



UK Atomic
Energy
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Annual Report and Accounts 2021/22



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United Kingdom Atomic Energy Authority

Annual report and accounts 2021-2022

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United Kingdom Atomic Energy Authority
Culham Science Centre
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Oxfordshire
OX14 3DB
United Kingdom

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CHIEF EXECUTIVE'S STATEMENT



"BY WORKING TOGETHER, WE ARE POWERFUL ENOUGH TO DELIVER FUSION POWER, AND IT IS OUR TREMENDOUS PEOPLE THAT WILL MAKE THAT HAPPEN."

Every year I begin these remarks recalling harrowing manifestation of climate change, and this year was no different. The last seven years are the hottest seven on record, and 2021 saw the highest ever recorded temperature on the planet as California hit 54.4°C, with many countries seeing temperatures over 50°C. Climate change shows no signs of abatement and, frankly, the global efforts to address this existential threat do not demonstrate an imperative commensurate with the defining challenge of our generation. This year the UK hosted the 26th Congress of the Parties where all nations committed to measures necessary to limit warming to 1.5°. Sir David Attenborough opened the event by saying, "if, working apart, we are a force powerful enough to destabilise our planet, surely, by working together, we are powerful enough to save it". The onus to save our planet, and ourselves, grows daily.

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. 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.

This year the UK government published its first ever Fusion Strategy, which aims to build a prototype powerplant to demonstrate the pathway to viable fusion as well as

establishing an industrial base capable of delivering fusion globally. Like our approach to COVID, it is no good finding parochial solutions to low-carbon energy which work in only a few jurisdictions, we must have answers for every country, on every day of the year. This requires a unification of the world-leading fusion research and development at UKAEA with the private sector which characterises the Government's strategy, and that is manifest by many companies moving to Culham to work alongside us this year. The Government are also putting the actions in place to deliver this strategy having run a Green Paper consultation on how to regulate fusion this year, as well as committing more than £700m over three years for fusion development in the recent budget. This commitment gives us the platform to deliver on our mission.

Our flagship facility is JET – the largest fusion device operating in the world – and this year we announced a flagship result by breaking the world record for fusion energy released. For the last four decades JET has been a beacon of that international cooperation. If we are to deliver fusion as part of the wider effort to address climate change, we must work together, and we are hugely proud of the collaboration in our community. To mark this totemic result, we were privileged to host His Royal Highness, the Prince of Wales, to JET to meet the team who achieved 59MJ of fusion energy over 5 seconds. These results have also provided previously unseen visibility to fusion with coverage in every major news outlet. As fusion gathers pace,

INTRODUCTION

the appetite for investment in the private sector is also burgeoning, with over \$2Bn invested in the second half of 2021. We plan to celebrate the major progress in the field at a showcase forum in the Science Museum later this year, connecting investors with fusion companies with policy makers with innovators – collaboration between these different entities is essential on our pathway to fusion power and we hope this is the first of many such events.

JET will continue operating until the end of 2023, at which point we are planning a ten-year high-innovation decommissioning programme. This will undoubtedly be a major change for UKAEA after four decades of JET operation. However, we are now well set to weather this change, having established world-leading centres of excellence in robotics, manufacturing, materials, tritium science, plasma science and computing in recent times. Indeed, this year we doubled the size of our Remote Applications in Challenging Environments (RACE) centre and our Materials Research Facility (MRF). We are also nearly finished the building for our new Hydrogen-3 Advanced Technology (H3AT) centre and have awarded contracts for our new office building and a doubling of our Oxfordshire Advanced Skills (OAS) apprentice training centre. MAST Upgrade, having demonstrated a huge improvement

in plasma exhaust last year, completed a highly productive experimental campaign with widespread international participation, evidenced by more than 260 participants at the recent research forum. We also completed our executive team as Liz Haynes joined as Director of People and Organisational Development, Carrie Leadbeater-Hart as Director of JET Decommissioning and Repurposing, and Fulvio Militello as Director of Tokamak Science and MAST-U.

We continue to move at pace with the design of the Spherical Tokamak for Energy Production (STEP) as a key pillar of our mission to deliver fusion energy. Whilst there are many technical challenges yet to overcome, we have now down selected to a preferred concept. This was positively reviewed by an international technical advisory group for government this year. We are also well progressed with our assessment of the future site for STEP, having reached a shortlist of five excellent sites. We expect to announce the site by the end of 2022, making it the fourth UKAEA site after we established our Fusion Technology Facility in Yorkshire this year and opened a new centre for Robotics and Artificial Intelligence Collaboration (RAICo) in Cumbria alongside the Nuclear Decommissioning Authority and Sellafield Limited.

INTRODUCTION

Life is never all smooth sailing. We are still unsure about our future relationship with the Euratom Research and Training programme. Despite an agreement on the protocol being reached in December 2020, this remains unfinalised. This means that UK entities are not able to participate in ITER, and we are not clear about the UK's participation in EUROfusion, and therefore the future of JET is not completely settled. This uncertainty has persisted for too long, and the sooner we have clarity the better. Equally, COVID has made operations more difficult in many ways. In the face of both of these challenges our brilliant people continue to innovate and solve problems to make sure we continue to deliver. Finally, we make sure our people go home safe every day, and whilst our safety performance is excellent – this year we won the RoSPA President's medal for a decade of consecutive gold awards – we will never rest on our laurels.

It is the opportunity to represent these talented people of which I am most proud. Every day I am astonished by the resourcefulness, the dedication and the perseverance of our team. We have continued to grow and now have more than 2200 people, coming from 66 different countries - a third of all the countries in the world! To

be best in the world, you must, by definition, have people from all over the world, and the tremendous diversity in our team is one of our greatest strengths. To paraphrase Sir David Attenborough, by working together, we are powerful enough to deliver fusion power, and it is our tremendous people that will make that happen.



Ian Chapman
Chief Executive and Accounting Officer
15th July 2022

CHAIR'S STATEMENT

"THE UKAEA HAD A RECORD-BREAKING YEAR, BRINGING FUSION ENERGY PRODUCTION CLOSER TO REALITY"

The UKAEA had a record-breaking year, bringing fusion energy production closer to reality. In December 2021, we broke our own world record for sustained fusion energy, creating 59 megajoules in the JET machine - more than double the energy we created when we set the record back in 1997. Our MAST-U machine gave further confidence, with a proof-of-concept experiment which successfully demonstrated that enormous temperature differentials can be managed in spherical tokamaks.

In addition to these results, we chose the design concept for the UK's STEP Programme, aiming to be the world's first machine to deliver power onto the electricity network. We also secured a deal with General Fusion, a private Canadian company which will build their next device on our Culham campus.

Just as science created a path through the COVID pandemic, science is crucial for solving the climate emergency. Meeting the ambitions of COP26 requires the creation of carbon-free, safe, and sustainable methods of energy production both now and in the net zero era.

Fusion power has huge potential to provide long term sustainable energy. Fusion research is advancing rapidly and, recognising its potential, governments are investing significantly, alongside increasing interest from the private sector. This year the UK Government became the first to publish a fusion strategy, outlining how it will leverage scientific, commercial and international leadership to deliver fusion power. Building on decades of leadership and collaboration



in fusion science and technology, the UKAEA is central to delivering this strategy and its environmental and economic benefits.

This was an impressive year by any standards, and I extend my thanks to everyone at UKAEA for helping us to achieve these feats, and to the Executive team and my colleagues on the UKAEA Board for their leadership. Even as the organisation evolves, it is reassuring to see our people work in such a strong and well managed safety culture, and with renewed attention to security. These extraordinary achievements were made in a year characterised by ongoing challenges as the impact of the pandemic lingered on. We are appalled by the actions of the Russian Government in Ukraine. We have worked closely with the UK Government to cease any activities with the Russian State.

Growth has continued, with nearly 340 people joining the organisation during the year. We are delighted to welcome them. The Board expects the UKAEA to provide equality of opportunity and support a safe, high performance, collaborative culture and work environment. In order to provide leadership and guidance on these issues, the Board expanded the remit of its Remuneration Committee to include strategic issues relating to people and culture. I am grateful to Lady Eithne Birt for leading these changes and chairing the Committee.

In March of this year both Shrin Honap and Professor Sir Adrian Smith completed their terms as Non-Executive Directors on the UKAEA Board. We are grateful to both of them for their many and varied contributions to leadership and for their wisdom and advice. Shrin was Chair of the Audit and Risk Assurance Committee since joining the Board in 2019 and promoted many improvements to the organisation's audit function, and financial management, ably supported by an adept Executive team. Adrian provided deep insight into management and leadership of major international scientific and innovation capabilities; his knowledge of public sector R&D has been invaluable.

In November 2021 we were fortunate to welcome two new Non-Executive Directors to the UKAEA Board. Richard Hookway brings extensive business, financial and technical knowledge from the energy sector. He succeeds Shrin Honap as Chair of the Audit and Risk Assurance Committee. Sir Stephen Hillier joins the Board following a distinguished military career in the RAF, where he ultimately became Chief of the Air Staff, the head of the service. Stephen brings deep knowledge of large, complex, and high profile projects. We warmly welcome Richard and Stephen to the Board.

Professor David Gann, CBE
Chair
July 2022

AT A GLANCE

Financial

28% growth

Funding from income and capital investments increased +28%

Performance

89% achieved

35 fully / 4 partially



People

15% growth

Resourcing of new programmes has increased our capacity & capability, with 15% growth in average number of staff

Highlights

May 2021



1st results from MAST-U, marked by Tim Peake visit



June 2021



Minister of Science visit to UKAEA Culham campus



July 2021



MAST-U team wins Royal Academy of Engineering Major Project prize



Oct 2021



Announced the five sites shortlisted for consideration as the STEP site



Nov 2021



Fusion had its first ever presence at COP



Jan 2022



Prince Charles visits UKAEA



Feb 2022



News announcement of the record breaking results with D-T fuel in JET



MISSION, STRATEGY, VALUES AND PRINCIPLES

Mission:

The UK Government has 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

It is within the context of these aspirations, driven by the global need for long term sustainability, that we set the UKAEA mission.

To lead the delivery of sustainable fusion energy and maximise the scientific and economic benefit

Fusion is based on the same processes that powers the stars. When a mix of two forms of hydrogen is heated to form a plasma at extreme temperatures (10 times hotter than the core of the sun) they fuse together to create helium and release huge amounts of energy.

In the face of a changing climate and dwindling fossil fuel reserves, fusion offers the potential for a safe, abundant, low carbon, reliable baseload energy supply.

The conditions needed to harness fusion are extreme and the journey to get there is 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, operated on behalf of the UK Government, has pioneered fusion research for many decades by building strong international partnerships, an ambitious domestic fusion programme and supporting 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.



Fusion could be transformative for energy security

OUR STRATEGIC GOALS



OUR MISSION

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

UK FUSION STRATEGY PILLARS

INTERNATIONAL LEADERSHIP

Operating Joint European Torus (JET) in collaboration with the European Union as the world's premier fusion machine, supporting the ITER experiment (a collaboration of 35 nations in the south of France) as the next stage in fusion development with unique skills and expertise. We collaborate and provide leadership to the EUROfusion consortium with many other teams around the globe towards the shared goals of fusion science and technology.

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. 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 Science Centre into the hub of a global fusion cluster through the Fusion Foundations programme and site regeneration following JET. Delivering a wide-ranging programme of support for fusion industry to grow a thriving fusion ecosystem in the UK, and supporting UK industry to win major contracts for ITER, with over £0.5bn to date and targeting a further £1bn in coming years.

FACILITIES, INFRASTRUCTURE AND SKILLS

VALUES AND PRINCIPLES

It's not just our goals that matter – there is also importance in how we get there. UKAEA is committed to principles and aspirations that aid us to measure performance, guiding us to deliver with integrity, efficiently and effectively.

PRINCIPLES



Safety

Safety and wellbeing of our people is our top priority



Equality of opportunity

Diversity of thought and people who are representative of society is crucial for our mission



Environmental sustainability

We will strive for energy-efficient delivery, minimising our environmental impact



Responsible financial management

We will use our resources carefully and will be accountable for our investment decisions



Working with business

Strong and effective public-private partnerships are an essential part of our operation

The spirit of how we work is captured by our **VALUES** of:



Innovation



Commitment



Trust



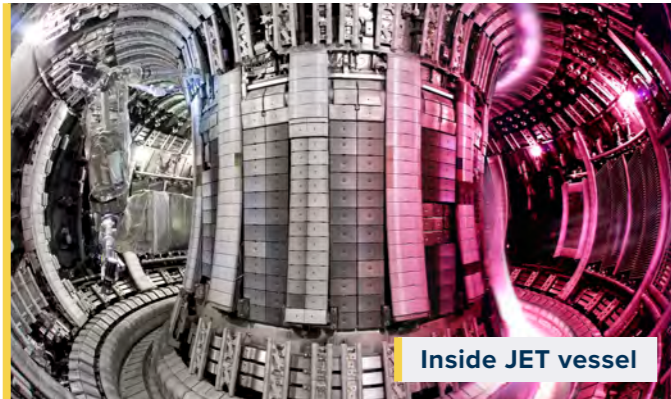
Collaboration



Fusion complements other sustainable energy, and is independent of the weather

OUR EXPERIMENTS AND FACILITIES

JET



Inside JET vessel

Effective confinement performance of hot fusion fuel will be fundamental to a successful fusion power plant. Joint European Torus, the world's largest and most capable fusion facility, is owned and operated by the UK as a key part of the EUROfusion roadmap to fusion electricity. Capable of using tritium, JET is a model for the next generation fusion device, ITER, and is the best facility to address the challenges ahead of ITER operation.

MAST Upgrade



MAST Upgrade

Fusion both requires and generates heat in abundance, and a commercial fusion power plant must be able to handle excess heat in a safe and effective manner. Mega Ampere Spherical Tokamak Upgrade is the world's largest operational "spherical" tokamak. MAST-U has new unique features focused on exhausting heat and will be developed and exploited with EUROfusion, offering a wide range of measurement techniques to explore a broad spectrum of plasma physics.

MRF



MRF facility

Fusion will require new and novel materials capable of withstanding the harsh environment of a fusion power plant. The Materials Research Facility (MRF) allows advanced analysis and testing of materials relevant to fusion, including materials activated and damaged after neutron irradiation or exposure to tritium. It is a part of the National Nuclear User Facilities (NNUF), linked to the Henry Royce Institute.

RACE



Telescopic Articulated Remote Manipulator in RACE

A cost effective fusion power plant must be maintainable, relying heavily on robotics. RACE, Remote Applications in Challenging Environments, is a centre to develop remote maintenance and robotics techniques for fusion and adjacent applications. It builds on UKAEA's extensive experience of remote handling on JET and has played a leading role in the EUROfusion DEMO remote maintenance programme.

H3AT



Interim H3AT facility

Tritium is a key fuel for a self-sustaining fusion power plant but, as a radioactive isotope of Hydrogen, is challenging to work with. The Hydrogen-3 (tritium) Advanced Technology facility (H3AT) is a new facility which will open in 2024. As a pilot plant for tritium technologies, it will operate devices focusing on efficient tritium separation and purification techniques, tritium accounting, and R&D on tritium removal at low and high concentration from solid, liquid and gaseous materials.

Fusion Technology



HIVE testing facility

The complex environment of a fusion power plant requires innovative design and careful testing of manufacturing and components. A new set of Fusion Technologies Facilities in our South Yorkshire site will include an evolving range of bespoke capabilities to design and test metre-scale fusion power plant component, supporting fusion power plant design programmes and setting the standard for component testing in fusion.

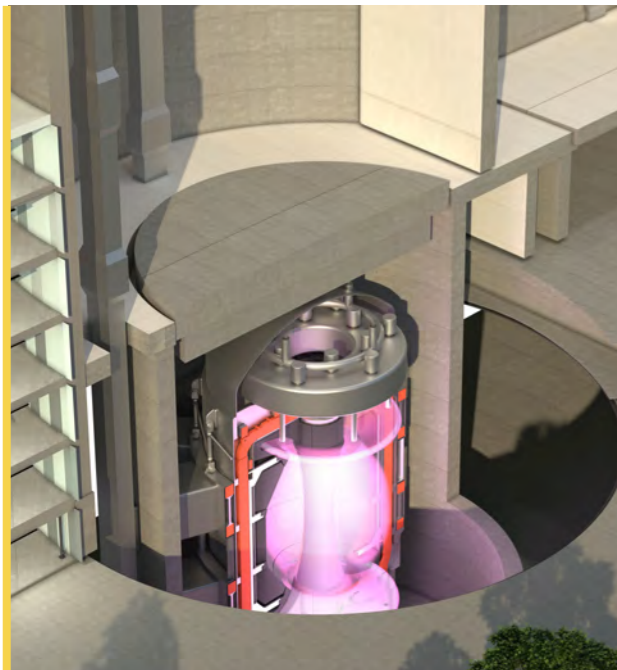
OUR MAJOR PROGRAMMES

Fusion Research



The Fusion research programme, UKAEA's underpinning research and innovation programme funded by UKRI, EUROfusion and other sources, focuses on fundamental science and technological development to advance fusion. The programme addresses fundamental fusion research challenges across disciplines where deep innovation is required to match the challenge of fusion development: Tokamak science and plasma physics, materials science, tritium science, fusion technology, remote maintenance, and advanced computing. Through the fusion research programme, UKAEA researchers contribute and lead in the development of the global fusion knowledge base, helping to solve the challenges that will make fusion a reality.

STEP



STEP is an ambitious programme to deliver a UK prototype fusion energy plant, targeting 2040, and a path to commercial viability of fusion. The programme builds on the UK's fusion leadership and engages both industry and academia across the nation. The initial five-year tranche-1 of the programme, funded by the UK Government and managed by UKAEA, aims to produce a viable concept design, a delivery proposal for subsequent tranches and will select a host site, alongside a host of benefits arising as the programme progresses. STEP is following a compact route to a fusion powerplant design, seeking to reduce costs and accelerate the delivery of commercial fusion energy. The programme has completed year 3 of the five year tranche-1 focused on development of the STEP concept design.

National Fusion Technology Platform



In 2017 the UK Government announced the £86m National Fusion Technology Platform investment as part of the Industrial Strategy Challenge Fund to establish two new capabilities at UKAEA – the Fusion Technology (FT) facilities in South Yorkshire and the Hydrogen-3 Advanced Technologies (H3AT) facility at Culham, Oxfordshire. These new facilities, in combination with the existing RACE and MRF capabilities, greatly expand UKAEA's ability to support industry and address the challenges of fusion. As part of NFTP, UKAEA has established its first regional presence outside Oxfordshire in a decade on the Advanced Manufacturing Park in Rotherham.

Fusion Foundations



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. Now moving into its third year, the programme will revitalise the Culham campus with investment in modernised office space, a new entrance, and new commercial buildings for tenants. The programme will enhance capabilities in UKAEA's facilities with new equipment and capacity, a full IT transformation project, and expanded apprenticeship skills in new sectors and locations. The programme also seeks to nucleate a UK fusion cluster around the infrastructure and capabilities provided by UKAEA to stimulate and support research and innovation in the private fusion sector.

JET Decommissioning and Repurposing



JET is moving into a new phase with operations due to complete 31st December 2023. A Decommissioning and Repurposing Team is being established under our newly appointed Director of Decommissioning and Repurposing. The team, expected to mobilise from July 2022, will deliver a detailed Lifetime Plan and an Alternative Decommissioning Plan with the ambition to maximise repurposing of assets and drive innovation to support alternative decommissioning techniques such as remote handling and de-tritiation. Research and Development has been executed for the past 18 months to explore these possibilities. Over the next year, we will review the research and development outcomes and determine the optimal decommissioning strategy – this will then be presented as an Outline Business Case for approval by BEIS.

OUR 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

Experimentation, modelling and engineering producing knowledge to advance fusion and related fields.



Tokamak Operation

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



Supporting National and International Science

Contributing to and leading teams in domestic and international collaborations in fusion science and engineering and adjacent fields.



Facility Operation and Management

Operating the RACE and MRF business units, and developing the Fusion Technology and H3AT facilities, providing unique 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, our graduate scheme, and PhD students.



Campus Development and Site Management

Managing the Culham campus for UKAEA activities and tenants, and public share of the Harwell campus Joint Venture, alongside UKRI.

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 BEIS 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 a 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 2021/22

- ▶ Produced globally impactful results in a number of key areas, including plasma physics, materials science, tritium, and robotics
- ▶ Major presentations at international conferences including the prestigious IAEA fusion energy conference



- ▶ Ran first experimental campaign on MAST Upgrade
- ▶ Delivered a fusion energy output of 59MJ over a 5 second pulse on JET, more than doubling the previous world record for energy output



- ▶ Contributed to and led international scientific teams in EUROfusion
- ▶ Collaborated with and supported universities across the UK, including PhD supervision



- ▶ Transitioned fully to Hybrid Working
- ▶ Became operational at our Fusion Technology Facility in South Yorkshire, with 45 UKAEA staff members based there



- ▶ 334 new employees
- ▶ 210 colleagues were promoted
- ▶ 112 apprentices in total employed at UKAEA, 29 apprentices joining in 2021/22
- ▶ 85 graduates within the workforce



- ▶ Shortlisted 5 sites for the STEP demonstration power plant
- ▶ Doubled the footprint of our Materials Research Facility



RISK LANDSCAPE

The last year has seen an evolving risk landscape which has required resilience and preparedness against the recovery from the impact of the pandemic and a turbulent geo-political backdrop following the Russian invasion of Ukraine. We know we need to be more agile and proactive in how we manage risk following these unpredictable events, in addition to the growing challenges from climate change.

In this evolving risk landscape, safety continues to be our number one priority and we take the threat of potentially causing injury or accident very seriously. We have no tolerance towards any risk of harm to our people, our workers and our environment. We continue to have robust principles to minimise risk around any life-limiting health or injury. We have a continual safety improvement in place to drive improvement and effective mitigation of this risk, and a mature safety culture ensures compliance with health and safety regulations.

The risk environment has become a lot more dynamic through the last year. It is changing more quickly than in the past and is more unstable in its features. We recognise that we need to challenge ourselves about the way we manage risk. Being prepared and anticipating emerging risk is critically important. We have been very agile and increasingly resilient in how we have faced the challenges of the pandemic and are responding to the global supply chain fragility risk and cyber risk with the same resilience.

The Government is committed to collaborating internationally on fusion R&D. However, despite the UK-EU Joint Declaration on Participation on the Union being passed in law in December 2020, the association is still not ratified. The UK stands ready to formalise our association to Euratom and the Government continue to discuss with the European Commission to finalise our association as soon as possible. However, until the UK associates to the Euratom Research and Training

programme we will not be able to sign the EUROfusion grant agreement so cannot receive EUROfusion funding or recover retroactive costs for EUROfusion participation or JET operation.

Interim arrangements are in place with ITER Organisation (IO) to enable continued engagement between UK entities and IO whilst the UK awaits association to Euratom. These were always intended as stopgap measures to enable UK businesses to engage in the tendering process, in the assumption that association was ratified before award decisions needed to be made. We are enhancing our communications with UK industry regarding the risks and maintaining strong dialogue with ITER procurement to ensure links remain strong when major reengagement becomes possible. Our relationship with ITER remains positive and collegial, with both sides wishing to find a way forward to maintain the positive working relationship with a shared goal to enable continued fundamental sharing of science and knowledge that association brings. In the event that the UK is unable to associate to Euratom, the Government has mitigation plans in place to support new international partnerships. Government is preparing for all eventualities to ensure the UK research community has a strong offer of both interim and long-term funding.

The current heightened geopolitical risk of the Russian invasion of Ukraine has put increasing pressure on the global supply chain already impacted through pandemic, weather disruption, manufacturing and logistics issues and reliance on natural resources. There is therefore a risk of shortages of key materials across Europe. We continue to monitor the impact on our supply chain. The geopolitical landscape is also exacerbating rising inflationary and energy pricing and has heightened the cyber security risk for which additional measures have been put in place to mitigate the risk.

Increased sophistication of cyber attacks and increased threats related to the situation in Eastern Europe has increased the chance of a large scale and successful information security incident. We remain vigilant in ensuring security measures are enhanced through implementing enhanced network management tools with robust disaster recovery processes in place. The impact of the conflict is being factored into longer term cyber resilience plans and strategies and it is a high priority to our Executive in ensuring specialist resource and measures are in place to strengthen our resilience. In addition, we plan to work towards ISO27001 accreditation which is the information security management system standard and best practice for cyber security controls. Loss or inappropriate release of critical information/records due to inadequate information management/protection remains a risk and could result in a significant political and reputational damage. A major loss of scientific data could result in significant programme delays and/or loss of Intellectual Property. This is a longstanding risk for which we have robust resilience plans in place.

The adverse impact of JET utility pricing is significant for the remainder of the JET programme. This, combined with an adverse foreign exchange movement is driving a potential EUROfusion funding gap over the remaining scientific programme and mitigations are being put in place to address this.

At the same time as adapting to the changing threat environment we also need to seize opportunities to continue to lead in fusion energy working collaboratively in assisting government in the development of the fusion regulatory framework and in delivering the STEP prototype plant. STEP is an ambitious programme that aims to deliver the first goal of the UK Fusion Strategy delivering a prototype plant that puts net energy on the grid and is a major driver of the second goal (for the UK to build a world-leading















fusion industry). It is an ambitious programme, leading in this strategic technology has the potential to generate immense benefits but also comes with significant scientific and engineering risks. The biggest risks are scientific and technical – identifying the solutions to contain and sustain a burning fusion core, dealing with the consequence of extremely high neutron flux and fluence, and integration of all elements of a design that is meaningful as a prototype for later commercial plant. STEP will work to deliver ongoing value realisation throughout its lifetime. There are also significant risks in delivery driven by the scale of infrastructure required, the need to develop industry to enable delivery (though that is also a benefit) and the likely cost, which will drive significant government interaction.

