

UK Nuclear Academics Meeting 2022

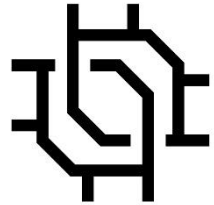
Nuclear Training – Industry Needs

8th September 2022

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Controls Director - Energy, Security & Technology

Jacobs Global Reach

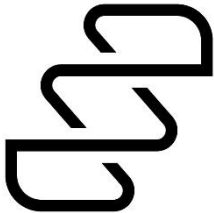
Our focus areas



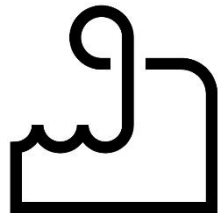
Cutting-edge
Manufacturing



Mission Critical
Outcomes



Operational
Advancement



Resilient
Environments



Scientific
Discovery



Thriving
Cities

By the numbers

40+

Countries

55K+

Talent
Force

400

Offices

\$14B

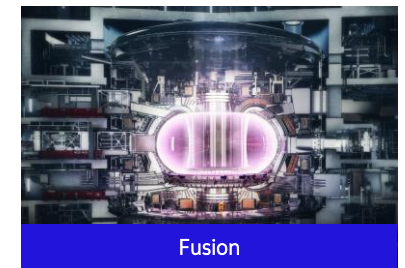
Annual
Revenue

\$26.6B

in Backlog

Jacobs in the UK - Energy, Security & Technology

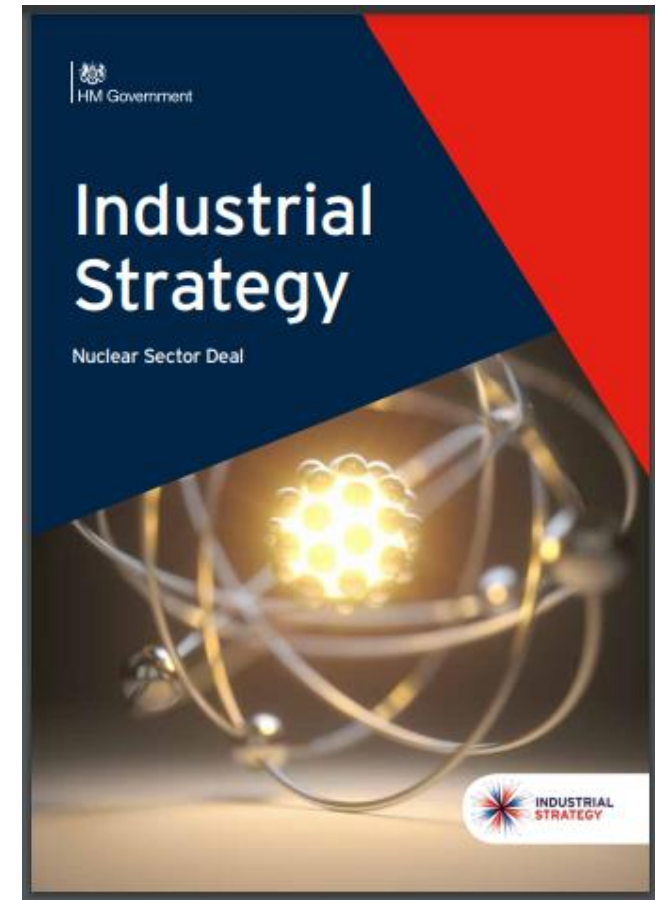
- Aligned with mission critical national priorities
- Tier 1 and 2 supplier to UK nuclear site licensees and developers of new technologies
- >4,000 engineering, scientific and project delivery resources
 - >5% of our staff are externally recognised nationally or internationally as experts, 75% degree level and above
- Extensive facilities
 - Largest UK independent laboratories supporting the nuclear industry
 - The UK's only accredited inspection validation centre (non-destructive testing) for nuclear new build
 - Largest Radiochemical Analysis Laboratory in the UK
- Projects range for consultancy to large scale engineering, procurement and construction



Jacobs and the nuclear industry needs well trained and highly skilled engineers, scientists and project delivery resources now and in the future.

