



UK Atomic
Energy
Authority

Annual Report and Accounts 2022/23



HC 303

United Kingdom Atomic Energy Authority

Annual Report and Accounts 2022/2023

For the period 1 April 2022 to 31 March 2023

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United Kingdom Atomic Energy Authority
Culham Science Centre
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Oxfordshire
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United Kingdom

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Chief Executive's
statement





Fusion energy at a glance

UKAEA leads the world in fusion research with a wide range of programmes covering plasma science, robotics, materials testing and development, and tritium science. Our scientists and engineers are working with partners around the globe to develop fusion as a new source of clean energy for tomorrow's power stations.

HOW DOES IT WORK?

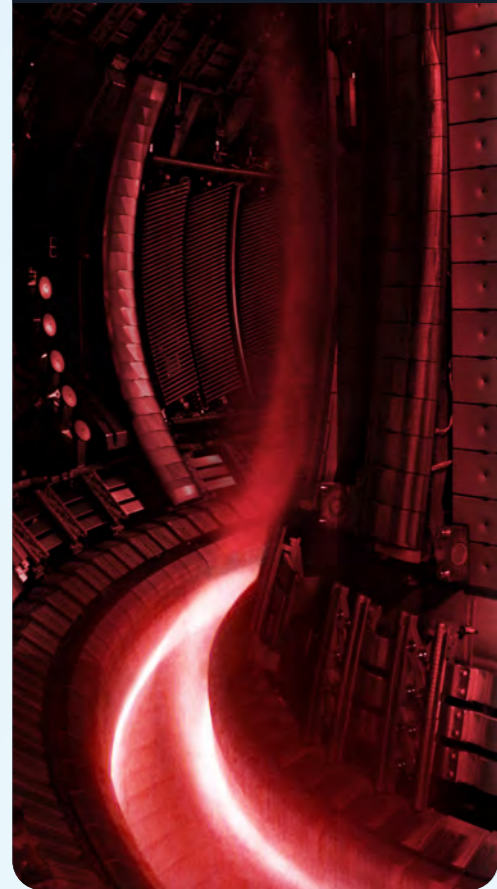



Fusion takes place in the heart of the stars and provides the power that drives the universe.





A combination of hydrogen gases, deuterium and tritium, heated to very high temperatures to create a plasma.

Energy is released when the lighter deuterium and tritium atoms fuse together to form a heavier helium atom and a neutron.

Scientists and engineers all over the world are developing the technology to sustain this process on Earth to create a new source of sustainable energy.



WHAT NEXT?



The UK is a world leader in the most promising fusion energy technologies.




UKAEA collaborates with the best talent and facilities globally, including ITER, the world's largest fusion project.



2040


The UK also aims to build a prototype fusion power plant – STEP – in the UK targeting completion around 2040.




Private companies in the UK and around the world are also developing their own fusion power plant designs.



BENEFITS OF FUSION



Low carbon

Fusion energy is carbon-free at the point of generation.



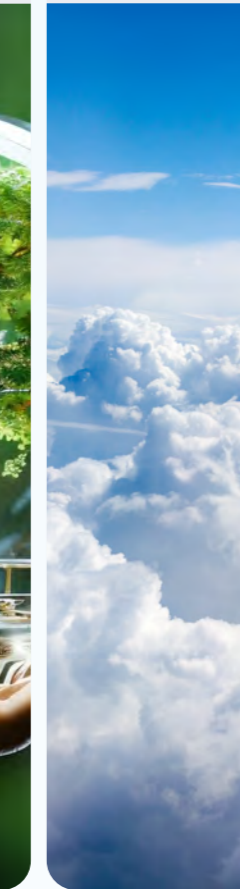

Safe

Fusion energy is a safe and low risk technology.



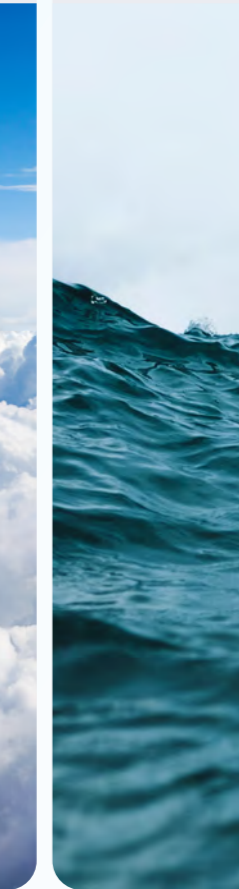


Reliable

Fusion complements other sustainable energy forms and is independent of the weather.




Sustainable

Fusion fuel is potentially abundant in our seas and the Earth's crust.

Energy efficiency

Fusion provides the most power-dense process available on Earth.



Year in numbers

OVERVIEW



11%
Financial growth

PERFORMANCE

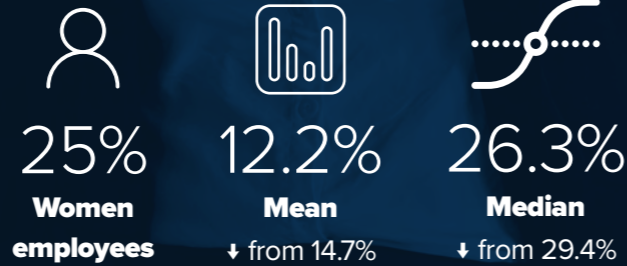


80%
Milestones achieved
31 fully achieved
8 partially achieved
10 missed

PEOPLE



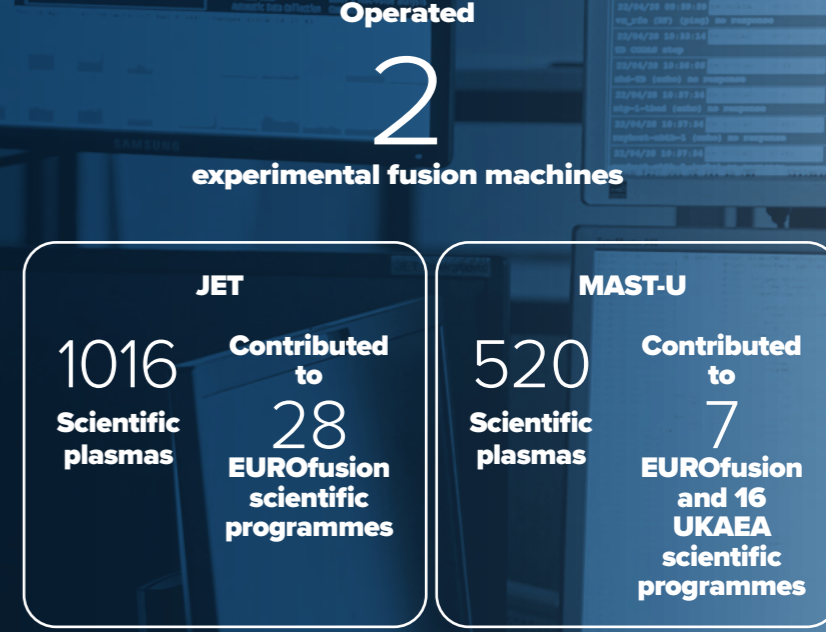
GENDER PAY GAP



SCIENTIFIC CONTRIBUTION



TOKAMAK OPERATIONS



Highlights

Month	Event
April 2022	Strategic outline business case complete for the second tranche of the STEP prototype fusion power plant programme.
May 2022	UKAEA scientists reveal Tungsten x-ray breakthrough for non-destructive testing of fusion component. Laser-welding robotic snake demonstrates solution to fusion energy pipework challenge.
June 2022	UKAEA's advanced computing research boosted by exascale collaboration.
July 2022	UKAEA and Commonwealth Fusion Systems sign collaboration agreement to advance fusion energy.
August 2022	Oxfordshire Advanced Skills training centre expansion will launch space and robotics apprenticeships.
September 2022	UKAEA co-hosts new OX to ZERO summit, showcasing Oxfordshire's world-leading solutions to reaching net zero.
October 2022	Site of UK's first fusion energy plant selected as West Burton in Nottinghamshire. UKAEA organises the first-of-its-kind FUSION22, energising the global fusion industry.
November 2022	Upgraded Materials Research Facility doubles capacity and empowers fusion research.
December 2022	UKAEA participates in COP27 panel.
January 2023	First Light Fusion to build demonstration facility at UKAEA's Culham Campus.
February 2023	Plasma 'heat barrier' demonstration by JET boosts ITER and future powerplants. Tokamak Energy's fusion prototype to be built at UKAEA's Culham Campus.
March 2023	UKAEA signs four key research partnerships with the UK, US, Japan, and Korea. Prime Minister and Secretary of State choose Culham to unveil the UK's new energy security plan.

Operating model

Our operating model enables us to progress our mission and defines our approach to delivering on our strategic objectives. It is designed with a focus on:

- ▶ The safety and wellbeing of our staff
- ▶ The delivery of our major R&D programmes
- ▶ Support and development for our business units
- ▶ High quality and robust assurance across all of our activities

What we do



Research and development

Experimental, modelling, and engineering research to advance fusion and related fields



Tokamak operation

Operating and managing two tokamak machines on Culham campus: JET, operated on behalf of the European Commission; and MAST Upgrade, the UK's new and novel spherical tokamak



Supporting national and international science

Taking part in and leading domestic and international collaborations in fusion science and engineering and adjacent fields



Facility operation and management

Steer the RACE and MRF divisions, and develop the Fusion Technology and H3AT facilities to provide unparalleled capabilities for us and our stakeholders



Training the next generation

Developing skills for the future fusion sector through the Oxfordshire Advanced Skills apprentice training centre, graduate scheme, and PhD programme



Campus development and site management

Managing the Culham, Cumbria, South Yorkshire and West Burton sites for UKAEA activities and tenants, and public share of the Harwell campus joint venture, alongside UKRI (STFC)

How we do it

Safety

Safety is our highest priority and UKAEA operates with a robust safety culture, supported by a certified health and safety management system, underpinned by integrated risk management and control, with top down leadership, a dedicated safety team and expert individuals authorising operations.

Assurance

As we design and develop new technology, plant and processes it is essential that we achieve high standards of quality and governance in the work we do. This includes acting in a responsible and ethical manner with our partners and supply chain, adhering to our values with appropriate governance of risk. Our research is conducted in line with UKRI guidelines and open data policies.

People

To achieve our mission, we need diverse and talented people working in an environment that challenges and stimulates innovation and produces future leaders in fusion. We support and develop staff, and manage our talent pipeline, with a dedication to equality, diversity and inclusivity.

Funding

Our major sources of funding are from the UK government, through our sponsor department DESNZ and the Engineering and Physical Sciences Research Council fusion grant.

Expertise

Our work is state-of-the-art and demands a varied range of skills. In areas where skills are highly specialised our technical resource is embedded within teams. In other areas, we operate centralised resource management to ensure our programmes deliver efficiently and effectively.

Partnerships

We cannot deliver fusion energy in isolation, and engagement with external partners in industry and academia, both domestic and international, is key to our delivery.

What we did in 2022/23

- ▶ Produced globally impactful results in a number of key areas, including plasma physics, materials science, tritium, and robotics
- ▶ Presentations at high impact international conferences

- ▶ Commenced final period of JET Science Operations
- ▶ New record performance achieved for the MAST-Upgrade experiment

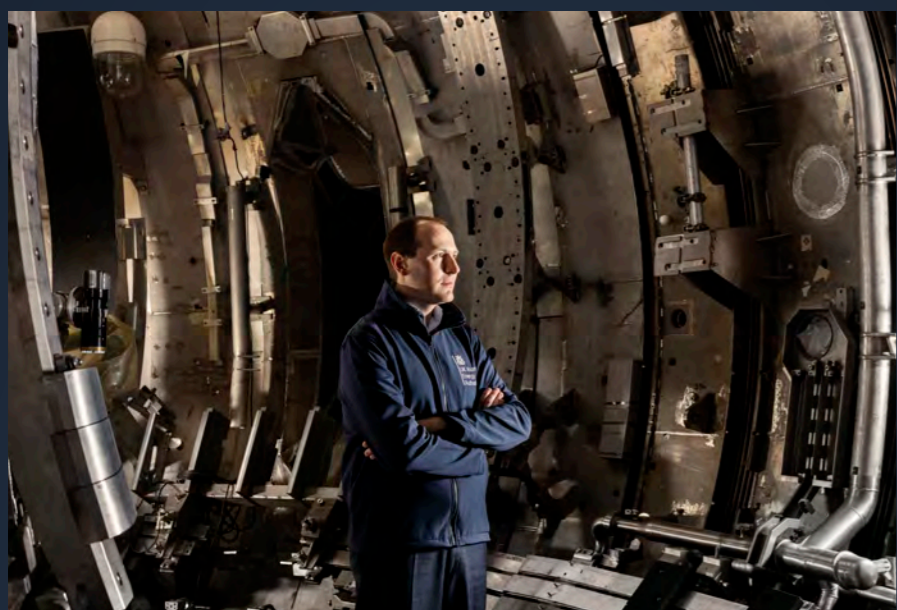
- ▶ Collaborating with ITER and the US, using JET operations and scientific modelling to inform the design of ITER systems and their commissioning approaches
- ▶ Contributed to and led international scientific teams in EUROfusion
- ▶ Signed bilateral collaboration agreements with Commonwealth Fusion Systems (US), General Fusion (Canada), and Tokamak Energy (UK)
- ▶ Created, promoted, and grown clusters to support robotics and artificial intelligence, materials research, and fusion innovation

- ▶ Mobilised operations at the STEP prototype powerplant site in West Burton, and the RAICo1 site in Cumbria

- ▶ 300 new employees including 24 apprentices and 54 graduates
- ▶ Hosted 11 industrial students, 41 summer students and 16 work experience students

- ▶ Opened 9250m² of new office and facilities space
- ▶ Started construction of the new UKAEA HQ, OAS training centre extension, and commercial tenant buildings
- ▶ Installed 470kW of solar PV and renewed 1.5Km of pavements

Chief Executive's statement



"WE ARE LUCKY TO HAVE BRILLIANT, RESOURCEFUL AND DETERMINED PEOPLE, UNITED BY AN ALTRUISM TO DELIVER FUSION."

Professor Sir Ian Chapman
Chief Executive and Accounting Officer

This year continued to demonstrate the harrowing manifestation of climate change: Cyclone Batsirai displaced 60,000 people and destroyed 124,000 homes in Madagascar; 33 million people were impacted by deadly flooding in Pakistan which covered a third of the country with the UN warning it was "hard to predict if Pakistan will be able to rebuild its lost infrastructure in this decade"; 907 people lost their lives to lightning strikes in India with government figures showing a 111 times increase in lightning this year; a new record temperature of 40.3° was registered in the UK as fires broke out around Europe; Typhoon Nanmadol resulted in 4 million evacuations in Japan; 100 people died in Florida due to Hurricane Ian, the worst in a century; and this horrifying list goes on and on... These events are now a regular part of our lives, not some conjectured dystopia. In March 2023, the UN's Intergovernmental Panel on Climate Change (IPCC) released its sixth synthesis report, saying that we are now at the last chance to make "deep, rapid and sustained" cuts to greenhouse gas emissions. This is why we believe that UKAEA's mission to lead the delivery of sustainable fusion power and maximise the scientific and economic benefits on that pathway must play an important role in addressing climate change, not so much in making 'rapid' cuts to greenhouse emissions, but integral to 'sustaining' them. Fusion has the potential to provide low-carbon, sustainable, inherently safe and continuous power, and whilst technical challenges must be overcome on the quest to deliver fusion, it will be worth the effort.

Fusion is firmly part of the recent government energy security strategy. Indeed, this strategy was announced by a visit from the Prime Minister and our Secretary of State to Culham in March. The recent Machinery of Government change saw UKAEA move from the science and innovation directorate in the old Department for Business, Energy and Industrial Strategy to the new Department for Energy Security and Net Zero – this in itself is a sign that government share our ambitions to realise fusion energy. We continue to experience tremendous support from government towards our mission, especially in bringing private sector participation into fusion. For example, a new £55m Fusion Industry Programme was launched this year and has already seen 19 different organisations leading innovation projects.

On 7th September 2023, the Government announced plans to put in place ambitious alternative R&D programmes to support the UK's flourishing fusion sector and strengthen international collaboration following the decision not to associate to the Euratom Research and Training programme (Euratom R&T) and by extension, the Fusion for Energy Programme. We were pleased with a decision which ends many years of uncertainty about our relationship with our EU partners. We now know that the government plans to invest up to £650 million until 2027, subject to business case approvals in addition to the £126 million announced in November 2022. We anticipate that further details on the alternative programmes will be set

out later in 2023. We remain very open to collaboration with the EU and other international partners, and this will form a key part of this new programme of work. The new alternative fusion R&D package will include: new facilities, specifically to grow new fusion fuel cycle capabilities and support innovation; a new fusion skills package, to ensure that we develop the skills and capability needed to deliver on our fusion strategy; further support to strengthen international collaborative projects; as well as other measures to accelerate the commercialisation of fusion and build on our research programmes.

This commitment has allowed us to continue operation of our world-record-holding JET facility. We have conducted unique experiments in support of ITER which can only be done at the stored energy achievable in JET. We are currently operating the final deuterium-tritium experiments on JET (only the third time this has ever been done at JET, and only the fourth time ever done in any magnetic fusion facility anywhere!) before JET ceases operation at the end of 2023. Make no mistake, this will be a major change for the organisation, but it offers great opportunity for us too. JET is not just a liability to decommission – though undoubtedly part of our future programme is to show sustainable decommissioning in fusion – but also a £bn-class asset with many subsystems that can be reused. These assets are already part of our value proposition to incoming private fusion companies. This year has cemented Culham as the epicentre of private fusion

development in the world, with Tokamak Energy and First Light Fusion announcing plans to build their next fusion facilities at Culham following General Fusion. These three companies, alongside the largest fusion research organisation in the world, and a range of globally unique facilities makes the UK the "go-to" place for fusion. We have supported the creation of the 'Fusion Cluster' which already boasts 200+ members in its first year as we aim to secure the well-known benefits of clustering such as enhanced inward investment, accelerated delivery and dispersion of ideas within the ecosystem. Our engagement with partners continues to expand at pace with over 4,500 companies now working with UKAEA.

Integral to this cluster is the evolution of UKAEA from an organisation that five years ago was utterly dominated by operating JET to one which supports seven Centres of Excellence that work across the full fusion lifecycle, from invention and research, to powerplant design, to operation of facilities, and finally to sustainable decommissioning and reuse. These Centres of Excellence are in Plasma Physics, Materials, Technology, Tritium Fuel Cycle, Robotics, Computing and Integrated Engineering. This breadth of capability is not found in any other single organisation and being able to integrate these disciplines allows us to support many different powerplant programmes, from the private sector companies to the flagship programme in the UK government's fusion strategy, STEP.

Chief Executive's statement continued

The STEP programme has made a number of important advances this year: Firstly, we have identified the West Burton power station as the site for STEP and begun mobilising site characterisation and some early team members on this former coal power station in North Nottinghamshire. Secondly, we will form a new company-limited-by-shares, called UK Industrial Fusion Solutions, initially as a wholly-owned subsidiary of UKAEA to lead the STEP programme from next year. Thirdly, we continue to make significant progress on the technical design, which has now had 1000 person-years of effort and recently progressed through an independent government-appointed technical review. And finally, the Energy Security Act 2023 has received royal assent, confirming that a bespoke and proportionate fusion regulatory framework will be established under the Environment Agency and the Health and Safety Executive.

As an organisation devoted to invention and discovery, the path doesn't always follow a straight course. We are late on a couple of our major projects, notably the world's largest tritium research facility, H3AT and our unique magneto-thermal-hydraulics test facility, Chimera. In part this is down to wider global supply chain disruption, in part it is down to the considerable technical complexity of these projects, and in part it is down to not being able to recruit and retain the right people at the right time. We are lucky to have brilliant, resourceful and

determined people, united by an altruism to deliver fusion. However, the biggest risk to the delivery of the UK's fusion strategy and our continued international stature is our ability to attract and retain the diverse and talented people we need. We will continue to work with our government sponsors to find a solution to this pressing issue.

The best part of my role is the opportunity to represent the 2,400 amazing colleagues with whom I work. I see everyday the creativity, invention and perseverance of this team, made up of people from a third of the countries in the world, pulling together to deliver fusion. This year, both our CFO, Antonia Jenkinson, and COO, Lyanne Maclean, moved to new opportunities with ARIA and Tokamak Energy respectively after making a major contribution with UKAEA. Their successors, Ruth Elliot and Justin Kingsford, joined us in May 2023. We were also delighted that Tim Bestwick, our Chief Development Officer and Deputy CEO, was deservedly recognised with an OBE in the King's Birthday Honours.

Fusion has the potential to change the world, but realising it is maddeningly difficult – just as we make breakthroughs in one area, another throws up new challenges. Finding integrated solutions that satisfy all of the constraints simultaneously is the real skill, and UKAEA has a breadth of capability that you don't find elsewhere. Beyond that, delivering fusion at pace is akin to the challenge our predecessors faced in building

cathedrals – beginning on the foundations before knowing how to build the roof. Given the size of the challenge, we will achieve nothing alone. We will need both our international and industrial partners increasingly as we take on the audacious challenges to deliver a prototype powerplant. That collective action remains the only way to address climate change. As the Pakistan's Minister for Climate Change said at COP this year, "the dystopia has already come to our doorstep", and we need urgent, sustained and concerted action to realise every solution we can, including fusion.



Professor Sir Ian Chapman
Chief Executive and Accounting Officer

17th November 2023



INTRODUCTION TO UKAEA



Our mission

Lead the delivery of sustainable fusion energy and maximise the scientific and economic benefit

Fusion, the process that powers the sun, offers the potential for a safe, abundant, low carbon, reliable baseload energy supply. With dependable output, fusion could be a great complement to renewable and other low carbon sources in the world's future energy mix.

The conditions needed to harness fusion are extreme and the journey to get there is particularly challenging. At UKAEA we are utilising our world-leading capabilities and expertise to drive the delivery of sustainable fusion energy, and through collaboration, we are addressing the scientific and engineering challenges that stand in the way. Whilst the imperative to arrest the damaging impact of climate change is at the forefront of our mission, we will do our best to capture the huge economic and social opportunities arising from fusion energy.

UKAEA is the largest fusion organisation in the world and has pioneered fusion research for many decades. We have built strong international partnerships, we also drive an ambitious domestic fusion programme, and support a thriving private sector. All of our activities are underpinned by globally unique

facilities on our sites in Oxfordshire and South Yorkshire, and a vibrant, diverse, and talented workforce supported by a commitment to equality, diversity, inclusivity, skills growth and development.

Our research focuses on the tokamak concept. In this approach, a mix of two types of hydrogen is heated to form a plasma at extreme temperatures (10 times hotter than the core of the sun). The plasma is held within a toroidal, or doughnut, shaped machine by large electromagnets, and under these conditions the particles of hydrogen fuse together to create helium and release huge amounts of energy. However, the tokamak is not the only potential solution to achieving fusion power and we are supporting the growth of the UK fusion ecosystem and other fusion concepts to maximise the ability of the UK to deliver its Fusion Strategy.

Harnessing fusion was recognised by the late Stephen Hawking as one of the grand technical challenges for humankind. With the unique breadth of capability at UKAEA, a growing fusion supply chain, and an increasing number of private companies entering the market, a fusion future is closer than ever before.

In 2021 the UK government set out ambitious plans for fusion in the UK through the Fusion Strategy, with UKAEA as the key delivery partner. The aspirations of the Fusion Strategy are for:



The UK to demonstrate commercial viability of fusion by building a prototype fusion power plant in the UK that puts energy on the grid



The UK to build a world-leading fusion industry which can export fusion technology around the world in subsequent decades

<https://www.gov.uk/government/publications/towards-fusion-energy-the-uk-fusion-strategy>

Our people and culture

UKAEA is an incredibly multicultural organisation, with a third of all nationalities represented within our workforce – that’s people from 70 different countries! We are dedicated to growing a pipeline of talent in the fusion sector, underpinned by our commitment to Equality, Diversity, Inclusion, and Wellbeing (EDI&W) and our public sector equality duties. Our aim is to be an employer of choice, and valuing and celebrating all forms of diversity is the right thing to do; attracting, retaining,

and developing people to their full capability, regardless of individual differences.

We celebrate the diversity of our staff and are proud of having created a friendly and open environment, where everyone’s opinion is valued, and curiosity and questioning is encouraged.

We want everyone to bring the best of themselves to work, so we champion EDI&W. We recognise that this requires constant engagement and effort, and that

there is always more we can do. We have recently appointed a fantastic new head of EDI&W, who brings a wealth of knowledge and specialist experience to UKAEA. She is keen to enable quick action and great results.

The binary terms “women”, “men”, “female”, and “male” used in this report relate to legal gender.

Who we are?



We have more than seven different religions and many belief systems represented, as well as atheist and agnostic colleagues.



At least 11% of us are from ethnic minority backgrounds (19% of employees have not shared).



At least 6% are LGBTQI+ (32% of employees have not shared).



At least 5% have a disability (37% of employees have not shared).

We are split across four main job families. The majority of our staff are technical, with engineers making up more than half of the total number of employees.

SCIENTIFIC

Staff in scientific and closely related disciplines e.g. physics, materials research, neutronics, and advanced computing.

ENGINEERING

Staff from a range of engineering fields who qualify to work towards, or already have, incorporated/chartered engineer status.

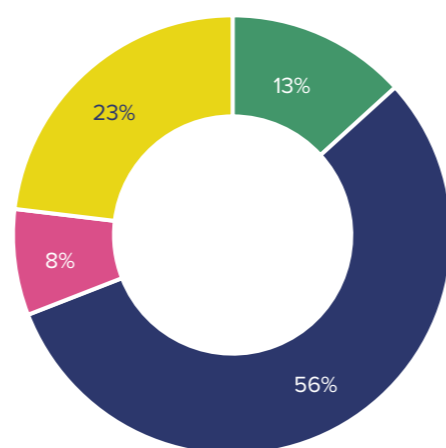
PROFESSIONAL SUPPORT (Technical)

Staff with a technical background whose skills don’t directly contribute toward the scientific/ research output of the site e.g. skilled trades and laboratory staff.

PROFESSIONAL SUPPORT (Non-Technical)

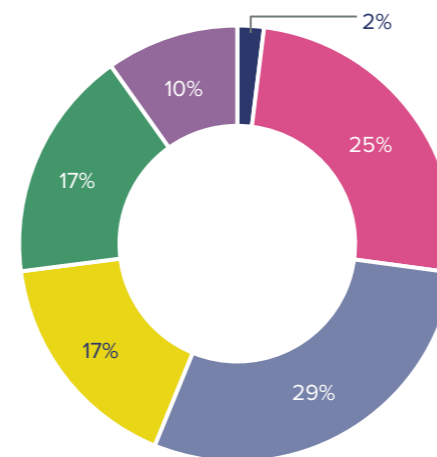
Non-technical support services to the organisation e.g. HR, finance, property, business development etc.

2022/23 Job family split



- Scientific
- Engineering
- Professional support (Technical)
- Professional support

2022/23 Age distribution



- Under 20
- 20 to 29 years
- 30 to 39 years
- 40 to 49 years
- 50 to 59 years
- 60 years +

We have a relatively young demographic compared to the working population in the South East (benchmark ONS, March 2023 (<https://www.ons.gov.uk/employmentandlabourmarket/peopleinwork/employmentandemployeetypes/datasets/regionalemploymentbyagex01>))

Reflecting the sectors in which we operate, 25% of our employees are female and 75% male. Self-reported gender identity shows that 0.75% of employees identify as non-binary and that a similar number of our colleagues are transgender. The trust demonstrated in these disclosures is a positive endorsement of the work we have put in to establish a safe and welcoming environment.

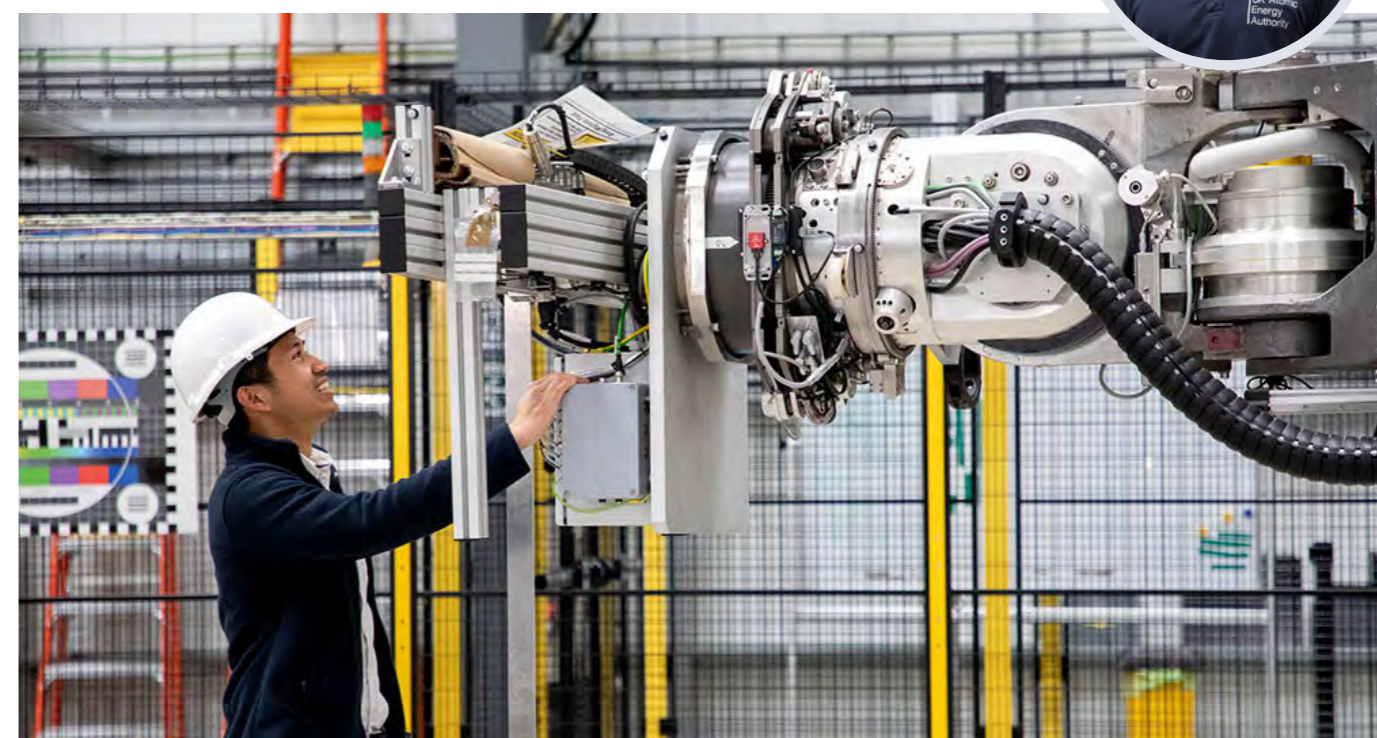
Our women are distributed unevenly across the job families, with the majority of women working in professional support (non-technical) roles.

26% of the organisation have people management responsibilities, 23% of our people managers are women and at least 8% of managers are from ethnic minority backgrounds.



The UKAEA team have always listened and helped with our issues where they could. It’s not just the support staff, my fellow graduates on the scheme were instrumental to my development during my time here. We are all supportive of each other and help whenever required. Nothing short of enjoyable and challenging.

Faiz Rahman Control Systems Software Engineer



INTRODUCTION TO UKAEA

Supporting our staff

2022 staff survey

The survey received 1000 responses (40% of staff) and was generally very positive about our culture. We are running focus groups to better understand the detail and developing plans for continuous improvement. Some feedback highlights include:

- 87% agreed that they are interested in and challenged by their work
- 90% feel that their manager trusts them to do their job effectively
- 89% feel able to identify and challenge inappropriate behaviour in the workplace
- 84% think that UKAEA respects individuals' differences

Gender pay gap

Despite our efforts to date, our gender pay gap remains too high. Skills shortages in the sector mean that we are very motivated to look after all of our staff. We have a targeted action plan and are planning to launch an ambitious EDI&W strategy next year.

Staff networks

We have a number of established networks; the women's network, parenting and carers network, disability network, LGBTQI+ network, the ethnicity, nationality and culture network, and our inclusion ambassadors.

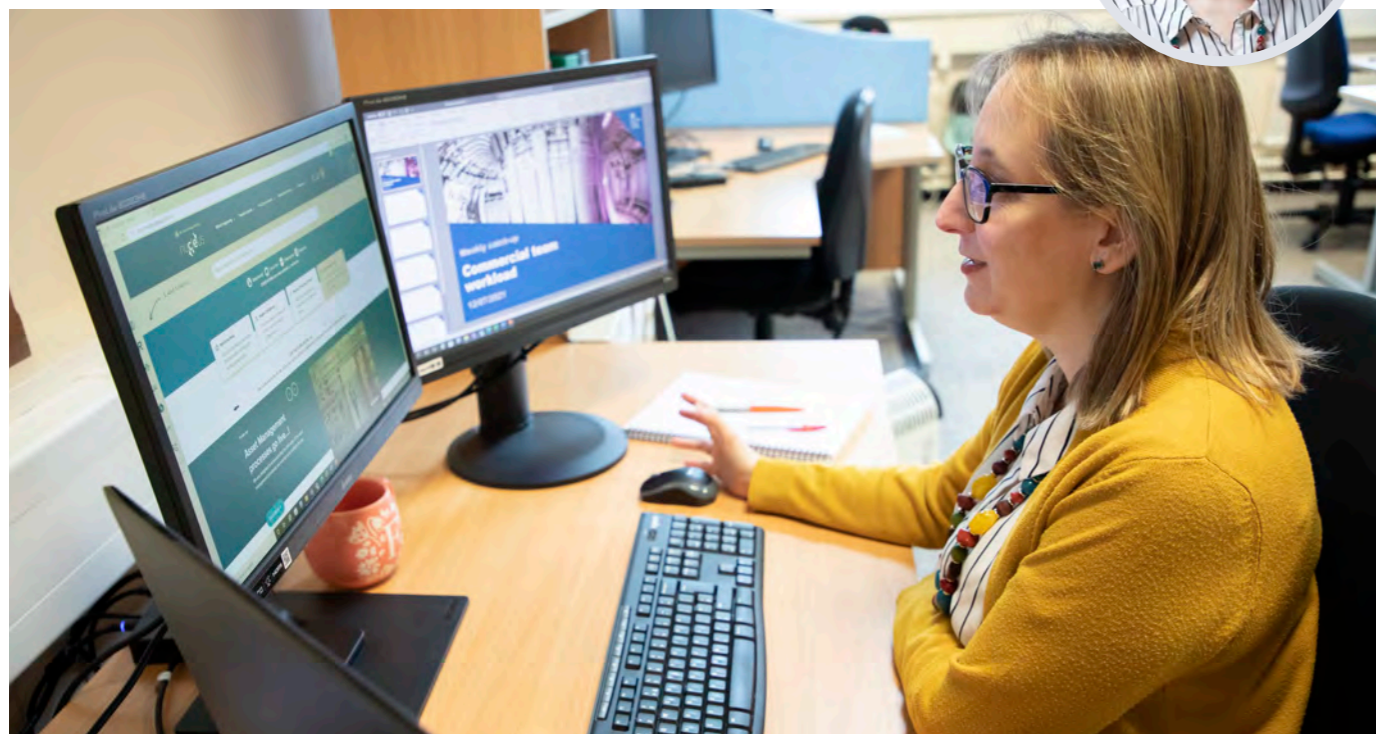
Wellbeing and mental health

We have an established team of mental health first aiders who can support staff and signpost to wellbeing resources. We hold regular events focused on a wide range of wellbeing topics and provide an individual health assessment option to all employees. To enable everyone to thrive we are keen to fast-track workplace adjustments for staff with long-term conditions, and we have access to a neurodiversity specialist team to assist this process.



It's great to be part of an organisation that is working towards such a big goal. You get a feeling of working together as part of a community to help towards that.

Fay Charlett Head of Commercial



INTRODUCTION TO UKAEA

Flexible working

Innovation often works best when colleagues are co-located, but it is clear that a blend of on-site and remote working promotes an optimal balance for many people. We offer hybrid working in all possible roles from the recruitment stage onwards and benefit from, and are supportive of, those who need flexible hours for any reason.

Early careers schemes

Growing our future talent pipeline is vital to building UKAEA capability and that of the fusion sector. At any one time we have around 200 employees on our attractive apprentice and graduate schemes, spanning all job families. We also have thriving student placement and work experience schemes, and support PhD students and research fellows.

Career development

As well as an increasing number of specialist and e-learning programmes, we value the informal and formal mentoring our staff generously offer to support learning, growth and career development. Our professional development scheme is accredited by the Institution of Mechanical Engineers, Institution of Engineering and Technology, and Institute of Physics.

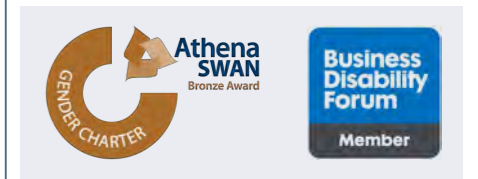
Partnerships

This year we worked in partnership with STEM Returners, Vercida, Returning Works, Advance HE (Athena SWAN), and Equal Engineers. These charters, specialist agencies, and industry standard bodies help us to achieve progress towards a more representative, fair and inclusive workplace.

Influence

We are proud and committed to support the transformation of the culture of the wider UK nuclear industry. We champion the Women in Nuclear network and are keen to engage with the Race Equality in Nuclear network. In March 2023, in partnership with Jacobs, we pioneered the Nuclear Rainbow Forum to make the nuclear industry more inclusive and welcoming to the LGBTQI+ community.

Our EDI&W accreditations



UKAEA is committed to creating an inclusive and supportive environment in which everyone can thrive.

Dr Amanda Quadling Director of Materials Research



Our sites



Cumbria – RAICo1

Home to **<10 employees** at present Size of site **1,000m²**

The first of a network of Robotics and Artificial Intelligence Collaboration (RAICo) hubs to support decommissioning of nuclear sites.

Opened at the end of March 2023, the site at Whitehaven will contain test facilities to mirror those used across the Nuclear Decommissioning Authority estate, enabling collaborations to accelerate robotic and AI solutions to decommissioning challenges.



South Yorkshire – Fusion Technology Facility

Home to **32 employees** Size of site **2,230m²**

Strategically placed at the heart of the UK's advanced manufacturing region, our site at Rotherham enables UKAEA to engage industry in commercial fusion development.

South Yorkshire hosts a number of the Fusion Technology Facility's test facilities. Its centrepiece will be CHIMERA - a unique device, designed to test prototypes in the extreme temperature, heat flux and magnetic environment representative of fusion power conditions.



Culham – UKAEA HQ

Home to **1745 employees** Size of site **0.6km²**

Culham has been a major international fusion research centre since the 1960s. It has hosted more than 60 different fusion experiments over the years, and is currently home to JET and MAST-U.

Culham Campus is one of the three large internationally significant science and business centres in south Oxfordshire, underpinning the county's economic growth and is the base for the majority of UKAEA activities and tenants.

The majority of our facilities are located at Culham, and investment in the site is focusing on creating a hub for UK fusion and growing a fusion ecosystem with industry.



West Burton – STEP

Home to **<10 employees** at present Size of site **3.6km²**

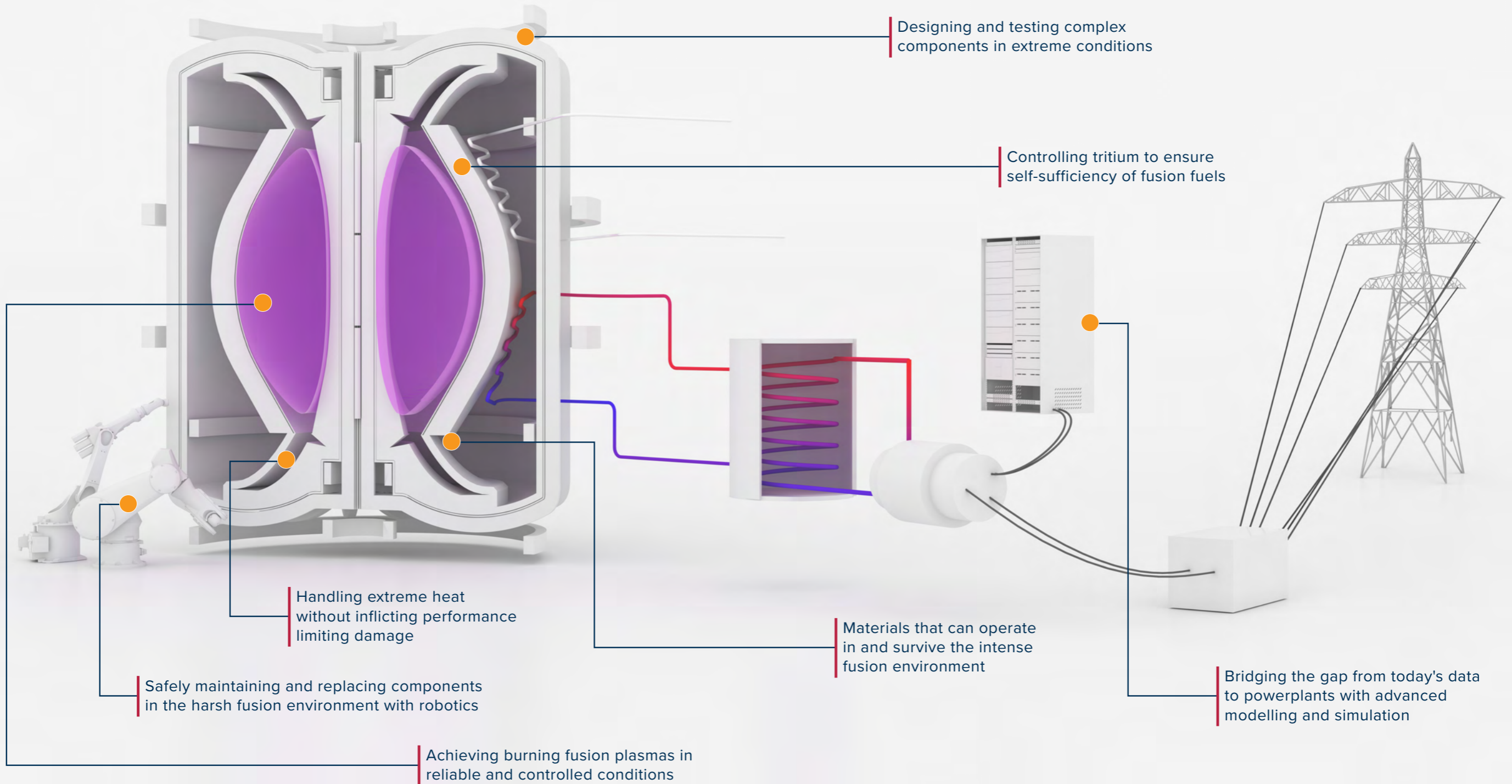
In October 2022, the UK government announced that the West Burton power station site in North Nottinghamshire would be the site of the ground-breaking STEP fusion prototype plant.

Site characterisation for STEP has started, and we are exploring options for office buildings and a fusion skills training centre.

All employee numbers on the page are correct as of 31st March 2023

Our technical challenges

A collection of scientific and engineering challenges stands between us and the realisation of a fusion powerplant. Our talented people, our unique breadth of capabilities, and our strong partnerships continuously push the boundaries of technology every day to overcome these hurdles.



Performance

Accountability

Annual Accounts

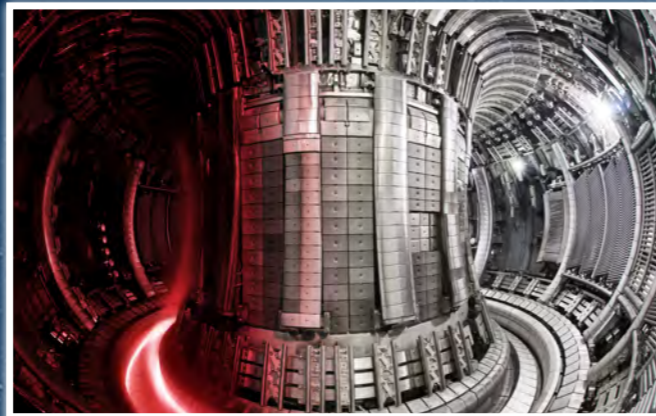
Performance

Accountability

Annual Accounts

Our capabilities

LEAD THE DELIVERY OF SUSTAINABLE FUSION ENERGY AND MAXIMISE THE SCIENTIFIC AND ECONOMIC BENEFIT



FUSION PLASMA

JET (Joint European Torus) – The world’s largest and most capable magnetic confinement fusion machine currently operating in the UK on behalf of the European Commission.



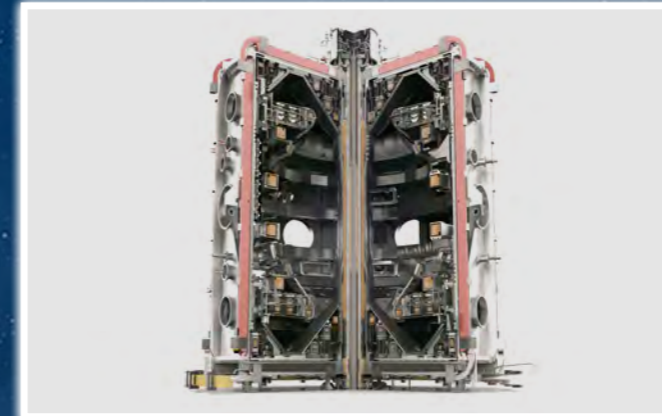
ROBOTICS

RACE (Remote Applications in Challenging Environments) – A world-leading centre developing robotic solutions for fusion and other applications.



TRITIUM

H3AT (Hydrogen-3 Advanced Technology) – A world-leading tritium research centre, studying how to process, store and recycle tritium for fuelling fusion power stations.