Planning beyond the highly successful JET DTE2 campaign completed in December 2021 the JET Repurposing Programme is now underway with the aim of developing strategic business cases to release decommissioning funding for 2022/23 and beyond. One of the key challenges going forward will be to balance the specialist resources required to deliver the operational schedule and at the same time progress the repurposing programme.

UKAEA has continued to grow rapidly and the need to recruit and retain exceptional employees continues. The People Strategy aims to address the risks associated with our inflexible pay conditions, poor workforce planning controls and scarcity of suitably qualified and experienced personnel. The new workforce planning framework will facilitate movement of people from JET to other business units and programmes going forward. One of the key challenges going forward will be to balance the specialist resources required to deliver the operational schedule and at the same time progress the decommissioning programme.

OUR PRINCIPAL RISKS

 <p>WORLD LEADING RESEARCH Be a world leader in fusion research and development</p>	 <p>ECONOMIC GROWTH Drive economic growth and high-tech jobs in the UK</p>	 <p>FUSION DELIVERY Enable the delivery of sustainable fusion power plants</p>	 <p>PEOPLE & PLACES Create places that accelerate innovation and develop skilled people for industry to thrive</p>	 <p>RELATES TO ALL</p>
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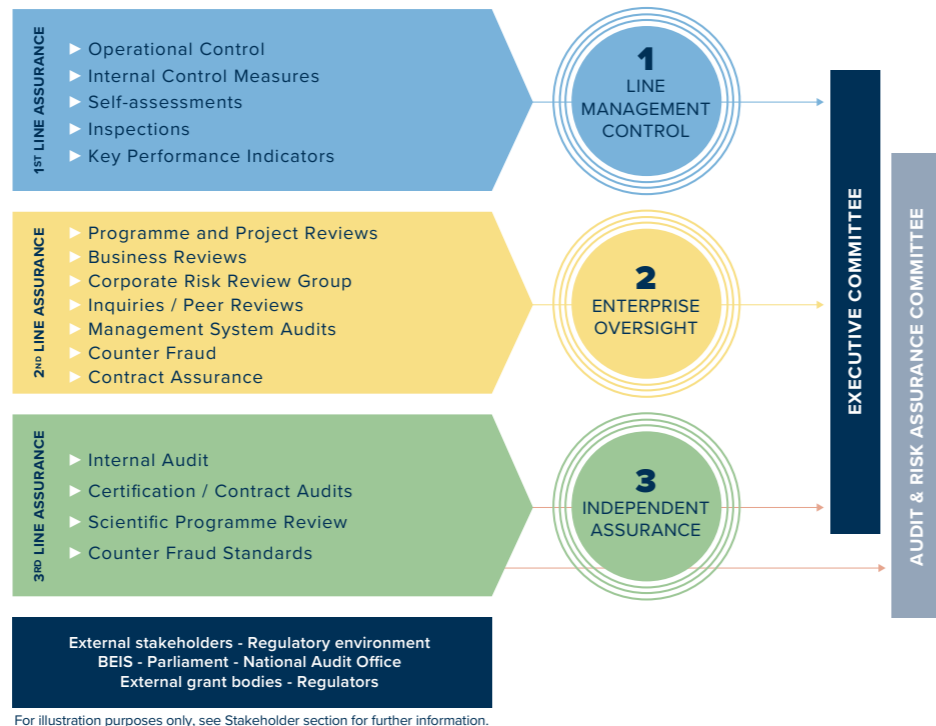
RISK DESCRIPTION	STRATEGIC PRIORITY	RISK APPETITE	MITIGATIONS ENACTED	RISK MOVEMENT
THE FOLLOWING OPERATIONAL RISKS PRESENTED IN 2020/21, HAVE BEEN RETIRED OR MODIFIED IN 2021/22				
Impact of Covid 19 causes milestone slippage and loss of funding.			We were successful in minimising the impact of Covid 19 on our delivery millstones whilst maintaining principal funding. Also see Covid 19 section.	RETIRED
STRATEGIC RISKS CARRIED FORWARD IN 2022/23				
No Euratom association damages Fusion Programme			Dialogue continues between the UK Government and the EU however UK's association to Euratom remains unresolved. Also see EU Exit section.	↑
Failure to deliver an investable concept design for STEP			A risk reduction strategy has been developed to address the principal technical challenges and to establish good relationships with internal and external stakeholders. A Project Management and Controls Framework is in place.	↓
MAST-U Enhancements fails to deliver the capabilities promised to EURO fusion within the agreed time scales			An updated delivery plan is in place overseen by a project board monitoring tenders, timeline and budget. Key mitigations include; a detailed plan is in place to deliver the enhancement on time.	↓
Delivery of H3AT and CHIMERA facilities are delayed			An innovation partnership type procurement is in place to mitigate the risks associated 'first of a kind' innovative developments. Commissioning of an interim H3AT facility to enable some technical work is to be completed before main H3AT facility is available CHIMERA will implement a design acceptance process.	↑
Campus development fails to deliver the benefits promised			Effective governance and oversight is in place to address a diverse cohort of campus transformation and enhancement projects. Internal audit of campus development projects is planned to ensure project controls are effective.	↔
OPERATIONAL RISKS CARRIED FORWARD IN 2022/23				
Staff capability and capacity is insufficient to meet objectives			We continue to develop methods of securing resource in a labour market where skills required by UKAEA are in short supply. We are working with Cabinet Office on provisions to improve attractiveness and retention. The People Strategy is in place and Strategic Workforce Planning is established.	↔

RISK DESCRIPTION	STRATEGIC PRIORITY	RISK APPETITE	MITIGATIONS ENACTED	RISK MOVEMENT
OPERATIONAL RISKS CARRIED FORWARD IN 2022/23				
Inability to implement an organisational Safety Culture risks failure to fully comply with Health and Safety regulations, resulting in work related illness or injury			We have a mature health and safety management system which is certified to ISO45001. We establish good working relationships with all local services, partners agencies and Authorities. A behavioural safety leadership engagement plan and safety, health and environment Continuous Improvement Programme is in place.	↓
Heightened geopolitical risk of the Russia/ Ukraine conflict increasing cyber-attacks, and further impacts to the global supply chain/ impacts to our programme with rising fuel, energy, and material costs			All contracts with Russian entities have been terminated and work has been completed to strengthen our defences against cyber-attack and to strengthen resilience in our supply chain. Increased costs across the board remain a significant challenge. We are working with government to identify possible potential relief for our supply chain and reviewing the robustness of inflationary clauses within existing contracts.	↑
Cyber-attack on UKAEA digital and/or operational systems			Work undertaken 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.	↑
Site Power Enhancement Plan which is reliant on Southern and Scottish Energy (SSE) and our own power upgrade, fails to deliver the power enhancements in line with our needs on campus development			The Site Power Enhancement Project has proposed timescales to disconnect JET, undertake extensive refurbishment and repurposing for the 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			Further enhancement of asset management on JET include provision of a set of tools under the new Asset Management Framework to assist the JET Asset Steward with understanding the risk spread across all JET assets and extending formal appointment of Asset Managers for maintenance of JET Assets.	↓

ASSURANCE AND RISK MANAGEMENT

Our control environment comprises three key areas: governance, risk management, and internal control. Together these aim to manage risk to an acceptable level. Our governance model includes the three lines of assurance model which provides the UKAEA Board with an appropriate level of comfort that we are managing risks effectively. Each line of assurance provides a level of oversight, appropriate to their position within the business.

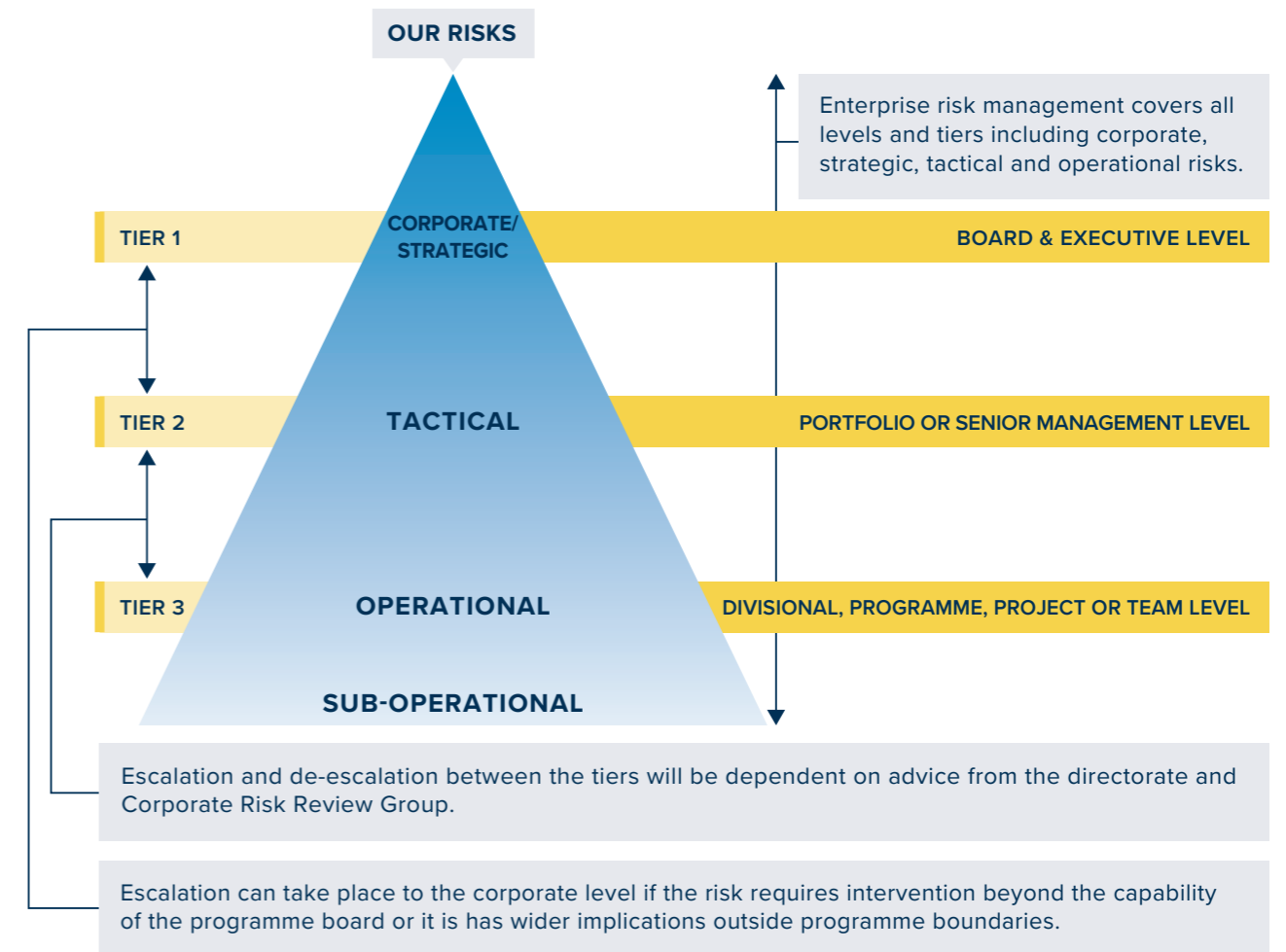
The Three Lines of Assurance Model outlines internal audit's role in assuring the effective management of risk, and the importance for delivering this of its position and function in the corporate governance structure. The first line of assurance (functions that own and manage risks) is formed by managers 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 of 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. Although they sit outside the organisation, external auditors can play an important role through their considerations of the governance and control structure where this is relevant to financial reporting.



Our Chief Executive Officer (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.

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 ExCo and provide strategic guidance.



UKAEA operates a mature enterprise risk management (ERM) process embedded at all levels of the business. The ERM process is compliant with the Treasury 'Orange Book' and ISO31000. The risk process ensures interconnected risk management operates at all levels of the business. Significant risks and associated mitigations and control effectiveness are tracked, challenged and

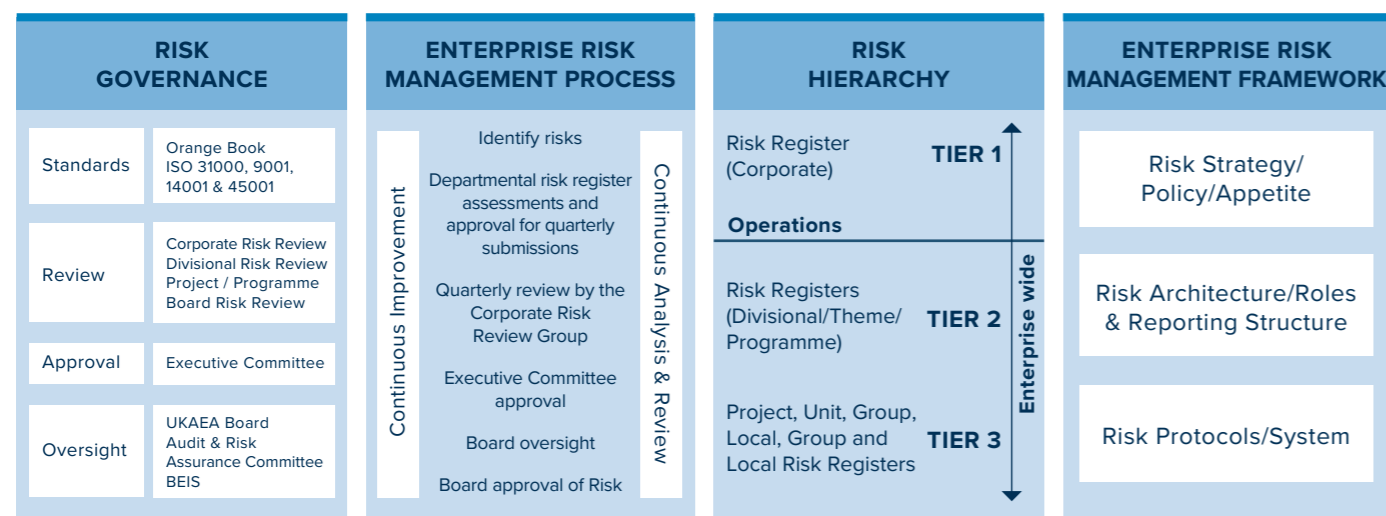
moderated by programme/project boards and the Corporate Risk Review Group, with active engagement by senior management through the Executive Committee, Audit and Risk Assurance Committee (ARAC) and the Board. The risk appetite is endorsed by the Board and risks are assessed against the risk appetite in driving risk based decisions.

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. Our Chief Executive (as Accounting Officer) is accountable to Parliament for ensuring that all risks are managed effectively. On behalf of the Chief Executive, the Head of Risk and Assurance has been appointed to deploy a mature embedded enterprise risk process, ensuring consistency of approach, and periodically report risk to the Executive Committee, Audit and Risk Assurance Committee and the Board.

Ownership of tactical, operational and sub-operational risk registers is assigned to relevant senior managers, and individual risks are owned by the most appropriate team or individual. 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.

Our framework for managing risk is embedded across the organisation and benefits from the ongoing commitment and participation of leadership. Risks are regularly reported to the Board via Audit and Risk Assurance Committee, and quarterly to UKAEA's sponsoring department BEIS

RISK MANAGEMENT PROCESSES



OUR RISK APPETITE

Our risk appetite and the achievement of our goals demands ambition and varies according to



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. At the same time, we need to ensure the integrity of our science is excellent and we can fully support any contentious scientific claims with robust evidence to maintain our reputation.



BUSINESS DEVELOPMENT

If we are to achieve our goals and be successful at growing business for UKAEA and UK industry, we need to be prepared to pursue some speculative prospects where the risk of commercial failure may be higher than we would normally tolerate with an expectation of commensurate return on investment. To mitigate these risks, we ensure robust management arrangements are in place to monitor when prospects are not developing as intended and to realign activities to limit future loss.



OPERATIONS

We have robust operational and engineering processes and systems. 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 and other applicable requirements.



PROGRAMME MANAGEMENT

We aim to balance resources, capabilities, and progress to comply with declared programmes. 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 low.



SAFETY & 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 taking into account shared best practice with similar research organisations.



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 very low tolerance of risk in this area.

FUSION SAFETY AUTHORITY

The Fusion Safety Authority was established in 2021 to provide support to the BEIS Fusion Policy team in the development of a regulatory framework for fusion power plant. The Fusion Safety Authority team provide technical expertise on safety, security and environment to the BEIS Fusion Policy team. They are working with the IAEA on producing technical documents for fusion safety and regulation and engage with various domestic and international stakeholders on fusion regulation through fusion specific and other related events.

The team worked closely with BEIS on the sections of the Government’s consultation paper on the “Proposals for a regulatory framework for fusion energy”, describing the hazards associated with fusion. This included the publishing of a supporting document “Technology report – Safety and waste aspects for fusion power plant”.

Following a consultation process the Government has confirmed that current UK regulators of fusion R&D facilities (EA and HSE) will retain responsibility for future fusion energy facilities. To help support the development of a fusion regulatory framework BEIS has asked UKAEA to consider how this expertise could form the basis of a ‘Technical Support Organisation’ providing technical advice to regulators on safety, security and environment matters throughout the regulatory process, and sought views on this in the Consultation Paper. The Head of Risk and Assurance oversees the Fusion Safety Authority, while BEIS provides separate and ringfenced funding, maintaining independence from UKAEA operations and programmes.



Success involves working at the forefront of science, engineering, and technology

STAKEHOLDER ENGAGEMENT



The UK government

We benefit from a strong relationship with our sponsoring department, BEIS, meeting regularly with people from across BEIS, UKRI, and Ministers. We have also built key relationships with other Government departments to ensure Government and Parliament are informed and up to date.



Our partners

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



The UK public

Making the public aware of fusion's amazing potential is essential in building support for our mission. It's also our duty, as our research is paid for by the taxpayer. We hold events for public, school, university and other audiences and use media coverage and social media to inform, excite and enthuse anyone interested in fusion.



As UKAEA expands, we have an increasing and diverse range of valued stakeholders. Effective communication on the world-changing potential of fusion, the UK's leading role and our mission is key to getting the support to keep the UK at the forefront of fusion.



Our people

Our workforce is one of our most important stakeholders. Keeping people informed and engaged ensures that they have a shared view of our strategy, and a voice to be heard at the highest levels.



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.



The local community

UKAEA is part of the community, and many of our people live close to our Culham and Rotherham sites. We work with local councils and transport providers to ensure we bring mutual benefit to the local community as we develop and thrive.



Launch of the UK Fusion Strategy.

In November 2021, UKAEA joined BEIS, private fusion companies and industry stakeholders at a Westminster event to unveil 'Towards Fusion Energy', the UK's first fusion strategy, introduced by the Minister of Science, George Freeman MP.



General Fusion agree to build demonstration plant at Culham.

In June 2021, UKAEA and General Fusion announced the Canadian firm would build its Fusion Demonstration Plant at the Culham Campus. It is the first major step towards making Culham the centre of a fusion cluster with global impact.



JET world record results put fusion in the public eye.

Fusion was on the front pages in February 2022 as the UKAEA and EUROfusion announcement of JET's record-breaking results made headlines worldwide. The story was covered across the world, and in the UK was featured on BBC and Sky national TV news, and in The Times and The Sun amongst others.

2021/22 Highlights



Navigating our way out of the pandemic.

Internal communications were crucial in keeping employees informed of changing COVID restrictions and the new world of hybrid working. This was done through regular staff talks, clear and informative intranet pages and company-wide messages.



Three new Professorships with universities.

Our growing strategic links with UK universities were increased during 2021/22 with key appointments at the University of Manchester (in Digital Engineering and Tritium Science) and at Durham University (in Plasma Diagnostics).



Getting to know the community in South Yorkshire.

With the opening of our new Rotherham facility, we started new engagement programmes in the area. As well as a strong presence at the North Star and Get Up To Speed science festivals, we formed a burgeoning relationship with nearby Sheffield Park Academy school.

COVID-19

UKAEA's recovery

At the start of the year, we were continuing with our COVID crisis management plan. This was built on the key tenets of continuing to follow the UK Government guidance and keeping our people safe and protecting their wellbeing, whilst continuing to deliver our performance targets.

We had strong crisis management in place and adapted as the situation evolved. With our COVID protection measures in place we had the ability to constantly evolve as the situation changed, so that we could flex our workforce between onsite working and working at home to underpin both their welfare and their operational performance.

The strength of our COVID response and our ability to implement a recovery plan, for an early transition to new ways of working, was testament to our strong crisis management team and our people's ability to adapt. As we progressed our COVID recovery plan we transitioned early in the year to a Hybrid Working framework. A pilot Hybrid Working project had begun the previous year assuring a fast and effective establishment of supporting activities and procedures was quickly deployed. These supported UKAEA in delivering its Mission and Goals in this transition time and made us more robust regarding future potential difficult circumstances.

We engaged with our staff in April 2021 via a survey to understand their views of hybrid working, capturing recommendations to ensure an inclusive approach is taken as hybrid working evolves:

General recommendations from survey respondents and team used to steer Hybrid Working:

- Ensure the availability of quiet spaces for work
- Teams should hold 'on site team days' which helps team building
- Ensure sufficient parking availability for the desired amount of on-site attendance
- Review the Robin App and its use
- Provide more meeting rooms with hybrid capabilities
- Provide more kitchen space, canteen space, outside benches for more social and collaboration space
- Introduce more breakout spaces
- Introduce more open plan seating for informal gatherings
- Improved access to collaboration materials

- Introduce a way of flagging whether people are working on-site or off-site day to day.

There was an overwhelming positive response with regards to hybrid working from our employees – when asked:

- "Do you like or dislike hybrid working" - 94% responded as "like".
- "Do you believe that UKAEA as an organisation is benefitting from the implementation of hybrid working" – 86% responded "yes", 11% "unsure", 2% "no".
- "Do you think hybrid working is positive, neutral or negative towards your productivity" – 80% "positive", 16% "neutral", 4% "negative".

The opportunity to offer hybrid working has also had a positive impact for our new joiners, with 64% confirming that the ability to work in a hybrid manner influenced their decision to join us.

The desk booking system 'Robin Powered' was progressed from pilot to full roll out to provide a flexible desk and room booking system. As the year progressed, we gathered data on the platform's use, identifying 40% of desk are assigned, leaving 60% for hotel desks. We are continuing to use the growing dataset to understand how our employees are utilising desk and office space to optimise facilities now, and in the future.

Other areas of progress include:

Hybrid working and meeting room audio-visuals – provision of hybrid working setup for 850+ desks. Deployed 1,700 laptops since April 2020. Up to date AV equipment and software, suitable for in-room and remote meeting attendance, installed and configured in 33 conference and meeting rooms on campus.

SharePoint Phase 4 - developed and delivered training courses through external supplier and in house resource. Created a SharePoint governance document (available via our intranet to staff) and developed an O365/SharePoint vision and strategy.

Cyber Security Tool – System has been implemented which will identify and send alerts for potential security breaches.

Data Connection Upgrade – Lines installed and infrastructure in place to run up to 100Gb connection, 10Gb connection now increased to 20Gb. Switch over to the new firewalls still to take place, planned for July 2022.



Fusion presents an exciting economic opportunity for the UK

EU EXIT

Delays to UK association to the Euratom Research and Training programme and Fusion 4 Energy, continues to have an impact on UKAEA participation in and contribution to these programmes. The UK Government's position is that the UK is ready to associate, however, it is prudent to plan for all eventualities. As such, UKAEA has been working with government to prepare alternatives to Euratom/ F4E association.

