

The Nuclear Supply Chain Action Plan

December 2012

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1 Ministerial Forewords



"I am a strong advocate of nuclear power as part of the UK's future energy mix, and Ministers and officials across Government have worked tirelessly to persuade international investors that new nuclear is an exciting prospect and Britain is very much open for business.

The next ten years will see investment in Britain's energy infrastructure, already running at a 20-year high, increase still further. This investment is vital as electricity demand increases and we replace old plant with new, low-carbon generation – and it includes significant investment in new nuclear power stations.

The decisions that are already being made are a clear vote of confidence in Britain's nuclear sector and I want us to make the most of the business opportunity that this investment presents. The UK nuclear supply chain has the potential to grow beyond the £3.8bn a year achieved in domestic sales in 2010/11, and to take a larger share of the highly competitive global market which is currently valued around £95bn per annum. Winning more contracts will create jobs in many parts of the UK, and will help to drive economic growth as we rebalance the economy.

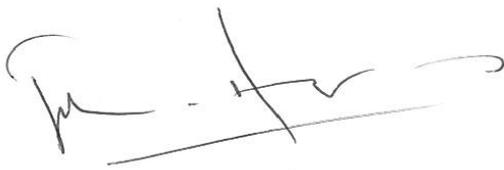
To achieve the maximum economic benefit for the UK, Government and industry need to work together. This is not a question of Government attempting to pull the strings of industry, risking tying companies up in regulatory knots. Nor is it a question of 'picking winners'. It is, rather, an honest recognition that Government is a major actor in the nuclear sector, and that our energy policy must go hand in hand with an enlightened industrial strategy.

The UK has the potential to be a springboard for new nuclear development around the world, and this presents huge opportunities for firms in the UK not just to supply the domestic market, but to export goods and services too.

Government will not get in the way of business success; on the contrary, we will facilitate it by removing barriers and encouraging competition. We have a once-in-a-generation opportunity to do this in the nuclear supply chain, and I am determined to ensure that we grasp it. This action plan sets out what this means in practice.

It is precisely because we want the supply chain to get the benefits from nuclear investment that Government, working closely with industry - has developed this ambitious action plan and is committed to ensuring that the key actions it identifies are successfully implemented.

Emblematic of our commitment is the formation of the Nuclear Industry Council. This council will take a strategic lead in driving the deployment of new nuclear and making sure the UK supply chain is equipped to maximise its economic benefits at home and abroad. As Energy Minister I will work with industry to ensure that new nuclear development goes hand in hand with securing the maximum economic benefit for our country and our people.”

A handwritten signature in black ink, appearing to read 'John Hayes', written over a horizontal line.

JOHN HAYES

Minister of State for Energy



“This action plan – the result of excellent collaboration between Government and industry – provides a striking illustration of the enormous opportunities for UK businesses in the nuclear industry. We are on the brink of an exciting nuclear revival in this country, and we must ensure that we deliver new nuclear power stations efficiently – to time and budget – and provide safe and dependable energy for decades to come. This will position UK industry to win contracts overseas, providing high quality manufactured products, components and professional services. The scale of the opportunities in future years is remarkable.

That is especially true of the UK, where our companies could capture £25bn-£35bn worth of business, as well as a share of multi-billion contracts globally, creating exceptional opportunities for growth and new jobs across the country.

The opportunities are there. I want to see UK businesses seize these all the way along the supply chain, from large companies to SMEs with specialist products and skills. I want to see businesses competing successfully for the large scale construction projects for new nuclear power stations, and above all for the high value manufactured products and quality jobs associated with them.

Companies will have to earn their market share. To do so, they will need to invest in enhancing their capabilities, including physical assets. They will also need to meet exacting industry standards, invest in skills and be at the forefront of offering innovative solutions to the technical challenges that lie ahead. We stand ready in Government to continue to support UK industry. We are already doing that in many areas, such as funding the unrivalled facilities at the Nuclear Advanced Manufactured Research Centre (NAMRC) at Sheffield University, which enable companies to drive down costs and increase quality; supporting innovation via the Technology Strategy Board’s nuclear feasibility projects; and uniting the UK skills offer under the National Skills Academy for Nuclear. Our support for R&D through our outstanding national institutions and scientific/engineering expertise will be instrumental in securing the UK’s place among the top nuclear nations. We are also offering companies customised professional advice to improve their competitiveness through the Manufacturing Advisory Service in partnership with NAMRC.

The actions set out in this plan require industry, Government and the research community to work together to maximise commercial opportunities for UK business. The forthcoming nuclear sector strategy – part of the Government’s wider industrial strategy – will build on this action plan, and make effective use of the Nuclear Industry Council to drive forward the transformation of the UK

nuclear industry throughout all parts of the supply chain. Achieving that will lay the foundations for a new nuclear energy era in the UK, based on safe, reliable and competitively priced energy.”

A handwritten signature in black ink that reads "Michael Fallon". The signature is written in a cursive style with a horizontal line underneath the name.

MICHAEL FALLON

Minister of State for Business and Enterprise

2 Executive Summary

- 2.1 The Government has already made significant progress in developing the nuclear energy sector from the perspective of securing energy supplies and improving opportunities for growth. The Energy Bill will establish a legislative framework for delivering secure, affordable and low carbon energy and will put in place measures to attract the £110bn investment which is needed to replace current generating capacity and upgrade the grid by 2020, and to cope with a rising demand for electricity.
- 2.2 To ensure that new nuclear generating capacity will be available when needed, the Energy Bill includes provisions for EMR¹, which will enable large-scale investment in low-carbon generation capacity in the UK and deliver security of supply in a cost-effective way. Government has also undertaken a series of facilitative actions to enable new nuclear plants to be built to time and budget, for example through the reactor Generic Design Assessment work undertaken by the UK nuclear regulators.
- 2.3 The Government has a vision of the UK nuclear industry becoming a global leader, with key companies forming an integral part of the domestic civil nuclear market supported by a large and diverse supply chain across manufacturing, professional services, construction, skills, training and educational services. If this is achieved, the UK supply chain will be in a prime position to supply to the major nuclear developers, reactor vendors and operators in both the domestic and global nuclear markets. With this vision in mind, the Nuclear Supply Chain Action Plan has been developed by Government in partnership with industry. The action plan focuses on the complete civil nuclear fuel cycle including front end, operations and maintenance, new nuclear build, waste management, decommissioning, with the following key objectives:
- To maximise UK economic activity and growth from the nuclear sector at national and local level, including employment and business opportunities for the UK supply chain.
 - To boost job creation in the nuclear industry, and to ensure that potential skills shortages do not act as a barrier to the future development of the industry in the UK.
 - To use the domestic nuclear market to enhance a sustainable and successful UK civil nuclear industry, and to use this basis as a lever to access export opportunities.

¹ *The Glossary at the back of this document will typically be used to define acronyms used in the text*

- To maintain and develop a vibrant supply chain covering key capabilities to deliver safe, innovative and cost effective clean up of the legacy facilities and to exploit synergies with new build.
 - To raise awareness across the supply chain of nuclear sector opportunities, to identify barriers preventing access to those opportunities and to develop actions for Government and industry that will help place the supply chain in a stronger position to compete for those opportunities.
- 2.4 This action plan is the first deliverable of a wider programme of work that was initiated at the beginning of 2012 to address all aspects of the UK's interests in civil nuclear energy. This broader programme stems from the House of Lords report *Nuclear Research and Development Capabilities*², produced by the Select Committee on Science and Technology. In depth work on the UK's research capability and proposed longer term strategy in this field continues and more information on this is expected to be published in early 2013.
- 2.5 The nuclear sector clearly offers significant opportunities for the supply chain. Likely future increases in electricity demand, the need to prevent dangerous climate change plus growing dependence on overseas supplies of fossil fuels are all making the case for increasing use of nuclear power, alongside renewables and generation plants fitted with carbon capture and storage technology.
- 2.6 The Government has engaged extensively with industry to understand what are the key issues preventing growth in the domestic nuclear sector and globally. The list below describes some of the key issues that have been identified in this action plan:
- **Confidence Regarding the Government's Commitment to Nuclear:** In order for the nuclear industry to maintain and increase investment and involvement in the sector it is important that the UK Government not only continues to convey its clear commitment to nuclear and the new build programme, but also that it delivers the necessary market framework to enable new build to come forward.
 - **Clarity on the Forward Pipeline and Access to Contracts in the Nuclear Sector:** To undertake the investments required to meet the new build programme, supply chain companies will benefit from clarity on the timing and requirements of forthcoming contracts.
 - **Need to Enhance Capability and Competitiveness in the Nuclear Industry:** The supply chain may need a level of assistance in developing and closing gaps in capability and competitiveness.

² *Science and Technology Committee. (2011). "3rd Report - Nuclear Research and Development Capabilities"*

- **Availability of Funding for Key Training:** There are funding pots available for skills interventions but there are ways for industry and Government to utilise them more effectively to best address the areas of most concern.
- 2.7 Thirty actions are proposed in this action plan to tackle the issues identified, and these actions will be implemented by Government and the nuclear industry in the coming years for the benefit of the UK supply chain. The first actions are presented in Section 6 of this report.
- 2.8 Accordingly, a formal governance and implementation structure will be put in place and the newly formed ministerial and industry co-chaired Nuclear Industry Council will oversee how the action plan is implemented.

In summary, there are significant opportunities in the UK nuclear sector from which the UK supply chain can benefit, provided it retains and builds up its capabilities and competitiveness.

The Government wants to ensure that the new nuclear build programme delivers not only much needed low carbon electricity at competitive prices, but also economic benefits to the UK including ensuring the nuclear supply chain is well positioned to access UK and long-term export opportunities.

3 UK Energy Infrastructure

- 3.1 Energy is one of the biggest infrastructure sectors in the UK, vital to the economy and essential to driving growth. The investment associated with Government's reforms to the electricity market - which involve stimulating up to an estimated £110bn³ of new investment in the electricity generation and transmission sectors by 2020 - has the potential to support as many as 250,000 jobs in the energy sector⁴.
- 3.2 Nuclear energy plays a vital role as the backbone of our existing low carbon generation fleet. The civil nuclear industry currently employs around 44,000 highly skilled people throughout the UK⁵. The industry has the experience to manufacture fuel, operate and maintain reactors throughout their full lifecycle, and to manage the legacy waste generated from their operation.
- 3.3 Nuclear power is low-carbon, affordable, dependable, and contributes to the UK's diversity and security of energy supplies. It has been part of the UK's energy mix for over 50 years; but most of the existing fleet of nuclear power stations will have reached the end of their operational lives by 2030. The 2008 Nuclear White Paper⁶ stated that new nuclear power stations should have a role to play in this country's future energy mix, alongside other low-carbon sources, and that remains the UK's position.
- 3.4 There are major planned investments in new nuclear with industry committed to helping build a low carbon secure energy future for the UK.
- EDF Energy and Centrica are seeking to build new reactors at existing nuclear sites at Hinkley Point in Somerset and Sizewell in Suffolk, providing work for companies in the local communities and across the UK economy as a whole.
 - Following purchase by Hitachi, Horizon is bringing forward plans to develop either two or three nuclear reactors at each of its sites, Wylfa on Anglesey and at Oldbury in South Gloucestershire. Hitachi has committed to work with Horizon in maximising UK content on projects.
 - NuGen's Moorside project focuses on the development of a new generation nuclear power station on land in West Cumbria. NuGen will work in

³ *The Energy Bill*: <http://www.publications.parliament.uk/pa/bills/cbill/2012-2013/0100/130100.pdf>

⁴ http://www.decc.gov.uk/en/content/cms/news/pn12_062/pn12_062.aspx

⁵ Cogent. (2009). "Renaissance Nuclear Skills Series 1: Power People, The Civil Nuclear Workforce 2009-2025"

⁶ BERR. (2008). "A White Paper on Nuclear Power"

partnership with the local community in West Cumbria and will look to maximise employment and skills opportunities in the region.

- 3.5 The UK nuclear industry has the capability to carry out a significant proportion of the work involved in new nuclear power station projects in England and Wales. It is estimated that a 16GW new nuclear programme could support between 7,600 to 9,800 direct jobs in the supply chain on average per year over the period 2012-2030⁷, with each new power station thereafter employing up to one thousand people in operation. This anticipated industry investment of approximately 16GW of new capacity before 2030 equates to almost £60bn, which is equivalent to five new multiple-reactor nuclear power stations each with on average capital investment requirements of around £12.0bn⁸. This compares to an overall cost of around £9bn for the London 2012 Olympic and Paralympic Games⁹.
- 3.6 The Government wants to see a successful and growing UK nuclear industry, with key companies forming an integral part of the domestic civil nuclear market supported by a large and diverse supply chain across manufacturing, professional services, engineering, construction, skills, training and educational services. If this is achieved, UK companies will be in a prime position to supply to the major nuclear developers, reactor designers and operators in both the domestic and global nuclear markets.
- 3.7 Opportunities must be maximised if the domestic nuclear supply chain is to reach national and global markets and to harness the full economic benefit for the UK economy. To achieve this, Government and industry will need to work closely together to support existing business, encourage opening of new markets and to implement any supportive actions.
- 3.8 To realise these goals the UK nuclear supply chain needs to be:
- **Confident of a Nuclear Programme:** The Government recognises that the nuclear industry will need to be confident that the UK provides the right commercial environment for a new nuclear build programme.
 - **Ready to Deliver:** There are important pre-requisites for winning contracts in the nuclear industry, including capability building, demonstrating an understanding of nuclear safety and quality standards and making aspirations known to the developers, technology vendors and major contractors to become part of their supply chains.

⁷ Oxford Economics and Atkins, "The Economic Benefit of Improving the UK's Nuclear Supply Chain Capabilities", Forthcoming.

⁸ Estimate of around £60 billion is based on capital cost estimates from PB Power (2012), assuming a transition from First of a Kind (FOAK) to Nth of Kind (NOAK) costs. PB Power, Electricity Generation Cost Model – 2012 Update of Non-Renewable Technologies, DECC, 2012.

⁹ http://www.culture.gov.uk/news/news_stories/9470.aspx

The UK supply chain needs to make timely strategic investments to build its capability and capacity to compete for emerging opportunities. Government intends to continue to work closely with industry to ensure the supply chain has a clear view of timescales and requirements relating to key contracts, to ensure UK industry is able to compete fairly for work.

- **Prepared to Act:** There is a window of opportunity that currently exists for the supply chain to become involved in the first of the proposed new build projects at Hinkley Point C, as work packages are already being actively procured. Many of the work packages for Hinkley Point will also include options for Sizewell, so the UK supply chain is at risk of missing out on a significant tranche of work if immediate action is not taken.
- **Competitive:** Cost competitiveness is a fundamental factor in winning contracts in the nuclear industry, with predictability of costs and dependable delivery being key. The UK supply chain must offer value for money, and have a clear understanding of, and concentration on, its competitive strengths and ambitions. The corollary of that is recognition of those parts of the nuclear supply chain where the UK does not possess the necessary capability, nor would it be cost-effective to attempt to acquire it, at least in the period covered by this action plan.

3.9 In summary, there are significant opportunities in the UK nuclear sector from which the UK supply chain can benefit, provided it retains and builds up its capabilities and competitiveness. The Government wants to ensure that the new nuclear build programme delivers not only much needed low carbon electricity at competitive prices, but also economic benefits to the UK including ensuring the nuclear supply chain is well positioned to access UK and long-term export opportunities.

