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Resource and Training Challenges in the UK Civil Nuclear Industry: Ensuring a Skilled Workforce for Future Growth

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Abstract

The United Kingdom's civil nuclear industry is undergoing a significant transformation, driven by ambitious targets to expand nuclear capacity to 24 GW by 2050. Achieving this goal necessitates a substantial increase in suitably qualified and experienced personnel (SQEP). This article examines the current workforce demographics, identifies key challenges in recruitment, training, and retention, and evaluates existing initiatives aimed at bridging the skills gap. It also provides policy recommendations to ensure the industry can meet its future workforce requirements.

Keywords: civil nuclear, transformation, suitably qualified and experienced personnel, skills gap

1. Introduction

The UK's commitment to achieving net-zero carbon emissions by 2050 has placed nuclear energy at the forefront of its energy strategy. Projects like Hinkley Point C and Sizewell C, along with the development of Small Modular Reactors (SMRs), underscore the sector's expansion. However, this growth is contingent upon a robust pipeline of skilled professionals to design, build, operate, and decommission nuclear facilities.

2. Current Workforce Demographics

As of 2024, the UK civil nuclear industry employs approximately 87,000 individuals, marking a 60% increase over the past decade. This surge is largely attributed to major projects such as Hinkley Point C and Sizewell C. Notably, the construction of Hinkley Point C has tripled the nuclear workforce in the South West from 8,500 in 2014 to over 27,000 in 2024.¹

Despite this growth, the sector faces demographic challenges. A significant portion of the workforce is nearing retirement age, raising concerns about the loss of institutional knowledge and expertise.² Additionally, regional disparities exist, with certain areas lacking sufficient training infrastructure and employment opportunities in the nuclear field.³

3. Challenges in Recruitment, Training, and Retention

3.1 Recruitment Difficulties

The nuclear sector competes with other industries for talent, particularly in engineering and technical disciplines. Misconceptions about nuclear energy, concerns over job stability, and the industry's perceived complexity deter potential candidates. Furthermore, stringent security

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 $^{^{\}rm 1}$ Nuclear Industry Association. (2024). Nuclear jobs hit record high as major new projects revitalise sector. Retrieved from

https://www.niauk.org/nuclear-jobs-hit-record-high-as-major-new-projects-revitalise-sector/

 $^{^2}$ UK Parliament. (n.d.). Delivering nuclear power - Science, Innovation and Technology Committee. Retrieved from

https://publications.parliament.uk/pa/cm5803/cmselect/cmsctech/626/re port.html

³ ECITB. (2024). Leading Industry Learning Strategy. Available at: https://www.ecitb.org.uk/

clearance requirements can prolong the hiring process, discouraging applicants.⁴

3.2 Training Limitations

Training programs must evolve to meet the sector's dynamic needs. Traditional academic pathways may not provide the practical experience required for nuclear roles. There's a pressing need for integrated training models that combine theoretical knowledge with hands-on experience.⁵

One of the key organisations addressing this issue is the National Skills Academy for Nuclear (NSAN), which plays a central role in coordinating industry-led training solutions. NSAN offers employer-focused training, apprenticeship standards, and the Triple Bar training suite, which provides foundational understanding in nuclear professionalism, safety, and security. The Academy also supports the delivery of the Nuclear Industry Training Framework and works closely with employers to accredit bespoke programmes for developing SQEP staff.⁶

3.3 Retention Issues

Retaining skilled professionals is crucial. Factors such as limited career progression, relocation demands, and work-life balance challenges contribute to attrition. Moreover, the sector's historical underrepresentation of women and minorities affects its ability to retain a diverse workforce.⁷

4. Government and Industry Initiatives

Recognising these challenges, both the government and industry stakeholders have launched initiatives to bolster the nuclear workforce.

4.1 Educational Collaborations

Institutions like the National College for Nuclear (NCfN) offer specialised apprenticeships, ranging from Level 4 to Level 6, in areas such as nuclear engineering and science.⁸ Similarly, the University of Derby's Nuclear Skills Academy

⁸ Ibid.

provides degree apprenticeships in collaboration with industry partners like Rolls-Royce.⁹

4.2 Industry-Led Programs

Companies like EDF Energy have established Nuclear Engineer Degree Apprenticeships, combining academic study with practical experience at facilities like Hinkley Point C and Sizewell B.¹⁰ The UK National Nuclear Laboratory (UKNNL) also offers apprenticeships across various disciplines, emphasizing real-world projects and professional development.¹¹

4.3 Strategic Workforce Planning

The Engineering Construction Industry Training Board (ECITB) forecasts a need for approximately 13,000 additional workers in the nuclear sector by 2028, particularly in critical areas like welding and mechanical engineering.¹² To address this, the ECITB's Leading Industry Learning Strategy focuses on expanding the workforce and closing skills gaps.