Impacts are primarily in three areas:

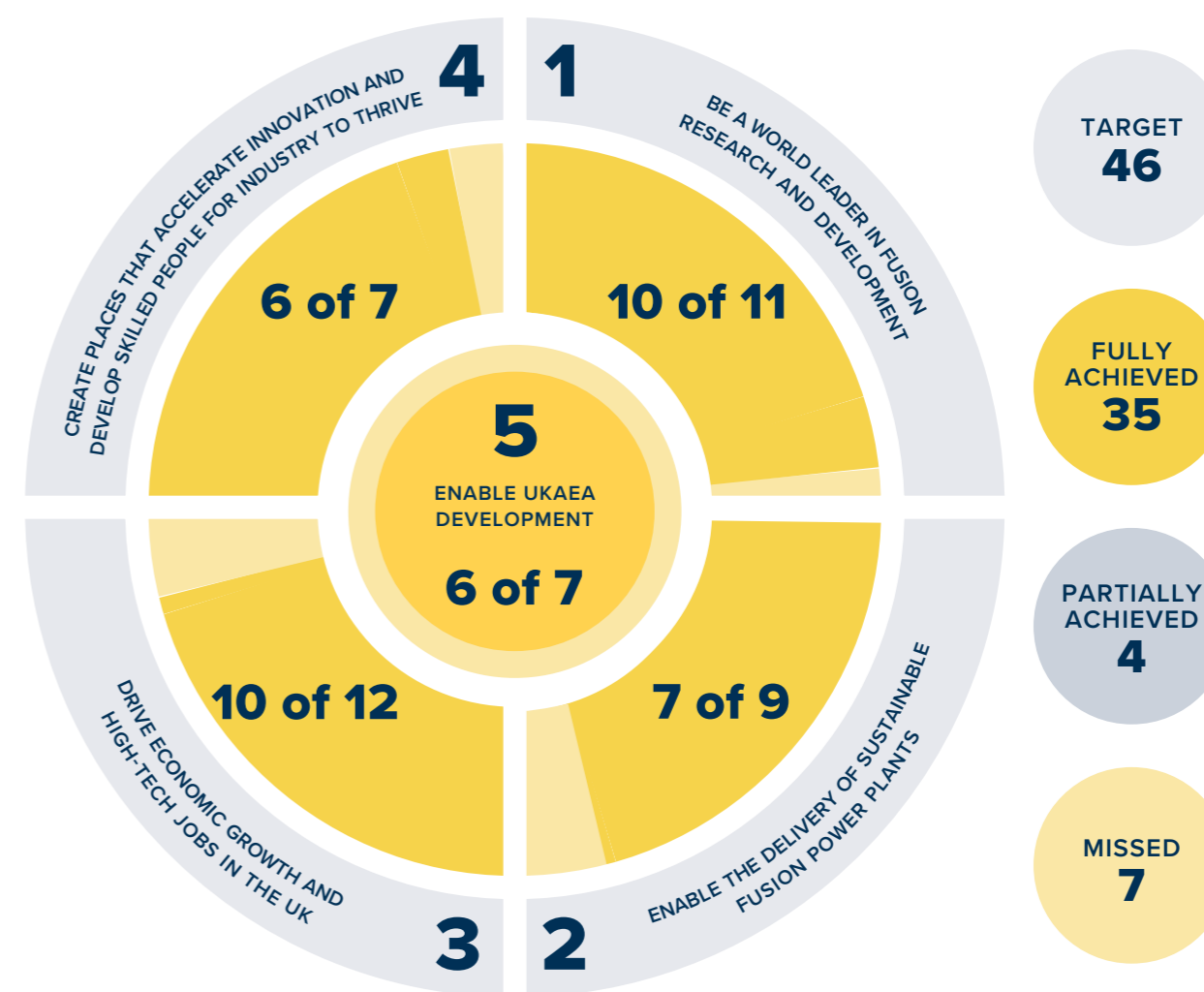
EUROfusion	JET	ITER
<p>Membership of the EUROfusion consortium requires UK's association to the Euratom Research and Training programme. In 2021 UKAEA became a "suspended signatory" to the EUROfusion consortium agreement i.e. it is a member of the consortium, but its membership has been suspended until such a time as the UK associates to Euratom R&T. However, UKAEA has entered into an Associated Partner Agreement with Max-Planck-Gesellschaft zur Förderung der Wissenschaften e.V in Garching, Germany (which is a EUROfusion member) under the auspices of the EUROfusion Grant Agreement. UKAEA therefore continues 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 has continued to cooperate with on MAST and a portion of the experimental programme was allocated for EUROfusion experiments in 2021.</p>	<p>JET is normally run and funded as a joint facility with EUROfusion. As the UK is not currently associated to Euratom (and by extension EUROfusion) EUROfusion is not currently funding JET. As a result, UKAEA has continued to fund full JET running costs to maintain the world class science done at this facility, including record breaking results at the end of 2021.</p>	<p>UK industry has so far secured around £650m of contracts from ITER, and with UKAEA support through unique expertise and capabilities, we target another £1bn before operations begin in 2025. 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, from 2021 UK entities have been judged ineligible to win or participate in ITER contracts.</p>

PERFORMANCE OVERVIEW

The performance overview and analysis present UKAEA's performance for the period 2021/22, providing an indication of performance measures achieved or missed, and a detailed description of programme performance against our strategic goals.

Performance Overview - Milestones

To focus performance on our key goals, we define objectives and 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. These are set to be attainable but stretching. In 2021/22, we targeted 46 milestones to reflect a cross section of our ambitious, important and impactful areas which support the UKAEA mission and goals. We fully achieved 35, partially met 4 and missed 7. A summary of the key successes and the impact of partial/ missed milestones is included within the Performance Report.



A detailed analysis of our performance in 2021/2022 is provided in the performance analysis section that follows.

OBJECTIVE 1:

BE A WORLD LEADER IN FUSION RESEARCH AND DEVELOPMENT

Milestones



Maintaining a strong, world-renowned research programme is essential to realising UKAEA's mission by developing new ideas, solutions, innovations, and technologies that drive fusion forwards. In operating and being a leading contributor to the scientific output of the EU's JET facility at Culham – widely acknowledged as the most capable fusion research facility in the world – and participating in the science of ITER as a route to a key experimental validation of fusion energy gain, UKAEA research will remain at the forefront of the global community. UKAEA's MAST Upgrade device at Culham represents a unique experimental facility advancing fusion towards higher performance and more compact design and providing key experimental input to the modelling and understanding of fusion systems. Our RACE, MRF, FTF, and future H3AT facilities offer a unique breadth of experimental capability in robotics, materials, component design and manufacture, and tritium to address fundamental challenges in fusion science and technology. As a primary use case for these experimental capabilities, the Fusion Research programme focuses on developing the fundamental science and solve the challenges underpinning fusion power plant design and innovating to improve performance and reduce costs for future sustainable fusion power production.

FUSION RESEARCH AND DEVELOPMENT

4 OF 6 MILESTONES FULLY ACHIEVED, 1 PARTIALLY ACHIEVED

MAST UPGRADE OPERATIONS

In October 2020 the MAST Upgrade device ran its first plasma experiment – or pulse – and this year has taken leaps forwards by completing its first experimental campaign. This was held from 10th May – 28th October 2021 with over 1000 individual pulses run across the breadth of the campaign. 299 of these pulses were run on behalf of the EUROfusion consortium, where MAST Upgrade plays a key role as part of the Tokamak Exploitation programme. The full experimental campaign saw 181 individual participants from 30 international institutions in the UK, Europe, US, and Asia. The scientific achievements of the experimental campaign have been numerous, and this has translated into planning for the second set of experiments to begin in summer 2022. The MAST Upgrade research forum – the convening body bringing together scientists from across the sector to advise on the goals of the campaign – had more than 180 participants with 3.7 times more pulses requested than available: a testament to the value of the facility to the fusion scientific community.

In the intervening months since the first experimental campaign ended, MAST Upgrade has been undertaking a planned engineering break. The main objective of this break is to inspect and test key components of the device after their first use, and to install new components to the device to extend its capabilities for the second experimental campaign. Whilst a large portion of these activities have completed successfully and to schedule, and milestone was missed relating to the installation of a cryoplant system to the device.

In the next few years, MAST-U will undergo an extensive upgrading programme, more than doubling its auxiliary heating power and providing the device with more reactor relevant capabilities. In particular, a cryoplant will be connected to the existing cryopumps of the machine, thus allowing better density control and plasma purity. Two additional neutral beams will bring the external heating from the current

5MW to 10MW and will provide a great flexibility in shaping the plasma current. Finally, a new Electron Bernstein Wave heating system will add 2MW of additional power, specifically tailored to reproduce reactor relevant electron heating and supporting the STEP programme, where this technology will be widely used.

FUSION RESEARCH

The fusion research programme focuses on fundamental research and development to drive fusion forwards, convening the UK fusion community, and training the next generation of fusion scientists and engineers. The programme is conducted under grants, majority funded by the Engineering and Physical Sciences Research Council. In March 2022 the previous EPSRC programme grant was completed, and a new 5-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 seven areas:

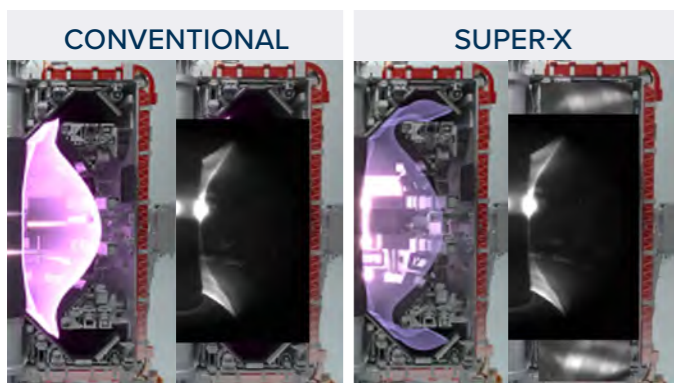
TOKAMAK SCIENCE

The Tokamak Science programme covers fundamental research in the physics of tokamak plasmas through a portfolio of experimental and theoretical analysis and modelling based activities conducted by a diverse range of experts. In the last year. Some milestones were not fully realised (paper/report on respectively, simulations of JET shattered pellet injection and the influence of plasma exposure on some properties of plasma facing material) but enormous effort by the JET team has been focused on delivering the ambitious high-power deuterium-tritium fusion campaign (DTE2). JET is by far the best placed experiment to test whether ITER can reach its goals and prepare us for a fusion economy. The main thrust of the DTE2 campaign was to validate the ITER approach and provide unique, detailed, and valuable, scientific insight into DT fusion plasmas – important for the whole field of fusion. Although internal targets set for the tritium

PERFORMANCE REPORT

rich pulses were not fully reached, the DTE2 campaign was a great success with respect to both of the intentions above, breaking records in the process. On 21st December 2021, JET delivered a fusion energy output of 59MJ over a 5 second pulse, more than doubling the previous world record for energy output and did so in an ITER-relevant set up. JET's record-breaking performance was in line with predictions made by sophisticated computer models developed to model the highly complex behaviour of these plasmas in conditions never attempted before.

In parallel, MAST-U had its first campaign in the last year, demonstrating scientific advancement in addressing the Plasma Exhaust Strategy, including the Super-X divertor configuration. Exhausting the heat and particles from the plasma core in a reactor is a key issue facing the development of fusion energy and MAST-U is at the forefront of research to reduce the heat arriving at the material surfaces. An internal milestone to complete installation of the cryoplant was not met, However, experimental results this year have confirmed the predictions of the Super-X divertor and have shown more than a tenfold reduction in the heat arriving at material surfaces, thus demonstrating an approach that will be crucial for handling the exhausted power in reactor grade machines, especially those based on spherical geometry – an outstanding result.



In Focus: MAST Upgrade

MAST-U was designed 13 years ago and 10 years ago we made a prediction of being able to reduce the energy fluxes by a factor of 10, using our Super-X divertor. The scientific advancement this year also validated our modelling, which means we can have confidence in our simulations for our future devices.

ADVANCED COMPUTING

Fusion research is computationally demanding, a team is built, dedicated to addressing key computing challenges, developing a network with leading specialists in the UK and embracing new and emerging ideas to move the digital capability of fusion forwards. The group is a partner in the design and development of the ExCALIBUR project, a major EPSRC programme led by the Met Office to develop simulation tools in the UK to exploit the radically changing exascale supercomputing architectures of the future. Advanced Computing continues to engage with a range of partners, including Nvidia, Intel, Universities collaborations include Oxford, Cambridge, and Manchester, to explore applications of cutting edge digital technologies and architectures to the challenges of fusion. Future plans will focus on growing a holistic digital capability.

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. 2021 saw the launch of the Fusion Roadmap where the materials science and engineering team is providing a holistic perspective on what is yet to be done in materials analysis, modelling, development and qualification towards future fusion powerplant builds. The team has also developed and trialled the first modified fusion-relevant castable steel for improved performance beyond EUROFER and achieved stable mechanical property results for this candidate materials. The nuclear data team generated a first web-interface version of the internationally used and respected nuclear data inventory code, FISPACT II. In terms of capability, the year saw a doubling of the Materials Research Facility via a £10m Fusion Foundations Programme grant and project. We also achieved an RAEng award to set up a first modelling cohort to work on predictive models (at polycrystalline scale) for fusion materials in powerplant conditions.

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

PERFORMANCE REPORT

factors create a need for innovative design, manufacture, and testing processes to deliver the technological and structural components of a fusion reactor.

This year the team developed an experimental-modelling framework for multiscale full-field plasticity assessments of components and materials performance utilising Digital Image Correlation, along with complete first validation. They are establishing methods for assessing component complex loading on small scale materials testing samples, rapidly accelerating research analysis procedures. Another focus has been code developments for neutronics: assessment of modern nuclear analysis techniques for integrated fusion engineering design. State of the art benchmarking and comparison of emergent radiation transport codes. Also, Development of a novel 1-Step Shutdown dose rate code for rapid shutdown does rate assessment of fusion power plants. This led to a key report and journal submission, clear progress towards world leading assessment code in both accuracy and computational speeds.

The team has supported the release of the EUROfusion DEMO Design Criteria for In-Vessel Components Roadmap. The DEMO Design Criteria will dictate how to perform “design by analysis” processes accounting novel failure modes for divertor and Blanket components, essential to enable design and operation of the EU-DEMO and a key requirement to EUROfusion delivery.

A key capability, HIVE (High heat flux testing system), has seen substantial use with key supporting activities to UK Universities and major fusion programmes (STEP and DEMO). Notably validating additive manufactured components for future use in fusion systems.

TRITIUM SCIENCE

Tritium is the radioactive isotope of hydrogen used to fuel the fusion reaction alongside the non-radioactive isotope deuterium (extractable from natural water). Being lighter than other elements, hydrogen isotopes are able to permeate materials easily. These factors mean that designing tritium systems for fusion is challenging and requires dedicated research and innovation. This year, the Active Gas Handling System (AGHS) team have delivered critical

operations in support of JET. This has provided vital operational experience and the real-life hands on experience necessary to our research and innovation programmes. Our capabilities have been increased with the establishment of an interim H3AT laboratory, and the team has supported ITER by testing the performance of a Palladium membrane reactor. The team provided expertise to the DELPHI (Device for Exposure to Low-energy Plasmas of Hydrogen Isotopes) experiment, in collaboration with other R&D organisations, which looked at the retention and release of deuterium from molybdenum samples, representing an important world-first investigation of the material. A milestone missed was the close out of experiments to explore to what extent tritium retention in wall materials saturates with increasing radiation damage (compared with theoretical models); this important work continues.

In Focus: Palladium membrane reactor (PMR)

The palladium membrane reactor (PMR) project has explored, in close collaboration with ITER, the efficiency of an inside-out type PMR to recover hydrogen from fusion relevant gas streams. This year, after an upgrade to the water inlet to improve steam quality, the experiment has successfully recovered more than 99.99% hydrogen from methane and water and explored the efficacy of the recovery from 400C to 550C.

Having successfully demonstrated detritiation of operational waste through the Materials Detritiation Facility, the team are working to de-risk the treatment of other materials which will be generated from JET such as Tungsten and Beryllium. This will also be relevant to future fusion devices. They also played a key role in an IAEA Fusion Radioactive Waste Workshop in Vienna through presentations, papers and chairing sessions.

ROBOTICS

A fusion power plant in or after operation will be a hostile environment for human operators, and alternative solutions to maintenance, servicing, inspection and decommissioning will be necessary. Primarily focused on the EUROfusion

PERFORMANCE REPORT

DEMO programme, the work undertaken to date in Robotics within the UK fusion programme has led to the widespread acceptance that remote maintenance is device defining and mission critical: a fusion power plant has to be designed to be remotely operated and the remote maintenance system must work. Alongside systems engineering and design of maintenance solutions and strategies for DEMO, several large scale test systems have been developed and studied within RACE. These include TARM – the Telescopic Articulated Remote Manipulator, built for JET in the 1990s and now refurbished to test new control systems allowing for high payload movement at acceptable speed – and AIM-TU – The Automated Inspection and Maintenance Test Unit to test automation of maintenance tasks using digital twin technology with the power to adapt to unknown environments.

OUTREACH AND TRAINING

UKAEA benefits from many strong collaborations with over 30 UK universities, supporting a wide range of undergraduate, masters, and doctoral students with projects using UKAEA facilities, expertise, and supervision.

As we have emerged from the pandemic, our public engagement and outreach continues to grow, and face to face events (open evenings, science festivals etc.) have restarted in earnest. Most notable is an increasing public and schools' engagement programme around our Fusion Technology Yorkshire site. In the period April 2021 to March 2022, we hosted 110 virtual and face to face events including visits; talks; festivals; and other ad-hoc activities. reaching ~9,000 individuals.

JET OPERATIONS

5 OF 5 MILESTONES FULLY ACHIEVED

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.

Until 31st October 2021, UKAEA operated JET under a JET Operating Contract (JOC) with the European Commission. Following expiry of the JOC, JET became a UK asset but with 100% of its scientific programme given over to the EUROfusion consortium who had endorsed a proposed extension up to the end of 2023, subject to sufficient funding being made available in the Grant Agreement. At the time of writing, the UK had not associated to Euratom with the result that funding of JET operations through the EUROfusion Grant Agreement is not secured and JET operations continue to be funded at risk by the UK Government.

Scientifically, this was a historic year for JET with many unique and incredibly important results delivered, culminating in the first D-T experiments in a generation which concluded on 21st December 2021. This campaign had 6 high level goals including sustaining an average fusion output power of 10MW over a period of 5 seconds. Many of the goals were achieved, including this high performance goal where a record 59MJ of fusion energy was delivered. However, system reliability issues, particularly the neutral beam heating systems, ITER-like Antenna, power supplies and the Cryoplat, meant some of the goals were not achieved including, for instance, limited high power performance in the "baseline" scenario, one of the two ITER-like plasma scenarios under investigation. Overall, this and other campaigns were judged a success and a major step forward in the quest for fusion energy, with over 50 scientific and 20 operational papers expected to be published from the DT campaign alone.

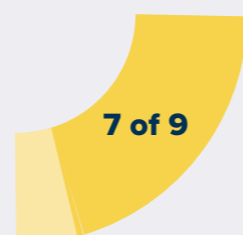
PERFORMANCE REPORT



Experiments on the Joint European Torus delivered record-breaking results

OBJECTIVE 2: ENABLE THE DELIVERY OF SUSTAINABLE FUSION POWER PLANTS

Milestones



UKAEA is focusing on the ‘tokamak’ approach to fusion, the most mature fusion concept in terms of development to date and an approach which can be extrapolated to envisage a full-scale fusion power plant. Building on a pioneering legacy in spherical tokamak research, UKAEA’s STEP Programme will develop commercially viable compact fusion power plant designs, whilst the EUROfusion DEMO programme of which we are an active participant and supporter is based on the more mature but larger conventional tokamak approach. In moving from research to a delivery phase, new design approaches, processes and tools that take a holistic view whilst respecting the complexity of a fusion power plant are in development; the legacy of these developments will be an integrated fusion design capability for fusion systems in the UK alongside wider societal benefits. Alongside technical advancements, UKAEA is committed to supporting the development of an enabling environment needed for a fusion power plant in the UK, by engaging industry and academia, providing expert advice to government, and generating the programme tools needed to deliver the first fusion power plant.

SPHERICAL TOKAMAK FOR ENERGY PRODUCTION

4 OF 5 MILESTONES FULLY ACHIEVED

The mission of the Spherical Tokamak for Energy Production (STEP) programme is to “Deliver a UK prototype fusion energy plant, targeting 2040, and a path to commercial viability of fusion”. The programme builds on the UK’s fusion leadership and engages both industry and academia across the nation.

The programme has now completed its third year of an initial five-year phase and has made some significant progress against its key Tranche 1 objectives during 2021 and 2022.

Firstly, at the end of 2021, the team agreed an initial preferred single concept for the STEP prototype plant. This is significant as it moves the programme from a period of prospecting and investigating the design space to ongoing iteration of a single design point. The programme also presented its detailed technical work to the Technical Advisory Group (TAG), convened by BEIS to provide assurance on technical progress. The feedback from the TAG was that although significant technical challenges remain, the programme has a good understanding of each one and emerging plans to address them.

Outside the technical programme of work there are other important areas of progress. The process to select a site where the STEP prototype will be built continued through the year, with a longlist of 15 possible sites shortlisted to five potential locations in October 2021. A second phase of detailed technical and socio-economic assessment was completed through the winter, with final recommendations due to be submitted to the Secretary of State early in the next financial year.

Equally significant is the work, in partnership with government, towards the achievement of the Tranche 1 objective to establish the appropriate delivery model for STEP to move into Tranche 2. This includes the establishment of a new Delivery Body, most likely as a subsidiary of but operationally independent from UKAEA, as well as the successful engagement of two Whole Plant Partners to work alongside the new organisation and UKAEA to deliver the STEP prototype. The delivery body has now been outlined and, through submission of a business case to BEIS, will be established in the next financial year.

PERFORMANCE REPORT

3 OF 4 MILESTONES FULLY ACHIEVED

EUROFUSION DEMO AND RELATED WORK

The European DEMO (DEMOstration power plant) is the EU power plant concept developed by the EUROfusion consortium. Similar to 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. The UK's position within the DEMO and wider EUROfusion programme was through its association to Euratom. At present, the UK's position is as an Associated Partner, via an agreement with Max-Planck-Gesellschaft zur Förderung der Wissenschaften e.V in Garching, Germany (which is a EUROfusion member).

UKAEA supports the EUROfusion DEMO programme through skills, expertise, and capability provided by RACE, Fusion Technology, Tritium systems, Materials Science, and Tokamak Science, and uses staff in support divisions as well. The DEMO programme is divided into twelve specialist work packages now linked via overarching activities, especially a new DEMO Central Team (DCT) focusing on the integrated design and its optimisation, and UKAEA has several participants in the DCT, including in 2021-22 the engineering lead who has been assembling the engineering team in the DCT.

Amongst the specialist work packages, UKAEA has led and conducted the majority of the remote maintenance design and R&D package since the start of the EUROfusion consortium in 2014. The remote maintenance concept is device-defining as has become even clearer over the last year as various options for the DEMO architecture were rapidly explored to ease the challenge of precise handling of very large (up to 100 tonnes) blanket components. These studies addressed the entire maintenance scheme, from maintenance strategy to the design of the active maintenance building and the logistics of moving items around the plant, control, logistics, robotics and tools for in and ex-vessel activities, aiming for a holistic design. In the year there were two major activities (amongst others), working on approaches to handling the large blanket components to high precision (sub-cm) inside the vessel. This included the idea of systems holding both the top and bottom of the very tall (~10m) components, and extensive work on integrated and automated control of the multi-actuator movers. This took advantage of the multi-joint robot arm from a major facility built for

JET, after refurbishment and modification, to provide a testbed for control of complex movers with many degrees of freedom (eg. several options for the same movement of the object). A wide range of 3rd party and open-source software was identified and used for the control system, and for the design a change was explored towards near off-the shelf winches etc.

A major piece of work has been led by UKAEA over the last few years, developing the materials design criteria for DEMO, and an updated roadmap with supporting documents was assembled (some still in development – it is a live roadmap). This is important to allow the design to advance, addressing criteria for the structural integrity, overall performance of the materials and components, and the safety (eg. containment structures). It sits alongside the Materials Properties Handbooks (which UKAEA have also been involved in assembling).

Also, in the area of materials, new work was initiated to develop improved microstructures of steels in the quest to increase their radiation resilience and operating temperature. The hope was to use standard casting and thermomechanical processes, but in different ways, different minority chemical concentrations, to try to adapt the microstructure in ways that would, for example, increase the creep strength as well as the yield and ultimate tensile stress. There are encouraging signs from the results, at least for the unirradiated material. This was conducted in close collaboration with Swansea University.

Finally, in the area of tritium handling, a programme was started, as a part of the EUROfusion programme, to provide a facility to test and develop the high accuracy, high precision measurements needed for tritium accountability – the tritium inventory has to be known to high precision, and the small losses to the local environment measured accurately and consistently, over long time periods. An extensive survey of the options was conducted, and an outline design of a rig was created. This would be built at Culham and ultimately located in the H3AT facility.

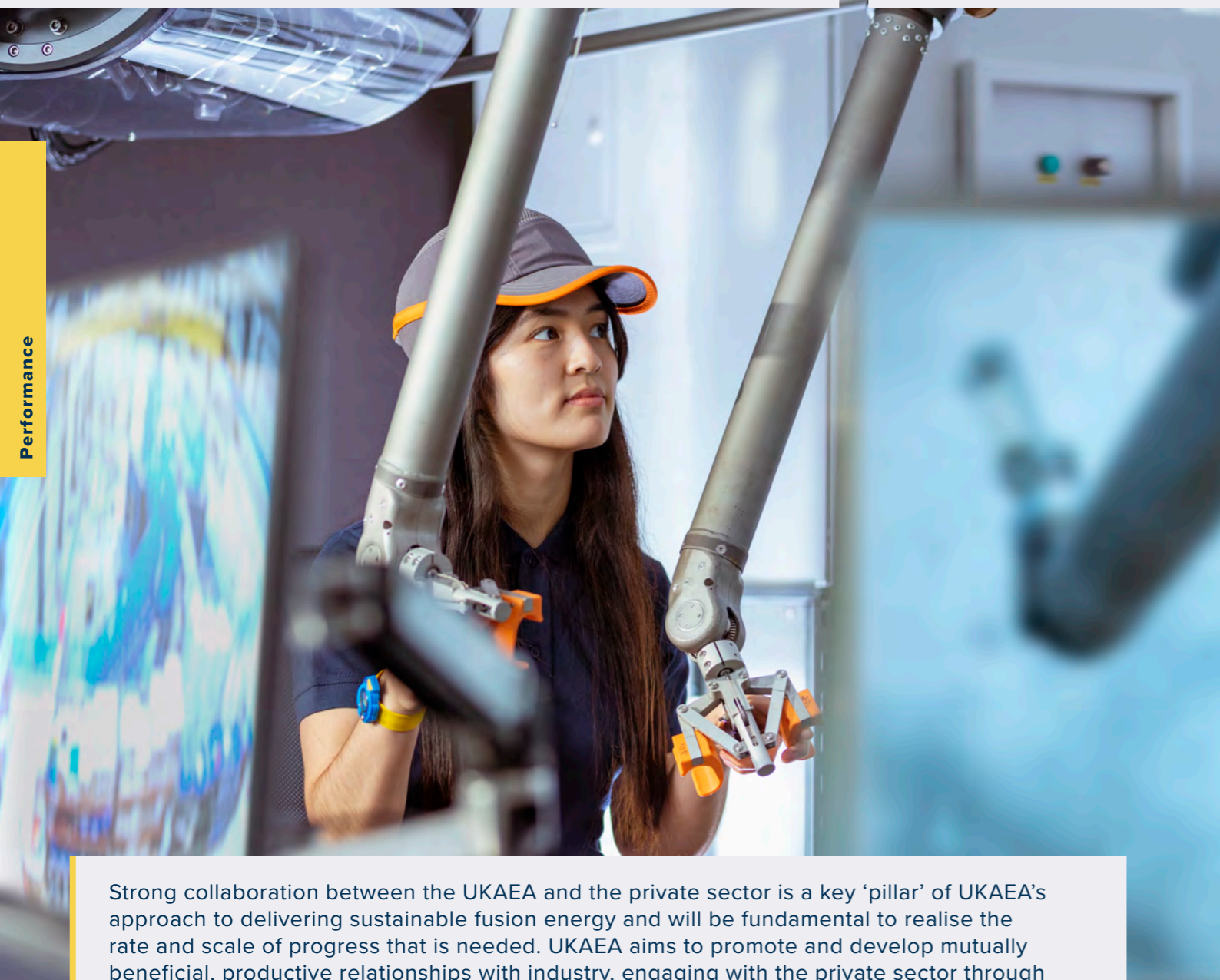
For the milestones where there was an intention to make more progress, the situation is probably recoverable, with extra effort if needed – they are steps in longer programmes linked to the DEMO schedule (which may itself evolve).