TOKAMAK PERFORMANCE

MAST-U (Mega Amp Spherical Tokamak Upgrade) – One of the world’s largest “spherical” tokamaks, with unique features focused on the challenge of safely exhausting heat from fusion plasmas.



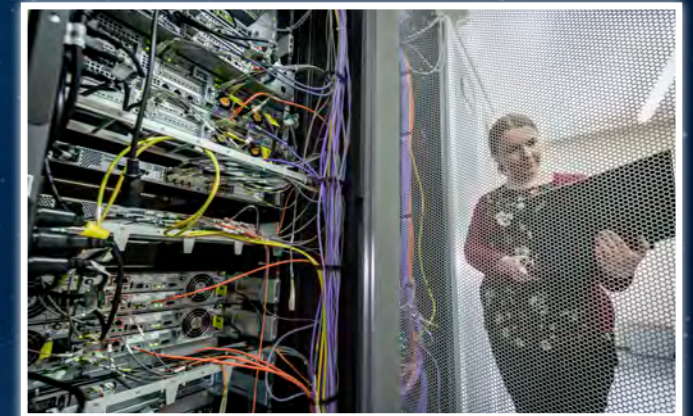
POWERPLANT DESIGN

STEP (Spherical Tokamak for Energy Production) – Designing the UK’s prototype fusion power plant, targeting operations by 2040.



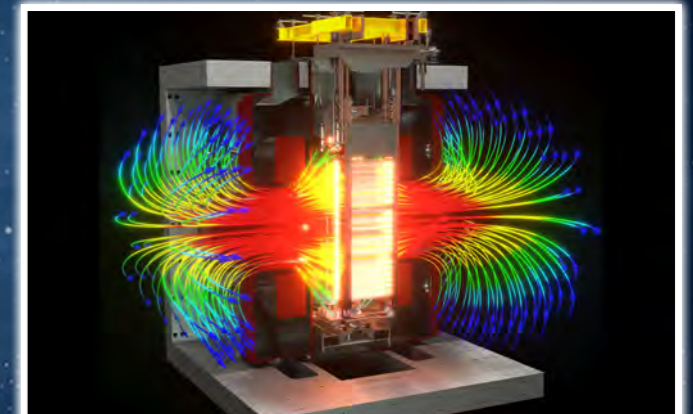
MATERIALS RESEARCH

MRF (Materials Research Facility) – A facility providing advanced analysis and examination of radioactive materials relevant to fusion and other industries.



ADVANCED DIGITAL

Acceleration of design and optimisation of the operation of fusion power plants through automation, simulation, machine learning, and digital twins.



FUSION TECHNOLOGY

FTF (Fusion Technology Facility) – A suite of facilities offering unique testing capabilities for materials and components under extreme heat, magnetic, or mechanical loads.



APPRENTICE TRAINING

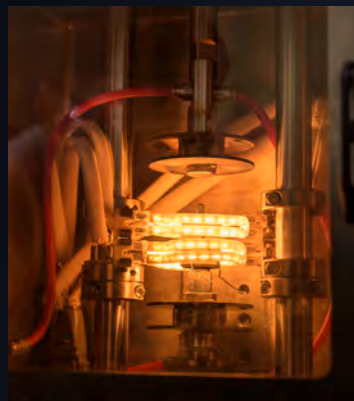
OAS (Oxfordshire Advanced Skills) – High quality training for apprentice engineers and technicians at technology businesses in the Thames Valley.

Our major programmes



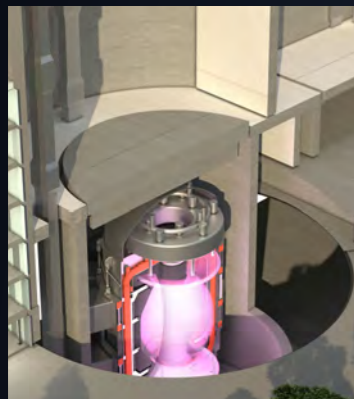
Fusion Research

Our fusion research programme, funded by UKRI, is our underpinning research and innovation programme focused on fundamental science and technological development to advance fusion in key science and technological areas where deep innovation is required to match the challenge of fusion development.



Fusion Industry Programme

The Fusion Industry Programme is an exciting new programme to enhance and support the growth of industry and the fusion private sector in the UK, helping to make the UK one of the most attractive places in the world for fusion. The programme will stimulate new research to drive fusion forwards via industry challenges, and offer a range of support to fusion technology businesses to promote a strong vibrant ecosystem in the UK.



STEP

STEP is an ambitious UK programme to design a prototype compact fusion power plant, targeting operations by 2040, and to develop the onward path to commercialisation of fusion energy. The programme builds on the UK's fusion leadership and engages both industry and academia across the nation. Tranche 1 of the programme, funded by the UK government and managed by UKAEA, will produce a viable concept design, select a site for the prototype plant and develop a delivery model for subsequent tranches, with a focus on delivering benefits through the life of the programme.



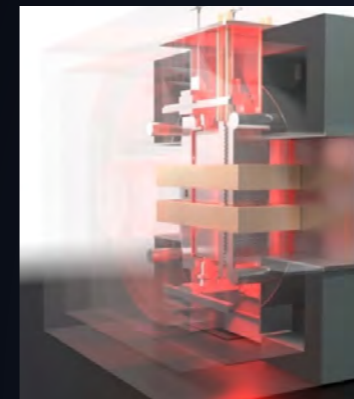
JET Decommissioning and Repurposing

The JET Decommissioning and Repurposing programme is responsible for the decommissioning of JET after the end of its operational lifetime in 2023. The programme will utilise a technology based approach that builds valuable knowhow, and enables the repurposing of JET assets for the UK and international communities.



Fusion Foundations - Culham Campus

Fusion Foundations is a wide-ranging five-year programme to deliver facilities, infrastructure and skills to enable world-leading fusion and innovation in the UK. Currently in its 4th year, the programme will revitalise Culham Campus as the centre of a global fusion technology cluster, with major investment in new modernised infrastructure, enhanced capabilities in UKAEA's facilities with new equipment and capacity, expanded apprenticeship skills growth into new sectors, and new infrastructure to support the private sector on Culham Campus.



NFTP

The National Fusion Technology Platform is part of the Industrial Strategy Challenge Fund and will establish two new capabilities at UKAEA – the Fusion Technology Facilities including our new facility in South Yorkshire, and the Hydrogen-3 Advanced Technologies facility. These new facilities, in combination with our existing programme greatly expand our research capability, and our ability to support industry.

Our stakeholders

To maintain the UK's leading position in fusion, it is crucial to effectively communicate the transformative potential of fusion and the significant role played by UKAEA. As our capabilities expand, we also acquire a wider range of stakeholders who greatly value our mission.

The UK government

Our success is built on an excellent relationship with our sponsoring government department, the Department for Energy Security and Net Zero (DESNZ). As UKAEA's portfolio of activities broadens, so do our links with other government departments.

Prime Minister and Secretary of State visit Culham

The Government chose Culham as the setting for the launch of its new UK energy plan, 'Powering Up Britain'. Prime Minister Rishi Sunak and DESNZ Secretary of State Grant Shapps visited UKAEA for the event in March 2023, providing us with the opportunity to showcase our research facilities to both ministers.

"It was an honour to host both the Prime Minister and our own Secretary of State, and a golden opportunity to highlight our work and why we think fusion is worth investing in. It shows how far we, and fusion, have come that the Government decided that Culham was the ideal place to launch their ambitious future energy plan."

Professor Sir Ian Chapman
CEO, UKAEA

The UK public

Raising awareness and understanding among the public about the incredible potential of fusion is crucial for garnering support for our mission. As a publicly funded organisation, it is also our responsibility to do so. In order to inform, engage, and generate interest in fusion, we use various approaches to disseminate communications to target audiences. We attend and organise events for the public and for schools, use marketing and social media, and liaise with the media to effectively communicate and create excitement about fusion.

Fusion at the Royal Society Summer Exhibition

An interactive fusion energy display developed by UKAEA inspired thousands of visitors at the prestigious Royal Society Summer Exhibition during July 2022. The free exhibition opens its doors every summer to anyone curious about the latest advances in science and technology. It was a chance for the public to meet our researchers and learn how we're bringing star power to Earth for cleaner energy.

Our people

Our most important stakeholders are our staff. Keeping them informed and engaged ensures that they understand our strategy and their role in delivering it. We aim to do this through effective internal communications and by providing people within the organisation the opportunity to make their views heard.

Getting UKAEA 'Fit for the Future'

Internal communications were a key part of UKAEA's preparations to restructure and meet the challenges of the next decade. A series of all-staff talks and videos took people through the organisational changes, and a dedicated 'Fit for the Future' intranet area kept colleagues informed with the latest plans, providing them with a platform to ask questions and make comments.

Our partners

Strong partnerships in the UK and around the globe are essential for us to advance our mission. These range from the EUROfusion consortium, other fusion labs, and the international ITER programme, to private sector fusion firms, professional bodies, trade associations and the industrial supply chain.

Developing the ultimate energy source



UK academia

Engaging with universities drives innovation in fusion research and prepares the next generation of fusion scientists and engineers. We interact with dozens of UK and overseas universities through visiting lectures, PhD open days, shared graduate and undergraduate studentships, and research collaborations.

University links continue to advance fusion research

UKAEA has strategic partnerships with almost 25 UK universities and these connections expanded in 2022/23. We developed our research relationships through sponsoring Chairs at Birmingham and Sheffield universities, and a Reader position at Bangor University.

The local community

At each of our sites – Culham, South Yorkshire, and now West Burton and Cumbria – we engage with residents, local councils and other key regional stakeholders to explain our work and future plans. We aim to bring benefit to the community as we develop and thrive.

From fossil to fusion at West Burton

We marked the decision to site STEP at West Burton by inviting local stakeholders to the announcement and holding a drop-in information event for the community. We have already formed strong relationships with partners around the area, and there is excitement about turning a former coal power station site into the location of the UK's first fusion prototype plant.

Private fusion firms team up with UKAEA

This year saw a succession of partnerships between UKAEA and companies from the burgeoning private sector fusion industry. We signed collaboration agreements with Commonwealth Fusion Systems (CFS, spun out of MIT), Tokamak Energy, and General Fusion, and both First Light Fusion and Tokamak Energy announced plans to build test facilities at the Culham Campus.

"We are in a race against time to phase out the world's reliance on fossil fuels and aim to deliver fusion as a clean, sustainable, low cost and globally available energy source. Tokamak Energy and UKAEA jointly recognise the importance of collaboration to accelerate the delivery of commercial fusion."

Chris Kelsall
Former CEO, Tokamak Energy

How we are changing

The landscape of fusion is changing at pace; the commercial fusion sector is growing, ITER construction is well advanced, and globally there is a visible drive towards fusion power plants. Closer to home, JET has started its final operational campaign before transitioning into a decommissioning programme in 2024.

UKAEA's mission will only be successful if we both innovate and grow UK fusion research, supply chains, and industry. All of these will become an ecosystem which can realise a power plant demonstrator and a subsequent commercial fleet. We're increasing our efforts to support research and innovation across all stages of the fusion lifecycle.

Euratom alternatives programme

On the 7th September 2023, the UK government announced that it will invest further in its own fusion energy strategy instead of associating with the Euratom Research and Training programme.

The Euratom alternatives programme, backed by up to £650m through to 2027, intends to replicate the benefits of Euratom association, mitigate lost access to markets, and explore

new opportunities for the UK fusion sector. With these intentions in mind, the programme has been shaped to achieve three objectives:

- To create a strong industrial sector that leads the world in operationalising and commercialising fusion energy.
- To enable the UK to maintain its global scientific lead in fusion energy through the delivery of domestic capabilities.
- To maintain essential fusion

energy research conducted in the UK and seek mutually beneficial international collaborations.

The programme will cover five key workstreams: Facilities, Industries, Skills, Research and Operations. A vital element of the alternatives programme is to seek a new way of working with ITER, intending to allow industry, researchers, and operational staff to participate in those areas of the ITER programme in which UKAEA can support its delivery.

FACILITIES	INDUSTRIES	SKILLS	RESEARCH	OPERATIONS
<ul style="list-style-type: none"> • Fusion Fuel Capability • Technology Transfer Hub • Cluster Development 	<ul style="list-style-type: none"> • ITER industry access via in-kind contribution • International Collaborations • Fusion Industry Programme • STEP Enhancement/ Systems Prototype 	<ul style="list-style-type: none"> • Apprentice training • Graduate training • PhD researchers • Post-doctoral researchers • International fellowships 	<ul style="list-style-type: none"> • ITER science agreement • JET • EUROfusion 	<ul style="list-style-type: none"> • ITER operational exchange • Operational experience will also be developed within the other workstreams

JET transition

JET is the largest magnetic fusion machine built to date and has been used for 40 years to conduct ground-breaking fusion science and engineering research. The fusion reaction in JET has used hydrogen, deuterium, and tritium in various combinations in a series of campaigns which will conclude on 31 December 2023. The JET Decommissioning and Repurposing programme will then take responsibility for the maintenance and decommissioning of the JET estate.

Decommissioning is a critical part of the power plant lifecycle and this phase of JET's life provides a first of a kind opportunity to develop and demonstrate the safe and cost-effective decommissioning of a fusion machine in a practical and

environmentally sound manner. The approach and lessons learned from this long-term endeavour will set the standard for future fusion plant decommissioning, and more importantly, will influence fusion power plant design and operation.

Beyond the infrastructure challenges faced by decommissioning, staff involved with JET operations have a wealth of skills and knowledge that must be preserved, recorded, and shared. These staff are being transitioned into roles across the organisation where they will continue to make a significant contribution to the success of fusion.

STEP and UK Industrial Fusion Solutions

STEP's mission is to deliver a UK prototype fusion energy plant, targeting

2040, and a path to commercial viability of fusion. STEP exploits the compact spherical tokamak design; the same technology as MAST-U. Its key objectives are to produce net energy – that is, more energy generated by the plant than it takes to run it – as well as demonstrating how future power plants will be effectively maintained, and how the machine will make its own fuel to become self-sufficient.

The programme is currently in the first of four phases: the concept phase. Alongside the programme we have successfully found a site at West Burton, Nottinghamshire, where the prototype powerplant will be built. We have also established UK Industrial Fusion Solutions Ltd (UKIFS), a wholly owned subsidiary of UKAEA. UKIFS will take responsibility for STEP delivery during 2024.

The Fusion Industry Programme

<https://ccfe.ukaea.uk/programmes/fusion-industry-programme/>

The UKAEA's Fusion Industry Programme (FIP) was launched by UKAEA in November 2021 and aims to stimulate and accelerate growth of the UK fusion ecosystem and prepare it for the future global fusion power plant market. In October 2022 FIP was allocated £42.1 million as part of the Government's £484 million support package for UK research.

The Fusion Cluster

<https://thefusioncluster.com>

The Fusion Cluster aims to amplify communication within the growing fusion ecosystem, bringing companies closer and ultimately facilitating faster innovation. Since its conception in late 2021, The Fusion Cluster has grown rapidly to a membership of more than 200 organisations. The Fusion Cluster is unique to the UK, and recognised as such on the fusion world stage. To date the Fusion Cluster has focused on growing its member base and shining a spotlight on UK fusion and the ecosystem that we're building.

In 2022, The Fusion Cluster took a leading role in devising and shaping the content for the

The programme is comprised of four schemes:



CHALLENGE SCHEME
Engaging and supporting UK businesses in overcoming important technical challenges in fusion, developing valuable intellectual assets and capabilities



EDUCATION SCHEME
Increasing the supply of highly skilled students and researchers into the fusion sector and wider industry



VOUCHER SCHEME
Making it easy for UK businesses to use specialist fusion technical facilities at UKAEA, giving them access to the latest skills and techniques



EQUITY SCHEME
Investing in promising new UK businesses arising from fusion technology, helping develop new high growth businesses

inaugural OxToZero summit that brought together Oxfordshire's most innovative thinkers, investors and entrepreneurs. More globally, The Fusion Cluster and UKAEA founded FUSION22 (<https://fusioniscoming.com>), a first-of-its-kind event at the Science Museum in London that brought together the whole fusion industry to showcase the developments taking place all over the world, discuss the most pressing issues in fusion and highlight the opportunities for investors and industry.

Innovation

In April 2022 UKAEA established an innovation department which proactively supports all parts of UKAEA to exploit technology transfer opportunities into and out

of fusion globally, and in doing so create value in the UK.

Technology spillovers into other sectors from the fusion programme have the potential to result in transformative economic, financial and social benefits.

The innovation department is starting to initiate technology transfer into fusion to solve specific challenges. The resulting connections and partnerships will ensure that there is no gap in the pipeline from ideation to commercialisation, and will support innovation at all points of the fusion lifecycle. Ultimately it encourages the development of a global commercial fusion market ready for deployment of fusion power plants.

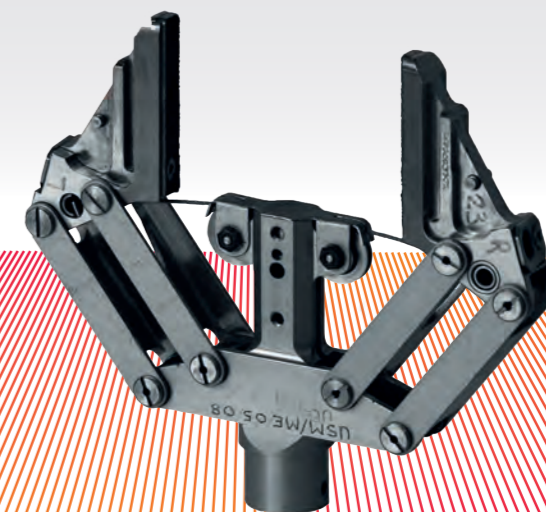
HOW WE DELIVER

32

Strategy

34

Principles and values



UKAEA's strategy is founded five strategic goals and one enabling goal, which align to the pillars of the UK government's strategy for fusion. We hold ourselves accountable in our response to our strategic goals.

In the hugely challenging but vitally important quest to deliver our mission, we ask three questions of our work:

- 1 Does this bring us closer to sustainable fusion energy?
- 2 Are we adding to socio-economic prosperity?
- 3 Are we being true to our values and principles?

HOW WE DELIVER

Our strategy develops these questions; identifying the key challenges and ideas required to address them and aligning those challenges and ideas around our strategic goals.

OUR STRATEGIC GOALS



Solve challenges of sustainable fusion energy - from design through to decommissioning - with world-leading science and engineering.



Enable partners to design, deliver, and operate commercial fusion power plants.



Drive UK economic growth and a thriving industry that exports fusion technology around the world.



Create clusters that accelerate innovation in fusion and related technologies.



Develop the talented, diverse people needed to deliver fusion energy.



Enabling goal
Corporate performance.

OUR MISSION

Leading the delivery of sustainable fusion energy and maximising the scientific and economic benefit

UK FUSION STRATEGY PILLARS

International leadership

UKAEA has unique experience of operating the world's premier fusion facility, JET (Joint European Torus), which it has hosted at its Culham site since 1983. JET has set world records for fusion performance, supporting the ITER experiment (a collaboration of 35 nations in the south of France). The MAST-U device is one of the world's largest spherical tokamaks, with unique exhaust features. UKAEA collaborates with the best talent and facilities globally (including US, China, Japan, Spain) working with both public and private sectors towards the shared goals of fusion science and technology, along with enabling functions, such as regulation.

Scientific leadership

Delivering the STEP programme to design and build a compact prototype power plant in the UK by 2040 as a national endeavour with industry and academia. In parallel, the JET Decommissioning and Repurposing programme is progressing innovations at the end of fusion devices that will inform future fusion power plant design. This is supported and enabled by the broad and vibrant UK Fusion research programme exploiting the unique capabilities of UKAEA's facilities and experts to deliver world-class scientific and technological innovation in plasma science, advanced materials and robotics, tritium science, engineering design and computing, to drive fusion forwards.

Commercial leadership






Transforming Culham Campus into the hub of a global fusion cluster through the Fusion Foundations programme and site regeneration following JET. Leveraging that success across our sites in Yorkshire (Fusion Technology), Nottinghamshire (STEP build site) and Cumbria (Robotics and AI hub). Delivering a wide-ranging programme of support for fusion industry to grow a thriving fusion ecosystem in the UK via our Fusion Industry Programme, Cluster, Innovation Department and Supply Chain activities.

FACILITIES - INFRASTRUCTURE - SKILLS

Principles and values

The journey holds as much significance as the destination itself. We believe success lies not only in achieving our goals, but in the principles and aspirations that pave our way. We strive for efficiency and effectiveness and we do so by ensuring UKAEA's values are embedded in every step we take.

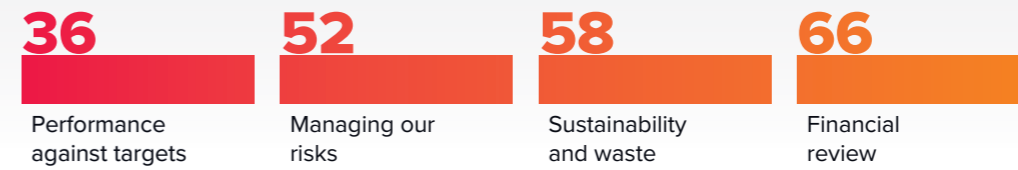
PRINCIPLES

 <p>SAFETY</p> <p>Safety and wellbeing of our people is our top priority</p>	 <p>EQUALITY OF OPPORTUNITY</p> <p>Diversity of thought and people who are representative of society is crucial for our mission</p>	 <p>ENVIRONMENTAL SUSTAINABILITY</p> <p>We will strive for energy-efficient delivery, minimising our environmental impact</p>	 <p>RESPONSIBLE FINANCIAL MANAGEMENT</p> <p>We will use our resources carefully and will be accountable for our investment decisions</p>	 <p>WORKING WITH BUSINESS</p> <p>Strong and effective public-private partnerships are an essential part of our operation</p>
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The spirit of how we work is captured by our **VALUES** of:

 <p>INNOVATION</p> <p>We will seek out ways to do things better, be that designing fusion systems or how we operate our organisation</p>	 <p>COMMITMENT</p> <p>We believe in what we do, the importance of our mission, and doing what we can to achieve it</p>	 <p>TRUST</p> <p>We strive to be open, transparent, and inclusive, so that everyone we work with believes and values what we say and do</p>	 <p>COLLABORATION</p> <p>We believe in the power and importance of working in partnership</p>
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HOW WE PERFORMED



HOW WE PERFORMED

Performance against targets

To focus performance on our strategic goals, we define milestones that cover the full range of organisational delivery. These are agreed within the organisation, led by the executive team, and approved by the board. In 2022/23, we targeted 49 milestones to reflect a cross section of our ambitious, important, and impactful areas which support the UKAEA mission and goals. We achieved 31, partially achieved 8, and missed 10. The milestones are set to be stretching; this year's 80% achievement is within the 80-90% range achieved over the past 5 years.

A summary of the key successes and impact of partial/missed milestones follows.

A colour code is used throughout the following sections:

M MILESTONE ACHIEVED
 M MILESTONE PARTIALLY ACHIEVED
 M MILESTONE MISSED

STRATEGIC GOALS



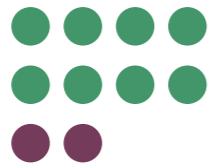
8 of 12

Solve challenges of sustainable fusion energy - from design through to decommissioning - with world-leading science and engineering.



9 of 9

Create clusters that accelerate innovation in fusion and related technologies.



8 of 10

Enable partners to design, deliver, and operate commercial fusion power plants.



3 of 3

Develop the talented, diverse people needed to deliver fusion energy.



8 of 12

Drive UK economic growth and a thriving industry that exports fusion technology around the world.



3 of 3

Enabling goal
Corporate performance

HOW WE PERFORMED

Goal 1: Solve challenges of sustainable fusion energy with world-leading science and engineering

● ● ● ● **12 Milestones:**
● ● ● ● **6 achieved**
● ● ● ● **2 partially achieved**
● ● ● ● **4 missed**

Our research programme, delivered with our academic and industrial partners, focuses on developing, innovating upon, and applying the fundamental science underpinning fusion power plant design.

UK Fusion research

The fusion research programme focuses on the fundamental research and development required to drive fusion forwards. At its core is the need to convene the UK fusion community and train the next generation of fusion scientists and engineers. The programme is conducted under grants, majority funded by the Engineering and Physical Sciences Research Council (EPSRC). In March 2022 the previous EPSRC programme grant was completed, and a new five-year research programme began with a focus on solving the integrated scientific and engineering challenges that are fundamental to magnetic confinement fusion. The research programme is focused in the following areas:

- Plasma Science and MAST-U Operations
- Advanced Computing
- Materials Science
- Fusion Technology
- Tritium Science
- Robotics
- Outreach and Training

Plasma science

The behaviour of the plasma will determine the fusion performance and even the feasibility of future power plants.

Its intrinsic complexity requires a deep understanding to reliably extrapolate to the hot regimes in which the fusion processes will deliver more energy than they receive. At the beating heart of every fusion power plant, the ionized fuel remains a design challenge as well as an opportunity to improve the efficiency and performance of the whole device.

We have a vibrant machine agnostic research programme which studies the theory of fusion plasmas. In collaboration with UK universities, our numerical modelling in the core and boundary regions of the plasma has demonstrated the unique features that turbulence has in spherical tokamaks such as MAST-U and STEP; an essential piece of information to reliably design future devices. Similarly, we have developed new theoretical explanations for detrimental instabilities associated with the finite resistivity of the walls of the device. Understanding these instabilities is crucial as, if controlled, they can lead to premature termination of the plasma.

M The UKAEA science team at JET has also produced a large amount of insightful analysis on the record experiments carried out in the device while using Deuterium and Tritium (DT, the two hydrogen isotopes that will be used in power plants). The number of high impact publications submitted and conference talks secured exceeded the targets, with more expected in 2023, marking the importance of communicating the results from the unique JET experiments. The detailed analysis of the JET DT results paves the way to even greater things at ITER, as understanding gives firmer basis for predictions, and will enable them to achieve higher performance quicker.

MAST-U operations

The MAST-U science programme in 2022 concentrated on delivering impactful and novel results to address key physics issues for the operation of ITER and the design of future fusion power stations. The programme supports a broad network of collaborators in the UK as well as the EUROfusion consortium, the United States, and the wider world with MAST-U attracting world-leading expertise in all major disciplines in the physics of tokamak plasmas.

HOW WE PERFORMED

M Leveraging the unique features of MAST-U, experiments successfully demonstrated the prediction that the core plasma where fusion occurs can be effectively separated from the much colder plasma that reaches the internal surfaces of the machine. This is an important and unique result along the path towards power plants, where we need to ensure high fusion performance and stellar temperatures in the core plasma without damaging the device. A considerable delay to the start of the experimental campaign meant that it was not possible to meet the milestone to submit a high impact paper on these results before the target date, instead this will be done during 2023.

M The enhancements made to MAST-U at the beginning of 2022 meant that a new record performance for the device was achieved, with hotter plasmas, more efficient particle confinement, and more controllable conditions. Considerable effort was devoted to creating different shaped plasmas with a plasma current of 1 million amps (a mega amp) with high levels of heating. At the end of the campaign a conventionally shaped mega amp plasma had been achieved, and we had started to develop a second ‘super-X’ shaped mega amp plasma. The heating systems were unable to provide the heating power required so a milestone to complete the development of these mega amp plasmas will be completed during 2023.

M The next stage of enhancement to MAST-U is the addition of cryogenic cooling. Once operational this will improve the machine vacuum conditions to power plant relevant levels, resulting in purer plasmas. During

2022/23 the major components of the cryoplant were installed despite delays with contracts and technical challenges with a kink in one of the cryolines. The cryoplant is due to be completed and commissioned during 2023.

Advanced computing

Artificial Intelligence (AI) & machine learning has become an essential discipline in all scientific research domains, including fusion. The UKAEA team is collaborating with several partners, both public and private, to leverage the latest advances in the field towards fusion applications. These partners include NVIDIA, Microsoft, Intel, digiLab, California Institute of Technology, University College London, Imperial College London, Cambridge, and many others. We are working on innovative solutions that can accelerate existing High Performance Computing (HPC) simulations by employing machine learning to generate accurate surrogate models that act as preconditioners to the final HPC solution.

With increasing diversity of hardware and reliance on accelerators, efficient exploitation of these resources is becoming more complex, and most codes are not unable to take advantage of them without significant additional work. UKAEA is exploring novel methods to tackle these problems, including expanding the use of uncertainty quantification and of time parallel schemes.

M We successfully demonstrated the use of the INL MOOSE software, a massively parallel finite element solver, as an alternative to the commercial workstation based ABAQUS software to assess the structural integrity of fusion components. This has advanced our computing capability by demonstrating the transition from a commercial workstation-based solution to an exascale scalable solution.

Materials science

Materials science is fundamental to fusion; a fusion reactor must be made of materials capable of tolerating its harsh environment, and addressing this challenge is a key part of the UK fusion programme. The fusion reactor environment is possibly the most extreme environment any material will face, with the combination of irradiation and thermal, magnetic, electric and mechanical loads. The materials research programme relies on a rapidly expanding network of national and international partners in industry and academia, and takes its direction from the UK fusion materials roadmap launched in late 2021. https://www.royce.ac.uk/content/uploads/2021/09/UK_Fusion_Materials_Roadmap_Interactive.pdf

M A milestone was the demonstration of a crystal plasticity finite element method for the simulation of material behaviour following irradiation. This has resulted in two publications, with a third under preparation. This third paper applies the learnings, representing a real-life reactor component loading which is not covered by a conventional material; a world first.

M The materials research programme also conducted an experiment involving the cutting and welding of pipes using an in-bore high-power laser. Unfortunately, the tests did not reach the target laser power; learnings from the result are being used to inform future work.

HOW WE PERFORMED

JET operations

JET is the world’s largest and most powerful operational magnetic fusion device, hosted and operated by the UKAEA at our Culham site. A large on-site team of scientists, engineers and support staff operate JET. The scientific exploitation of JET is managed by EUROfusion with JET typically receiving up to 350 visiting scientists from around Europe to participate in important and exciting experiments.

M The deuterium-tritium experiments in 2021/22 were the first in a generation. In addition to their plasma science and record-breaking results, they presented a key learning opportunity around how to operate a tokamak with tritium in the fuel mix. Publishing our learnings enables others to learn from our experience and will also inform the operational regimes of future tokamaks and prototype fusion power plants. Although we achieved only 5 of the 6 targeted publications, they covered a range of topics and gave opportunities to first time authors. The sixth paper is currently within internal review with a view to being put forward for publication during 2023/24.

M M M A break after the deuterium-tritium experiments was used to upgrade various scientific sensors and actuators, and to refurbish critical operational equipment; in all work packages covering 11 major sub-subsystems were delivered. The upgrades and refurbishments were completed on schedule, but an unfortunate series of cryoplant issues during machine restart delayed the first of three scientific campaigns by over a month. Despite this delay the subsequent machine performance was good, and the three campaigns were successful. The first campaign cleaned up the inside of the machine after the previous year’s record-breaking deuterium-tritium campaign, and the second explored specific aspects of operating helium plasmas. The third campaign investigated the physics of plasmas which are most like those planned for ITER and DEMO (the European demonstration fusion power plant) as well as understanding how the upgraded shattered pellet injector can mitigate some of the potentially machine-damaging effects of a rapid plasma termination. Some of the experiments had strong on-site participation from ITER and US staff, with the impact being information to fed into the design of some ITER systems, and a change in their approach to commissioning.

Preparation for JET decommissioning

Where repurposing equipment and buildings does not represent value for money then, for the purposes of decommissioning, the materials and components that JET is constructed from are considered waste. Components located within the JET vacuum vessel will have been purposefully exposed to the radioactive isotope tritium and without further processing would be classified as Intermediate Level Waste (ILW). Maximising tritium recovery from materials and components is an essential element of fuel management for a future fusion power plant, and one of the key areas of innovation within the JET decommissioning programme is developing methods to do this.

M During the year, samples of Inconel, Beryllium, Tungsten and Graphite were used to successfully develop new heat treatment cycles for detritiation. UKAEA has assessed that it may be possible to reduce the amount of ILW from JET from a few hundred tonnes down to a few tens of kilograms; a substantial reduction. This supports the aims of decommissioning JET faster, safer, and more cheaply, and adds to the evidence that fusion is sustainable.



HOW WE PERFORMED

Goal 2: Enable partners to design, deliver, and operate commercial fusion power plants

10 Milestones:
8 achieved
2 missed

Building on a pioneering legacy in spherical tokamak research the UK has embarked on the first phase of the ambitious STEP programme to design and build a compact, energy-producing prototype fusion power plant.

Combined with technical advancements, we will develop the enabling environment needed for a commercial fusion sector in the UK, contracting out more than half of STEP R&D activities to industry and academia.

Preparation for JET decommissioning

Decommissioning of JET, the largest fusion machine built to date, is a critical part of the product lifecycle, and this phase of JET's life will help demonstrate the practicality of fusion as an energy source for the future.

M An outline business case is in preparation with an alternative decommissioning and repurposing strategy to support a faster, safer, and cheaper route to decommissioning. This presents the strategic, commercial, management, economic, and financial cases for the alternative commissioning strategy. Decommissioning JET is expected to be a 14-to-15-year programme, and we are proposing that this is split into tranches, each two-to-four years long. Work is progressing strongly to deliver the business case, however the corporate milestone for having it approved was missed because the date for review by DESNZ was delayed. Subsequently, the outline business case was formally approved on 15th June 2023, confirming the budget and allowing progress with the

UKAEA's preferred option which moves away from demolition to repurposing.

STEP: Spherical Tokamak for Energy Production

STEP is UKAEA's programme to design and build a prototype fusion power plant. The programme's mission is to "Deliver a UK prototype fusion energy plant, targeting 2040, and a path to commercial viability of fusion". The programme has now completed its fourth year of an initial five-year phase (tranche 1) and made some significant progress against key tranche 1 objectives.

M One of the headline achievements this year was the selection of the West Burton site as the future home of STEP, concluding an almost two-year process of assessment and analysis. Since the Secretary of State's announcement of the successful site in October 2022, the programme has established a small, West-Burton based team, kicked off an initial phase of site characterisation work and started

to explore the options for a fusion skills centre to be built on site. The selection of a site is of international impact and has sent a clear message that the UK is serious about fusion.

M Another achievement this year was the agreement to establish a company, limited by shares, that will be responsible for the delivery of STEP. The creation of UK Industrial Fusion Solutions Ltd, which will be a wholly owned subsidiary of UKAEA, was announced by the Science Minister during a visit to West Burton in February 2023. It is currently anticipated that UKIFS will take responsibility for STEP delivery during 2024.

M A key part of the delivery structure for STEP is the procurement and on-boarding of whole plant partners, with the first step towards this being the formal launch of the selection questionnaire phase of procurement. It was anticipated that the procurement would be issued during this financial year, however, following discussions with BEIS, HM Treasury, and Cabinet Office it has been agreed

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that formal procurement of the whole plant partner cannot occur until the outline business case for the next phase of STEP has been approved. The outline business case was approved by government in September 2023, and commencement of whole plant partner procurement has been re-set as a corporate milestone for FY23/24.

M In terms of technical progress, the programme defined its first integrated concept design – named SPP-001 - during the year. This is a very significant step towards achievement of a full concept design by the end of Tranche 1 in 2024. All aspects of SPP-001, including the underpinning critical technology roadmaps, were examined by the independent, government-sponsored Fusion Technical Advisory Group who provided comprehensive and useful feedback to allow further successful development of the design.

M Testing and prototyping are critical to the evolution of an integrated power plant design such as STEP and this year saw the first test of a full-functionality re-mountable magnet joint connection prototype. The tests were performed in STEP-relevant temperature conditions and in a regime where there are very few facilities available, meaning that the company involved, Advanced Conductor Technologies, upgraded its facilities to achieve it. The re-mountable magnet joints are a cornerstone of the SPP-001 concept, and this test is a crucial first step in de-risking the magnets for STEP. As the STEP concept design crystallises, many more tests of prototype components will be undertaken using UKAEA facilities at the South Yorkshire Fusion Technology Facility.

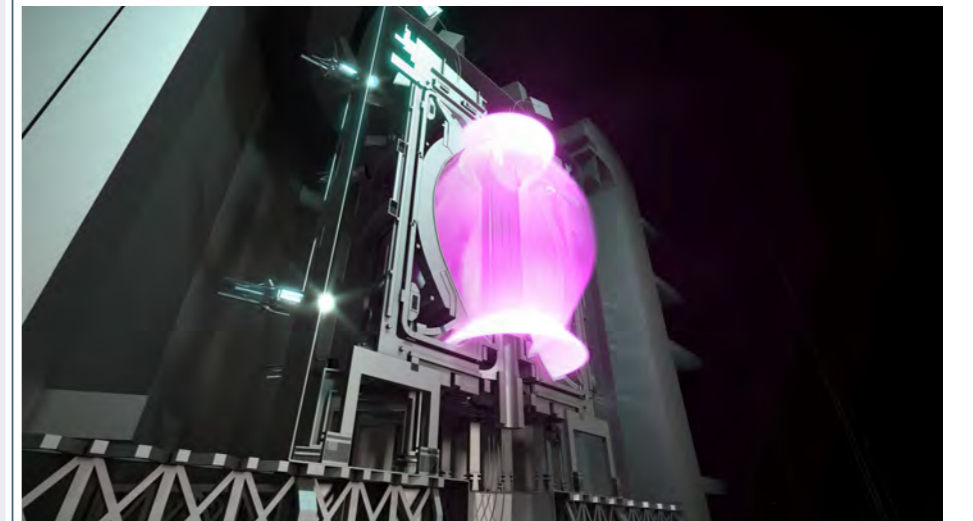
EUROfusion DEMO and related work

DEMO (DEMOstration power plant) is the European power plant concept developed by the EUROfusion consortium. Like STEP, DEMO targets the production of several hundred MW net electricity from fusion. The DEMO programme follows a longer, though still highly ambitious, roadmap based on the more mature approaches of JET and ITER, linking construction decisions to high power fusion results and blanket tests from ITER.

M In 2021/22 a programme was started to develop a facility at Culham for progressing the technologies for high accuracy, high precision measurements of tritium in gas mixtures: the DEMO tritium management and control facility. This year a detailed design of the facility was completed, supported by tests of the two preferred measurement techniques. This state-of-the-art system will ultimately be used to determine how to effectively operate the fuel cycle for fusion power plants.

M 2022/23 saw UKAEA release an open-source version of its world-leading power plant design software, BLUEMIRA. BLUEMIRA is a fast design-scoping code, combining magnet design (optimising the magnet positions), a simplified plasma model, calculation of overall power balance, and generation of 3D CAD. It has been used to help develop outline designs on STEP and DEMO and is gaining an external user base. It represents a potential revolutionary approach to the design process for future fusion power plants, with the potential to substantially shorten design cycles.

M Novel experimental and modelling approaches were applied to a structural integrity assessment of a DEMO divertor (the tokamak exhaust system) component. Destructive and non-destructive techniques identified substantial residual stress within the manufactured components which if not accounted for could have led to invalidity of the design or even early failure. Our achievements are allowing re-design and better development of key components for fusion.



Performance

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Regulation

As fusion transitions from experimental facilities to demonstration/prototype devices on the path to commercial fusion power plants, aspects relating to safety, security, environment, and waste will change. The Fusion Safety Advisory Group (FSA Group) was established in 2021 to provide technical expertise on safety, security, and environment to the BEIS Fusion Policy team, now DESNZ, in the development of a regulatory framework for fusion power plants. The FSA Group remains independent from operations and programmes, as part of the risk and assurance division, which sits directly under UKAEA Group Chief Executive (see page 76).

In June 2022, the “UK government’s response to the consultation on its proposals for a regulatory framework for fusion energy” was published, presenting the Government’s decision that the current UK regulators of fusion R&D facilities (the Health and Safety Executive and the Environment Agency) will retain responsibility for fusion going forwards. This world first puts the UK in a leading position within fusion regulation. The FSA Group plays an international role to achieve harmonisation of global regulatory frameworks, advocating for proportionality in their development, and ultimately enabling global deployment of fusion power plants.

M The FSA Group has continued to provide technical advice to DESNZ on fusion safety, security, and environment. As well as supporting regulator familiarisation by hosting several site visits to Culham, the FSA Group have supported the regulatory consultation response. A technical annex produced by the FSA Group addresses key technical issues raised by some respondents in relation to fusion hazards and accident scenarios. As a result, the Nuclear Installation Act is being amended to confirm the exclusion of fusion energy facilities from nuclear site licensing requirements.

The FSA Group leads the UK input into the International Atomic Energy Authority (IAEA) activities on fusion design safety and safety assessment, with a member of the group working directly for the IAEA on a number of short-term secondments throughout the year. The FSA Group has also engaged on fusion safety and regulation at several national and international events, key events including leading a panel discussion on “the right regulatory framework” at FUSION 22 and being the fusion representative on the Team UK delegation at the IAEA general conference.

Fusion is one of the priorities of the Foreign, Commonwealth and Development Office initiative on regulatory diplomacy, aiming to build on the UK’s world-leading approach. Through this, the FSA Group has participated in several international visits as part of a team from DESNZ, the Environment Agency, and the Health and Safety Executive. The aim of these was to share the regulatory approach for fusion adopted in the UK with countries and organisations across the world. Visits to Japan, the US (featuring visits to both public and private organisations), and ITER enabled our government and the FSA Group to share the UK’s proportional approach to regulation and to develop a broader understanding of the hazards posed by the less conventional approaches to fusion.

HOW WE PERFORMED

Goal 3: Drive UK economic growth and a thriving industry that exports fusion technology around the world

12 Milestones:
 6 achieved
 2 partially achieved
 4 missed

Strong partnership with the private sector is essential to developing fusion power plants- to address both the rate of progress and the scale of the technical challenges. UKAEA is committed to maximising the transfer of innovation, skills, and knowledge from fusion into adjacent sectors.

RACE: Remote Applications in Challenging Environments

RACE, the UKAEA’s robotics centre, continues to deliver a broad portfolio of over 20 projects with a team of more than 350 engineers.

M A dedicated team is focused on the definition and delivery of the JET decommissioning programme, with particular focus on equipment preparation for remote sample retrieval in 2024, and demonstrating feasibility of removal of JET components which were never intended to be remotely maintained, such as internal magnetic coils. Through a combination of virtual reality and successful trials, we demonstrated that it is fully possible to remotely cut the internal magnetic coils using commercially available technology without causing the material to reach smoke point (necessary to avoid compromising air handling systems). Removal of these coils is a critical enabler of JET vacuum vessel separation, and being able to cut smoke free and use existing remote handling capabilities reduces decommissioning costs.

M Beyond fusion, the UKAEA contribution to the European Spallation Source (ESS) active cells facility is entering its final phase of installation of commissioning and has started a dedicated operator training programme. We tested critical equipment (the dexterous manipulators) for the operations of the ESS active cells facility, including functionality and integration with key UKAEA control and digital twin systems.

M The Robotics and Artificial Intelligence Collaboration (RAICo), comprised of the Nuclear Decommissioning Authority, Sellafield, and the University of Manchester, led by RACE, has made significant progress across a number of research themes. As part of the collaboration, we demonstrated a range of technologies (including robot dogs, tooling, digital twins, and remote operation from a control room) to stakeholders, leading to an ongoing first of a kind deployment in a nuclear decommissioning environment within Sellafield. Hundreds of hours of transformative decommissioning have been completed by a robot in a contaminated cell, achieving the goal of completing decommissioning faster, safer, and cheaper.

MRF: Materials Research Facility

The MRF is a facility at UKAEA for UK materials scientists in academia and industry that uniquely bridges the gap between universities, where radioactivity limits are low but access is readily available, to nuclear licensed sites where limits are high but access is strictly controlled.

M In Oct 2021, UKAEA and its collaborating partners, were awarded £7.8m funding through the National Nuclear User Facility phase 2a call. Split across three projects and over two years, this funding has delivered an analytical transmission electron microscope with in-situ testing capabilities, a plasma Focused Ion Beam (FIB), upgrades to our existing Gallium ion FIB, and an in-situ heating stage for our X-Ray diffractometer. Each piece of equipment has been integrated into our specialist facilities for handling radioactive material, significantly increasing the testing capability at the MRF and enabling cutting edge research on the most relevant materials for fusion power. A supply chain issue prevented the new differential scanning calorimeters from being delivered in time to fully meet the milestone; delivery has since been taken during 2023.

HOW WE PERFORMED

M In order to improve thermal efficiency, the STEP concept power plant is aiming to operate coolants at higher temperatures than conventional power plants; this will require a new class of steel. The materials division, alongside 10 project partners, applied for £10m for a five-year programme to develop a new steel suitable for fusion and fission. Pending an award, UKAEA is funding a £1m soft start of this programme and the materials division supplemented that by winning an extra £1.7m of funding (of a target £5m). This funding has enabled a major extension of work scope in development of fusion structural materials: specifically, steels and ceramic composites. Significant progress has been made with the University of Swansea in developing and testing a new reduced activation steel and a low chromium steel; further supported by STEP sponsoring a five-year, £3m, neutron irradiation campaign at Oak Ridge National Lab in the US. Finally, a local manufacturing route for fusion silicon carbide ceramic composite was developed and in an impressive UK fusion first, five silicon carbide fibre reinforced panels have been produced. These panels are already being exploited to drive forward several key activities.

Fusion technology

Developing, designing, and fabricating the technology needed for a fusion power plant is a challenge given its exacting environment. High energy neutrons, high magnetic fields, strong temperature gradients, and a range of other factors create a need for innovative design, manufacture, and testing processes to deliver the technological and structural components of a fusion reactor. UKAEA runs a fusion technology business unit looking to address these issues.

M The Combined Heating and Magnetic Research Apparatus (CHIMERA), the flagship test facility in construction at the South Yorkshire Fusion Technology Facility, will be the only facility of its kind in the world which allows component scale testing under fusion conditions. Unfortunately, delivery of this facility has been delayed due to technical challenges from the burgeoning UK based fusion supply chain that we were utilising for advanced technical delivery. We have supported these suppliers and together are overcoming the most critical technical challenge; we are confident in delivering the full testing system to scope enabling the UK to be world leaders in combinatorial testing of fusion components.

