Fusion Industry Taskforce Policy Recommendations for The Development of Skills in UK Fusion

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Fusion Industry
TASKFORCE

Introduction

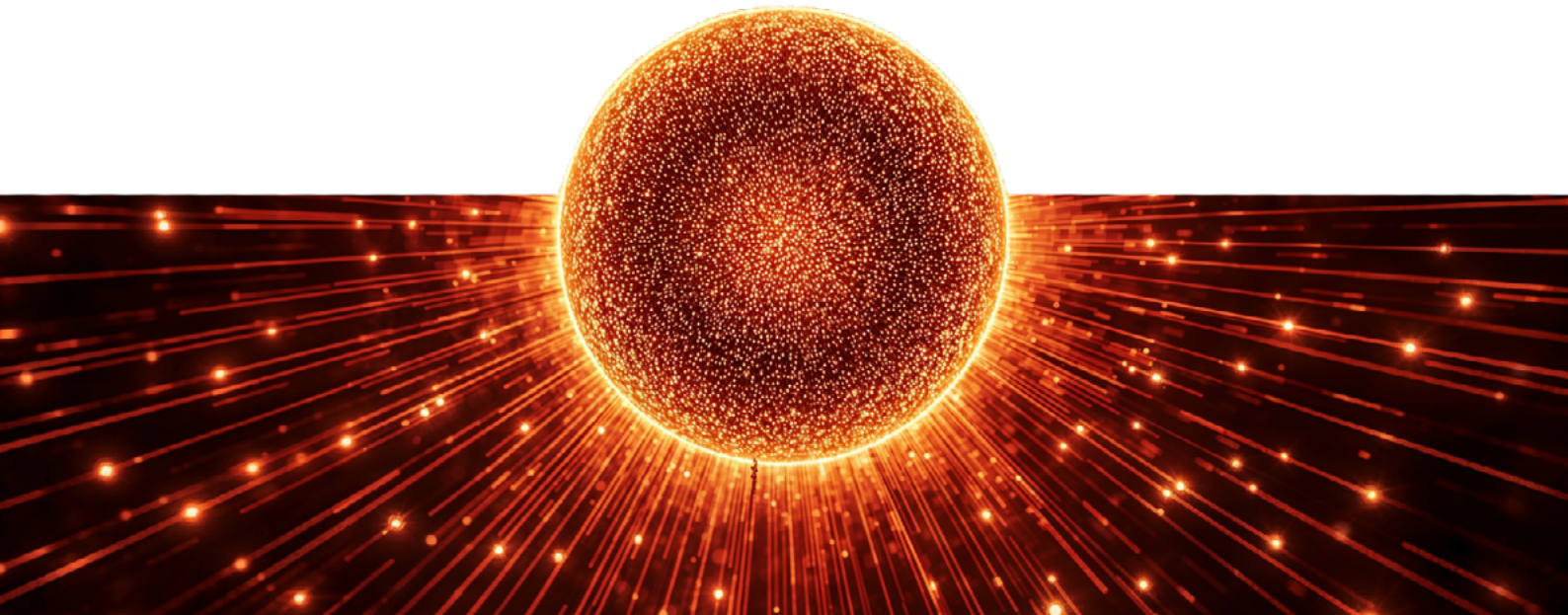
The lack of a suitably skilled workforce presents arguably the greatest challenge to the success of fusion. The Fusion Skills Council, as reported in the most recent UK Fusion Strategy, has estimated that:

> The fusion workforce will need to grow by at least 3000 people within five years and by 7000 people within 10 years. This is likely to be an underestimate of the needs of the entire sector.
>
> - **The Fusion Skills Council**

This increase is required across skill levels and job types. Some of these roles are fusion specific. Other roles are generic science and engineering roles. Some are less technical but no less vital.

This challenge cannot be met (nor should it be met) by fusion in competition for people in adjacent sectors. Instead, fusion must work with the rest of the science and engineering community to increase the number of scientists and engineers. Fusion can play a useful role in attracting new recruits to STEM careers because it is a new and exciting technology, which carries clear social benefits. Conversely, fusion faces the challenge that, although we know that the jobs will be required in the future, not all of these roles currently exist.

FIT believes that the UK is currently leading the world in fusion-specific skills training, and it is important that this remains the case. Opportunities exist for extending our delivery overseas in collaboration with international partners including the IAEA. These training projects would be mutually beneficial to fusion programmes both in the UK and overseas.



Policy objectives

The objectives of the Skills Pillar are to outline how information sharing can be outlined at different stages of development and how learners should be treated to ensure the UK has fusion at the heart of STEM. FIT's recommendations are mostly categorised by learner type since this might facilitate implementation.

Building an inclusive and diverse fusion workforce – fostering an inclusive and diverse workforce is key to attracting the best talent, enhancing innovation, and positioning the fusion industry as an attractive place to work.

Inspiring early and sustained interest in science and engineering – inspiring STEM participation in education helps to build a stronger future workforce, which will in turn increase the rate of advancements in fusion research.

Enabling flexible career pathways – providing flexible pathways to roles in STEM allow those who may not have traditionally taken the route to get involved, creating a more diverse workforce which will boost innovation.

Coordinating national and regional skills infrastructure – providing the UK with infrastructure that links skills avoids duplication of work, improves efficiency, and will ensure that the best talent is available for the fusion industry to progress.