4 The Nuclear Supply Chain Action Plan

- 4.1 The Government is keen to ensure that critical UK energy sectors such as renewables, nuclear, carbon capture and storage and oil and gas attract new investment, which in turn will benefit UK supply chains and provide long-term jobs, growth and UK economic benefit. To support this ambition, Government and key industry players will engage proactively with industry to understand capability and capacity constraints and opportunities and, where appropriate, develop sector strategies to ensure UK industry is competitive and ready to deliver.
- 4.2 The Government believes the UK nuclear supply chain has the potential to build capability and capacity to supply a much greater proportion of the domestic and global nuclear markets than is currently the case. To support this ambition this Nuclear Supply Chain Action Plan has been developed by Government in partnership with industry with the following key objectives:
- To maximise UK economic activity and growth from the nuclear sector at national and local level, including employment and business opportunities for the UK supply chain.
 - To boost job creation in the nuclear industry, and to ensure that potential skills shortages do not act as a barrier to the future development of the industry in the UK.
 - To use the domestic nuclear market to enhance a sustainable and successful UK civil nuclear industry, and to use this basis as a lever to access export opportunities.
 - To maintain and develop a vibrant supply chain covering key capabilities to deliver safe, innovative and cost effective clean up of the legacy facilities and to exploit synergies with new build.
 - To raise awareness across the supply chain, including UK industry, of nuclear sector opportunities, to identify barriers preventing access to those opportunities and to develop actions for Government and industry that will help place the supply chain in a stronger position to compete for those opportunities.
- 4.3 Whilst new build opportunities are a key focus of this action plan, the wider civil nuclear sector is also addressed i.e. front end, operations and maintenance, waste management and decommissioning.
- 4.4 Section 5 of this document aims to provide an overview of the nuclear sector market potential, to help raise awareness of sector opportunities, with the first actions presented in Section 6.

The Action Plan in Context with Other Government Nuclear Documents

- 4.5 This action plan addresses a number of key issues, primarily in relation to new build opportunities that will arise within the nuclear sector over the coming years. Complementing that is a related programme of work that was initiated at the beginning of 2012 to address the UK's interests in civil nuclear energy in the longer term. That broader programme stems from the House of Lords' report *Nuclear Research and Development Capabilities*¹⁰, produced by the Select Committee on Science and Technology, to which the Government responded in February 2012.
- 4.6 The broader programme is considering the longer term perspective for progressing the nuclear sector towards both Government and industry's vision for 2050 and beyond. The Government's Chief Scientific Adviser, Sir John Beddington, is chairing an Advisory Board, made up of representatives from across the UK's nuclear sector. Their work is building on a stocktake of the current R&D landscape and developing a roadmap of R&D pathways to underpin future policies and actions. Taken as a whole, the programme will form a comprehensive and integrated approach to nuclear energy and industrial policy for the nuclear sector, and form the basis of an industrial strategy for the sector and the UK's long-term use of nuclear energy.

¹⁰ *Science and Technology Committee. (2011). "3rd Report - Nuclear Research and Development Capabilities"*

5 Nuclear Sector Market Potential

- 5.1 The civil nuclear sector is estimated to have contributed around £3.8bn in sales to UK companies in 2010/11, demonstrating that sector opportunities are already significant¹¹. Of the £3.8bn, activities related to nuclear power plant operations were valued at around £1.5bn. Moreover, the nuclear sector is forecast to grow by 2.8% on average each year until 2014/15.
- 5.2 Building a new fleet of nuclear power stations in the UK will lead to a significant expansion of the industry, whilst companies considering opportunities in the new build programme may also possess, or wish to enhance, capabilities to supply to other parts of the nuclear sector.
- 5.3 There are also attractive export opportunities, and globally the nuclear sector is estimated to have been worth around £95bn in sales during 2010/11 and is expected to grow by 2.1% to 2014/15¹¹.

The Existing Domestic Nuclear Sector

Front End of the Fuel Cycle

- 5.4 From the outset, the UK has been a leading player in civil nuclear energy, with self-sufficient operations in conversion, enrichment, fuel fabrication, reprocessing and waste treatment, although uranium is imported. A 6000t/yr uranium conversion plant is located at the Springfields site, which is managed by Westinghouse on a long-term (150 year) lease from the Nuclear Decommissioning Authority. Uranium enrichment is undertaken by Urenco at Capenhurst.
- 5.5 The UK's AGR fuel fabrication is performed at Springfields, as was Magnox fuel fabrication for 53 years up to 2008. Springfields also made the first core and several reloads for the Sizewell PWR. The PWR line is currently being re-started to produce PWR fuel for EDF reactors in France.
- 5.6 Looking to the longer term, there are potential growth opportunities at Springfields. The site has considerable open space within the boundary of the nuclear site licence which could host new nuclear facilities, for fuel manufacture or other business activity.

¹¹ *Innovas and K-Matrix, Report for BIS. (2012). "Low Carbon and Environmental Goods and Services (LCEGS)2010/11"*

Operations, Maintenance and Life Extension¹²

- 5.7 There are very significant opportunities for the supply chain through support to existing operations, investment in safety and plant life extensions.
- 5.8 EDF Energy operates 15 reactors at 7 locations in the UK. The company has established partnering arrangements with key UK suppliers (including AMEC, Balfour Beatty, Doosan Babcock Energy, Cape, BNS Nuclear Services and Alstom) to provide a range of specialist services. These services include technical support, facilities management, mechanical and electrical services, access, scaffolding and insulation, nuclear support and turbine maintenance. The total value of the services contracts with these suppliers alone is over £200m per annum, and represents year round employment of almost 2000 people within the supply chain companies, rising to 6000 at peak times when maintenance shutdowns are taking place.
- 5.9 Subject to the necessary regulatory reviews and approvals in due course, EDF Energy is now targeting an average of 7 years life extension across all of the AGR stations – including Heysham 1 and Hartlepool whose 5-year extensions were announced in December 2010 - and 20 years for Sizewell B.
- 5.10 In addition to specific work related to life extension, EDF Energy continues to make substantial capital investment in the existing fleet. This investment is estimated to be worth some £300m per annum, the vast majority of which is likely to be spent in the UK.
- 5.11 In addition to the strategic partners referred to above, EDF Energy's nuclear generation business uses over 300 other major suppliers, and most of its total supply chain spend of around £650m per annum (excluding nuclear fuel) is in the UK.
- 5.12 EDF Energy has also embarked on a £200m programme of investment to further enhance the already robust safety systems in response to events at Fukushima in 2011. The work includes enhancement to on-site resilience, off-site and emergency back-up and supporting infrastructure, alongside commitments to greater openness and transparency including provision of visitor centres. Ninety per cent of the value of this programme, which will take 3 years to complete, will be spent in the UK.

¹² EDF Energy has provided the figures in this section from their own records

Waste Management and Decommissioning¹³

- 5.13 The NDA is an NDPB set up under the Energy Act 2004 and whose functions are to manage the UK's historic civil nuclear legacy. While the NDA owns the 19 sites in its estate as well as the associated liabilities and assets, it delivers its mission of decommissioning and clean up through others, primarily SLCs, which are licensed to operate the nuclear sites. The SLCs are owned by PBOs, who provide additional resource and management expertise.
- 5.14 The current NDA estate employs around 18,000 people, and the supply chain has been a part of the nuclear sector since 1946, when contractors supported the very earliest experiments associated with the nuclear era, providing raw materials, building first-of-a-kind facilities and working alongside scientists and engineers exploring the boundaries of engineering and material science.
- 5.15 Over the subsequent decades the supply chain has also been associated with the dismantling and decommissioning of those early facilities, initially under programmes instigated by BNFL and UKAEA but since 2005 under the direction and ownership of the NDA.
- 5.16 In 2005 the NDA required each of the sites for which they are responsible to develop and publish a forward procurement plan and to award work under the UK Public Contract Regulations¹⁴. These actions have not only materially increased the amount of work awarded competitively but also the volume of work undertaken by the supply chain. In 2005 around £1bn was awarded to the supply chain at Tier 2 and below, by financial year 2010/2011 the figure has risen to £1.6bn; a total of £6bn over 6 years directly supporting some 3500 businesses. Today the supply chain is at the heart of the NDA's mission, undertaking projects and programmes right across the NDA's estate ranging from the provision of the senior management teams as part of the Site Licence Ownership, through major capital builds, plant demolition and decommissioning, to small service contracts delivered locally.
- 5.17 In 2007, the former NIREX organisation was incorporated into the NDA bringing responsibility for dealing with LLW, ILW and HLW under one body. LLW activities remain centred on the LLWR near Drigg where the focus remains the appropriate use of that national facility which includes the appropriate segregation and the use of other waste disposal facilities/arrangements many of which are owned and operated by the supply chain. The design and construction of a new vault was recently completed helping to extend the operational life of the LLWR as well as a wide range of other services including the transport, waste containers, and even facilities management. At Dounreay the new near surface LLW repository has been designed and is being built.

¹³ The NDA has provided the figures in this section from their own records

¹⁴ <https://www.nda.gov.uk/strategy/criticalenablers/contracting-incentivisation/index.cfm>

- 5.18 Government's approach to implementing geological disposal for higher activity radioactive waste is community-led. Government is committed to voluntarism - working in partnership with areas that have come forward to take part in the site selection process. Work continues on the required underpinning activities, including the generic safety case and design and the associated R&D. This work is being undertaken by the supply chain using a range of framework contracts let and managed by the Government's delivery partner, the NDA. Once an interested community has come forward and taken the decision to participate in the later stages of the site selection process, the proposed site(s) will be subject to a programme of surface based investigations managed by the NDA which is currently valued at around £500m.
- 5.19 The supply chain is expected to have a continuing and growing role supporting the safe, environmentally responsible and cost effective reduction of the UK's nuclear liabilities of which an estimated £52.9bn of liabilities in net present value terms relates to the 19 civil nuclear facilities now owned by the NDA¹⁵.
- 5.20 In addition to the current NDA estate there will be sizeable future opportunities relating to the decommissioning of the existing EDF Energy fleet in the UK.

Fuel Cycle

- 5.21 The UK has an extensive history in domestic fuel cycle services. Commercial scale nuclear reprocessing facilities have been operating at Sellafield since the 1960s and the UK supply chain has traditionally provided a range of services into this market particularly in the research and development and design and construction sectors. Over the last 10 years the nature of this market has fundamentally changed. The breakup of BNFL in the mid 2000s effectively resulted in the disappearance of the customer base for future fuel cycle and reactor development. This has placed a strain on the maintenance of skills and capability in this sector.
- 5.22 Within the next 6 years all commercial reprocessing activity is expected to cease. Some work will continue in supporting 'end of life' of the recycle plants and a market will continue to develop in the Spent Fuel and Plutonium management sector which is set to expand as the NDA responds to the changing domestic situation.
- 5.23 Recent work on future energy scenarios has highlighted the necessity to prepare for a range of nuclear energy futures, including situations where nuclear will make up a higher proportion of the UK's energy provision in perpetuity. The NNL is well placed to be at the forefront of this preparation effort with its expertise and world leading R&D facilities.

¹⁵ NDA, *Annual Report and Accounts 2011/12, July 2012*.

<http://www.nda.gov.uk/documents/upload/Annual-Report-and-Accounts-2011-2012.pdf>

Defence Nuclear and Fusion

- 5.24 Although not the focus of this action plan, there are other significant nuclear opportunities that exist beyond the civil nuclear market, and capabilities relevant to the civil nuclear may also be used in other nuclear fields.
- 5.25 Considering naval nuclear, BAE System's submarine programmes involves a vast supply chain network, delivering considerable UK economic and employment benefits with a total of £4.4bn spent with suppliers since 2000¹⁶.
- 5.26 In June 2012 Rolls-Royce signed a contract worth in excess of £1bn with the Ministry of Defence to deliver reactor cores for the UK's nuclear-powered submarine fleet. This contract includes regeneration of the current Rolls-Royce submarine reactor core manufacturing facility in Derby¹⁷.
- 5.27 On fusion, the UK maintains magnetically confined thermo-nuclear fusion research at the Culham Centre for Fusion Energy. Around £100m per year from UK and EU support is spent on the Joint European Torus (JET) facility and the national programme on compact tokomaks and fusion technology¹⁸

Nuclear Education and Skills Provision

- 5.28 The UK has a comprehensive Quality Assured Network of training provision that support the nuclear programme, developed via the National Skills Academy for Nuclear. Additionally there is an extensive network of universities that offer a broad range of high-quality programmes in disciplines related to the Nuclear Programme. There are significant opportunities to grow this training and education network by increasing delivery to the nuclear industry both in the UK and internationally.

New Nuclear Build in the UK

- 5.29 Nuclear power has a vital role to play in the UK's energy mix alongside other low carbon forms of generation. The domestic new build programme has a central role as the enabler for supply chain development, which can ultimately lead to export growth and justify research and development into future nuclear needs. The National Policy Statements for Energy Infrastructure were published in July 2011¹⁹ and set out a needs assessment for low carbon electricity and the national policy against which applications for the construction of major energy projects will be assessed and consented. These documents align with nuclear developers plans for realising around 16GW of new nuclear capacity by 2030, summarised in Table 1.

¹⁶ http://www.baesystems.com/page/BAES_021269?_afrLoop=70378178607000

¹⁷ http://www.rolls-royce.com/nuclear/news/2012/120618_future_sub_programme.jsp

¹⁸ Science and Technology Committee. (2011). "3rd Report - Nuclear Research and Development Capabilities"

¹⁹ DECC. (2011). "National Policy Statements for Energy Infrastructure"

Table 1: Proposed UK New Build Projects

Applications	Capacity	Project Summary
Hinkley Point	3.2 GW	<p>The application for development consent for this nuclear power station from NNB Generation Company (a consortium of EDF Energy and Centrica), is currently being considered by the Planning Inspectorate who will make a recommendation to the Secretary of State for Energy and Climate Change by December 2012.</p> <p>NNB intend to build two EPR reactors at this site</p>
Sizewell	3.2 GW	<p>NNB has announced their intent to develop this site after Hinkley Point and published their first local public consultation in November 2012.</p> <p>NNB intend to build two EPR reactors at this site.</p>
Wylfa	Up to 4 GW	<p>Hitachi purchased Horizon Nuclear Power from RWE and E.ON in November 2012.</p> <p>Horizon intend to build at least two ABWRs at this site.</p>
Oldbury	Up to 4 GW	<p>Hitachi purchased Horizon Nuclear Power from RWE and E.ON in November 2012.</p> <p>Horizon intend to build at least two ABWRs at this site.</p>
Moorside (Sellafield)	Up to 3.6 GW	<p>NuGen (a consortium of GDF SUEZ SA and Iberdrola SA), has notified PINs of their intent to make an application for development consent.</p> <p>NuGen's choice of reactor technology is yet to be decided.</p>

- 5.30 A further 3 sites (Hartlepool, Heysham and Bradwell) have been assessed as potentially suitable for new nuclear power stations in the UK, but at this time no project plans have been announced.
- 5.31 Sector opportunities related to nuclear new build are substantial and significant agreements have already been announced including the following:
- In 2012 EDF Energy selected a Joint Venture between Bouygues and Laing O'Rourke as the preferred bidder for a civil engineering contract worth some £2.1bn for Hinkley Point C²⁰
 - A groundbreaking deal potentially worth £400m on nuclear reactors between Rolls-Royce and Areva, including the first EPR reactors at Hinkley Point, Somerset²¹
 - A contract between EDF Energy and Kier/BAM for the UK's first proposed new nuclear project at Hinkley Point, Somerset, meaning another £100m for companies operating in the South West and 350 jobs²¹
 - A £15m investment in a new world class training campus in Bridgwater, Somerset for EDF employees, new starters and the local community²¹
 - Hitachi has suggested that around 60% of the value of the first Horizon Nuclear Power plant at Wylfa, Anglesey, is expected to be sourced from within the UK, with more for subsequent units. Rolls-Royce and Babcock International have already signed Memorandums of Understanding with Hitachi, who has also confirmed it intends to establish a module assembly facility in the UK²²
 - A £6m state-of-the-art Energy Centre opened at Coleg Menai's Llangefni Campus on Anglesey. The centre houses some of the best low carbon energy technology, equipment and training facilities in the UK, and offers education, training, and specialist courses in low carbon energy technologies, including nuclear
- 5.32 The next section investigates the potential value of new build to the UK supply chain.

