support considered. Should a new strategic action be identified outside of annual refresh, it would be considered as a relative priority compared to in-progress actions, before adding to the delivery plan.

9.6 Timescales, priorities and next steps

Following the formal launch of the Strategic Plan the focus will change to the development of the detailed delivery plan, starting with a status report against the NESA Plan16.

In parallel with this, a comprehensive programme of work is being undertaken to refresh the LMI model. The output of this may change the prioritisation of the skill gaps, and hence influence the detailed plan. This emphasises that the detailed plan will be a live document; changing to reflect progress, changes to risks, LMI and any new work dictated by the NSSG.

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16 Nuclear Energy Skills Alliance – NESA Plan Version 3 Update November 2015
9.7 Key Performance Indicators

The Programme Manager will review the impact of delivery in terms of risk mitigation. This will feed a risk review process to determine whether the risk is then at an acceptable level, or whether additional intervention is required.

9.8 Barriers to implementation

Delivery is subject to many of the same risks facing the structure and function of the NSSG:

1) Availability of resource to deliver/implement
2) Requirement for start funding to seed-corn relevant project areas
3) Lack of commitment by employers and individuals to utilise products and services
4) Inability to develop products and services to meet the needs of all organisations, and therefore the need for individual organisation to create bespoke solutions
5) Duplication and overlap with existing products/services which lead to dilution of demand
6) Interventions that are difficult to convert into clear success criteria as a result of the complexity and long term nature of skills interventions

These barriers will be addressed, where appropriate, at the NSSG.

9.9 Communication

The NSSG’s work is underpinned by a Communications Strategy which includes communication across the broader industry.

Employers and stakeholders receive a range of updates and communications to inform and facilitate decision making and direction.

There is also an ambition to raise awareness of the NSSG’s strategic role and to communicate key decisions, strategy milestones, agreements and other activity that will support the ambition of the sector. There is also an objective to spread best practice in learning and development.

We have set out the following communication objectives:

- Regular NSSG two-way membership communication
- Authoritative NSSG voice on targeted issues, supported by an NSSG Communications Group
- Stakeholder communications
- Communication to government
- Communication across the sector

A comprehensive and regularly updated website is now live: www.cogentskills.com/nssg

This website incorporates a detailed historical, current and forward looking timeline on key nuclear events. For example, significant decommissioning milestones, first concrete pour and commissioning dates for new build generation and expected submarine milestones.

Key media publications are also updated on NSSG activity when appropriate, as part of the NSSG’s remit to inform the wider industry.
10 Conclusion

The nuclear industry is about to embark on unprecedented growth over the next decade which will inevitably result in pressure points within the regional skills infrastructure, competition for skills, and unfilled demands across the sector.

This Strategic Plan has outlined the industry’s plans to satisfy the goals in the government’s published nuclear skills strategy ‘Sustaining Our Nuclear Skills’. It has been developed by considering the risks, blockers and issues we need to address in order to recruit and employ skilled people. They have been grouped into five key themes, to ease their management.

The themes have been used to develop strategic actions aimed at mitigating the risks identified by the industry, and providing the necessary national infrastructure to meet the rise in demand. A detailed action plan will allow full programme management to be applied.

By working in collaboration with government, skills bodies, supporting organisations and employers, the industry is confident that these actions will address the underlying issues and allow employers to recruit at the required rate to meet the ambitious forward programme.
11 Acknowledgements

The Nuclear Skills Strategy Group would like to thank the following people and organisations for contributing to this Strategic Plan:

Members of the Strategic Support Team:

- Steve Bennett
- Alan Coley
- Judith Holcroft
- Martin McManus
- Beccy Pleasant
- Selvin Roberts

Members of the Nuclear Energy Skills Alliance, on behalf of:

- Standards Advisory Group
- Labour Market Intelligence Working Group
- ECITB
- CITB
- Dalton Institute
- National Skills Academy Nuclear
- Cogent Skills
- National College for Nuclear
- Department for Business, Energy and Industrial Strategy
- Welsh Government
- Nuclear Institute

Members of the NSAN Employers Advisory Board risk workshop:

- Costain
- Doosan
- Jacobs Engineering
- MOD
- Mott McDonald
- NIS Ltd
- Ultra Electronics

NSAN Employer Advisory Board Membership

- BAE Systems Maritime Ltd*
- Atkins
- Arc Energy Resources Ltd
- MOD*
- AECOM
- STS Defence
- Amec Foster Wheeler
- Independent Forgings and Alloys
• Westinghouse
• TUC
• NSAN
• DSRL
• Bechtel
• NuGen Ltd
• Sellafield Ltd
• Ultra Electronics
• AWE*
• Cavendish Nuclear Ltd
• Doosan Babcock Ltd
• Jacobs
• Nuvia Ltd
• NIS Ltd
• AREVA
• Servelec Controls
• Hargreaves Ductwork Ltd
• TIS Cumbria Ltd
• Rolls Royce*

*Companies/organisations representing Defence Nuclear Enterprise and industry partners
### Glossary of abbreviations

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASW</td>
<td>Agency Supplied Worker</td>
</tr>
<tr>
<td>BEIS</td>
<td>Department for Business, Energy and Industrial Strategy</td>
</tr>
<tr>
<td>BIS</td>
<td>Department for Business, Innovation &amp; Skills (responsibilities now passed to Dept. for Business, Energy and Industrial Strategy, and / or Dept. for Education)</td>
</tr>
<tr>
<td>CITB</td>
<td>Construction Industry Training Board</td>
</tr>
<tr>
<td>DECC</td>
<td>Department for Energy &amp; Climate Change (responsibilities now passed to Dept. for Business, Energy and Industrial Strategy)</td>
</tr>
<tr>
<td>ECITB</td>
<td>Engineering Construction Industry Training Board</td>
</tr>
<tr>
<td>FTE</td>
<td>Full Time Equivalent (staff member)</td>
</tr>
<tr>
<td>GWe</td>
<td>Gigawatts (electric)</td>
</tr>
<tr>
<td>IfA</td>
<td>Institute for Apprenticeships</td>
</tr>
<tr>
<td>LEP</td>
<td>Local Enterprise Partnership</td>
</tr>
<tr>
<td>LMI</td>
<td>Labour Market Intelligence</td>
</tr>
<tr>
<td>MOD</td>
<td>Ministry of Defence</td>
</tr>
<tr>
<td>NCfn</td>
<td>National College for Nuclear</td>
</tr>
<tr>
<td>NESA</td>
<td>Nuclear Energy Skills Alliance</td>
</tr>
<tr>
<td>NSAN</td>
<td>National Skills Academy Nuclear</td>
</tr>
<tr>
<td>NSSG</td>
<td>Nuclear Skills Strategy Group</td>
</tr>
<tr>
<td>PPDG</td>
<td>Programme, Planning and Delivery Group</td>
</tr>
<tr>
<td>ONR</td>
<td>Office for Nuclear Regulation</td>
</tr>
<tr>
<td>SLC</td>
<td>Site Licensed Company</td>
</tr>
<tr>
<td>SMR</td>
<td>Small Modular Reactor</td>
</tr>
<tr>
<td>SQEP</td>
<td>Suitably Qualified and Experienced Person(nel)</td>
</tr>
<tr>
<td>STEM</td>
<td>Science, Technology, Engineering, Mathematics</td>
</tr>
<tr>
<td>TUC</td>
<td>Trade Union Congress</td>
</tr>
</tbody>
</table>
Contact us

01925 515 200
www.cogentskills.com/nssg