PERFORMANCE REPORT



OBJECTIVE 3: DRIVE ECONOMIC GROWTH AND HIGH-TECH JOBS IN THE UK

Milestones



Strong collaboration between the UKAEA and the private sector is a key 'pillar' of UKAEA's approach to delivering sustainable fusion energy and will be fundamental to realise the rate and scale of progress that is needed. UKAEA aims to promote and develop mutually beneficial, productive relationships with industry, engaging with the private sector through its four business units to stimulate innovative solutions to technical challenges and develop economic opportunities. A fusion power plant may be decades away, but the economic impact of the fusion programme can be significantly nearer-term. UKAEA is committed to maximising the transfer of innovation, skills and knowledge from fusion into adjacent sectors to provide socioeconomic benefit in different regions of the UK, with the objective of increasing national prosperity, resilience, and sustainability.

3 OF 3 MILESTONES FULLY ACHIEVED

REMOTE APPLICATIONS IN CHALLENGING ENVIRONMENTS

RACE, the UKAEA's robotics centre for Remote Applications in Challenging Environment continues to deliver a broad portfolio of projects with a team of more than 300 engineers.

Recognising that design for remote maintenance is device defining for all fusion power plant architectures, our work has included completion of the design and commissioning of the JET remote handling recovery systems and demonstration of wire cutting and laser size reduction for the inside-out decommissioning of JET. RACE continues to host the ITER Robotics Test Facility and contributes to STEP and leads remote maintenance within EUROfusion's DEMO Programme.

Beyond fusion, this has been a critical year for the European Spallation Source Active Cells Facility. Despite COVID, RACE has installed shielding systems, control system, handling systems and size reduction systems on budget and on schedule in Sweden, building capability for fusion hot cell design.

LongOps has seen the on schedule commissioning of the HWM Telbot manipulators and installation of a full digital mock-up (digital twin) for the opening of RAICo One, a new facility that hosts the Robotics and AI Collaboration with the NDA and the University of Manchester in Cumbria. The first six long-term TEPCO secondees are now embedded in the RACE team learning about long term remote operations for the planned fuel debris retrieval at the Fukushima Dai-ichi reactors.

We also saw the completion of RAIN, the UKRI funded Robotics and AI in Nuclear hub. Highlights included huge progress in remote handling with robots in not-glove boxes (RoBox™) and deployment of Spot the quadruped into a C5 radiation area for health physics checks showing the way for safer, faster, cheaper nuclear operations. In early 2022 we supported LuffyAI's Series A funding round also hosted the very first driver-out testing of Oxbotica's no-steering wheel autonomous vehicles. Oxbotica now looks set for unicorn status in 2022.

PERFORMANCE REPORT

3 OF 3 MILESTONES FULLY ACHIEVED

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. It has benefited from major investment from EPSRC, via the UK's National Nuclear User Facility (NNUF) programme and The Henry Royce Institute for Advanced Materials (Royce) initiatives, alongside direct support from the Government.

In September 2021, the newly constituted Materials Division launched a UK Fusion Materials Roadmap, after several months of intense engagement with industry, academia and relevant state-linked RTO's. This roadmap lays out five critical gaps on the path to future fusion powerplant delivery: radiation resilient superconducting magnets and their shielding, especially at cryogenic temperatures; better tritium breeder materials and barriers; high temperature structural materials; a strategy for engineering assurance via irradiation and modelling; and low activation variants for reduced fusion waste. Over the past year, the Division has recruited a team of over two dozen scientists and engineers, creating capability to deliver R&D against these five themes for UKAEA and to support wider efforts across the UK and international materials R&D community. First initiatives included experiments in novel thermomechanical treatments for reduced activation ferritic martensitic steels to achieve better microstructures for neutron irradiation resilience, and irradiation impact evaluation on high temperature ceramic composites for breeder modules.

This new materials science and engineering capability builds on the existing experimental capability represented by the Materials Research Facility (MRF) with the latter doubling its footprint in 2021 (to 4400m²) via a £10m Fusion Foundations Programme project and expanding its instrument footprint (new Plasma FIB and Transmission Electron Microscope among other equipment in 2022) via ~£8m of National Nuclear User Facility grants. Ramped up utilisation of the MRF brought challenges over the past year, in terms of waste processing as sample receipts exceeded current waste permitting constraints.

Remedial action was rapid, with intensive engagement with the Environmental Agency, and an expanded waste permit application is in process for late 2022.

A third core group in the Division, comprising nuclear data scientists and atomistic modellers, expanded their activity range in the past year to include consulting work for the radioisotope community while delivering fundamental shielding and waste calculations for the evolving engineering design concepts within the STEP Programme. In addition, the team developed the first web-aligned version of the well-respected FISCPACT inventory code, utilised globally for neutron cross-section analysis.

2 OF 3 MILESTONES FULLY ACHIEVED

H3AT

H3AT (Tritium Advanced Technology) both operates the tritium fuel handling systems for JET and also drives the UKAEA research and development programme for fuel cycle technology. The H3AT team of scientists and engineers are delivering innovative fusion solutions and tritium science on EPSRC, JET, DEMO and STEP programmes. Additionally, H3AT are building international collaborations with key research laboratories and fusion companies in Canada, the USA, Europe and Japan.

With funding from the NFTP programme, the H3AT facility will deliver a new world class capability for testing and developing the tritium technology required to fuel a future fusion power plant, supporting UK industry to win significant contracts in ITER and developing the next generation of UK tritium technologists.

Construction of the H3AT facility progressed significantly in the year and the team completed a concept design for the 'ITER relevant tritium loop' – a process pilot plant designed with ITER to demonstrate the ITER fuel cycle at 1/20th scale. The programme is placing major procurements in 2022 for assembly in 2023.

Our current laboratory facilities enable UKAEA to deliver research on tritium material interactions,

PERFORMANCE REPORT

2 OF 3 MILESTONES FULLY ACHIEVED

FUSION TECHNOLOGY

The Fusion Technology team consists of specialist technology groups with in-depth capabilities in a range of fusion-critical disciplines including neutronics, power plant design, thermal hydraulics, applied materials technology and testing, advanced manufacturing techniques and qualification of components. These groups continue to deliver innovative results across UKAEA's technical portfolio. Additionally, this team provides a broad range of commercial services to third-party fusion and non-fusion projects.

Funded by the NFTP programme, the Fusion Technology Facility in South Yorkshire is now operational with 45 UKAEA staff members based at the office. The location in the Advanced Manufacturing Park has helped to build collaborations with industrial organisations in the region including both large industrial groups and smaller SMEs.

A number of new test facilities are being developed for the FTF including open access thermal hydraulics experimental rigs supported by the National Nuclear Users Facility (NNUF) funding and cryo-magnetic test rigs to support the STEP programme. A major feature of this new facility will be the CHIMERA rig – a globally unique thermal hydraulic testbed capable of exerting simultaneous fusion relevant heat and magnetic loads onto full scale components. This facility will be relevant to all magnetic confinement fusion devices and will be critical to the qualification of component and assemblies for use in fusion. The CHIMERA test rig is currently in manufacture and will be assembled in 2023.

Fusion Technology was successful in establishing the South Yorkshire operation and implementing local policies and procedures for the safe and effective running of the site. A second milestone was also accomplished in building key capabilities across the technical groups.

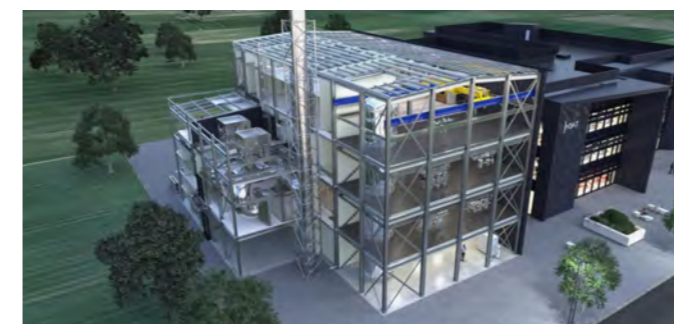
Fusion Technology missed a milestone to commission the CHIMERA test facility which is still in the manufacturing phase. This facility will now be commissioned in 2023.

permeation, process system performance and coatings. Our research is enhanced by close links to university research and H3AT supports a RAE Fellowship in Fusion Fuel Cycle Technology at the University of Bristol and has created a new Professorial Chair in Fuel Cycle Technology at the University of Manchester.

The H3AT team are also applying the UKAEA's experience in hydrogen research to Net Zero challenges within the broader hydrogen economy. This year the work programme has included a joint project with UK industry and universities applying fusion-enabling hydrogen storage technologies to net zero energy storage applications.

The H3AT team also have members based at the Fusion Technology Facility in South Yorkshire where we are establishing strong links with Sheffield University and the South Yorkshire hydrogen technology cluster.

H3AT successfully delivered the Interim H3AT facility, which will accommodate tritium experiments whilst the new facility is under construction. The team also delivered on the corporate milestones relating to training and the development of a skills pipeline. As a part of this goal, H3AT have created a structured tritium technology training programme which enables us to build capability both within our team and also within UK industry.

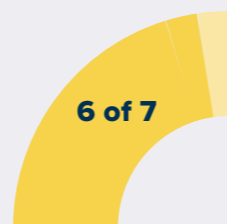


It was planned to place all major procurements for the new H3AT facility within the year. This milestone was missed due to the level of technical work required to complete the final design. As a result, the availability of the hardware will be pushed into 2023.

OBJECTIVE 4:

CREATE PLACES THAT ACCELERATE INNOVATION AND DEVELOP SKILLED PEOPLE FOR INDUSTRY TO THRIVE

Milestones



UKAEA uses its unique assets at Culham, Harwell and in Yorkshire to host our research facilities and our people, develop ‘clusters’ of focused R&D and commercialisation. We will use these to contribute to national prosperity, resilience and sustainability, to deliver the fusion mission. Place is important and, whilst our main base of activities remains on Culham Campus, our presence is expanding into regions elsewhere where the local ecosystems can help us to deliver our mission and where the delivery of our mission can bring local socioeconomic benefit and strengthen the national R&D capability.

2 OF 3 MILESTONES FULLY ACHIEVED

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 a thriving private sector in fusion and beyond. In 2021, UKAEA established a new technology cluster focused on advancing fusion. The Fusion Cluster brings together private fusion companies, a wide range of businesses in the supply chain and adjacent industries, academics, investors and policymakers. The Fusion Cluster has a strong presence in Oxfordshire where many fusion-focused organisations are based, but it works around the UK. The cluster creates connections, facilitates knowledge-sharing, offers support for start-ups and access to UKAEA’s facilities across the UK. Already more than 70 organisations have joined. The Fusion Cluster has its own dedicated development manager and advisory board.

To deliver the UK’s fusion energy objectives its essential to collaborate with the best talent and facilities globally. UKAEA has a long history of contributing to multinational projects, such as ITER, and is now complementing that by developing bilateral collaborations with the leading private fusion companies globally.

The year saw the progression of an industry pilot scheme into the Fusion Industry Programme – a private sector targeted set of schemes created to support the nascent fusion industry through equity investment, challenge project funding, skills support and free access of our capabilities for technology testing and transfer.

The fusion sector is rich in innovation and this year UKAEA has created and appointed a new Head of Innovation.

In collaboration with the Fusion Industry Association, we contributed the publication of “The global fusion industry in 2021” – a comprehensive review of the exciting progress of the burgeoning global fusion industry.

1 OF 2 MILESTONES FULLY ACHIEVED/
1 PARTIALLY ACHIEVED

CULHAM SITE IMPROVEMENT AND CAMPUS DEVELOPMENT

UKAEA operations and property interests are predominantly based across three sites: Culham, Rotherham and Harwell. Culham campus is one of the three large internationally significant science and business centres in southern Oxfordshire, underpinning the County’s economic growth and is the base for the majority of UKAEA activities and tenants. Investment on Culham campus in RACE the MRF, OAS, and other building projects is already enabling industry locally and across the nation with new skills and capabilities, providing the hub of an international fusion cluster. The continued development of the campus through the NFTP and Fusion Foundations programmes is expected to enhance this creation of jobs and provide economic growth both locally and nationally.

The first milestone was to streamline the maintenance process to improve the operational efficiency of the buildings and plant. This was achieved with updated platforms, standardised data and improved maintenance scheduling. The second milestone was to grow the provision of buildings and facilities at Culham, specifically to complete the MRF extension and start construction of the new offices and OAS apprentice buildings. The MRF extension was complete, but the new buildings were slightly delayed, beyond the year end date, due to delays to the design, planning process and procurement. Both have now started construction.

2 OF 2 MILESTONES FULLY ACHIEVED

FUSION FOUNDATIONS

In the second year of this ambitious programme set to “deliver facilities, infrastructure and skills to enable world leading fusion and innovation in the UK” main activities include reaching an agreement with Canadian company General Fusion to site a fusion demonstration machine on our Culham Campus. Kier and McLaughlin & Harvey were successful in winning contracts to deliver our Culham Commercial Development Building and HQ Offices and Oxford Advance Skills Facility expansion, with work already underway this year. A comprehensive review was undertaken of new builds to ensure sustainability and inclusivity are at the heart of the designs, with a parallel initiative delivered improving access and awareness of inclusivity across our OAS apprenticeships. In support of hybrid working there has been a full refurbishment of the 2 main UKAEA conference rooms and 40 GB connection upgrade to provide faster and more reliable connections. This fits well with the roll out of hybrid working support applications and the increased cyber security protection provisions.

The team worked hard to improve governance arrangements for the programme, completing a successful OGC/03 review with Amber/Green in April 2021 (A significant stage gate within the Government Major Projects Framework). This confirms that robust governance arrangements are in place to manage a complex programme of this size. Only minor recommendations were made, and these were all implemented immediately following the review.

This will help us mitigate the issues being faced by this type of programme, with construction, IT transformation and facility upgrades at its heart, across all these areas unprecedented material cost increases and delivery delays are being actively monitored to understand and manage the time, cost and quality impact.



UKAEA's work continues to stimulate science and technology advances

OBJECTIVE 5: ENABLE UKAEA DEVELOPMENT

Milestones



Performance

People are our most important asset, and their safety and wellbeing is our number one priority, these performance objectives support our continued commitment to continually nurture a culture that promotes research innovation and leading-edge technological excellence and is committed to investing in its people. We seek consistently to provide a working environment where people are given challenging and rewarding work and have the opportunity to think innovatively about new problems.

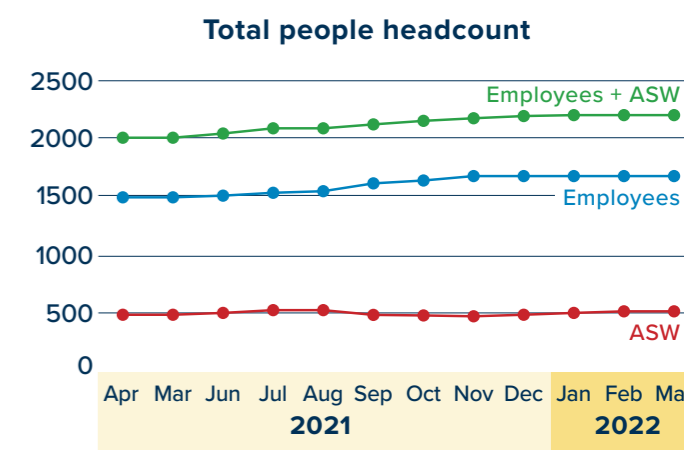
3 OF 3 MILESTONES FULLY ACHIEVED

PEOPLE

Attracting and developing our talent

Our world class reputation and increased contribution to the UK and other science and technology capabilities relies on the ability to attract, retain and develop first-class talent. 2021/22 was another year of growth for UKAEA, with the organisation reaching a milestone headcount of 2213 employees and agency workers. This growth continues to be driven by the delivery needs of UKAEA's widening portfolio of programmes and our continued international commitments. In total across 2021/22, 334 new employees joined UKAEA, and 210 colleagues were promoted. The Authority's recruitment system, which was implemented in 2021, supported this high level of talent acquisition. Since the rollout of the new system, 12,925 applications have been received (data from May 2021).

Growing our talent pipeline is a vital element of the work to ensure that UKAEA is training and developing current and future generations for the fusion sector, as well as for other technical industries. UKAEA hosts the Oxfordshire Advanced Skills apprentice training centre which provides technical apprenticeships for 35 businesses across the local area, particularly focusing on areas of skills shortage. The OAS provides opportunities for upskilling in engineering via apprenticeships across Oxfordshire with 25 businesses currently utilising the facilities. UKAEA employs 112

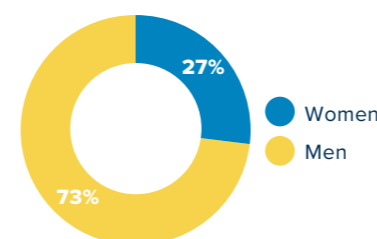


apprentices across a diverse range of disciplines from apprenticeship L3 to L6 standards, this includes 45 receiving their training through the OAS. UKAEA utilises the apprenticeship levy fully in line with Government expectations with 29 apprentices joining in 2021/22. Recognising the benefits of apprentices and supporting early careers within Oxfordshire we aim to grow apprentice numbers within the strategy to futureproof capability requirements.

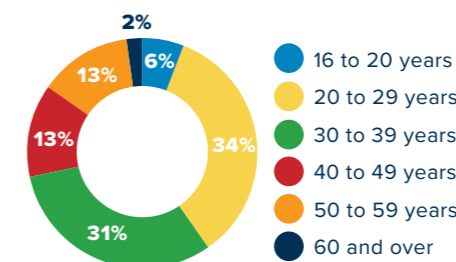
One of the highlights of the year was one of our engineering apprentices winning the national Large Employer Apprentice of the Year award at the Enginuity Skills Awards 2022. This particular award

Performance

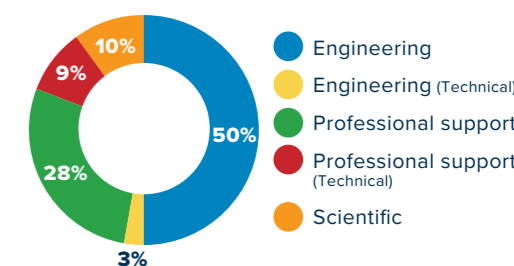
New hires gender split



New hires age split



New hires job family split



recognises the outstanding commitment to apprentices and apprenticeships within an organisation that has put apprenticeships “at the heart of their business”.

Alongside apprenticeships, UKAEA employs 81 graduates on a graduate leadership scheme, and supports approximately 95 PhD students through supervision and access to expertise and facilities. The development of the next generation of UKAEA leaders has been a focus in 2021/22, with new initiatives adopted, including the launch of UKAEA’s Leadership Programme, provided by King’s College London,

Feedback from participants in the first cohort of UKAEA employees on the Leadership Programme delivered by King's College London



OUR FIRST PEOPLE STRATEGY

The development of UKAEA’s future People Strategy continued in October 2021, with an extensive engagement programme, to give colleagues across the Authority the opportunity to provide input and express their views.

The five-year strategy will be presented to the Executive Committee in June 2022.

As part of the People Strategy work, we have been improving our strategic workforce planning to maintain our effectiveness in the coming years. Workstreams will allow us to continue focusing on supporting our people to be efficient, effective, safe and promote work-life balance:

- ▶ Enable the contraction and expansion of our workforce according to business priorities and budgeted establishment – the right skills, at the right size, for the right cost, in the right shape and at the right location
- ▶ Provide a systematic approach to planning for our future talent needs
- ▶ Inform our investment in the professional development of our people
- ▶ Inform the development of the skills base for the wider fusion sector.

EQUALITY, DIVERSITY AND INCLUSION

UKAEA is committed to providing a workplace where everyone can be themselves and live their truth free from discrimination, bullying or harassment. Over the last twelve months, we are proud of the progress we have made in embedding equality, diversity and inclusion in everything we do to support our goal of full equity and equality for all our colleagues.

To support this vision, we want to equally ensure our internal systems, practices and processes as an employer are adequately assessed for their impact on equality, are reducing/eradicating ineffective practices and any inequality as a result, thus ensuring we can evidence we have due regard to the need to eliminate discrimination, advance equality of opportunity and foster good relations between different people when carrying out their activities.

Our Employee Networks

We have four established employee networks and look to establish more in the coming year –

- ▶ **ENACT** (Ethnicity, Nationality, and Culture) Network,
- ▶ **LGBT+** (Lesbian, Gay, Bisexual, and Trans* +) Network,
- ▶ **Women's** Network
- ▶ **Parenting** Group

PERFORMANCE REPORT

Our Executive Sponsors

Our Executive Sponsors who champion the diverse spectrum of our workforce are as follows:

Ian Chapman	Chief Executive Officer	Age
Antonia Jenkinson	Chief Financial Officer	Disability
Paul Methven	Director of STEP	Gender Reassignment (including gender identity)
Alli Brown	Director of Finance	Marriage and Civil Partnership
Steve Wheeler	Director of Fusion Technology	Pregnancy and Maternity (including paternity, adoption and fostering)
Tim Bestwick	Chief Technology Officer	Gender (Female/Male)
Amanda Quadling	Director of Material Research	Sexual Orientation
Lyanne MacLean	Chief Operations Officer	Race and Ethnicity (Colour, nationality including citizenship)
Rob Buckingham	Director of RACE	Religion and Belief (including no belief)
Carrie Leadbeater-Hart	Director of JET Decommissioning and Repurposing	Young People (including Early Careers)

Our gender pay gap

In February 2022 the Executive Committee agreed an action plan to focus on this particular issue. We have established a Gender Pay Gap Panel, chaired by an executive sponsor, which is carrying out analysis to track and monitor the impact of those actions. Analysis includes starting salaries, levels of discretionary payments, promotion rates, the outcome of selection processes, resignations by women, and the uptake of flexible working and shared parental leave. Our actions are targeted to reduce the Authority's gender pay gap, and we will continue identifying and implementing additional actions as necessary.

Conferences and memberships

During this period, we supported several ED&I programmes, including the Women in Nuclear Conference, and Inclusion and Diversity in Nuclear Conference. To help us to keep informed and involved in initiatives that will enable us to improve our ability to meet the needs of all our colleagues, we have also become a member of several specialised national charities, including:

- ▶ Purple Space - <https://www.purplespace.org/memberships>
- ▶ Advoc8 - <https://advoc8.org.uk/memberships>
- ▶ Carers UK - <https://www.carersuk.org/for-professionals/employers-for-carers>
- ▶ Race Equality Network - <https://raceequalitynetwork.org.uk/membership/>
- ▶ Inclusive Employers - <https://www.inclusiveemployers.co.uk/membership/>

PERFORMANCE REPORT

Training and support

We have increased the support to our colleagues through the following initiatives:

- ▶ Introduction of mandatory ED&I objectives for every employee as part of their annual performance reviews and the delivery of training to support employees in the development and delivery of those objectives through webinars
- ▶ Launch of ED&I toolkits on neurodiverse conditions and reasonable adjustments
- ▶ Becoming a 'Disability Confident Scheme' employer
- ▶ Signing up to the 'Women in Nuclear' Charter.

Our ED&I calendar:

We hosted multiple events on the ED&I calendar in conjunction with Inclusion Ambassadors and Staff Networks.

- 8th April – Stress Awareness Event
- 18th May – Disability Awareness with Hybrid Working
- 9th June – Parenting at Different Stages
- 22nd June – Parenting at Different Stages
- 21st July – Gay Pride @ UKAEA
- 27th July – World Day Against Trafficking Persons Event
- 17th August – All Ages Panel
- 17 Sept – Faith in the time of Covid
- 23rd Sept – Faith Month Quiz
- 5th Oct – Insight into Intersectionality – Race, Gender & Disability
- 26th Oct – Panel to launch ENACT
- 4th Nov – Diwali
- 10th Nov – Women's Network launch
- 19th Nov – Guru Nank Gurburab
- 19th Nov – Self Care, Wellbeing and Positive Masculinity 2022
- 6th Dec – Hanukkah Celebrations
- 1st Feb – Chinese New Year Celebrations
- 2nd Feb – Women's Network Speed Networking
- 17th Feb – LGBT+ History Month with Rikki Arundel
- 18th Feb – LGBT+ History Month Quiz
- 18th Mar – Holi
- 28th March – Women's Network 'Have your Say!' event

SAFETY, QUALITY & ENVIRONMENTAL PERFORMANCE

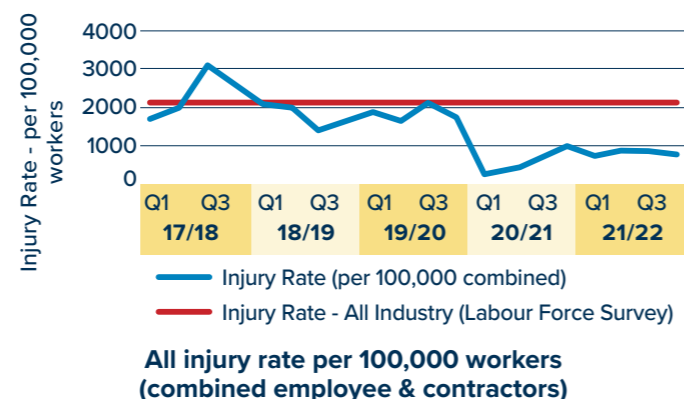
1 OF 4 MILESTONES FULLY ACHIEVED/
2 PARTIALLY ACHIEVED

SAFETY & QUALITY

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 continue to improve our safety and health management including but not limited to:

- ▶ Implementation of a Safety & Health Business Partner Framework where safety professionals are integrated into departments, working next to the department managers to advise support as they drive a proactive safety culture. This collaborative approach is fully in line with our values.
- ▶ Increasing wellbeing with the People Department and Safety and Health working closely together to mature resources such as our annual health calendar - linked to national campaigns, Employee Assistance scheme and a 'caring moment' which has been added to key meeting agendas, giving a few minutes at the start to share important safety, health or wellbeing messages.
- ▶ Effective use of performance dashboards that covered both lagging and leading measure. From this any areas of improvement could be identified, corrective action put in place which is then tracked via key meetings.

