UKAEA unveils 2026-2030 fusion roadmap

14.4.2026 - | Her Majesty's Revenue and Customs

UK’s national fusion laboratory charts a clear mission and targets progress towards fusion energy and generating economic benefits for the UK.

The United Kingdom Atomic Energy Authority (UKAEA) Group has launched its 2026–2030 organisational Strategy for UKAEA’s national fusion laboratory, building directly on the UK Government’s Fusion Strategy launched last month and aligning with the Strategy of UKAEA Group’s subsidiary company, UK Fusion Energy Ltd, also published today.

The Strategy sets out the national laboratory’s role to deliver foundational research, technology and innovation in support of the UK fusion sector through world-leading expertise and capability.

The UKAEA Strategy outlines objectives for 2030, including:

- supporting UK Fusion Energy Ltd to complete a detailed design of the STEP Fusion prototype power plant
- increasing the number of UK companies delivering fusion products and services around the world
- completing new internationally leading research facilities at Culham Campus in Oxfordshire
- growing a new generation of fusion scientists, engineers, and technical experts

Speaking at The Economist’s second annual Fusion Fest event in London, Dr Tim Bestwick, UKAEA CEO, said:

> Building on the UK Government’s ambitious Fusion Strategy, which was launched last month, the UKAEA Strategy provides further detail of our programme.
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> We are focused on technical excellence and delivery in key technology areas essential for future fusion power plants and building a thriving commercial industry to support fusion.

The Government’s Fusion Strategy directs research and development to yield near-term scientific and economic benefits and support the growth of a competitive domestic industry, backed by skills development at all levels, to lay the foundations for deployable fusion energy.

Fusion offers the promise of large-scale, low-carbon energy to meet rising demand, enhance resilience against climate change and safeguard energy security.

Fusion is tipped to be a multi-trillion-pound global industry in the second half of the century, and it is at an inflection point in 2026. But getting there involves a set of technical challenges, which span specialist science, novel manufacturing, integrated design and large-scale infrastructure.

UKAEA Group is stepping up to that challenge. UK Fusion Energy Ltd has published its first Strategy alongside the national laboratory, describing how it will partner with industry and with the national laboratory to build the capacity necessary to develop and build STEP Fusion – the UK’s prototype fusion power plant – and successive fusion power plants.

What are the challenges and how will UKAEA develop solutions?

UKAEA's Strategy describes how it sees fusion as four interrelated challenges:

1. Effective fusion core – deliver sufficient power output from the heart of the fusion machine, controlling the plasma while managing the demands on the components inside to export more energy out than goes in.
2. Fuel self-sufficiency – operate an efficient, closed cycle without the need of a sustained external supply of fusion fuel.
3. Systems integration – combine diverse components and systems into one energy-producing installation while delivering all required performance objectives.
4. Affordability and attractiveness – doing all the above in a way that is affordable and attractive in a global energy market.

To address these challenges, UKAEA will focus its work with industry and academia to build knowledge and capability across the technical disciplines required:

- plasma understanding and control
- fuel cycle development
- advanced materials
- robotics and automation
- fusion technologies including high-temperature superconducting (HTS) magnets
- components production
- integration and design
- advanced computing

UKAEA will also serve as the 'Fusion Partner' to UK Fusion Energy Ltd, applying technical knowledge in these areas to advance the design and development of the STEP prototype power plant.

A strategic approach

The Strategy highlights the major technical outcomes UKAEA will deliver by 2030, incorporating a focused subset of flagship targets set out in the UK Government's Fusion Strategy. The Strategy describes how these activities explicitly target scientific and economic benefits for the UK, collaborating internationally, undertaking cutting-edge research, commercialising technologies for adjacent applications and supporting UK industry to grow.

Efforts will be spread across its four sites – Culham Campus in Oxfordshire, West Burton in Nottinghamshire, Cumbria, and South Yorkshire.

By taking this coordinated, determined and strategic approach, UKAEA will deliver against the government's UK Fusion Strategy. Working to clear challenging but achievable targets, UKAEA's Strategy will derisk the pathways to deployable fusion, stimulate the growth of the UK fusion supply chain and maintain the UK's position as a global thought-leader in the field.

Dr Nick Wayth FEI, Chief Executive of the Energy Institute, said:

> UKAEA's new strategy sets out a clear and credible vision for delivering sustainable

fusion energy. By combining world-leading research with the delivery of the STEP prototype power plant, stronger international collaboration, and a focus on skills and industrial capability, it shows how fusion could strengthen the UK's energy system. The strategy demonstrates how investment in innovation could deliver long-term economic growth, energy security and opportunity for UK plc.

Andrew Holland, CEO, Fusion Industry Association, said:

UKAEA has shown real commitment to industrial partnerships in recent years, and their four strategic themes of 'International, Research, Commercialisation, and Industry' show readiness to support the growth of a thriving UK private sector.

A comprehensive end-to-end private fusion industry is emerging, with commercial plants anticipated within the next decade.

For the UK to develop its economy as a major fusion power, UKAEA will be at the center of the partnership between industry and government. The FIA has demonstrated how the UK could capture billions in economic activity from fusion, putting the country at the center of the new industry - capturing huge economic opportunities, and further enabling this vital technology for all the world.

Since its inception, the FIA has worked hand in hand with DESNZ and UKAEA to commercialize fusion. We look forward to their continued cooperation with our members: the industrial partners that are driving innovation today and will be the leaders of the new industry.

Jannet Shimel, Portfolio Director for Advanced Energy Technologies at AtkinsRéalis, said:

This is a clear, confident and credible pathway for turning world-leading fusion science into lasting national and global benefit, and we welcome UKAEA's continued leadership of the national fusion laboratory and its pivotal role in delivering STEP, alongside UK Fusion Energy. By combining deep scientific excellence with a strong commitment to collaboration, commercialisation and skills, UKAEA is creating the conditions needed to industrialise fusion responsibly and at scale.

This strategy provides industry, academia and international partners with confidence, clarity and opportunity to engage, and it will enable a thriving fusion ecosystem for the decades ahead. AtkinsRéalis looks forward to continuing to share our knowledge and experience as we collectively engineer the science of fusion for the future.

Professor Lee Margetts, Director of the Fusion Engineering Centre for Doctoral Training, said:

As set out in the section on the FOSTER skills programme, aligning doctoral training with UKAEA strategy is enabling the development of a new generation of engineers who will strengthen the pathway from fusion science to engineered, deliverable solutions – an approach central to building the sustained national capability required for the UK's fusion ambitions.

Supporting industry and international collaborations

As part of UKAEA’s 2026-2030 Strategy rollout, it is launching:

- an SME guide to facilitate small- to medium-sized enterprises navigate opportunities in the fusion supply chain
- the Diagnostics Centre for Excellence (DICE), leveraging UKAEA’s decades of plasma science expertise
- the Cumbria Robotics Operation Skills Centre (CROSS) to build the robotics workforce needed for fusion

UKAEA welcomes increased investment and new partnerships to accelerate fusion development. Domestic as well as international governmental and private sector companies are invited to engage with UKAEA’s programmes, facilities and expertise to contribute to a world-leading UK fusion ecosystem.

Read the UK Atomic Energy Authority strategy 2026 to 2030

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https://www.gov.uk/government/news/ukaea-unveils-2026-2030-fusion-roadmap