²⁰ <http://www.edfenergy.com/media-centre/press-news/EDF-Energy-selects-Bouygues-TP-Laing-O'Rourke-Joint-Venture-as-preferred-bidder-for-Hinkley-Point-C-Main-Civils-Work-contract.shtml>

²¹ http://www.decc.gov.uk/en/content/cms/news/pn12_012/pn12_012.aspx

²² http://www.decc.gov.uk/en/content/cms/news/pn12_135/pn12_135.aspx

Analysis of the Potential Value of a 16GW Nuclear Programme to the UK Supply Chain

- 5.33 A forthcoming independent study for Government provides estimates of the potential value to the UK supply chain from new nuclear programme of around 16GW with a total investment requirement of almost £60bn over the period to 2030²³. The analysis was based on consultations with industry experts and a review of the existing evidence in order to assess the share of activity that could be captured by the UK supply chain. A summary of the estimated impacts on the UK supply chain and related gross multiplier effects is presented below.
- 5.34 The modelled programme broadly aligns with developers' stated plans for the construction of around 16GW²⁴ of new nuclear power stations as outlined in Table 1 previously. The results below are therefore indicative of the potential gross impacts on the supply chain and wider economy from the deployment of new nuclear capacity on this scale by 2030 and are based on generic assumptions on capital costs, reactor capacity and construction timescales. It is recognised that the future level of new nuclear, the developers' choice of reactor technology together with the costs, timescales and phasing of projects is uncertain and may be subject to change over time.
- 5.35 It should also be noted that these levels of output and GVA quoted below do not represent net benefits to the UK economy of expanding the UK nuclear supply chain. This is because it is likely that in the absence of this supply chain expansion the capital and labour used in an expanded nuclear sector would have been used in other sectors creating value added.
- 5.36 However, there are reasons to believe that the development of the nuclear supply chain might lead to net output growth, including current spare capacity in the economy, spillover benefits of R&D investment and potentially a 'productivity premium': workers may be more productive in the nuclear supply chain than in other sectors where they might have worked instead. The full independent report, to be published in the near future, will expand on this analysis presented below to provide an assessment of the potential net

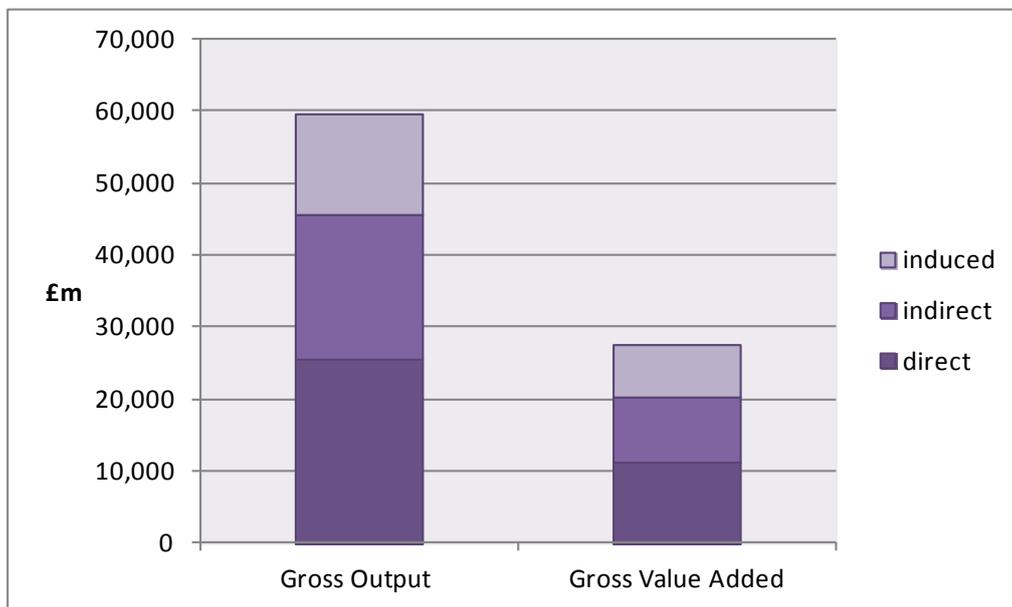
²³ Oxford Economics and Atkins, "The Economic Benefit of Improving the UK's Nuclear Supply Chain Capabilities", Forthcoming.

²⁴ The modelled programme assumes 16.5GW of new nuclear capacity being operational by 2030, which is assumed to comprise of ten 1.65GW reactors, or the equivalent of five twin-reactor power stations. Based on assumed decarbonisation of the power sector to an average emissions intensity of 100g/kWh in 2030, modelling undertaken by DECC shows different potential 'futures' of the GB electricity system. For example, the Updated Energy and Emissions Projections report (October 2012) illustrates a diversified mix scenario within which nuclear contributes around 10GW of new capacity by 2030. The Gas Generation Strategy (November 2012) also presents a scenario in which new nuclear is deployed more heavily than other low carbon technologies, which results in total nuclear capacity of 19GW by 2030.

impacts of developing the nuclear supply chain on the UK economy.

5.37 As illustrated in Figure 1 below, the results suggest that under a baseline scenario the UK supply chain could capture in the order of 44%, or over £25bn, of direct programme expenditure, which equates to over £11bn in direct Gross Value Added (GVA). In addition to the direct effects to the UK's nuclear supply chain, there will be 'indirect' impacts as the nuclear supply chain demands products and services from the wider economy and 'induced' impacts as the employment supported by the programme leads to further consumer spending effects. Combined with the direct impacts, these multiplier effects are estimated to result in total gross UK output and GVA of almost £60bn and £28bn respectively.

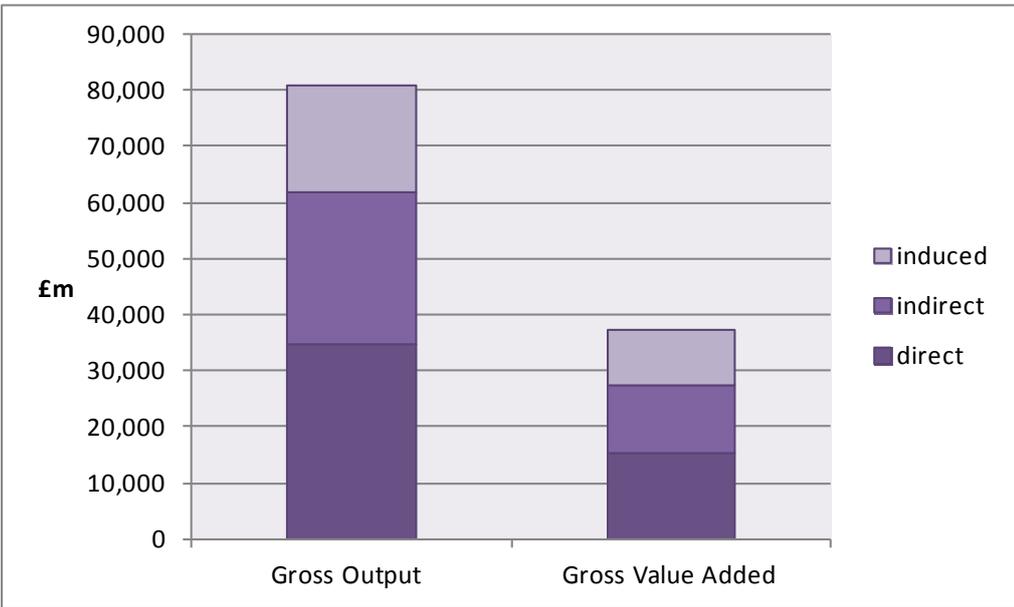
Figure 1: Baseline 44% Value Share: Estimated Gross Output and GVA from a 16GW New Build Programme, 2012-2030, 2012 Prices.



Source: Oxford Economics and Atkins, 2012

5.38 The analysis also identified areas of new build activity within which the UK supply chain may increase its share, through a combination of policy interventions and actions taken by organisations and companies participating in new build. As illustrated in Figure 2, under this scenario the supply chain captures 59% of the overall value of investment in a 16GW programme by 2030, equivalent to almost £35bn in gross direct output and over £15bn in direct GVA. Including the indirect and induced effects under this scenario would bring total gross UK output and GVA to over £80bn and £37bn respectively. Such a scenario aligns with the Government’s ambitions to maximise employment and business opportunities and will require concerted action by industry and continued support from Government, professional bodies and trade associations of the type outlined in this Action Plan.

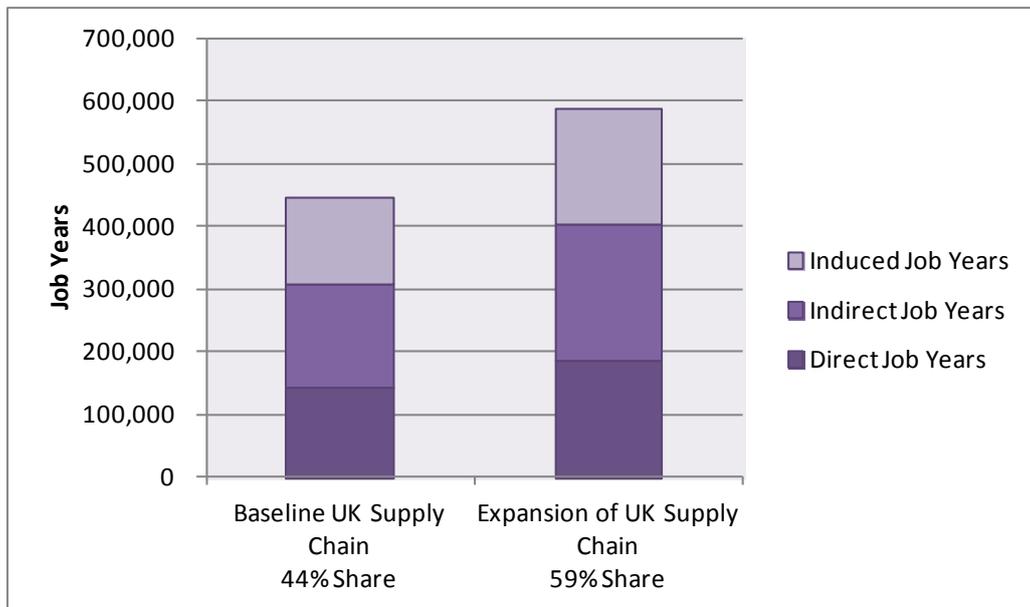
Figure 2: Increased 59% Value Share: UK Supply Chain Gross Output and GVA from a 16GW New Build Programme, 2012-2030, 2012 Prices.



Source: Oxford Economics and Atkins, 2012

- 5.39 Figure 3 illustrates the estimated gross employment impacts associated with 16GW of new nuclear under both scenarios outlined above. As for the output figures above, it should be noted that these gross employment estimates for the nuclear supply chain do not take account of displacement of employment in other sectors.
- 5.40 Under the baseline scenario it is estimated that 145,000 gross direct job years²⁵ in the nuclear supply chain would be supported by the programme over the period 2012-2030, compared to 187,000 job years under the increased UK share scenario. While the total impacts are equivalent to an average of around 7,600 and 9,800 direct jobs in the supply chain per annum for the duration of the programme, the point at which employment impacts peak is dependent on the assumed reactor deployment profile. Under the modelled 16GW programme, direct employment impacts peak in 2020 at 13,700 under the baseline scenario, which rises to 18,600 under the increased UK share scenario.
- 5.41 As shown below, including indirect and induced effects results in total gross job years in the UK as a result of a new nuclear programme of 444,000 under the baseline scenario and 587,000 under the higher scenario over the period 2012-2030. At the modelled peak of activity in 2020, indirect and induced jobs are between 15,700-22,100 and 13,300-19,300 respectively, with the ranges showing the difference between the baseline and increased UK share scenarios. Combined with the direct jobs, the modelling therefore suggests a total of between 42,700-60,000 gross jobs related to a new nuclear programme in 2020.

Figure 3: Estimated Employment Impacts from a 16GW New Build Programme 2012-30, Job Years.



Source: Oxford Economics and Atkins, 2012

²⁵ One job year is defined as one person in full time employment for one year.

The Global Nuclear Sector

The Global New Build Opportunity

- 5.42 The WNA has published²⁶ key information on the size of the global nuclear energy generation opportunity. They estimate, based on current plans, that the value of global investment in new reactor build will be of the order US\$1.5 trillion (£0.93 trillion), with significant international procurement expected to be approximately US\$530bn (£330bn), US\$40bn (£25bn) per year through 2025. Approximately \$500bn (£310bn) will be for equipment purchases, with the balance consisting of design, engineering, project management, commissioning, and other professional consulting services.
- 5.43 Based on these figures, an assessment of the potentially accessible global new build market to 2025 has been performed as part of the Government's economic analysis work in this area²⁷.
- 5.44 If the equipment, and professional consulting services expenses associated with UK nuclear new-build program over the same time period is excluded, this results in a theoretical export market for UK manufacturers and professional service firms of £330bn. There are certain areas where the UK supply chain is likely to have a competitive advantage, including design and engineering, construction management, and commissioning. However, there are certain areas, such as the manufacturing of many of the nuclear island components, where the UK lacks capacity and is unlikely to develop the capacity over the period of this plan. If we exclude those aspects this reduces the theoretical export market for the UK supply chain to around £240bn.
- 5.45 A competitive global market exists for construction and procurement of nuclear power plants and the amount of the potential export market that the UK supply chain is able to capture will depend on where the plants are constructed and the amount of localisation that is expected to occur in each country.
- 5.46 Table 2 estimates the potential global export market by region. The potential market size was estimated assuming that the market size in each region is proportional to number of new plants constructed in each region and each region was assigned a score of Low, Medium, High based on the perceived export potential for the UK supply chain. While it is acknowledged that there is uncertainty around both the number of new plants that will be constructed and the development timescales, the analysis provides an indication of the potential scale of export opportunities.

²⁶ WNA. (2012). *"The World Nuclear Supply Chain: Outlook 2030"*

²⁷ Oxford Economics and Atkins, *"The Economic Benefit of Improving the UK's Nuclear Supply Chain Capabilities"*, Forthcoming.