Although the UKAEA saw a busy year, including some significant construction projects such as safety improvements to the Culham site pedestrian and road network, the overall injury remained low with no significant safety incidences through the year. A healthy 'near-miss' and 'unsafe condition' reporting culture remains in place which supports a proactive safety and health culture.



COVID remained a challenge for a good proportion of the year and the UKAEA maintained its commitment to the health and wellbeing of our people through initiatives such as hybrid working, improved ventilation in offices and meeting rooms, continued use of COVID controls in critical areas and most importantly robust communication and consultation.

UKAEA maintains an effective level of security risk management at Culham Science Centre and its site at Rotherham, aligning closely with the BEIS security strategy and working to the Cabinet Office functional standard – GovS 007:Security.

Security audits and the annual departmental security health check continue to show that the security standards are being maintained and further developed. As part of the new staff induction process mandatory security awareness eLearning training is compulsory and all staff with an emergency response role undertake the Government provided eLearning ACT security awareness course. In addition, a number of security related emergency exercises have been undertaken and a regular programme of these exercises is in place. These demonstrate that security arrangements are robust and continually improving.

UKAEA is currently certificated to ISO 9001:2015, ISO 14001:2015 and ISO 45001:2018. The supporting documented management system provides an integrated framework for the organisation's systems and processes regarding quality, the environment and health and safety. The management system and associated processes were subject to independent audit by AFNOR. The transition from OHSAS 18001 to ISO 45001 was successfully completed this year.

The management systems audit programme evaluates UKAEA's conformance with quality, safety, health and environmental management system requirements and provides an annual assurance opinion to the Audit and Risk Assurance Committee on the effectiveness of UKAEA's systems, processes and procedures at meeting external and internal requirements. Audits are planned over a three-year rolling period to determine the continuing suitability, adequacy and effectiveness of the integrated management system to preserve its longstanding certification. This is reviewed annually to cover key processes, changes affecting the organisation, previous audit results and UKAEA's risks. The programme also identifies opportunities for improvement, promotes best practice and monitors performance to drive continuous improvement in line with the strategic direction of the organisation.

ENVIRONMENTAL PERFORMANCE

We take our environmental responsibilities very seriously, and our environmental management system is certified to ISO 14001, the international standard that provides a system for managing environmental commitments and performance. UKAEA manages the receipt and use of radioactive material, and the generation, accumulation and disposal of radioactive waste produced on the Culham site in accordance with Environmental Permitting Regulations (EPR) permit (EPR/LB3330DP) and relevant legislation.

During 2021/2022 however, internal audits identified some EPR permit overruns with respect to waste retention times on site. Our investigation identified the root cause as incorrect interpretation of waste categories and we put in place a robust corrective action plan.

In Q1 of 2022, our alpha waste allowance was exceeded under our permit. No persons were put in danger and no environmental impact occurred, but the event represented a non-conformance of procedure. On discovery, we informed the Environment Agency, conducted in-depth investigations and have in place an action plan to prevent reoccurrence.

Engagement with the Environment Agency regarding these non-compliances continues and UKAEA is awaiting a Radioactive Substances Compliance Assessment Report (RASCAR). UKAEA is confident that lessons learnt have been fed back into our process and into our previously planned uplift to our permit limits.

FINANCIAL REVIEW

WHAT DO 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.

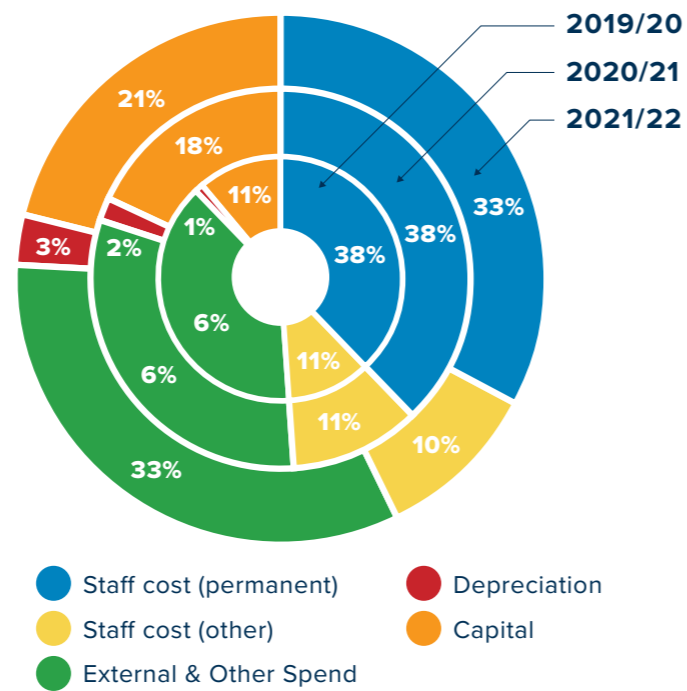
Over the past ten years, as UKAEA facilities and research has grown, the number of people within the organisation has commensurately.

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.

In comparison to prior year, absolute spend has grown in all major areas – reflecting the increased investment in fusion research and facilities.

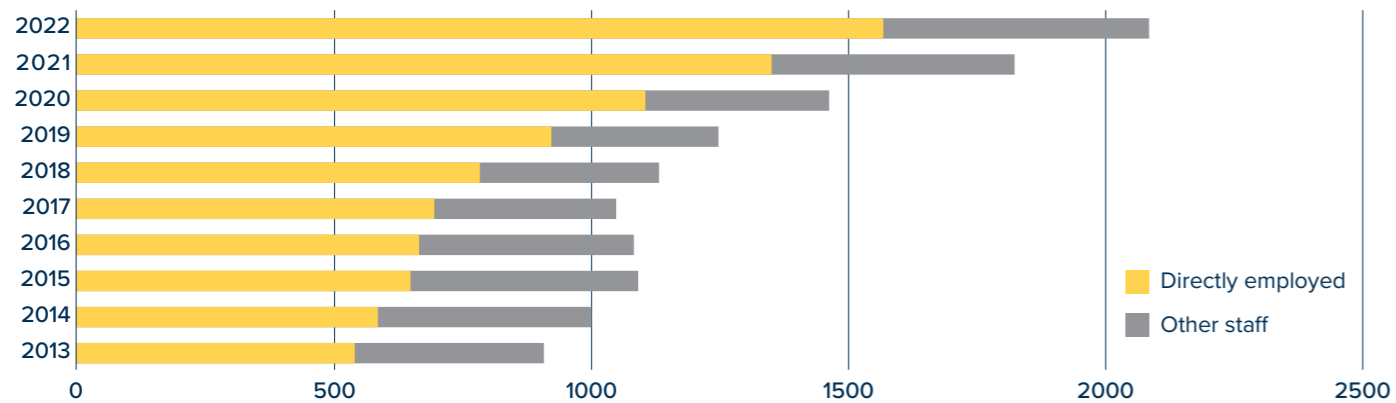
Expenditure by Type (including Capital)



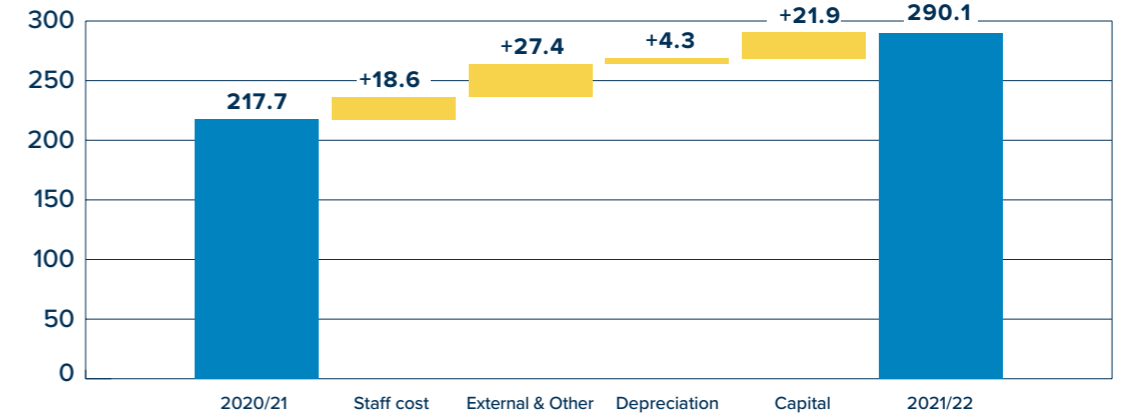
- Staff cost (permanent)
- Staff cost (other)
- External & Other Spend
- Depreciation
- Capital

External & Other Spend includes a rounding adjustment +/-1%pt

People (Full time equivalents)



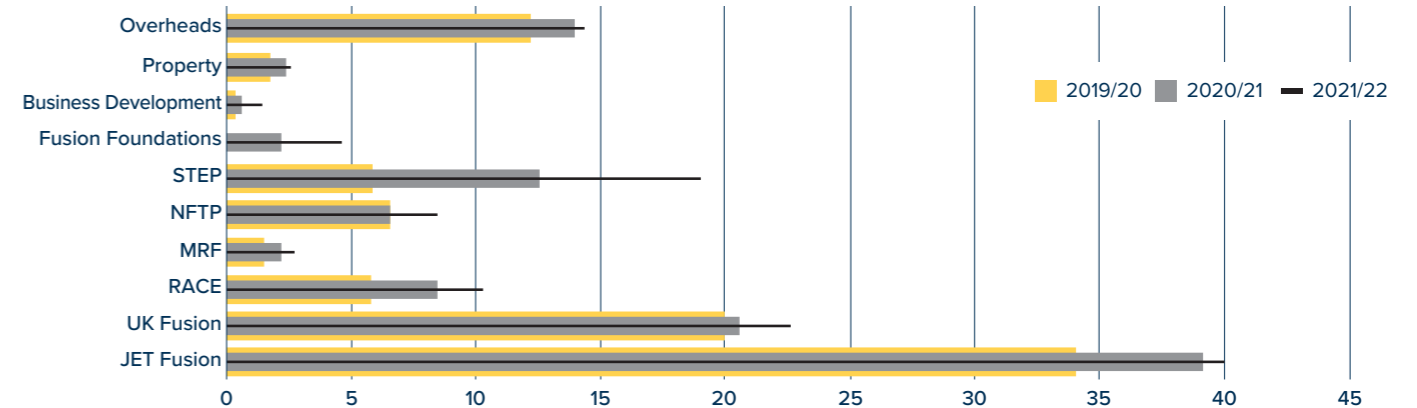
Revenue and Capital Expenditure vs last year (£m)



Operating & capital Expenditure, was £72.7m higher than in 2020/21, with increased expenditure on capital additions being £29.1m of this.

Staff costs have increased year on year, driven by the expansion of programmes such as STEP, new programmes starting in the year - Fusion Foundations and JET Repurposing project.

Staff Cost by Area - 2021/22 vs previous two years (£m)

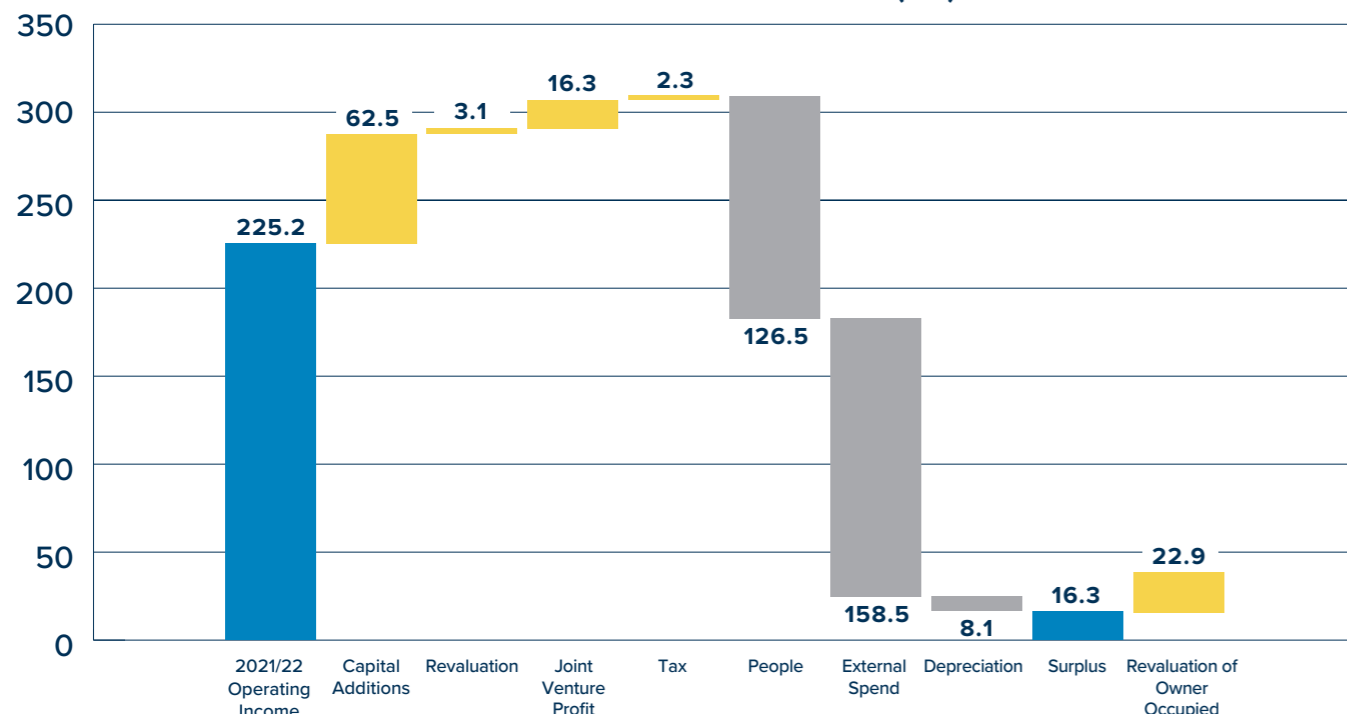


PERFORMANCE REPORT

Overall Outturn

In 21/22 there was an overall surplus at a Group level of £16.3m (2021: £10.6m).

Financial Performance in 2021/22 (£m)



Income includes recognition in year of £1.8m income relating to capital additions rather than deferring as a capital grant. This is in accordance with HMT guidance, as relates to grant income from other government sources. The profit from the Harwell joint venture is £16.3m, resulting largely from an increase in the Fair Value of the investment properties managed by the Harwell JV, as well as an improvement in operating profit due to increased income in the financial year.

Tax credit of £2.3m, driven by Research and Development Expenditure Credits (RDEC). These gains are slightly offset by depreciation, resulting in the overall surplus of £16.3m.

Revaluation of property gains (net of tax impact) extend the Total Comprehensive Income for the year to £33.2m (see Financial Statements for further information).

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.

PERFORMANCE REPORT

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 £489.4m. BEIS, as Sponsoring Department, provides UKAEA with a Letter of Comfort that it will cover the cost of decommissioning JET, UKAEA therefore recognise an opposing receivable. This provision is recognised by BEIS 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 started to build a JET Decommissioning and Repurposing Programme, with the Director – Carrie Leadbeater-Hart being appointed in January 2022 (see Bios on page 90).

As a substantial programme, JET Decommissioning will require business case approval, in line with HMT guidance.

Following that process, the business case for significant spending proposals is developed in three key stages

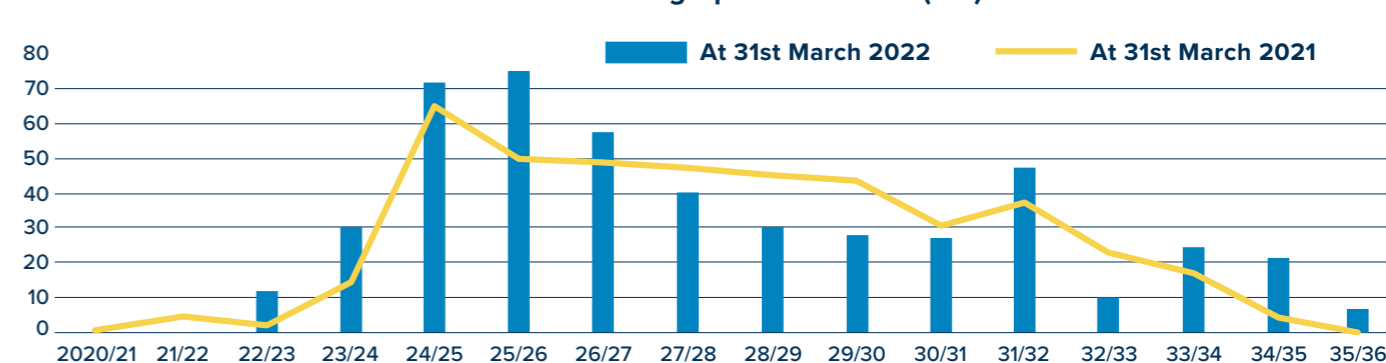
- Stage 1** – Scoping the scheme and preparing the Strategic Outline Case (SOC)
- Stage 2** – Planning the scheme and preparing the Outline Business Case (OBC)
- Stage 3** – Procuring the solution and preparing the Full Business Case (FBC)

The Strategic Outline Business Case has been approved in March 2022 and the team have moved on to create an Outline Business Case by the end of 22/23 and Full Business Case in 23/24.

The recent update of the restructuring provision and the base case for the business cases, has focused on a full decommissioning remit, utilising current best available techniques. In parallel with the decommissioning base case, we are reviewing alternatives – to maximise value, both scientific and financial, obtained in the decommissioning of the first fusion device, including options to repurpose equipment and generate new techniques.

The current assessment is that a provision of £489m is required – including inflation and discounted to current value.

Decommissioning Spend Estimate (£m)



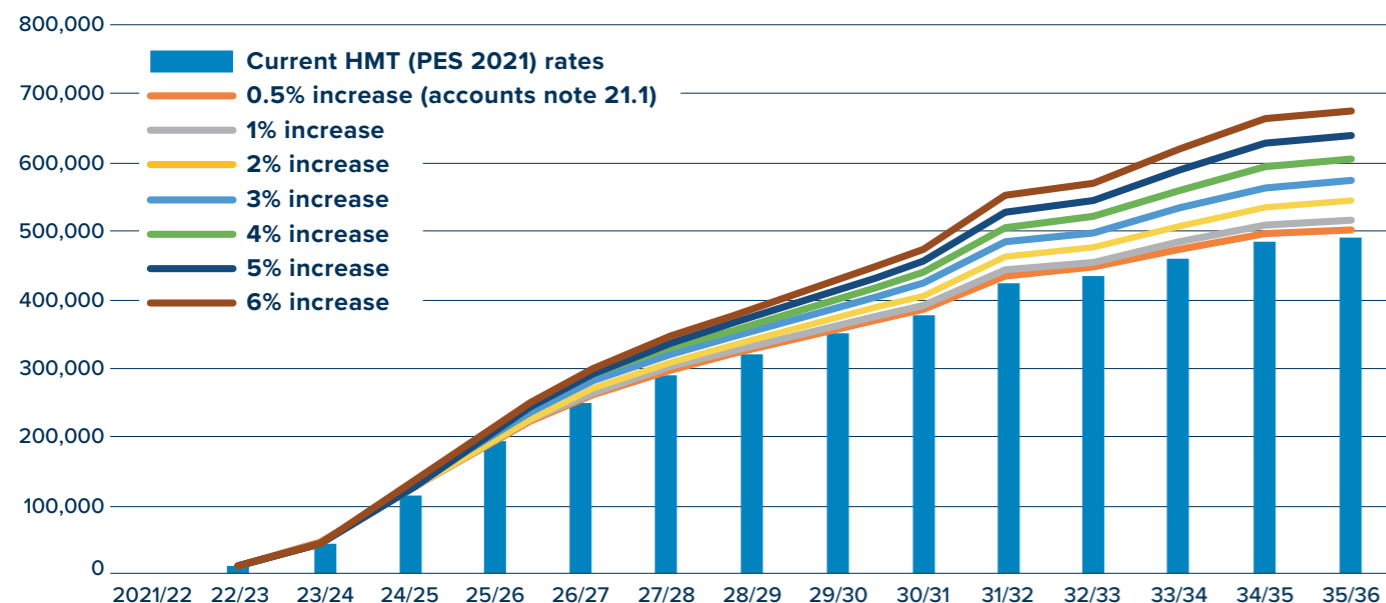
See Financial Statements note 21.1 for further information

Inflation impacts

Inflation is a key sensitivity; the table and graph below indicate the impact of higher than anticipated inflation on the restructuring provision.

Sensitivity	Group and Authority 2022 (£k)							
	Current HMT (PES 2021) rates	0.5% increase (accounts note 21.1)	1% increase	2% increase	3% increase	4% increase	5% increase	6% increase
Year 1	4.00%	4.50%	5.00%	6.00%	7.00%	8.00%	9.00%	10.00%
Year 2	2.60%	3.10%	3.60%	4.60%	5.60%	6.60%	7.60%	8.60%
Into perpetuity	2.00%	2.50%	3.00%	4.00%	5.00%	6.00%	7.00%	8.00%
Discounted Site Restoration Provision	489,394	502,335	515,695	543,731	573,629	605,521	639,554	675,882

Site restoration provision at higher rates of inflation (£k)



Robotics, computing, and artificial intelligence all benefit from fusion R&D

SUSTAINABILITY REPORT

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 is committed to contribute to long-term environmental sustainability.

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.

GREENING GOVERNMENT COMMITMENT (GGC)

UKAEA is exempt from 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 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.

OVERALL OPERATIONAL PERFORMANCE

Energy and water consumption, as well as waste disposal volumes all vary year on year due to changes in our operations. This therefore affects the total greenhouse gas emissions. During the operation of our fusion machines' electricity, water and waste production increases. During 2021/22, UKAEA's annual energy usage and greenhouse gas emissions have returned to pre COVID levels following the gradual re-opening of the site to normal operations and a hybrid working system.

SUSTAINABILITY STRATEGY

UKAEA is firmly committed to delivering world-class research in an energy efficient manner to minimise the impact we have on our environment and to support and enhance the wider government net zero targets.

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.

The reports show that 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, UKAEA is exempt from the standard GGC operational targets, and we exclude fusion related emissions from our own sustainability targets so as not to impact the development of fusion energy. To mitigate this impact, the electricity contracts that power the running of our

Joint European Torus (JET) experiment are on Zero Carbon tariffs. The contracts that power the rest of the Culham site are on a standard tariff. UKAEA will provide input in the future sourcing of these contracts to encourage the adoption of Zero Carbon tariffs for all contracts.

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, an initial internal study showed that Scope 3 emissions are a significant part of UKAEA's carbon footprint, which exceeds both Scope 1 and 2 combined, and that those associated with purchased goods and services are the most significant of all the Scope 3 sub-categories.

Therefore, our three key sustainability goals are focused on reducing emissions in the areas which make the biggest contribution to our carbon footprint:

OUR SUSTAINABILITY GOALS

We're committed to delivering world-class fusion research in an energy efficient manner to support and enhance the UK's net zero targets. Our three key sustainability goals are:



NEW BUILDINGS AND INFRASTRUCTURE

Design and construct new buildings with a focus on sustainability



EXISTING ESTATE

Improve and upgrade the energy performance of our existing estate



SUPPLY CHAIN

Promote sustainability in our supply chain to ensure environmental benefits

The full version of the UKAEA Sustainability Strategy is publicly available here www.gov.uk/ukaea.

FOCUS ON SUSTAINABILITY OBJECTIVES

We have developed clear objectives to help achieve our three sustainability goals. These include:

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

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

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

BIODIVERSITY

All of our new developments are to maintain and improve biodiversity on site in line with Local Authority Biodiversity Net-Gain (BNG) 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, as well as reduction in mowing and installation of bee hotels and barn owl boxes. This year we have also established an employee bee management team. We maintain and protect areas on our site which have established biodiversity beds and encourage staff to be enjoy these areas in a considerate way.

SUSTAINABILITY ACHIEVEMENTS IN 2021-22

In addition to the release of the Sustainability Strategy, other projects have also been progressed during 2020-21 including:

- ▶ working with local bus companies to improve services to site, and we introduced a shuttle service to connect the site to the nearest train station
- ▶ surveys undertaken for installing additional PV panels on newer buildings and for façade replacement on older buildings
- ▶ improvements to metering and energy monitoring systems
- ▶ migration of the kitchen energy supply from gas to electric
- ▶ replacement of old lighting with LED in some of our existing buildings
- ▶ design of new buildings in line with BREEAM and net zero targets
- ▶ transition to hybrid for some of the vehicles used on our site
- ▶ creation of additional sustainability roles to support the delivery of targets.

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. The specific objectives related to this are captured in our Sustainability Strategy document.