Challenges in maintaining and growing a competent workforce

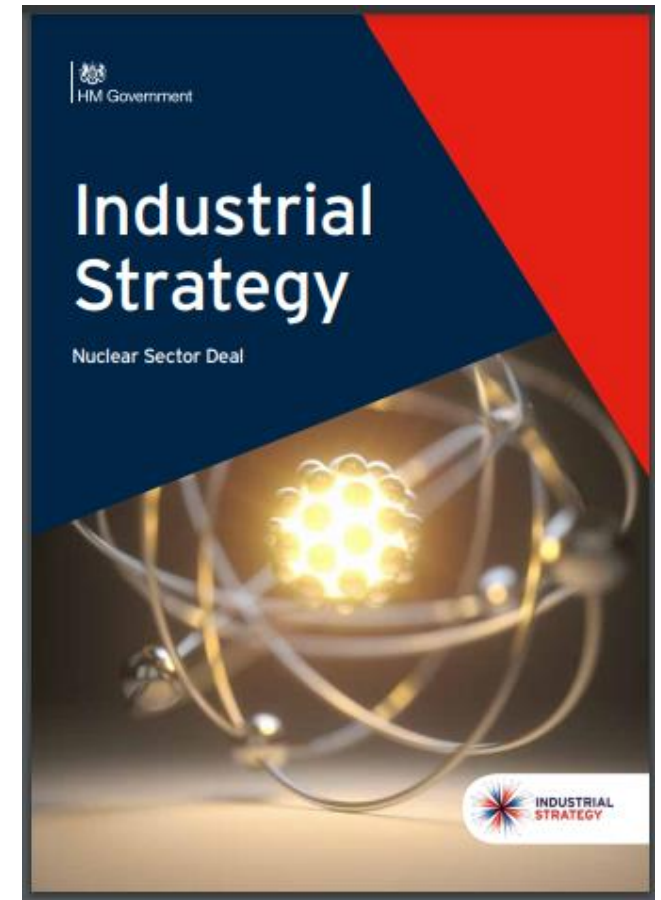
- In 2018, the UK government's Industrial Strategy Nuclear Sector Deal identified opportunities to radically improve industrial productivity while still delivering affordable, reliable and always available nuclear power through a number of initiatives:
 - a new approach to building power plants — with a target for 30% lower costs on new build projects by 2030;
 - a long-term vision of innovation-led growth that delivers successively lower generation costs and a 20 per cent reduction in decommissioning costs to the taxpayer;
 - a more competitive supply chain, with more UK companies using advanced manufacturing methods and entering domestic and export markets for nuclear goods and services;
 - 40% of the nuclear workforce to be women by 2030.



https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/720405/Final_Version_BEIS_Nuclear_SD.PDF

Challenges in maintaining and growing a competent workforce

- The deal also aims to extend our nuclear excellence into the future, driving improved industrial productivity and competitiveness. It also supports:
 - growth of a highly skilled workforce;
 - a globally unique stock of technology and skills which will benefit other industries and services and which has significant potential in overseas markets;
 - a lasting contribution to the communities that are host to nuclear facilities, both current and future.
- To deliver on the nuclear sector deal, the industry needs a highly skilled workforce capable of supporting existing and future projects.



https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/720405/Final_Version_BEIS_Nuclear_SD.PDF

Challenges in maintaining and growing a competent workforce

- Jacobs sees these key challenges in current and future nuclear skills:
 - High demand for skilled resources across the nuclear industry and other sectors
 - Recruitment and retention of resources
 - Early careers
 - attracting school leavers into STEM careers
 - Specific skills shortages in key capabilities
 - Electrical engineering
 - Control and instrumentation engineering
 - Nuclear ventilation engineering
 - Engineering/Project management
 - Human Factors
 - Knowledge management of the ageing workforce approaching retirement
 - Capturing and disseminating knowledge
 - Meeting diversity and inclusion targets (Jacobs' own and Nuclear Sector Deal targets)

What skills and knowledge is the nuclear industry looking for?