M The new fusion technology building at Culham Campus has been completed, in addition to fusion technology staff, instruments have been moved in and recommissioned, and the new laboratory space is already enabling enhancement to our world-leading research programme and designed to allow growth supporting the emerging fusion sector.

M A prototype passive neutron spectrometer has been developed by UKAEA for fusion neutron dosimetry applications. Our multi-disciplinary teams, relying on decades of development, completed the device which enhances safety analysis related to fusion. It is already being considered for patents and UK based production.



HOW WE PERFORMED

H3AT: Hydrogen 3 Advanced Technologies

H3AT both operates and maintains the UKAEA tritium life cycle facilities, as well as leads innovations in the field through its R&D. The team delivers innovative solutions to technical challenges facing future fusion power plants related to tritium and waste processing. These activities support programmes under EPSRC, JET, DEMO and STEP, whilst building collaboration with key academic and industrial partners both domestic and international.

M M H3AT has identified a need to bring forward our high tritium inventory experimental capability at Culham to support our R&D. In addition to extensive upgrades of some of the experiments, the existing tritium processing plant has been moved to a new space and modified to create a service which will enable experiments to be connected to the main detritiation system. The move was achieved later than the target date, however the equipment is now located within a space shared by H3AT and MRF, enabling work on material retention and permeation, as well as supporting prototyping of proof-of-concept products for collaborators. Technical challenges on three projects also delayed the start of tritium operations, however these challenges are expected to be resolved early next year.

M A collaboration with the University of Bristol was expected to see a mini plasma deposition reactor grow a diamond using radioactive carbon-14 methane. A delay by the collaborator meant that the reactor assembly was completed, but not quite in time to grow a diamond by the target date. When achieved, this will be a world first.

Computing

UKAEA has set a grand challenge to deliver fusion power to the national electricity grid in the early 2040s via the STEP programme. This timeline cannot be met through conventional test-based design and engineering, instead, the STEP power plant must be designed and optimised “in silico” by exploiting modern supercomputing and AI augmented approaches - so called “data centric engineering”. Access to these tools will need to be extended to the whole fusion supply chain.

M Responding to this need, a new computing division was formed in 2022. This division brings together several existing functions across UKAEA into a single unit and sets out the objectives and opportunities to drive a data centric engineering approach within fusion.



HOW WE PERFORMED

Goal 4: Create clusters that accelerate innovation in fusion and related technologies

● ● ● **9 Milestones:**
● ● ● **9 achieved**
● ● ●

We are committed to growing a world-leading fusion cluster in the UK on Culham Campus and we will expand our presence elsewhere in the UK to tap into the skills and expertise needed to deliver our mission and play our part in socio-economic development. We will strive to be a leading example of sustainable development as we drive towards net zero at our sites.

Contributes to UN sustainability goals:

	ENSURE INCLUSIVE AND EQUITABLE QUALITY EDUCATION AND PROMOTE LIFELONG LEARNING OPPORTUNITIES FOR ALL
	PROMOTE SUSTAINED, INCLUSIVE AND SUSTAINABLE ECONOMIC GROWTH, FULL AND PRODUCTIVE EMPLOYMENT AND DECENT WORK FOR ALL
	BUILD RESILIENT INFRASTRUCTURE, PROMOTE INCLUSIVE AND SUSTAINABLE INDUSTRIALIZATION AND FOSTER INNOVATION

Business Development and Innovation

UKAEA's unique facilities, expertise, and capability provides rich opportunity for spin-out and innovation transfer and provides a powerful platform to support, and benefit from, a thriving private sector in fusion and beyond. This year saw considerable growth of our innovation and business development programmes.

M Internally, UKAEA held its first innovation showcase, inviting the whole of the organisation to attend in person or online. The aim of the showcase was to encourage increased engagement in technology transfer from across UKAEA by both communicating why it is important and demonstrating how to get involved as well as providing case studies to inspire people. Projects from seven different departments were

presented and ranged from the establishment of new facilities to the invention of novel technologies; all of which solve fusion challenges but also have applications in other sectors. The event resulted in a greater understanding of why spill over benefits are key to our objectives, an increase in idea submissions, and internal collaboration allowing faster progress through the addition of new perspectives.

M Externally, the Fusion Cluster grew from 10 to over 180 members (far exceeding its target of an additional 10 members) and hosted the Fusion 22 conference – a world first - at the Science Museum in London. The Fusion Cluster was established by UKAEA in 2021 to bring together private fusion companies, a wide range of businesses in the supply chain and adjacent industries, academics, investors, and policymakers. Next year the Fusion Cluster will focus on delivering value to its members.

M Collaboration with the best talent and facilities globally is essential to deliver the UK's fusion energy objectives. UKAEA has continued to grow its collaborations with leading global private fusion companies, exceeding its target by signing up to 3 bilateral collaboration agreements with Commonwealth Fusion Systems (US), General Fusion (Canada), and Tokamak Energy (UK). UKAEA is actively engaging with these companies to identify areas where they need support from UKAEA, and a number of support projects are active with more in the pipeline. Discussions with other global private fusion companies are ongoing with the objective of further expanding UKAEA's collaborative activity with the private fusion sector.

HOW WE PERFORMED



Fusion Foundations

The fusion foundations programme is an ambitious five-year programme delivering “facilities, infrastructure and skills to enable world-leading fusion and innovation in the UK”.

M Construction of our Culham Commercial Development Building, HQ Offices, and Oxfordshire Advanced Skills centre expansion has successfully commenced, with the latter 2 buildings on track for completion in 2023. Following the completion of a competitive tender action exercise, construction of our new main gate and visitors centre will commence during 2023.

M At the same time as announcing the site for STEP, the government announced that a skills development facility, known as Fusion Skills, would be built on the same site. The fusion foundations programme is developing plans for the design of this building and skills programme.

M Finally, a major upgrade to Culham site IT infrastructure has been completed. This further increases WiFi coverage across the site as well as site data connection speeds.

Site improvement and campus development

UKAEA operations and property interests cover sites across the UK at Culham, Harwell, South Yorkshire, West Burton and Cumbria.

M At the Culham Campus 85 buildings and facilities projects, across 71 locations, were completed. There was a particular focus on projects with improved physical accessibility as well as the installation of solar panels. Most of the pedestrian crossings on site have been raised, new accessible parking bays have been added along with dropped kerbs to all car park areas and 1.5Km of pavements have been renewed, widened and flattened. These improvements make it easier and safer for everyone to move around the site. In support of our sustainability strategy and aspirations to transition away from burning natural gas at the Culham site, a total of 470kW of solar PV was installed on top of four buildings and preparations have been started for more.

M Planning for the future of the Culham Campus has included a significant piece of work to further develop the existing framework plan; this focused on the north-eastern corner of the campus. In addition to General Fusion, further opportunities to accommodate large scale fusion facilities for Tokamak Energy and First Light Fusion's have been identified.

M Together with the Science and Technology Facilities Council, UKAEA holds and manages the public sector's share in the Joint Venture Partnership. Harwell Campus is now one of the fastest growing science and innovation environments nationally, with employment in region of 6000 people. As such, the Joint Venture company has recently been restructured to support the future development pipeline more effectively and a large development will be leased to Moderna. Demand for space on campus remains strong and there is a clear development pipeline.

HOW WE PERFORMED

Goal 5: Develop the talented, diverse people needed to deliver fusion energy

● ● ● **3 milestones:**
2 achieved
1 partially achieved

Talented and enthused people are central to the delivery of our mission, and those of our partners. Our skills growth programmes will help to ensure that the fusion sector has the people needed to succeed.

Contributes to UN sustainability goals:

4 QUALITY EDUCATION	ENSURE INCLUSIVE AND EQUITABLE QUALITY EDUCATION AND PROMOTE LIFELONG LEARNING OPPORTUNITIES FOR ALL
5 GENDER EQUALITY	ACHIEVE GENDER EQUALITY AND EMPOWER ALL WOMEN AND GIRLS



HOW WE PERFORMED

Strategy Pillar 1: Valuing our people

UKAEA operates in a truly global market. We are competing for skills and experience with other public sector organisations, including national laboratories and universities, as well as a growing number of private companies. With the increasing acknowledgement around the world of the importance of fusion, identifying, attracting, and retaining talented people to collaborate in high performing teams is central to the success of UKAEA. Just as important is the recognition of their efforts. We play a key role in delivering the UK Fusion Strategy and growing the skills base for the fusion sector, and our numerous collaborations with industry partners will continue to contribute to the wide range of exciting opportunities across UKAEA.

M Performance management is an important aspect to supporting, developing, and valuing our people. Employees set SMART objectives and create a development plan at the beginning of the reporting year and, in addition to regular meetings with their line managers, employees have two appraisal meetings a year. In addition to role-relevant objectives, every employee must set an EDI objective; this ensures that all employees are engaged with UKAEA's EDI programme, that they grow their knowledge, and/or proactively make changes in their and their colleagues' working environment. Performance management is sufficiently important to warrant a corporate milestone for completion of appraisals and objective setting, and in 2022/23, more than 95% of staff completed their appraisal activities before the target dates.

Strategy Pillar 2: Developing our culture

An engaged workforce is one where everyone is pulling in the same direction, with clarity about the organisational objectives and how they contribute to them. The highly ethical and motivational nature of our mission and goals is one that unites us. We are proud of the diversity at UKAEA but we know that we need to be evermore ambitious about how we reflect it in our work. As we continuously strive to be a highly trusted employer, this must be one of our top priorities. Alongside this, as a National Laboratory, a leader in our industry, and a high-performance organisation, we recognise the importance of investing in the skills of our colleagues. With major endeavours ahead of us - such as the closure of JET and transition to decommissioning - we know that a focus on well-being and strengthening the employee voice represent additional vital elements of our work to nurture our culture.

M Driven initially by the action plans developed for gender equality and Athena SWAN accreditation, before being expanded to cover Equality, Diversity, and Inclusion (EDI) more widely, UKAEA has an established action plan to transform the EDI culture in the workplace and influence other organisations and the public where it can. An ambitious set of actions were identified for 2022/23, and despite resourcing gaps in EDI leadership, we made excellent progress against the actions and partially met the corporate milestone; 12 of the 15 actions were completed, and 2 partially completed. Of note is the improved governance and accountability now placed on EDI at UKAEA, the significant investment in talent acquisition activities to ensure that UKAEA is releasing inclusive job adverts, using EDI job boards, and applying additional resource to proactively increase the diversity of applicants, and the allocation of budgets to each of the EDI networks to support their impact.

Strategy Pillar 3: Building our organisation

With the specialist skills and knowledge required by the organisation and accumulated by our people over time, strategic workforce planning and succession planning is essential for the future. A robust plan will not only support operational performance business continuity, but also fair career development.

M With the imminent transition of JET from scientific operations to decommissioning and repurposing, line managers and senior directors have worked closely with around 700 affected personnel to transition to new deployments in UKAEA from January 2024. We are fortunate to have a wide range of technical, engineering and scientific activities underway across our site in Culham that will now benefit from the exceptional skills, knowledge and experience of these colleagues.

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Enabling goal: Corporate performance

3 milestones:
3 partially achieved

The delivery of our mission and goals is only possible because of our people working within a culture of safety, security, and commitment to quality, under robust governance and with a focus on the wider enabling environment for fusion in the UK.

Contributes to UN sustainability goals:

<p>3 GOOD HEALTH AND WELL-BEING</p>	<p>ENSURE HEALTHY LIVES AND PROMOTE WELL-BEING FOR ALL AT ALL AGES</p>
<p>16 PEACE, JUSTICE AND STRONG INSTITUTIONS</p>	<p>PROMOTE PEACEFUL AND INCLUSIVE SOCIETIES FOR SUSTAINABLE DEVELOPMENT, PROVIDE ACCESS TO JUSTICE FOR ALL AND BUILD EFFECTIVE, ACCOUNTABLE AND INCLUSIVE INSTITUTIONS AT ALL LEVELS</p>

Health and safety

The UKAEA is committed to zero harm by providing a safe workplace, ensuring the safety, health, and wellbeing of all who may be affected by our work. We strive to continuously improve our safety and health management.

M A large effort was made to reduce the amount of overdue mandatory training, and the target of 90% completion was just missed. A review was initiated to streamline mandatory training courses, and to move away from the present 'one size fits all' approach to one where training is appropriately targeted. Behavioural safety continues to present a particular challenge due to the number of new starters. The number of behavioural safety mentors (trained members of staff from across the organisation) has now increased to allow more course dates for new starters.

Quality

UKAEA is currently certificated to ISO 9001:2015, ISO 14001:2015 and ISO 45001:2018; the international standards for quality management, environmental management, and occupational health and safety management. The management systems audit programme evaluates UKAEA's conformance with quality, safety, health and environmental management system requirements.

M The completion of audit actions on time is a measure of how UKAEA responds to implementing improvements to its risk management, control, and governance processes. Each action is given a priority rating (red, amber, green) which reflects the seriousness and timescales for correcting the weaknesses found in the governance, risk management and control framework. The audit programme covers all areas of UKAEA and there has been tremendous effort from a wide range of individuals to close 107 actions on time out of 124 which were due in this year. The one remaining red action, from the 10 identified, is continuing to be addressed.

Programme and projects

The Programme and Project Management Office (PPMO) within UKAEA performs several services and functions ultimately geared towards ensuring programmes and projects conducted by the organisation are given the maximum chance for them to be delivered successfully, in the right way, every time to realise the scientific and economic benefit of sustainable fusion energy.

M The PPMO is undergoing a significant transformation to better align its skills and services with the needs of UKAEA's portfolio of programmes and projects and to influence senior leaders in UKAEA to adopt an improved approach to the delivery of programmes and projects. To deliver these aims the PPMO identified and mostly delivered a plan to establish an improved project delivery lifecycle, a standardised way of reporting progress, and a more controlled start up. The project delivery lifecycle can be tailored to reflect the complexity of each project. The outstanding work, which will now be completed in 2023, is to assess and categorise the complexity of each project. This means that some projects at UKAEA are still using a 'one size fits all' approach for the delivery of their projects and will transition to the new system next year.



Managing our risks

Risk landscape

This year has continued to see an evolving and challenging risk landscape which has required continued efforts to bolster resilience and preparedness, primarily against the emerging threat of energy price and availability, in particular the risk of national power outages and the sustained cost of energy within the UK. Whilst the organisation has seen developments in the way that it manages risks in evolving national and global landscapes, there are still efforts being made to increase agility in how we counter these threats.

Safety continues to be our top priority and we have no tolerance towards any risk of harm to our people, our workers, and our environment. We continue to have robust controls in place to minimise the risk, a continual safety improvement programme in place to drive effective mitigation, and a mature safety culture ensuring compliance with health and safety regulations.

One of our most challenging areas of risk is the need to deliver the highly scientific, technical, and niche work underpinning our corporate goals, with appropriate resourcing key to mitigating this. This year has seen higher rates of turnover within the wider context of specialist skills being in short supply in competing markets. In the first instance projects and programmes look for specialist knowledge and resource within JET staff to ensure that this is retained within the organisation. Increased focus on strategic workforce planning and improvements to the employee value proposition are key to our strategy for retention.

The UK government has now made a definitive decision regarding the association to Horizon Europe and Euratom. Although the UK and the EU have signed the agreement for the UK to re-join Horizon Europe, the decision has been taken not to associate with Euratom and instead pursue a programme of alternatives. The UK government has committed a significant amount of funding to the alternatives programme which will look to accelerate innovation and research in Fusion. As we maximise our alternatives funding we continue to monitor the effect on the future risk landscape as alternative programmes are announced.

Interim arrangements remain in place with ITER Organisation (IO) to enable continued engagement between UK entities and IO with an alternative, long-term agreement now being explored. Our relationship with ITER remains positive and collegial, with both sides wishing to find a way forward to maintain the positive working relationship.

The heightened geopolitical risk of the Russian invasion of Ukraine continues to put increasing pressure on the global supply chain already impacted through inflation, increasing energy costs, weather disruption, manufacturing and logistics issues, and reliance on natural resources. There is therefore a risk of both shortages and of high price increases to key materials across Europe. We continue to monitor the impact on our supply chain.

Cyber-attack remains a very likely possibility for UKAEA, with the geopolitical landscape as a key driver for the heightened risk. As a result, we remain vigilant and continue to strengthen our security measures through enhanced network management tools, robust disaster recovery processes, and key training and awareness programmes.

The risks of tranche 1 of the STEP programme are reducing in line with completion at the end of 2023/24. An exercise to refine the risks for tranche 2a of the programme is in progress. There are still significant scientific and engineering risks involved, in particular with scaling up technologies to meet the design requirements identified in tranche 1. There are also significant risks in delivery which are driven by the scale of infrastructure required, supply chain management, the need to develop industry to enable delivery (also a benefit), and the likely cost (which will drive significant government interaction).

The JET Decommissioning and Repurposing programme has undergone a reference class forecast to establish a baseline impact of uncertainty to cost and schedule. Further cost and schedule analysis is being conducted to assist in the planning and delivery of key objectives. An emerging risk area has developed as a result in terms of UKAEA's management of the transition between JET operations and decommissioning and repurposing; the key areas of concern are the people, processes, and change management involved, and efforts are underway to develop a plan to mitigate these.

Our risk appetite

Ambition to achieve our goals demands a varying appetite for risk



SCIENTIFIC RISK

To maintain the UK's position as a world leader in fusion we are prepared to push the boundaries of known science and, on occasions, step into the unknown to achieve delivery of our strategic objectives. This we are prepared to do and indeed these scientific behaviours are ones we expect of our people. However, in taking these scientific risks, we need to recognise that there may be other associated risks where we have a much lower appetite for risk e.g. risks to the safety and health of our people and quality. In addition, we need to ensure that integrity of our science is good, and we can back up any contentious scientific claims with robust evidence to maintain our reputation.



BUSINESS DEVELOPMENT ACTIVITIES

Whilst growing business development opportunities for the UKAEA and UK industry is important we also recognise that resources – may be constrained to pursue these opportunities which may detract us from our core mission. In pursuing prospects, we would expect to see a return on investment commensurate with the increased risk others. We need to have robust management arrangements in place to monitor when prospects are not developing as intended and be prepared to realign activities in a timely fashion to limit the downside of opportunities that are not delivering.



OPERATIONS

We have robust operational and engineering processes and systems. These include effective project management/design, machine protection procedures, technical design standards and rigorous safety cases. Staff are provided with operational training, mentoring and ongoing education to include hazard awareness and control. We expect technical staff to exercise good technical judgement in operations and comply with internal processes (see also Safety and health of people).



PROGRAMME MANAGEMENT

We aim to balance resources, capabilities and progress to comply with declared programmes and meet scheduled delivery. We are prepared to consider re-prioritisation of lower priority programme elements to deliver high priority programme goals, provided the risk to budget compliance is moderate.



REPUTATION AND PUBLIC RELATIONS

We regard our continuing good name as essential to our success and recognise that funding of our activities relies on it to a significant extent and are confident in promoting fusion. Accordingly, we are prepared to take a balanced and moderate risk in this area.



ETHICAL

Responsible business conduct is fundamental to the success of our organisation. We expect our staff to always work to high ethical standards and therefore have low tolerance of risk in this area.



FRAUD AND FINANCIAL COMPLIANCE

UKAEA operates robust financial control systems to protect against fraud and other financial losses. UKAEA will endeavour to minimise risks of fraud associated with financial transactions. UKAEA will not engage in any speculative foreign exchange or other contracts but may consider the use of foreign exchange hedging instruments for the purpose of mitigating exposure to foreign exchange fluctuations.



SAFETY AND HEALTH OF PEOPLE

The health and safety of personnel be they employees, contractors, visitors or members of the public is paramount to us. We take our obligations in this area extremely seriously and expect all safety risks to be fully mitigated not only in line with all applicable legislation but also considering shared best practice with similar research organisations.

HOW WE PERFORMED

Our principal risks

- 

SOLVE FUSION CHALLENGES
Solve challenges of sustainable fusion energy - from design through to decommissioning with world-leading science and engineering.
- 







ENABLE PARTNERS
ENABLE partners to design, deliver, and operate commercial fusion power plants.
- 

DRIVE ECONOMIC GROWTH
Drive UK economic growth and a thriving industry that exports fusion technology around the world.
- 






CREATE CLUSTERS
Create clusters that accelerate innovation in fusion and related technologies.
- 

DEVELOP PEOPLE
Develop the talented, diverse people needed to deliver fusion energy.
- 

RELATES TO ALL

RISK DESCRIPTION	STRATEGIC PRIORITY	RISK APPETITE	MITIGATIONS ENACTED	RISK MOVEMENT
THE FOLLOWING STRATEGIC RISKS PRESENTED IN 2021/22, HAVE BEEN RETIRED OR MODIFIED IN 2022/23				
JET repurposing programme fails to deliver an alternative strategy that realises benefits of time, cost, IP generation and waste reduction.		Cautious	Work to determine an effective strategy following the end of JET operations has effectively mitigated this risk. Burndown of delivery risks is now the focus.	↓
No decision on Euratom association damages fusion programme.		Cautious	Dialogue continues between the UK government and the EU. Despite some positive progress with negotiations the UK's association to Euratom remains unresolved.	↓
STRATEGIC RISKS CARRIED FORWARD IN 2022/23				
Failure to deliver an investable concept design for STEP.		Bold	A risk reduction strategy is in place to address the principal technical challenges and to maintain good relationships with internal and external stakeholders. A project management and controls framework is in place.	↔
Delivery of H3AT and CHIMERA facilities are delayed or without the required capability.		Cautious	An innovation partnership type procurement is in place to mitigate the risks associated with 'first of a kind' innovative developments.	↔
MAST-U enhancements budget is insufficient to deliver the capabilities promised to EUROfusion within the agreed timescales.		Cautious	A detailed delivery plan is in place overseen by a project board monitoring tenders, timeline and budget to deliver enhancements on time.	↔
OPERATIONAL RISKS CARRIED FORWARD IN 2023/24				
Staff capability and capacity is insufficient to meet objectives.		Cautious	Increased focus on strategic workforce planning and improvements to the employee value proposition. The people strategy is in place and strategic workforce planning is established.	↑
Heightened geopolitical risk of the Russia/ Ukraine conflict.		Minimalist	Work continues to strengthen our defences against cyber-attack, to strengthen resilience in our supply chain and by identifying potential relief through reviewing the robustness of inflationary clauses within existing contracts.	↑

HOW WE PERFORMED

RISK DESCRIPTION	STRATEGIC PRIORITY	RISK APPETITE	MITIGATIONS ENACTED	RISK MOVEMENT
OPERATIONAL RISKS CARRIED FORWARD IN 2023/24				
Cyber-attack on UKAEA digital and/or operational systems.		Minimalist	Work continues to strengthen our defence against hostile actors and to meet government cyber security standards. Specialist resource is in place within the cyber security team to ensure robust measures and resilience is in place to protect our systems.	↑
Inflation puts intolerable pressure on agreed budgets and deliverables		Cautious	Increased costs across the board remain a significant challenge but the initial shock increases are progressively being absorbed into budget.	↑
Site power enhancement plan fails to deliver the power enhancements in line with our needs on campus development.		Cautious	The site power enhancement project has proposed timescales to disconnect JET as well as to undertake extensive refurbishment and repurposing for future operational requirements. Good stakeholder management is in place with SSE and effective governance arrangements actively monitor dependencies and delivery.	↑
JET breaks down or underperforms.		Bold	Ongoing asset management systems and process is continued to support JET in the lead up to the cessation of operations.	↔
Lack of adherence to compliance standards at UKAEA.		Averse	Effective processes and systems of internal control are in place to address this risk including strengthened lines of defence and appropriate governance.	↓

HOW WE PERFORMED

Significant external challenges

EU exit

On the 7th September 2023, the UK government announced that it will invest further in its own fusion energy strategy instead of associating with the Euratom Research and Training programme (Euratom R&T). The new arrangement will involve close international collaboration, including with European partners, and a new, cutting-edge alternative research and development programme, backed by up to £650m through to 2027. During 2022/23, delays in the UK government’s decision primarily impacted UKAEA in three areas:

EUROfusion: Membership of the EUROfusion consortium requires UK’s association to the Euratom R&T programme. In 2021 UKAEA became a “suspended signatory” to the EUROfusion consortium agreement i.e. UKAEA was a member of the consortium, but our membership had been suspended until such a time as the UK associated to Euratom R&T. In response, UKAEA entered into an associated partner agreement with Max-Planck Institute for Plasma Physics in Garching, Germany (which is a EUROfusion member) under the auspices of the EUROfusion Grant Agreement.

UKAEA therefore continued to participate in the EUROfusion consortium as an associated partner under the EUROfusion Grant Agreement, although unable to receive grant funding from EUROfusion. In accordance with this, EUROfusion and UKAEA continued to cooperate on MAST-U and a portion of the experimental programme was allocated for EUROfusion experiments in 2022/23.

JET: As the UK was not associated to Euratom in 2022/23 (and by extension EUROfusion), EUROfusion was not funding JET. As a result, the UK government continued to fund JET’s running costs during 2022/23 to maintain the world class science at this facility, making it fully available to our EU partners.

ITER: Previously, UK industry secured around £650m of contracts from ITER, and with UKAEA support through unique expertise and capabilities, were targeting another £1bn. Access to these contracts is only available to F4E members (F4E is the EU’s procurement agency for ITER contributions) which requires association to Euratom. As a result, UK entities have been judged ineligible to win or participate in ITER contracts since 2020.

Energy price crisis

The primary impact of the energy price crisis has been increased financial pressure on UKAEA’s operating costs given the energy demands of several of its facilities. That said, the impact on the cost of JET operations - the largest single electricity consumer on the Culham Campus (approximately 15% of our total electricity use) - was minimised by an Executive decision to fix the price prior to the significant increases experienced over the past 12 months.

An indirect, but more significant, impact of the energy price crisis has been the inflationary pressures on materials. This pressure has increased the costs of the numerous construction projects undertaken primarily under the £184m Fusion Foundations programme.

Cost increases have largely been mitigated by contingency and management reserve, but the fusion foundations programme could not be fully shielded from the impact of increased materials costs.



HOW WE PERFORMED

Performance

Accountability

Annual Accounts

Performance

Accountability

Annual Accounts

Sustainability and waste

Sustainability report

Overall operational performance

Energy and water consumption, as well as waste disposal volumes, vary from year to year due to changes in our operations. Specifically, electricity consumption, water consumption, and waste production tend to increase during the operation of our fusion experiments. This variation affects our total greenhouse gas emissions. During 2022/23, UKAEA's overall greenhouse gas emissions decreased compared to the previous year due to lower energy usage. Waste levels did not change compared to 2021/22 and remained high compared to the levels seen during 2018-2021. This is due to several factors - extensive works on site that included clearances and removals, an increasing number of employees, and the recovery of business growth following the Covid-19 pandemic. Recycling levels remained high, with 80% of non-hazardous waste going for reuse or recycling. For more information on waste, see page 64.

Summary of financial and non-financial sustainability information for 2022/23

Area	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	
Greenhouse gas emissions (1,000 tCO ₂ e)	15.37	15.6	22.1	17.6	17.3	15.5	
Estate Energy	Consumption (mill kWh)	36.1	49.8	77.8	68.7	74.6	70.6
	Expenditure (£k)	4,055	5,686	9,345	7,249	10,020	14,605
Estate Waste	Amount (tonnes)	503.04	659.20	643.79	297.89	861.58	861.20
	Expenditure (£k)	309.50	371.27	319.05	124.37	202.02	161.56
Estate Water	Consumption ('000 m ³)	63	98	93	99	102	107
	Expenditure (£k)	144	279	206	276	234	370

Greenhouse gas emissions

Greenhouse gas emissions	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	
Non-financial indicators (1,000 tCO ₂ e)	Total emissions (Scope 1-3)	15.37	15.60	22.11	17.60	17.27	15.52
	Gross emissions Scope 1 (direct)	1.45	1.20	1.32	1.76	1.65	1.90
	Gross emissions Scope 2 & 3 (indirect)	13.92	14.40	20.79	15.84	15.62	13.62
Related energy consumption (million kWh)	Electricity: Non-Renewable	29.80	44.74	72.02	62.00	66.95	64.00
	Electricity: Renewable	-	-	-	-	-	-
	Gas	6.33	5.01	5.80	6.70	7.64	6.63
	LPG	-	-	-	-	-	-
	Other	-	-	-	-	-	-
Financial indicators (£k)	Expenditure on Energy	4,055	5,686	9,345	7,249	10,020	14,605
	CRC Licence expenditure	294	330	0	0	0	0
	Expenditure on accredited offsets	0	0	0	0	0	0
	Expenditure on official business travel	569	677	655	42	451	1,059

Note: The greenhouse gas emissions were calculated (from the raw data) using DEFRA conversion factors: <https://www.gov.uk/government/collections/government-conversion-factors-for-company-reporting>. The emissions categories we currently report under Scope 3 are: energy transmission and distribution emissions and business travel.

Waste disposal

Waste	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23		
Total waste disposed of	503.04	659.20	643.79	297.89	861.58	861.20		
Non-financial indicators (tonnes)	Hazardous waste	Total	24.48	19.89	30.49	16.87	40.28	49.02
		Landfill	13.36	56.36	40.30	18.81	26.48	16.30
	Non-hazardous waste	Reused/Recycled	270.94	409.16	394.20	200.03	594.05	625.30
		Composted	37.36	33.84	36.72	7.04	18.35	8.84
		Incinerated (energy recovery)	100.10	99.04	102.32	40.29	147.35	129.20
		Incinerated (no energy recovery)	0.07	0.03	0.00	2.36	0.08	0.26
	Total non-hazardous waste	421.83	598.43	573.54	268.53	786.31	779.90	
Radioactive	Produced	40.94	50.05	49.81	31.46	57.50	84.21	
	Disposed	56.73	40.88	39.76	12.49	34.99	32.18	
OSR (see note below)	Produced	36.49	9.81	25.63	7.55	16.16	0.00	
	Incinerated (no energy recovery)	-	-	-	-	-	0.10	
Total Radioactive / OSR waste disposed of	56.73	40.88	39.76	12.49	34.99	32.28		
Financial Indicators (£k)	Total disposal cost	309.50*	371.27	319.05	124.37	202.02	161.56	
	Hazardous waste disposal cost	Total	24.00	16.50	25.20	19.77	57.70	45.78
		Landfill	2.00	4.00	16.50	3.83	7.47	8.78
	Non-hazardous waste disposal costs	Reused/recycled	5.00	30.00	64.43	12.21	-8.96	-23.75
		Composted	1.50	1.30	1.59	1.95	0.84	0.00
		Incinerated (energy recovery)	21.00	20.47	24.33	8.58	40.32	37.56
		Incinerated (no energy recovery)	-	-	-	-	-	0.12
	Radioactive	Disposed	256.00	299.00	187.00	78.03	104.65	93.07
OSR	Incinerated (no energy recovery)	-	-	-	-	-	-	

* Previously reported as £245k

Notes:

- The figure for 'Compost' is food waste sent for anaerobic digestion.
- Out of Scope of Regulations (OSR) waste is material where the activity is low enough to fall below the threshold set by the Environmental Permitting Regulations to be classified as radioactive waste.

Finite resource consumption

Finite resource consumption	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23		
Non-financial indicators ('000m ³)	Water consumption (whole site)	Supplied	62.7	97.95	92.89	98.61	102.09	107.12
		Abstracted	N/A	N/A	N/A	N/A	N/A	N/A
		Supply per FTE	0.06	0.08	0.06	0.05	0.05	0.05
	Average number FTE staff/contractors	1,130	1,249	1,461	1,818	2,087	2,306	
A4 paper reams equivalent*	4,800	5,200	9,200	200	3,200	1,600		
Financial indicators (£k)	Water supply costs (whole site)	144	279	206	276	234***	370	
	Paper supply costs**	7	8	12	<1	3.2	9.5	

* note this does not include printroom publication paper supply.

** previously counted at 10 reams per box in error, this year 5 reams per box

*** previously reported as £245k

HOW WE PERFORMED

Business travel

Scope 3 Business travel emissions			2022/23
Domestic travel	Distance travelled (km)	Hire vehicles	478,671
		Taxi	49,388
		Bus / coach	42,298
		Rail	344,972
		Flight	55,371
	Emissions (tCO2e)	Hire vehicles	81.70
		Taxi	7.35
		Bus / coach	1.31
		Rail	12.24
		Flight	7.20
Other travel	Distance travelled (km)	Short haul international	1,381,413
		Long haul international	2,392,668
		International (non-UK)	262,592
		Rail - Eurostar	24,676
	Emissions (tCO2e)	Short haul international	112.13
		Long haul international	244.24
		International (non-UK)	25.49
		Rail - Eurostar	0.11
	Emissions with RF factor* (tCO2e)	Short haul international	212.09
		Long haul international	462.00
International (non-UK)		48.22	

* Air travel CO2 emissions are multiplied by the Radiative Forcing (RF) factor, to account for the higher global warming potential from emissions released at higher altitudes.

Note: That this is the first year of reporting business travel emissions and we hold no prior data

Consumer Single Use Plastic (CSUP)		2022/23
Total quantity of CSUP		273183
Types of CSUP contributing to the Total		47%
Types of CSUP omitted from Total as have been replaced / removed		53%

Note: That this is the first year of reporting Consumer Single Use Plastic (CSUP) and we hold no prior data

Environment and sustainability

The goal of fusion research is to provide a low carbon energy source for the second half of this century. Whilst on the path to sustainable fusion energy, we aim to make our progress as environmentally friendly as possible.

UKAEA takes its environmental responsibilities very seriously and ensures all statutory obligations relating to waste management and standard discharges to

the environment are strictly complied with. Our environmental management system is certified to ISO 14001, the international standard that provides a system for managing environmental commitments and performance.

A sustainability strategy has been created and enacted in an effort to reduce our greenhouse emissions and carbon footprint, for more information on the strategy see page 62.

Greening Government Commitment

UKAEA is exempt from Greening Government Commitment (GGC) operational targets because the nature of the experiments is such that safe, technically and financially feasible energy efficient measures cannot be adopted to the extent required for meeting the commitments. However, for transparency purposes we report our emission, waste, and resource consumption data together with

HOW WE PERFORMED

our strategy and objectives for reducing our impact. In line with GGC requirements we also report the actions we take for biodiversity, sustainable procurement, climate change adaptation and sustainable construction. Rural proofing is not applicable to UKAEA, and this is therefore not included.

Greenhouse Gas Emissions

The greenhouse gas protocol sets out the process for reporting emissions categorised in 3 scopes. In line with government requirements, we report on our scope 1 and 2 emissions, along with the business travel aspect of scope 3. Scope 1 covers emissions from sources that an organisation owns or controls directly, for example from burning fuel in our fleet of vehicles. Scope 2 are emissions that a company causes indirectly and come from where the energy it purchases and uses is produced, for example the emissions caused when generating the electricity that we use in our buildings. Scope 3 encompasses emissions that are not produced by the company itself and are not the result of activities from assets owned or controlled by them, but by those that it is indirectly responsible for up and down its value chain; an example of this is when we buy, use and dispose of products from suppliers.

The energy used directly in the running of our fusion experiments is one of our main greenhouse gas emission sources. Running fusion experiments is a highly energy intensive activity and represents a short-term emissions cost as an investment in a much longer-term sustainable future. For this reason, fusion related emissions are excluded from our sustainability strategy so as not to impact the development of fusion energy.

In addition to the energy used directly by our fusion experiments, energy used for the running of our buildings, as well as energy used in the making of the products and services we buy, represent our most significant sources of greenhouse emissions. Although we do not formally report on all the scope 3 categories, initial analysis shows that scope 3 emissions are a significant part of UKAEA's carbon footprint, exceeding those from scopes 1 and 2 combined, and that those associated with purchased goods and services are the most significant of all the scope 3 sub-categories.

Biodiversity and nature recovery plans

At Culham, all of our new developments are to maintain and improve biodiversity on site in line with local authority biodiversity net gain requirements as a minimum, striving to retain and enhance tree canopy cover and vegetation throughout the campus and along the boundaries. The biodiversity strategy adopts a sequential mitigation approach, starting with on-plot mitigations, and if this is not practicable, we consider off-site mitigation and payment to local council biodiversity process. We also have ongoing initiatives for wildflower and tree planting, shrub bed replacement with insect friendly options, a reduction in mowing, and installation of bee hotels and barn owl boxes. We maintain and protect areas on our site which have established biodiversity beds and encourage staff to enjoy these areas in a considerate way. Note that the requirement for nature recovery plans is not applicable to the Culham Campus as it does not hold significant natural capital.

Our new site at West Burton is currently in the process of being fully characterised. The site is made up of a combination of greenfield and brownfield sites, and the STEP programme is currently undertaking rigorous biodiversity net gain impact studies to ascertain the future options for habitat compensation.

Sustainable procurement

Environmental standards are integrated as part of the tender process for our key contracts. We also observe the Government buying standards for sustainable procurement in the areas relevant to our activities. In addition, promoting sustainability in our supply chain is one of our three main sustainability goals.

Climate change adaptation

Projects with long-term implications, such as new building construction projects, are being designed for durability and resilience. As part of these projects, high standards of flood and surface water management are also adopted.

Continuous improvement

As part of the ISO14001 Certification, we are required to demonstrate that we consider our key environmental risks and opportunities and to show our commitment for continuous improvement in the areas where the impact is the greatest.

HOW WE PERFORMED

Contributes to UN sustainability goal



Sustainability strategy

In recognition of our goal to reduce our high energy usage, our commitment to minimise the impact we have on our environment, and our responsibility to support government net zero targets, in 2022 we finalised and enacted a sustainability strategy. The strategy is built around the three largest non-experimental contributors to our carbon footprint: heating of buildings, energy for building services and sustainable procurement. There are also additional efforts to improve business travel data collection and set performance targets and metrics. The following sections highlight the progress made during 2022/23.



Download Sustainability strategy

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1092465/UKAEA_Sustainability_Strategy.pdf

GOAL 1 NEW BUILDINGS AND INFRASTRUCTURE

Design and construct new buildings with a focus on sustainability



NEW BUILDINGS AND INFRASTRUCTURE

New buildings completed after 1 January 2023:

- ▶ BREEAM Excellent sustainable design rating
- ▶ Net zero carbon in operation
- ▶ 25% water use reduction and sustainable drainage
- ▶ Biodiversity net-gain; responsibly sourced materials
- ▶ Sustainable transport facilities and incentives

Our business is rapidly developing with new sites being acquired and major development at Culham Campus in progress. To minimise the additional greenhouse emissions and carbon footprint associated with the construction and design of these buildings, we consider sustainability at all stages of the design and build.

All of our new buildings have been designed to BREEAM Excellent standard and are designed to be 100% electric. To encourage wider adoption of standards, the UKAEA

sustainability strategy is now shared with developers where we enter into a new building lease.

UKAEA continued to encourage sustainable means of transport, boosted by the completion of a travel plan based on the results of our yearly travel surveys. We actively publicise the cycle to work and car share schemes, specify cycling links and related facilities with each new building development/refurbishment, and meet regularly with transport operators and public transport

officers at Oxfordshire County Council to achieve bus and rail service improvements. Car parks currently under development are built around the boundary of the site, reducing the number of vehicles in proximity to people, but also so that these areas can be easily repurposed as the demand for cars decreases in the future.

UKAEA has started to develop a green IT strategy to reduce the impact of computing equipment and of our digital operations.

HOW WE PERFORMED

GOAL 2 EXISTING ESTATE

Improve the energy performance of the existing estate



EXISTING ESTATE

Existing buildings monitored and upgraded:

- ▶ Gas energy supply transitioned to electric
- ▶ Solar PV panels and hot water systems
- ▶ Facade and roof refurbishments for insulation
- ▶ Metering and energy monitoring
- ▶ Develop long-term decarbonisation plan

Culham Campus largely consists of legacy buildings. Some date back to the 1960s when energy efficiency was not considered important, and others were built in the 1980s specifically for temporary use during the anticipated 10 year lifespan of JET. The energy performance of these buildings must be improved to reduce our greenhouse emissions and carbon footprint.

New energy monitoring systems have been installed to monitor

energy consumption and a heat map visualisation has been completed to identify high heat loss areas. These will allow us to prioritise improvements and, after further monitoring, to set long-term emission reduction targets and create a decarbonisation plan.

In parallel with improved data collection, significant progress was made with energy reduction measures during 2022/23. The restaurant kitchen at Culham was refurbished and transitioned to

100% electric, the roof insulation on three of our large legacy buildings was upgraded from 15mm to 120mm resulting in an achieved thermal efficiency increase of 300%, four of our buildings had solar PV added to their roofs (470kW of generation, saving 183 tonnes of carbon), and work to replace building facades – removing asbestos, adding new insulating panels, and upgrading to double glazing – has continued.

GOAL 3 SUPPLY CHAIN

Promote sustainability in our supply chain



SUPPLY CHAIN

Environmental focus to procurement process:

- ▶ Updated competency training for contract managers
- ▶ Structured sustainability selection criteria
- ▶ Emissions data collection and ambitious targets
- ▶ Cut carbon footprint and single use plastics
- ▶ Develop greenhouse gas reduction strategy

UKAEA must go further than simply considering sustainability within our procurement process. We must actively promote change and sustainability in our growing supply chain.

A process was developed for collecting supply chain emission data enabling us to identify that supply chain emissions are by far the largest source of all emissions at UKAEA. Understanding this fact helps to identify short-term priority

areas, such as enhancing training for contract project managers and updating tools for use within the procurement process, as well as informing the development of our longer-term decarbonisation strategy during 2023/24.

HOW WE PERFORMED

Waste

UKAEA's activities on the Culham Campus create a varied range of waste streams. Some of these waste streams are complex and require extensive input from experts to ensure UKAEA complies with its legal obligations under the waste duty of care and code of practice, and other relevant legislation. The duty of care legislation makes provision for the safe management of waste to protect human health and the environment. The code of practice sets out practical guidance on how to meet waste duty of care requirements. It is issued under section 34(7) of the Environmental Protection Act 1990 in relation to the duty of care set out in section 34(1) of that act.

Errors with the interpretation of waste categories were noted in the 2021/22 annual report, and corrective action has been fully implemented. In Q2 of 2022/23, additional errors were found with items originating from a different area, the Environment Agency has been informed and measures have been taken to prevent re-occurrence. As part of the response, our governance processes have been strengthened with the establishment of the Waste Management Committee (chaired by the COO). The Waste Management Committee independently reviews the UKAEA waste management process on an on-going basis. UKAEA continues to work in an open and transparent manner with the Environment Agency.

Waste types

UKAEA, its tenants, and contractors working on-site produce in the region of 1000 tonnes of waste per year (excluding building and demolition wastes). The majority of the waste can be streamed into five categories: controlled, hazardous, radioactive, water, and gaseous discharge.

Controlled

Controlled waste is routine office and industrial waste which is not contaminated with hazardous materials or radioactivity. We segregate all controlled waste into material types, sending 90% for recycling or energy capture, minimising the amount of waste going to landfill.

Hazardous

Hazardous waste includes materials or substances which are harmful to humans or the environment. Our dedicated on-site hazardous waste storage facility segregates the different types of hazardous materials to prevent cross contamination and disposal is by licensed carriers only.

Radioactive

The majority of radioactive waste on site is of low activity/contamination. Only small volumes of intermediate waste are produced, which is carefully managed to minimise the amount requiring disposal. Processing waste, such as the thermal treatment of solids, allows for down categorisation and releases tritium which can be recycled for future use within our research facilities. We manage all radioactive waste in accordance with the UKAEA environmental permits issued by the Environment

Agency (environmental permitting regulations permit EPR/LB3330DP). We select the most appropriate waste routes in accordance with the best available techniques and waste acceptance criteria.

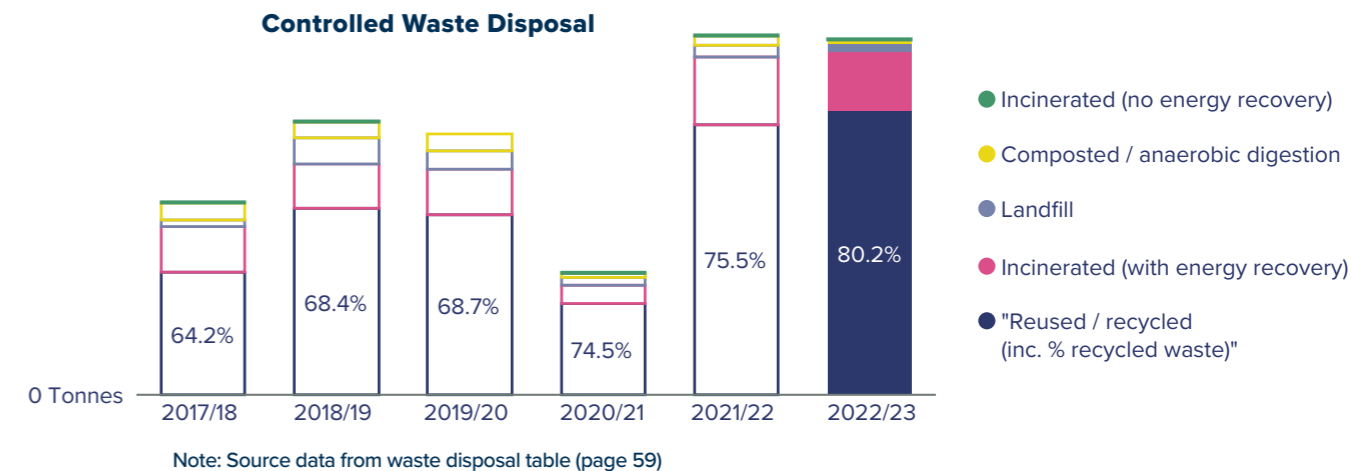
Water

Aqueous waste comes from a number of sources on site: general washing in bathrooms and kitchens, water from operational areas, foul drainage, and radioactive water from some research facilities. Uncontaminated water (primarily from kitchens and bathrooms) is disposed via the Thames Water sewage system. The remaining non-radioactive water is discharged via a dedicated trade effluent system under controlled conditions to comply with the UKAEA Environment Agency permit. Low level radioactive water, produced within our research facilities, is discharged via a dedicated radioactive drain system to the trade effluent system under an Environment Agency permit.