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. Progress is reviewed periodically as part of internal and external audits and through an annual management review by the Executive Committee. Improvement actions are addressed as required and reviewed in subsequent audits.

PERFORMANCE REPORT

Summary of financial and non-financial sustainability information for 2020/21

Area		2018/19	2019/20	2020/21	2021/22
Greenhouse gas emissions (1,000 tCO ₂ e)		15.6	22.1	17.6	17.3
Estate Energy	Consumption (mill kWh)	49.8	77.8	68.7	74.6
	Expenditure (£k)	5,686	9,345	7,249	10,020
Estate Waste	Amount (tonnes)	659.2	643.8	297.9	861.6
	Expenditure (£k)	371.27	319.05	124.37	202.02
Estate Water	Consumption ('000 m ³)	98	92.9	98.6	102.1
	Expenditure (£k)	279	206	276	234

Greenhouse gas emissions

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

Note: The greenhouse gas emissions were calculated (from the raw data) using DEFRA/DECC 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.

PERFORMANCE REPORT

Waste Disposal

Waste		2018/19	2019/20	2020/21	2021/22	
Non-financial indicators (tonnes)	Total waste disposed of	659.20	643.79	297.89	861.58	
	Hazardous waste	Total	19.89	30.49	16.87	40.28
		Landfill	56.36	40.30	18.81	26.48
	Non-hazardous waste	Reused/Recycled	409.16	394.20	200.03	594.05
		Composted	33.84	36.72	7.04	18.35
		Incinerated (energy recovery)	99.04	102.32	40.29	147.35
		Incinerated (no energy recovery)	0.03	0.00	2.36	0.08
		Total non-hazardous waste	598.43	573.54	268.53	786.31
	Radioactive	Produced	50.05	49.81	31.46	57.50
		Disposed	40.88	39.76	12.49	34.99
OSR (see note below)	Produced	9.81	25.63	7.55	16.16	
	Incinerated (no energy recovery)	-	-	-	-	
Total Radioactive / OSR waste disposed of		40.88	39.76	12.49	34.99	
Financial Indicators (£k)	Total disposal cost	371.27	319.05	124.37	202.02	
	Hazardous waste disposal cost		16.50	25.20	19.77	57.70
	Non-hazardous waste disposal costs	Landfill	4.00	16.50	3.83	7.47
		Reused/recycled	30.00	64.43	12.21	(8.96)
		Composted	1.30	1.59	1.95	0.84
		Incinerated (energy recovery)	20.47	24.33	8.58	40.32
		Incinerated (no energy recovery)	-	-	-	-
	Radioactive	Disposed	299.00	187.00	78.03	104.65
	OSR	Incinerated (no energy recovery)	-	-	-	-

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		2018/19	2019/20	2020/21	2021/22	
Non-financial indicators ('000m ³)	Water consumption (whole site)	Supplied	97.95	92.89	98.61	102.09
		Abstracted	N/A	N/A	N/A	N/A
		Supply per FTE	0.08	0.06	0.05	0.05
	Average number FTE staff/contractors	1,249	1,461	1,818	2,087	
A4 paper reams equivalent		5,200	9,200	200	3,200	
Financial indicators (£k)	Water supply costs (whole site)	279	206	276	222	
	Paper supply cost	8	12	<1	3.2	



Professor Ian Chapman
Chief Executive and Accounting Officer
15th July 2022

THE ACCOUNTING OFFICER'S STATEMENT

Section 4(3) of the Atomic Energy Authority Act 1954 requires the United Kingdom Atomic Energy 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 those 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 81.

Disclosure of personal data-related incidents on page 100.

IMPACT OF EU EXIT

The UK's transition from the European Union impacted UKAEA, as with many other organisations, in several ways including changes in business areas such as procurement and recruitment. The most significant factor affecting UKAEA in the transition from the EU has been the UK's association to Euratom. Whilst membership of the EU and Euratom are separate, Euratom membership has been of the EU member states and is governed in large part by the European Commission. The UK Government judged it legally necessary to leave Euratom at the same time as the EU. On 30th December 2020, the UK Government passed the UK-EU Joint Declaration on Participation in the Union passed into law, which allows for full participation of the UK in Euratom programmes as an associate member under equivalent conditions. For further detail on the impact EU Exit on Programmes – see page 36.

UKRAINE

Russian invasion of Ukraine: the UK Government response: The UK and our allies condemn the Russian Government's unprovoked and premeditated war against Ukraine. The UK and our international partners are united in support for Ukraine. The UK Government is providing a range of economic, humanitarian and defensive military assistance to Ukraine, and is imposing additional sanctions on Russia and Belarus.

The UKAEA strongly condemns Russia's invasion of Ukraine and the aggression shown to the Ukrainian people. UKAEA is not conducting any procurement, commercial, business development or supply chain activity with any Russian or Belarus entity. This includes any goods or services originating from a Russian/Belarus source, even if not necessarily the main contractor. UKAEA has already terminated any contractual arrangements with Russian entities.

FUTURE OUTLOOK AND GOING CONCERN

UKAEA has a pipeline of major investment spanning the next 3 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 from international parties and the UK Government to fusion research 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 £529.6m for site restoration and historic restructuring costs. Matching reimbursement receivables are recognised for most of these liabilities on the basis of assurances from BEIS that it continues to accept responsibility in principle for these costs and provides for them in the BEIS departmental resource accounts. These assurances are re-confirmed annually and there is therefore no effect on UKAEA's ability to operate as a going concern. The financial statements have therefore been prepared on a going concern basis

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 is in development and has received strategic outline case approval from BEIS, this is now progressing to a further stage of detailed planning. Further information on the key achievements, deliverables and scientific campaigns for JET Operations are contained within the Performance Report on page 42.

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 Ian Chapman
Chief Executive and Accounting Officer
15th July 2022

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 Authority (UKAEA) Group as a whole by the Chief Financial Officer, Director of Property and Corporate Services.

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.

CORPORATE STRUCTURE

UKAEA is a non-departmental public body of the Department for Business, Energy and Industrial Strategy (BEIS) under the portfolio of the Minister of Science.

FRAMEWORK AGREEMENT

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

It acts as a central reference point for everyone involved between BEIS and UKAEA, and supports them in making strategic, policy, and financial decisions and agreements with confidence.

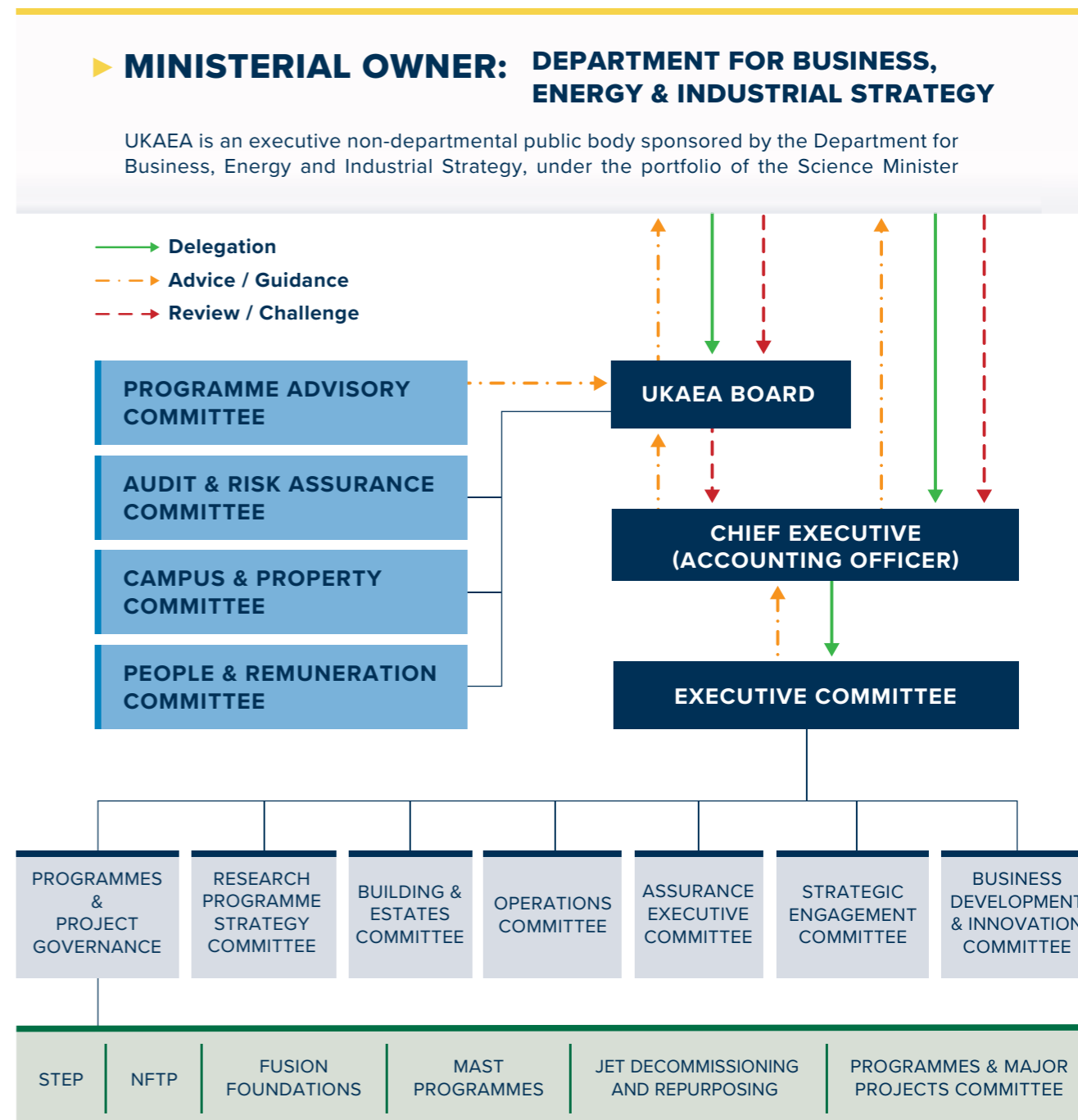
(See www.gov.uk/government/publications/uk-atomic-energy-authority-ukaea-framework-document)

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 Chief Financial Officer, Director of Property and Corporate Services is on the Board of HSIC PubSP and our CTO and Director of Strategy, Communications and Business Development 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. 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.

GOVERNANCE MODEL



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 annually, 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.

ACCOUNTABILITY REPORT

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 BEIS. 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 BEIS, UKAEA does not have a Nominations Committee.

THE ROLE OF THE CHIEF EXECUTIVE

The Chief Executive is also UKAEA Accounting Officer, appointed by BEIS. 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 BEIS 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.

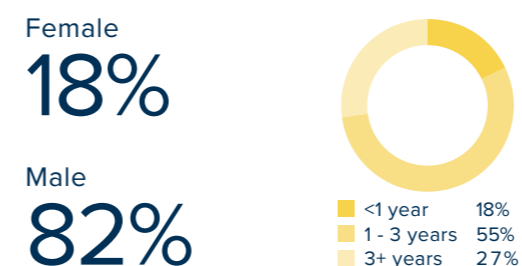


ACCOUNTABILITY REPORT

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.

Gender Tenure in role



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

- ▶ 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 & Social Care.

External appointments:

David is a Non-Executive Director of Directa Plus plc, a leading producer of pristine graphene and Vencap International plc, a leading venture. He is a member of UK Government's Innovation Expert Group, a director of the London Symphony Orchestra and Fellow of the Institution of Civil Engineers.

(R)



Dr Luc Bardin
Non-Executive (from May 2020)

- ▶ 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 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:

He is Executive Advisor to the UK Cabinet Office, sits on HMG's Crown Representatives Board, is Advisor to the Board of Guy's & St Thomas NHS Foundation Trust and Corporate Advisor to the Toyota Motor Corporation. Luc is Chair at Strategic Partnering Ltd.

(A) (R)



Stephen Barter
Non-Executive (from May 2020)

- ▶ Leadership
- ▶ Strategic overview
- ▶ Governance
- ▶ Property Development & 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.

External appointments:

Stephen is Non-Executive Chairman of Mailbox REIT PLC and Thomas's London Day Schools; a Non-Executive Director of Cambridge University Property Board and H3 TradeCo (formerly Nexus Group). He is Chairman of the West Midlands Public Land Task Force and a member of the London Symphony Orchestra Advisory Council, among other appointments. He is a Special Adviser to Transport for London and (via KPMG) to the Foreign, Commonwealth and Development Office.

(C)

ACCOUNTABILITY REPORT

**Dr Mark Bayley CBE**
Non-Executive (from May 2020)

- ▶ 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, Non-Executive member of the Department for Transport Audit, Risk and Assurance Committee and the Board of the Water Services Regulation Authority (Ofwat) and Chair of the Board of Trustees at the Shadwell Opera.

**Lady Eithne Birt CB**
Non-Executive (from May 2020)

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

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.



ACCOUNTABILITY REPORT

**Richard Hookway**
Non-Executive (from Oct 2021)

- ▶ 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 & Governance Committee at Parkland Corp. In the not-for-profit sector he is a member of the Board of Trustees and Chair of the Audit & Risk Committee of the British Council and also Chairs Swim England and its Remuneration Committee.

**Shrinivas Honap**
Non-Executive (Retired March 2022)

- ▶ Risk Management
- ▶ Finance
- ▶ Transformation
- ▶ Advance use of technology

Experience:

Shrinivas is a Chartered Accountant by profession and currently chair of our Audit Risk & Assurance Committee. He has previously held senior roles with Vodafone and Capita. He brings with him experience focused on systems development, regulation, risk and finance and has a particular interest in transformation and diversity.

External appointments:

Shrin is currently Chair at the DVSA and a Non-Executive and Chair of ARAC at: Office of the Public Guardian, LLWR, Rural Payments Agency. He is a Board member at the Civil Service Pensions Board. He has panel membership of the CMA and Pensions Determinations Body and is a lay member of the Speakers Committee on IPSA.

**Professor Ian Chapman**
Executive

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

Experience:

Ian Chapman became CEO of the UK Atomic Energy Authority in October 2016. 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.

**Sir Stephen Hillier**
Non-Executive (from Oct 2021)

- ▶ Leadership
- ▶ Governance
- ▶ Risk management
- ▶ Portfolio, Programme & 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 a property investment and development company, 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

- ▶ Corporate finance
- ▶ Organisation leadership & 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 & Investment (FCSI) and a Chartered Certified Accountant (ACCA). Antonia is the Authority Secretary.

External appointments:

Antonia is currently a Non-Executive Director at Tekfor Global Holdings Ltd, a KKR investee company.

**Professor Sir Adrian Smith, FRS**
Non-Executive

- ▶ Digital research infrastructure
- ▶ Governance
- ▶ Leadership

Experience:

Sir Adrian is a distinguished statistician. He undertook an inquiry into Post-14 Mathematics Education for the UK Secretary of State for Education and Skills. In 2017, he published a 16-18 Maths Review and in 2006 he completed a report for the UK Home Secretary on the issue of public trust in Crime Statistics.

External appointments:

Adrian is the Institute Director and Chief Executive of the Alan Turing Institute. He is also President of the Royal Society, a member of the government's AI Council and Chair of the Board of the Diamond Synchrotron.



BOARD REPORT

Overview and key duties

The Board, which met six times during the year, 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 21	EPSRC Grant review Fusion Industry Programme Business Case General Fusion agreement
July 21	Safety management system Corporate plan Cyber security and Threat analysis
September 21	Technical update RACE Culham Campus - Vision 2050
November 21	STEP Target Operating Model MAST-U results
Jan 22	STEP siting JET Decomm Business case
March 22	Portfolio Business plan 2022/23 budget approval 2022/23 Performance Measures approval STEP design and preferred concept

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 March two new independent Non-Executive Directors joined the Board, filling the vacancies owing to retirements within the previous year. The composition of the UKAEA Board is in line with other bodies that report to BEIS.

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 81 to 83.

Board Composition & Attendance

Non Executive Director		Executive Director	
Professor David Gann, CBE	6 (6) Chair	Professor Ian Chapman	6 (6) Chief Executive Officer (Accounting Officer)
Dr Luc Bardin	6 (6)	Antonia Jenkinson	6 (6) Chief Financial Officer & Director of Property & Corporate Services
Stephen Barter	6 (6)	Board Attendee	
Dr Mark Bayley	6 (6)	Tim Bestwick	4 (6) Chief Technology Officer
Lady Eithne Birt	6 (6)	Lyanne Maclean, MBE	6 (6) Chief Operating Officer
Sir Stephen Hillier	1 (3) from 11th Oct 2021	BEIS	6 (6) Representative from Sponsoring Department
Richard Hookway	3 (3) from 11th Oct 2021		
Shrinivas Honap	5 (6) to 31st March 2022		
Prof Sir Adrian Smith, FRS	6 (6) to 31st March 2022		

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:

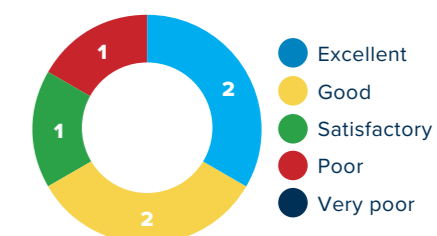
- has been an employee of UKAEA within the last five years
- has, or has had within the last three years, a material business relationship with UKAEA or its former or current subsidiaries
- receives remuneration from the Authority other than a director's fee and expenses incurred in carrying out their 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

In November 2021, the UKAEA Board held an Effectiveness Review of the preceding year via survey issued to all Non-Executive Directors.

Areas of strength identified included:

- member individual role and contribution to the Board is clearly defined
- the Board has a clearly defined appetite for risk, and a plan for its mitigation
- the Board has the right combination of skills and experience to discharge its duties effectively
- there is a good level of interaction and engagement between the Board and its committees
- the Chair and CEO work effectively with one another
- members have a good understanding of the organisation.



BOARD REPORT

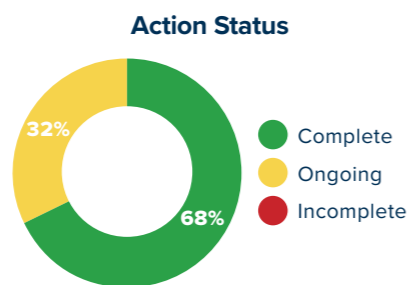
Areas for improvements included:

- increase understanding of each other's roles, responsibilities and experience
- provide more time for discussions
- increase diversity of views
- make board papers more succinct.

Work has also continued following on from the outcomes of the Effectiveness Review of the previous year. Then priority recommendations included:

- enhanced utilisation of Non-Executive Board member expertise outside of board meetings
- enhanced review of Equality, Diversity and Inclusivity
- enhanced interaction of the Board and its sub-committees to drive strategic alignment, the integration of aspects of the Board Assurance Committee into the Audit Committee (now Audit and Risk Committee)
- broadened focus on programmatic areas.

These were further detailed as sixteen recommendations, translated into actions, and have been progressed as follows:



Ongoing actions are being actively tracked to ensure completion.

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.

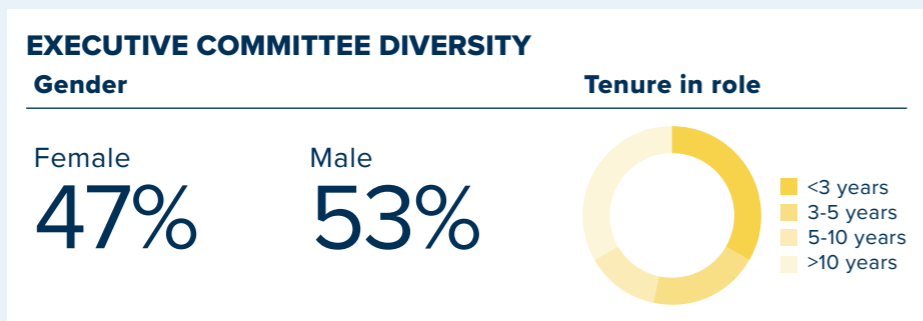


The world-class centre for Remote Applications in Challenging Environments

UKAEA EXECUTIVE COMMITTEE

The Executive Committee has expanded to reflect the growth and focus of the organisation, during the financial year Carrie Leadbeater-Hart joined to lead the new Jet Decommissioning and Repurposing Programme, in April both Paula Barham, Head of Procurement and Andrew Hynes, Head of CODAS and IT, joined, reflecting the importance that both Digital Programmes and Supply Chain development and Strategic Procurement has on the attainment of our mission. We also wish a fond farewell to Kay Nicholson, Head of Assurance, who has led the Assurance team for 8 years. Nicola Barber joined us as Head of Risk and Assurance in April 2022.

Biographies of Executive Committee members are included in the following pages. As at 31st March 2022, the Executive Committee was proportionally 47% female and 53% male, with tenures at UKAEA as outlined in the figure below:



Professor Ian Chapman
Chief Executive Officer and Accounting Officer

Experience:
See page 82 for Ian Chapman's bio.

Antonia Jenkinson
Chief Financial Officer,
Director of Property & Corporate Services

Experience:
See page 83 for Antonia Jenkinson's bio.

Nicola Barber
Head of Risk & Assurance (from April 22)

- ▶ Governance
- ▶ Assurance
- ▶ Enterprise Risk Management

Nicola joined UKAEA in April 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 including leading on assurance, risk and project controls. In her most recent previous role as Head of Risk for Magnox Ltd, she drove decision making and set the policies, standards and framework for risk across a number of nuclear sites. Prior to this Nicola has led planning teams in the Rail and Oil & Gas industries.

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
Head of Procurement (from April 22)

- ▶ 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.

Dr Tim Bestwick
Chief Technical Officer & Director of Strategy, Communications and Business Development

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

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.

External appointments:
Director, Harwell Science & Innovation Campus

Professor Rob Buckingham
Director of RACE

- ▶ Robotics
- ▶ Change & Innovation

Rob is the first Head of RACE, the UKAEA's centre for Remote Applications in Challenging Environments. 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 on the Board
UK Robotics Growth Partnership

ACCOUNTABILITY REPORT

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.

External appointments:

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

Dr Andrew Hynes

Head of CODAS&IT (from 1st April 2022)

- ▶ 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.

Carrie Leadbeater-Hart

Director of Decommissioning & Repurposing

- ▶ 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.

Liz Haynes

Director of People & Organisational Development

- ▶ 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.

Lyanne Maclean

Chief Operating Officer

- ▶ 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 highly successful Royal Mail's LGBT+ Network. Lyanne is an MBE and was awarded a Queen's Commendation for Valuable Service.

ACCOUNTABILITY REPORT

Dr Joe Milnes

JET Operating Contract Senior Manager

- ▶ 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.

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. He has a PhD in Tokamak Science. Originally a Tokamak plasma physicist, he headed the experimental Tokamak programme at Culham and the department of plasma researchers (including JET). 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, is an author and co-editor of the 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.

Prof Fulvio Militello

Director of Tokamak Science & MAST-U

- ▶ Fusion science & 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. Fulvio led the EUROfusion programme for alternative divertors, he is Professor of Physics at Chalmers University (Sweden) and Visiting Reader at Imperial College London.

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 M&I 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 together with the Royce Institute, is focused on 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).

ACCOUNTABILITY REPORT

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.

Dr Nick Walkden
Head of the Executive Office (to May 22)

Nick joined UKAEA in 2010. He originally joined as a placement student, before returning in 2011 as a PhD student with the University of York. Nick has had a successful research career, leading research at home and overseas. In 2019 he was recently awarded the inaugural Malcolm Haines Prize for early career research by the Institute of Physics. Nick transferred to the corporate side of the business in early 2020 and is secretary for Board and Executive meetings.

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.

Lyndsey Mooring
Head of the Executive Office (from May 22)

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.

RETIREMENTS FROM THE EXECUTIVE COMMITTEE DURING THE YEAR:

Dr Andrew Kirk
Director of Tokamak Science and MAST-U Operations (to Jan 22)

- ▶ Commissioning of Tokamak fusion devices
- ▶ Fusion plasma physics
- ▶ Science programme management

Experience:
Appointed Director of Tokamak Science and MAST Upgrade 1 July 2020. Andrew joined UKAEA in 2000 after spending 15 years working at CERN. He has led the Tokamak Science programme since 2016 and the MAST-U programme since 2014.

External appointments:
Member of the NSTX-U Programme Advisory Board.

Kay Nicholson
Head of Assurance (to March 22)

- ▶ Governance
- ▶ Assurance
- ▶ Enterprise Risk Management

Experience:
Kay joined UKAEA in 2014 and is a Fellow of the Institute of Risk and Safety Management and chartered member of the Institute of Occupational Safety and Health. She has worked in a range of manufacturing industries, notably the Maritime Defence sector in the UK and internationally, as well as the automotive industry. Kay has led on cultural change programmes with particular emphasis on improving assurance processes.

External appointments:
UKAEA appointed Board member of RADSAFE CLG (up to April '22).



MAST Upgrade ran first experimental campaign

EXECUTIVE COMMITTEE REPORT

Overview and key duties

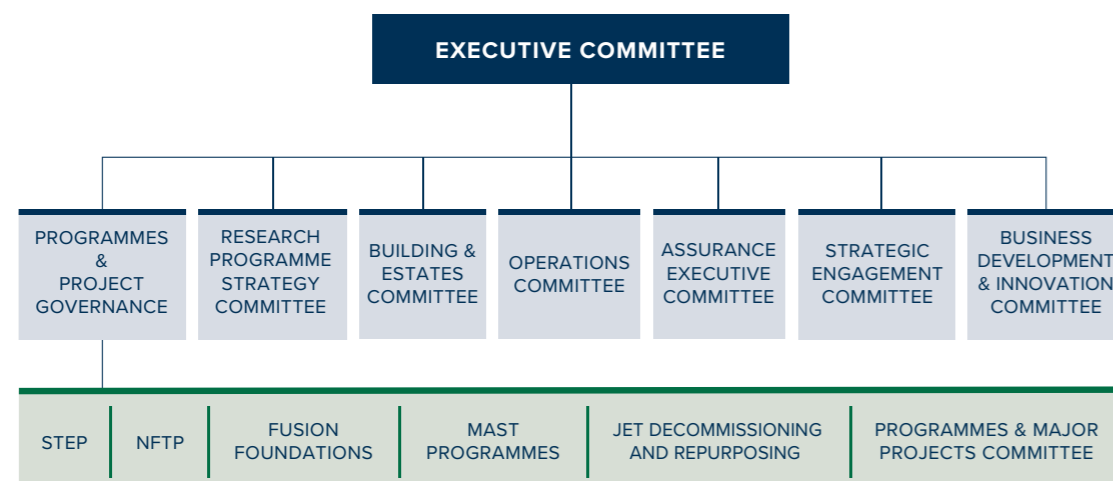
Meeting 12 times this year, our Executive Committee delivers the strategic direction of our business on behalf of the Board. It brings together all aspects of our business and seeks to embed our delivery culture at the highest level of our decision-making. The Executive Committee analyses material issues 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 budgets for 2022/23 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 ED&I.