Table 2: Export Market Potential, By Region Through 2025

Region	Number of New Plants	Potential Market Size (bn)	Export Potential
North America	12	£ 13.00	Mid
Latin America	3	£ 3.30	High
Western Europe	11	£ 12.00	High
Eastern Europe & Central Asia	48	£ 52.20	Mid
Africa	1	£ 1.10	High
Middle East and South Asia	39	£ 42.40	High
Southeast Asia and Pacific	6	£ 6.50	Low
Far East	101	£ 109.70	Low
Total	221	£ 240.20	

Source: WNA, 2012 (adapted), and Oxford Economics and Atkins (2012)

- 5.47 While North America has the capacity to manufacture significant portions of the nuclear supply chain they have made the decision to not become fully self-reliant which should provide some potential export opportunities for UK suppliers. In addition, while some countries in Eastern Europe and Central Asia have specialised in certain components of the supply chain where they enjoy a competitive advantage, they will still need to import large amounts of equipment. This should supply a high amount of potential export opportunities for the UK supply chain; however significant competition is likely from China and other Asia countries that have over the last decade been investing in their nuclear supply chains.
- 5.48 In Asia and the Far East it may be difficult for the UK supply chain to capture a significant portion of the new build market. The most recent plants completed in Japan have seen local content rise to over 90% of total project costs. Korea has set a goal of being fully self-reliant by 2012, and China has set the goal of full self-reliance by 2015²⁸. In addition, in 2007, China struck an agreement with Westinghouse for the transfer of technology to Chinese companies for the AP1000 design. This may give China an advantage in supplying projects located in other countries located in the Far East, Southeast Asia and Pacific and to a lesser extent Eastern Europe and Central Asia.

²⁸ World Nuclear Association. 2012. "World Nuclear Supply Chain: Outlook 2030." WNA Report No. 2012/001. September 2012.

5.49 The UK has the potential to capture a portion of spending for countries that are in their infancy in terms of nuclear development. These include countries located in Africa, the Middle East, South Asia, and Latin America. These countries currently lack significant manufacturing capacity for most nuclear components and as result will initially be reliant on imports for a large portion of the equipment related spending. However, as these countries develop their own nuclear sectors, the export potential for the UK supply chain is likely to decrease. In addition, the UK firms have the potential to capture some of the spending associated with nuclear plant construction in Western Europe.

5.50 Table 3 shows that based on an assumption that the UK supply chain is able to capture 1.0% of the potential export market in regions where the UK has a Low potential, 2.5% in regions with Mid potential, and between 5.0% and 10.0% in regions with High potential, there could be opportunities for the UK to access approximately £8bn in new nuclear build related exports in total to 2025.

Table 3 Potential Export Market for the UK Supply Chain

Region	Number of New Plants	Potential Market Size (bn)	Percent Captured	Exports (bn)
North America	12	£ 13.00	2.5%	£ 0.33
Latin America	3	£ 3.30	5.0%	£ 0.17
Western Europe	11	£ 12.00	5.0%	£ 0.60
Eastern Europe & Central Asia	48	£ 52.20	2.5%	£ 1.31
Africa	1	£ 1.10	10.0%	£ 0.11
Middle East and South Asia	39	£ 42.40	10.0%	£ 4.24
Southeast Asia and Pacific	6	£ 6.50	1.0%	£ 0.07
Far East	101	£ 109.70	1.0%	£ 1.10
Total	221	£ 240.20		£ 7.91

Source: WNA, 2012 (adapted) and Oxford Economics and Atkins (2012)

The Global Nuclear Sector Beyond New Build

- 5.51 A recent report for EDF Energy²⁹ estimated that the combined UK civil and defence nuclear sectors export around £700m a year in overseas business³⁰. If growth predictions are accurate and the UK retains its current market share, nuclear exports could increase to between £1.1bn and £1.6bn per year, in current prices, by 2030.
- 5.52 In the next 10 to 15 years the global decommissioning and waste management market is expected to grow significantly as older plants come to the end of their economic life, and countries like Germany and Switzerland begin to phase out civil nuclear power in response to events at Fukushima. Activity in this sub-sector is therefore likely to expand and markets such as India and China are already beginning to express interest in learning about the UK experience.
- 5.53 As a further example, as part of the Prime Minister's first official visit to Japan in April 2012, the UK and Japan agreed a Framework on Civil Nuclear Cooperation. The Framework means the countries will share expertise, experience and technology in the remediation, decontamination and decommissioning of the Fukushima nuclear site. It provides UK companies with the opportunity to compete on a level playing field for multi-billion pound decommissioning opportunities in Japan.

²⁹ IPPR Trading report for EDF Energy. (2012). "Benefits from Infrastructure Investment: A Case Study in Nuclear Engineering"

³⁰ NAMTEC. (2009). "The Supply Chain for a UK Nuclear New Build Programme"

6 Nuclear Sector Market Access

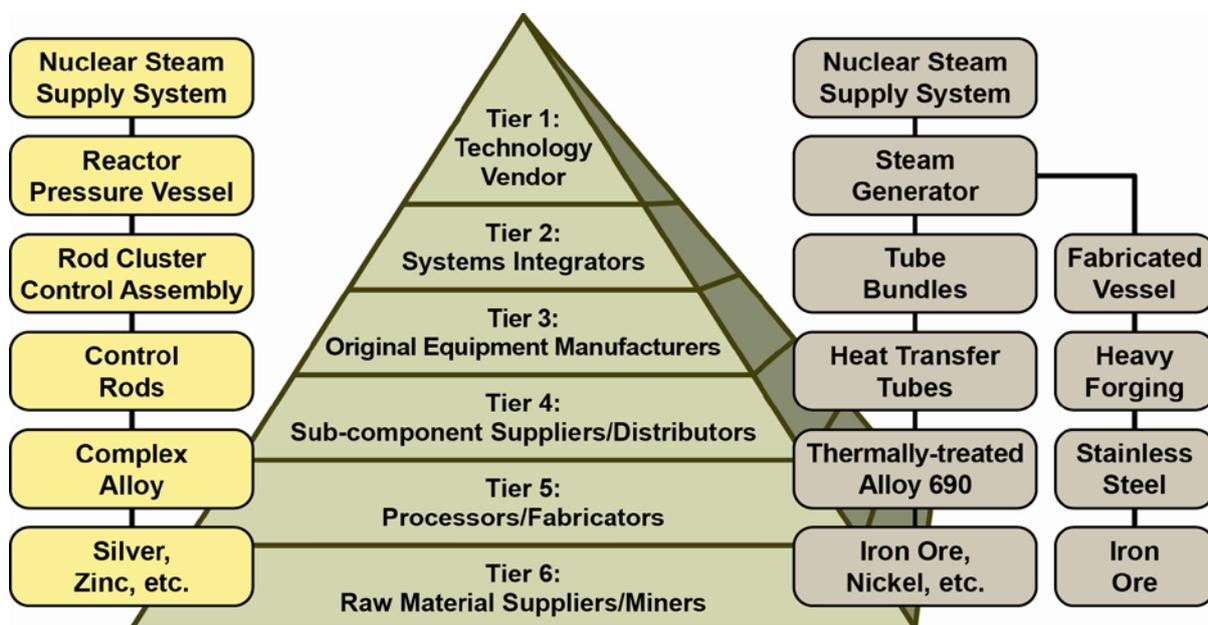
6.1 The Government wishes to ensure that supply chain companies can harness significant business opportunities and expand and develop capabilities to be critical UK and international partners in nuclear markets. Companies will need access to information that will allow them to understand and exploit nuclear sector opportunities, including how to access those opportunities. As an introduction, this section provides high level examples of the structure of new nuclear build and waste and decommissioning markets. Specific barriers to market access are identified and actions to address those barriers are outlined.

Nuclear Power Plant – Supply Chain Structure

6.2 Paragraphs 6.3 to 6.5 provide an overview of the tier structure for a generic nuclear power plant as described in the recent WNA report on the world nuclear supply chain³¹:

6.3 The supply chain may be divided into several tiers, as shown in Figure 4:

Figure 4: Tiers in the Supply Chain for a Nuclear Power Plant³²



³¹ WNA. (2012). "The World Nuclear Supply Chain: Outlook 2030"

³² Reproduced with permission from the WNA

- 6.4 In the case of a new construction, the first tier comprises of the client's contractor, who might be an EPC contractor or the principle technology vendor, or a partnership between them. In the example shown, the Tier 1 contractor supplies the NSSS; but depending on the way the client is undertaking procurement this could equally well be the complete nuclear power plant, as would be the case in the turnkey contract package. Tier 2 is labelled 'the system integrators'. If the client's EPC contractor (Tier 1) contracted for the NSSS, then the reactor vendor would be a Tier 2 supplier and a system integrator. OEMs, here shown in Tier 3, provide major components, such as the steam generator, which in turn will include sub-components and sub assemblies from Tier 4 suppliers.
- 6.5 The figure also shows that a steam generator supplier will need to manufacture or procure tube bundles that, in turn are formed from an alloy, which requires input from raw material processors, and eventually mined ores. An RPV can be broken down into many different sub-components and sub-assemblies. A vertically integrated company may well manufacture a large proportion of a major component, like an RPV; in which case there would be fewer tiers of subcontracting.

New Nuclear Build – NNB EPR Specific Example

- 6.6 Recognising that arrangements for delivering a nuclear power plant project will vary depending on the specific project, it is nevertheless useful to consider the specific example of the plans to deploy EPRs at Hinkley Point C, as this is currently the most advanced of all new build projects. In 2009, EDF Energy established a joint venture, NNB, in which Centrica plc took a 20% stake. NNB will be the Nuclear Site Licence holder for the new reactors, and the client for the construction project.
- 6.7 Drawing on in-house expertise and experience within the EDF Group, NNB appointed its own Nuclear Engineering Division (DIN) as Architect Engineer and to provide procurement support for the entire nuclear power plant project. Working together, NNB and DIN comprise the "NNB Team" with activities centred at a dedicated London office and in DIN's Paris office, but drawing on advisory services from both internal and external sources.
- 6.8 NNB expects to let around 150 "Tier 1" contracts for the construction of Hinkley Point C. This will include a small number of large contract packages to deliver the site preparation works, NSSS, civil engineering works, turbine island and marine works as well as a large number of contracts to deliver the balance of plant and associated developments.
- 6.9 NNB intends to use competitive tendering wherever possible, while recognising that supply of certain components is already determined through the selection of the UK EPR design. For example, AREVA will supply the NSSS for the EPR. Tier 1 contractors will be supported by a number of large Tier 2 suppliers who can take full responsibility for major packages of work, equipment supply or installation/erection services. Opportunities also exist at Tier 2 and Tier 3 for companies able to supply specialist equipment or on-site services.

6.10 To date a significant volume of contracts have been let (see paragraph 5.31 for examples), although commitment to the major Tier 1 contracts will be subject to the final investment decision on the project. NNB has committed to making information available to potential suppliers through a dedicated website³³.

UK Waste Management and Decommissioning – Supply Chain Structure³⁴

6.11 The NDA and the SLCs procure major goods and services under the Public Contract Regulations 2006 (as amended). Work is advertised via the Government's "Contract finder" website³⁵ or accessed via the NDA's web pages or those of any of the SLCs. Progressively it is expected that new opportunities and awards will also be posted by the major Tier 2 contractors to continue to open the market to new entrants and SMEs.

6.12 The six SLCs operating within the NDA Estate are:

- Sellafield Ltd (including Calder Hall, Capenhurst and Windscale) with an annual budget of some £1.6bn.
- Magnox Ltd – responsible for the 10 Magnox reactors in England, Scotland and Wales. The reactors are all in various stages of defueling with the exception of one at Wylfa, Anglesey, which was scheduled to close in December 2010 but, following a review with the site regulators was granted an agreement for extended generation up to 2014, and is still contributing electricity to the National Grid. The total annual budget for Magnox is £510m.
- Dounreay Ltd – responsible for the Dounreay Site in Caithness, Scotland. The Site has an annual budget of £150m.
- Reactor Sites Restoration Ltd – responsible for the Winfrith and Harwell sites with an annual budget of £60m.
- Springfields - predominately an operational site, manufacturing fuel for commercial customers, however there is an ongoing decommissioning programme with an annual budget of £42m.
- LLWR Ltd – responsible for the facility near Drigg in West Cumbria. The Site has an annual budget of some £30m.

³³<http://www.edfenergy.com/about-us/energy-generation/new-nuclear/supplier-opportunities/>

³⁴ The NDA has provided the figures in this section from their own records

³⁵ <http://www.contractsfinder.businesslink.gov.uk/>

- 6.13 The NDA has created a “Supply Chain Charter for Nuclear Decommissioning Sites” which has been signed by over 150 companies. These companies are able to use a “wordmark” and their details appear on a national database.
- 6.14 The NDA estate also operates a “Shared Services Alliance” which includes a collaborative procurement programme with an annual spend of some £160m, approximately 20% of which utilises the Government Procurement Services. It is also worth noting that many of the SLCs have formed large value long-term alliances into the supply chain, especially the mission critical parts. e.g. Sellafield's Design Services Alliance and Decommissioning Frameworks.
- 6.15 The NDA along with its SLC's and main contractors have proposed establishing Regional SME Steering Groups, the first to be in Wales. The aim will be to work collaboratively to develop practical measures to shape proposals for increasing access for smaller businesses to the budget spent each year within the supply chain across the NDA estate.
- 6.16 The NDA is also a signatory to the new Government Procurement Pledge³⁶ which aims to increase the effectiveness and efficiency of procurement across Government.

Local Support for Market Access

- 6.17 Whilst Government has a role to secure commercial interests for the UK as a whole, it is also recognised that particular benefits need to accrue to communities that host nuclear facilities. The nuclear sector offers a real chance to sustain the local workforce, to grow that workforce and to ensure wider business development and opportunities for the long-term unemployed. There are also opportunities for college students to develop the skills that are needed to have work opportunities in the local area rather than having to move away. Recognising these points, significant effort is being made at a local level to secure access to nuclear sector opportunities, for example:
- EDF Energy is working alongside the Somerset and Suffolk Chambers of Commerce to capture details of local capability and to communicate the broad range of opportunities that will come not only from the construction of the power stations, but also from workforce support services and other associated activities.
 - Local supplier databases have been established, managed by the Chambers of Commerce on EDF Energy's behalf, to capture the capability and track record of interested suppliers and to deliver a “Matching Service” to Tier 1 and 2 contractors. 'Meet the Buyer' events and other workshops have also been held with interested parties to help them understand the requirements and to become involved.

³⁶ <http://www.cabinetoffice.gov.uk/resource-library/our-procurement-pledge>

- One of the priority sectors for Welsh Government is the Energy and Environment sector and they have well established support structures in place to assist businesses and individuals to take advantage of the opportunities that nuclear development creates.
 - The Energy Island Programme is a collective effort between several stakeholders within the public and private sector working in partnership to put Anglesey at the forefront of energy research and development, production and servicing. The Energy Island vision is to create a world-renowned centre of excellence for the production, demonstration and servicing of low carbon energy. Working in partnership across dedicated workstreams Welsh Government, Anglesey Council, Horizon and Magnox are committed to maximising the opportunities that nuclear generation, decommissioning and new build will bring to Wales.
 - NSA Nuclear has established training centres in West Cumbria, Somerset, Caithness and Anglesey to support local skills and training development.
- 6.18 Other equally significant effort is ongoing around numerous nuclear sites in the UK.