Gaseous discharges

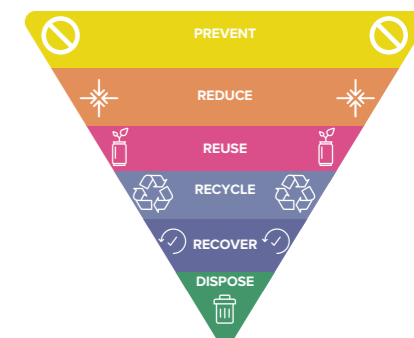
Non-radioactive gas discharges are controlled where applicable under the relevant legislation such as greenhouse gases. Our radioactive gaseous discharges (tritium being the main isotope of importance) are regulated, monitored, and discharged under an Environment Agency permit. All of our exhaust stacks have in-line monitoring systems, and there are tritium alarms in and around the operational areas. Where higher levels of tritium are found, such as in the JET vessel, the air is passed through an abatement system which removes the tritium for storage, processing, and recycling.

HOW WE PERFORMED



Waste management

As well as ensuring UKAEA meets all its legal obligations relevant to waste activities, it also vigorously applies the principles of the waste hierarchy.



Prevent

UKAEA's waste teams are regularly consulted on various projects at the conception stage, advising on waste minimisation techniques.

Reduce

From materials research for future fusion power plant design to reduce the waste burden to promoting reusable coffee cups at our favourite coffee outlets, waste reduction is at the heart of most of UKAEA's activities.

Reuse

UKAEA has been proactive in offering redundant plant and equipment for reuse by different facilities on-site or reuse by other organisations. We have also applied for permits to allow the reuse of construction wastes on-site, such as soil removed during excavation works.

Recycle

UKAEA has an excellent, and steadily increasing, recycling rate for its controlled waste streams, diverting many hundreds of tonnes of waste from landfill. The significant increase in waste arising in the years 21/22 and 22/23 is mainly attributed to the enabling works and site clearance for major construction projects on the Culham Campus.

Recover

The materials detritiation facility on Culham Campus has been operating with great success for several years now and is able to recover tritium from hard materials. Recovery methods like this will be crucial during the decommissioning of JET, substantially reducing the quantity of intermediate level waste. During 2023 we will commission a new water detritiation system enabling recovery of tritium from both the waste condensate produced by exhaust stack abatement plant and the bubbler water from the materials detritiation facility.

Dispose

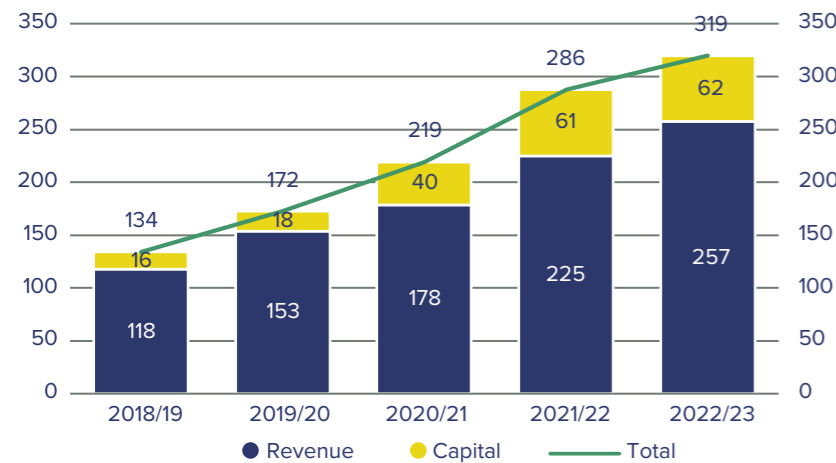
With some of the more complex waste streams we perform best available technique studies to ensure that all possible options are considered in advance of disposal. We carry out compliance monitoring of the disposal contractors and disposal sites to ensure that all legal and environmental obligations are fulfilled.

Professor Sir Ian Chapman
Chief Executive and
Accounting Officer
17th November 2023

Financial review

UKAEA Group incorporates the results of United Kingdom Energy Authority, AEA Insurance Ltd and UKAEA's share of trading results and net assets of the Harwell Science and Innovation Campus Joint Venture. The Annual Accounts on pages 122 to 157 provide the financial statements and further information. The key highlights are presented below:

Total funding profile over last 5 Years (£m)



Over the last 5 years, funding has increased to enable the growth in science & research and operational funding for the experimental fusion programmes, and investment in facilities.

Total income £319.7m

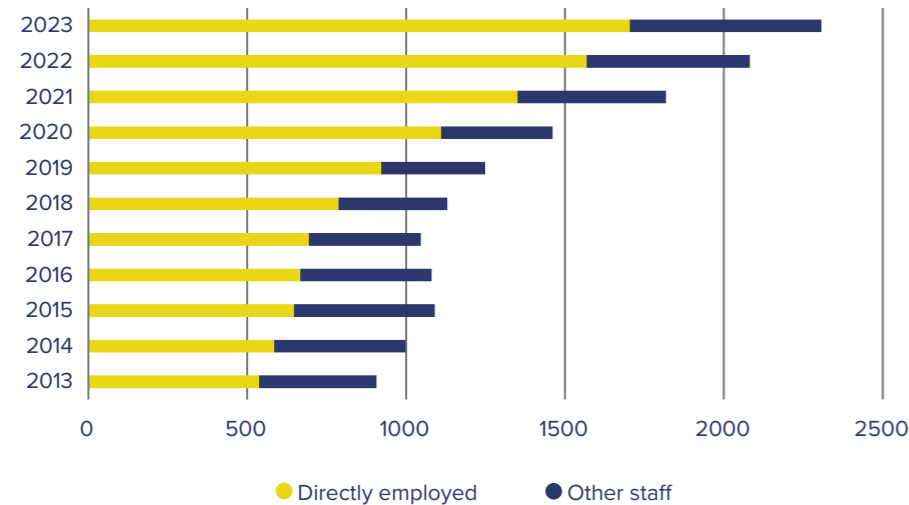
Revenue income £257.7m

Capital income £62.0m

+11.2% since prior year

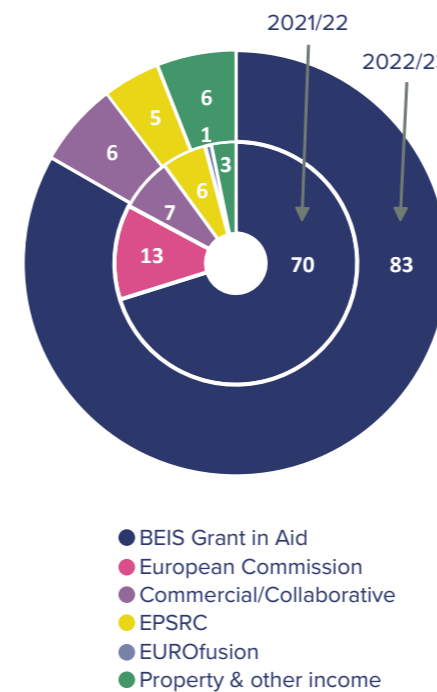
+138.7% over 5 years

People (full time equivalents)



Staff cost and FTEs have increased steadily year on year, driven by the expansion of programmes such as STEP, Fusion Foundations and JET Decommissioning. 2023 saw a further increase, and notably the UKAEA increased its engagement with specialist UK industry suppliers through framework agreements. These enable us to call upon a broad range of specialist engineering and technical skills to support the range of activities such as in fusion research, powerplant design, robotics, materials and other technology areas.

Income by source (excluding capital) (%)



Revenue income £257.7m

The majority of the income is from our sponsoring department - BEIS £209.3m. This is in respect of a series of major ongoing projects to develop the UK fusion capability - STEP, H3AT, Fusion Technology and operation of the JET experiment in Culham.

European funding:

The JET experiment was co-funded until 2021/22 with the European Commission contributing £36.2m in that year, and then intended to be given over to the EUROfusion consortium. Further, the multiyear EUROfusion Framework Programme (FP8) came to its scheduled end in 2020. Following the decision to not associate to Euratom, the participation of UKAEA in the current multiyear EUROfusion Framework Programme (FP9) is fully funded by UK government through our sponsoring department. Consequently, the Grant in Aid (income from our sponsoring department) now accounts for 83% of total income.

EPSRC maintains responsibility for Fusion Research, which has remained broadly flat over the 3 years. As has the UKAEA involvement in collaborative projects including the European Spallation Source, and our LongOps project with TEPCO's Fukushima Dai-ichi reactor in Japan and at Sellafield in the UK.

Capital income / expenditure £62m

Development of science and research facilities at Culham and Rotherham have continued during the year under the National Fusion Technology Programme, with construction costs of new buildings near completion and continuation of contracts for the plant and machinery required to deliver the equipment for the scientific programmes. The Fusion Foundation programme which commenced in the 20/21 to enhance infrastructure, facilities, and skills to enable world-leading fusion and innovation in the UK, contributed the largest increase in Fixed Assets, with ongoing work on office and training facilities, an IT transformation programme and enhancements to site power infrastructure.

Source of funding is predominantly our sponsoring department, BEIS, with £5.0m of expenditure funded through collaboration and external grants.

HOW WE PERFORMED

Expenditure

What did we spend it on?

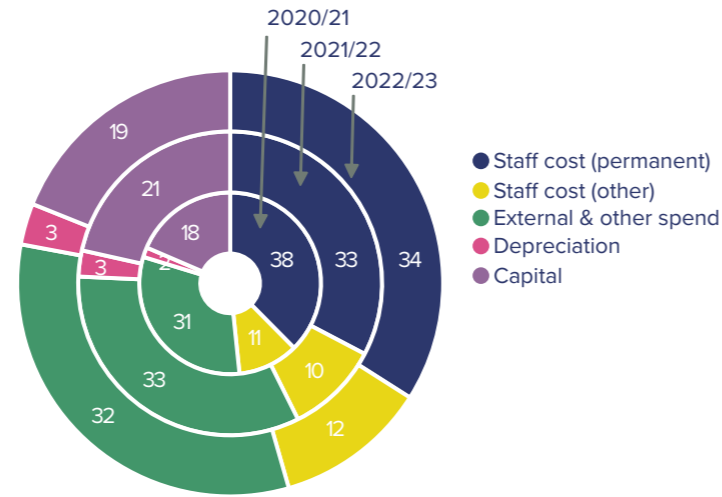
UKAEA spends most its revenue income on people, both permanent staff and contingent labour. These are predominantly engineering and operations people who are operating our facilities.

Over the past 3 years, as UKAEA facilities and research has grown the proportional spend on staff, operating expenditure and capital has remained consistent.

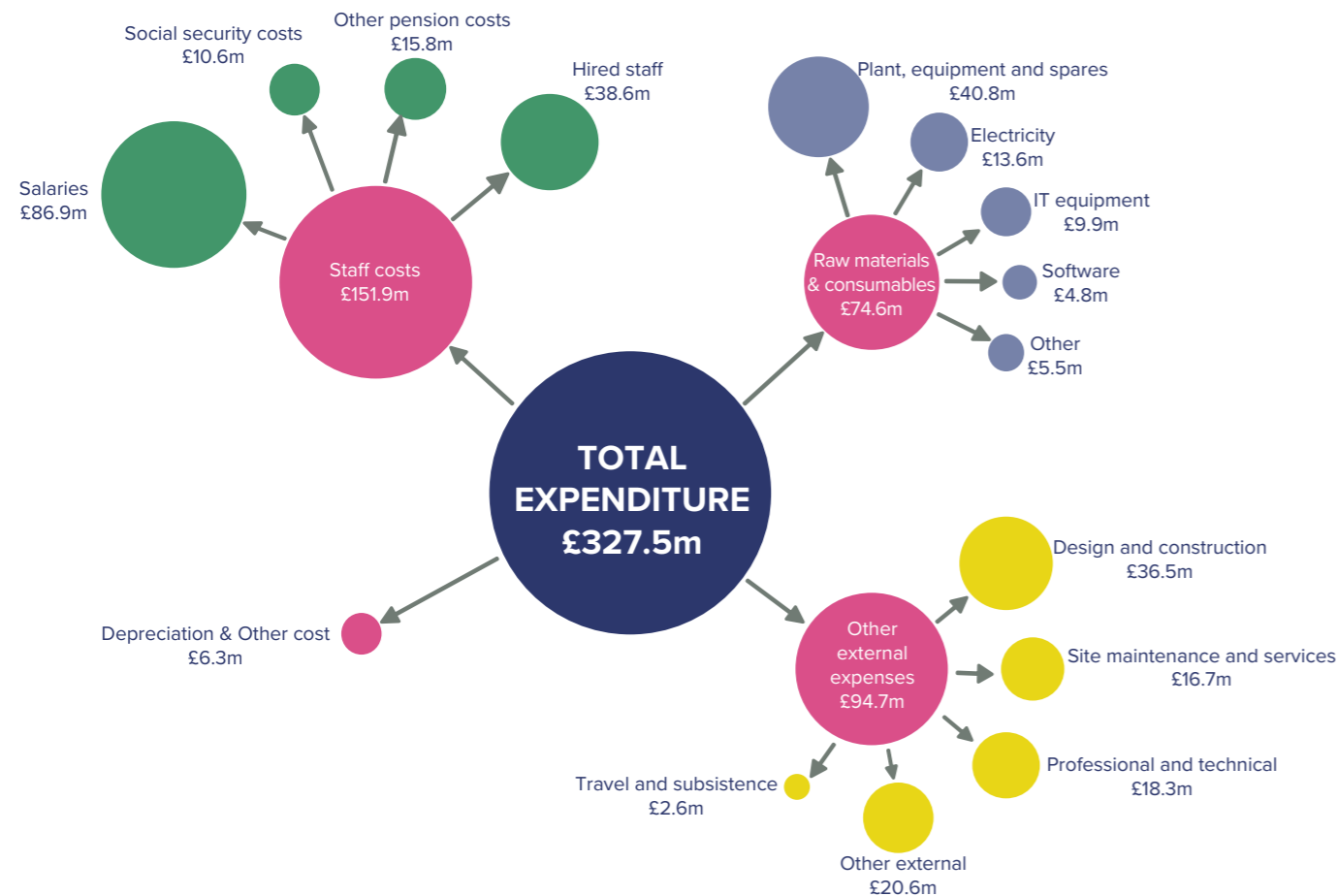
The depreciation is mainly in respect to the buildings on Culham site that are utilised by UKAEA.

The balance of spend is external, encompassing utilities, plant and equipment, sites services and construction.

Expenditure by type (including capital) - in %



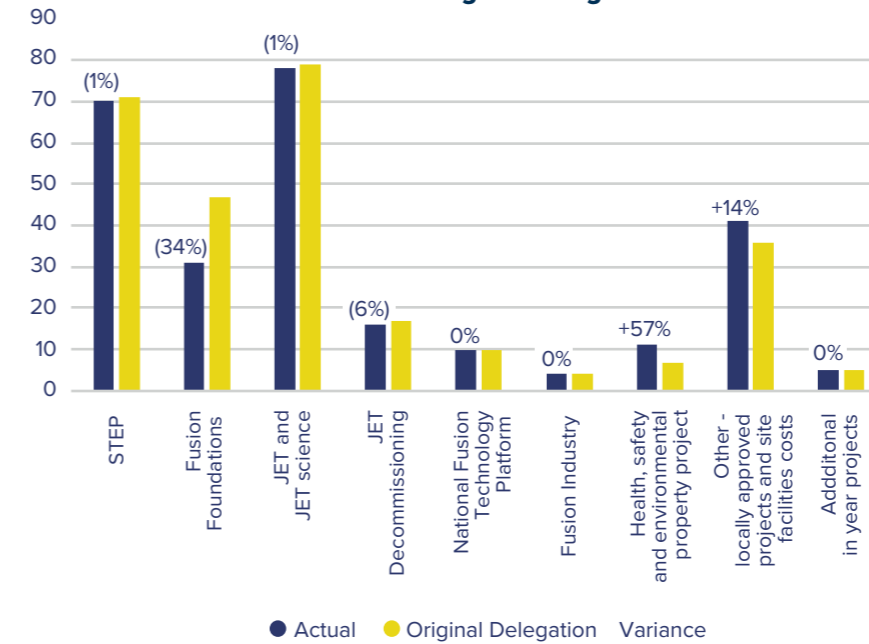
Total expenditure in the year was £327.5m, £37.5m higher than in 2021/22 with the majority related to increased staff costs. Investment in our staff is critical to the organisation and continues to be our single largest category of spend.



HOW WE PERFORMED

How did we perform compared to the funding provided by our sponsoring department

Funding from sponsoring department by programme - in £m variance to original delegation - in %

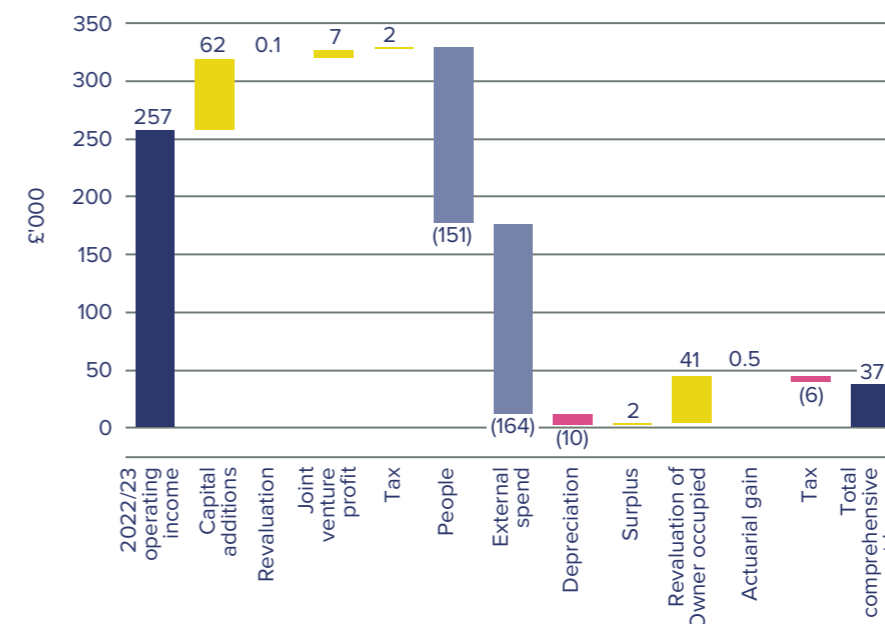


The main element of UKAEA income is Grant in Aid, which is confirmed by our sponsoring department each year in a delegation letter. For 2022/23 this was £276m (excluding historic restructuring), of which we actually drawdown £266m - receiving £248m cash in the year, £10m in prior year and recorded £8m to be received in 2024/25.

The key reasons for the £10m unutilised original delegation (£266m vs £276m, 4% underspend) was delays in our Fusion Foundation programme, primarily new office & support buildings on Culham Campus. The programme is forecasting a slippage into 2025 onwards which will be subject to the next Spending Review decisions on funding. Offset by overspends on property improvement projects as we were able to proceed faster than originally planned in business cases, cost pressures from utilities, rates in our facilities costs and some local projects supporting our Fusion Technology division.

During the year, UKAEA were successful in obtaining additional funding from our sponsoring department (£4m) for computing.

Financial performance in 2022/23 (£m)



Overall outturn

In 22/23 there was an overall surplus at a Group level of £2.1m (2022: £16.3m).

As majority of funding is from government via Grant in Aid or external grants, UKAEA aims to balance income and expenditure (excluding depreciation) at an operational level. This was achieved in 2022/23 with £10.3m of depreciation translating through to a £7.8m operating loss. Positive movements in joint venture and tax, resulted in an overall profit of £2.1m. The main driver being the share in profits from the Harwell joint venture of £7.2m, resulting largely from an increase in the fair value of the investment properties managed by the Harwell joint venture, as well as an improvement in operating profit.

Revaluation of property gains (net of tax impact) then extend the total comprehensive income for the year to £37.6m.

HOW WE PERFORMED

Provisions - A key item on UKAEA balance sheet is the provision for site restoration: UKAEA hosts the Joint European Torus (JET) facility at Culham. The site restoration provision represents the estimated costs of decommissioning this facility and restoring the site upon which it sits. Due to the nature of fusion experiments, the fuel types used, and the advanced remote handling systems which will be used for decommissioning for the first time, this decommissioning project will be of great scientific and technical importance. It will also be subject to unique uncertainties and risks.

The JET Lifetime Plan is to conduct this decommissioning and restoration. It is compiled in collaboration with the Nuclear Decommissioning Authority (NDA).

- It contains three major activities:
- 1 Decommissioning the JET experimental tokamak fusion machine.
 - 2 Storing, processing, and disposal of radioactive wastes.
 - 3 Demolishing structures, including buildings, and restoring the ground – once their use for decommissioning is complete.

The JET Lifetime Plan is set out as a costed project plan, current estimate is £762.5m. DESNZ, as Sponsoring Department, provides UKAEA with a Letter of Comfort that it will cover the cost of decommissioning JET, UKAEA therefore recognise an UKAEA therefore recognise a matching receivable. This provision is recognised by DESNZ within its Annual Accounts.

The JET Scientific Operational Programme runs until the end of December 2023. Following which, the machine will need to be operationally ceased and decommissioned. In preparation, UKAEA have developed a JET Decommissioning and Repurposing Programme.

As a substantial programme across multiple years (at least 14 years), JET Decommissioning will require business case approvals from DESNZ & HMT. This will be approached in tranches – providing oversight of the full programme and requesting approvals for a defined period of spend. The first tranche of the programme has been fully approved at an OBC

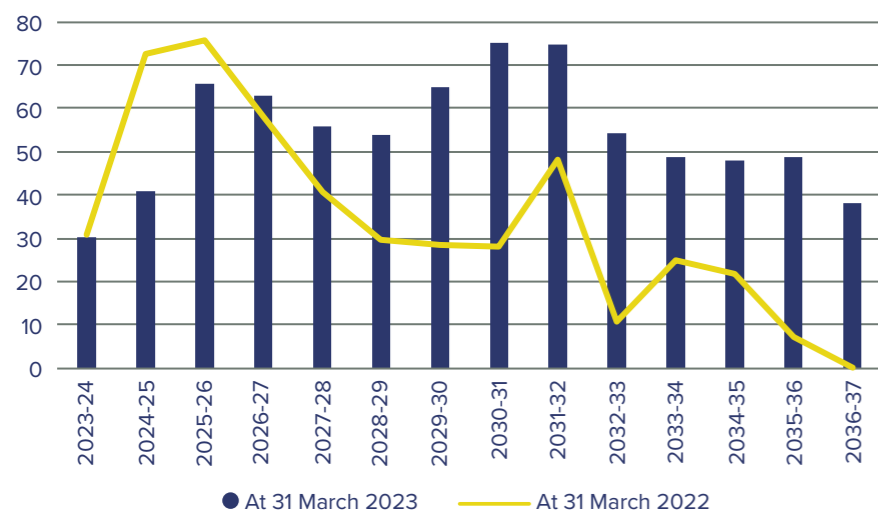
(Outline business case) and funding approved for 23/24 and 24/25, a FBC (Full Business Case) is in progress. This tranche covers the early in-vessel decommissioning phase until March 2025.

This business case set out the base case for decommissioning (Life Time Plan) alongside options to pursue Alternative Strategies to repurpose the JET facilities for UK science and innovation where there is a strong value for money case to do so. There were two Alternative Strategies presented, at 2% and 18% lower nominal programme cost – the main difference being the extent of building decommissioning. A comparative (“Do Nothing”) long-term Care & Maintenance strategy was also presented, at 33% higher nominal programme cost.

The strategic decision from the business case was to pursue an Alternative Strategy, receiving full approval in October 2023. The provision is maintained in the UKAEA & BEIS Annual Accounts on the basis of the Life Time Plan (Decommissioning) base case as this was agreed and in place on the 31st March 23. The retention and repurposing of JET buildings is a fundamental basis of the chosen Alternative Strategy, as these do not yet have long-term planning permission or an identified future income stream to maintain them, it is considered that the Life Time Plan represents the appropriate basis to calculate the provision.

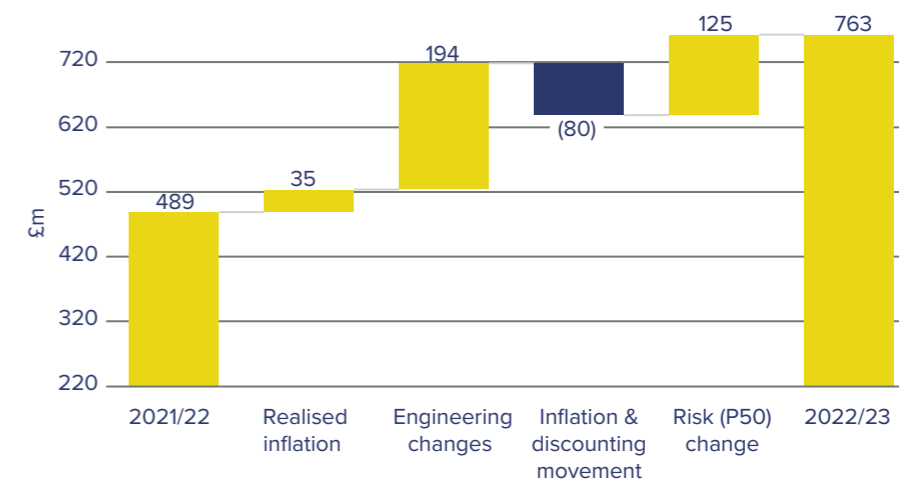
The current assessment of the Life Time Plan (Decommissioning) is that a provision of £762.5m is required – including inflation and discounted to current value. This is significantly greater than the £489.4m provided for at March 2022.

Decommissioning spend estimate (£m)



HOW WE PERFORMED

Key changes year on year – Site restoration provision £m



Key changes

Realised inflation:

This represents changes in prices between March 2022 and March 2023.

Engineering changes:

The change in activities/engineering scope within the programme has driven £194m of the £274m increase vs 2021/22. Of this, nearly half is due to a significant shift in assumptions about the cost of removing materials. 9,000 tonnes of materials previously assumed to be out of scope of nuclear regulations have been reassessed to low level radioactive waste, significantly increasing the expected handling and disposal costs (total volume now 10,200 tonnes). Other major movements were driven by a re-evaluation of materials in J1 (the main JET building) and more detailed planning for their clearance using currently available and safe techniques.

Inflation & discounting:

Movements of £80m (reduction) is based on changes to forward inflation and discount rates, from the latest HM Treasury Public Expenditure System (PES) guidance note.

Risk P50 change:

P50 represents the best estimate of the liability based on known discrete risks and uncertainty, which is driven by the nature and maturity of underlying plans. A detailed update to the plan to decommission JET was conducted in 2022/23, which uses the currently best available techniques, processes, and waste disposal routes. Some of the new underlying plans have a significantly lower level of maturity than those replaced, which has significantly increased the assessment of uncertainty.

See Note 21.1 Site restoration provision for further details

Professor Sir Ian Chapman
Chief Executive and Accounting Officer
17th November 2023

Chair's statement



"UKAEA IS ONE OF THE MOST ADVANCED, CAPABLE, EXCITING SCIENTIFIC AND ENGINEERING ORGANISATIONS I KNOW."

Professor David Gann
Chair
July 2023

It is a great honour to have been part of UKAEA's vital mission to provide a new, safe, and clean source of energy. After 5 years in post, I am stepping down to become inaugural Chair of UK Industrial Fusion Solutions (UKIFS), to deliver the STEP prototype fusion energy plant at West Burton.

During my time as UKAEA's Chair our mission has become of even greater prominence and importance, and I am proud of our growth in scientific and technical capability. The number of people we employ has doubled and our budget increased by 150%. We have broken world records and made considerable technical progress across a range of fusion challenges. It has been a real pleasure to see UKAEA deliver internationally recognised leadership in fusion during this time.

Highlights from this year demonstrate successful delivery against these goals, including a new fusion energy recruitment framework to boost economic activity and improve equality and diversity in employment. This will see UKAEA fill over 100 roles, with a boost to the economy in support of our major fusion energy programmes over the next four years.

A fresh wave of innovative companies will be moving onto our Culham site following agreement to build an 8,000 square metre research and development building. We have signed a five year agreement with Massachusetts-based Commonwealth Fusion Systems, confirming trans-Atlantic collaboration to advance commercial fusion energy. In South Yorkshire, our Fusion Technology

Facility opened for business, providing a manufacturing test capability, engaging with global engineering and manufacturing companies located in the area.

The Materials Research Facility at Culham has benefited from major investment from the EPSRC, through the UK's National Nuclear User Facility programme and The Henry Royce Institute for Advanced Materials initiatives, alongside direct support from the Government. In the past year, a 2200m² extension was completed, doubling the building footprint and research room capacity. In addition, a £5m Hot Cell Extension project was initiated.

Three digital technologies for fusion scientists and technologists are accelerating systems design and operations: the modern internet, high performance supercomputing for data analytics, and generative Artificial Intelligence. These combine to provide a powerful engineering, design and analytics environment, led by our newly established Computing Division. This provides opportunities for the UKAEA to collaborate on computing R&D in the development of systems and services with a range of research partners including Oxford and Manchester Universities and NVIDIA.

UKAEA's first robotics open event was held on the Culham Campus. Alongside its work for fusion and the nuclear sector, our robotics lab, RACE, has completed its first contract in the field of space robotics, working with the Satellite Applications Catapult to develop remote maintenance solutions in space.

The pathway to developing commercial fusion energy has been strengthened further through UK government's choice of the West Burton site to build a working fusion prototype machine, delivering electricity onto the grid. The establishment of UK Industrial Fusion Solutions provides the organisational structure to develop our STEP design into development for the new machine. This is coupled with the UK government's choice of a proportionate and appropriate regulatory framework managed by the Environment Agency and Health & Safety Executive. This progressive approach will help accelerate fusion energy in the UK, providing certainty over safety and environmental requirements.

These activities would not have been possible without the dedication and efforts of our hugely talented teams, led by our excellent executive, supported and guided by a highly experienced Board; I thank them all.

Earlier this year I was delighted to congratulate Ian Chapman, our CEO, who received a knighthood for services to global fusion energy, and Tim Bestwick, our Chief Development Officer and Deputy CEO, who received an OBE in the King's Birthday Honours.

I am grateful for the enormous contributions made by Lyanne Maclean and Antonia Jenkinson who left our executive team, and we wish them well in their future roles. I am very pleased to welcome Ruth Elliot and Justin Kingsford who take over their responsibilities as CFO and COO.

My thanks also goes to Mark Bayley who completed his term of office on the Board this year. Mark provided valuable knowledge in delivering major projects, his thoughtful guidance and insights naturally supported the STEP programme, helping it to successfully navigate government approvals. In January we welcomed Dame Sue Gray, who has quickly become an integral part of the team, bringing deep experience in organisational transformation in complex technology-based environments, and strategies for the deployment of skilled personnel.

The UKAEA is one of the most advanced, capable, exciting scientific and engineering organisations I know. It regularly operates with temperatures 10 times hotter than the centre of the sun, with cryogenics working at a few degrees Kelvin – Culham has simultaneously both the hottest and amongst the coldest temperatures in the Galaxy!

The UKAEA has developed the range and depth of expertise coupled with an innovative culture to take on the major challenges of creating viable fusion machines. I am delighted that the UK government has agreed a package of new funding in support of the UKAEA's work on fusion in relation to its previous Euratom funding. This will support the development of skilled people to work in fusion, further collaboration with universities, industrial and international partners, as well as the development of new facilities.

Professor David Gann
Chair
July 2023

Accounting Officer's statement

Section 4(3) of the Atomic Energy Authority Act 1954 requires the United Kingdom Atomic Energy Authority (also referred to as "the Authority") to prepare a statement of accounts for each financial year in the form and on the basis set out by HM Treasury. The financial statements are prepared on an accruals basis and must give a true and fair view of the state of affairs of the Authority and of its income and expenditure, Statement of financial position and cash flows for the financial year.

In preparing these financial statements, the Accounting Officer is required to comply with the requirements of the Government Financial Reporting Manual and in particular to:

- observe any additional guidance issued by HM Treasury, including the relevant accounting and

disclosure requirements, and apply suitable accounting policies on a consistent basis

- make judgements and estimates on a reasonable basis
- state whether applicable accounting standards as set out in the Government Financial Reporting Manual have been followed, and disclose and explain any material departures in the financial statements; and
- prepare the financial statements on a going concern basis
- confirm that the Annual Report and Accounts as a whole is fair, balanced and understandable and take personal responsibility for the Annual Report and Accounts and the judgements required for determining that it is fair, balanced and understandable.

The Accounting Officer of the Department for Business, Energy and Industrial Strategy (BEIS) has

appointed the Chief Executive as Accounting Officer of the United Kingdom Atomic Energy Authority. The responsibilities of an Accounting Officer, including responsibility for the propriety and regularity of the public finances for which the Accounting Officer is answerable, for keeping proper records and for safeguarding the Authority's assets, are set out in Managing Public Money published by HM Treasury.

As the Accounting Officer, I have taken all the steps that I ought to have taken to make myself aware of any relevant audit information and to establish that UKAEA's auditors are aware of the information. So far as I am aware, there is no relevant audit information of which the auditors are unaware.

Directors' report

The following items, required as part of the Directors' report, are included. Composition of the UKAEA Board on page 86. Disclosure of personal data-related incidents on page 104.

Machinery of government changes

During this reporting period, our sponsoring government department was changed, from Department for Business, Energy and Industrial Strategy (BEIS) to Department for Energy Security and Net Zero (DESNZ). For the purpose of financial reporting, the 2022/23 Annual Accounts will remain consolidated as BEIS.

Arm's Length Body review

During this reporting period, our sponsoring government department initiated an Arm's Length Body Review for UKAEA.

The stage 1 review concluded that the UKAEA is in good health and carries out an important function on behalf of government; delivering the UK Fusion Strategy. Evidence was consistent that the UKAEA has effective leadership and mechanisms in place to ensure a high standard of governance and accountability. This is also supported by a strong policy sponsor relationship.

UKAEA completed an assessment against the Public Sector Research Establishment (PSRE) Value Framework. The result was evaluated by the DESNZ chief scientific adviser who confirmed that the UKAEA met the requirements of this assessment.

On the basis of the evidence provided, as well as quality assurance carried out by the review

team, this stage 1 review did not indicate a need for a follow-up full-scale review of the UKAEA at this time. This outcome has since been endorsed by the Secretary of State. A total of 12 recommendations were identified across the review scope areas of efficacy, efficiency, governance and accountability.

Future outlook and going concern

UKAEA has a pipeline of major investment spanning the next 2 years, supported mainly, through a Spending Review allocation from BEIS of £708m for R&D for the period 2022/23 to 2024/25. This includes the balance of funding for ongoing programmes such as the £222m investment in STEP and £184m 'Fusion Foundations' investment to deliver the foundations necessary for a thriving fusion sector.

The commitment to fusion research from international parties and the UK government remains strong. The UK government is providing significant funding to deliver the expansion in programmes at UKAEA.

UKAEA's Statement of financial position includes liabilities of £794.5m for site restoration and historic restructuring costs. Matching reimbursement receivables are recognised for most of these liabilities on the basis of assurances from our Sponsoring Department that it continues to accept responsibility in principle for these costs and provides for them in their departmental resource accounts. These assurances are reconfirmed annually and there is therefore no effect on UKAEA's ability to operate as a going concern.

The JET facility will cease scientific operations at the end of 2023. BEIS has confirmed that UKAEA will lead the preparation of the decommissioning programme, which enables this to be integrated with repurposing / regeneration of the JET site and to explore the opportunities for research and technical development in the first time a fusion device has been decommissioned. A business case for JET post 2023 has received strategic outline case approval from our Sponsoring Department, this is now progressing to a further stage of detailed planning with a business case approved for the next 2 years. Further information on the key achievements, deliverables and scientific campaigns for JET Operations are contained within the Performance report on page 39.

I have reviewed all evidence provided to support the annual Governance statement. My conclusion is that UKAEA's overall governance and internal control structures are generally sound and fit for purpose.



**Professor Sir Ian Chapman
Chief Executive and
Accounting Officer
17th November 2023**

GOVERNANCE STATEMENT

Governance statement

Scope of responsibility and purpose of the governance statement

As Accounting Officer, I have responsibility for maintaining a sound system of governance and internal control that supports the achievement of the United Kingdom Atomic Energy Authority's policies, aims and objectives, whilst safeguarding the public funds and assets for which I am personally responsible, in accordance with the responsibilities assigned to me in Managing Public Money. I am assisted in this across the UKAEA Group as a whole by the Chief Financial Officer, Director of Property and Corporate Services (and for the interim period of January to May 2023, jointly by the Director of Finance & Business Systems and Director of Procurement).

The Governance Statement, for which I am personally responsible, sets out how I have discharged my responsibility to manage and control UKAEA's resources during the year. It also sets out the governance framework and control structure of UKAEA, its stewardship and corporate governance, and the framework for and effectiveness of the risk management process in place.

It acts as a central reference point for everyone involved between the sponsoring Department and UKAEA, and supports them in making strategic, policy, and financial decisions and agreements with confidence. (See www.gov.uk/government/publications/uk-atomic-energy-authority-ukaea-framework-document)

UKAEA Group

The UKAEA Group has 50% control of a joint Public Sector Limited Partnership (HSIC PubSP), the public-sector partner in Harwell Science and Innovation Campus Ltd Partnership (HSIC), which is responsible for the development of the Harwell Campus. Both HSIC PubSP and HSIC have appropriate and fully documented governance arrangements in place, covering such matters as membership of, and decisions made by, their Boards of Directors, appointment and removal of directors, funding and confidentiality. Our Head of Campus and Property Development is on the Board of HSIC PubSP and our Chief Development Officer is on the boards of both HSIC PubSP and HSIC.

UKAEA's subsidiary, AEA Insurance Ltd, has appropriate governance arrangements in place. These are formally reviewed and updated as necessary by its Board of Directors, which includes UKAEA's Director of Finance and Business Systems. A compliance and company secretarial summary is tabled for review at each board meeting. A risk register and provisions for an annual internal audit of controls and risks are also in place.

In February 2023 the government established UK Industrial Fusion Solutions Ltd (UKIFS) to deliver a prototype fusion energy plant at West Burton in Nottinghamshire. The new organisation is a company limited by shares established to work together with industry to deliver the prototype plant by 2040. UKIFS is a wholly owned subsidiary of UKAEA with its own board, directors and governance arrangements. It was not trading in the financial year 2022/23.

UKAEA has dormant registrations at Companies House for UK Fusion Solutions Ltd and UKAEA Ltd.

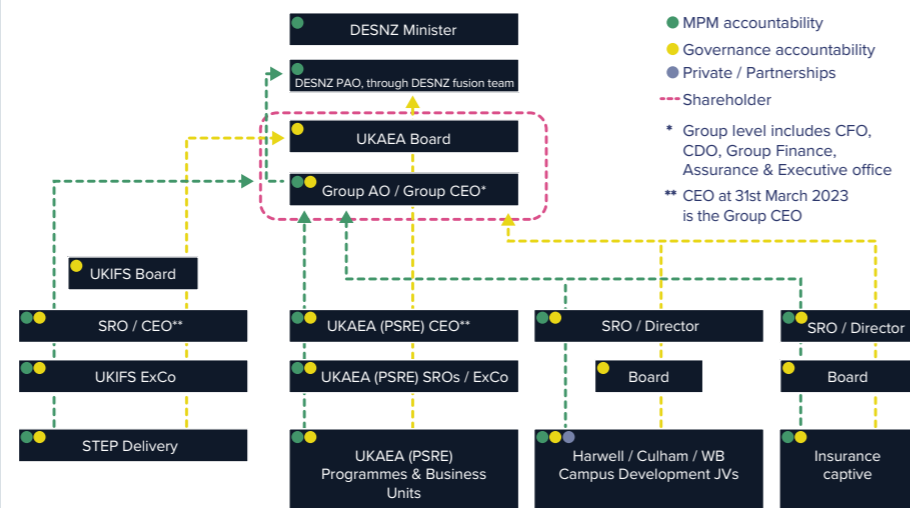
Corporate governance

Corporate structure

UKAEA is a non-departmental public body sponsored by the Department for Energy Security and Net Zero under the portfolio of the Minister for Nuclear and Networks.

Framework agreement

The Framework Agreement, last reviewed in March 2021, between the Department for Business, Energy and Industrial Strategy (BEIS) (previous sponsoring Department) and the UK Atomic Energy Authority (UKAEA) sets out the overall governance framework and the formal operating relationship.



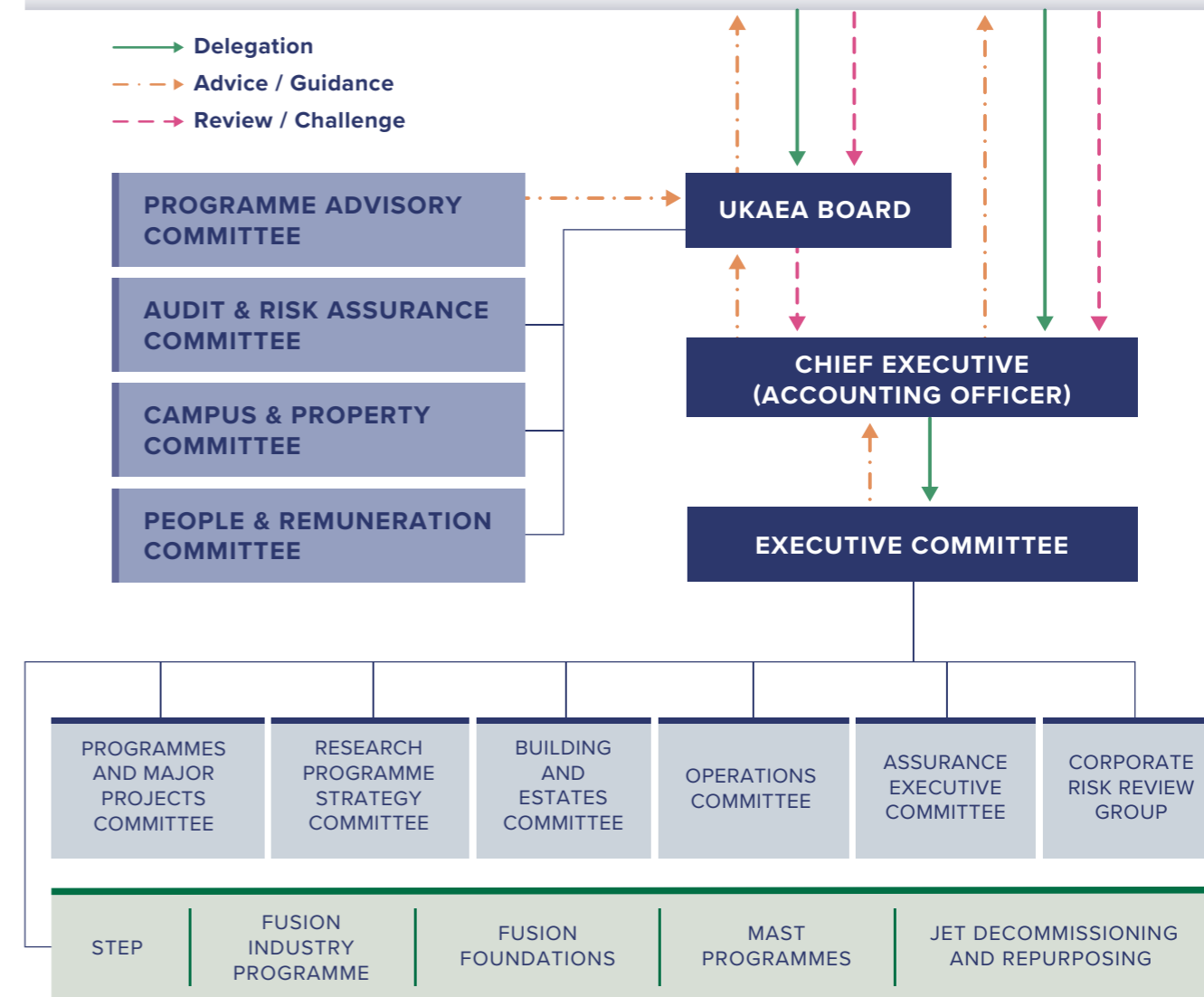
GOVERNANCE STATEMENT

Governance model

MINISTERIAL OWNER: DEPARTMENT FOR ENERGY SECURITY AND NET ZERO

UKAEA is an executive non-departmental public body sponsored by the Department for Energy Security and Net Zero, under the portfolio of the Minister for Nuclear and Networks

- Delegation
- Advice / Guidance
- Review / Challenge



The membership and purpose of the Board, Executive Committee, and sub-committees is outlined in the following pages

The committees and governance beneath the UKAEA Board and Executive Committee support them with advice, review and guidance. Terms of reference are in place and reviewed periodically, these include any delegated authority and frequency of reporting to the parent committee. The membership and purpose of the Board, Board sub-committees and the Executive Committee, are outlined in the following pages.

GOVERNANCE STATEMENT

Risk management

An integrated system of risk management is in place across the organisation, see pages 52 to 56 of the Performance report for a summary of the key risks facing UKAEA.