Aligning skills development with industry growth and innovation – aligning skills development with the growth of the fusion industry is key to capturing global investment as it positions the UK as a global leader in fusion advancements.

FIT Recommendation #1

Diversity and inclusion practices must be embedded in every activity at every stage

Stereotypes of role holders should be challenged. Barriers to access should be recognised and removed. Participants from underrepresented groups should be explicitly supported. Recruitment practices should be strengthened by effective training for decision makers and processes that facilitate merit-based selection. Those with reduced access to prior opportunities should not be penalised.

FIT Recommendation #2

Primary & early secondary school key stages 1-3

Science & engineering should be taught as disciplines that are as creative as they are analytic[1]. Opportunities for practical work and problem solving must be maximised. Children should understand that it is beneficial to try out ideas even if they do not work. The value of science to society should be explained, including the availability and breadth of careers. Engagement with parents (as well as their children) will reinforce the principle that everyone, independent of gender, ethnicity or social background, can become a scientist or engineer. Schools should have opportunities to engage in outreach events. Teachers should have opportunities to attend relevant training[2]. These opportunities should be available independent of geographical location. Resources should be targeted at schools and regions with historically low career aspirations and/or low adoption of science and engineering educational opportunities.

FIT Recommendation #3

Secondary school key stages 3 & 4

The activities and principles in the previous paragraph should be continued and reinforced. Fusion energy concepts should appear on all science GCSE syllabuses (i.e. whether single, double or triple subject variants). Fusion should be regarded in the syllabus both as a fundamental nuclear process (where relevant) and also an energy source. Its benefits and drawbacks should be discussed to the extent that these students can make informed decisions about whether to support fusion when proposals are made by the government. Students need to be suitably advised about the qualifications that might be required for careers in science or engineering (including the requirement for sufficient mathematics).

FIT Recommendation #4

School/College A-level

Fusion should appear on the physics A-level syllabus to at least the same extent as other energy producing technologies. Students should be able to describe the deuterium-tritium and neutron-lithium nuclear reactions that are most likely required for commercial fusion. Students should be able to explain why fusion requires a high temperature fuel and why it is fundamentally safe.

[1] **FuseNet's primary school fusion teaching materials:** https://fusenet.eu/for-educators/primary-school-fusion-educational-materials
[2] **FuseNet Teacher Day:** https://indico.fusenet.eu/event/58/

FIT Recommendation #5

Apprenticeships and higher technical education (HTE)

Apprenticeship programs and industry-academic partnerships should provide practical training, real-world experience, and pathways into fusion careers, ensuring skills are aligned with industry needs. Vocational pathways into the sector are still underdeveloped. For example, there are over 1,600 recognised apprenticeship standards in the UK, but none are explicitly titled or scoped for fusion energy. Instead, fusion employers rely on adapting existing standards—an approach that works well in some cases but lacks national coordination or recognition. Consequently we recommend co-creation of fusion-branded apprenticeship standards; embedding of fusion content into existing apprenticeships and HTE; a national fusion careers visibility campaign; and a fusion ambassadors programme.

FIT Recommendation #6

University undergraduate programmes (BEng, BSc, MEng, MPhys) and postgraduate taught programmes (MSc)

Barriers to access should be minimised. Foundation year programmes should be supported, to enable students from less traditional entry pathways. Financial support should be provided to those for whom this is a barrier. Student science and engineering societies should be supported by industry stakeholders e.g. through provision of talks and careers activities. Summer internships must provide opportunities to experience real-world industrial and research practice. MSc programmes should be designed to service their target industries, considering both the knowledge and skills that are required by potential employers of their graduates.

FIT Recommendation #7

Doctoral (PhD/EngD) training programmes

Doctoral (PhD/EngD) training programmes should support both fusion science[3] and fusion engineering[4]. The government (via research councils or other agencies) should provide the core funding, which should then leverage relatively substantial additional resource from non-academic partners, including industry from within the UK and overseas. Students should benefit from being part of a supportive cohort. As well as developing core research skills and specialist knowledge, successful graduates should also develop transferable and industrial skills, and a broad background knowledge that enables them to contextualise their research and apply their skills to a range of problems and in a range of contexts. A substantial proportion of graduates should go on to leadership roles in the UK fusion sector, recognising that others will take on roles in adjacent sectors and also overseas.

FIT Recommendation #8

Reskilling, retention and translation between sectors

Professionals in adjacent sectors with relevant skills should be welcomed into the fusion community, without fusion behaving as a poacher of talented individuals from other areas. This should be facilitated by a range of training opportunities including, for example, the Fusion Industry School[5]. Similarly, those trained for roles in fusion will be well-suited for careers in other sectors. Some roles (for example in procurement or project management) may be almost immediately translatable across sectors whereas more technical roles may involve more specific translation to identify which technical competencies are sector-specific. In this fluid career environment, fusion employers must provide attractive employment packages in order to retain the best staff.

FIT Recommendation #9

Funding

Central government must continue to grow its funding of fusion training. It is only through the provision of core funding from EPSRC, the UKAEA's FOSTER programme and other government agencies that funds from private stakeholders for skills training can be leveraged.

[1] **Fusion CDT:** https://fusion-cdt.ac.uk/ [2] **Fusion Engineering CDT:** https://www.fusion-engineering-cdt.ac.uk/
[3] **Fusion CDT:** https://fusion-cdt.ac.uk/fusion-industry-school/

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