Global Sector Market Access

- 6.19 Involvement with international companies in the UK domestic market may be a way of accessing international opportunities with those companies, and many of the key players in the nuclear sector are international companies.
- 6.20 Additionally, the UK Government, through UK Trade and Investment (UKTI) provides support for UK companies seeking to grow their export businesses by facilitating direct contact with international organisations.
- 6.21 Over the past 5 years UKTI's Energy Team has significantly increased the resource it devotes to promoting the UK's Civil Nuclear capability. Most of the activity has been focused on the new build market in response to the growing number of countries either expanding or seriously considering new build civil nuclear power programmes to address the twin challenge of energy security and climate change. Activity has been balanced between working with countries where new build projects are already occurring, and trying to engage with the leading new entrant countries that have announced new build programmes where there is strong interest from UK industry. Key markets include China, India, Jordan, South Korea, Saudi Arabia and UAE.
- 6.22 Promotion has been across the fuel cycle from legal and regulatory systems, programme management, project development and construction, operational support and lifetime extension through to fuel services, waste management, decommissioning, training and education.
- 6.23 As well as pinpointing project opportunities in target countries, UKTI are beginning to develop links with the key international nuclear reactor vendors (e.g. Hitachi, KEPCO, Rosatom, Westinghouse, Areva, etc) to help UK companies access their supply chains.
- 6.24 Given the UK civil nuclear industry is recognised as one of the global leaders in waste management and decommissioning, UKTI is also considering how to specifically promote this sub sector. Exploring how to share UK expertise to support the decommissioning and clean up of Fukushima is the first major initiative.
- 6.25 There are various kinds of activity UKTI supports including inward and outward trade missions, overseas seminars and exhibitions as well as development of marketing material to showcase UK expertise. Recent examples of UKTI activity include civil nuclear trade missions to India, USA, Canada, China, South Korea, UAE, Poland, Jordan and Japan and inward missions from China, India, Russia and Kuwait.

Market Access Issues

6.26 The Government has engaged extensively with the nuclear industry to understand the key issues relating to market access that are preventing growth in the domestic and global nuclear sectors. Findings from the NIA Capability Report³⁷ and economic analysis by Oxford Economics³⁸ have also been taken into account. The following issues have been identified and the UK Government is therefore keen to work closely with industry to further understand, and where possible, help to address these challenges.

- **Confidence Regarding the UK Government's Commitment to Nuclear:** In order for the nuclear industry to maintain and increase investment and involvement in the sector it is important that the UK Government not only continues to convey its clear commitment to nuclear and the new build programme, but also that it delivers the necessary market framework to enable new build to come forward.
- **Understanding Market Access:** Currently there are many organisations that provide information to supply chain companies interested in involving themselves in the nuclear sector. Government will ensure a simplified process where key information relating to nuclear sector market access is brought together.
- **Clarity on the Forward Pipeline and Access to Contracts in the Nuclear Sector:** To undertake the investments required to meet the new build programme, supply chain companies will benefit from clarity on the timing and requirements of forthcoming contracts. Government will work with developers, operators and higher tier companies to ensure clarity on the forward pipeline and that opportunities for UK companies to compete fairly are maximised.
- **Requirement for International Partnerships:** Whilst nuclear developers in the UK may wish to draw upon their pre-existing supply chain base, or their own industrial resource that is based outside of the UK, Government will want developers to encourage links between UK based businesses and these pre-existing supply chains. Opportunities for the supply chain to develop and strengthen links with experienced international nuclear companies will be increased.
- **Costs of Equipment Qualification:** For many nuclear components and equipment there is a requirement for qualification and proving work to be performed even before a contract can be tendered for. The associated costs involved can provide a significant barrier to entry, or challenge

³⁷ NIA. (2012) "Capability of the UK Nuclear New Build Supply Chain"

³⁸ Oxford Economics and Atkins, "The Economic Benefit of Improving the UK's Nuclear Supply Chain Capabilities", Forthcoming.

competitiveness where companies seek to recoup these costs through early contracts. The Government will work with industry to develop options for addressing this issue.

- **Accessing Export Opportunities:** The global nuclear market is likely to continue to grow, and export opportunities are likely to strengthen the attractiveness of the nuclear sector for supply chain companies. The Government is therefore keen to ensure the supply chain receives enhanced guidance and support in understanding export market opportunities and in gaining exposure to those opportunities.
- **Export Control Constraints:** Export Control requirements and processes may affect the UK supply chain's ability to respond quickly to emerging opportunities, and to access markets considered difficult from an export control perspective. The UK Government will seek to streamline the implementation of export control processes whilst maintaining legal commitments.
- **Attractiveness of the UK Export Finance Offering:** UK Export Finance does not directly offer credit for export projects, but guarantees repayments for banks that provide the financing. UK Export Finance will work with industry to raise awareness of the services they provide.
- **Level of Alignment of Public Sector Procurement Across Nuclear Related Sectors:** The Government is involved in the procurement of significant aspects of the UK nuclear sector. Clarification and alignment of the procurement processes in the nuclear decommissioning and R&D markets (e.g. Fusion) would enhance the potential for the supply chain operating in these areas to grow their global market share. Alignment of certain aspects of public sector purchasing (the NDA, MOD and Fusion), such as generic terms & conditions and pre-qualification questionnaires will be investigated.

Market Access – Actions

6.27 The actions in this section aim to address those issues identified. For each action a lead organisation has been identified along with initial success measures and target timescales. This information is indicative at this stage and as part of the implementation of this action plan a more detailed delivery programme will be compiled for each action.

Confidence Regarding UK Government's Commitment to Nuclear

6.28 A key first step to attracting developers and industry investment in building capacity and capability for the new nuclear programme is a strong and consistent commitment from Government to that programme. As part of the Government's long-term industrial strategy for the nuclear sector, and to help

deliver the near-term actions set out in this plan, a new Nuclear Industry Council (NIC) will be created, bringing together key players throughout the supply chain.

<p>ACTION 1 Nuclear Industry Council</p>	<p>Government, with industry will establish a partnership in the form of a Nuclear Industry Council to be co-chaired by the lead industry body and BIS and DECC Ministers.</p> <p>The NIC will focus on areas of common strategic interest to the UK civil nuclear industry, represent their interests and work to advance the UK nuclear industry securing global commercial success.</p>	<p>Lead: BIS & DECC</p>
<p>Initial Success Measure: NIC to be operating with clear terms of Reference</p>		<p>Q1 2013</p>

6.29 Whilst Government’s overarching role is to secure commercial interests for the UK as a whole, it is also recognised that particular benefits need to accrue to communities that host nuclear facilities. Accordingly, Government will oversee the formation of Strategic Delivery Forums at a local level, to demonstrate commitment to the industry and to maximise local opportunities.

<p>ACTION 2 Local Strategic Delivery Forums</p>	<p>Government will facilitate the formation of Strategic Delivery Forums at a local level, bringing together local and national Government representatives with developers, education and business partners. Objectives include maximising local and regional employment and supply chain opportunities arising from new nuclear (in the event that development consent is granted), and NDA developments in the area, and to address obstacles that would prevent local people finding employment, particularly for the long term unemployed.</p> <p>Welsh Government will continue to support the Energy Island Programme and recognises the strength and effectiveness of the collaboration the programme brings. Welsh Government will seek to utilise this model of delivery in deriving benefits across the wider nuclear related opportunities presented to Welsh companies in nuclear generation, decommissioning and new build.</p>	<p>Lead: DECC Supported by: The NDA Welsh Government</p>
<p>Initial Success Measure: First Local Strategic Delivery Forum operating</p>		<p>Q1 2013</p>

Understanding Market Access

6.30 More clarity regarding market entry options is required, as confusion exists regarding how supply chain companies can become involved, or widen their involvement in the nuclear sector.

<p>ACTION 3 SC@Nuclear Website Upgrade</p>	<p>The NIA, with the Nuclear-AMRC will upgrade the SC@Nuclear website to act as a market access portal, with links to detailed procurement information provided by the new build developers, nuclear operators and the NDA. The portal will also provide links to information from other relevant organisations such as Devolved Administrations, the Nuclear-AMRC and NSA Nuclear.</p> <p>The level of information provided should ensure sufficient notice of future plans, and the specifications required, to enable companies in the UK to make investment decisions and to compete openly for work.</p> <p>Initially funded by the Nuclear-AMRC through a grant from BIS, longer-term, funding for this initiative will be transferred to industry if successful.</p>	<p>Lead: NIA</p> <p>Supported by: NIC BIS Nuclear-AMRC</p>
<p>Initial Success Measures:</p> <p>NIA update of their “Essential Guide to the Nuclear Supply Chain”</p> <p>SC@Nuclear website procurement links updated</p>		<p>Q4 2012</p> <p>Q1 2013</p>

6.31 When preparing to become involved in the nuclear sector, or seeking ongoing continuous improvement of their efforts, it is important that supply chain companies are prepared with the right capabilities and skills to enable them to submit high quality bids. Support in this area will be led by the Nuclear-AMRC.

<p>ACTION 4 Entering the Nuclear Market</p>	<p>The Nuclear-AMRC exists to support manufacturing companies to market, develop and enhance capability, competitiveness and improve quality, durability and reliability of their products, whilst significantly reducing costs of manufacture. Specifically relating to readiness to provide bids and tenders into the nuclear arena, the Nuclear-AMRC will:</p> <ul style="list-style-type: none"> • Provide guidance on the completion of Pre-Qualification Questionnaires (PQQs) • Work with manufacturers to enable them to produce technically capable and competitive bids for tenders for new build, maintenance and decommissioning • Work with manufacturers to build and maintain their overall fitness for work in this sector and work with them to help match their existing and potential capabilities to products detailed the procurement pipelines • Develop specific training packages for SMEs on tendering and delivering estimates for work, including pricing in the cost of quality. • Build on the single procurement portal with additional specific information for manufacturers associated with the Nuclear-AMRC to enable them to access global nuclear markets through global nuclear reactor designers, developers and decommissioning companies. <p>Additionally, NSA Nuclear Manufacturing, supported by the Nuclear-AMRC, will work with SMEs to undertake detailed Skills Needs Analysis and to develop plans to address identified issues</p>	<p>Lead: Nuclear-AMRC</p> <p>Supported by: NSA Nuclear Manufacturing</p>
<p>Initial Success Measures:</p> <p>Workshop on nuclear estimating</p> <p>Workshop on winning nuclear tenders</p>	<p>Q1 2013</p> <p>Q1 2013</p>	

Clarity on the Forward Pipeline of Contracts in the Nuclear Sector

6.32 The process of engagement with the supply chain by utilities, vendors, SLCs and higher tier companies to provide them with indicative timetables and scope of procurement will be continued and deepened to provide enhanced clarity of the new order pipeline and confidence that there will be repeat orders for which they will be able to compete. Regular dialogue should therefore be maintained with the supply chain to exchange information about the expected pipeline of orders, and where possible to agree on phasing of orders to enable suppliers to contribute effectively and economically to project delivery.

<p>ACTION 5 New Build Contract Transparency</p>	<p>Developers and higher tier companies will provide transparent information regarding contracts, procurement processes and timings for new build reactors, based on the most likely deployment scenarios.</p> <p>Ideally this should also make clear the products and services which are out of scope to companies in the UK.</p> <p>The NIA SC@Nuclear website will provide links to this information.</p> <p>The NIC will encourage its members to provide this information to the supply chain.</p>	<p>Lead: NIC</p> <p>Supported by: Developers Higher Tier Companies</p>
<p>Initial Success Measure:</p> <p>NIC satisfied with the level of procurement information available to the supply chain</p>		<p>Date TBC by the NIC</p>

<p>ACTION 6 Operational Support Contract Transparency</p>	<p>Operators of nuclear facilities to clearly set out the procurement processes, timings and contracts to support their operations in the UK to enable firms to evaluate opportunities to bid for work to support maintenance and operations.</p> <p>The NIA SC@Nuclear website will provide links to this information.</p> <p>The NIC will encourage its members to provide this information to the supply chain.</p>	<p>Lead: NIC</p> <p>Supported by: Operators</p>
<p>Initial Success Measure:</p> <p>NIC satisfied with the level of procurement information available to the supply chain</p>		<p>Date TBC by the NIC</p>

<p>ACTION 7 Waste Management and Decommissioning Contract Transparency</p>	<p>Contracts Finder is the Government's single platform providing access to public sector procurement related information and documentation, including the facility to publish both tender and contract documents in the same place. The NDA and the majority of their key contractors will use Contract Finder to provide details of major contracts.</p> <p>More information on Contracts Finder can be found at: https://www.gov.uk/contracts-finder</p>	<p>Lead: NDA Supported by: SLCs</p>
<p>Initial Success Measure: NDA and SLC procurement information on the Contracts Finder website</p>		<p>Q1 2013</p>

<p>ACTION 8 Government Encouragement for Enhanced Contract Transparency</p>	<p>The UK Government will continue to clearly communicate its commitment to maximising the commercial opportunities of the UK civil nuclear industry and to seeing the domestic market act as a platform to enable growth in global market share.</p> <p>Government will convey expectations to key industry players that the supply chain in the UK must have genuine market access and that the UK public expect UK industry to have the best opportunities to compete fairly.</p> <p>Developers, vendors and top tier companies will be invited to report on progress (metrics to be defined). Information about this will be reported annually to the Secretaries of State at DECC and BIS, through the NIC.</p>	<p>Lead: BIS & DECC</p>
<p>Initial Success Measure: Improved contract transparency, confirmed by the NIC</p>		<p>Q2 2013</p>

Requirement for International Partnerships

6.33 It is recognised that new build developers may wish to utilise the experience of established international supply chains, at least in the early stages of the UK new build. It may therefore be beneficial in some instances for UK companies to form partnerships and/or joint ventures with international companies.

<p>ACTION 9 Opportunities for Engagement with Foreign Companies</p>	<p>Via its programme of nuclear activity, UKTI will provide opportunities for the UK supply chain to meet potential international partners to support and facilitate engagement. UKTI will publish a forward programme of nuclear events, and liaise with the supply chain to describe support available to participants.</p> <p>UKTI will work with UBIFrance and the NIA to arrange regular targeted sessions for the UK nuclear industry to meet French nuclear companies, such as the Franco-British Nuclear Forums.</p> <p>Similar effort will also be applied to other global supply chains of particular relevance to the UK.</p> <p>The Nuclear-AMRC is also mapping out potential partners and sub suppliers to the European suppliers who may be involved in the UK plants, and along with the NIA, will liaise closely on this with UKTI.</p>	<p>Lead: UKTI Supported by: UBIFrance Nuclear-AMRC NIA</p>
<p>Initial Success Measure: UKTI to publish forward programme of nuclear events</p>		<p>Q1 2013</p>

Costs of Equipment Qualification

6.34 For many nuclear components and equipment there is a requirement for qualification and proving work to be carried out even before a company can be invited to begin to compete for the work via a competitive bidding process. The associated costs involved in these qualification exercises can represent a significant barrier to entry, or challenge competitiveness if companies seek to recoup these costs through early contracts.