Risk assurance framework

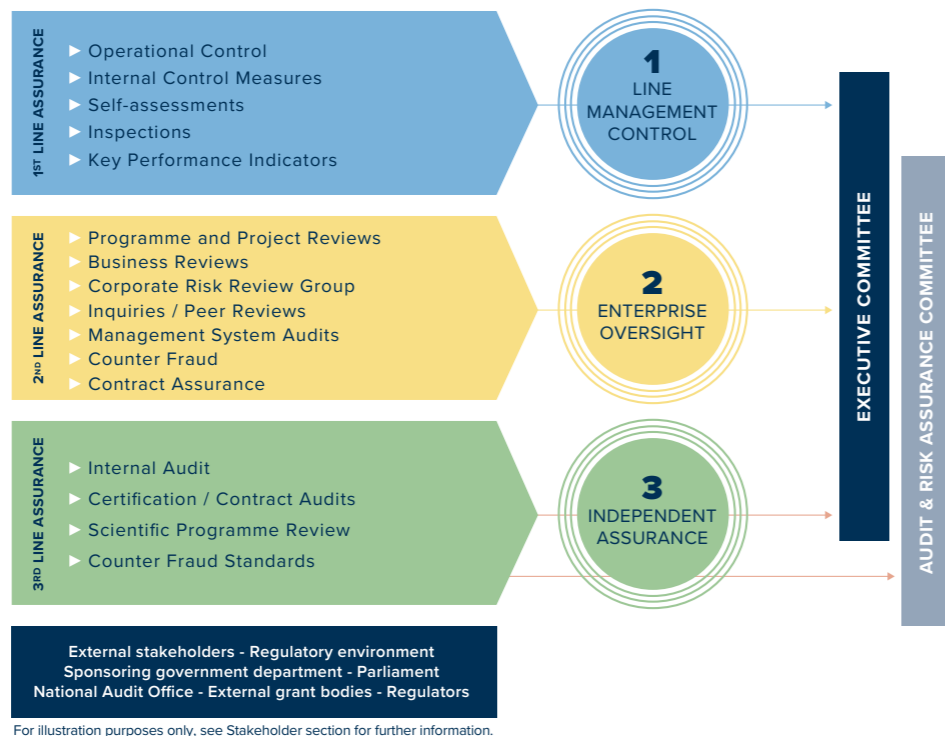
Our assurance framework comprises three key areas: governance, risk management, and internal control. All processes are assured through the UKAEA three lines of assurance model which provides the Board with an appropriate level of comfort that we are managing risks effectively and have a sound system of internal controls in place.

The three lines of assurance model outlines Internal Audit's role in assuring the effective management of risk, and the importance of

its position and function in the corporate governance structure. The first line of assurance (functions that own and manage risks) is formed by managers and staff who are responsible for identifying and managing risk as part of their accountability for achieving objectives. The second line of assurance (functions that oversee or who specialise in compliance or the management of risk) provides the policies, frameworks, tools, techniques and support to enable risk and compliance to be managed in the first line. The third line of assurance (functions that provide independent assurance) is provided by Internal Audit. Sitting outside the risk management processes of the first two lines of defence, its main roles are to ensure that the first two lines are operating

effectively and advise how they could be improved. Internal Audit provides independent and objective assurance and advice on the adequacy and effectiveness of governance and risk management. It achieves this through the competent application of systematic and disciplined processes, expertise, and insight. External auditors also play an important role through their considerations of the governance and control structure where this is relevant to financial reporting.

This year the interface between internal audit, risk and assurance has been strengthened to ensure that the audit plan is risk based enabling focus on the key risk exposure areas to minimise risk and to strengthen our resilience through the assurance framework.



For illustration purposes only, see Stakeholder section for further information.

GOVERNANCE STATEMENT

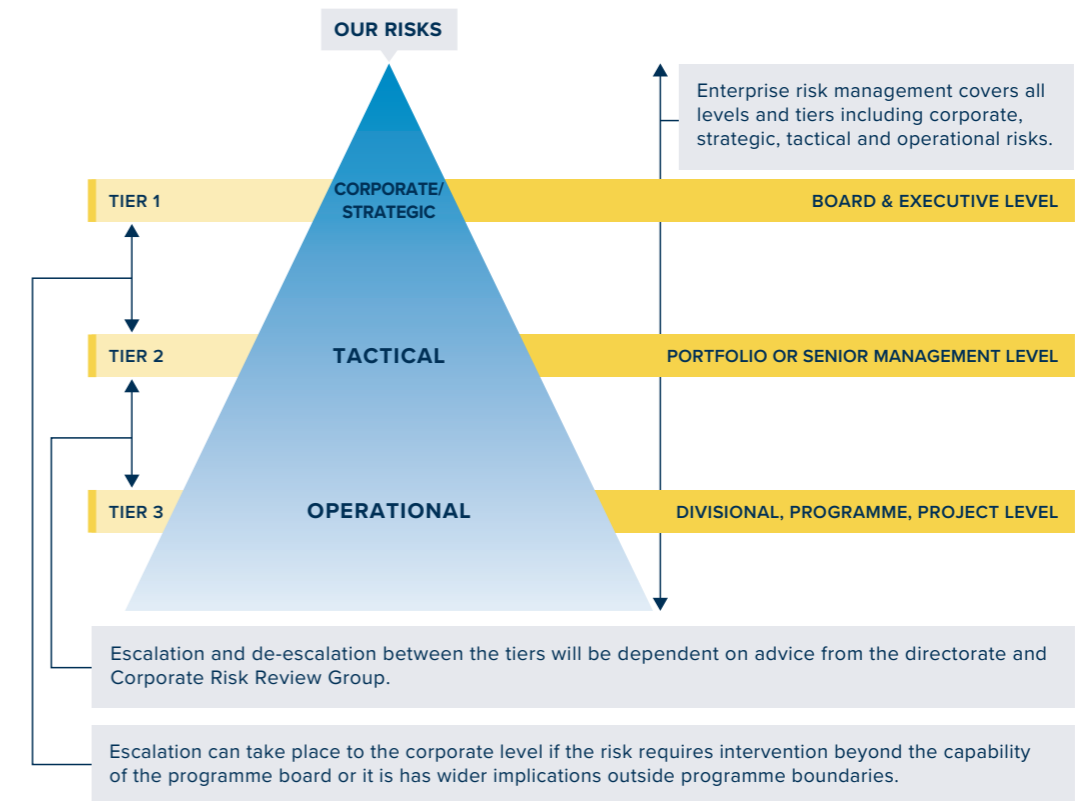
Our CEO (as Accounting Officer) is responsible for reviewing the effectiveness of the risk management and internal control systems. That review of the effectiveness of these systems is informed by the work of senior managers within UKAEA who have responsibility for the development and maintenance of the internal control framework, an internal audit function and feedback from the external auditors in their management letter and other reports.

The assurance framework allows the accounting officer to be assured that key regulatory and safety risks are being controlled and we have demonstrable compliance with standards set by regulatory and government bodies.

Our enterprise risk management process

The early identification and effective management of risk is fundamental to the achievement of our mission, goals and strategic

objectives. Our approach encompasses managing risk across our broad range of activities at operational, tactical and strategic levels. Risk registers are held at each level of the risk hierarchy including operational project risk registers and tactical portfolio risk register which can be escalated to the corporate/strategic risk register if appropriate. The Board have a view on top risks as recommended by Executive Committee and provide strategic guidance.



UKAEA operates a mature enterprise risk management (ERM) process embedded at all levels of the business. Effective risk management drives decision making through our transparent and open positive risk culture. The ERM process is compliant with the Treasury 'Orange Book' and ISO31000. The risk process ensures that:

- Interconnected risk management operates at all levels of the business and our people are

empowered to escalate their risks and concerns.

- Significant risks and associated mitigations and control effectiveness are tracked, challenged and moderated by programme/project boards and the corporate risk review group, with active engagement by senior management through the Executive Committee, Audit and Risk Assurance Committee and the Board.

- The risk appetite is endorsed by the Board and risks are assessed against the risk appetite in balancing innovation and enabling opportunities against the need for more focus on reducing risk.

GOVERNANCE STATEMENT

Risk appetite is a key part of our ERM framework, helping us to find the right balance between innovation and caution, without exposing the organisation to irrecoverable damage or stagnation. The UKAEA Board has overall responsibility for our risk appetite, determining the amount and type of risk that we are willing to take in pursuit of our strategic objectives and the amount of risk that we can bear whilst supporting effective decision making. Our risk appetite is set to reflect the evolving risk landscape of the organisation. Operational risk appetite is maturing in order to further enhance the quality of risk information supporting decision making. Our CEO (as

Accounting Officer) is accountable to Parliament for ensuring that all risks are managed effectively. Tactical and operational risks are owned by relevant senior managers or subject matter experts. Our robust governance structure enables review and escalation of risks as appropriate. The corporate risk review group, which meets quarterly, provides oversight of enterprise risk including corporate, programme and major project risks. The group reviews the status and the progress of mitigations identified by the risk owners and the effectiveness of the controls. The Audit and Risk Assurance Committee, on behalf of the Board, formally reviews key risks on an ongoing

basis in conjunction with UKAEA's risk appetite statement, reporting and / or escalating to the Board as required. Performance of programmes and major projects including current status, risk, and financial metrics, is reviewed on a monthly basis by the Executive Committee. Quantitative cost and quantitative schedule risk analysis for major projects and programmes, provides greater insight on the effect of uncertainty on a programme's budget and milestones thus allowing senior leadership to develop controls and mitigation plans to increase the probability of project success.

Risk management processes



GOVERNANCE STATEMENT

Assurance

Internal Audit

UKAEA has an internal audit function which operates in accordance with Public Sector Internal Audit Standards and Government Functional Standard GovS009: Internal Audit. The audit charter is approved by the Audit and Risk Assurance Committee (ARAC) and the Accounting Officer. The work of Internal Audit is determined by analysis of the risks to which UKAEA is exposed.

The annual Internal Audit programme is based on this analysis and additionally includes a 3-year rolling programme to test key financial controls, See Risk Management on page 78. This programme covers the management of risks and information from across the organisation.

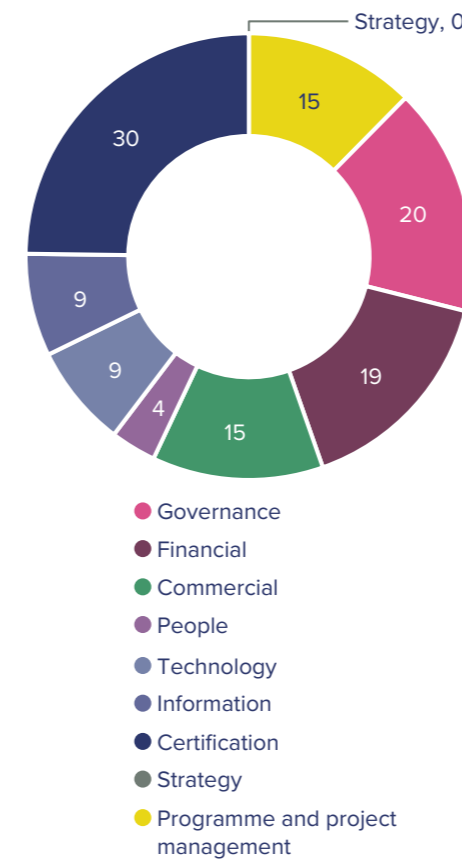
The Head of Internal Audit provides ARAC with regular updates on the programme progress.

Management Systems Audit

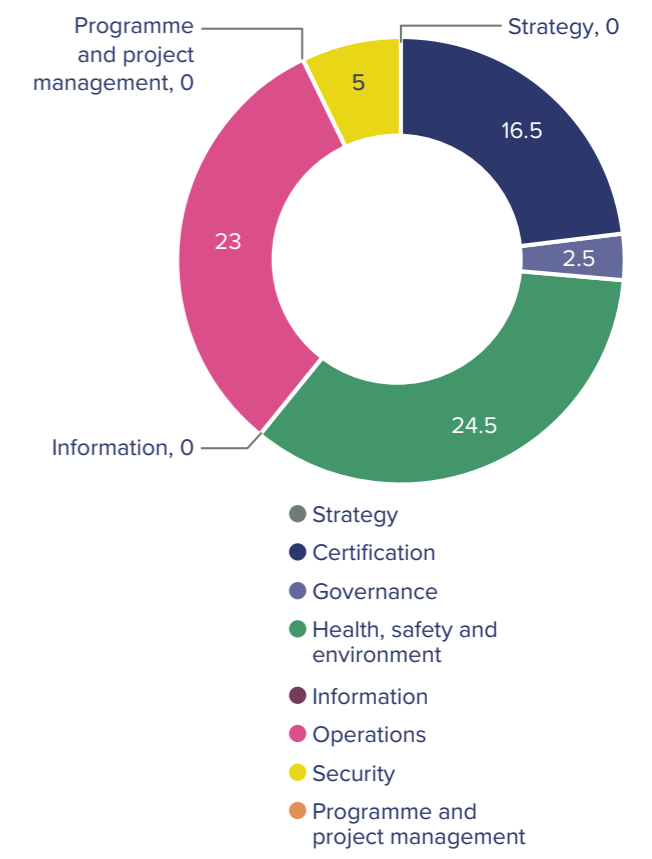
The Management Systems Audit programme provides assurance on the conformance of the UKAEA management system, and associated processes, to the internationally recognised quality, environmental and health & safety standards ISO 9001, 14001 and 45001, respectively. These audits are conducted and managed with close alignment to the Internal Audit programme and captured within the same 3-year rolling plan. This alignment was commended in the external quality assessment of the Internal Audit programme in March 2023 conducted by Managing for Quality, and ensures key risks are covered, over assurance is avoided and has optimised our drive for implementation of process improvements.

Programme progress is reported to ARAC by the Head of Internal Audit and the resultant actions reported to the Operations Committee and Executive Committee to support implementation.

Internal Audit days 2022/23



Management System Audit days 2022/23



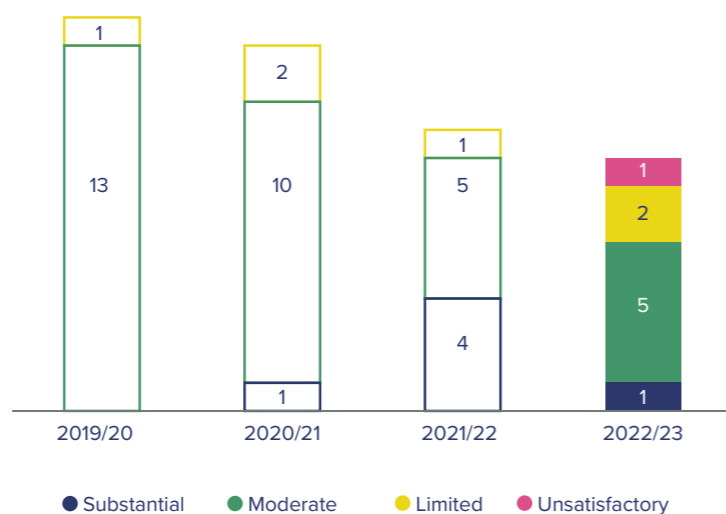
GOVERNANCE STATEMENT

Internal Audit

Audit results

The industrial services supplier contract management audit, which had an unsatisfactory rating, identified that a large proportion of the contract management controls did not conform to what was expected of a gold tier contract. These concerns have largely been addressed by management. The information security/SharePoint effectiveness audit, which was a limited assurance rating, found two high priority areas which needed improvement, SharePoint access controls and Microsoft Office 365 oversight and security. The project and programme governance and reporting audit, which was limited assurance, found that improvements to the reporting, oversight and governance framework were needed.

Audit assurance ratings



The following table summarises progress during the year on completing recommendations and actions arising from internal audit reviews. Of the 51 completed actions, 75% were completed on time with 13 of the 70 actions remaining in progress, of which 2 are overdue.

	No. of actions	Completed	Cancelled	Outstanding @ 31st March 2023	
				In Progress	Overdue
Audit actions					
Brought forward from 2020/21	1	1			
Brought forward from 2021/22	18	12	6		
Raised in this year	51	38		11	2
Total	70	51	6	11	2
Carried forward				13	

Overdue actions

The overdue actions are:-

2022/23 Industrial services supplier contract management - cost assurance

The work to document and improve the assurance of costs charged is ongoing. Additionally work is in progress to arrange a supplier audit.

2022/23 Site property planning strategy - second layer plan

There has been a change of approach to complete this action and a Strategic Space Planning Exercise is currently commencing.

GOVERNANCE STATEMENT

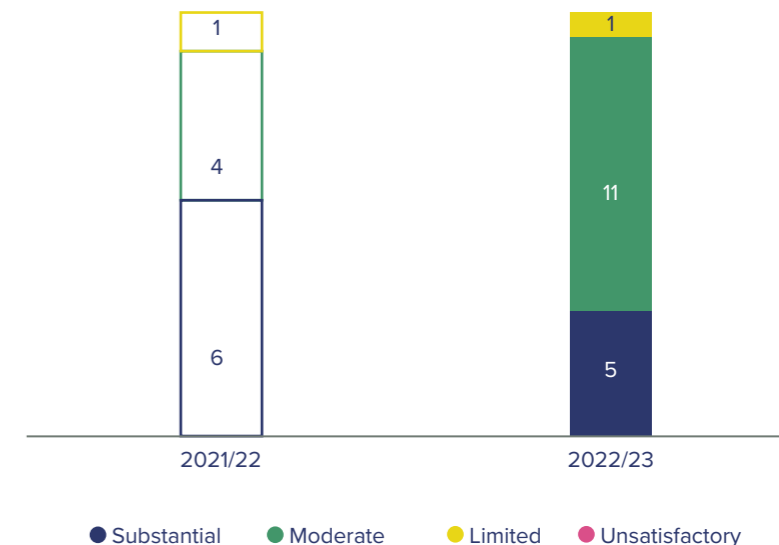
Management Systems Audit

Audit results

The Construction Design and Management (CDM) follow up audit received a limited assurance rating due to processes not being adequately defined and previous inquiry and audit actions not being addressed in a timely or effective manner. However, significant improvements since the inquiry and previous audits were observed within the projects sampled, including greater awareness of CDM application, clear demarcation of CDM roles, and effective implementation within new build projects.

The management system is subject to an annual external audit by our third-party certification body, SGS, which was successfully conducted in November 2022. This year also included the extension of our certification scope to include the Fusion Technology Facility in South Yorkshire.

Audit assurance ratings



Note: In 2021/22, 7 substantial assurance ratings were reported, however, upon review one of these was reclassified to moderate based on audit finding severity. 2021/22 ratings have been updated to reflect this.

	No. of actions	Completed	Outstanding @ 31st March 2023	
			In Progress	Overdue
Audit actions				
Brought forward from 2021/22	23	23	0	
Raised in this year	114	74	40	
Total	137	97	40	
Carried forward				40

Overdue actions

None

Government Functional Standards

UKAEA has continued to implement the requirements of the Government Functional Standards across thirteen applicable functions. Progress of implementation is reviewed quarterly, with most functions now meeting the baseline requirements. Improvement plans continue to be refined and implementation owners have been tasked with setting their appetite for improvement for the forthcoming year.

Oversight of progress continues to be monitored at both the Executive Committee and ARAC. Additionally, external peer reviews have been carried out for several functions and it is probable that this type of activity will apply to other functional standards as the government assessment framework matures. Furthermore, the mandatory requirements of the functional standards have been included in the 2023/24 audit programme.

GOVERNANCE STATEMENT

Self assessment

UKAEA continues to utilise a number of self-assessment tools supplied via Sponsoring Department/ Cabinet Office that are based on government standards and maturity models. These provide a valuable

insight and measure of assurance to UKAEA management. However reporting continues to present some challenges as not all functions have the self-assessment tools. Those functions that have not been issued with the government sponsored self-

assessment tools have continued to report progress only against the mandated 'shall' statements. Work will continue in 2023/24 to develop a solution that provides greater alignment and consistency in the reporting methodology.

Arm's Length Body review

During 2023 an Arm's Length Body Review was conducted. 12 recommendations were made across 4 key areas; these were:

EFFICACY

1. (UKAEA & DESNZ) Ensure there is an appropriate long-term strategic plan for maintaining UKAEA's core R&D purpose as the commercialised fusion industry grows.
2. (UKAEA) Standardise and simplify performance reporting, including the development of clear and understandable public-facing measures, in time for inclusion in the 2024/25 Annual Report.
3. (UKAEA & DESNZ) Engage with the DESNZ central Monitoring and Evaluation Team to agree feasible next steps to develop an improved evidence base that captures and demonstrates interim benefits of fusion programmes.
4. (DESNZ) Scope formalised mechanisms/arrangements required to maintain close links with the Department for Science Innovation and Technology (DSIT) given the wider R&D agenda and funding structures.

EFFICIENCY

5. (UKAEA) Consider how to centrally capture the organisation-wide continuous improvement and efficiency activity that takes place, enabling demonstration of the value of improvement work.
6. (UKAEA) Evaluate UKAEA's involvement in the Joint Venture Partnership which runs the Harwell Campus.
7. (DESNZ) Liaise with Cabinet Office to ascertain the most effective and proportionate way to engage with and maximise benefit from efficiency benchmarking tools that are currently being developed.
8. (UKAEA) Measure and report prevented fraud to demonstrate evidence of counter fraud effectiveness

GOVERNANCE

9. (UKAEA) Undertake a Board Effectiveness Review within six months of the new UKAEA Chair taking up post.
10. (UKAEA & DESNZ) Update the UKAEA Framework Document ensuring relevant reference to UK Industrial Fusion Solutions Ltd (UKIFS) and its relationship with UKAEA.
11. (UKAEA & DESNZ) Complete the five-year succession plan for the UKAEA Board before the end of 2023.

ACCOUNTABILITY

12. (DESNZ) Ensure that the priorities for UKAEA are set out in an annual chair's letter issued by the responsible minister (or Principal Accounting Officer if delegated).

Other control and governance structures

Decommissioning provision review

UKAEA with reference to the Nuclear Decommissioning Authority have completed a review of the Lifetime Plan which underpins the decommissioning provision, the impact of which is included within the Financial Statements (see note 21.1). This has followed the principles set out in "The Aqua Book", a good practice guide published by the UK government for assurance of financial analysis. Further explanation as to the key components and scope of the life-time plan is within the section on Financial Performance.

GOVERNANCE STATEMENT

Whistleblowing policy

UKAEA has an established whistleblowing policy available to all workers. During the year some concerns were raised through the whistleblowing process, however, following review they were not deemed to be valid whistleblowing cases.

Conflict of interest

UKAEA has a detailed conflict of interest policy. Board members and the Executive Committee are required to complete an annual declaration of interests. At the commencement of Board meetings the Chair requests members to confirm any conflict. Involvement in any tender exercise requires a declaration to be made which is assessed by the Director of Procurement. A Board Register of Interest is published on Gov.UK. <https://www.gov.uk/government/publications/ukaea-register-of-interests>

Alexander Tax Review

UKAEA is compliant with the requirements of the Alexander Review (2012). All senior staff and non-executive members are paid via UKAEA payroll. In all cases, this results in appropriate tax contributions being deducted at source.

During the year under review, UKAEA reviewed the tax arrangements of its off-payroll appointments. All contractors within scope of this exercise have been required to provide evidence of tax compliance. Of which, one failed the tax compliance audit and corrective action was taken to move the contractor to a compliant supplier and ensure appropriate 2022/23 tax contributions were deducted at source.

MacPherson Review of Quality Assurance - Business Critical Models

UKAEA conducted a review of analytical modelling as advocated by the Macpherson review (2013) and can confirm that it conducts no

analytical modelling within the scope of the review.

Cabinet Office controls

UKAEA complies with the suite of Cabinet Office controls, including changes to the scope of controls which came into effect in February 2023, ensuring enhanced assurance on significant complex areas of spending.

Freedom of Information

As a public authority the UKAEA has a legal obligation to provide information through an approved publication scheme and in response to requests. All requests must be responded to within 20 working days of receipt.

Any FOI requests are directed by the staff receiving the request to be made in writing and are forwarded or sent directly to foienquiries@ukaea.uk. The email account is published on the UKAEA website which also receives FOI enquiries directly and is monitored by the FOI officers.

UKAEA follows the Information Commissioner's Office guidance. An acknowledgement is issued to each original FOI, it is aimed to acknowledge the request within 1-2 working days of receipt. Each request is tracked and responded to within a 20 working daytime frame, beginning from the first working day after the request has been received.

In the current year UKAEA received 86 FOI requests, increasing from 49 received the previous year. The compliance of response within 20 days was 90% (77 of 86). In respect to the 9 that were not responded to within 20 days, in 8 cases this was notified, and the requestor kept informed.

Governance of Knowledge and Information assets

The CFO is the executive lead for information security and the Chief Development Officer (CDO) is

the executive lead for knowledge assets. Following the publication of the Government draft standard in April 2021, the knowledge asset management strategy is drafted and scheduled for initial review by the CDO.

Counter fraud

During the past year, we have progressed against the annual plan and continued to implement actions in line with the Government Counter Fraud Standard GovS 013. Through our relationship with GIAA, we can access Accredited Counter Fraud Specialists as required.

During the year, there was one case of alleged fraud. Immediate mitigating actions were put in place and an investigation is ongoing.

Better Payment Practice

UKAEA supports the Better Payment Practice Code in its treatment of suppliers with the aim of paying undisputed invoices as soon as possible. The key principles are to settle the terms of payment with suppliers when agreeing the transaction, to settle disputes on invoices without delay and to ensure that suppliers are made aware of the terms of payment and to abide by those terms.

During the year, UKAEA has achieved a 96% success rate for payment of suppliers in accordance with terms (2021/22 96 %). The average number of payment days from invoice date was 5.72 days (2021/22 7.73 days). These statistics are reported for all invoices received, we do not distinguish if the invoice was valid or not.

UKAEA Board



The Board

The United Kingdom Atomic Energy Authority is controlled through its Board of Directors, who are appointed by the Secretary of State of DESNZ. The Board's main role is to establish UKAEA's vision, mission and values, set strategy and structure, and exercise accountability to UKAEA's stakeholders.

The division of responsibilities between the Chair of the Board and the Chief Executive is clearly defined and has been approved by the Board.

The role of the Chair

The Chair leads the Board in the determination of its strategy and in monitoring the achievement of its objectives. On 1 August 2018, Professor David Gann was appointed the Chair of UKAEA.

Board Committees

There are a number of committees which operate in support of the Executive Committee and the Board. As all Non-Executive Directors are appointed by DESNZ, UKAEA does not have a Nominations Committee.

The role of the Chief Executive

The Chief Executive is also UKAEA Accounting Officer, appointed by DESNZ. The CEO has direct charge of UKAEA on a day-to-day basis and is accountable to the Board and to Parliament for the financial and operational performance of UKAEA and its subsidiaries and for the stewardship of resources.

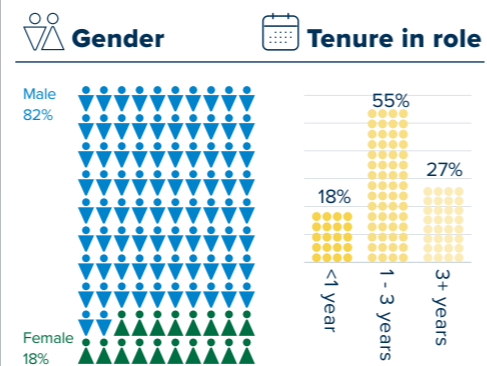
His responsibilities are set out in a letter from the DESNZ Permanent Secretary and the accompanying Accounting Officer memorandum.

Executive Committee

The CEO leads the Executive Committee, comprising key managers from within the organisation who assist leading UKAEA.

Board Diversity

Maintaining an appropriate balance, including a diverse range of skills, experience, knowledge and background on the Board is of paramount importance. Gender, social and ethnic diversity are significant elements of this.



- KEY**
- (A) Audit & Risk Assurance Committee
 - (C) Campus & Property Committee
 - (R) People & Remuneration Committee
 - (A) Audit & Risk Assurance Committee Chair
 - (C) Campus & Property Committee Chair
 - (R) People & Remuneration Committee Chair



Professor David Gann CBE
Chair (until Aug 2023)

- ▶ Strategy
- ▶ Leadership
- ▶ Innovation
- ▶ Governance

Experience:

David has chaired the UKAEA Board since 1 August 2018. He is also Pro-Vice-Chancellor Development and External Affairs at the University of Oxford, Professor of Innovation and Entrepreneurship at Saïd Business School, and Fellow, Magdalen College. David's business and academic work focuses on new technology, innovation strategy and entrepreneurship. He recently held posts on Boards with the UK's Ministry of Defence and Department of Health and Social Care.

External appointments:

David is a Non-Executive Director of Vencap International plc, a leading venture fund-of-funds; Chairman of the Advisory Board for the Montanaro Global Innovation Fund; Deputy Chairman of the Villars Institute Foundation; and a director of the London Symphony Orchestra.



Professor Sir Ian Chapman FRS FREng
Executive

- ▶ Research and innovation
- ▶ Leadership
- ▶ International collaboration
- ▶ Government relations

Experience:

Ian became CEO of the UK Atomic Energy Authority in October 2016. Ian was knighted for services to global fusion energy in 2023. As CEO he has overseen a major growth in the organisation, including the genesis of several major government programmes, to deliver UKAEA's ambitious mission and strategy. Ian is a fusion physicist whose primary research interests are in understanding and controlling macroscopic instabilities in fusion plasmas, with over 200 journal papers published and a number of international awards.

External appointments:

Ian is a Member of Princeton Plasma Physics Advisory Board, a Member of Chinese Academy of Sciences Plasma Physics Advisory Board, the Chair of IAEA International Fusion Research Committee, a Board member for Guernsey Electricity Ltd and a Clean Energy Advisor to Temasek Holdings Ltd.



Lady Eithne Birt CB
Non-Executive

- ▶ Governance
- ▶ Transformation
- ▶ Strategy
- ▶ Government Relations

APPOINTED AS INTERIM CHAIR IN AUGUST 2023

Experience:

Eithne was the founding Director General of the National Probation Service in 2000, building on 21 years' experience as a practitioner and senior manager. She was made a Companion of the Bath in 2004 in recognition of her public service achievements. She was appointed Managing Director of Fujitsu's UK government Business 2005-2011.

External appointments:

Eithne was co-founder of Bluelight Global Solutions, an intelligent security solutions provider in 2014 and has been its Chair since. She became a Patron of The Topsy Foundation UK in 2016, a charity provider of services to children in South Africa.



Stephen Barter FRICS FRSA
Non-Executive

- ▶ Leadership
- ▶ Strategic planning
- ▶ Governance
- ▶ Property development and funding

Experience:

Stephen has over 40 years' experience in real estate, holding senior leadership roles with an international property company (Grosvenor), a sovereign wealth fund (QIA), an international real estate consultant (CBRE) and a Big Four accounting firm (KPMG). He is a chartered surveyor. He has worked extensively with both government and the private sector, within the UK and internationally. He now has a portfolio career as Board Chair, Non-Executive Director, Trustee and Advisory Board member. His many pro bono involvements have focused on education and the arts, particularly music.

External appointments:

Stephen is Non-Executive Chair of Mailbox REIT PLC; a Non-Executive Director of H3 TradeCo (formerly Nexus Group) and a member of Cambridge University Property Board. He is a Special Adviser to Network Rail, Transport for London and (via KPMG) the Foreign, Commonwealth and Development Office. Among other appointments, he is Chair of the West Midlands Public Land Task Force (which enables stronger collaborations between public landowners to promote growth) and a member of the London Symphony Orchestra Advisory Council. He was for many years Deputy Chair of the University of the Arts London.



GOVERNANCE



Dr Mark Bayley CBE
Non-Executive (until May 2023)

- ▶ Finance
- ▶ Large project delivery
- ▶ Leadership

Experience:

Mark has spent much of his career in the delivery of large and complex projects at the interface between the private and public sectors. He was CFO then CEO of LCR, the developer of the High Speed 1 railway. Mark also held senior roles at HS2 and in MOD procurement.

External appointments:

Mark is a Non-Executive Director of Network Rail and the Water Services Regulation Authority (Ofwat), and a Non-Executive member of the Department for Transport Audit, Risk and Assurance Committee. He is also Chair of the Board of Trustees at the Shadwell Opera.



Dr Luc Bardin
Non-Executive

- ▶ Global business leadership
- ▶ Strategic Partnering & alliancing
- ▶ Transformational value

Experience:

Luc has over 35 years' experience in leading global organisations in complex areas of B2B, B2G, FMCG and retail, notably as past member of BP plc's Downstream Executive Committee and CEO of multiple global businesses. In 2014, he founded Strategic Partnering Ltd to help organisations break through the limitations of vertical silos and build for transformational and strategic value opportunities, notably towards net-zero. He has authored several published scholarly articles and books on strategic partnering.

External appointments:

Luc is Chair at Strategic Partnering Ltd and Foresight Factory Ltd. He is Senior Independent Advisor to Sizewell C and Adjunct Professor at Imperial College Business School.



GOVERNANCE



Sir Stephen Hillier
GCB CBE DFC
Non-Executive

- ▶ Leadership
- ▶ Governance
- ▶ Risk management
- ▶ Portfolio, programme and project delivery

Experience:

Stephen joined the UKAEA Board as a Non-Executive Director in October 2021. Currently the Chair of the Civil Aviation Authority, he previously had a long career in the Royal Air Force, ultimately becoming the Chief of the Air Staff, the head of the Service, from 2016 to 2019. He has considerable experience of leading large, high-profile and complex organisations, portfolios and programmes, within closely regulated and scrutinised environments.

External appointments:

In addition to the Civil Aviation Authority, Stephen chairs an advisory board for a plc, and a small heritage aviation company. He is also the Chair of Trustees of the RAF Museum and has a variety of roles in a range of other charities.



Antonia Jenkinson
Executive (until 24th Jan 2023)

- ▶ Corporate finance
- ▶ Organisation leadership and growth
- ▶ Collaborations and contracts

Experience:

Antonia was previously CFO at Roc Technologies Ltd, Satellite Applications Catapult Ltd and the Wyevale Group. Antonia has a background in private equity and corporate Finance. She won the Sunday Times NED Award/private equity backed business in 2015. Antonia is a Chartered Fellow of the Institute for Securities and Investment (FCSI) and a Chartered Certified Accountant (ACCA). Antonia is the Authority Secretary.

External appointments:

Antonia was a Non-Executive Director at Tekfor Global Holdings Ltd, a KKR investee company. This role ended in May 2022.



Air Marshal Dame Sue Gray
Non-Executive (from Jan 2023)

- ▶ Leadership
- ▶ Strategic Planning
- ▶ Capital projects & capability programmes to a value of £1.8bn pa
- ▶ Stakeholder management

Experience:

Sue joined the UKAEA Board in January 2023 as a Non-Executive Director. Having previously held the post of Director General (CEO) of the Defence Safety Authority from March 2019 to January 2022 – leading the regulation and assurance of military equipment and activity across air, land and sea. Sue was the most senior female officer ever to serve in the British Armed Services.

Sue has led over 2000 personnel supporting UK military deployments worldwide, providing highly specialised cadres of Engineers, Logisticians, Communications experts and Medical specialists. Head of the RAF Engineer profession, recruiting, developing and maintaining safe working practices for over 15,000 technical staff. She was also responsible for developing the strategic plan for the RAF's Estate, both capital projects and routine maintenance activity.

External appointments:

Sue is a Trustee of the Royal Academy of Engineering and the Armed Forces Equine Charity; she is also a passionate STEM advocate and mentor.



Richard Hookway
Non-Executive

- ▶ Leadership
- ▶ Finance
- ▶ Strategy
- ▶ IT

Experience:

Richard has over 35 years of executive and strategic leadership experience in the energy sector. He served as CFO for the Downstream Segment of BP and as COO for Global Business Services and IT for the BP Group. Subsequently he was appointed to the board of Centrica plc as Executive Director and CEO of Centrica Business. He currently holds a portfolio of non-executive roles in both the public and not-for-profit arenas where he serves as a Board Chair and Chair of Audit Committees.

External appointments:

Richard serves as a Supervisory Board member and member of the Audit Committee at Royal Vopak N.V., and as a non-executive director, member of the Audit Committee and Chair of the Environment, Social and Governance Committee at Parkland Corp. He also serves on the Supervisory Board and chairs the Audit Committee of JSC Naftogaz of Ukraine. In the not-for-profit sector he is a member of the Board of Trustees and Chair of the Audit and Risk Committee of the British Council and also Chairs Swim England and its Remuneration Committee.



Tim Bestwick OBE
Executive
Appointed to the Board in July 2023

- ▶ Technology start-up companies
- ▶ Development and commercialisation of technology
- ▶ Intellectual property

APPOINTED AFTER THIS REPORTING PERIOD

Experience:

Tim joined UKAEA in 2018, to lead innovation and commercialisation at UKAEA, and develop the UK Fusion cluster. Before coming to UKAEA, Tim led commercialisation and innovation at the Science and Technology Facilities Council. This included the major research and innovation campuses at Harwell and Daresbury and starting a number of successful new companies. Tim is also a past Chair of Eureka, the world's largest public network for R&D and innovation, and has worked for start-up companies, Sharp Corporation and IBM Research in the US.

During 2022/23, Tim served as Chief Technology Officer.

External appointments:

Director, Harwell Science and Innovation Campus



Ruth Elliot
Executive
Joined UKAEA in May 2023,
appointed to the Board in July 2023

- ▶ Working with government
- ▶ Leadership
- ▶ Finance

Experience:

Ruth joined UKAEA from UK Research and Innovation, where she was Deputy CFO. Ruth trained as an accountant with Deloitte but has spent most of her career in a variety of central government organisations and has extensive experience in leading corporate functions as well as experience in developing and implementing government policy. Ruth is a Fellow of the Institute of Chartered Accountant in England and Wales.

External appointments:

Ruth is the Chair of Ridgeway Education Trust, a multi-academy trust based in South Oxfordshire, and a Trustee of BMS World Mission, which works to support those facing hardship in over 30 countries around the world.



Board report

Overview and key duties

The Board, which met six times during the year, with one extraordinary meeting, has a schedule of matters reserved for its approval. This includes: establishing the overall strategic direction of UKAEA within the policy and resources framework agreed with the responsible government minister; reviewing UKAEA's corporate objectives and goals; approving the annual accounts, budget and corporate plan; reviewing and approving proposals to start new activities or to discontinue existing activities; ensuring that high standards of corporate governance are observed at all times; reviewing corporate risks, and reviewing the safety, environmental and security performance of UKAEA.

Highlight Topics covered at Board meetings throughout the year:

May 22	Strategy session UK-US collaborations
July 22	STEP siting business case Annual report and accounts
August 22	Extraordinary meeting – Formation of UKIFS
September 22	Future role of UKAEA EPSRC grant update
November 22	COP27 briefing Talent pipeline
January 23	Senior management structure ALB review
March 23	Budget approval 2023/24 Performance measures approval JET Decommissioning and repurposing costings

The Board delegates responsibility for day-to-day and business management control to the Chief Executive who is assisted by key senior managers comprising the Executive Committee. The Executive Committee meets monthly. Specific responsibilities delegated to the Executive Committee include development of UKAEA performance measures; implementation of the strategies and policies as determined by the Board; monitoring of the operating and financial results against plans and budgets; developing and implementing risk management systems and reviewing progress on major projects.

Board composition

In January one new independent Non-Executive Director joined the Board, filling the vacancy owing to retirements within the previous year. The composition of the UKAEA Board is in line with other bodies that report to DESNZ.

The Directors' biographical details included in the Directors' Report show that the members of the committee provide a wide range of experience from positions at the highest level in the UK scientific and business community.

A list of Board members and their biographical details are included on pages 87 to 89.

Directors' independence

The Non-Executive Directors constructively challenge and help develop proposals on strategy, and bring strong and independent judgement, knowledge and experience to the Board's deliberations. The independent directors are of sufficient calibre and number that their views carry significant weight in the Board's decision making.

The Board considers all its Non-Executive Directors to be independent in character and judgement.

No Non-Executive Director:
• has been an employee of UKAEA

Attendance 2022/23

Non-Executive Director		Executive Director	
Professor David Gann	6 (6) Chair	Professor Sir Ian Chapman	6 (6) Chief Executive Officer (Accounting Officer)
Dr Luc Bardin	5 (6)	Antonia Jenkinson	5 (5) Chief Financial Officer & Director of Property & Corporate Services
Stephen Barter	6 (6)	Board attendee	
Dr Mark Bayley	6 (6)	Tim Bestwick	5 (6) Chief Development Officer
Lady Eithne Birt	5 (6)	Lyanne Maclean	4 (4) Chief Operating Officer to Nov 22
Sir Stephen Hillier	5 (6)	BEIS / Department of Energy Security and Net Zero	6 (6) Representative from Sponsoring Department
Richard Hookway	6 (6)		
Dame Sue Gray	2 (2)	Alli Brown	3 (3) Finance Director and Authority Secretary (cover for CFO attendance Jan to May 23)
		Dr Joe Milnes	2 (2) Interim COO (cover for COO attendance Jan to May 23)

- within the last five years
- has, or has had within the last three years, a material business relationship with UKAEA or its former or current subsidiaries
- receives remuneration from the Authority other than a director's fee and expenses incurred in carrying out their duties
- has close family ties with any of UKAEA's advisers, directors or senior employees
- holds cross-directorships or has significant links with other directors through involvement in other companies or bodies or
- has served on the Board for more than nine years

Evaluation of Board performance

A light touch Board effectiveness review was completed in September 2023. A survey asked questions across 6 themes to assess effectiveness, efficiency, and

culture, with overall improvement seen in comparison to the previous review in 2021. Five minor improvement points were accepted including an exploration into increased day to day level interactions between non-executive directors and the Authority to maximise value to UKAEA. One opportunity for enhanced engagement of Board members with future strategy and resource alignment will be the upcoming Spending Review preparations.

External review

In addition to the Board sub-committees, external advice is a key element of the corporate governance process. The Programme Advisory Committee, which has an external chair and membership, all of whom have backgrounds in fusion and industry, provides expert external scrutiny of UKAEA programmes and strategy,

and reports directly to the Board. The key role of the committee is to review the UKAEA scientific programme and provide guidance and advice to the Executive on the implementation and planning for these, as well as independent assurance to the Board that the whole UKAEA programme is soundly based and achievable.

Compliance with the Corporate Governance Code

UKAEA's corporate governance arrangements are kept under review to ensure that they are compliant, where applicable, with the provisions of corporate governance in central government departments: Code of Good Practice April 2017. The Chair and Non-Executives are appointed by our sponsoring department.

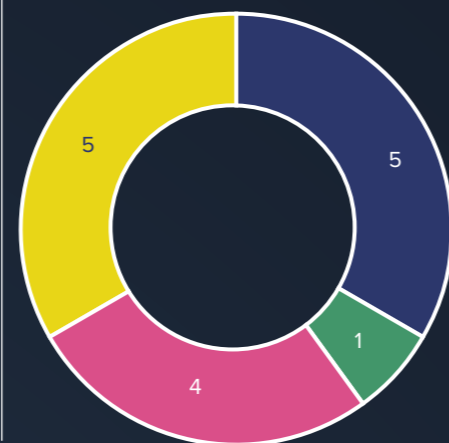
UKAEA Executive Committee

The Executive Committee has managed change through the year as the organisation has continued to evolve, with Lyanne Maclean, Chief Operating Officer and Antonia Jenkinson, Chief Finance Officer taking new opportunities during the year, although positive news that they are remaining within the wider fusion & public sector research community. We also welcomed Justin Kingsford and Ruth Elliot to these roles respectively in May 2023. More recently we also wished Carrie

Leadbeater-Hart and Liz Haynes a fond farewell and thank all our ex-colleagues for their contributions to UKAEA. In April 23, Jackie Costello joined the Executive Committee as interim director of people.

Biographies of Executive Committee members are included in the following pages. As at 31st March 2023, the Executive Committee was proportionally 40% female and 60% male, with tenures at UKAEA as outlined in the figure:

Executive Committee Diversity



TENURE IN ROLE
 ○ <3 years ● 5-10 years
 ● 3-5 years ● >10 years

GENDER
 40% Female 60% Male



Professor Sir Ian Chapman
 Chief Executive Officer and Accounting Officer

Experience:
 See page 87 for Ian's bio.

Nicola Barber
 Director of QSHE Risk and Assurance (from April 2022)

- ▶ Governance
- ▶ Assurance
- ▶ Enterprise Risk Management

Nicola joined UKAEA in 2022 and is a certified member of the Institute of Risk Management. Nicola has worked in a number of disciplines within the nuclear industry for the last 16 years. This includes holding senior roles in risk and assurance across a number of nuclear sites. Nicola's previous experience also includes leading planning teams in the Rail and Oil & Gas industries and project management in the Utility industry.

External appointments:
 Member of the Nuclear Special Interest Group Steering Group for the Institute of Risk Management.

UKAEA appointed Board member of RADS SAFE CLG.

Paula Barham
 Director of Procurement

- ▶ Leadership
- ▶ Strategy
- ▶ Complex procurement projects

Paula has worked at UKAEA for over 25 years. She is an experienced procurement leader managing the team of 35+. She specialises in transformation and complex strategic procurement projects, having a strong delivery track record in this area.

Paula is MCIPS qualified and has been key in developing a comprehensive view of UKAEA's supply chain and application of commercial strategies to manage industry capacity.

Tim Bestwick OBE
 Chief Development Officer and Deputy CEO

Experience:
 See page 89 for Tim's bio.

Professor Rob Buckingham
 Executive Director for RACE, RAICo and JET Decommissioning and Repurposing

- ▶ Robotics and design for remote operations
- ▶ Innovation-led change

Rob was appointed Executive Director in March 2023. He remains responsible for RACE, the UKAEA's centre for Remote Applications in Challenging Environments. Added to this he is Senior Responsible Officer for RAICo, the Robotics and AI Collaboration with the Nuclear Decommissioning Authority and the University of Manchester, and Senior Responsible Officer for the JET Decommissioning and Repurposing programme which starts in earnest at the end of JET Science in December 2023.

He was lead author of the UK's Robotics and Autonomous Systems 2020 Strategy (2014) and The Cyber-Physical Infrastructure (2022). Before joining the UKAEA, Rob co-founded and was Managing Director of OC Robotics which developed and commercialised snake-arm™ robots. He is a Fellow of the Royal Academy of Engineering and a Fellow of the Institute of Engineering and Technology. Rob received an OBE for services to robotics engineering in the 2021 New Year Honours.