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 has seven sub-committees that report into it, alongside specific Programme Boards responsible for the governance of for UKAEA programmes and major projects.

- **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.
- **Business Development and Innovation Committee** responsible for proposing strategy for investment in business development activities for approval at Executive Committee and managing the implementation of the agreed business development investment
- **Building & Estates Committee** is responsible for the investment in, and management of, property assets and proposing property strategy to the Executive Committee
- **Programmes and Major Projects Committee** responsible for monitoring and advising the Executive Committee of cross-portfolio issues, risks, resourcing, and performance
- **Assurance Executive Committee** established in 2020, 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.
- **Strategic Engagement Committee** established in November 2020 consists of a diverse cross-section of early and mid-career employees with strategic acumen and is responsible for providing a diverse view to the Executive Committee on topics of strategic importance to the organisation as well as developing its members in an Executive sub-committee setting.



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

BOARD COMMITTEE REPORTS

PEOPLE & REMUNERATION COMMITTEE

Overview

The committee's principal responsibility is to make recommendations to BEIS 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 and contract periods

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 Equality, Inclusivity and Diversity (ED&I) strategies and offer advice on major proposed changes to pay and remuneration arrangements or terms and conditions of UKAEA staff which would require the agreement of government. To drive the efficacy of UKAEA's Inclusion Council, the Chair of the Remuneration Committee chairs the council.

As the members of the UKAEA Board are appointed by BEIS, UKAEA does not maintain a nominations committee.

Composition of the People and Remuneration Committee

The People and Remuneration Committee met four times during the year. All its members are independent Non-Executive Directors. Where necessary, non-committee members are invited to attend. Lady Eithne Birt CB chairs the committee. Shrin Honap and Adrian Smith left the committee in March 2022, at the end of their tenures as a Non-Executive Directors.

Attendance

Non Executive Director		Non Executive Director	
Lady Eithne Birt	4 (4) Chair	Shrin Honap	1 (4) to 31st March 2022
David Gann	4 (4) UKAEA Chair	Adrian Smith	2 (4) to 31st March 2022
Luc Bardin	4 (4)		
		Secretary	
		Liz Haynes	4 (4) Director of People & Organisational Development

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.

ACCOUNTABILITY REPORT

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 2020
- Progress made on the Authority's pay strategy
- Progress of the Equality, Diversity and Inclusion agenda
- Development of UKAEA's People Strategy.

CHAIR'S REPORT



Lady Eithne Birt CB

"This was a year where the complexity of the People agenda increased tremendously. It will require sustained effort and progress with emphasis on pay, the People Strategy and ED&I.

One area of focus has been a review of senior employees' objectives for the 2022/23 performance cycle to include the calibration of objectives. The weighting of the objectives has also been reviewed, for clarity.

Following the successful implementation of the new Terms of Reference and continuing the theme of ED&I, the revival of the Inclusion Council has been encouraged.

The presentation of a People strategy progress paper was well received and with the support of the Executive team it creates the basis to continue our drive for inclusion and engagement.

The UKAEA is looking forward to the coming year by continuing the progress of our new strategy and welcoming new employees, expected to exceed 300, to the organisation.

Two members of the People and Remuneration Committee, Shrin Honap and Adrian Smith, have left, and we thank them for the contributions they have made"

CAMPUS & PROPERTY COMMITTEE REPORT

Overview

The Committee was established in May 2020 by UKAEA Board, in recognition of the increasing significance and growth of campus development and other property activities for the organisation, and in order 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 in light of the further increase in UKAEA's activities that have a property focus.

Composition of the Campus & Property Committee

The Campus and Property Committee met 9 times during the year, 4 ordinary meetings and 5 were extraordinary. Its membership consists of two independent Non-Executive Directors and three UKAEA executive members. The independent Non-Executives are Stephen Barter (as Chair) and Mark Bayley, see pages 81 to 82 for their bios. The UKAEA executive members are the Chief Financial Officer and Director of Property and Corporate Services (CFO), the Chief Technology Officer (CTO) and the Head of Campus Development.

The scope of the committee comprises property relating to the UKAEA Group. In addition to UKAEA's directly managed property interests at Culham and on other sites within the UK, it also controls 50% of the public sector partnership (Public Sector Limited Partnership, HSIC PubSP) which controls 50% of the Harwell Science and Innovation Campus Ltd Partnership (HSIC). The CTO is on the Boards of both HSIC PubSP and HSIC. The CFO is on the Board of HSIC PubSP.

Where necessary, non-committee members are invited to attend.

ACCOUNTABILITY REPORT

Attendance

Non Executive Director		Executive Members	
Stephen Barter	4 (4) Chair from 20 May 2020	Antonia Jenkinson	4 (4) Chief Financial Officer & Director of Property & Corporate Services
Dr Mark Bayley	4 (4) from 20 May 2020 to 31 Mar 2021	Tim Bestwick	4 (4) Chief Technology Officer
Sue Scane	4 (4) from 20 May 2020 to 31 Mar 2021	Caroline Livingstone	3 (4) Head of Campus Development
Committee Attendee		Secretary	
Steven Moss	3 (4) Property Advisor	Silvia Rapa	3 (4) Environment Advisor

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:

- Property objectives at UKAEA
- Progression of the masterplan at Culham, and particularly the provision of new facilities for General Fusion and 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, and the further decommissioning and drawdown of land for new development, for which occupier demand remains strong
- Support to the STEP team in considering the opportunities likely to be presented by the potential site acquisition for the STEP facility
- Visit to the new facility at Rotherham
- Review of property valuations and ongoing estate management arrangements, including sustainability and key property risks.

CHAIR'S REPORT



Stephen Barter

"The Committee has been actively engaged with the Executive Team throughout the year in considering both bigger picture objectives and specific projects and initiatives, in order to progressively deliver the desired outcomes for the campuses. The volume of activity is increasing, encouraged by a property investment market which, despite the economic headwinds, has become increasingly enthusiastic about science and technology based sectors.

UKAEA continues to be a distinctive magnet for complementary commercial businesses keen to collaborate in a variety of ways.

Our focus for the coming year will continue to be to support and provide guidance to the Executive Team in the forward planning and commercial structuring of priority development projects, and the ongoing management of the estate to achieve the objectives of the Corporate Plan."

AUDIT & RISK ASSURANCE COMMITTEE

Overview

The Audit and Risk Assurance Committee met four times during the year. All its members are independent Non-Executive Directors and attendees includes operational leaders. In 2021/22, five Non-Executive Directors were members of the Audit and Risk Assurance Committee, with two members ending their appointment in March 2022.

The committee welcomed two new Non-Executive Directors, Richard Hookway in November 2021 and Stephen Hillier in March 2022 (see bios on pages 81 to 83).

The committee is chaired by a Non-Executive Director. Shrinivas Honap who ended their appointment in March 2022, chaired the first three meetings of the year. Richard Hookway, who joined the committee in November 2021, was appointed to the role of Chair and chaired the fourth meeting.

The committee plays a crucial role in oversight and scrutiny of our internal control environment, financial reporting and approach to risk.

The committee's responsibilities include assuring the Board and the Accounting Officer that appropriate processes and monitoring are in place to effectively manage UKAEA's risks relating to safety, health, environment, security, quality and good scientific reputation. ARAC independently review the comprehensiveness and reliability of assurances on governance, risk management, the control environment and the integrity of the financial statements and the annual report.

Enterprise risk management oversight is undertaken by the Executive Committee and reported into the Board bi-annually. The annual audit plan is informed by the UKAEA's risks and associated mitigations to drive risk reduction and continual improvement.

Composition of the Audit and Risk Assurance Committee

For the year to 31st March 2022, the committee had at least one member possessing what the Smith report and HMT's Audit and Risk Assurance Committee handbook describe as recent and relevant financial experience; with Shrin Honap and subsequently, Richard Hookway (see bios on pages 81 to 83).

The Audit and Risk Assurance 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 the Audit and Risk Assurance Committee:

UKAEA: Chief Executive, Chief Financial Officer and Director of Property and Corporate Services, Chief Operating Officer, Finance Director (Counter Fraud executive lead), Head of Internal Audit, Head of Financial Accounts and Head of Risk and Assurance. National Audit Office (NAO): representatives of NAO audit team.

Department for Business, Energy and Strategy (BEIS): representatives of BEIS as sponsoring body.

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. In addition, the Audit and Risk Assurance Committee Chair meets with the Head of Internal Audit on a regular basis.

Attendance

Non Executive Director		Committee Attendee	
Shrinivas Honap	4 (4) Chair to March 2022	Stuart Biltcliffe	4 (4) Head of Financial Accounts
Richard Hookway	2 (2) Chair from March 2022	Stephen Blake	1 (1) Interim Head of Safety, Health, Environment, Quality and Business Resilience from Jan22
Sir Stephen Hillier	0 (0) from March 2022		
Luc Bardin	4 (4)	Allison Brown	4 (4) Director of Finance & Business Systems
Prof Sir Adrian Smith, FRS	0 (4) to March 2022		
Executive Director		Matthew Green	3 (3) Head of Safety, Health, Environment, Quality and Business Resilience to Jan22
Prof Ian Chapman	4 (4) Chief Executive Officer (AO)		
Antonia Jenkinson	4 (4) Chief Financial Officer & Director of Property & Corporate Services	Sarah Laws	4 (4) Head of Internal Audit
		Lyanne Maclean, MBE	4 (4) Chief Operating Officer
		Kay Nicholson	4 (4) Head of Assurance
		BEIS	4 (4) Representative from Sponsoring Dept
Secretary			
Lesley Hotchin	4 (4) Bid & Governance Accountant	NAO	4 (4) NAO representative

The ARAC terms of reference were updated and approved by the Board during the year.

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
- UKAEA counter fraud strategy and annual action plan, progress on the implementation of the Government Functional Standard 013 – counter fraud, bribery and corruption
- Review of the lifetime plan which underpins the site restoration provision
- Review of information security policy and procedures and
- UKAEA's statutory accounts, including compliance with HMT guidance and the application of accounting policies and assumptions.

ACCOUNTABILITY REPORT

Information Security

- The CFO 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 information assurance training was rolled out to information asset owners and their local information managers. Internal communications continued throughout the year to all staff, with key themes of cyber and information security which has proved particularly relevant in prevailing circumstances. UKAEA is aligned with the Government's 10 Steps to Cyber Security framework 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.

CHAIR'S REPORT



Richard Hookway

"As in the previous year the Executive Committee continue to make significant progress in managing and mitigating risks. However, the risk landscape is never static and new risks emerge which require management and mitigation, for example risks arising from the Russia/Ukraine conflict which has caused disruption to UKAEA from supply chain constriction, cyber attacks and price increases.

The focus in the coming year needs to be

1. Review of the risk landscape and the level of assurance over management and mitigation of risks
2. Specific risks arising if the UK fails to associate with Euratom and its associated organisations
3. Continuing to enhance progress on the effectiveness of our controls in cyber security
4. Continuing to monitor the decommissioning and utilisation of JET assets and associated financial impact
5. Monitoring the impact, and the executive's management, of supply chain fragility and inflationary pressures.

In support of the above, the ARAC Terms of Reference have been enhanced to incorporate safety, health and environment. A new member with deep operational expertise has been appointed to support the wider scope.

There has been a marked increase in the number of audits receiving substantial or moderate assurance opinion with JET Repurposing Programme being the only audit to receive limited opinion.

The progress in managing and mitigating risks has been even more commendable given the backdrop of the COVID crisis during the year.

As with a number of public sector establishments the UKAEA will face a competitive recruitment market for technical skills and research progress is dependent on securing and retaining such skill.

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

ACCOUNTABILITY REPORT

Risk Management

An integrated system of risk management is in place across the organisation, see pages 22 to 29 for further detail and a summary of the key risks facing UKAEA.

Internal Audit

UKAEA has an internal audit function which operates in accordance with Public Sector Internal Audit Standards and an Audit Charter approved by the Audit and Risk Assurance Committee. The work of Internal Audit is determined by analysis of the risks to which UKAEA is exposed.

Internal Audit Days 2021/22



The annual internal audit programme is based on this analysis and additionally includes a 3-year rolling programme to test key financial controls (See Assurance on page 26). This programme covers the management of risks and information from across the organisation.

The head of Internal Audit provides the Audit and Risk Assurance Committee with regular updates on the programme progress.

Internal Audit Annual Opinion

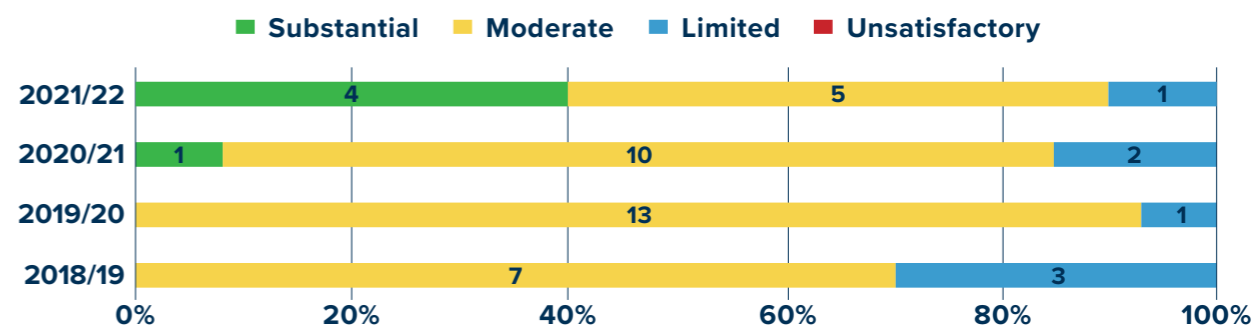
On the basis of the audit work undertaken for the year and considering all available evidence, in my opinion, I can provide moderate assurance that there is a generally sound system of internal control, governance and risk management within UKAEA. In forming this opinion, the following has been considered:

- All audits undertaken in the year with revised changes approved by ARAC
- 90% of audits undertaken received substantial or moderate assurance
- Closure of 81% of open and raised audit recommendations in the year
- Observations from the Payroll Assurance Board, and the U4BW Change Advisory Board embedded assurance
- Results of the management systems audit programme and
- 100% of audit recommendations accepted by management from completed audits with robust and timely action plans in place.

Audit results

The Jet Repurposing programme audit which had a limited assurance rating found concerns with programme and project governance and documenting decisions and changes to the programme. These are currently being addressed by management. The cyber phishing and ransomware which was a moderate assurance rating had two areas which received limited assurance, training due to poor compliance with mandatory training and technical controls which require strengthening. Four audits received substantial assurance which is a significant improvement from previous years.

Audit Assurance Ratings



ACCOUNTABILITY REPORT

The following table summarises progress during the year on completing recommendations and actions arising from Internal Audit reviews. Of the completed actions, 71% were completed on time – with 15 of 93 remaining in progress and 4 overdue 2 of which have been completed post yearend.

Audit actions	No. of actions	Completed	Outstanding @ 31st March 2022	
			In Progress	Overdue
Brought forward from 2017/18	1	1		
Brought forward from 2020/21	6	5		1
Raised in this year	86	68	15	3
Total	93	74	15	4
Carried forward			19	

Overdue Actions

Two overdue actions relating to findings from the cyber security audit (overall Moderate rating) were overdue at year end but closed by the end of May 2022. The remaining overdue actions are below:-

Payroll checking processes - task management improvements

The implementation of a workflow for pay actions to be transferred to the People department has been delayed due to other high priority activities. A review of system functionality, being carried out in July, will identify the best way for this to be achieved.

Cyber security audit - IT inventory (configuration management database)

The procurement of a new inventory tool for IT systems (low priority improvement action) was delayed by the pressures of higher priority tasks. Existing tools provide good records of hardware and software assets and further layers of protection exist to control access to data networks. A new tool is being procured to automate collection of IT inventory information. The tender is in progress now with a closing date of 1st June and implementation will take place in the coming months.

Management systems audit

The management systems audit programme helps ensure that the UKAEA's internal processes are operating effectively, in accordance with international management system standards relating to safety, health and environment, quality, legislative requirements and internal procedures. Management systems audits are included in the 3 year combined audit programme to ensure that key risks are covered, over assurance is avoided and has optimised our drive for implementation of process improvements. This was recognised as a 'strong point' during an external management systems certification audit in 2020.

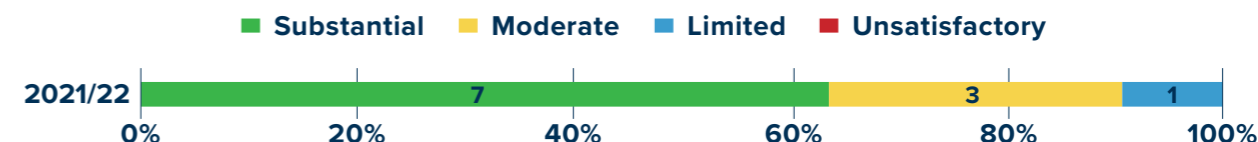
ACCOUNTABILITY REPORT

Management System Audit Days 2021/22



Audit Results

The control of property documents and records audit which had a limited assurance rating identified significant weaknesses attributed to the historic management and quality of site documents and records which could pose a risk to legal compliance and business operations. Significant progress has been made to address these issues



The following table summarises progress during the year on completing recommendations and actions arising from management systems audit reviews and certifications. Of the completed actions, 59% were completed on time – with 17 of 111 remaining in progress and 2 overdue.

Audit actions	No. of actions	Completed	Outstanding @ 31st March 2022	
			In Progress	Overdue
Brought forward from 2020/21	19	13	6	
Raised in this year	104	87	17	
Total	123	100	23	
Carried forward			23	

UKAEA utilises a number of self-assessment tools supplied via BEIS/Cabinet Office that are based on government standards and maturity models. These provide a valuable insight and measure of assurance to UKAEA management. Two examples of these are the Departmental Security health check which measures the robustness of security controls across all aspects of physical, personnel and information/cyber security; and the commercial and commercial continuous improvement assessment framework which measures compliance and maturity against government commercial standards.

ACCOUNTABILITY REPORT**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.

Whistleblowing policy

UKAEA has a whistleblowing policy which is available to all workers. A review of this policy took place during the year, this identified some improvements and the establishment of a dedicated email whistleblowing@ukaea.uk. No whistleblowing claims were received during the year.

Conflict of interest

UKAEA has a detailed conflict of interest policy. Board members and the Executive Committee are required to complete an annual declaration, meeting Chair’s request confirmation of any conflict at the commencement of Board meetings, involvement in any tender exercise will require a declaration to be made which is assessed by the Head of Procurement. A Board Register of Interest is published on Gov.UK.

Alexander tax review

I confirm that the 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. All off-payroll appointments were tax compliant as at 31st March 2022.

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 during 2021-22 which impacted on approvals for Consultancy, Contingent Labour and Professional Services.

Government Functional Standards

Reporting against the updated suite of Government Functional Standards (fourteen in total) is new for 2021/22. Government guidance has been that application of the standards should be proportionate to the scale and complexity of the work being done. Each of the Functional Standards has either a Senior Manager or Executive sponsor. Self-assessments led by each functional owner have now been completed against the standards and where mandatory requirements have not been fully met, an improvement plan that meets business needs and priorities is in place to close the gap. Progress against these plans will be reviewed throughout the coming year and strategic oversight is provided by the Executive Committee and the Audit and Risk Committee.

It is encouraging to note that in some areas UKAEA is already following ‘better’ / ‘best’ practices demonstrating a level of maturity in our processes.

ACCOUNTABILITY REPORT**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 49 FOI requests achieving 83% compliance of response within 20 days (41 of 49). The internal process deadlines have been shortened to ensure that the external response is issued within the 20 days.

Governance of knowledge and information assets

The CFO is the executive lead for information security and the CTO is the executive lead for knowledge assets. Following the publication of the Government draft standard in April 2021, the CTO is leading a review of UKAEA process to determine an implementation strategy.

Counter fraud

During the past year, we have 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.

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 (2020/21 95 %). The average number of payment days from invoice date was 7.73 days (2020/21 8.07 days). These statistics are reported for all invoices received, we do not distinguish if the invoice was valid or not.

As a result of the coronavirus, COVID, outbreak UKAEA complied with the Procurement Policy Note (PPN) 02/2020. The PPN set out information and guidance for public bodies on payment of their suppliers to ensure service continuity during and after the outbreak.

REMUNERATION AND STAFF REPORT

Remuneration Policy

The remuneration of Directors is set 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 BEIS on the overall remuneration package for Executive Directors. 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 are appointed 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 Remuneration Committee. The Chair and Non-Executive Directors receive fees for their services. Members of the Executive Team also receive a basic salary which is reviewed annually by the Remuneration Committee. The Remuneration Committee makes recommendations to BEIS as appropriate.

Benefits

Some members of the Executive Team receive a car allowance.

Executive Directors, and members of the Executive Team, are also reimbursed for reasonable expenses incurred in line with the policy for UKAEA's employees. These reimbursements are not included in the table below.

Performance related bonuses

The performance bonuses for Executive Directors are calculated in accordance with performance against agreed objectives, confirmed 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. Members of the Executive Team receive bonuses based on formulae that are agreed each year by the Remuneration Committee, and which are subject to approval by BEIS where applicable. The performance-related bonuses for 2021/22 shown in the table below have been calculated on the basis of assessment by the Remuneration Committee of performance against the relevant specific targets. Payment of the CEO's bonus is subject to approval by BEIS.

Individual Board directors' remuneration for the year is shown in the table below, with salaries disclosed on an accruals basis.

This part of the report is subject to audit.

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 CBE	20-25	-	-	-	20-25
Non-Executive Directors:					
Dr Luc Bardin	10-15	-	-	-	10-15
Stephen Barter	10-15	-	-	-	10-15
Dr Mark Bayley CBE	10-15	500	-	-	15-20
Lady Eithne Birt	10-15	-	-	-	10-15
Sir Stephen Hillier (from Oct 2021)	5-10	-	-	-	5-10
Shrin Honap	10-15	-	-	-	10-15
Richard Hookway (from Oct 2021)	5-10	200	-	-	5-10
Prof Sir Adrian Smith, FRS	10-15	-	-	-	10-15
Executive Directors:					
Prof Ian Chapman	180-185	-	25-30	28	235-240
Antonia Jenkinson	135-140	-	15-20	23	175-180

2020/21	Salary/ Fees £k	Benefits ^(a) to nearest £100	Annual ^(b) bonus £k	Pension ^(c) benefit £k	2020/21 Total £k
Chair:					
Prof David Gann CBE	20-25	-	-	-	20-25
Non-Executive Directors:					
Dr Luc Bardin (from May 2020)	10-15	-	-	-	10-15
Stephen Barter (from May 2020)	10-15	100	-	-	15-20
Dr Mark Bayley CBE (from May 2020)	10-15	-	-	-	10-15
Lady Eithne Birt (from May 2020)	10-15	-	-	-	10-15
Shrin Honap	10-15	-	-	-	10-15
Sue Scane	10-15	-	-	-	10-15
Prof Sir Adrian Smith, FRS	10-15	-	-	-	10-15
Chris Theobald	10-15	-	-	-	10-15
Executive Directors:					
Prof Ian Chapman	175-180	-	25-30	22	225-230
Antonia Jenkinson	135-140	-	15-20	29	180-185

Notes:

- Expenses disclosed for the Chair and Non-Executive Directors in 2021/22 and in 2020/21 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 BEIS. 2021/22 bonuses are estimated, and the actual 2020/21 bonuses awarded did not differ materially from those reported in the comparative for 2020/21.
- 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.

ACCOUNTABILITY REPORT

Remuneration ratios

These figures are subject to audit.

	2021/22 £	2020/21 £
Highest paid Director's total remuneration for the year excluding pension benefit	205k-210k	205k-210k
	Salary and allowances	Performance pay and bonuses payable
Highest paid director - percentage change from the previous financial year (a)	2.8%	0.0%
Employees taken as a whole, excluding the highest paid director - average percentage change from the previous financial year (b)	1.5%	4.5%

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 31st March, including annualised salary and allowances, divided by the full time equivalent number of employees (excluding the highest paid director) as at 31st March

Employee remuneration ratios

	Salary £	Other pay and benefits £	Total remuneration £	Ratio to highest paid director's remuneration ^(a)
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
2020/21				
25th percentile	29,697	3,533	33,230	6.2
Median percentile*	36,450	7,987	44,437	4.7
75th percentile	46,126	8,537	54,663	3.8

* Comparative has been restated

Notes:
 (a) Calculated using midpoint of £5k disclosure band for 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.

The Median and 25th percentile have seen a small increase year on year with a slight decline in the 75th percentile comparison.

In 2021/22 and in 2020/21 no employees received remuneration in excess of that of the highest paid Director.

Remuneration of employees excluding the highest paid director ranged from £14,296 to £153,412 (2020:21: £14,005 to £153,563*).

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.