The Office for Nuclear Regulation (ONR) has also recognised the urgent need to enhance specialist nuclear security capabilities across the UK civil industry. In response, ONR has collaborated with the Global Nuclear Security Partners and Ubique Risk Management to develop targeted nuclear security training. This initiative aims to build industry-specific expertise in areas such as threat assessment, protective security design, and regulatory compliance. By integrating real-world case studies and aligning with international best practices, the training will equip personnel with advanced skills to support the UK's evolving nuclear security landscape.¹³

This strategic collaboration not only addresses the training needs of existing security professionals but also helps broaden the pool of SQEP within the civil nuclear domain, ensuring the sector is resilient to emerging threats and future operational demands.

¹¹ UK National Nuclear Laboratory. (n.d.). Apprenticeships. Retrieved from https://uknnl.com/careers/early-careers/apprenticeships/

¹² Engineering Construction Industry Training Board. (n.d.). A bold leap for UK nuclear. Retrieved from https://energyfocus.the-eic.com/nuclear/bold-leap-uk-nuclear

¹³ Office for Nuclear Regulation (2024). ONR supports specialist nuclear security training initiative. Available at:

https://www.onr.org.uk/news/2024/onr-specialist-nuclear-security-training.htm

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⁴ UK National Nuclear Laboratory. (n.d.). Apprenticeships. Retrieved from https://uknnl.com/careers/early-careers/apprenticeships/

⁵ National College for Nuclear. (n.d.). Higher & Degree Nuclear Sector Apprenticeships. Retrieved from https://www.ncfn.ac.uk/courses/higherdegree-nuclear-sector-apprenticeships/

 $^{^{\}rm 6}$ National Skills Academy for Nuclear (NSAN). (n.d.). Our Work. Available at: https://www.nsan.co.uk/

⁷ EDF Energy. (n.d.). Nuclear Engineer Degree Apprenticeship. Retrieved from https://careers.edfenergy.com/content/Nuclear-Engineer-Degree-Apprenticeship/

⁹ University of Derby. (n.d.). Nuclear Skills Academy - Apprenticeships. Available at: https://www.derby.ac.uk/apprenticeships/nuclear-skillsacademy/

¹⁰ EDF Energy. (n.d.). Nuclear Engineer Degree Apprenticeship. Retrieved from https://careers.edfenergy.com/content/Nuclear-Engineer-Degree-Apprenticeship/

4.4 International Collaboration and Certification

In the context of global best practices, the World Institute for Nuclear Security (WINS) provides valuable support in training and professional certification. WINS offers internationally recognised professional development programmes, including the WINS Academy, which focuses on nuclear security management and certification through ISO 29993-aligned courses. This strengthens the nuclear security culture across civil programmes and supports the development of SQEPs in leadership, risk assessment, and compliance.¹⁴

5. Future Workforce Needs

The UK's ambition to achieve 24 GW of nuclear capacity by 2050 necessitates a significant expansion of the workforce. This includes not only engineers and scientists but also professionals in project management, regulatory compliance, and environmental safety. The development of SMRs and fusion energy projects further diversifies the skill sets required.¹⁵

6. Policy Recommendations

To ensure the civil nuclear industry meets its future workforce requirements, the following strategies are recommended:

• Enhance Public Perception: Launch awareness campaigns to improve the image of nuclear careers, highlighting opportunities for innovation and societal impact.

• **Streamline Security Clearances:** Review and optimize the security clearance process to reduce hiring delays without compromising safety or security.

• **Promote Diversity and Inclusion**: Implement targeted programs to attract underrepresented groups, ensuring a more diverse and resilient workforce.

• **Invest in Regional Training Centres:** Establish training facilities in underserved regions to address geographical disparities and support local employment.

• Foster Industry-Academia Partnerships: Encourage collaborations between educational institutions and industry to align curricula with practical needs.

7. Conclusion

The UK's civil nuclear industry stands at a pivotal juncture. While significant investments and projects signal a promising future, the realisation of these ambitions hinges on addressing the pressing challenges in workforce development. Through concerted efforts in recruitment, training, and retention, supported by strategic policies and collaborations, the sector can secure the skilled professionals necessary to power the nation's nuclear renaissance.

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