External appointments:
 LuffyAI Non-Executive Director, UK Robotics Growth Partnership, and NDA Future Challenge Board

GOVERNANCE

Alli Brown

Director of Finance and Business Systems

- ▶ Business systems and assurance
- ▶ Finance operations and shared services
- ▶ Business planning

Alli joined UKAEA in 2017. She is a member of the Chartered Institute of Management Accountants. Alli has broad senior experience across different sectors including scientific research, manufacturing and telecoms. Her role encompasses all aspects of finance with overall responsibility for the core business system enabling HR/Procurement and Finance. Alli leads the management of the UKAEA Pension Scheme on behalf of DESNZ.

External appointments:

UKAEA appointed Board member for AEAIL, a subsidiary captive insurance company.

Dr Andrew Hynes (from April 2022)

Head of CODAS & IT

- ▶ Research computing
- ▶ Information technology
- ▶ Cyber security
- ▶ IT leadership & programme management

Andrew Hynes joined UKAEA in 2014 following a career in industry and academia. His career spans biochemistry research, drug discovery, bioinformatics and IT strategy and delivery. In recent years he has specialised in scientific computing and digital transformation.

External Appointments:

Member of the EIROForum IT Thematic Working Group and AIRTO Cyber Security Special Interest Group.

Dr Joe Milnes

Executive Director for Engineering, Computing, and STEP Partner

- ▶ Project delivery
- ▶ Operations
- ▶ Technical leadership

Joe joined UKAEA in 2000. His background is in engineering, and he has a PhD in thermal-hydraulic modelling. Joe has held a variety of engineering and management roles across JET, MAST-U and ITER. As well as leading operations on JET, he also chairs and advises reviews of fusion facilities worldwide.

Joe served as interim Chief Operating Officer / head of JET operations between November 2022 and May 2023.

Professor Fulvio Militello

Director of Tokamak Science and MAST-U

- ▶ Fusion science and technology
- ▶ Leadership
- ▶ Science programme management

Fulvio was appointed Director of Tokamak Science and MAST-U in December 2021, following a career as a research scientist and manager started at UKAEA in 2008. Before joining the Authority, he worked in Italy, France, and United States as a plasma physicist, authoring 100 scientific papers and a book on plasma boundary physics. Fulvio led the EUROfusion programme for alternative divertors, he has been Adjunct Professor of Physics at Chalmers University (Sweden) and is Visiting Reader at Imperial College London.

Dr William Morris

Chief Scientist

- ▶ Fusion science and technology
- ▶ Technical and scientific leadership
- ▶ Research governance and assurance

William joined UKAEA in 1987 after a spell at Princeton. Originally a tokamak plasma physicist, he headed the experimental tokamak programme at Culham and the related department (including JET experimentalists). William has provided scientific and strategic advice to the European programme since the 1990s expanding from plasma science to the full spectrum of science and technology. He was the inaugural chair of the EUROfusion Science and Technology Advisory Committee (STAC) from 2014-2018, was an author and co-editor of the 2018 European Fusion Roadmap and was a member of the DEMO Technology Advisory Group until the pre-concept gate review in 2020. Since then, he has focused further on the integration of science and technology for fusion, taking account of uncertainties in both, and on wider strategic aspects alongside encouraging theory, rigour and evolution in research.

GOVERNANCE

Paul Methven

STEP Programme Director

- ▶ Major programme leadership
- ▶ Governance
- ▶ Strategic partnering and large-scale commercial relationships

Paul joined UKAEA September 2020 from the Ministry of Defence, where he was Director of Submarine Acquisition at the Submarine Delivery Agency. In this role he was Programme Director for Dreadnought and has previously led a number of other complex major programmes across the MoD.

Stephen Wheeler

Director of Fusion Technology

- ▶ Operations management
- ▶ Project governance
- ▶ Leadership
- ▶ Operational growth

Stephen joined UKAEA in 2015 following a career in industry first in engineering design and later managing advanced production facilities in Europe and North America. He successfully established the RACE business unit operation and over five years delivered five-fold growth. In April 2020 he was appointed Director of Fusion Technology.

Dr Amanda Quadling

Director of Materials

- ▶ Collaborative R&D
- ▶ Laboratory operations
- ▶ Science innovation

Amanda is a mineralogist with a PhD in Materials Science and Engineering. She has spent the last twenty years creating and managing laboratories, incubators, commercial service divisions and Centres of Excellence focused on products and services in the energy sector and head industry. She was previously on the Technology Advisory Board of global corporate Morgan Advanced Materials and Technical Director for UK manufacturer Mandl Materials (tungsten, dielectrics, electroceramics). In 2019, Amanda was named 10th most influential women in UK engineering 2019 (Financial Times). She is now UKAEA's Director of Materials and focused on delivering a Fusion Materials Roadmap for the UK.

External appointments:

Amanda was previously a Board member for the British Ceramic Confederation. She currently represents UKAEA on the Governing Board of The Henry Royce Institute (for Materials) and Chairs the Advisory Board for Bangor University's Nuclear Futures Institute.

Secretariat:

Dr Lyndsey Mooring

Head of the Executive Office

Lyndsey joined UKAEA in 2018. She originally joined as a Development Engineer, establishing and leading research on non-metallic materials and components across UKAEA's major programmes of NFTP and STEP, leveraging a successful research and product development career in aligned private sector industries. She is now UKAEA's Head of the Executive Office and is focused on supporting the directorate in all aspects of corporate delivery. She is secretary for the Board and Executive meetings. Lyndsey is also the UKAEA sponsor for the Fusion Industry Programme.

Retirements from the Executive Committee during the reporting year:

Liz Haynes
 Director of People and Organisational Development (until May 2023)

- ▶ People strategy
- ▶ Organisation development and design
- ▶ Employee engagement

Liz joined UKAEA in 2021. She is a Chartered Fellow of the Chartered Institute of Personnel and Development. Liz's career spans the private and public sectors, including roles in the Civil Service with Border Force, BEIS and the Cabinet Office, where she delivered a number of major ministerial programmes. Her role at UKAEA encompasses all aspects of the People Function and she is motivated by enabling individuals and organisations to thrive.

External appointments:

Liz is a trustee of Seb's Foundation, a charity providing academic and sporting opportunities for young people from socially disadvantaged backgrounds.

Antonia Jenkinson
 Chief Financial Officer, Director of Property and Corporate Services (until Jan 2023)

Experience:
 See page 89 for Antonia's bio.

Carrie Leadbeater-Hart
 Director of Decommissioning and Repurposing (until Mar 2023)

- ▶ Major project delivery
- ▶ Leadership
- ▶ Change management and team strategy

Carrie joined UKAEA in January 2022 from Magnox, where she headed up the Decommissioning Strategy and Delivery for Harwell. Carrie has extensive experience in delivery of large and complex projects and programmes within the nuclear industry both new build and decommissioning. In these roles she has led on cultural change to transition from Operations to Decommissioning with an emphasis on clarity of vision and building high functioning teams that are enjoyable to work within. She is a Chartered Mechanical Engineer and is passionate about developing professional career paths via a range of educational entry points.

Lyanne Maclean
 Chief Operating Officer (until Nov 2022)

- ▶ Leadership
- ▶ Crisis management
- ▶ Operations
- ▶ Safety

Lyanne joined UKAEA in June 2019. She has held a variety of senior leadership, operations, planning and policy roles as a British Army Officer and worked across Defence, NATO and the UN, Joint and Army HQs. She left in 2013 as a Colonel. She worked for Royal Mail in two senior leadership roles in both Fleet and Logistic Operations and established a highly successful Royal Mail's LGBT+ Network. Lyanne is an MBE and was awarded a Queen's Commendation for Valuable Service.

Changes to the Executive Committee after the reporting the year:

Jackie Costello
 Interim Director of People (from May 2023)

- ▶ People strategy
- ▶ Employee engagement
- ▶ HR systems optimisation

Jackie joined UKAEA in 1982. Having started as an administrator, she has enjoyed a diverse and highly successful career within Human Resources, progressing to Interim Director of People in 2023 whilst a permanent director was recruited. This role at UKAEA is responsible for delivery of all aspects of the People department and she is motivated by enabling individuals and organisations to thrive.

Ruth Elliot
 Chief Financial Officer and Director of Corporate Services (from May 2023)

Experience:
 See page 90 for Ruth's bio.

Justin Kingsford
 Chief Operating Officer (from May 2023)

- ▶ Operations
- ▶ High performing teams
- ▶ Major Programme and Project Delivery

Justin joined the UK AEA in May 2023 from the Army and brings a wealth of experience in operations, major project management and team building. He was commissioned into The King's Royal Hussars in 1996 and deployed on operations to Bosnia, Kosovo, and Northern Ireland. He also spent two tours in American Headquarters on operations in Afghanistan and Qatar. More recently, he spent five years as Programme Director for two programmes in the Government Major Projects Portfolio, and a further two years in the Defence Infrastructure Organisation.

Executive Committee report

Overview and key duties

Meeting 12 times this year, our Executive Committee delivers the strategic direction of our business on behalf of the Board. It brings together all aspects of our business and seeks to embed our delivery culture at the highest level of our decision making. The Executive Committee analyses material issues of strategic risk and opportunities for the organisation, alongside generating recommendations for the corporate strategy and ensuring that business plans are aligned to our strategic objectives. It reports on the delivery of the corporate strategy to the Board.

The Executive Committee is chaired by the CEO and considers all matters within its terms of reference, including: – the business plans and annual budgets and our five-year time horizon – strategic risk and material issues – UKAEA financial and delivery performance – information security, privacy and procurement – health and safety and sustainability – people, culture, customers, governance, and EDI.

Specific responsibilities delegated to the Executive Committee from the

UKAEA Board include development of UKAEA performance measures; implementation of the strategies and policies as determined by the Board; monitoring of the operating and financial results against plans and budgets; developing and implementing risk management systems and reviewing progress on major projects.

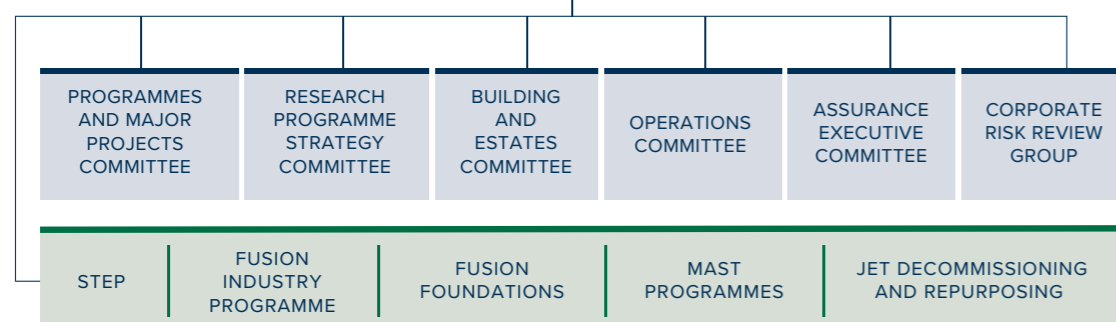
The Executive Committee had six sub-committees that report into it, alongside specific programme boards responsible for the governance of for UKAEA programmes and major projects. During the year, the Programmes and Major Project Committee (PMPC) was suspended and reporting was direct to the Executive Committee – the purpose and scope of this committee is under review, incorporating guidance from Infrastructure Projects Authority and the Government Functional Standard for Project Delivery.

• **Programmes and Major Project Committee** was responsible for monitoring schedule, cost and quality of projects and programmes at UKAEA, with the exception of tier 1 programmes which report directly into the Executive Committee. PMPC also resolves resource conflicts

between projects/programmes, and acts as a forum into which project sponsors can escalate issues that they need senior management advice on to resolve.

- **Research Programme Strategy Committee** responsible for proposing strategy for UKAEA's research programmes for approval at Executive Committee, managing the implementation of the agreed programme, governance of UKAEA research.
- **Operations Committee** responsible for ensuring that the operational activities of UKAEA meet its requirements.
- **Building and Estates Committee** is responsible for the investment in, and management of, property assets and proposing property strategy to the Executive Committee.
- **Assurance Executive Committee** is responsible for assuring the Executive and Board that the activities of UKAEA are performing in a compliant and prudent manner and that there are sound systems of internal control which identify areas for improvement.
- **Corporate Risk Review Group** described in the risk management section on pages 78-80.

EXECUTIVE COMMITTEE



The membership and purpose of the Board, Executive Committee, and sub-committees is outlined in the following pages

Board Committee reports

People and Remuneration Committee

Overview

One of the committee's principal responsibilities is to make recommendations to DESNZ on the level of directors' remuneration. In addition, the committee regularly reviews UKAEA's executive remuneration policy in relation to its competitors and industry norms.

In May 2021, in line with agreed actions from the board effectiveness review, the remit of the remuneration committee was extended to endorse

UKAEA's people and EDI strategies and offer advice on major proposed changes to pay and remuneration arrangements or terms and conditions of UKAEA employees which would require the agreement of government. To drive the efficacy of UKAEA's inclusion council, the Chair of the renamed people and remuneration committee chairs the Council. As the members of the UKAEA Board are appointed by DESNZ, UKAEA does not maintain a Nominations Committee.

Composition of the People and Remuneration Committee

The committee met three times during the year. All its members are independent non-executive directors. Where necessary, non committee members are invited to attend. Lady Eithne Birt chairs the committee.

Attendance

Non-Executive Director		Secretary	
Lady Eithne Birt	3 (3) Chair	Liz Haynes	3 (3) Director of People & Organisational Development
Professor David Gann	3 (3) UKAEA Chair		
Dr Luc Bardin	3 (3) Non-Executive Director		

Under its terms of reference, the committee is responsible for:

- Oversight and approval of the objectives of the Executive team and associated performance related pay
- Review of UKAEA's Executive remuneration policy in relation to its competitors and industry norms and contract periods
- Advice to the CEO and Board on succession plans for the Executive team
- Oversight of the people strategy, including offering advice on the approach to any major changes

to pay, remuneration and terms and conditions which require government approval

- Oversight of the equality, diversity and inclusion strategy and the effectiveness of the inclusion council
- Provision of assurance to the Board and CEO on these, undertaking a periodic review of the work of the People and Remuneration Committee

Key areas considered by the People and Remuneration Committee during the year were:

- Executive remuneration in the period based on a detailed review of the achievement of objectives and UKAEA performance
- Approving executive objectives for the coming year
- UKAEA's gender pay gap report for 2022
- Progress made on the Authority's pay strategy
- Progress of the equality, diversity and inclusion agenda
- Development and publication of UKAEA's people strategy
- Adoption of strategic workforce planning

Chair's report

The momentum behind people issues continued to gather pace this year and considerable progress was achieved on issues of critical importance to the organisation.

In addition to the scrutiny of senior employees' objectives and their performance, which the committee undertakes during every performance cycle, some major milestones were achieved. Notable amongst these was the publication of UKAEA's first ever people strategy, which extends over a five-year period, until 2027. Underpinning the strategy, the first annual people plan was also brought to the committee to solicit the contributions of its members. The Authority now has a compelling vision for its people which is accessible by employees and external stakeholders alike, reflecting its culture and establishing the specificity of the progress required on people issues for its mission and goals to be realised.

A new area of work which the committee was pleased to review was the implementation of a strategic workforce planning framework, which will enable us to undertake the long-term planning

required to secure exceptional, talented individuals for our key roles of interest. During 2023, we will ensure it is embedded as an integral element of the business planning cycle, along with position management.

Our endeavours to increase the diversity and inclusion of the organisation also took a meaningful stride forward with the continuing development of the inclusion council, which is becoming a powerful and inclusive mechanism for progressing this agenda. We were delighted to see the reduction, in both the mean and median measures, of the UKAEA's gender pay gap in 2022 too. There remains a great deal of work to do to make the Authority an equitable employer in this respect, and our focus will be maintained over the coming performance cycle.

I bring my report to a close by recognising the enormous work that was done to bring UKAEA's remuneration challenges to the attention of His Majesty's Government and the significant achievement in securing an important pay award for 2022. We shall continue to press for the

reforms of our pay framework and the adoption of an approach which will enable managers to attract and retain our outstanding employees, in an increasingly competitive employment market where these high-grade skills are already scarce.

Over the coming period UKAEA, will continue to develop as an organisation, to adopt a structure that reflects and enables its focus and priorities, and achieves the creation of its subsidiary, UK Industrial Fusion Solutions Ltd. There is certainly another full and challenging year ahead of us!



Chair
Lady Eithne Birt

Campus and Property Committee Report

Overview

The committee was established in May 2020 by the UKAEA Board, in recognition of the increasing significance and growth of campus development and other property activities for the organisation, and to support the delivery of financial and commercial returns from property consistent with the corporate plan. The principal responsibility is to advise the Board on strategic property matters and to provide guidance to the Executive team. This has proven a timely strategic decision considering the increased activity across campus development and UKAEA's property management.

Composition of the Campus and Property Committee

The Campus and Property Committee met 4 times during the year. Its membership consists of two independent Non-Executive Directors and three UKAEA executive members. The independent Non-Executives are Stephen Barter (as Chair) and Dr Mark Bayley, see pages 87 to 89 for their biographies. The UKAEA executive members are the Chief Financial Officer and director of property and corporate services (CFO), the Chief Development Officer (CDO), and the Head of Campus Development.

The scope of the committee comprises campus development and property relating to the UKAEA Group. In addition to UKAEA's directly managed property interests at Culham Campus and on other sites within the UK – Fusion Technology Facility in South Yorkshire and the Oct 2022 announcement for STEP in West Burton, it also controls 50% of the Public Sector Limited Partnership (HSIC PubSP) within the Harwell Science and Innovation Campus Ltd Partnership (HSIC LP) HSIC LP is controlled by HSIC PubSP and HSIC PSP (HSIC Private Sector Limited Partnership) in equal parts (50/50). The CDO is on the Boards of both, HSIC PubSP and HSIC LP, while the CFO (until Jan 2023) or the Head of Campus Development (from Jan2023) is on the Board of HSIC PubSP.

Attendance

Non-Executive Director		Executive Members	
Stephen Barter	4 (4) Chair	Antonia Jenkinson	4 (4) Chief Financial Officer & Director of Property & Corporate Services (until Jan 2023)
Dr Mark Bayley	4 (4)	Tim Bestwick	3 (4) Chief Development Officer*
		Dr Caroline Livingstone	1 (1) Head of Campus Development (until Jul 2022)
		Iain Wallace	3 (3) Head of Campus Development (from Aug 2022)
Committee Attendee		Secretary	
Sarah Hennessey	4 (4) FFP Programme Delivery Director	Marta Barrabino - Clemente	4 (4) Executive Officer
Keith Musgrave	2 (4) Head of Buildings and Facilities Management		

*for the period 25 Jan to May 23, Chief Development Officer also covered the property responsibilities of the Chief Financial Officer & Diirector of Property

Under its terms of reference, the committee is responsible for:

- Reviewing campus development and other property project proposals ahead of consideration by the UKAEA Board
- Providing strategic advice and guidance to the Executive team
- Regularly reviewing the governance, management, funding and risk of the UKAEA estate in order to achieve the overall corporate objectives, including the delivery of financial and commercial returns from property consistent with the corporate plan
- Reporting on its activities to the UKAEA Board
- Undertaking a periodic review of the work of the Campus and Property Committee

Key areas considered by the Campus and Property Committee during the year were:

- Progression of the masterplan at Culham, and particularly the development and funding of a new, multi-let office building which can be offered to commercial occupiers, as well as looking ahead to the decommissioning of the JET facilities and the regeneration of that part of the site. All of these initiatives will enhance the diverse 'Fusion Cluster' character of the campus over time
- Progression of the Harwell Joint Venture, including the creation of new facilities for partner organisations, the asset management of existing buildings to enhance their sustainability

credentials, the further decommissioning and drawdown of land for new development, for which occupier demand remains strong.

- Progression of the STEP site selection process and support consideration of arising opportunities as the STEP site develops at West Burton with initial discussions for governance evolution at UKAEA Group
- Visit to the future STEP home in West Burton
- Review of property valuations and ongoing estate management arrangements, including sustainability and key property risks.

Chair's report

The further evolution of 'knowledge clusters' at the Harwell and Culham campuses, in furtherance of the Government's increasing momentum towards both its broader science agenda and low-carbon energy alternatives, has led to increasing interest from international organisations keen to co-locate and collaborate with UKAEA. This momentum has, in turn, encouraged further physical development at both campuses, and developments are now either under

construction or being planned which will provide facilities for further research into fusion energy, as well as multi-let commercial buildings which will meet the demands of co-locating businesses.

At the same time, securing the option to acquire the site at West Burton for the location of the first fusion power station, opens up an exciting opportunity to create a further campus and science cluster for UKAEA.

In the coming year, the committee will continue to support the Executive in progressing all of these activities.



Chair
Stephen Barter

Audit and Risk Assurance Committee

Overview

ARAC met four times during the year. All its members are independent Non-Executive Directors and attendees include operational leaders. In 2022/23, three Non-Executive Directors were members of the committee.

The committee is chaired by a Non-Executive Director Richard Hookway.

During the year, three attendees ended their appointments, Kay Nicholson (head of assurance) in April 2022, Lyanne Maclean (COO) in November 2022 and Antonia Jenkinson (CFO and director of property and corporate services) in January 2023.

The Committee welcomed Nicola Barber (Director of QSHE Risk and Assurance) in April 2022 and Dr Joe Milnes, (interim COO) in November 2022 (see biographies on pages 93 to 94).

The Audit and Risk Assurance Committee is a committee of the UKAEA Board. The overall

purpose of the committee is to support and advise the Board and accounting officer by independently reviewing the integrity, efficacy, and effectiveness of the Safety, Health and Environmental (SHE) management system, the risk management processes, the financial statements, and the annual report.

Enterprise risk management oversight is undertaken by the Executive Committee and reported into the Board. The annual audit plan is informed by the UKAEA's risks and associated mitigations to drive risk reduction and continual improvement while ensuring key risk exposure areas are covered.

Composition of the Audit and Risk Assurance Committee

For the year to 31st March 2023, the committee had one member possessing what the Smith report and HM Treasury's Audit and Risk Assurance Committee handbook describe as recent and relevant financial experience; Richard Hookway (see biography on page 89).

The committee is committed to discharging its key role with transparency and objectivity. In support of this, in addition to the members, the following groups are also invited to attend ARAC:

- UKAEA: CEO, CFO and Director of Property and Corporate Services, COO, Director of Finance and Business Systems (Counter Fraud Executive Lead), Head of Internal Audit, Financial Controller and Director of QSHE Risk and Assurance, Head of SHE, Head of Pensions, and the ARAC secretary
- National Audit Office (NAO): representatives of NAO audit team
- Representatives from our sponsoring Government department

As our external auditor, the NAO are given complete access to all financial and other information and the committee meets (without management present) with the NAO.

The committee chair meets with the Head of Internal Audit, the Director of QSHE, Risk and Assurance, and the secretary of ARAC on a regular basis.

Attendance

Non-Executive Director		Committee Attendee	
Richard Hookway	4 (4)	Stuart Biltcliffe	4 (4) Financial Controller
Dr Luc Bardin	4 (4)	Stephen Blake	4 (4) Head of Safety, Health, Environment, Quality and Business Resilience
Sir Stephen Hiller	4 (4)		
Executive Director		Jakub Kaniewski	3 (3) Network Engineer & Cyber Security Section Leader
Professor Sir Ian Chapman	4 (4) Chief Executive Officer (Accounting Officer)	Sarah Laws	4 (4) Head of Internal Audit
Antonia Jenkinson	4 (4) Chief Financial Officer & Director of Property & Corporate Services (until Jan 2023)	Lynne Maclean	2 (2) Chief Operating Officer (until Nov 2022)
Alli Brown	4 (4) Director of Finance & Business Systems	Kay Nicholson	4 (4) Risk and Assurance Advisor (until Apr 2022)
		Nicola Barber	3 (3) Director of QSHE Risk and Assurance (from Apr 2022)
Secretary		BEIS/DESNZ	4 (4) Representative from Sponsoring Dept
Lesley Hotchin	4 (4) Bid & Governance Accountant	NAO	4 (4) NAO representative
		Dr Joe Milnes	2 (2) Interim COO (cover for COO attendance Jan to May 23)

Key areas considered by the Audit and Risk Assurance Committee during the year were:

- Workplan of Internal Audit, the results of such audit work and management’s progress to resolve issues and risks identified and key areas of focus for Internal Audit
- The 3-year Internal Audit and Management Systems Audit programmes and mapping of these audits to the Corporate Risk register
- Internal Audit Charter is endorsed
- The committee’s performance effectiveness review
- Review of the lifetime plan which underpins the site restoration provision
- Review of information security
- UKAEA’s statutory accounts, including compliance with HM

Treasury guidance and the application of accounting policies and assumptions

- Counter fraud strategy approved
- Pension scheme accounts review
- Risk appetite review

Information Security

- The CFO (Director of Finance & Business Systems January 23 to May 23) is the executive lead for information management. Information risks are overseen by an information assurance steering committee which feeds significant risks into the corporate risk review group. During the year the focus of information asset owners and their local information managers was related to cyber security. Internal communications

continued throughout the year to all staff, with key themes of cyber and information security as ongoing priorities. UKAEA is aligned with The National Cyber Security Centre’s 10 Steps to Cyber Security and work is ongoing to align with the information security management system standard (ISO 27001). Technical controls have been further enhanced with improvements to threat detection/prevention, remote access and vulnerability assessments. The maturity of these controls and other information security practices have been evaluated through independent audits

- There have been no reportable data breaches or data loss incidents during the year.

Internal Audit annual opinion

Based on the audit work undertaken for the year and considering all available evidence, in my opinion, I can provide moderate assurance that there is a generally sound system of internal control, governance and risk management within UKAEA. However, this is on a downward trend from last year as within this there are some high priority control weaknesses that management need to address. In forming this opinion, the following has been considered:

Sarah Laws, Head of Internal Audit

- All audits undertaken in the year with revised changes approved by ARAC.
- 33% of internal audits undertaken received limited or unsatisfactory assurance compared to 10% last year.
- Results of the Management Systems Audit programme which also shows a downward trend in audit opinions.
- Unsatisfactory audit opinion from an industrial services supplier contract management audit, that highlighted weaknesses in expert level contract management capability across UKAEA. A wider contract management audit has been added to the plan for 2023/24.
- Limited assurance opinion in the management system construction design and management follow up audit due to processes not being adequately defined and previous inquiry and audit actions not being addressed in a timely or effective manner.
- Cancellation of the 2021/22 JET Repurposing programme audit actions, which was approved by ARAC. An audit of the JET Decommissioning and Repurposing programme is included on the 2023/24 audit plan.
- An increase in inquiries as a result of health, safety and environmental occurrences which shows an upward trend.
- Root cause analysis of audit findings is predominately process driven which highlights a weakness in the first line of defence.
- Observations from the payroll assurance board, and the U4BW change advisory board embedded assurance which show good control and monitoring.
- 100% of audit recommendations accepted by management from completed audits with robust and timely action plans in place.

Chair’s report

The Executive Committee and UKAEA team continue to make significant progress in managing and mitigating risks which are assessed against the organisation’s risk appetite.

This progress has been more commendable given the context of the competitive recruitment market with one of the most pressing risks being a failure to attract and retain staff of the right capability. This has placed a significant strain on our ability to deliver the highly scientific, technical and niche work underpinning our corporate goals.

The focus in the coming year will be:

- Continual review of the risk landscape and the level of assurance over management and mitigation of risks including:

- Geopolitical risk as the Russia/ Ukraine conflict continues to cause significant disruption to UKAEA from supply chain constriction, cyber-attacks and inflationary pressures.
- Managing both risk and opportunity in response to the UK government decision to pursue a domestic fusion energy strategy instead of associating to Euratom.
- Formalisation of the governance model including terms of reference of ARAC given that the formation of UKIFS is underway following the announcement of West Burton as the STEP site.
- Improving UKAEA contract management including framework of governance, risk management and control.

- Strengthening our project and programme governance and reporting, especially in the context of JET decommissioning and repurposing.
- Ensuring that the availability and integrity of our digital assets are appropriately managed and governed to prevent unauthorised access.

Moreover, the organisation will need to demonstrate value for money on programmes which are over an extended timescale whilst retaining its world-leading reputation for fusion research.



**Chair
Richard Hookway**

Remuneration and staff report

Directors' remuneration

Remuneration policy

The remuneration of Directors appointed to the UKAEA Board is set by the Secretary of State for DESNZ (formerly by the Secretary of State for BEIS) with the approval of HM Treasury in accordance with the Atomic Energy Authority Act 1954. The UKAEA Remuneration Committee makes recommendations to DESNZ (formerly to BEIS) on the overall remuneration package for Directors who are appointed to the UKAEA Board. The Non-Executive Directors who form the committee are not involved in decisions relating to their own remuneration.

In reaching its recommendations, the committee has regard to the following considerations:

- the need to recruit, retain and motivate suitably able and qualified people to exercise their different responsibilities; and
- the funding available to UKAEA.

The committee takes account of the evidence it receives about wider economic considerations and the affordability of its recommendations.

Service contracts

Executive Directors who are members of the UKAEA Board, are appointed by the Secretary of State for DESNZ (formerly by the Secretary of State for BEIS). This is normally for a three year term that may be renewed upon expiry in accordance with the guidelines issued by the Commissioner for Public Appointments.

Remuneration and pension entitlements

The individual components of the remuneration packages are:

Salary and fees

The CEO and CFO as Executive Directors receive a basic salary which is reviewed annually by UKAEA's People and Remuneration Committee. The Chair and Non-Executive Directors receive fees for their services. The People and Remuneration Committee makes recommendations to DESNZ (formerly to BEIS) as appropriate.

Benefits

Executive Directors are also reimbursed for reasonable expenses incurred in line with the policy for UKAEA's employees. These reimbursements are not included in the following table.

Performance related bonuses

The performance bonuses for Executive Directors are calculated in accordance with performance against agreed objectives, confirmed by DESNZ (formerly by BEIS) on the basis of recommendations from the Remuneration Committee. The total bonus is made up of two components: the performance of UKAEA against specific quantified targets, and the performance of the individual against specific targets. The performance related bonuses shown in the table below have been calculated on the basis of assessment by the People and Remuneration Committee of performance against the relevant specific targets. Payment of the CEO's bonus is subject to approval by DESNZ (formerly by BEIS).

Board Directors' remuneration for the year (subject to audit)

Individual Board Directors' remuneration for the year is shown in the following table, with salaries, fees and bonuses disclosed on an accruals basis.

2022/23	Salary/ Fees £k	Benefits ^(a) to nearest £100	Annual ^(b) bonus £k	Pension ^(c) benefit £k	2022/23 Total £k
Chair:					
Prof David Gann	20-25	100	-	-	25-30
Non-Executive Directors:					
Dr Luc Bardin	10-15	500	-	-	15-20
Stephen Barter	10-15	1,600	-	-	15-20
Dr Mark Bayley	10-15	300	-	-	15-20
Lady Eithne Birt	10-15	-	-	-	10-15
Dame Sue Gray ^(e)	(from Jan 2023) 0-5	100	-	-	0-5
Sir Stephen Hillier	10-15	1,100	-	-	15-20
Richard Hookway	10-15	1,300	-	-	15-20
Executive Directors:					
Prof Sir Ian Chapman	185-190	-	25-30	11	220-225
Antonia Jenkinson ^(d)	(to Jan 2023) 110-115	-	10-15	3	130-135

2021/22	Salary/ Fees £k	Benefits ^(a) to nearest £100	Annual ^(b) bonus £k	Pension ^(c) benefit £k	2021/22 Total £k
Chair:					
Prof David Gann	20-25	-	-	-	20-25
Non-Executive Directors:					
Dr Luc Bardin	10-15	-	-	-	10-15
Stephen Barter	10-15	-	-	-	10-15
Dr Mark Bayley	10-15	500	-	-	15-20
Lady Eithne Birt	10-15	-	-	-	10-15
Sir Stephen Hillier	(from Oct 2021) 5-10	-	-	-	5-10
Shrin Honap	(to Mar 2022) 10-15	-	-	-	10-15
Richard Hookway	(from Oct 2021) 5-10	200	-	-	5-10
Prof Sir Adrian Smith	(to Mar 2022) 10-15	-	-	-	10-15
Executive Directors:					
Prof Sir Ian Chapman	180-185	-	25-30	28	235-240
Antonia Jenkinson	135-140	-	15-20	23	175-180

Notes:

- Expenses benefits disclosed for the Chair and Non-Executive Directors in 2022/23 and in 2021/22 relate to travel for Board and other meetings at Culham and include the tax liability on these expenses which was met by UKAEA. These expenses vary depending on the distance of the individual's home from Culham.
- Where applicable, annual bonuses of Directors are subject to approval by DESNZ (formerly by BEIS). 2022/23 bonuses are actual, and the actual 2021/22 bonuses awarded did not differ materially from those reported in the comparative for 2021/22.
- The value of pensions benefits accrued during the year is calculated as (the real increase in pension multiplied by 20) plus (the real increase in any lump sum) less (the contributions made by the individual). The real increases exclude increases due to inflation or any increase or decrease due to a transfer of pension rights. In some cases, the pensions benefit is negative in real terms where pay increases and additional service have not offset the effect of inflation.
- The full time annual equivalent salary banding for this Executive Director, who left UKAEA during the year 2022/23, was £140k - £145k.
- The full time annual equivalent salary banding for this Non-Executive Director, who joined UKAEA during the year 2022/23, was £10k - £15k.

REMUNERATION AND STAFF REPORT

Fair pay disclosures (subject to audit)

Remuneration ratios

	2022/23 £	2021/22 £
Highest paid Director's total remuneration for the year excluding pension benefit	210k-215k	205k-210k
	Salary and allowances	Performance pay and bonuses payable
Highest paid Director - percentage change from the previous financial year ^(a)	2.7%	0.0%
Employees taken as a whole, excluding the highest paid Director - average percentage change from the previous financial year ^(b)	9.0%	(4.3)%

Notes:
 (a) This calculation is based on the mid-point of the band used in disclosing Directors' remuneration for each of salary and performance pay and bonuses payable
 (b) Calculated as the total for all employees (apart from the highest paid Director) as at 31 March, including annualised salary and allowances, divided by the full time equivalent number of employees (excluding the highest paid Director) as at 31 March.

Employee remuneration ratios

	Salary £	Other pay and benefits £	Total remuneration £	Ratio to highest paid director's remuneration ^(a)
2022/23				
25th percentile	35,961	1,802	37,763	5.6
Median percentile	46,293	8,319	54,612	3.9
75th percentile	49,084	10,959	60,043	3.5
2021/22				
25th percentile	30,679	3,649	34,328	6.0
Median percentile*	44,494	2,536	47,030	4.4
75th percentile	45,884	9,227	55,111	3.8

Notes:
 (a) Calculated using mid point of £5k disclosure band for highest paid Directors' remuneration

Reporting bodies are required to disclose the relationship between the remuneration of the highest paid Director in their organisation and the percentile remuneration of the organisation's workforce.

Salary and total remuneration have increased from prior year across the median and all percentiles. This results in a reduction for all ratios compared to the highest paid director for UKAEA employees in the financial year and consistent with the pay, reward, and progression strategy for all employees.

In 2022/23 and in 2021/22 no employees received remuneration in excess of that of the highest paid Director.

Remuneration of employees excluding the highest paid Director ranged from £18,902 to £152,919 (2021/22: £14,296 to £153,412).

Total remuneration includes salary, non-consolidated performance related pay and benefits-in-kind. It does not include severance payments, pension benefits, employer pension contributions or the cash equivalent transfer value of pensions.

REMUNERATION AND STAFF REPORT

Pension entitlements (subject to audit)

Executive Directors are members of the United Kingdom Atomic Energy Authority Combined Pension Scheme that pays an annual pension based on pensionable final earnings together with a lump sum at normal retirement age. Benefits are also payable in the event of death or ill health retirement. UKAEA also operates an unfunded pension arrangement in respect of three former Chief Executives to take account of pensionable pay above the earnings cap introduced by the Finance Act 1989.

Further details of the pension schemes and unfunded pensions can be found later in the Remuneration and Staff Report.

The pension entitlements shown in the table below are those that would be paid annually on retirement based on service to 31 March 2023 and include the value of added years paid for by Directors.

	Accrued pension as at 31/3/23 £k	Lump sum as at 31/03/23 £k	Real increase in accrued pension ^(a) £k	Real increase in lump sum ^(a) £k
Prof Sir Ian Chapman	32	95	1	3
Antonia Jenkinson ^(b)	12	37	1	2

Notes:
 (a) The real increase has been calculated after subtracting inflation.
 (b) Figures for Antonia Jenkinson are up to 24 January 2023 when she left UKAEA.

The following table sets out the Cash Equivalent Transfer Value (CETV) of the Executive Directors' accrued pension entitlements which have been calculated by the Scheme managers in accordance with the Occupational Pension Schemes (Transfer Values) Regulations 1996 as amended, having taken actuarial advice. The transfer values do not represent sums paid or payable to the Directors but represent a potential liability of the pension scheme or UKAEA.

	CETV at 31 March 2022 £k	Real increase in CETV ^(a) £k	CETV at 31 March 2023 £k
Prof Sir Ian Chapman	445	2	517
Antonia Jenkinson ^(b)	224	2	264

Notes:
 (a) The real increase has been calculated after subtracting inflation.
 (b) Figures for Antonia Jenkinson are up to 24 January 2023 when she left UKAEA.

Members of the pension scheme have the option to pay Additional Voluntary Contributions; neither the contributions nor the resulting benefits are included in the above tables.

REMUNERATION AND STAFF REPORT

Staff report

Staff costs (subject to audit)	2023 £k	2022 £k
Directly employed staff:		
Salaries, bonuses and allowances	86,921	75,836
Social security costs	10,604	8,858
Pension costs – defined contribution plans (see below)	15,760	12,183
	113,285	96,877
Temporary staff	38,640	29,653
	151,925	126,530

* Comparatives amended in respect of re-categorisation of costs

Staff numbers (subject to audit)

The average of full time equivalent staff during the year was as follows:

	2023	2022
Directly employed	1,704	1,568
Temporary staff	603	514
	2,307	2,082

Temporary (non-payroll) staff may be 'off-payroll workers' who are engaged via an intermediary, or they may be on the payroll of another organisation within the supply chain. Most of the temporary staff are engaged to carry out specialist work in UKAEA's scientific facilities.

Staff composition as at 31 March 2023 (not subject to audit)

All figures in the tables below relate to actual staff numbers at the year end rather than to average full time equivalents.

Board and senior staff

	Male	Female	Total
Board members	7	2	9
Executive Committee	8	5	13
Senior staff	13	4	17

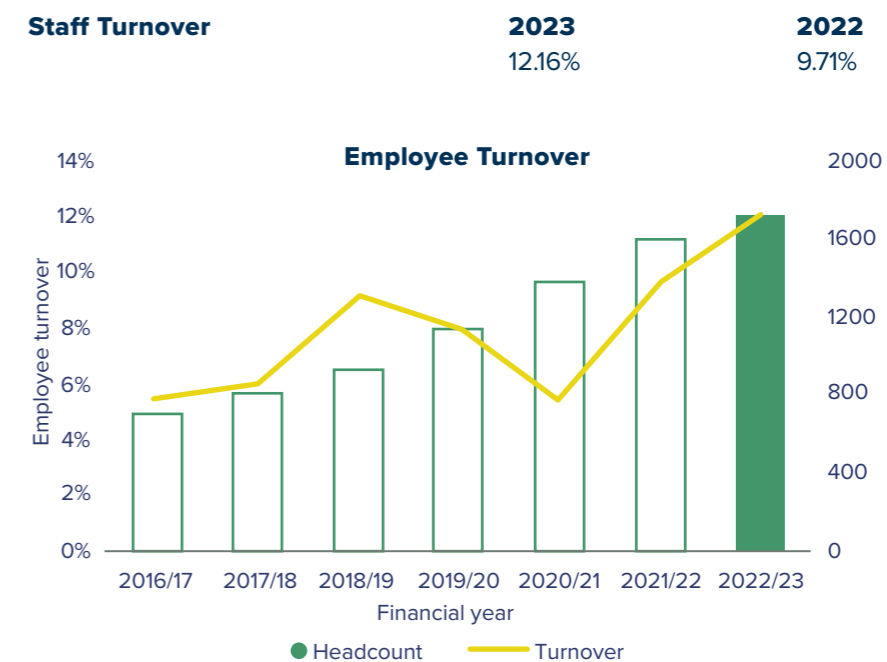
All Employees

	2023		2022	
Male	1,339	75.2%	1,277	75.4%
Female	442	24.8%	417	24.6%

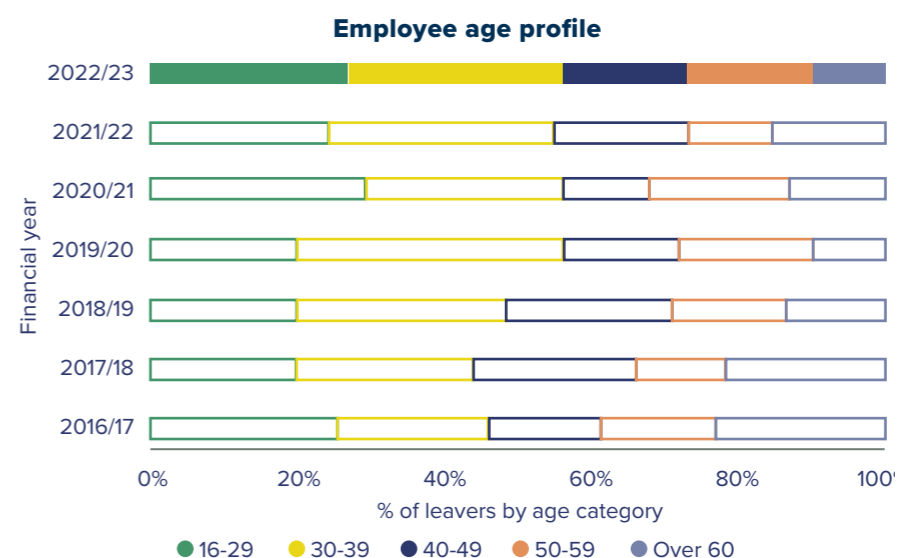
Sickness absence (not subject to audit)

The average sickness absence per employee for UKAEA during the year 2022/23 was 5.7 days (2021/22: 5.9 days).

REMUNERATION AND STAFF REPORT



Employee turnover has increased significantly again this year. See People section in the Performance report for further detail.



UKAEA pension schemes

(a) Defined benefit schemes

UKAEA has three defined benefit schemes: The Combined Pension Scheme (CPS), the Principal Non-Industrial Superannuation Scheme (PNISS) and the Protected Persons Superannuation Scheme (PPSS). These schemes have members from other employers as well as UKAEA. No information in these financial statements relates to other employers participating in the CPS, PNISS or PPSS. UKAEA has overall responsibility for the management of the schemes under a Framework Agreement with BEIS. No contingent liability is expected to arise from this responsibility.

In common with other public sector schemes, the CPS, the PNISS and the PPSS do not have many of the attributes of normal pension schemes. All contributions are paid to and benefits paid by HM Government via the Consolidated Fund. Any surplus of contributions made in excess of benefits paid out in any year is surrendered to the Consolidated Fund and any liabilities are met from the Consolidated Fund via the annual Parliamentary vote. The Government does not maintain a separate fund and actuarial valuations are based on a theoretical calculation as to how a typical UK pension scheme would have invested the historical surplus of contributions over payments.

REMUNERATION AND STAFF REPORT

(a) Defined benefit schemes continued

In accordance with the FReM, the schemes are accounted for as defined contribution schemes.

Employer contributions are calculated in accordance with HM Treasury methodology “Superannuation Contributions Adjusted for Past Experience” and are based on the expected cost of members’ benefits as they accrue. The total contributions paid by UKAEA during the year were £14,453k (2022: £12,086k).

(b) Defined contribution schemes

UKAEA manages two defined contribution schemes, the Additional Voluntary Contribution (AVC) scheme and the Shift Pay Pension Savings Plan (SPPSP) scheme, both of which are fully insured schemes administered by Prudential (a trading name of Prudential Distribution Limited, which is a subsidiary of M&G plc.) to whom contributions are paid.

The AVC scheme includes members from UKAEA and from other employers who are members of CPS or PPSS and who have opted to pay additional voluntary contributions. No employer contributions are made to this scheme.

The members of the SPPSP scheme include shift working employees of UKAEA and of other employers who are members of CPS or PPSS. The costs of the SPPSP scheme, which are directly linked to shift pay earnings, are charged to the Statement of comprehensive net income at the time the shift pay is paid. The total contributions paid by UKAEA during the year were £26k (2022: £25k).

(c) Unfunded retirement benefits

There are unfunded retirement benefits in respect of three former UKAEA Chief Executives which are not included in the UKAEA pension schemes.

The movement in the liability for these benefits is shown below:

	Group and Authority	
	2022/23 £k	2021/22 £k
At 1 April	2,281	2,190
Interest on liability	35	27
Benefits payable	(85)	(84)
Change in discount rate	(684)	103
Actuarial gain/(loss)	158	45
At 31 March	1,705	2,281

The interest on liability is included in the Statement of comprehensive net income and the actuarial gain/(loss) is included in taxpayers’ equity. The closing liability, discounted at the appropriate pensions liability discount rate, is included in other provisions for liabilities and charges in the Statement of financial position (further details of provisions are given in Note 21).

REMUNERATION AND STAFF REPORT

Staff policy

UKAEA’s pay policy is determined by our sponsoring department, DESNZ (formerly BEIS).

Our Trade Union is Prospect and we have an extant framework on how we engage and consult. We use our existing mechanisms to seek their feedback and thinking on current issues.