<p>ACTION 10 Equipment Qualification Costs</p>	<p>The Government working with industry and devolved administrations, commits to work with the Nuclear-AMRC, NNL and others to attempt to develop methods to ease or overcome the challenge posed by the costs of this type of qualification e.g. through common facilities for equipment qualification and accreditation.</p> <p>The NIA will also consider this particular challenge as part of their working group on quality (see Action 21).</p>	<p>Lead: DECC</p>
<p>Initial Success Measure: First meeting with industry to understand issues</p>		<p>Q1 2013</p>

Accessing Export Opportunities

6.35 Initiatives to support UK industry in accessing and succeeding in export markets will be led and driven forward by UKTI, supported by key partners through the following action:

<p>ACTION 11</p> <p>Support to the Development of Export Opportunities</p>	<p>UKTI will develop a coordinated nuclear export strategy with agreed market priorities and the development of specific campaigns to enhance the nuclear industry’s understanding of, and access to, export opportunities. To include:</p> <ul style="list-style-type: none"> • Key Government agencies with existing strong brand recognition (e.g. the NDA) that can significantly enhance the international profile of UK nuclear capability will be enabled to actively support and promote civil nuclear exports. • Ministers and Senior Officials will support trade missions where appropriate. • UKTI will facilitate industry led discussions to investigate the potential for UK companies to form integrated and coordinated nuclear offerings to address export opportunities across the nuclear sector. • Under its High Value Opportunities initiative, UKTI, working with industry, will identify a number of top priority nuclear projects that offer significant potential to the UK nuclear industry. Campaigns will be developed around these projects to help ensure the UK supply chain can secure maximum benefit. • UKTI will consider organising a major event, perhaps on an annual basis, in association with the NIC to showcase UK nuclear capabilities to an international audience. • The NIA Export Group will maintain an issues log of aspects restricting export opportunities for discussion on a six-monthly basis with UKTI and BIS. The NIA Export Group will also provide an overview of where UK companies are winning work 	<p>Lead: UKTI</p> <p>Supported by:</p> <p>DECC</p> <p>BIS</p> <p>FCO</p> <p>Devolved Administrations</p> <p>NIA</p> <p>NDA</p> <p>NSA Nuclear</p> <p>Nuclear-AMRC</p>
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	<p>globally and future opportunities</p> <ul style="list-style-type: none"> • UKTI will work with NSA Nuclear, NIA, Nuclear-AMRC and wider industry to develop promotional material about the UK commercial offer and capabilities. This would include a Skills Service Provider Directory produced by the Nuclear Skills Academy to market UK nuclear training to the domestic and global market. • Supported by UKTI, NSA Nuclear will build on the existing strong links and partnerships it has developed with INPO and IAEA to promote the excellence, capability and high standards of nuclear professionalism of the UK workforce internationally • As an additional dimension to the NIA SC@Nuclear website, a global opportunities section will be developed utilising data from UKTI, NDA, NIA, World Nuclear Association and global developers. This could provide skills, capability and capacity data and a gateway to nuclear export opportunities, including as appropriate, timelines and route to market. 	
<p>Initial Success Measure: UKTI coordinated nuclear export strategy developed</p>		<p>Q2 2013</p>

<p>ACTION 12 NNL Strategic Export Role</p>	<p>NNL will play a greater strategic role in marketing UK nuclear capability and R&D overseas.</p>	<p>Lead: NNL Supported by: BIS DECC</p>
<p>Initial Success Measure: NNL's programme to market UK capability overseas developed in accordance with Government long term nuclear energy strategy</p>		<p>Q3 2013</p>

Export Control Constraints

6.36 The UK Government recognises that export control issues impact the UK supply chain and is placing significant emphasis on continued improvement of the Export Control / Compliance processes. Specific points are currently under consideration by UK Government, including:

- The ability to engage in sizeable export markets where some export control challenges exist.
- The delays associated with multiple requests for single licences, where open licences could significantly reduce the burden on both the supply chain and the Government.

<p>ACTION 13</p> <p>Export Control Service Improvement</p>	<p>The Export Control Organisation in BIS is committed to continuous development of the Export Control Service including greater use of Open Licensing and awareness work for the UK supply chain on export control processes, possibly through an annual Q&A event.</p> <p>Government wants to see industry increase the number of high value exports, and will strive to ensure an export control system exists that enables this whilst recognising our non-proliferation obligations.</p> <p>Export Control welcomes regular interaction with the NIC and NIA on areas that are working well and areas that are not delivering. Drawing on successful examples, work will continue to be done to clarify and streamline the export process once issues are properly identified.</p>	<p>Lead: BIS</p> <p>Supported by:</p> <p>DECC</p> <p>FCO</p> <p>MoD</p> <p>NIC</p> <p>NIA</p>
<p>Initial Success Measure:</p> <p>Update on export control service improvement to be reported to the Minister for Business and Enterprise.</p>		<p>Q4 2012</p>

Attractiveness of the UK Export Finance Offering

6.37 UK Export Finance is the UK's export credit agency. As a government department (UKEF is the new trading name for the Export Credits Guarantee Department) it operates under an Act of Parliament, to complement the private market by providing Government assistance to exporters and investors, principally in the form of insurance policies and guarantees on bank loans. UK Export Finance's range of products and services has recently changed, providing the potential to assist a wider range of UK exporters. Offering:

- A range of credit insurance and financing products to complement the commercial finance and insurance markets; and
- Political risk insurance on overseas investments.

6.38 UK Export Finance recognise that as they don't offer direct financing, other country's export banks who do offer finance can look more attractive to organisations seeking loans. However the recent announcement by the Chancellor of a refinancing scheme which, whilst not aimed at competing with pricing of other countries export banks, will help commercial banks to provide loans for large projects and longer tenures. UKEF is working with British Bankers' Association on details of the scheme with a view to its introduction in the coming months.

ACTION 14 UK Export Finance	UKEF to continue working with UKTI / DECC / NIA to raise awareness of its products. UKEF to support UK industry and UKTI in developing key overseas opportunities.	Lead: UK Export Finance
Initial Success Measure: UKEF continued support to UK industry		Ongoing

Alignment of Public Sector Procurement Across Nuclear Related Sectors

6.39 To improve clarity and alignment amongst public sector nuclear clients (Fusion, MOD and the NDA) and to support the most efficient use of limited resources, a high level Public Sector client group will be drawn together tasked with collaborating to ensure the most efficient use of the supply chain resource. The objective of this group would be to perform action such as the creation of one generic set of terms and conditions, a standard approach to Pre-Qualification Questionnaires and agreement of a common approach to advertising work and to working with SME's.

<p>ACTION 15 Public Sector Client Group</p>	<p>Government will form a public sector client group to assess the potential for efficiency improvements across public sector procurement (i.e. NDA, MoD and Fusion portfolios) and supply chain development.</p> <p>This client group will likely take into account standard value for money considerations, but also the long-term benefits of using procurement to develop indigenous capabilities and agreed industry wide skill standards.</p> <p>This group could become a sub-group of the NIC.</p>	<p>Lead: NDA</p>
<p>Initial Success Measure: Public sector client group operating with clear terms of reference</p>		<p>Q2 2013</p>

7 UK Supply Chain Capability and Capacity

- 7.1 This section is intended as a high level summary of work performed to date to assess UK capability in the nuclear sector, including work by the NIA³⁹, NAMTEC⁴⁰, and IBM⁴¹, and the reader is referred to those reports for more detailed analysis.
- 7.2 The UK has a strong history of developing and supplying civil nuclear programmes. Many of the skills that were developed to build previous generations of nuclear power stations are now being deployed in the decommissioning and clean-up programme. And the UK has successfully delivered major infrastructure programmes in energy and transport that demonstrate many of the construction skills that will be required in the nuclear new build programme³⁹.
- 7.3 Other companies across the supply chain, which may not currently supply to the nuclear industry, may have many of the necessary characteristics to do so. For example, companies serving the defence or aerospace industries are used to working to exacting specifications, with a strong focus on quality and reliability. These companies too may be keen and able to take advantage of the opportunities offered in nuclear.

Front End of the Fuel Cycle

- 7.4 The UK has full fuel cycle facilities for conversion, enrichment, fuel fabrication, reprocessing and waste treatment, which should be capable of supplying fuel(s) for a new nuclear programme, and also of dealing with spent fuel and waste from new power plants, as well as their ultimate decommissioning. It is worth noting that the UK's capability and experience encompasses a very broad range of reactor types (PWR, Magnox, AGR and SGHWR variants, plus fast reactors and a nuclear defence propulsion programme). The supply chain associated with this heritage is therefore adaptable to a number of future scenarios.

³⁹ NIA. (2012) "Capability of the UK Nuclear New Build Supply Chain"

⁴⁰ NAMTEC. (2009) "The supply chain for a UK nuclear new build programme"

⁴¹ IBM Business Consulting Services. (2005). "An evaluation of the capability and capacity of the UK and global supply chains to support a new nuclear build programme in the UK"

Operations, Maintenance and Life Extension

- 7.5 With more than 50 years' experience of building and operating nuclear power stations, the UK has a mature supply chain and skill base to service the operations and maintenance requirements of the existing nuclear fleet. In addition, substantial ongoing investment is being made to replace obsolete equipment and enhance the safety, security and performance of the fleet.

New Nuclear Build

- 7.6 In the past the UK was almost self-sufficient in terms of manufacturing and supply chain capabilities, with more than 90% of the value of the hardware contracts for Sizewell B being placed directly or indirectly with UK based companies⁴².
- 7.7 To better understand the current picture the Government has commissioned the NIA to produce an update report on the UK's capability to support new build nuclear plants⁴³, and some of the findings of that report relating to capability and capacity are reproduced in this section.

New Nuclear: Programme Management & Support to Owners

- 7.8 It is widely recognised that strong project and programme management capability, provided by a combination of the developers' own in-house resources, those of main contractors and support from external consultancy advice, will be critical to the successful delivery of the new build programme, bearing in mind the scale and complexity of the challenge.
- 7.9 The UK has demonstrated the capability to programme manage large infrastructure projects of a similar scale and complexity, most recently in the Channel Tunnel Rail Link, Heathrow Terminal 5, the Olympic programme and currently with Crossrail.
- 7.10 Currently no single UK company would be seen to be capable of managing the delivery of a programme of nuclear power stations. However, capability has been demonstrated to deliver large, complex projects through special project delivery vehicles with integrated management teams bringing together several organisations with strong international experience.
- 7.11 It is anticipated that such teams will be located in the UK and will incorporate UK companies that can provide project management and technical expertise support.

⁴² NAMTEC. (2009) "The supply chain for a UK nuclear new build programme"

⁴³ NIA. (2012) "Capability of the UK Nuclear New Build Supply Chain"

New Nuclear: Civil Engineering and Construction

- 7.12 There are several large UK civil engineering companies, operating internationally on major projects, with the capability to carry out much of the design work and most of the construction work for new nuclear power stations in the UK. It is anticipated that much of this work will be delivered through joint ventures involving both UK and international companies, as is common practice internationally in major infrastructure projects.
- 7.13 UK companies have experience of delivering very large scale and complex civil engineering and construction projects, including the Olympics, Heathrow Terminal 5, Channel Tunnel Rail Link (stage 2) and Crossrail. In many cases, including the examples mentioned, these entailed bringing large resources into logistically difficult locations.
- 7.14 Much of the work will be managed by UK/international partnerships and these are already being developed. However, most of the delivery of projects will be handled by resources from the UK companies in these partnerships. UK contractors have a strong track record of working successfully with trades unions. All of the on-site employment and most of the employment in the supply of materials (steel, cement, aggregates) will be in the UK.

New Nuclear: Plant and Equipment - Supply

- 7.15 There is a small number of items for a nuclear project which can be manufactured by only a few companies in the world and for which there is no current UK capability. These are the reactor pressure vessel, main turbo-generator, steam generator, reactor coolant pump, associated ultra-large forgings and large diesel engines. There are only a very few companies in the UK who could possibly develop this capability; the cost and timescales are very demanding and the business cases for investment are currently not attractive. These key items will therefore be supplied from the few companies in the world that have this capability. Although they are critical, these items represent a relatively small portion of the total requirement for a new nuclear plant.
- 7.16 The UK does have the capability to supply most of the remainder of the manufactured components for a new nuclear plant including pumps and valves, pipework, vessels, tanks, heat exchangers, HVAC, radwaste plant, control, instrumentation and electrical equipment and forgings.
- 7.17 Many of the UK companies that are capable of manufacturing these items are already supplying similar equipment to the global new build market, as well as to the existing nuclear industry in the UK and to other regulated sectors such as the oil and gas, chemical and other process industries.
- 7.18 It is expected that some of the equipment, even where the UK does have capability, will come from JVs of UK companies with international partners, with the latter providing experience of design and codes and standards, as well as involvement in existing international supply chains, whilst UK partners will

provide delivery capability and understanding of the UK commercial, regulatory and stakeholder environment.

- 7.19 As UK companies extend their experience and demonstrate their capability to supply the new build market, the opportunity for UK content may increase over the timescale of the programme. Equally, though, companies winning contracts for the first projects (which may contain options for subsequent projects) will be in a favoured position to win follow on contracts so the potential for growing UK content may therefore be limited.

New Nuclear: Plant and Equipment - Installation

- 7.20 A key part of the capability required to deliver a new nuclear plant will be installing the equipment on site.
- 7.21 The UK has capability to provide much of the onsite installation of mechanical and electrical components, in some situations supplemented and backed by specialist engineering skills from the equipment suppliers. It is expected that increases in capacity and associated training will be required across the board.
- 7.22 The nuclear system provider is likely to use its own specialist engineering teams for installation of safety-critical components within the nuclear island but may utilise UK partners or specialist subcontractors. Most other installation can be provided by UK companies and is similar in scope to work currently being carried out by UK contractors on nuclear projects and in other infrastructure sectors such as oil and gas or safety-critical engineering sectors such as aerospace.
- 7.23 As for the civil works, the experience of developers and UK contractors in working with trades unions, including having effective site agreements and communications, will be important in avoiding costly disruption.
- 7.24 There will be a period of two to three years from initial contract award to start of site installation, but it is necessary that companies start early to develop their installation teams.

Waste Management and Decommissioning

- 7.25 UK suppliers are a major contributor to the supply chain supporting the NDA's mission. The US Department of Energy's Environmental Management programme and the NDA programme have between them helped create a global decommissioning market which has seen companies of all sizes work across national and international boundaries, frequently through some form of collaboration, joint venture and/or special purpose body. Currently there are no insurmountable market capacity or capability issues affecting the NDA's estate.

Fuel Cycle and Regulation

- 7.26 The UK has been operating and regulating back end fuel cycle facilities for over 50 years and has a strong heritage of supporting these facilities through products and services ranging from manufacturing and construction through to R&D, consultancy and project management. The UK supply chain is experienced in supporting the rigorous quality standards demanded by the sector.
- 7.27 Commercial reprocessing is set to cease in the UK within 6 years and therefore the specialist services provided by industry will begin to be eroded. Many of the more generic areas such as process plant design and supply, safety consultancy and project management are equally applicable to the decommissioning agenda and will be preserved as a result.

Skills, Education and Training

- 7.28 During the early years of the UK nuclear programme over 50 years ago there were several top-quality universities that provided the majority of the lead engineers and scientists for the sector. As the growth in the sector declined so did the related educational and training provision. However, over the last few years several important developments have taken place:
- Employers and Government came together to establish the NSA Nuclear with a key role of developing and growing a High Quality Provider Network to deliver the best quality training, skills development and education for the nuclear programme. There are now 47 members of this Network across the UK.
 - Four new NSA Nuclear flagship training delivery centres have been established in West Cumbria, Somerset, Caithness and Anglesey to provide excellent facilities for training delivery.
 - Many universities are now offering both undergraduate and post-graduate programmes that include nuclear modules or are nuclear specific.
- 7.29 This network of skills training and educational provision is available to support the development of a high-quality supply chain, and should be capable of responding to the needs of its clients. NESAs will monitor performance and provide an essential co-ordinating role.