- Nuclear Sector Specific Knowledge
 - Basic understanding of nuclear science and engineering
 - Wider than core discipline
 - Understanding the context of individual contributions
- Digital Skills
 - Projects are moving to a digital delivery model and skills and experience of using digital tools are becoming essential
 - Data centric engineering tools
 - Digital Twins
 - Modelling
 - Application of Artificial Intelligence
 - Design tools
 - 3D, 4D, 5D
 - Application of Extended reality (XR)
 - Augmented (AR), mixed (MR) and virtual (VR)
- Knowledge of advanced manufacturing techniques
- Knowledge of real world examples of engineering solutions

What skills and knowledge is the nuclear industry looking for?

- General Skills
 - Ability to
 - write documents (e.g. reports and specifications)
 - write and deliver presentations
 - read and interpret engineering/technical documents, drawings, reports and data
 - analyse, manipulate and present data
 - make judgements based on a variety of information
 - perform research
 - write software code
- Soft Skills
 - Collaborative working and engagement with team members
 - Virtual and face to face
 - Questioning mind set
 - Challenging the accepted
 - Seeking opportunities for self development
 - Communication skills for a business environment
 - Be able to adapt to evolving technology with the curiosity to work outside core area

Challenges in maintaining and growing a competent workforce

- Jacobs bridges training and knowledge gaps with:
 - Technical training (external and internal)
 - Early Career training for graduates
 - Report writing
 - Giving presentations
 - Public speaking
 - Support for professional accreditation (Incorporated and Chartered status via accredited graduate development programme)
 - Nuclear industry overview
 - Jacobs New to Nuclear Academy for recruits with no nuclear industry experience, jointly developed with National Skills Academy Nuclear ([NSAN](#))
 - Formal nuclear science training for graduates
 - [NSAN Award for Nuclear Industry Awareness \(ANIA\)](#)

Challenges in maintaining and growing a competent workforce

- Jacobs recruits at all levels of experience
 - Apprentice
 - Levels 3 and 6
 - Graduate
 - Bachelors
 - Masters
 - Post-Graduate
 - PhDs
 - All career phases
- Challenges in attracting apprentices and graduates into the nuclear industry.
 - Jacobs works with educational establishments local to our offices to encourage applications to apprenticeship and graduate programmes.
 - September 2022 intakes
 - 100 graduates (all engineering, scientific and project delivery disciplines)
 - 50 apprentices (focused on engineering disciplines)
 - 2023 intake will be similar or larger

Challenges in maintaining and growing a competent workforce

Conclusions (1)

- There is a shortage of skilled engineers, scientists and project delivery resources across the nuclear industry and this has been recognised by the UK Government
 - Very high demand for engineers, scientists and designers from other zero carbon energy and large infrastructure projects, transport electrification, and other sectors
 - Recent UK Government announcements for funding support for Sizewell C, the Rolls-Royce SMR and AMRs will increase the demand for highly skilled nuclear resources
- Jacobs and the nuclear industry in general are keen to work with the education sector at all levels, and other stakeholders to fill the current and future skills gap
 - The nuclear industry engages with NSAN to support training initiatives and to coordinate with the UK Government
- The industry needs resources with specific technical skills who also have a range of general skills (slide 8) to enable them to operate effectively.

Challenges in maintaining and growing a competent workforce

Conclusions (2)

- Academia could support the nuclear industry by:
 - developing courses, or modules within courses, that focus on nuclear science, engineering and project delivery
 - These could include courses where there are specific skills shortages (slide 6) and provide opportunities to work on real world designs
 - Consider how long-term research can be supported taking into account a three year PhD period.
 - Encourage students to consider a career in nuclear
 - Advise industry on how it can better engage with students

Conclusions (3)

- Improving collaboration between industry and academia
 - Develop Internship and work experience (year in industry) programmes
 - Feedback to universities (and current students) from recent graduates, and industry, how academic courses support the transition into work.

Thank you

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Jacobs

Challenging today.
Reinventing tomorrow.