UKAEA is committed to promoting equality, diversity, and inclusion inside and outside of the organisation, and to ensuring that the working environment is welcoming, supportive, and inclusive for all. In 2020 we launched a ‘Being Inclusive’ strategy as a five-year campaign coordinating a series of actions centring around four main commitments:

- **People:** “UKAEA will take positive action to improve the opportunities and lived experience of all individuals working at, or interacting with, the organisation.”
- **Environment:** “UKAEA will take positive steps to identify and improve the physical working environment for all of its people, particularly those with disabilities, whether they are visible or hidden.”
- **Communication and engagement:** “UKAEA will improve internal and external communications to fully reflect its ED&I commitment and progress to maximise the awareness and engagement of all stakeholders.”
- **Policies and practices:** “UKAEA will integrate equality, diversity and inclusion into all our policies and practices.”

UKAEA’s equal opportunities policy requires that all job applicants enjoy equal opportunity for employment on the basis of ability, qualifications, experience and suitability for the work. We deliver in-house training on diversity and equality, unconscious bias and specific recruitment training. These courses cover equality, diversity and inclusion, ensuring that line managers are aware of their responsibilities towards, and the benefits of, these topics.

UKAEA’s equal opportunities policy provides a framework for ensuring that equality is considered throughout the employment of staff. For those who become disabled during their employment, we provide occupational health facilities which provide direct support to the employee and advise line managers on modifications and restrictions which are required. In addition to the training mentioned above, People Department Business Partners provide coaching on flexible working and unconscious bias to ensure that employees with disabilities are given equal opportunity in training, career development and promotion. UKAEA is also registered with the Disability Confident Scheme.

Expenditure on consultancy and temporary staff

The expenditure on temporary staff (the provision of workers to cover business-as-usual or service delivery activities within an organisation) was £38,640k (2022: £29,653k), as detailed in the Staff costs note above. The increase year on year relates mainly to temporary staff recruited to support the increasing breadth of programmes.

UKAEA spend on consultancy (the provision to management of objective advice relating to strategy, structure, management, or operations of an organisation, in pursuit of its purposes and objectives) was £735k (2022: £49k). Such advice is sought when UKAEA does not have the skills set required within its support services and the particular requirement falls outside the ‘business-as-usual’ environment. When used appropriately, consultancy can be a cost effective and efficient way of getting the temporary and skilled external input that UKAEA needs. The increase in expenditure year on year includes work relating to the STEP siting assessment for the prototype powerplant and operating model.

REMUNERATION AND STAFF REPORT

Off-payroll appointments

(a) Highly paid off-payroll worker engagements as at 31 March 2023, earning £245 per day or greater

Number of existing engagements 294

Of which the number that have existed at the time of reporting for

Less than one year 102
 Between one and two years 70
 Between two and three years 35
 Between three and four years 29
 For four or more years 58

(b) All highly paid off-payroll workers engaged at any point during the year ended 31 March 2023, earning £245 per day or greater

Number of temporary off-payroll worker engagements in force during the year ended 31 March 2023 343

Of which:

Number not subject to off-payroll legislation 322
 Number subject to off-payroll legislation and assessed as within the scope of IR35 -
 Number subject to off-payroll legislation and assessed as not within the scope of IR35 21

Number of engagements reassessed for consistency/assurance purposes during the year 13

Of which:

Number of engagements that saw a change to IR35 status following the review -

(c) Off-payroll engagements of board members, and/or senior officials with significant financial responsibility, between 1 April 2022 and 31 March 2023

Number of off-payroll engagements of board members, and/or senior officials with significant financial responsibility, during the financial year -
 Total number of individuals on payroll that have been deemed 'board members, and/or senior and/or senior officials with significant financial responsibility' during the financial year 14

(d) AEA Insurance Limited (see also Note 13.1): Off-payroll engagements of board members, and/or senior officials with significant financial responsibility, between 1 April 2022 and 31 March 2023.

Number of off-payroll engagements of board members, and/or senior officials with significant financial responsibility, during the financial year 2

Total number of individuals on payroll and off-payroll that have been deemed 'board members, and/or senior officials with significant financial responsibility' during the financial year. 3

AEAIL is a captive insurance company registered in the Isle of Man and subject to their tax and NI legislation. AEAIL does not employ anyone.

Two AEAIL Directors, who have been engaged since 2002 and 2022 respectively, are off-payroll by default and are paid a small fee by AEAIL.

The third Director of AEAIL, who has been engaged since 2019, is an employee of UKAEA and on the UKAEA payroll.

REMUNERATION AND STAFF REPORT

Trade Union facility time

Facility time is when an employee takes paid time off from their normal role to carry out their duties and activities as a trade union representative.

Table 1 – Relevant Union Officials

Number of employees who were relevant union officials during the year	Full time equivalent number of employees
20	18

Table 2: Percentage of time spent on facility time

Percentage of working time spent on facility by employees who were relevant union officials	Full time equivalent number of employees
0%	7
1-50%	11
51-99%	0
100%	0

Table 3: Percentage of pay bill spent on facility time

	Figures £k
Total cost of facility time	55
Total pay bill	113,285
Percentage of the total pay bill spent on facility time, calculated as: (total cost of facility time ÷ total pay bill) x 100	0.05%

Table 4: Paid trade union activities

Time spent on paid trade union activities as a percentage of total paid facility time hours calculated as: (total hours spent on paid trade union activities by relevant union officials during the year ÷ total paid facility time hours) x 100	Nil
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Exit packages paid to employees (subject to audit)

Exit package cost band	Number of compulsory redundancies		Number of other departures agreed	
	2022/23	2021/22	2022/23	2021/22
Total number of exit packages	0	0	0	0

The departures disclosed above relate to early releases which are within the terms set out in UKAEA's Conditions of Employment Manual or have been subject to separate and appropriate approval processes. Where applicable, the additional costs of early releases are met by UKAEA and not by UKAEA's CPS. Ill-health retirement costs are met by the CPS and these retirements are not included in the table above.

Other Parliamentary disclosures

Fees and charges (subject to audit)

UKAEA does not receive fees and charges for public services, as defined by HM Treasury in Managing Public Money. There are therefore no related disclosures.

Losses and special payments (subject to audit)

There were reportable total losses and special payments of £0.3m in the year (on an accruals basis). This includes: Foreign exchange losses due to timing differences on realised transactions, an estimated credit loss on a commercial contract and supplier services not received.

Remote contingent liabilities (subject to audit)

UKAEA has no significant remote contingent liabilities to report.



Professor Sir Ian Chapman
Chief Executive and Accounting Officer
17th November 2023

The Certificate and Report of the Comptroller and Auditor General to the Houses of Parliament

Opinion on financial statements

I certify that I have audited the financial statements of the United Kingdom Atomic Energy Authority and its Group for the year ended 31 March 2023 under the Atomic Energy Authority Act 1954.

The financial statements comprise the United Kingdom Atomic Energy Authority and its Group's

- Statement of Financial Position as at 31 March 2023;
- Statement of Comprehensive Net Income, Statement of Cash Flows and Statement of Changes in Taxpayers' Equity for the year then ended; and
- the related notes including the significant accounting policies.

The financial reporting framework that has been applied in the preparation of the Group financial statements is applicable law and UK adopted International Accounting Standards.

In my opinion, the financial statements:

- give a true and fair view of the state of the United Kingdom Atomic Energy Authority and its Group's affairs as at 31 March 2023 and its profit/loss for the year then ended; and
- have been properly prepared in accordance with the Atomic Energy Authority Act 1954 and Secretary of State directions issued thereunder.

Opinion on regularity

In my opinion, in all material respects, the income and expenditure recorded in the financial statements have been applied to the purposes intended by Parliament and the financial transactions recorded in the financial statements conform to the authorities which govern them.

Basis for opinions

I conducted my audit in accordance with International Standards on Auditing (UK) (ISAs UK), applicable law and Practice Note 10 *Audit of Financial Statements and Regularity of Public Sector Bodies in the United Kingdom (2022)*. My responsibilities under those standards are further described in the Auditor's responsibilities for the audit of the financial statements section of my certificate.

Those standards require me and my staff to comply with the Financial Reporting Council's *Revised Ethical Standard 2019*. I am independent of the United Kingdom Atomic Energy Authority and its Group in accordance with the ethical requirements that are relevant to my audit of the financial statements in the UK. My staff and I have fulfilled our other ethical responsibilities in accordance with these requirements.

I believe that the audit evidence I have obtained is sufficient and appropriate to provide a basis for my opinion.

Conclusions relating to going concern

In auditing the financial statements, I have concluded that the United Kingdom Atomic Energy Authority and its Group's use of the going concern basis of accounting in the preparation of the financial statements is appropriate.

Based on the work I have performed, I have not identified any material uncertainties relating to events or conditions that, individually or collectively, may cast significant doubt on the United Kingdom Atomic Energy Authority and its Group's ability to continue as a going concern for a period of at least twelve months from when the financial statements are authorised for issue.

My responsibilities and the responsibilities of the Accounting Officer with respect to going concern are described in the relevant sections of this certificate.

PARLIAMENTARY ACCOUNTABILITY AND AUDIT REPORT

The going concern basis of accounting for the United Kingdom Atomic Energy Authority and its Group is adopted in consideration of the requirements set out in HM Treasury's Government Financial Reporting Manual, which require entities to adopt the going concern basis of accounting in the preparation of the financial statements where it is anticipated that the services which they provide will continue into the future.

Other Information

The other information comprises the information included in the Annual Report, but does not include the financial statements nor my auditor's certificate and report. The Accounting Officer is responsible for the other information.

My opinion on the financial statements does not cover the other information and, except to the extent otherwise explicitly stated in my certificate, I do not express any form of assurance conclusion thereon.

My responsibility is to read the other information and, in doing so, consider whether the other information is materially inconsistent with the financial statements, or my knowledge obtained in the audit, or otherwise appears to be materially misstated.

If I identify such material inconsistencies or apparent material misstatements, I am required to determine whether this gives rise to a material misstatement in the financial statements themselves. If, based on the work I have performed, I conclude that there is a material misstatement of this other information, I am required to report that fact.

I have nothing to report in this regard.

Opinion on other matters

In my opinion the part of the Remuneration and Staff Report to be audited has been properly prepared in accordance with Secretary of State directions issued under the Atomic Energy Authority Act 1954.

In my opinion, based on the work undertaken in the course of the audit:

- the parts of the Accountability Report subject to audit have been properly prepared in accordance with Secretary of State directions made under the Atomic Energy Authority Act 1954; and
- the information given in the Performance and Accountability Reports for the financial year for which the financial statements are prepared is consistent with the financial statements and is in accordance with the applicable legal requirements.

Matters on which I report by exception

In the light of the knowledge and understanding of the United Kingdom Atomic Energy Authority and its Group and their environment obtained in the course of the audit, I have not identified material misstatements in the Performance and Accountability Reports.

I have nothing to report in respect of the following matters which I report to you if, in my opinion:

- Adequate accounting records have not been kept by the United Kingdom Atomic Energy Authority and its Group or returns adequate for my audit have not been received from branches not visited by my staff; or
- I have not received all of the information and explanations I require for my audit; or
- the financial statements and the parts of the Accountability Report subject to audit are not in agreement with the accounting records and returns; or
- certain disclosures of remuneration specified by HM Treasury's Government Financial Reporting Manual have not been made or parts of the Remuneration and Staff Report to be audited is not in agreement with the accounting records and returns; or
- the Governance Statement does not reflect compliance with HM Treasury's guidance.

Responsibilities of the Accounting Officer for the financial statements

As explained more fully in the Statement of Accounting Officer's Responsibilities, the Accounting Officer is responsible for:

- maintaining proper accounting records;
- providing the C&AG with access to all information of which management is aware that is relevant to the preparation of the financial statements such as records, documentation and other matters;
- providing the C&AG with additional information and explanations needed for his audit;
- providing the C&AG with unrestricted access to persons within the United Kingdom Atomic Energy Authority and its Group from whom the auditor determines it necessary to obtain audit evidence;

PARLIAMENTARY ACCOUNTABILITY AND AUDIT REPORT

- ensuring such internal controls are in place as deemed necessary to enable the preparation of financial statement to be free from material misstatement, whether due to fraud or error;
- ensuring that the financial statements give a true and fair view and are prepared in accordance with Secretary of State directions made under the Atomic Energy Authority Act 1954;
- ensuring that the annual report, which includes the Remuneration and Staff Report, is prepared in accordance with Secretary of State directions directions made under the Atomic Energy Authority Act 1954; and
- assessing the United Kingdom Atomic Energy Authority and its Group's ability to continue as a going concern, disclosing, as applicable, matters related to going concern and using the going concern basis of accounting unless the Accounting Officer anticipates that the services provided by the United Kingdom Atomic Energy Authority and its Group will not continue to be provided in the future.

Auditor's responsibilities for the audit of the financial statements

My responsibility is to audit, certify and report on the financial statements in accordance with the Atomic Energy Authority Act 1954.

My objectives are to obtain reasonable assurance about whether the financial statements as a whole are free from material misstatement, whether due to fraud or error, and to issue a certificate that includes my opinion. Reasonable assurance is a high level of assurance but is not a guarantee that an audit conducted in accordance with ISAs (UK) will always detect a material misstatement when it exists. Misstatements can arise from fraud or error and are considered material if, individually or in the aggregate, they could reasonably be expected to influence the economic decisions of users taken on the basis of these financial statements.

Extent to which the audit was considered capable of detecting non-compliance with laws and regulations including fraud

I design procedures in line with my responsibilities, outlined above, to detect material misstatements in respect of non-compliance with laws and regulations, including fraud. The extent to which my procedures are capable of detecting non-compliance with laws and regulations, including fraud is detailed below.

Identifying and assessing potential risks related to non-compliance with laws and regulations, including fraud

In identifying and assessing risks of material misstatement in respect of non-compliance with laws and regulations, including fraud, I:

- considered the nature of the sector, control environment and operational performance including the design of the United Kingdom Atomic Energy Authority and its Group's accounting policies, key performance indicators and performance incentives.
- inquired of management, the United Kingdom Atomic Energy Authority's head of internal audit and those charged with governance, including obtaining and reviewing supporting documentation relating to the United Kingdom Atomic Energy Authority and its Group's policies and procedures on:
 - o identifying, evaluating and complying with laws and regulations;
 - o detecting and responding to the risks of fraud; and
 - o the internal controls established to mitigate risks related to fraud or non-compliance with laws and regulations including the United Kingdom Atomic Energy Authority and its Group's controls relating to the United Kingdom Atomic Energy Authority's compliance with the Atomic Energy Authority Act 1954 and Managing Public Money.
- inquired of management, the United Kingdom Atomic Energy Authority's head of internal audit and those charged with governance whether:
 - o they were aware of any instances of non-compliance with laws and regulations;
 - o they had knowledge of any actual, suspected, or alleged fraud;
- discussed with the engagement team and the relevant internal specialists, how and where fraud might occur in the financial statements and any potential indicators of fraud.

As a result of these procedures, I considered the opportunities and incentives that may exist within the United Kingdom Atomic Energy Authority and its Group for fraud and identified the greatest potential for fraud in the following areas: revenue recognition, posting of unusual journals, complex transactions, and bias in management estimates. In common with all audits under ISAs (UK), I am also required to perform specific procedures to respond to the risk of management override.

I obtained an understanding of the United Kingdom Atomic Energy Authority and its Group's framework of authority and other legal and regulatory frameworks in which the United Kingdom Atomic Energy Authority and its Group operates.

PARLIAMENTARY ACCOUNTABILITY AND AUDIT REPORT

I focused on those laws and regulations that had a direct effect on material amounts and disclosures in the financial statements or that had a fundamental effect on the operations of the United Kingdom Atomic Energy Authority and its Group. The key laws and regulations I considered in this context included Atomic Energy Authority Act 1954, Managing Public Money, employment law and or pensions legislation, and tax legislation.

Audit response to identified risk

To respond to the identified risks resulting from the above procedures:

- I reviewed the financial statement disclosures and testing to supporting documentation to assess compliance with provisions of relevant laws and regulations described above as having direct effect on the financial statements;
- I enquired of management, the Audit and Risk Committee and in-house legal counsel concerning actual and potential litigation and claims;
- I reviewed minutes of meetings of those charged with governance and the Board and internal audit reports; and
- in addressing the risk of fraud through management override of controls, I tested the appropriateness of journal entries and other adjustments; assessed whether the judgements on estimates are indicative of a potential bias; and evaluated the business rationale of any significant transactions that are unusual or outside the normal course of business.

I communicated relevant identified laws and regulations and potential risks of fraud to all engagement team members including internal specialists and remained alert to any indications of fraud or non-compliance with laws and regulations throughout the audit.

A further description of my responsibilities for the audit of the financial statements is located on the Financial Reporting Council's website at: www.frc.org.uk/auditorsresponsibilities. This description forms part of my certificate.

Other auditor's responsibilities

I am required to obtain evidence sufficient to give reasonable assurance that the expenditure and income recorded in the financial statements have been applied to the purposes intended by Parliament and the financial transactions recorded in the financial statements conform to the authorities which govern them.

I communicate with those charged with governance regarding, among other matters, the planned scope and timing of the audit and significant audit findings, including any significant deficiencies in internal control I identify during my audit.

Report

I have no observations to make on these financial statements.

Gareth Davies
Comptroller and Auditor General

Date 18th November 2023

National Audit Office
157-197 Buckingham Palace Road
Victoria
London
SW1W 9SP

PARLIAMENTARY ACCOUNTABILITY AND AUDIT REPORT

Performance

Accountability

Annual Accounts

Performance

Accountability

Annual Accounts

CONSOLIDATED STATEMENT OF COMPREHENSIVE NET INCOME

Consolidated statement of comprehensive net income for the year ended 31 March 2023

	Note	Group		Authority	
		2023 £k	2022 £k	2023 £k	2022 £k
Income					
Revenue	5	259,702	226,236	256,328	222,460
Other income		1,367	2,778	2,071	3,496
Less: Share of revenue of joint venture		(3,374)	(3,776)	-	-
Total operating income		257,695	225,238	258,399	225,956
Expenditure					
Raw materials and consumables	9	74,596	53,525	74,596	53,525
Other external expenses	9	94,109	103,057	94,699	103,057
Staff costs	6	151,925	126,530	151,925	126,530
Depreciation, amortisation and impairment		10,296	8,059	10,296	8,059
Other expenses	9	(1,020)	3,350	(1,020)	3,886
Costs charged to provisions		(2,319)	(1,308)	(2,319)	(1,308)
		327,587	293,213	328,177	293,749
Revaluation adjustment	12	(64)	(3,139)	(64)	(3,139)
Costs capitalised		(62,082)	(62,504)	(62,082)	(62,504)
Total operating expenditure		265,441	227,570	266,031	228,106
Operating (loss)/profit		(7,746)	(2,332)	(7,632)	(2,150)
Finance income	8	559	18	454	6
Finance expense	8	31	(16)	31	(16)
Profit/(loss) on disposal of assets		-	(23)	-	(23)
Share of profit/(loss) of joint venture after tax	13	7,232	16,282	-	-
Profit/(loss) before tax	9	76	13,929	(7,147)	(2,183)
Current tax (charge)/credit	10	4,819	5,707	4,819	5,707
Deferred tax (charge)/credit	10	(2,833)	(3,365)	(2,833)	(3,365)
Profit/(loss) for the year		2,062	16,271	(5,161)	159
Other comprehensive net income					
Net gain/(loss) on revaluations		41,391	22,848	28,214	16,578
Actuarial gains/(losses) on defined benefit pension plans		526	(147)	526	(147)
Tax (charge)/credit relating to components of other comprehensive income		(6,388)	(5,730)	(6,388)	(5,730)
Total other comprehensive net income for the year		35,529	16,971	22,352	10,701
Total comprehensive net income for the year		37,591	33,242	17,191	10,860

The notes on pages 126 to 157 are an integral part of these financial statements.

CONSOLIDATED STATEMENT OF FINANCIAL POSITION

Consolidated statement of financial position as at 31 March 2023

	Note	Group		Authority	
		2023 £k	2022 £k	2023 £k	2022 £k
Non-current assets					
Property, plant and equipment	11	279,974	201,712	279,974	201,712
Right-of-use assets	11	3,856	4,074	3,856	4,074
Investment property	12	59,472	57,688	59,472	57,688
Intangible assets	11	484	165	484	165
Financial assets	13	99,132	78,723	18,623	18,623
Other receivables	15	763,671	514,448	763,671	514,448
Total non-current assets		1,206,589	856,810	1,126,080	796,710
Current assets					
Trade and other receivables	15	96,108	74,005	96,278	74,783
Financial assets	13	959	-	-	-
Cash and cash equivalents	16	69,328	66,566	64,819	60,383
Total current assets		166,395	140,571	161,097	135,166
Total assets		1,372,984	997,381	1,287,177	931,876
Current liabilities					
Trade and other payables	17	81,363	76,064	81,311	76,012
Lease liabilities	20	253	263	253	263
Provisions for liabilities and charges	21	37,282	20,598	37,282	20,465
Total current liabilities		118,898	96,925	118,846	96,740
Total assets minus current liabilities		1,254,086	900,456	1,168,331	835,136
Non-current liabilities					
Trade and other payables	17	1,483	59	1,483	59
Deferred income	18	13,945	10,152	13,945	10,152
Deferred income tax liabilities	19	30,284	21,063	30,284	21,063
Lease liabilities	20	3,440	3,565	3,440	3,565
Provisions for liabilities and charges	21	765,033	520,355	764,769	520,126
Total non-current liabilities		814,185	555,194	813,921	554,965
Assets less liabilities		439,901	345,262	354,410	280,171
Taxpayers' equity					
General reserve		13,658	13,658	13,658	13,658
Revaluation reserve		62,148	41,313	62,148	41,313
Capital grants reserve		182,903	133,079	182,903	133,079
Retained earnings		181,192	157,212	95,701	92,121
Total taxpayers' equity		439,901	345,262	354,410	280,171

The notes on pages 126 to 157 are an integral part of these financial statements.



Professor Sir Ian Chapman
Chief Executive and Accounting Officer
17th November 2023

CONSOLIDATED STATEMENT OF CASH FLOWS

Consolidated statement of cash flows

for the year ended 31 March 2023

	Note	Group		Authority	
		2023 £k	2022 £k	2023 £k	2022 £k
Cash flows from operating activities					
Profit/(loss) for the year		2,062	16,271	(5,161)	159
Adjustments for non-cash transactions:					
- Depreciation, amortisation and impairment		10,295	8,059	10,295	8,059
- Deferred income released	18	(1,167)	(785)	(1,167)	(785)
- Change in fair value of investment property	12	(64)	(3,139)	(64)	(3,139)
- Loss on disposal of property, plant and equipment		-	15	-	15
- Loss on disposal of right-of-use assets		-	8	-	8
- Net finance (income)/expense recognised	8	(590)	(2)	(485)	10
- Tax charge/(credit)	10	(1,986)	(2,342)	(1,986)	(2,342)
- Share of loss/(profit) of joint venture	13.2	(7,232)	(16,282)	-	-
Changes in working capital:					
- (Increase)/decrease in trade and other receivables		(356)	(19,317)	252	(19,191)
- (Increase)/decrease in current financial assets		(959)	4,611	-	-
- Increase/(decrease) in trade and other payables		11,683	4,651	11,683	4,611
- Use of and change in provisions, net of the movement on reimbursement receivables		(4,197)	3,390	(4,099)	3,906
Net cash inflow/(outflow) from operating activities		7,489	(4,862)	9,268	(8,689)
Cash flows from investing activities					
Purchase of property, plant and equipment	11	(61,631)	(62,379)	(61,631)	(62,379)
Purchase of intangible assets	11	(450)	(125)	(450)	(125)
Net cash inflow/(outflow) from investing activities		(62,081)	(62,504)	(62,081)	(62,504)
Cash flows from financing activities					
Capital grant from sponsoring department		57,048	58,998	57,048	58,998
Interest received	8	559	18	454	6
Payments of interest on lease liabilities	8	(35)	(41)	(35)	(41)
Repayments of lease liabilities	20	(218)	(496)	(218)	(496)
Net cash inflow/(outflow) from financing activities		57,354	58,479	57,249	58,467
Net increase/(decrease) in cash and cash equivalents in the year		2,762	(8,887)	4,436	(12,726)
Cash and cash equivalents at the beginning of the year		66,566	75,453	60,383	73,109
Cash and cash equivalents at the end of the year		69,328	66,566	64,819	60,383

The notes on pages 126 to 157 are an integral part of these financial statements.

CONSOLIDATED STATEMENT OF CHANGES IN TAXPAYERS' EQUITY

Consolidated statement of changes in taxpayers' equity

for the year ended 31 March 2023

Group	General reserve ^(a) £k	Revaluation reserve ^(b) £k	Capital grants reserve ^(c) £k	Retained earnings ^(d) £k	Total £k
Balance at 1 April 2021	13,658	31,107	79,788	128,469	253,022
Changes in Taxpayers' Equity 2021/22:					
Total comprehensive net income for the year	-	10,848	-	22,394	33,242
Capital grant from sponsoring department	-	-	58,998	-	58,998
Depreciation transfer	-	(642)	(5,707)	6,349	-
Balance at 31 March 2022	13,658	41,313	133,079	157,212	345,262
Changes in Taxpayers' Equity 2022/23:					
Total comprehensive net income for the year	-	21,826	-	15,765	37,591
Capital grant from sponsoring department	-	-	57,048	-	57,048
Depreciation transfer	-	(991)	(7,224)	8,215	-
Balance at 31 March 2023	13,658	62,148	182,903	181,192	439,901

Authority	General reserve ^(a) £k	Revaluation reserve ^(b) £k	Capital grants reserve ^(c) £k	Retained earnings ^(d) £k	Total £k
Balance at 1 April 2021	13,658	31,107	79,788	85,760	210,313
Changes in Taxpayers' Equity 2021/22:					
Total comprehensive net income for the year	-	10,848	-	12	10,860
Capital grant from sponsoring department	-	-	58,998	-	58,998
Depreciation transfer	-	(642)	(5,707)	6,349	-
Balance at 31 March 2022	13,658	41,313	133,079	92,121	280,171
Changes in Taxpayers' Equity 2022/23:					
Total comprehensive net income for the year	-	21,826	-	(4,635)	17,191
Capital grant from sponsoring department	-	-	57,048	-	57,048
Depreciation transfer	-	(991)	(7,224)	8,215	-
Balance at 31 March 2023	13,658	62,148	182,903	95,701	354,410

(a) General reserve - This is a legacy reserve created from historical transactions, representing investment in UKAEA by the sponsoring department.

(b) Revaluation reserve - Reflects the unrealised element, net of tax, of the cumulative balance of gains/(losses) on revaluations of land and buildings (see Note 11.1).

(c) Capital grants reserve - Relates to capital grants received from the sponsoring department less the associated depreciation.

(d) Retained earnings - Represents total assets less liabilities, to the extent that the total is not represented by other reserves.

The notes on pages 126 to 157 are an integral part of these financial statements.

Notes to the financial statements

1 General information

UKAEA is a non-departmental public body (NDPB) and was established by the Atomic Energy Authority Act 1954. The address of UKAEA's registered office is Culham Science Centre, Abingdon, Oxfordshire, OX14 3DB. UKAEA and its subsidiaries are referred to as 'the Group'. Until 31 March 2023 UKAEA's sponsoring government department was the Department for Business, Energy and Industrial Strategy (BEIS).

On 7 February 2023, the Prime Minister announced a major machinery of government change which redistributed the activities of several existing government departments, including BEIS, and created three new departments: the Department for Business and Trade, the Department for Digital, Science, Innovation and Technology, and the Department for Energy Security and Net Zero (DESNZ). UKAEA has been designated to DESNZ, with accounting officer responsibilities formally transferred from 1st April 2023.

2 Basis of preparation

The financial statements comply with the provisions of the Atomic Energy Authority Act 1954 and the requirements of HM Treasury. The latter requires the financial statements to be prepared in accordance with the Government Financial Reporting Manual (FRm) issued by HM Treasury as updated annually. The accounting policies contained in the FRm apply International Financial Reporting Standards (IFRS) as adapted or interpreted for the public sector. Where the FRm permits a choice of accounting policy, the accounting policy which is judged to be most appropriate to the particular circumstances of the Group for the purpose of giving a true and fair view has been selected.

The financial statements have been prepared on a going concern basis.

The Board, Executive team and Accounting Officer believe that the commitment from international parties and the UK government to fusion research, the growth of UKAEA, combined with the acceptance by DESNZ (formerly by BEIS) of responsibility for costs associated with UKAEA site restoration and restructuring liabilities, is sufficient to support continuing operations for the foreseeable future.

The financial statements are presented in pounds sterling, which is UKAEA's functional currency, and have been prepared under the historical cost convention, except for land and buildings, investment properties, assets held-for-sale and derivative financial instruments which are stated at fair value.

The preparation of financial statements in conformity with IFRS requires judgements, estimates and assumptions to be made that affect the application of accounting policies and the reported amounts of income, expenses, assets and liabilities. Estimates and underlying assumptions are reviewed on an ongoing basis. Revisions to accounting estimates are recognised in the period in which the estimates are revised and in any future periods affected. Information about significant areas of estimation uncertainty and critical judgements in applying accounting policies that have the most significant effect on the amounts recognised in the consolidated financial statements is included in the notes to the financial statements.

3 Significant accounting policies

The principal accounting policies applied by UKAEA and its subsidiary AEA Insurance Ltd (AEAIL) in the preparation of these financial statements are set out below. These policies have been applied consistently in dealing with all items that are considered material to the financial statements.

3.1 Provisions

Provisions are recognised when the Group has a present legal or constructive obligation as a result of past events; it is probable that an outflow of resources will be required to settle the obligation; and the amount can be reliably estimated.

UKAEA's site restoration provision is the most significant area of estimation uncertainty in the financial statements. Full details are in Note 21.

Where there are a number of similar obligations, the likelihood that an outflow will be required in settlement is determined by considering the class of obligations as a whole. A provision is recognised even if the likelihood of an outflow with respect to any one item included in the same class of obligations may be small.

Provisions are measured at the present value of the expenditures expected to be required to settle the obligation using real rates of interest. The change in the provision due to passage of time and changes in discount rate is recognised as finance expense or finance income as appropriate.

Where assurances have been received from another party that they will reimburse some or all of the expenditure required to settle a provision, and the requirements for recognition of IAS 37 'Provisions, Contingent Liabilities and Contingent Assets' section 53 are met (i.e. it is virtually certain that reimbursement will be received if the obligation is settled) a reimbursement asset will be recognised to the extent of the amount expected to be reimbursed. The reimbursement asset is shown separately from the related provision in the Statement of financial position.

3.2 Consolidation

(a) Subsidiaries

Subsidiaries are entities controlled by the Group. Control exists when the Group has the power to govern the financial and operating policies of an entity so as to obtain benefits from activities. In assessing control, potential voting rights that are currently exercisable are taken into account. The financial statements of subsidiaries are included in the consolidated financial statements from the date that control commences until the date that control ceases. The accounting policies of subsidiaries are changed when necessary to align them with the policies adopted by the Group.

(b) Joint ventures

Joint ventures are those entities over which the Group exercises joint control through a contractual arrangement. The results, assets and liabilities of joint ventures are incorporated in the consolidated financial statements using the equity method of accounting. Investments in joint ventures are initially carried in the Statement of financial position at cost and subsequently adjusted by post-acquisition changes in the Group's share of the net assets of the joint venture, less any impairment in the value of individual investments. Losses of joint ventures in excess of the Group's interest in those joint ventures are not recognised, except where the Group has made a commitment to make good those losses.

(c) Transactions eliminated on consolidation

Intra-group transactions, balances and unrealised gains and losses on transactions between Group companies are eliminated on consolidation.

NOTES TO THE FINANCIAL STATEMENTS

3.3 Revenue recognition

Revenue is recognised when a performance obligation has been met which reflects the point of control over a product or the supply of a service to the customer and specific criteria having been met as described below. Revenue is shown net of value added tax, returns, rebates and discounts.

Grant funding relating to revenue expenditure is recognised in the Statement of comprehensive net income in the same period as the related expenditure that it is intended to fund, in accordance with IAS 20 'Accounting for Government Grants and Disclosure of Government Assistance'.

(a) Service contracts

Revenue is recognised when a performance obligation has been delivered which reflects the point of control over a product or the transfer of a service to the customer and specific criteria having been met as described below. Revenue is shown net of value added tax, returns, rebates and discounts.

Revenue from customer contracts is recognised under IFRS 15 'Revenue from Contracts with Customers'. Contract milestones have been identified as the performance obligations for revenue recognition and are satisfied at a point in time. Revenue on contracts that do not separately identify milestones is recognised on completion. Most of UKAEA's contracts with customers allow for invoices to be raised once contract milestones have been completed. Revenue is measured based on the consideration set out in the customer contract.

(b) Rental income

Rental income from investment properties is recognised in the statement of comprehensive income on a straight-line basis over the term of the lease. Lease incentives granted are recognised as an integral part of the total rental income over the term of the lease.

(c) Grant in Aid

Grant in Aid relating to revenue expenditure is recognised in the Statement of comprehensive net income in the same period as the related expenditure that it is intended to fund, in accordance with IAS 20 'Accounting for Government Grants and Disclosure of Government Assistance'. This departure from the specified treatment in the FReM has been agreed with UKAEA's sponsoring government department.

Capital grants from UKAEA's sponsoring department are recognised as financing and credited to taxpayers' equity in line with the FReM.

3.4 Research expenditure

Expenditure on research activities, undertaken with the prospect of gaining new scientific or technical knowledge and understanding, is recognised in the Statement of comprehensive net income when incurred.

3.5 Employee benefits

(a) Short-term employee benefits

Short-term employee benefits are recognised in the year in which the related service is provided. A liability is recognised for the amount expected to be paid under short-term bonus arrangements if the Group has a present legal or constructive obligation to pay this amount as a result of past-service provided by employees and the obligation can be estimated reliably.

(b) Termination benefits

Termination benefits are payable when employment is terminated by the Group before the normal retirement date, or whenever an employee accepts voluntary redundancy in exchange for these benefits. The Group recognises termination benefits when it is demonstrably committed to either: terminating the employment of current employees according to a detailed formal plan without possibility of withdrawal; or providing termination benefits as a result of an offer made to encourage voluntary redundancy. Benefits falling due more than 12 months after the reporting date are discounted to their present value.

NOTES TO THE FINANCIAL STATEMENTS

(c) Retirement benefits

Obligations for contributions to defined contribution schemes are recognised as an expense when they are due. The Group has no further payment obligations once the contributions have been paid.

The Group operates three defined benefit schemes for the benefit of its employees. Two of these are closed to new members. The schemes are unfunded multi-employer defined benefit schemes. In accordance with the FReM, these schemes are accounted for as defined contribution schemes in these financial statements and the obligations recognised are limited to the contributions due.

The Group also has a separate liability in respect of unfunded retirement benefits relating to three individuals. The liability recognised in the Statement of financial position is the present value of the defined benefit obligation at the reporting date, together with adjustments for unrecognised past-service costs. The defined benefit obligation is calculated annually by independent actuaries using the projected unit credit method. The present value of the defined benefit obligation is determined by discounting the estimated future cash outflows using a real rate of interest set by HM Treasury. Actuarial gains and losses arising from experience adjustments and changes in actuarial assumptions are charged or credited to taxpayers' equity in the period in which they arise.

3.6 Segment reporting

Operating segments are reported in a manner consistent with the internal reporting provided to the chief operating decision maker. The chief operating decision maker, who is responsible for allocating resources and assessing performance of the operating segments, has been identified as the UKAEA Board.

3.7 Foreign currency translation

Transactions in foreign currencies are translated to the functional currency of the Group using the exchange rates at the dates of the transactions. Monetary assets and liabilities denominated in foreign currencies at the reporting date are retranslated to the functional currency using the exchange rates at that date. Foreign exchange gains and losses resulting from the settlement of transactions and from the translation of monetary assets and liabilities are recognised in the Statement of comprehensive net income except when deferred in taxpayers' equity as qualifying cash flow hedges.

3.8 Property, plant and equipment

Land and buildings are occupied by the Group and are shown at fair value, based on periodic, but at least triennial, valuations by external independent valuers, less subsequent depreciation for buildings. The last full valuation of all land and buildings was carried out in February 2021. In the intervening years any new buildings along with elements of land and buildings that have changed circumstances are independently revalued, and the remaining property portfolio is uplifted using indexation rates with the assistance of the valuers

Fair value is based on market values for existing use, except where there are alternative uses for the land and buildings. Where basing fair value on market values is not applicable because of the specialised nature of the asset, valuations are carried out on a depreciated replacement cost basis.

Increases in the carrying amount arising on revaluation of land and buildings are credited to the revaluation reserve. Decreases that offset previous increases in the value of the same asset are charged against the revaluation reserve; all other decreases are charged to the Statement of comprehensive net income. Each year the difference between depreciation based on the revalued carrying amount of the asset charged to the Statement of comprehensive net income and depreciation based on the asset's original cost is transferred from the revaluation reserve to retained earnings.

In accordance with the FReM, other classes of property, plant and equipment with short useful lives or low book values are stated at historical cost less depreciation as a proxy for current valuations. Subsequent costs are included in the asset's carrying amount or recognised as a separate asset, as appropriate, only when it is probable that future economic benefits associated with the item will flow to the Group and the cost of the item can be measured reliably. All other repairs and maintenance are charged to the Statement of comprehensive net income during the financial period in which they are incurred.

NOTES TO THE FINANCIAL STATEMENTS

3.8 Property, plant and equipment continued

Expenditure on property, plant and equipment in respect of the Joint European Torus (JET) is recognised in the Statement of comprehensive net income during the financial periods in which it is incurred.

Land is not depreciated. Assets under construction are not depreciated until they are in use. Depreciation on other assets is calculated using the straight-line method to allocate their cost or revalued amounts to their residual values over their estimated useful lives, as follows:

– Buildings	initially up to 40 years, reassessed during the property valuation cycle
– Leasehold improvements	over the balance of the lease term
– Plant, machinery and equipment	up to 25 years

The assets' residual values and useful lives are reviewed, and adjusted if appropriate, at each reporting date.

Property, plant and equipment may have component parts with different useful lives. In accordance with the provisions of IAS 16 'Property, Plant and Equipment', each part of any newly recognised item of property, plant and equipment with a cost that is significant in relation to the total cost of the item is depreciated separately.

An asset's carrying amount is written down immediately to its recoverable amount if the asset's carrying amount is greater than its estimated recoverable amount (Note 3.12).

Gains and losses on disposals are determined by comparing the proceeds with the carrying amount and any amounts to be released from deferred income on disposal and are recognised in the Statement of comprehensive net income. When revalued assets are sold, any amounts included in the revaluation reserve are transferred to retained earnings.

3.9 Leases

Leases are accounted for in line with IFRS 16 'Leases'.

(a) The Group as lessee

The Group assesses whether a contract is or contains a lease, at inception of a contract. The Group recognises a right-of-use asset and a corresponding lease liability with respect to all lease agreements in which it is the lessee, except for short-term leases (defined as leases with a lease term of 12 months or less) and leases of low value assets. For such leases, the Group recognises the lease payments in the Statement of comprehensive net income as an operating lease expense on a straight-line basis over the term of the lease.

The lease liability is initially measured at the present value of the lease payments that are not paid as at the commencement date, discounted by using the rate implicit in the lease. If this rate cannot be readily determined, the Group uses its incremental borrowing rate / discount rate(s) as advised by HM Treasury.

Lease payments included in the measurement of the lease liability comprise:

- fixed lease payments (including in-substance fixed payments), less any lease incentives
- variable lease payments that depend on an index or rate, initially measured using the index or rate at the commencement date
- the amount expected to be payable by the lessee under residual value guarantees
- the exercise price of purchase options, if the lessee is reasonably certain to exercise the options
- payments of penalties for terminating the lease, if the lease term reflects the expected exercise of an option to terminate the lease.

Under IFRS 16 tenant lease breaks available to the Group have only been included in the calculation of the lease liability where there is a high degree of certainty that the Group would exercise them. The Group currently does not anticipate exercising any available lease breaks.

The lease liability is presented as a separate line in the Statement of financial position.

NOTES TO THE FINANCIAL STATEMENTS

The lease liability is subsequently measured by increasing the carrying amount to reflect interest on the lease liability (using the effective interest method) and by reducing the carrying amount to reflect the lease payments made.

The Group remeasures the lease liability (and makes a corresponding adjustment to the related right-of-use asset) whenever:

- the lease term has changed or there is a change in the assessment of the likelihood of exercising a purchase option, in which case the lease liability is remeasured by discounting the revised lease payments using a revised discount rate.
- the lease payments change due to changes in an index or rate or a change in expected payment under a guaranteed residual value, in which cases the lease liability is remeasured by discounting the revised lease payments using the initial discount rate (unless the lease payments change is due to a change in a floating interest rate, in which case a revised discount rate is used).
- a lease contract is modified and the lease modification is not accounted for as a separate lease, in which case the lease liability is remeasured by discounting the revised lease payments using a revised discount rate.

The Group made one such adjustment during the year to 31 March 2023, in respect of a lease which was extended and modified (see Notes 11.2 and 20).

At the lease commencement date the costs of right-of-use assets comprise the initial measurement of the corresponding lease liability, lease payments made at or before the lease commencement date, any initial direct costs incurred, plus the amount of any provision for reinstatement (whenever the Group incurs an obligation for costs to dismantle and remove a leased asset, restore the site on which it is located or restore the underlying asset to the condition required by the terms and conditions of the lease, a provision is recognised and measured under IAS 37).

Right-of-use assets are subsequently measured at cost less accumulated depreciation and impairment losses.

Right-of-use assets are depreciated over the shorter period of lease term and estimated useful life of the underlying asset.

If a lease transfers ownership of the underlying asset or the cost of the right-of-use asset reflects that the Group expects to exercise a purchase option, the related right-of-use asset is depreciated over the estimated useful life of the underlying asset.

The depreciation starts at the lease commencement date.

The right-of-use assets are presented as a separate line in the Statement of financial position.

The Group applies IAS 36 'Impairment of Assets' to determine whether a right-of-use asset is impaired and accounts for any identified impairment loss.

Variable rents that do not depend on an index or rate are not included in the measurement of the lease liability and the right-of-use asset. The related payments are recognised as an expense in the period in which the event or condition that triggers those payments occurs and are included within other external expenses in the Statement of comprehensive net income.

As a practical expedient, IFRS 16 permits a lessee not to separate non-lease components, and instead account for any lease and associated non-lease components as a single arrangement. The Group has not used this practical expedient.

NOTES TO THE FINANCIAL STATEMENTS

3.9 Leases continued

(b) The Group as lessor

The Group enters into lease agreements as a lessor with respect to some of its investment properties.

Leases for which the Group is a lessor are classified as finance or operating leases. Whenever the terms of the lease transfer substantially all the risks and rewards of ownership to the lessee, the contract is classified as a finance lease. All other leases are classified as operating leases.

All of the Group's leases during 2022/23 and 2021/22 were operating leases.

Rental income from operating leases is recognised on a straight-line basis over the term of the relevant lease. When a contract includes lease and non-lease components, the Group applies IFRS 15 to allocate the consideration under the contract to each component.

3.10 Investment property

Investment property, comprising freehold land and buildings, is held either for rental yields or capital appreciation and is not occupied by the Group. Investment property is carried at fair value, representing open market value determined annually by external independent valuers.

Fair value is based on active market prices, adjusted, if necessary, for any difference in the nature, location or condition of the specific asset. In the absence of current prices in an active market, the valuations are prepared by considering the aggregate of the estimated cash flows expected to be received from renting out the property. Valuations reflect the allocation of maintenance and insurance responsibilities between the Group and the lessee and the remaining economic life of the property.

Changes in fair values are recognised in the Statement of comprehensive net income.

3.11 Intangible assets

Intangible assets comprise acquired computer software licenses and are stated at cost, net of amortisation and any provision for impairment. The cost of intangible assets, less estimated residual value, is amortised on a straight-line basis over their estimated useful lives of up to five years.

3.12 Impairment of non-financial assets

Assets that are subject to depreciation or amortisation are reviewed for impairment whenever events or changes in circumstances indicate that the carrying amount may not be recoverable. An impairment loss is recognised for the amount by which the asset's carrying amount exceeds its recoverable amount. The recoverable amount is the higher of an asset's fair value less costs to sell and value in use. For the purposes of assessing impairment, assets are grouped at the lowest levels for which there are separately identifiable cash flows. Non-financial assets that suffered impairment are reviewed for possible reversal of the impairment at each reporting date.

3.13 Cash and cash equivalents

Cash and cash equivalents include cash in hand, deposits held at call with banks and other short-term highly liquid investments with original maturities of three months or less.

NOTES TO THE FINANCIAL STATEMENTS

3.14 Current and deferred tax

The tax charge or credit for the period comprises current and deferred tax. Tax is recognised in the Statement of comprehensive net income, except to the extent that it relates to items recognised directly in taxpayers' equity. In this case, the tax is also recognised in taxpayers' equity.

Current tax is the expected tax payable or receivable on the taxable income for the year, using tax rates enacted or substantially enacted at the reporting date, plus any adjustment to tax payable in respect of previous years.

Research and Development Expenditure Credits (RDEC) payable by HM Revenue and Customs are treated as tax credits in line with the provisions of IAS 12 'Income Taxes' and are included within current tax (charge)/credit in the Statement of comprehensive net income (see Note 10).

Deferred tax is recognised, using the liability method, on temporary differences arising between the tax bases of assets and liabilities and their carrying amounts in the financial statements. Deferred tax is determined using tax rates (and laws) that have been enacted or substantially enacted by the reporting date and are expected to apply when the related deferred tax asset is realised, or the deferred tax liability is settled. Deferred tax assets are recognised only to the extent that it is probable that future taxable profit will be available against which temporary differences can be utilised.

3.15 Financial instruments

UKAEA measures its financial assets in accordance with IFRS 9 'Financial Instruments', whereby financial assets are classified into the following measurement categories: amortised cost, fair value through other comprehensive income (FVOCI) and fair value through profit and loss (FVTPL). UKAEA's financial assets comprise trade and other receivables, investments and cash and cash equivalents, and are held at amortised cost.