UK Capacity in the Nuclear Sector

7.30 This section sets out some of the key findings of the NIA report⁴⁴ with respect to capacity in the nuclear sector. The NIA has concluded that, provided there is a clear programme for nuclear new build with continuity of work over the anticipated build period of 15 to 20 years, and that conditions are created which will attract contractors, staff and labour, the programme should not be constrained by developments in other sectors of energy and infrastructure. Whilst the requirements of the programme will undoubtedly be very large, with the foregoing clarity, continuity and conditions, delivery of the 16GW of capacity will be manageable. Further specifics as reported by the NIA are as follows:

- In manufacturing of plant and equipment, although companies may have the capability and a certain amount of capacity, they will need to judge whether to increase their capacity to target greater scope in the light of potential competition from overseas companies.
- In civil engineering and construction, UK companies have the capacity, skills and resources required to deliver the programme. Many of the workforce will need training in safety and requirements for working on nuclear sites. Also, there will be the need to build up resource numbers in the areas around new build sites, through recruitment and training of local people and movement of resources into the area.
- The majority of the materials required for construction are readily available in the UK market.
- In mechanical and electrical on-site installation, the UK has substantial capability and capacity and valuable experience of working under UK site conditions. Capacity will need to be increased by recruitment, up-skilling and transfer from non-nuclear sites and possibly by joint ventures.
- For all on-site activities there will be a substantial amount of movement from project to project, to follow the demand for skills, which will be attractive to many in the workforce. However, consideration will need to be given to the remoteness of some of the sites in terms of attractiveness to the workforce, accommodation, travel and employment conditions
- Where shortages of specific skills arise this could be resolved by importing labour from overseas; UK firms are experienced in employing and integrating foreign skilled labour.
- The amount of labour required onsite, and therefore potentially moving from one project to another, will also be influenced by the extent of modularisation of equipment as opposed to onsite assembly.

⁴⁴ NIA. (2012) *“Capability of the UK Nuclear New Build Supply Chain”*

UK Supply Chain Capability and Capacity Issues

7.31 The Government has engaged extensively with the nuclear industry to understand what are considered to be the key issues relating to supply chain capability and capacity. Findings from the NIA Capability Report⁴⁵ and the Oxford Economics report⁴⁶ have also been taken into account. The following issues have been identified and the UK Government is therefore keen to work closely with industry to further understand, and where possible, help to address these challenges.

- **Need to Enhance Capability and Competitiveness in the Nuclear Industry:** The supply chain may need a level of assistance in developing and closing gaps in capability and competitiveness. Significant benefits for the supply chain will only be realised if projects can be delivered in a competitive way and Government is keen to do what it can to help. Investment in capability and capacity will be required if benefits are to be maximised. However, some of these investments may be difficult to finance through conventional market instruments, so Government is keen to work with industry to understand how best to provide support in this area.
- **Quality and Accreditation in the Supply Chain:** The supply chain is required to understand the importance of high-quality performance and quality assurance in products and services provided. Support, training and guidance will be required to be ready to deliver projects to nuclear quality standards. It would also be valuable to consider whether a single accreditation system could be developed for approving supply chain companies to work in part or all aspects of the nuclear sector.
- **Project Continuity and Programme Alignment:** To ensure the most efficient use of UK capability, capacity and resources, it will be ideal for projects to be sensibly phased and for developers in the UK to align their plans. Clients and contractors will be encouraged to develop more effective collaboration to ensure best practices are applied to the new build programme based on a shared commitment to reduce project risks and a mutual interest in successful delivery.
- **Enhanced International R&D Collaboration:** It would be valuable to stimulate increased international R&D Collaboration as the UK currently has limited involvement in some international research programmes such as Gen IV⁴⁷, and it is recognised that engagement in international forums could be used to generate related commercial opportunities.

⁴⁵ NIA. (2012) “Capability of the UK Nuclear New Build Supply Chain”

⁴⁶ Oxford Economics and Atkins, “The Economic Benefit of Improving the UK’s Nuclear Supply Chain Capabilities”, Forthcoming.

⁴⁷ Generation IV reactors (Gen IV) are future nuclear reactor designs currently being researched. Current reactors in operation around the world are generally considered as second or third generation systems.

Supply Chain Capability & Capacity - Actions

Need to Enhance Capability and Competitiveness in the Nuclear Industry

- 7.32 The Government has made available significant funding to support the nuclear supply chain to develop its capability and competitiveness. Some specific examples from 2012, representing investment of around £52m, are included below:
- 7.33 **RGF Funding:** The Regional Growth Fund (RGF) is now a £2.4bn fund operating across England from 2011 to 2015. It supports projects and programmes with significant potential for economic growth that can create additional, sustainable private sector employment. In October 2012 the Deputy Prime Minister Nick Clegg announced that 130 bids have been selected under Round 3. Amongst these, Sheffield University has been selected to go forward to final contracting and due diligence for a £37m project involving continuing support for the Nuclear-AMRC. The Nuclear-AMRC has launched a large-scale programme of nuclear supplier development and manufacturing research in partnership with key industrial members.
- 7.34 **TSB Funding:** The Technology Strategy Board is leading efforts to fund the development of UK nuclear capability (co-funded by RCUK, DECC & the NDA) and has initiated the following competitions:
- **Collaborative R&D and Feasibility Funding** - Up to £14m is being made available for feasibility projects and collaborative research and development to stimulate innovation in the civil nuclear power sector and to strengthen the UK supply chain. Up to £2m of this is available for feasibility studies lasting between six and twelve months. Projects must be led by an SME and be collaborative. The remaining £12m is available for collaborative R&D.
 - **Knowledge Transfer Partnerships** - Up to £1m has been made available to establish new Knowledge Transfer Partnerships in the field of nuclear technologies for civil power generation, decommissioning and waste management. This initiative will help businesses improve their competitiveness, productivity and performance in the nuclear sector through better use of the knowledge, technology and skills that are available within the UK knowledge base.
- 7.35 The TSB is also supporting innovation in high value manufacturing through Nuclear-AMRC as part of the **HVM Catapult**, and an integrated and dynamic network of business, academic and policy stakeholders to deliver strategic and effective knowledge exchange through the nuclear group of the **Energy Generation & Supply KTN**.
- 7.36 See www.innovateuk.org for more information on TSB funding.

- 7.37 The Welsh Government has also invested significant funding into delivering infrastructure such as business parks, Construction and Energy Centres of Excellence for future students, R&D programmes through the Low Carbon Research Institute and Enterprise Zones.
- 7.38 It is recognised however that there is a need for larger scale investments in some parts of the industry, especially if the UK is to develop capability in some of the areas of equipment supply where none currently exists. Given the long-term nature of these investments, and the need to make a return over several projects with different timescales and clients, these investments will be difficult to finance through conventional market instruments.
- 7.39 Industry wish Government to consider mechanisms including the provision or underwriting of loans on a commercial basis to support specific investment requirements, and Government is keen to continue to investigate opportunities to help the UK nuclear industry develop capability and competitiveness.

<p>ACTION 16 Supply Chain Investment Requirements</p>	<p>BIS, along with the Welsh Government, will continue to work with the civil nuclear industry to identify investment requirements and how these might be met.</p> <p>To date Government has worked with industry, supplying co-investment through the Regional Growth Fund, the Advanced Manufacturing Supply Chain Initiative and other funding sources, including working with the private sector and financial community.</p> <p>Moving forward this work will also be considered as part of the Government's Industrial Strategy to see what the best ways are of working alongside industry to deliver long-term investment.</p>	<p>Lead: BIS</p> <p>Supported by: Welsh Government</p>
<p>Initial Success Measure:</p> <p>BIS to continue to work with industry to review potential funding options</p>		<p>Ongoing</p>

7.40 UKTI offer extensive support and facilitation for inward investment from overseas companies interested in bringing high-quality investment to the UK in support of the UK nuclear sector. Free and confidential support services are delivered in partnership with teams in London, the regions and the devolved administrations in the following areas:

- Tailored information including advice on financing, recruitment and activities such as R&D, tax, human capital and visas
- Building key contacts - UKTI can provide introductions to service providers, local, regional and national Government and trade organisations, and centres of excellence
- Assistance in finding new partners through a Partnership Programme
- Aftercare through ongoing support

<p>ACTION 17 UKTI Support for Inward Investment</p>	<p>UKTI will continue to engage with potential foreign investors, presenting details of the services offered to support the right high value inward investment to develop capacity and capability in the UK, through a programme targeting key markets.</p>	<p>Lead: UKTI</p>
<p>Initial Success Measure: Continue contact with potential nuclear inward investors</p>		<p>Ongoing</p>

7.41 The supply chain has improved its awareness of the opportunities arising from the new build programme but it is recognised that more needs to be done to improve capability and capacity. Leading companies in the nuclear sector can play a vital role in working together to identify the challenges, and perform joint actions to address those challenges. This work is best led by industry itself but it is vital to secure the confidence and buy-in of clients to ensure that the right issues are being addressed.

ACTION 18 NIA Readiness Programme	The NIA will establish working groups of major companies from each sub-sector to identify challenges and the joint actions to improve readiness for new build. These will be coordinated by an industry chairman and will report to the NIA Programme Management Board ⁴⁸	Lead: NIA
Initial Success Measure: Working groups to be established by the NIA Programme Management Board		Q1 2013

7.42 The Nuclear AMRC and NSA Nuclear Manufacturing are applying significant effort to develop UK manufacturing capability / competitiveness and will continue to do so.

ACTION 19 Manufacturing Capability Development	To support the development capability and competitiveness, the Nuclear-AMRC and NSA Nuclear Manufacturing will: <ul style="list-style-type: none"> • Deliver nuclear safety, culture and quality workshops • Facilitate Supplier Excellence Training • Offer localized SME tailored training and ensure these are more inclusive • Provide SME sized companies with manufacturing improvement opportunities • Undertake specific capability programmes covering processes, quality and people 	Lead: Nuclear-AMRC & NSA Nuclear Manufacturing
Initial Success Measure: Workshop on Nuclear-AMRC support for supply chain capability development		Q1 2013

⁴⁸ The NIA chairs the Programme Management Board (PMB), which was set up to ensure that a programme management approach is implemented for nuclear new build in the UK.

7.43 There would be value in enhancing research and the dissemination of best practice across construction contractors in the nuclear industry. The NIA will work with Constructing Excellence and the ICE to set up a forum to develop a common understanding of the principles that should guide new build projects, consider research opportunities and productivity improvements.

<p>ACTION 20 Construction Forum</p>	<p>Nuclear new build developers who are at the point of proceeding will establish with the NIA, Constructing Excellence and the ICE, a construction forum led at the most senior levels from the client and contractor communities that will establish a shared vision of the key lessons from existing and previous large infrastructure construction projects and how these might be applied to UK nuclear construction by developers in the construction and engineering construction industry.</p> <p>The NDA has useful experience of delivering challenging nuclear construction projects, so they will also participate in this group.</p> <p>The forum will secure commitment from both clients and contractors to a programme of the activities to deliver the vision.</p>	<p>Lead: NIA Supported by: Constructing Excellence ICE NDA</p>
<p>Initial Success Measures: Construction forum operating with clear terms of reference</p>		<p>Q1 2013</p>

Quality and Accreditation in the Supply Chain

7.44 The NIA will set up a Working Group, led by industry, to consider numerous aspects of nuclear quality and equipment qualification. The group will include key industry players including new nuclear developers, the ONR and the NDA.

<p>ACTION 21 Quality In the Supply Chain</p>	<p>The NIA with the support of the Nuclear-AMRC and NIC will set up an industry led working group to manage UK supply chain quality and coordinate all other significant industry initiatives on quality development.</p> <p>The detailed objectives will be developed by the group, but are likely to include:</p> <ul style="list-style-type: none"> • Develop a clear understanding of quality requirements for the UK new build projects and to convey these requirements to the supply chain • Identify any gaps in UK quality capability or understanding and where needed, develop clear plans to raise the quality standards • Ensure the supply chain is accredited to the level required, recognising the varying requirements for supply of different components and services • Assess the availability of facilities for equipment and options for addressing any shortages in capacity . • The Nuclear-AMRC and NSA Manufacturing will support the NIA by linking in with their quality initiatives. 	<p>Lead: NIA Supported by: Nuclear-AMRC NIC</p>
<p>Initial Success Measure: Map of other industry quality initiatives and this working group's objectives prepared</p>		<p>Q1 2013</p>

Project Continuity and Programme Alignment

7.45 In order to maximise the chances of successful deployment of a programme of nuclear new build in the UK, it is important for developers to work together to manage plans and thus ensure most efficient use of resources.

7.46 The NIA chairs the PMB which was set up with participation from Government to ensure that a programme management approach is implemented for nuclear new build in the UK. As such its membership includes all consortia planning to build reactors in the UK, along with vendors and other key industry organisations. The PMB will work closely with the NIC although the exact relationship between those groups is still to be defined.

ACTION 22 Programme Alignment	The PMB will continue to identify any obstacles to delivery arising from the interfaces between projects and potential barriers to the deployment of a programme of new build in the UK.	Lead: NIA
Initial Success Measure: The PMB will consider an analysis of skills and capacity requirements rising from the NIA capability report ⁴⁹		Q1 2013

Enhanced International R&D Collaboration

7.47 It would be useful to stimulate increased international R&D collaboration, which could lead to valuable niche business opportunities.

ACTION 23 International R&D Collaboration	The Government's forthcoming nuclear strategy and underpinning R&D roadmap will define a domestic national programme for nuclear and specifically the fuel cycle. This will facilitate stronger international collaboration on R&D in a number of areas.	Lead: DECC
Initial Success Measure: Government to issue the R&D Roadmap		Q2 2013

⁴⁹ NIA. (2012) "Capability of the UK Nuclear New Build Supply Chain"

8 Skills for the UK Nuclear Programme

- 8.1 The Government is committed to working with industry to ensure that there is a skilled workforce in place that can deliver the new nuclear programme to time and to budget without compromising the effective continuation of current operations and decommissioning. The programme represents a significant opportunity to create jobs and drive economic growth across the country. At Hinkley Point C in Somerset, EDF have estimated a peak construction workforce of 5,600, with an additional 900 jobs once the plant is operational⁵⁰, whilst Horizon Nuclear Power owners Hitachi anticipate a construction workforce of between 5,000 and 6,000 at both Wylfa on Anglesey and Oldbury in South Gloucestershire with a further 1,000 jobs at each site once they become operational⁵¹.
- 8.2 The UK has a high level of expertise in several areas related to the wider nuclear supply chain, including decommissioning. However, the scale of the industry's new build aspirations, the length of time since the last new build project and the high average age of the existing nuclear workforce means that it is essential to take action now to prevent skills gaps developing over the course of the new nuclear programme.
- 8.3 The development of an overarching skills strategy for the nuclear industry is the responsibility of the National Skills Academy for Nuclear, working in close partnership with the relevant Sector Skills Councils and Industry Training Boards. The co-ordinated delivery of skills interventions across the sector, including in the key areas of Construction, Engineering Construction and Manufacturing, is facilitated by the Nuclear Energy Skills Alliance (NESA). NESA brings together the relevant skills bodies⁵² with Government to ensure an aligned and collaborative approach to addressing the skills challenges facing the industry.
- 8.4 NESA members are working with employers to input relevant research and labour market intelligence into a Nuclear Workforce Tool. This project, led by Cogent SSC with the input of all NESA member skills bodies, will help to define industry-wide skills requirements over the course of the nuclear programme, acting as a crucial evidence base for skills interventions as well as supporting workforce planning.
- 8.5 Government recognises advancement, or acceleration, of the Civil nuclear new build programme has the potential to exacerbate the problem of skill shortages already affecting nuclear programmes in Defence. However, this action plan provides a new opportunity for MoD to assess the risks to its nuclear programmes and to work collectively across Government to identify and pursue measures to address the skills capacity issues and to mitigate the

⁵⁰ <http://www.edfenergy.com/about-us/energy-generation/new-nuclear/>

⁵¹ <http://www.hitachi.com/>

⁵² *ConstructionSkills, ECITB, Cogent SSC, NSA Nuclear, Semta SSC*

skills' risks to nuclear programmes in both the Civil and Defence sectors.