Financial assets are included in current assets, except for maturities greater than 12 months after the reporting date which are classified as non-current assets.

UKAEA's credit risk is low (see Note 4(c)).

Under IFRS 9, financial liabilities are classified as held at amortised cost or at FVTPL. They are included in current liabilities, except for maturities greater than 12 months after the reporting date which are classified as non-current liabilities. The majority of UKAEA's financial liabilities relate to trade and other payables which are held at amortised cost.

AEAIL also measures its financial assets in accordance with IFRS 9.

3.16 New and amended accounting standards

Certain new standards, amendments and interpretations to existing standards have been published but are not effective on UKAEA's accounting period.

The following new standards, amendments and interpretations to existing standards are not yet effective or are not yet effective in HMT's 2022/23 FReM and have not been early adopted by the Authority:

IFRS 17 'Insurance Contracts' (replacement for IFRS 4 'Insurance Contracts') – effective for accounting periods beginning on or after 1 January 2023.

The Board anticipate that the adoption of this standard in future periods will have no material impact on the financial statements of the Authority. There is also no material impact on AEAIL.

NOTES TO THE FINANCIAL STATEMENTS

4 Financial risk management

Due to the nature of its activities, the Group is not exposed to the same degree of financial risk faced by other business entities. Financial instruments play a much more limited role in creating or changing risk and generally financial assets and liabilities are generated from day-to-day operational activities and not held to change the risks facing the Group in undertaking its activities. While the Group has significant financial liabilities relating to decommissioning and restructuring, most of the risks attached to these liabilities do not rest with the Group as they are broadly matched by reimbursement assets.

(a) Foreign exchange risk

Foreign exchange risk arises when future commercial transactions or recognised assets or liabilities are denominated in a currency that is not the Group's functional currency. The Group operates internationally and is exposed to foreign exchange risk arising from various currency exposures, primarily with respect to the Euro.

(b) Interest rate risk

As the Group has no borrowings or significant interest bearing assets, the Group's income and operating cash flows are substantially independent of changes in market interest rates. Cash balances on deposit are held in highly rated fixed term deposits and the exposure to interest rate risk is minimal and appropriately managed.

(c) Credit risk

The Group's income is received primarily from public sector bodies in the UK and Europe and the exposure to credit risk is therefore considered to be low.

(d) Liquidity risk

The Group is primarily financed by income from public sector bodies in the UK and in Europe. Uncertainties about the timing and amount of some of this income, particularly income from Europe, expose the Group to liquidity risk. The Group has a facility to request temporary working capital funding from the DESNZ (formerly from BEIS) should the need arise.

5 Segment information

As the majority of the Group's activities do not represent the provision of public services, segment information in accordance with IFRS 8 'Operating Segments' is included in these financial statements.

5.1 Reportable segments

The Group has two reportable segments, as described below, which are the Group's main business areas reported to the Authority Board. The business areas offer different services and are managed separately because they require different strategies and have different funding streams.

The following summary describes the operations in each of the Group's reportable segments:

- (a) Fusion research - research into using fusion to create a new source of energy that is safe and environmentally benign
- (b) Property management - operational costs, management and development of the Culham and Harwell campuses for future scientific use

NOTES TO THE FINANCIAL STATEMENTS

Other segments include insurance. None of these segments met any of the criteria for determining reportable segments in 2022 or 2023. The results of these segments are included in the "other" column in the segmental analyses below.

The segment information for the reportable segments for the years ended 31 March 2022 and 31 March 2023 is as follows:

	Note	Fusion research £k	Property management £k	Other £k	Total £k
Year ended 31 March 2022					
Revenue	9	204,493	13,986	7,757	226,236
Less: Share of revenue of joint venture		-	(3,776)	-	(3,776)
Other income		2,778	-	-	2,778
Expenditure		(209,972)	(11,696)	(9,040)	(230,709)
Investment property revaluation		-	3,139	-	3,139
Operating profit/(loss)		(2,701)	1,653	(1,283)	(2,332)
Finance income		-	-	18	18
Finance expense		-	-	(16)	(16)
Loss on disposal of assets		-	-	(23)	(23)
Share of profit/(loss) of joint venture		-	16,282	-	16,282
Profit/(loss) before tax		(2,701)	17,935	(1,304)	13,929
Year ended 31 March 2023					
Revenue	9	227,994	17,783	13,925	259,702
Less: Share of revenue of joint venture		-	(3,374)	-	(3,374)
Other income		1,367	-	-	1,367
Expenditure		(237,466)	(17,653)	(10,386)	(265,505)
Investment property revaluation		-	64	-	64
Operating profit/(loss)		(8,105)	(3,180)	3,539	(7,746)
Finance income		-	-	559	559
Finance expense		(35)	-	66	31
Loss on disposal of assets		-	-	-	-
Share of profit/(loss) of joint venture		-	7,232	-	7,232
Profit/(loss) before tax		(8,140)	4,052	4,164	76

NOTES TO THE FINANCIAL STATEMENTS

5.1 Reportable segments continued

Revenue from external parties is measured in a manner consistent with that in the Statement of comprehensive net income.

Reconciliation between Reportable segments and Statement of comprehensive net income

	Group	
	2023 £k	2022 £k
Revenue		
Total revenue for reportable segments	245,777	218,479
Other revenue	13,925	7,757
Consolidated revenue per Statement of comprehensive net income	259,702	226,236
Profit or loss		
Total profit/(loss) for reportable segments	(4,088)	15,233
Other profit/(loss)	4,164	(1,304)
Consolidated profit/(loss) before tax per Statement of comprehensive net income	76	13,929

Geographical segments

In presenting information on the basis of geographical segments, segment revenue is based on the geographical location of customers.

	Group	
	2023 £k	2022 £k
Revenue		
United Kingdom	256,508	178,756
Europe	2,148	47,191
Rest of the World	1,046	289
	259,702	226,236

Revenue from major customers

	Group	
	2023 £k	2022 £k
European Commission	38	38,783

Income from the European Commission is attributable to the fusion research segment, the main components are the JET Operating Contract which ceased on 31 October 2021 and science & research activities under EUROfusion Framework 8. Since 1 January 2021 work completed in respect of the anticipated scope of the new EUROfusion Framework 9 programme, including the operation of JET since 1 November 2021, is reported as UK funded as whilst UKAEA can participate in this new Framework Programme 9 it is not eligible for funding.

NOTES TO THE FINANCIAL STATEMENTS

5.2 Disaggregation of revenue IFRS15 (Revenue from Contracts with Customers)

UKAEA derives its customer revenue from the transfer of goods and services at a point in time. This revenue is categorised within the fusion segment, total 2023 £17,621k (2022: £16,556k).

Contract milestones have been identified as performance obligations under IFRS 15 and are fulfilled within twelve months.

Timing of revenue recognition

Contract milestones have been identified as the performance obligations for revenue recognition at a point in time. Revenue on contracts which do not have separately identifiable milestones is recognised at a point in time, on completion.

Most customer contracts provide for invoices to be raised and paid once contract milestones have been completed.

Contract balances

The following table provides information about receivables, contract assets and contract liabilities from contracts with customers:

	Note	2023 £k	2022 £k
Trade receivables	15	937	2,149
Contract assets	15	1,303	1,070
Contract liabilities	17	(368)	(34)

Contract assets relate to direct costs incurred on unsatisfied performance obligations and to performance obligations satisfied but not yet invoiced.

Contract liabilities relate to invoicing and consideration received in advance.

Movement in contract assets/liabilities in the year:

	2023 £k	2022 £k	2023 £k	2022 £k
	Contract Assets	Contract Assets	Contract Liabilities	Contract Liabilities
Contract assets/liabilities at the beginning of the year	1,070	579	(34)	(30)
Contract assets for performance obligations satisfied but not yet invoiced	23	36	-	-
Contract liability for payments received in advance of the satisfaction of performance obligations	-	-	(334)	(4)
Changes in the measure of progress	210	455	-	-
Contract assets/liabilities at the end of the year	1,303	1,070	(368)	(34)

NOTES TO THE FINANCIAL STATEMENTS

6 Staff Costs

Staff costs comprise:

	2023 £k	2022 £k
Directly employed staff:		
Salaries, bonuses and allowances	86,921	75,836
Social security costs	10,604	8,858
Pension costs – defined contribution plans (see below)	15,760	12,183
	113,285	96,877
Temporary staff	38,640	29,653
	151,925	126,530

Full details of UKAEA's pension schemes are given in the Remuneration Report.

The total employer's pension contributions paid by UKAEA to the CPS during the year were £14,453k (2022: £12,086k).

The total employer's pension contributions paid by UKAEA during the year to the SPPSP were £26k (2022: £25k).

7 Auditors' remuneration

The total remuneration of the Group's auditor, the National Audit Office, for services provided to the Group was:

	2023 £k	2022 £k
Audit fees		
UKAEA	180	106

2022: Includes £7k in respect of 2021.
2023: Includes £20k in respect of 2022.

Audit of subsidiary and joint venture

The audit fee payable to the auditors of AEAIL was £11k (2022: £12k).

The audit fee payable to the auditors of HSIC PubSP, in which UKAEA has a share of one half, was £11k (2022: £12k).

The audit fee payable to the auditors of HSIC Holdings, in which UKAEA has a share of one quarter via HSIC PubSP, was £35k (2022: £26k).

NOTES TO THE FINANCIAL STATEMENTS

8 Finance income and expense

Profit/(loss) for the year has been arrived at after (charging)/crediting:

	Group		Authority	
	2023 £k	2022 £k	2023 £k	2022 £k
Finance income				
Interest receivable	559	18	454	6
Finance expense				
Interest on lease liabilities	(35)	(41)	(35)	(41)
Revalorisation of provisions:				
- Unwinding of discounting	6,952	211	6,952	211
- Adjustments to reimbursement receivables	(6,851)	(159)	(6,851)	(159)
Interest on unfunded retirement benefits	(35)	(27)	(35)	(27)
	31	(16)	31	(16)

Full details of provisions and the discount rates used are provided in Note 21.

9 Analysis of net income

9.1 Analysis of operating income

	Group	
	2023 Total £k	2022 Total £k
Grant in Aid from sponsoring department	209,256	141,650
European Commission income	38	38,783
Rentals, property and construction income	16,565	7,860
Revenue from contracts with customers and collaborations	14,961	15,202
Grant income	18,589	22,547
Other revenue	293	194
Total revenue	259,702	226,236
Release of deferred capital grant income	1,167	785
Other	200	1,993
Total other income	1,367	2,778
Less: Share of revenue of joint venture	(3,374)	(3,776)
Total operating income	257,695	225,238

NOTES TO THE FINANCIAL STATEMENTS

9.2 Expenditure analysis – staff costs

For analysis of staff costs see Note 6.

9.3 Expenditure analysis – other

	Group	
	2023 £k	2022 £k
Raw materials and consumables		
Plant, equipment and spares	40,790	32,270
Electricity	13,634	9,658
Gases	1,923	2,072
IT equipment	9,923	4,068
Software	4,758	3,155
Other	3,568	2,302
	74,596	53,525
Other external expenses		
Design and construction	36,518	32,816
Site maintenance and services	16,724	13,898
Inspection services	667	4,455
Pensions administration	1,536	1,492
Professional and technical services	25,248	34,013
Travel and subsistence	2,608	785
Contribution to Fusion Industry Program (UKI2S)	0	8,000
Other	10,808	7,598
	94,109	103,057
Operating lease rentals included within other external expenses:		
- Short-term leases - plant, machinery and vehicles	52	102
- Leases of low value assets - plant, machinery and vehicles	5	7
Other expenses		
Movement in provisions net of reimbursement receivables	(787)	3,764
Movement in contract assets	(211)	(455)
Expected Credit Loss	37	10
Foreign exchange differences	(59)	31
	(1,020)	3,350

NOTES TO THE FINANCIAL STATEMENTS

10 Tax (charge)/credit

	Group and Authority	
	2023 £k	2022 £k
Current tax		
Current tax credit (RDEC)	6,762	5,707
Current tax charge for year	(1,943)	-
	4,819	5,707
Deferred tax		
Origination and reversal of temporary timing differences	(1,072)	(3,145)
Recognition of deferred tax asset (Note 19)	(1,761)	(220)
	(2,833)	(3,365)
Total tax (charge)/credit	1,986	2,342

The Research and Development Expenditure Credit (RDEC) became mandatory from 1 April 2016. The RDEC is beneficial for UKAEA and offsets the tax charge on any non-trading profits from property and other activities.

The current tax on the Group's profit before tax differs from the theoretical amount that would arise using the weighted average tax rate applicable to profits of the consolidated entities as follows:

	2023 £k	2022 £k
Profit/(loss) for the year	2,062	16,271
Add back: Tax charge/(credit)	(1,986)	(2,342)
Profit/(loss) before tax	76	13,929
Tax calculated at the standard UK corporation tax rate of 19% (2022: 19%)	(14)	(2,647)
Tax effects of:		
- Reversal of timing differences	(1,720)	(1,039)
- Expenses not deductible for tax purposes	962	3,293
- Capital gains tax arising on sale of land	(3,059)	-
- R&D expenditure credit under s104A CTA 2009	(1,586)	(1,339)
- Current year profit offset against deferred tax asset	2,132	1,587
- Non-trading profits offset by RDEC credit	1,344	177
- Net RDEC claim 2021/22	-	5,707
- Net RDEC claim 2022/23	6,762	-
- Tax losses for which no deferred income tax asset was recognised	(2)	(32)
Current tax (charge)/credit for the year	4,819	5,707

The tax (charged)/credited to taxpayers' equity during the year is as follows:

	2023 £k	2022 £k
Tax (charge)/credit relating to fair value gains on property, plant and equipment	(6,388)	(5,730)

11 Property, plant and equipment

11.1 Tangible assets

Group and Authority	Land £k	Buildings £k	Leasehold Improvements £k	Plant and equipment £k	Assets under construction £k	Total £k
Cost or valuation						
At 31 March 2021	29,380	38,527	3,324	22,799	53,094	147,124
Additions	-	-	-	663	61,716	62,379
Disposals	-	-	-	(165)	-	(165)
Revaluation	6,197	10,381	-	-	-	16,578
Transfers within property plant and equipment	-	7,851	-	8,673	(16,524)	-
Transfer (to)/from investment property	-	-	-	-	-	-
At 31 March 2022	35,577	56,759	3,324	31,970	98,286	225,916
Additions	-	114	-	458	61,059	61,631
Disposals	-	-	-	(110)	-	(110)
Revaluation	23,512	4,702	-	-	-	28,214
Transfers within property plant and equipment	-	10,099	444	17,235	(27,778)	-
Transfer (to)/from investment property	(1,720)	-	-	-	-	(1,720)
At 31 March 2023	57,369	71,674	3,768	49,553	131,567	313,931
Depreciation and impairment						
At 31 March 2021	-	(8,276)	(83)	(8,649)	-	(17,008)
Depreciation charge	-	(1,838)	(166)	(5,342)	-	(7,346)
Disposals	-	-	-	150	-	150
At 31 March 2022	-	(10,114)	(249)	(13,841)	-	(24,204)
Depreciation charge	-	(2,606)	(179)	(7,078)	-	(9,863)
Disposals	-	-	-	110	-	110
At 31 March 2023	-	(12,720)	(428)	(20,809)	-	(33,957)
Net book value						
At 31 March 2022	35,577	46,645	3,075	18,129	98,286	201,712
At 31 March 2023	57,369	58,954	3,340	28,744	131,567	279,974

All property, plant and equipment are owned by the Group.

New buildings along with elements of land and buildings that have changed circumstances during the year have been revalued as at 28 February 2023. The valuations were undertaken by Carter Jonas in accordance with the Valuation Standards of the Royal Institute of Chartered Surveyors, IFRS and guidelines in HM Treasury's FReM. The JET land and buildings have not been stated on an existing use value, as the JET experiment is due to end in less than 1 year from the valuation date. The value of the remaining property portfolio has been uplifted using indexation rates with the assistance of the valuers.

The Group determined that the valuations were still appropriate as at the reporting date.

The additions during the year include expenditure on the development of UKAEA's Culham campus and on progress on major programmes including STEP, NFTP and MRF. For further information on these major programmes, please see the Performance Report.

The net book value under the historical cost model as at 31 March 2023 relating to classes of property, plant and equipment subject to revaluation was as follows: Land £133k (2022: £133k) and Buildings £37,167k (2022: £28,570k).

The value of property, plant and equipment additions in year which were funded by government grant comprises £57,048k (2022: £58,998k) funded by capital grant from sponsoring department and £5,034k (2022: £3,506k) funded by other UK government grants.

NOTES TO THE FINANCIAL STATEMENTS

11.2 Right of use assets

Group and Authority	Buildings £k	Plant, equipment and vehicles £k	Total £k
Cost or valuation			
At 31 March 2021	-	-	-
Capitalisation on initial adoption of IFRS 16	4,153	110	4,263
At 1 April 2021	4,153	110	4,263
Additions	982	109	1,091
Remeasurements	(638)	-	(638)
Disposals	(344)	-	(344)
At 31 March 2022	4,153	219	4,372
Additions	-	-	-
Remeasurements	-	83	83
Disposals	-	-	-
At 31 March 2023	4,153	302	4,455
Depreciation			
At 31 March 2021	-	-	-
Depreciation charge	(549)	(85)	(634)
Disposals	336	-	336
At 31 March 2022	(213)	(85)	(298)
Depreciation charge	(213)	(88)	(301)
Disposals	-	-	-
At 31 March 2023	(426)	(173)	(599)
Net book value			
At 1 April 2022	3,940	134	4,074
At 31 March 2023	3,727	129	3,856

During the year to 31 March 2023 the Group agreed an extension and modification to an existing lease. This resulted in a remeasurement of the right-of-use asset (an increase in right of use asset value of £83k), with a corresponding remeasurement of the lease liability (an increase in lease liability of £83k, see Note 20)

Right-of-use assets relate to leases entered into by UKAEA of industrial and office buildings, vehicles, lifting and transporting equipment and office equipment. AEAIL does not have any leases.

UKAEA only has one property lease subject to IFRS 16. As this lease is for a shorter period than the useful life of the underlying asset and the rent is open market with regular periodic reviews UKAEA has used the cost measurement model as an appropriate proxy for the current value in existing use or fair value of the right-of-use asset.

NOTES TO THE FINANCIAL STATEMENTS

11.3 Intangible assets

Group and Authority	Software £k	Total £k
Cost		
At 31 March 2021	1,894	1,894
Additions	125	125
At 31 March 2022	2,019	2,019
Additions	450	450
At 31 March 2023	2,469	2,469
Amortisation		
At 31 March 2021	(1,775)	(1,775)
Amortisation charge	(79)	(79)
At 31 March 2022	(1,854)	(1,854)
Amortisation charge	(131)	(131)
At 31 March 2023	(1,985)	(1,985)
Net book value		
At 31 March 2022	165	165
At 31 March 2023	484	484

12 Investment property

	Group and Authority	
	2023 £k	2022 £k
At 1 April	57,688	54,549
Transfer from land and buildings	1,720	-
Revaluation adjustment - transfer into joint venture ^(a)	(13,433)	-
Revaluation adjustment - change in fair value	13,497	3,139
At 31 March	59,472	57,688

(a) transfer value is stated at 1 April 2022, actual value in year to the joint venture was £14.6m .

Investment properties were valued at fair value as at 28 February 2023 by independent valuers. The valuations were undertaken by Carter Jonas in accordance with the Valuation Standards of the Royal Institute of Chartered Surveyors, IFRS and guidelines in HM Treasury's FReM.

2022: Upon senior management review with Carter Jonas in July 2022 the Group determined that the investment property valuation as at 28 February 2022 was understated by £4.8m due to a variance in appropriate investment yield. This item was not adjusted in the values presented at 31 March 2022.

The net book value under the historical cost model at 31 March 2023 relating to investment property subject to revaluation was £16,465k (2022: £16,465k).

NOTES TO THE FINANCIAL STATEMENTS

Investment properties are held for their investment potential. Rental income from tenants outside the Group is negotiated at arm's length. The following amounts have been recognised in the Statement of comprehensive net income:

	Group and Authority	
	2023 £k	2022 £k
Rental income	2,712	2,544
Direct operating expenses:		
- Investment properties that generated rental income	2,632	1,909
- Investment properties that did not generate rental income	171	294
- Expected Credit Loss	-	10

The Expected Credit Loss in 2022 is in respect of outstanding rent and direct costs due from a Culham commercial tenant which is in liquidation.

13 Financial assets

	Group		Authority	
	2023 £k	2022 £k	2023 £k	2022 £k
Non-current				
Movements during the year				
At 1 April	78,723	56,171	18,623	18,623
Investment in joint venture	-	-	-	-
Revaluation and profit on joint venture	20,409	22,552	-	-
At 31 March	99,132	78,723	18,623	18,623
Total non-current assets				
Investment in subsidiary undertakings	-	-	3,000	3,000
Investment in joint venture	99,132	78,723	15,623	15,623
	99,132	78,723	18,623	18,623
Current				
Total current assets				
Term bank deposits	959	-	-	-
	959	-	-	-

13.1 Investment in subsidiary undertakings

Name	Country of incorporation	Ownership interest %	
		2023	2022
AEA Insurance Limited	Isle of Man	100	100
UK Industrial Fusion Solutions Ltd	(dormant subsidiary) England and Wales	100	0
UK Fusion Solutions Ltd	(dormant subsidiary) England and Wales	100	0
UKAEA Ltd	(dormant subsidiary) England and Wales	100	0

All subsidiary undertakings are included in the consolidation. The proportion of voting rights in the subsidiary undertakings held directly by the Group does not differ from the proportion of shares held.

Registered offices:

AEA Insurance Limited, 1st Floor, Goldie House, 1-4 Goldie Terrace, Upper Church Street, Douglas, Isle of Man, IM1 1EB

Dormant subsidiaries:

Culham Science Centre, Abingdon, Oxfordshire, OX14 3DB

NOTES TO THE FINANCIAL STATEMENTS

13.2 Investment in joint venture

The Group has 50% control of a joint venture, Harwell Science and Innovation Campus Public Sector Limited Partnership (HSIC PubSP), the public sector partner in Harwell Science and Innovation Campus Holdings (HSIC Holdings LP) (formerly HSIC LP), which is responsible for the development of the Harwell Oxford Campus. The interest in the joint venture, which is accounted for using the equity method in the Group financial statements, is as follows:

	Group	
	2023 £k	2022 £k
At 1 April	78,723	56,171
Share of profit/(loss) net of tax	7,232	16,282
Revaluation	13,177	6,270
At 31 March	99,132	78,723
Analysed as follows:		
Cost or valuation	51,696	38,519
Share of retained profits/(losses)	47,436	40,204
	99,132	78,723

The £7,232k share of profit of the joint venture (2022: profit of £16,282k) represents UKAEA's share of the operating profit of HSIC Holdings LP via HSIC PubSP and was largely due to revaluation adjustments. The increase in investment compared with the previous year was mainly due to a higher share of non-current assets and related to HSIC Holdings LP investment properties.

The following amounts represent the Group's share of the income, results, assets and liabilities of HSIC Holdings LP via HSIC PubSP. They are included in the Statement of comprehensive net income and Statement of financial position:

	Group	
	2023 £k	2022 £k
Profit/(loss) net of tax		
Income	3,374	3,776
Expenditure	(3,255)	(3,252)
Net revaluation gain	7,113	15,758
	7,232	16,282
Assets		
Non-current assets	104,453	85,276
Current assets	25,499	22,998
	129,952	108,274
Liabilities		
Current liabilities	1,796	924
Non-current liabilities	29,024	28,626
	30,820	29,550
Net assets	99,132	78,723

There are no contingent liabilities relating to the Group's interest in the joint venture, and no significant contingent liabilities of the joint venture itself.

NOTES TO THE FINANCIAL STATEMENTS

13.2 Investment in joint venture continued

Within current/non-current assets there is £95.9m of investment properties (2022: £77.4m). The investment properties have been valued at market value as at 31 March 2023 using information provided by Radice Chartered Surveyors, independent chartered surveyors. The valuation was carried out in accordance with the provisions of RICS definition of market value. The market value has been determined having regard to factors such as current and future projected income levels, taking account of location, quality of the building and recent market transactions in the sector. Changes in these assumptions such as the valuation basis applied in comparable market transactions, or the income level generated by the investment property could materially impact the valuation of the investment properties.

The Group noted that the joint venture accounts are in the final stages of audit and not yet approved by the HSIC board.

Annual accounts including the full investment property disclosure note can be requested from the registered office below

Registered office:

Harwell Science and Innovation Campus Public Sector Limited Partnership
c/o Science and Technology Facilities Council
UK Astronomy Centre
Royal Observatory Edinburgh
Blackford Hill
Edinburgh
EH9 3HJ

13.3 Term bank deposits

Term bank deposits were held during the year with major UK banks. The average interest rate on the deposits held at 31 March 2023 was 4.81%. The credit risk associated with these investments was considered to be low because of the size and status of the banks involved. There were no term bank deposits held at 31 March 2022.

14 Financial instruments

UKAEA has applied IFRS 9 (see Note 3.15). Term deposits (Note 13.3) are solely payments of principal and interest and were therefore held at amortised cost. With the exception of UKAEA's interest in its subsidiaries and joint venture (Notes 13.1 and 13.2), which are exempted from the application of IFRS 9, all other financial assets of the Group were held at amortised cost at both 31 March 2023 and 31 March 2022. All financial liabilities of the Group were held at amortised cost at both 31 March 2023 and 31 March 2022.

The majority of financial instruments relate to contracts to buy non-financial items in line with the UKAEA's expected purchase and usage requirements and UKAEA is therefore exposed to little credit, liquidity or market risk.

NOTES TO THE FINANCIAL STATEMENTS

15 Trade and other receivables

	Group		Authority	
	2023 £k	2022 £k	2023 £k	2022 £k
Amounts falling due after more than one year				
Reimbursement receivables:				
- Site restoration	732,130	476,982	732,130	476,982
- Restructuring	24,779	31,759	24,779	31,759
Corporation tax	6,762	5,707	6,762	5,707
	763,671	514,448	763,671	514,448
Amounts falling due within one year				
Trade receivables	2,156	5,475	2,156	5,475
Reimbursement receivables:				
- Site restoration	30,387	12,411	30,387	12,411
- Restructuring	3,129	3,122	3,129	3,122
Prepayments and accrued income - Grant in Aid from sponsoring department	26,328	18,723	26,328	18,723
Prepayments and accrued income - other	19,210	20,522	19,192	20,509
Contract assets - in respect of revenue receivable	67	44	67	44
Contract assets - direct costs (in respect of work in progress)	1,236	1,026	1,236	1,026
VAT	7,763	7,331	7,763	7,331
Corporation tax	5,707	5,334	5,707	5,334
Other receivables	125	17	313	808
	96,108	74,005	96,278	74,783

There are no impaired assets in any of the classes of trade and other receivables.

UKAEA has calculated an Expected Credit Loss provision for its trade receivables, in accordance with the requirements of IFRS 9, in the sum of £496k (2022: £458k).

The reimbursement receivables have been discounted at the rates applicable to the provisions to which they relate. Further details of these rates are disclosed in Note 21.

NOTES TO THE FINANCIAL STATEMENTS

16 Cash and cash equivalents

	Group		Authority	
	2023 £k	2022 £k	2023 £k	2022 £k
At 1 April	66,566	75,453	60,383	73,109
Net change in cash and cash equivalent balances	2,762	(8,887)	4,436	(12,726)
At 31 March	69,328	66,566	64,819	60,383
The following balances were held at 31 March:				
Commercial banks and cash in hand	69,328	66,566	64,819	60,383
	69,328	66,566	64,819	60,383

17 Trade and other payables

	Group		Authority	
	2023 £k	2022 £k	2023 £k	2022 £k
Amounts falling due within one year				
Trade payables	10,200	11,198	10,200	11,198
Accrued costs	44,109	34,376	44,057	34,324
Payments received on account - Grant in Aid from sponsoring department	9,059	19,182	9,059	19,182
Payments received on account - other	7,321	7,473	7,321	7,473
Contract liabilities	368	34	368	34
Corporation tax	1,943	-	1,943	-
Social security and other taxes	4,779	2,223	4,779	2,223
Other payables	3,584	1,578	3,584	1,578
	81,363	76,064	81,311	76,012
Amounts falling due after more than one year				
Payments received on account	1,434	-	1,434	-
Other payables	49	59	49	59
	1,483	59	1,483	59

18 Deferred income

	Group and Authority	
	2023 £k	2022 £k
At 1 April	10,152	9,237
Deferred income received	4,960	1,700
Released to Statement of comprehensive net income	(1,167)	(785)
At 31 March	13,945	10,152

The majority of UKAEA's deferred income relates to capital grants for the RACE building and for the purchase of equipment for RACE, Fusion Technology, and the Materials Research Facility.

NOTES TO THE FINANCIAL STATEMENTS

19 Deferred income tax

Group and Authority

Deferred tax liability

	Investment property £k	Land and buildings £k	Total £k
At 31 March 2021	7,474	6,475	13,949
Movements during 2021/22:			
Charged/(credited) to Statement of comprehensive net income:			
- Revaluation	785	-	785
- Change in tax rate	2,360	-	2,360
Charged/(credited) directly to taxpayers' equity:			
- Revaluation	-	3,684	3,684
- Change in tax rate	-	2,046	2,046
At 31 March 2022	10,619	12,205	22,824

Movements during 2022/23:

Charged/(credited) to Statement of comprehensive net income:			
- Revaluation	1,072	-	1,072
- Change in tax rate	-	-	-
Charged/(credited) directly to taxpayers' equity:			
- Revaluation	-	6,388	6,388
- Change in tax rate	-	-	-
At 31 March 2023	11,691	18,593	30,284

Deferred tax asset

At 31 March 2022			1,761
Increase/(decrease) in deferred tax asset			(1,761)
At 31 March 2023			-

Net deferred tax liability

At 31 March 2022			21,063
At 31 March 2023			30,284

Deferred tax liability

During 2020/21, the Government announced that the corporation tax rate would increase from 19% to 25% from 1 April 2023. This change was substantively enacted on 24 May 2022. UKAEA's deferred tax provision has therefore been calculated at 25%.

Movements in the deferred tax provision relating to investment property are charged or credited to the Statement of comprehensive net income in arriving at the profit or loss for the year. Movements in the deferred tax provision relating to revaluation of land and buildings are charged or credited to the revaluation reserve.

Deferred tax asset

Deferred income tax losses are recognised for tax depreciation and tax loss carry-forwards to the extent that the realisation of the related tax benefit through future taxable profits is probable.

UKAEA has recognised a deferred income tax asset of £Nil (2022: £1,761k) as RDEC set-off amounts have been fully utilised against the 2022/23 corporation tax liability.

NOTES TO THE FINANCIAL STATEMENTS

20 Lease liabilities

Group and Authority

	Buildings £k	Plant, equipment and vehicles £k	Total £k
At 31 March 2021	-	-	-
Recognition of lease liabilities on initial adoption of IFRS 16	3,865	104	3,969
At 1 April 2021	3,865	104	3,969
Additions	744	109	853
Remeasurements	(498)	-	(498)
Repayments	(439)	(98)	(537)
Unwinding of discounting	40	1	41
At 31 March 2022	3,712	116	3,828
Additions	-	-	-
Remeasurements	-	83	83
Repayments	(187)	(66)	(253)
Unwinding of discounting	33	2	35
At 31 March 2023	3,558	135	3,693
At 31 March 2022			
Due within one year	187	76	263
Due after one year	3,525	40	3,565
	3,712	116	3,828
At 31 March 2023			
Due within one year	156	97	253
Due after one year	3,402	38	3,440
	3,558	135	3,693

During the year to 31 March 2023 the Group agreed an extension and modification to an existing lease. This resulted in a remeasurement of the lease liability (an increase in lease liability of £83k), with a corresponding remeasurement of the right-of-use asset (see Note 11.2).

A maturity analysis of lease liabilities as at 31 March is given in the table below:

Group and Authority	2023 £k	2022 £k
Undiscounted lease payments to be made after the reporting date:		
Not later than one year	285	257
Later than one year and not later than two years	226	222
Later than two years and not later than three years	202	201
Later than three years and not later than four years	207	202
Later than four years and not later than five years	207	207
Later than five years and not later than ten years	1,094	1,072
Later than ten years and not later than twenty years	1,776	2,005
Total lease payments	3,997	4,166
Less: Interest element	(304)	(338)
Total present value of obligations	3,693	3,828

NOTES TO THE FINANCIAL STATEMENTS

21 Provisions for liabilities and charges

Group	Site restoration £k	Restructuring £k	Other £k	Total £k
At 31 March 2021	443,061	42,449	8,145	493,655
Unwinding of discounting	(159)	(372)	(3)	(534)
Provisions utilised in the year	(230)	(3,271)	(1,468)	(4,969)
Provisions not required written back	(318)	-	-	(318)
Increase/(decrease) in provision in the year	32,431	(795)	4,359	35,995
Changes in price levels	17,166	1,101	359	18,626
Discount charge	(2,557)	1,055	-	(1,502)
At 31 March 2022	489,394	40,167	11,392	540,953
Unwinding of discounting	(6,851)	(480)	(34)	(7,365)
Provisions utilised in the year	(10,507)	(3,187)	(3,144)	(16,838)
Provisions not required written back	(1,905)	-	-	(1,905)
Increase/(decrease) in provision in the year	419,441	(1,050)	(791)	417,600
Changes in price levels	11,614	3,271	335	15,220
Discount charge	(138,668)	(6,682)	-	(145,350)
At 31 March 2023	762,518	32,039	7,758	802,315
At 31 March 2022				
Non-current	476,983	36,878	6,494	520,355
Current	12,411	3,289	4,898	20,598
	489,394	40,167	11,392	540,953
At 31 March 2023				
Non-current	732,131	28,660	4,242	765,033
Current	30,387	3,379	3,516	37,282
	762,518	32,039	7,758	802,315

NOTES TO THE FINANCIAL STATEMENTS

21.1 Site restoration provision

The decommissioning provision represents the estimated costs of decommissioning the JET facility at UKAEA's Culham site, including the storage, processing and eventual disposal of radioactive wastes.

After the closure of JET, it will be the responsibility of UKAEA to oversee the repurposing of the part of the Culham site on which JET is located. Where necessary, UKAEA work with the Nuclear Decommissioning Authority (or its authorised parties), as the body responsible for the disposal of higher activity waste.

Calculation of the liabilities is based on the technical assessments of the processes and methods likely to be used in the future to carry out the work. Estimates are derived from the latest technical knowledge and commercial information available, considering current legislation, regulations and Government policy. Summary figures are built up by aggregating detailed estimates for individual liabilities. Allowance is also made for infrastructure costs, which are an appropriate share of site running costs and other overhead costs attributable to plant and buildings. The calculation is reassessed annually.

A detailed update to the plan to decommission JET was conducted in 2022/23, which uses the currently best available techniques, processes and waste disposal routes. The previous detailed update was in 2018/19.

JET is still being used for high energy experiments and will undergo a final categorisation of hazards once this has completed. The update in 2022/23 has taken account of significant changes in expected waste volumes and characterisation needs. Further details and explanation of the changes are stated in the performance report. The best estimate of the cost of dealing with the liabilities at 31 March 2023 is discounted to the reporting date at inflation and nominal (discount) rates advised by HM Treasury. The rates are set out below:

General provisions

			2023	2022
Nominal rates	Short-term	(up to and including 5 years)	3.27%	0.47%
	Medium-term	(between 6 and 10 years)	3.20%	0.70%
	Long-term	(between 11 and 40 years)	3.51%	0.95%
	Very long-term	(41 or more years)	3.00%	0.66%
Inflation rates	Year 1		7.40%	4.00%
	Year 2		0.60%	2.60%
	Into perpetuity		2.00%	2.00%

Cash flows which occur during the first year are assumed to be at present value and are not discounted or inflated.

The unwinding of discounting in the year of £(6,851)k (2022: £(159)k) is the change in the provision from unwinding the previous year's estimated forward cash flows at the same rate as was used the previous year but bringing all the cash flows forward by one year.

Changes in price levels of £11,614k (2022: £17,166k) is the change in provision arising from changes in inflation rates. This is the difference between the current year's estimated forward cash flows, discounted using last year's discount rates, inflated using this year's inflation rates and the same cash flows inflated using last year's inflation rates. The discount charge for the year of £(138,668)k (2022: £(2,557)k), represents the effect of changes in the nominal discount rates as advised by HM Treasury in comparison to prior year rates. This is the difference between the current year's estimated, inflated, forward cash flows discounted at the current year's nominal rates and the same cash flows discounted at the previous year's nominal rates; this plus the changes in price levels gives the total change in liability due to changes in real discount rates.

The analysis of expected timing of discounted cash flows is as follows:

	Group and Authority	
	2023 £k	2022 £k
Not later than one year	30,387	12,411
Later than one year and not later than five years	225,174	237,417
Later than five years and not later than ten years	323,268	175,053
Later than ten years and not later than twenty years	183,689	64,513
	762,518	489,394

NOTES TO THE FINANCIAL STATEMENTS

21.1 Site restoration provisions continued

The real terms discount rate is sensitive to changes in inflation and nominal discount rates, as illustrated below:

	Group and Authority 2023 (£k)				
	Current rates	Inflation rates		Nominal discount rates	
		0.5% increase	0.5% decrease	0.5% decrease	0.5% increase
Not later than one year	30,387	30,387	30,387	30,387	30,387
Later than one year and not later than five years	225,174	228,006	222,369	228,028	222,375
Later than five years and not later than ten years	323,268	334,527	312,350	334,508	312,471
Later than ten years and not later than twenty years	183,689	194,203	173,701	194,131	173,859
	762,518	787,123	738,807	787,054	739,092

The best estimate of the undiscounted cost of dealing with the liabilities is £800,986k (2022: £446,721k). The best estimate of the discounted cost is £762,518k (2022: £489,394k):

	P50 - 50% chance of actual costs being higher or lower £k	P80 - 80% chance of actual costs being lower £k
Undiscounted costs	800,986	987,185
Discounted costs	762,518	939,774

The best estimate (P50) value is supported by a statistical analysis of cost and estimation uncertainties, along with other discrete risks.

A letter issued by the then Secretary of State for Energy in 1986 stated that the Government was prepared to continue to accept responsibility in principle for those costs which UKAEA incurs in treating and disposing of nuclear wastes and in decommissioning plant arising from:

- (i) programmes carried out by UKAEA and its predecessors prior to 1 April 1986; and
- (ii) programme agreement work undertaken for BEIS and its predecessors after 1 April 1986.

These assurances were reconfirmed by DESNZ in July 2023. On the basis of these assurances a matching receivable is included in the Statement of financial position.

NOTES TO THE FINANCIAL STATEMENTS

21.2 Restructuring provisions

The restructuring provisions represent termination benefits payable under early retirement arrangements to employees who had retired early, or had accepted early retirement, before 31 March 2019. These benefits continue at least until the date at which the employee would have reached normal retirement age, and in many cases part of the benefit is payable for life. The restructuring provisions are discounted to the reporting date at the discount rate for pension liabilities advised by HMT, which is 1.7% in 2022/23 (2022: (1.3)%). The undiscounted cost of the group provisions is £35,660k (2022: £36,626k) and the benefits are estimated to be payable over a period up to 30 years.

The analysis of the expected timing of discounted cash flows is as follows:

	Group and Authority	
	2023 £k	2022 £k
Not later than one year	3,379	3,289
Later than one year and not later than five years	11,477	12,260
Later than five years	17,183	24,618
	32,039	40,167

Part of the expenditure required to settle the restructuring liabilities will be reimbursed by other parties as follows:

- (i) Lump sums paid to employees on early retirement are refundable to the Group from the appropriate pension scheme at or after the date on which the individual concerned would have reached normal retirement age.
- (ii) Assurances covering restructuring provisions made before 1 April 2004 have been received from BEIS, and reconfirmed by DESNZ in July 2023, and expenditure related to these provisions is reimbursed by DESNZ (formerly by BEIS).

On the basis of these reimbursement arrangements, receivables have been included in the Statement of financial position.

21.3 Other provisions

Provision of £1,450k (2022: £4,031k) has been made relating to the disposal of operational waste arising from the operation of JET. The provision was discounted at the Treasury rates for general provisions referred to in Note 21.1 above.

The undiscounted cost of the provision is £1,450k (2022: £3,995k).

In addition, UKAEA has made provision of £1,694k (2022: £1,253k) for the eventual decommissioning of the MRF at its Culham site.

The remaining provisions mainly comprise unfunded retirement benefit obligations and claims relating to industrial-related injuries.

NOTES TO THE FINANCIAL STATEMENTS

22 Commitments

Expenditure contracted for at the reporting date but not recognised in the financial statements comprised capital commitments £47.8m, which related mainly to assets in course of construction. There were no further financial commitments under non-cancellable contracts.

23 The Group as lessor

UKAEA leases its investment property with lease terms of between 0.5 and 99 years. The leases contain market review clauses in the event that the lessee exercises the option to renew. The lessee does not have an option to purchase the property at the expiry of the lease period. UKAEA has classified these leases as operating leases because they do not transfer substantially all of the risks and rewards incidental to the ownership of the assets.

AEAIL is not a lessor.

Operating leases:

	2023 £k	2022 £k
Not later than one year	2,643	2,287
Later than one year and not later than two years	2,215	2,101
Later than two years and not later than three years	1,653	1,543
Later than three years and not later than four years	1,204	1,137
Later than four years and not later than five years	855	887
Later than five years and not later than ten years	2,927	3,103
Later than ten years and not later than twenty years	5,193	5,193
Later than twenty years and not later than forty years	9,789	9,858
Later than forty years and not later than sixty years	9,000	9,000
Later than sixty years and not later than eighty years	8,333	8,783
	43,812	43,892

NOTES TO THE FINANCIAL STATEMENTS

24 Related party transactions

UKAEA is an NDPB sponsored by DESNZ (formerly by BEIS). DESNZ and BEIS are regarded as related parties.

During the year UKAEA had various transactions which were collectively material with BEIS and with UKRI (another entity for which BEIS was regarded as the responsible department). UKRI (STFC) is UKAEA's partner in the Harwell Science and Innovation Campus Public Sector Limited Partnership (Note 13).

No Board member, key manager or other related party has undertaken any material transactions with the Group during the year, except for remuneration as disclosed in the Remuneration and Staff Report.

25 Statutory borrowing limit

During 2022/23, the statutory borrowing limit set by Section 3 of the Atomic Energy Authority Act 1986 as amended by The United Kingdom Atomic Energy Authority (Limit on Borrowing) Order 1991 remained at £200m. There were no borrowings by UKAEA during the current or previous year.

26 Events after the reporting period date

In accordance with the requirements of IAS10 'Events After the Reporting Period', post Statement of financial position events are considered up to the date on which the Accounts are authorised for issue. This is interpreted as the same date as the date of the Certificate and Report of the Comptroller and Auditor General.

LIST OF ABBREVIATIONS

AEAIL	AEA Insurance Ltd	JET	Joint European Torus
AI	Artificial Intelligence	MAST-U	Mega Amp Spherical Tokamak Upgrade
ARM	Active Risk Manager	MDF	Material Detritiation Facility
BEIS	Department for Business, Energy and Industrial Strategy	MPM	Managing Public Money
CRC	Carbon Reduction Commitment Energy Efficiency Scheme	MRF	Material Research Facility
CETV	Cash Equivalent Transfer Value	MTL	Materials Test Laboratory
CEO	Chief Executive Officer	MTF	Module Test Facility
CDT	Centre for Doctoral Training	NAO	National Audit Office
CPS	Combined Pension Scheme	NDPB	Non-Departmental Public Body
CCFE	Culham Centre for Fusion Energy	NDA	Nuclear Decommissioning Authority
DEMO	Demonstration fusion power station	OAS	Oxfordshire Advanced Skills
DT	Deuterium-Tritium campaigns	OGC	Office of Government Commerce
ED&I	Equality, Diversity & Inclusion	OSR	Radioactive and Out of Scope of Regulations
EDS	Exhaust Detritiation System	PAO	Principal Accounting Officer
ELMs	Edge Localised Modes	PPSS	Protected Persons Superannuation Scheme
EPSRC	Engineering and Physical Sciences Research Council	PNISS	Principal Non-Industrial Superannuation Scheme
ExCo	Executive Committee	PSRE	Public Sector Research Establishment
FReM	Government Financial Reporting Manual	RACE	Remote Applications in Challenging Environments facility
FTE	Full Time Equivalent	R&D	Research & Development
FTF	Fusion Technology Facilities	RDEC	Research and Development Expenditure Credit
H3AT	Hydrogen-3 Advanced Technology - tritium facility	RoSPA	Royal Society for the Prevention of Accidents
HMT	His Majesty's Treasury	STFC	Science & Technology Facilities Council
HSIC	Harwell Science and Innovation Campus Ltd partnership	SIRO	Senior Information Risk Officer
HSIC	Public/private sector partnership for the Harwell joint venture	SPPP	Shift Pay Pension Savings Plan
PubSP/LP		ST	Spherical Tokamak
IAS	International Accounting Standards	STEP	Spherical Tokamak for Energy Production
IAEA	IAEA International Atomic Energy Agency	STFC	Science and Technology Facilities Council
IET	Institution of Engineering and Technology	WDS	Water Detritiation System
IFRS	International Financial Reporting Standards	UKAEA	UK Atomic Energy Authority
IPA	Infrastructure and Projects Authority	UKIFS	UK Industrial Fusion Solutions Ltd
ITER	Next generation international experimental fusion reactor	UKRI	UK Research and Innovation

| Notes

The UK Atomic Energy Authority's mission is to lead the delivery of sustainable fusion energy and maximise scientific and economic benefit



Find out more
www.gov.uk/ukaea

United Kingdom Atomic Energy Authority
Culham Science Centre
Abingdon
Oxfordshire
OX14 3DB

t: +44 (0)1235 528822

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