- 8.6 This section of the action plan does not make reference to Nuclear R&D. A comprehensive review of the Nuclear R&D landscape in the UK is currently being led by the Government's Chief Scientific Advisor, Sir John Beddington. This report will be published shortly together with a roadmap for future R&D requirements to address the full range of nuclear energy generation scenarios up to 2050.

Skills Issues

- 8.7 Government and NESAs members have engaged extensively with the nuclear industry to understand the key skills issues likely to affect the progress of the new nuclear programme, the expansion of the nuclear supply chain and ongoing operations and decommissioning. The following issues have been identified and Government, alongside the skills body members of NESAs, is keen to work closely with industry to help to address these challenges.

- **Defining the Industry skills requirements for the UK Nuclear Programme:** Government's Skills Strategy *Skills for Sustainable Growth*⁵³ sets out the need for employers to lead skills development, rather than just advising on it. Key factors for the success of the new strategy will be: industry clearly defining its skills 'ask'; industry engaging and driving the activities of their Sector Skills Councils, Skills Academies and learning providers; and that businesses have access to finance. It is however essential that public funding is able to unlock private sector skills investment.
- **Ensuring robust, unified labour market intelligence for accurate workforce planning:** There is currently no comprehensive and robust labour market intelligence for workforce planning over the course of the new nuclear programme. Current labour market intelligence is made up of a combination of specific intelligence from different sectors within the industry and anecdotal information gathered at workshops and working groups; interventions are therefore based on evidence gathered in this way.
- **Ensuring funding is available for key training:** There are several funding pots available for skills interventions but there are ways for industry and Government to utilise them more effectively to best address the areas of most concern.
- **Ensuring availability of specific skills in key workforce groupings:** In advance of industry-wide labour market intelligence, industry has identified certain key skills where they have significant concerns about not having enough people of the appropriate quality to ensure that the new nuclear programme can go ahead without any delays or large cost increases.

⁵³ <http://www.bis.gov.uk/skillsforgrowth>

Skills - Actions

Defining the Industry Skills Requirement for the New Nuclear Programme.

- 8.8 The Government is clear in its skills strategy *Skills for Sustainable Growth* that the skills sector is most effective when it is led by employer demand. Whilst there is a substantial amount of work that the Government can and is doing to harness the job creation benefits of the new nuclear programme, industry needs to work closely with the relevant skills bodies to articulate its skills requirements in order for the skills sector to fully deliver.

ACTION 24 Industry skills requirements	Industry to articulate its skills requirements for the new nuclear programme so that the UK skills system can develop an agreed set of deliverables.	Lead: Industry
Initial Success Measure: Clear details to be provided by industry as to their skills requirements as new build plans become more developed.		Q3 2013

Ensuring Robust, Unified Labour Market Intelligence

- 8.9 The development of robust labour market intelligence is vital to identify gaps between the supply and demand of labour in specific roles over the course of the new nuclear programme. This will act as the evidence base to help the industry better prepare for the different new build scenarios and the resulting demand on labour, making the most of job creation opportunities in the UK workforce. As such, this will support industry when articulating its skills requirement.
- 8.10 DECC has funded initial design and development work undertaken to create the software to model this information, and the focus is now on ensuring high-quality input data from all relevant sources so that the labour forecasts are accurate. The project includes significant input from the other skills bodies in NESAs to ensure that the model benefits from their specific areas of expertise on crucial areas including construction, engineering construction and manufacturing.

ACTION 25 Generation of Robust Labour Market Intelligence	Industry to supply accurate and detailed data to the nuclear workforce model via the NESAs members, and keep this updated as their plans develop and mature.	Lead: Industry
	NESAs members will make appropriate assumptions about future supply and demand data by working closely with industry.	Lead: NESAs members
	As data becomes available, the outputs from the model will be analysed to identify skills gaps. This analysis will be regularly communicated to Industry.	Lead: Cogent With support from NESAs Members
Initial Success Measure: Initial outputs from the model communicated to industry		Q2 2013

Ensuring Funding is Available for Key Training

8.11 Where a skills gap has been identified, it is important that employers are aware of available funds and support to help address the issue. Government is looking to ensure that these funds can be used effectively to support skills development across the whole industry.

Making existing funds work for Nuclear

8.12 Government is working with the UK Commission for Employment and Skills, reforming the skills system to support employer investment and co-investment in skills training. It is for employers to drive the skills system, with control over their funding, with Government providing the support and information needed to help employers make the right choices for their future. This new approach to skills has included the launch of the £250m Employer Ownership of Skills (EOS) programme, offering employers in England direct access to funds to design and deliver their own training solutions. Funding from round one of the EOS pilot demonstrates Government's ability to provide tailored support to the nuclear supply chain where employers are able to articulate specific requirements, for example, in principal approval has been given to:

- Doosan to help increase the supply of construction welders, including the development of a new Level 4 Diploma;
- Laing O'Rourke to train construction supervisors and steel fixers for the nuclear programme in conjunction with Bridgwater and Gateshead colleges;
- Support was also granted to a consortium of eleven major construction companies to advance the use of apprenticeships and develop leadership and management in the construction sector.

8.13 This support is leveraging significant funding and contributions from the industry themselves, including the Industry Training Boards (ITBs), to support development of the UK construction capability.

8.14 ITBs operate with the consensus of employers in the industry they cover to address the key skills needs identified by the employers and trade federations in their sector. Both the CITB and ECITB include those construction and engineering construction employers for whom nuclear new build is a priority. As the demand for key skills increases, it is expected that ITBs will focus their attention increasingly on those key requirements levy payees identify as critical to the build programme. The CITB has already committed £2m of funding to the nuclear build programme and the ECITB has been investing around £2.5m annually in support of skills for nuclear; this is expected to increase to over £5m annually.

8.15 The Growth and Innovation Fund (GIF), worth up to £34m in 2012-2013, has also been used to fund nuclear industry projects. For example, funding has recently been agreed for the NSA Nuclear project 'Transformational Growth in the Nuclear Industry – A National Nuclear Gateway' to specifically support the

development of skills and capability across the nuclear supply chain.

- 8.16 Government wants to ensure wide access to the GIF for employers in the future. Industry Training Boards, Sector Skills Councils and Skills Academies can access resource through the GIF to fund projects that address the delivery or take up of skills in the sector.
- 8.17 The latest round of the EOS competition brings the elements of the GIF and EOS into a single fund allowing bids to develop new skills systems to be made alongside bids to increase and assist participation in skills development and advance apprenticeship learning.

Ensuring Value for Money

- 8.18 To ensure that funding can be targeted at the skills issues that pose the highest risk to the Nuclear Programme, the members of NESAs, working with Government, will create a funding map to demonstrate the funds available to address specific shortages and highlight key challenges to access these funds.
- 8.19 Concerns have been raised that the current path of money from Government to providers is inefficient as employers do not have control over which training provider they use. As a result industry are concerned that there is not a free market that can be used to drive up quality on training. The Government is working with the Skills Funding Agency to ensure that failing providers are addressed and new providers, including employer led organisations are introduced to the marketplace.

<p>ACTION 26 Skills Funding Map</p>	<p>Create a funding map to demonstrate what funds are available to the industry, highlighting any key challenges in terms of accessing/relevance of these funds</p>	<p>Lead: NESAs Members</p>
<p>Initial Success Measure: Production of a funding map linking available funds to skills priorities</p>		<p>Q2 2013</p>

Ensuring Availability of Specific Skills in Key Workforce Groupings.

- 8.20 NESAs members are currently developing a delivery plan that will set out specific actions to be taken by each member. This will act as a co-ordinated response to skills issues identified by the industry and will be a ‘live’ document, updated regularly to reflect changing priorities. Actions in the delivery plan will cover the whole range of skills required for the nuclear programme, from construction supervisors, concretors and engineers for the construction phase, to manufacturing engineers needed to maximise UK supply chain opportunities, through to the operational and maintenance personnel required when the new plants become operational. There will also be cross-sector activity to facilitate the transfer of experienced workers from other industries and to increase the number of apprentices in the nuclear industry.
- 8.21 A common theme when considering concerns around areas of skills is building experience and increasing organisational capability. In many areas it is felt that increasing secondments and pooling labour allows organisations to increase capability, even when their own workload does not allow experience to be gained.
- 8.22 Another concern for the supply chain is taking on apprentices and wider labour pools when work cannot be guaranteed, and not giving those that are employed the widest experience. Schemes exist to pool labour resources among the supply chain to allow them to take on work and develop skills, even when their own company does not have sufficient contracts to offer experience. The NSA Nuclear Supply Chain Apprenticeships for Nuclear (SCAN) programme has been launched to specifically help SMEs take on new and additional apprentices. It is worth considering how this can be expanded on or what further initiatives would be appropriate.
- 8.23 In addition, Government commissioned an independent review, led by the entrepreneur Doug Richard, to take a medium to long-term look at the future of apprenticeships in England. The review has been completed⁵⁴ and sets out a comprehensive vision for the future of apprenticeships. The Government will now consider the review and issue a full response in the New Year.

ACTION 27 Skills Shortages	Address key skills shortages through targeted interventions that attract new people to the sector, consider redeployment of existing skills and draw in relevant skills from related industries (up skilling where needed).	Lead: NESAs Members
Initial Success Measure: Publication of the initial version of NESAs delivery plan		Q1 2013

⁵⁴ <http://www.bis.gov.uk/policies/further-education-skills/apprenticeships/richard-review>

ACTION 28 Technical Workshops	NESAs members to hold technical workshops to look in detail at the specific key issues identified by industry and fully assess the effectiveness of proposed mitigations. Any findings from these workshops will be reflected in a revised delivery plan. This will provide clarity on all actions and minimise overlap.	Lead: NESAs Members
Initial Success Measure: Workshops planned for all key skills priorities		Q1 2013

8.24 Concerns are also raised that key talent within the workforce is sometimes not retained. In particular this is true of those currently working in decommissioning when their workstreams come to an end, and those from the armed forces, who come to the end of their service. Both have many of the practical skills and nuclear awareness that could be utilised in the new build, operations and decommissioning.

8.25 The Talent Retention Solution (TRS) already exists as a means of retaining skills in the Advanced Manufacturing and Engineering (AME) Sector by putting skilled individuals looking for work and companies searching for new employees in direct contact. Nuclear employers, such as EDF and Rolls-Royce, are sponsors of the programme and the ECITB is working with TRS to establish a broad, industry-wide platform that is accessible by the supply chain.

ACTION 29 Nuclear Careers for Ex Military	Government to work with NESAs and industry to ensure that nuclear career paths are promoted to the military when retraining at the end of their service.	Lead: Government Supported by: NESAs
Initial Success Measure: The detailed plan for this workstream outlined in the NESAs delivery plan		Q2 2013
ACTION 30 Retention of Existing Skilled Workforce	The NDA will develop and take forward its work on a transition framework to retain skills in the nuclear industry	Lead: NDA
Initial Success Measure: Maximise the use of resources and protect the skills base by identifying the key changes and put plans in place to manage resources effectively.		Q3 2013

9 Action Plan Governance, Direction and Implementation

- 9.1 It is essential that this action plan is successfully implemented if the objectives of the plan are to be realised. Accordingly, the Secretary of State co-chaired Nuclear Industry Council will oversee how the action plan is taken forward and implemented.
- 9.2 Day to day management of the implementation of this action plan will be the responsibility of the Head of Supply Chain and Skills in DECC who will work with the Council and wider industry to ensure that an appropriate implementation structure is in place.
- 9.3 Whilst this document identifies a lead organisation along with an initial success measure for each action, this information is indicative at this time. The next stage of work on this action plan will include the development of a detailed implementation programme.

Glossary

ABWR	Advanced Boiling Water Reactor
AGR	Advanced Gas-Cooled Reactor
AMRC	Advanced Manufacturing Research Centre
AME	Advanced Manufacturing and Engineering
BERR	The Department for Business, Enterprise and Regulatory Reform
BIS	The Department for Business, Innovation and Skills
BNFL	British Nuclear Fuels Ltd
CITB	Construction Industry Training Board
DECC	The Department of Energy and Climate Change
US DoE	Department of Energy
ECITB	Engineering Construction Industry Training Board
EMR	Electricity Market Reform
EPSRC	Engineering and Physical Sciences Research Council
EOS	Employer Ownership of Skills
EPC	Engineering Procurement Construction
FCO	Foreign and Commonwealth Office
FOAK	First of A Kind
GDF	Geological Disposal Facility
GDP	Gross Domestic Product
GVA	Gross Value Added
HLW	High Level Waste
HVAC	Heating, Ventilation and Air-Conditioning
IAEA	International Atomic Energy Agency
ILW	Intermediate Level Waste
INPO	Institute of Nuclear Power Operations
JET	Joint European Torus
JV	Joint Venture
KTN	Knowledge Transfer Networks
KTP	Knowledge Transfer Partnerships
LLW	Low Level Waste
LLWR	Low Level Waste Repository
MoD	Ministry of Defence
NAMTEC	National Metals Technology Centre
NDA	Nuclear Decommissioning Authority
NDPB	Non Departmental Public Body
NESA	Nuclear Energy Skills Alliance
NIA	Nuclear Industry Association

NIC	Nuclear Industry Council
NOAK	Nth Of A Kind
NNL	National Nuclear Laboratory
NPP	Nuclear Power Plant
NSA	National Skills Academy (Nuclear)
NSG	Nuclear Suppliers Group
NSSS	Nuclear Steam Supply System
OEM	Original Equipment Manufacturer
ONR	Office for Nuclear Regulation
PBO	Parent Body Organisation
PINs	The Planning Inspectorate
PMB	(NIA) Programme Management Board
PWR	Pressurised Water Reactor
R&D	Research and Development
RCUK	Research Councils UK
RGF	Regional Growth Fund
RPV	Reactor Pressure Vessel
SCAN	Supply Chain Apprenticeships for Nuclear
SEMTA	Sector Skills Council for Science, Engineering and Manufacturing Technologies
SGHWR	Steam Generating Heavy Water Reactor
SLCs	Site Licence Companies
SMEs	Small and Medium Enterprises
TBC	To Be Confirmed
TSB	Technology Strategy Board
TRS	Talent Retention Solution
UKAEA	UK Atomic Energy Authority
UKEF	UK Export Finance
UKTI	United Kingdom Trade and Investment
WNA	World Nuclear Association

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