* Comparative has been restated

ACCOUNTABILITY 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 2022 and include the value of added years paid for by Directors.

	Accrued pension as at 31/3/22 £k	Lump sum as at 31/03/22 £k	Real increase in accrued pension ^(a) £k	Real increase in lump sum ^(a) £k
Prof Ian Chapman	28	83	2	5
Antonia Jenkinson	11	32	2	5

Notes:
 (a) The real increase has been calculated after subtracting inflation.

The following table (which is subject to audit) 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 2021 £k	Real increase in CETV ^(a) £k	CETV at 31 March 2022 £k
Prof Ian Chapman	395	14	445
Antonia Jenkinson	183	20	224

Notes:
 (a) The real increase has been calculated after subtracting inflation.
 (b) Remuneration tables only include Board members for 2021/22 and 2020/21.

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.

STAFF REPORT

This section is subject to audit.

Staff costs comprise:	2022 £k	2021 £k
Permanently employed staff:		
Salaries, bonuses and allowances	75,836	65,633
Social security costs	8,858	7,461
Pension costs – defined contribution plans (see below)	12,183	10,486
	96,877	83,580
Other staff*	29,653	24,344
	126,530	107,924

* Comparatives amended in respect of re-categorisation of costs

Staff numbers

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

	2022	2021
Directly employed	1,568	1,351
Other staff	514	467
	2,082	1,818

Other staff are hired staff. Most these are used to carry out specialist work in UKAEA's scientific facilities.

Staff composition as at 31 March 2022 (not subject to audit)

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

Board and senior staff

	Male	Female	Total
Board members	7	2	9
Executive Committee	8	7	15
Senior staff	11	4	15

All Employees

	2022	2021
Male	1,277	1,144
Female	417	363

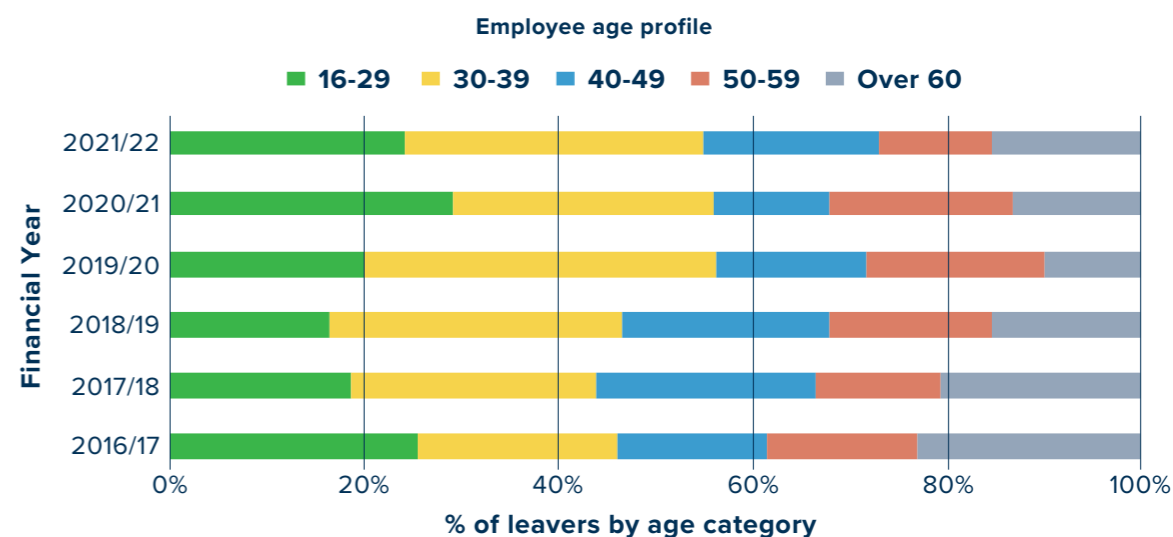
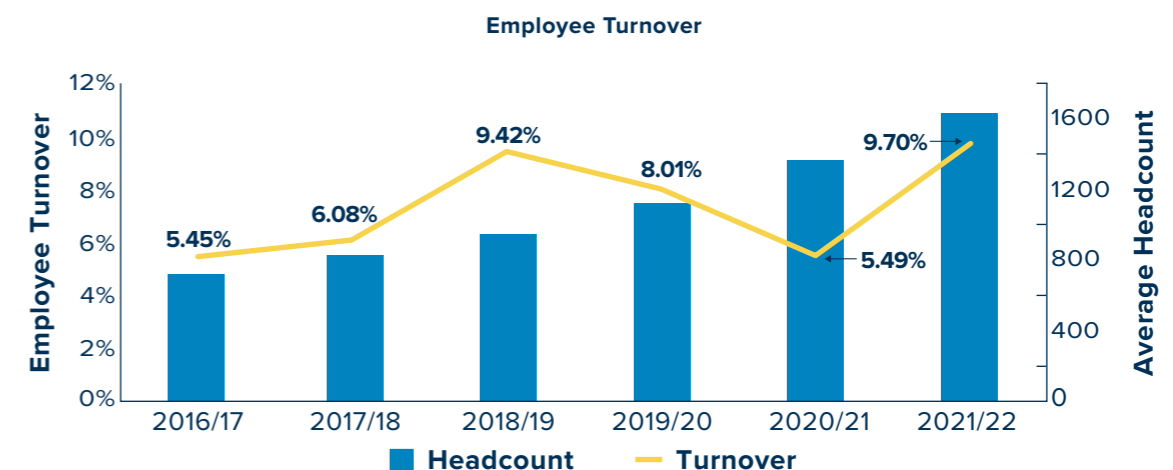
Sickness absence (not subject to audit)

The average sickness absence per employee for UKAEA during the year 2021/22 was 5.9 days (2020/21: 4.1 days).

Staff Turnover

2022
9.70%

2021
5.49%



Turnover has increased significantly, returning to levels equivalent to the year immediately prior to the pandemic. 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

ACCOUNTABILITY REPORT

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.

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 £12,086k (2021: £10,460k).

(b) Defined contribution schemes

UKAEA manages two defined contribution schemes, the Additional Voluntary Contribution (AVC) scheme and the Shift Pay Pension Savings Plan (SPPP) scheme, both of which are fully insured schemes administered by Prudential Assurance Company Ltd 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 SPPP scheme include shift working employees of UKAEA and other employers who are members of CPS or PPSS. The costs of the SPPP 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 £25k (2021: £26k).

(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	
	2021/22 £k	2020/21 £k
At 1 April	2,190	2,218
Change in discount rate	103	50
Interest on liability	27	39
Benefits payable	(84)	(83)
Actuarial (gain) loss	45	(34)
At 31 March	2,281	2,190

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).

ACCOUNTABILITY REPORT

Staff Policy

UKAEA’s pay policy is determined by our sponsoring department, BEIS.

Our Trade Union are Prospect, and we have an extant framework on how we engage and consult. We involved our Trade Union on our COVID-19 response and 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, HR 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

UKAEA spend on consultancy was £49.0k (2021: £138.2k). Consultants are hired to work on projects in a number of specific situations: where UKAEA does not have the skills set required within its support services; where the particular requirement falls outside the core business; or where an external, independent perspective is required.

When used appropriately, consultancy can be a cost effective and efficient way of getting the temporary and skilled external input that UKAEA needs.

The expenditure on temporary staff was £29,653k (2021: £24,344k), 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.

Professional and technical services are sourced externally and included in the expenditure analysis Note 9.3.

Expenditure on sponsorship

There was no expenditure on sponsorship in the year 2021-22.

ACCOUNTABILITY REPORT

Off-payroll appointments

(a) Off-payroll engagements as at 31 March 2022, for more than £245 per day or greater

Number of existing engagements	287
Of which the number that have existed at the time of reporting for	
Less than one year	119
Between one and two years	54
Between two and three years	42
Between three and four years	27
More than four years	45

(b) All highly paid off-payroll workers engaged at any point during the year ended 31 March 2022, earning £245 per day or greater

Number of temporary off-payroll workers engaged during the year ended 31 March 2022	329
Of which:	
Number not subject to off-payroll legislation	313
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	16

Number of engagements reassessed for consistency/assurance purposes during the year	5
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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 2021 and 31 March 2022

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 officials with significant financial reporting responsibility' during the 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 2021 and 31 March 2022.

Number of off-payroll engagements of board members, and/or senior officials with significant financial responsibility, during the financial year	3
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.	4

Engagements from 2002 and 2005 respectively: 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. Three AEAIL Directors are off-payroll by default and are paid a small fee by AEAIL.

From 2014 to 2022: The fourth Director of AEAIL is an employee of UKAEA and on the UKAEA payroll.

ACCOUNTABILITY REPORT

Trade Union Facility Time

Table 1 – Relevant Union Officials

Number of employees who were relevant union officials during the relevant period	Full-time equivalent number of employees
14	14

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%	6
1-50%	8
51-99%	-
100%	-

Table 3: Percentage of pay bill spent on facility time

	Figures £k
Total cost of facility time	29
Total pay bill	96,877
Percentage of the total pay bill spent on facility time, calculated as: (total cost of facility time ÷ total pay bill) x 100	0.03%

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 relevant period ÷ total paid facility time hours) x 100	Nil
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Exit packages paid to employees (audited)

Exit package cost band	Number of compulsory redundancies		Number of other departures agreed	
	2021/22	2020/21	2021/22	2020/21
<£10,000	0	0	0	0
£10,000 - £25,000	0	0	0	0
£25,000 - £50,000	0	0	0	0
£50,000 - £100,000	0	0	0	0
£100,000 - £150,000	0	0	0	0
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.

OTHER PARLIAMENTARY DISCLOSURES

Fees and Charges (audited)

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 (audited)

There were reportable losses and special payments of £65k in the year (on an accruals basis). This includes: Foreign exchange losses of £32k (see Note 6.2 to the Accounts), due to timing differences on realised transactions and restatement of future Euro receivables at year end exchange rates. Loss on disposal of assets £23k. An estimated expected credit loss of £10k for a commercial tenant in respect to outstanding rent and direct costs.

Remote contingent liabilities (audited)

UKAEA has no significant remote contingent liabilities to report.

COVID-19 pandemic impact

The COVID-19 pandemic has continued to cause significant economic disruption for the 2021-22 reporting period. The ongoing disruption caused by the pandemic has created significant economic uncertainty, and this uncertainty is expected to continue throughout 2022. No contingent liabilities or assets have been recognised.

EU Exit

On 31 January 2020, the withdrawal agreement between the UK and the EU became legally binding, and the UK left the EU. There have been subsequent changes in legislation and regulation, whilst funding arrangements are subject to the outcome of continued negotiations as noted in the performance report. No contingent liabilities or assets have been recognised.



Professor Ian Chapman
Chief Executive and Accounting Officer
15th July 2022

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 2022 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 2022;
- 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 2022 and its profit 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 of Public Sector Entities in the United Kingdom. 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 have also elected to apply the ethical standards relevant to listed entities. 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.

The going concern basis of accounting for the United Kingdom Atomic Energy Authority and its Group is adopted in

ACCOUNTABILITY REPORT

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 anticipated that the services which they provide will continue into the future.

Other Information

The other information comprises information included in the Annual Report, but does not include the financial statements nor my auditor's certificate. 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.

In connection with my audit of the financial statements, 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 its environment obtained in the course of the audit, I have not identified material misstatements in the Performance and Accountability Report.

I have nothing to report in respect of the following matters which I report to you if, in my opinion:

- I have not received all of the information and explanations I require for my audit; or
- 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
- 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, and Accounting Officer are responsible for:

- maintaining proper accounting records;
- the preparation of the financial statements and Annual Report in accordance with the applicable financial reporting framework and for being satisfied that they give a true and fair view;
- ensuring that the Annual Report and accounts as a whole is fair, balanced and understandable;
- internal controls as the Accounting Officer determines is necessary to enable the preparation of financial statement to be free from material misstatement, whether due to fraud or error; 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.

ACCOUNTABILITY REPORT

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, we considered the following:

- 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.
- Inquiring 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 relating to:
 - o identifying, evaluating and complying with laws and regulations and whether they were aware of any instances of non-compliance;
 - o detecting and responding to the risks of fraud and whether they have knowledge of any actual, suspected or alleged 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 and its Group's compliance with the Atomic energy Authority Act 1954, Managing Public Money, employment law, and tax legislation;
- discussing among the engagement team and involving relevant internal and external specialists, including property expertise regarding 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's 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 of controls.

I also obtained an understanding of the United Kingdom Atomic Energy Authority and its Group's framework of authority as well as other legal and regulatory frameworks in which the United Kingdom Atomic Energy Authority and its Group operates, focusing 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 the Atomic Energy Authority Act 1954, Managing Public Money, employment law, and tax legislation.

Audit response to identified risk

As a result of performing the above, the procedures I implemented to respond to identified risks included the following:

- reviewing 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;
- enquiring of management, the Audit and Risk Committee and in-house legal counsel concerning actual and potential litigation and claims;
- reading and reviewing 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, testing the appropriateness of journal entries and other adjustments; assessing whether the judgements made in making accounting estimates are indicative of

ACCOUNTABILITY REPORT

- a potential bias; and evaluating the business rationale of any significant transactions that are unusual or outside the normal course of business;
- performing analytical procedures to identify any unusual or unexpected relationships that may indicate risks of material misstatement due to fraud; and
- reviewing internal audit reports.

I also communicated relevant identified laws and regulations and potential fraud risks 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 income and expenditure reported in the financial statements have been applied to the purposes intended by Parliament and the financial transactions 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 that I identify during my audit.

Report

I have no observations to make on these financial statements.

Gareth Davies
Comptroller and Auditor General

Date 15th July 2022

National Audit Office
157-197 Buckingham Palace Road
Victoria
London
SW1W 9SP

ACCOUNTABILITY REPORT

CONSOLIDATED STATEMENT OF COMPREHENSIVE NET INCOME

for the year ended 31 March 2022

	Note	Group		Authority	
		2022 £k	2021 £k	2022 £k	2021 £k
Income					
Revenue	5	226,236	176,918	222,460	173,687
Other income		2,778	5,034	3,496	5,808
Less: Share of revenue of joint venture		(3,776)	(3,232)	-	-
Total operating income		225,238	178,720	225,956	179,495
Expenditure					
Raw materials and consumables	9	53,525	36,413	53,525	36,413
Other external expenses	9	103,057	67,119	103,057	67,119
Staff costs	6	126,530	108,350	126,530	108,350
Depreciation, amortisation and impairment		8,059	3,804	8,059	3,804
Other expense		3,350	2,376	3,886	3,014
Costs charged to provisions		(1,308)	(40)	(1,308)	(40)
		293,213	218,022	293,749	218,660
Revaluation adjustment		(3,139)	(691)	(3,139)	(691)
Costs capitalised		(62,504)	(40,650)	(62,504)	(40,650)
Total operating expenditure		227,570	176,681	228,106	177,319
Operating (loss)/profit		(2,332)	2,039	(2,150)	2,176
Finance income	8	18	60	6	41
Finance expense	8	(16)	(10)	(16)	(10)
Profit/(loss) on disposal of assets		(23)	-	(23)	-
Share of profit/(loss) of joint venture after tax	13	16,282	4,570	-	-
Profit/(loss) before tax	9	13,929	6,659	(2,183)	2,207
Current tax credit	10	5,707	5,334	5,707	5,334
Deferred tax (debit)/credit	10	(3,365)	(1,393)	(3,365)	(1,393)
Profit/(loss) for the year		16,271	10,600	159	6,148
Other comprehensive net income					
Net gain/(loss) on revaluations		22,848	18,232	16,578	18,217
Actuarial gains/(losses) on defined benefit pension plans		(147)	(17)	(147)	(17)
Tax (charge)/credit relating to components of other comprehensive income		(5,730)	(1,072)	(5,730)	(1,072)
Total other comprehensive net income for the year		16,971	17,143	10,701	17,128
Total comprehensive net income for the year		33,242	27,743	10,860	23,276

The notes on pages 126 to 157 are an integral part of these financial statements.

CONSOLIDATED STATEMENT OF FINANCIAL POSITION

as at 31 March 2022

	Note	Group		Authority	
		2022 £k	2021 £k	2022 £k	2021 £k
Non-current assets:					
Property, plant and equipment	11	201,712	130,116	201,712	130,116
Right of use assets	11	4,074	-	4,074	-
Investment property	12	57,688	54,549	57,688	54,549
Intangible assets	11	165	119	165	119
Financial assets	13	78,723	56,171	18,623	18,623
Other receivables	15	514,448	482,380	514,448	482,380
Total non-current assets		856,810	723,335	796,710	685,787
Current assets					
Trade and other receivables	15	74,005	37,655	74,783	38,559
Financial assets	13	-	4,611	-	-
Cash and cash equivalents	16	66,566	75,453	60,383	73,109
Total current assets		140,571	117,719	135,166	111,668
Total assets		997,381	841,054	931,876	797,455
Current liabilities					
Trade and other payables	17	76,064	72,406	76,012	72,394
Lease liabilities	20	263	-	263	-
Provisions for liabilities and charges	21	20,598	6,211	20,465	5,875
Total current liabilities		96,925	78,617	96,740	78,269
Total assets minus current liabilities		900,456	762,437	835,136	719,186
Non-current liabilities					
Other payables	17	59	766	59	766
Deferred income	18	10,152	9,237	10,152	9,237
Deferred income tax liabilities	19	21,063	11,968	21,063	11,968
Lease liabilities	20	3,565	-	3,565	-
Provisions for liabilities and charges	21	520,355	487,444	520,126	486,902
Total non-current liabilities		555,194	509,415	554,965	508,873
Assets less liabilities		345,262	253,022	280,171	210,313
Taxpayers' equity					
General reserve		13,658	13,658	13,658	13,658
Revaluation reserve		41,313	31,107	41,313	31,107
Capital grants reserve		133,079	79,788	133,079	79,788
Retained earnings		157,212	128,469	92,121	85,760
Total taxpayers' equity		345,262	253,022	280,171	210,313

The notes on pages 126 to 157 are an integral part of these financial statements.



Professor Ian Chapman
Chief Executive and Accounting Officer
15th July 2022

CONSOLIDATED STATEMENT OF CASH FLOWS

as at 31 March 2022

	Note	Group		Authority	
		2022 £k	2021 £k	2022 £k	2021 £k
Cash flows from operating activities					
Profit/(loss) for the year		16,271	10,600	159	6,148
Adjustments for non-cash transactions:					
- Depreciation, amortisation and impairment		8,059	3,804	8,059	3,804
- Deferred income released	18	(785)	(3,731)	(785)	(3,731)
- Change in fair value of investment property	12	(3,139)	(691)	(3,139)	(691)
- Loss on disposal of property, plant and equipment		15	-	15	-
- Loss on disposal of right of use assets		8	-	8	-
- Net finance income recognised	8	(2)	(50)	10	(31)
- Tax debit/(credit)	10	(2,342)	(3,941)	(2,342)	(3,941)
- Share of loss/(profit) of joint venture		(16,282)	(4,570)	-	-
Changes in working capital:					
- (Increase)/decrease in trade and other receivables		(19,317)	561	(19,191)	885
- (Increase)/decrease in inventories		-	114	-	114
- (Increase)/decrease in current financial assets		4,611	988	-	-
- Increase/(decrease) in trade and other payables		4,651	13,578	4,611	13,578
- Use of and change in provisions, net of the movement on reimbursement receivables		3,390	1,731	3,906	2,149
Net cash inflow/(outflow) from operating activities		(4,862)	18,393	(8,689)	18,284
Cash flows from investing activities					
Purchase of property, plant and equipment	11	(62,379)	(40,365)	(62,379)	(40,365)
Purchase of intangible assets	11	(125)	(125)	(125)	(125)
Net cash inflow/(outflow) from investing activities		(62,504)	(40,490)	(62,504)	(40,490)
Cash flows from financing activities					
Capital grant from sponsoring department		58,998	37,035	58,998	37,035
Interest received	8	18	60	6	41
Payments of interest on lease liabilities	8	(41)	-	(41)	-
Repayments of lease liabilities	20	(496)	-	(496)	-
Net cash inflow/(outflow) from financing activities		58,479	37,095	58,467	37,076
Net increase/(decrease) in cash and cash equivalents in the year		(8,887)	14,998	(12,726)	14,870
Cash and cash equivalents at the beginning of the year		75,453	60,455	73,109	58,239
Cash and cash equivalents at the end of the year		66,566	75,453	60,383	73,109

The notes on pages 126 to 157 are an integral part of these financial statements.

CONSOLIDATED STATEMENT OF CHANGES IN TAXPAYERS' EQUITY

for the year ended 31 March 2022

Group	General reserve £k	Revaluation reserve £k	Capital grants reserve £k	Retained earnings £k	Total £k
Balance at 1 April 2020	13,658	14,470	45,124	114,992	188,244
Total comprehensive net income for the year	-	17,145	-	10,598	27,743
Capital grant from sponsoring department	-	-	37,035	-	37,035
Depreciation transfer	-	(508)	(2,371)	2,879	-
Balance at 31 March 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

Authority	General reserve £k	Revaluation reserve £k	Capital grants reserve £k	Retained earnings £k	Total £k
Balance at 1 April 2020	13,658	14,470	45,124	76,750	150,002
Total comprehensive net income for the year	-	17,145	-	6,131	23,276
Capital grant from sponsoring department	-	-	37,035	-	37,035
Depreciation transfer	-	(508)	(2,371)	2,879	-
Balance at 31 March 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

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 an 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. Its sponsoring government department is the Department for Business, Energy and Industrial Strategy (BEIS). UKAEA and its subsidiaries are referred to as "the Group".

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 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 37.53 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 and actually exercises this power. 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.

3.3 Revenue recognition

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.

(a) Service contracts

Revenue from cost recovery contracts for managing the UK's fusion research programme, the JET facility and in support of the wider European fusion research programmes is recognised to the extent of costs incurred in the period that are expected to be recoverable from customers.

Revenue from customer contracts is recognised under IFRS 15. 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 customer contracts with UKAEA 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 income in the same period as the related expenditure that it is intended to fund. This departure from the specified treatment in the FReM has been agreed with HM Treasury.

Capital grants from UKAEA's sponsoring department are recognised as financing and credited to reserves 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 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.

(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 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 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 quinquennial, valuations by external independent valuers, less subsequent depreciation for buildings. In the intervening years, these valuations may be updated by the Group with the assistance of independent advice as required. A valuation of all the properties was carried out in February 2022.

Fair value is based on market values for existing use as there are no alternative uses for the land and buildings. Where this basis 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 of the same asset are charged against the revaluation reserve; all other decreases are charged to the statement of comprehensive 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 income during the financial period in which they are incurred.

Expenditure on Property, plant and equipment that was funded by the European Commission in respect of the Joint European Torus was recognised in the Statement of Comprehensive Income during the financial periods it was 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	up to 40 years
-	Plant, machinery and equipment	up to 20 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 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 from 1 April 2021.

A full disclosure of the effects of the implementation of IFRS 16 is given in Note 3.16.

(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 income as an operating expense on a straight-line basis over the term of the lease. Lease incentives are considered to be an integral part of the total lease expense and are recognised 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 and
- payments of penalties for terminating the lease if the lease term reflects the expected exercise of an option to terminate the lease.

The lease liability is presented as a separate line in the consolidated statement of financial position.

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 measured 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 2022, in respect of a lease which was terminated early (see Notes 11.2 and 20).

The right-of-use assets comprise the initial measurement of the corresponding lease liability, lease payments made at or before the lease commencement date and any initial direct costs. They are subsequently measured at cost less accumulated depreciation and impairment losses.

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. The costs are included in the related right-of-use asset.

Right-of-use assets are depreciated over the shorter period of lease term and 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 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 consolidated 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 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 consolidated 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.

(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 2021/22 and 2020/21 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 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.

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, and 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 and disclosed separately in the income statement.

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 consolidated 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, whereby financial assets are classified in 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 4c).

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**IFRS 16 - Leases**

The Group adopted IFRS 16 for the first time from 1st April 2021 and the impacts on the Statement of Comprehensive Income (SoCI) and Statement of Financial Position (SoFP) have been detailed below.

	2022	2021
	IFRS 16	IAS 17
	£k	£k
SoCI impacts arising from IFRS 16		
Asset depreciation	634	-
Interest expense on discounted lease liability	41	-
IAS 17 basis rental payments	-	164
Total net impact to SoCI	675	164

	2022	2021
	IFRS 16	IAS 17
	£k	£k
SoFP impacts arising from IFRS 16		
Right of use assets recognised	4,074	-
Lease liabilities recognised	(3,828)	-
Total net impact to SoFP	246	-

Lease liabilities

	£k
Total commitments under operating leases as at 31/03/21	2,736
Less: Leases committed to but not commenced as at 31/03/21	(793)
Less: Low value / short leases	(46)
Add back: Lease breaks unlikely to be exercised	2,404
Add: Extension options likely to be exercised	47
Discounting	(372)
Adjustment for rental payments made before due date	(7)
IFRS 16 lease liabilities as at 01/04/21 (initial adoption)	3,969
New IFRS 16 leases signed during the year	853
Payments made	(537)
Interest accrued	41
Remeasurement on early termination	(498)
IFRS 16 lease liabilities as at 31/03/22	3,828

	£k
Total lease liabilities as at 31/03/22 undiscounted	4,166

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Under IFRS16 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.

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 2021/22 FReM and have not been early adopted by the Authority:

IFRS 17 - Insurance Contracts (IFRS 4 replacement - Insurance Contracts) - effective date 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.

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 other 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 Department for Business, Energy and Industrial Strategy 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 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.

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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

Other segments include grant-in-aid funding and insurance. None of these segments meets any of the criteria for determining reportable segments in 2021 or 2022. 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 2021 and 31 March 2022 is as follows:

	Fusion research £k	Property management £k	Other £k	Total £k
Year ended 31 March 2021				
External segment revenue	157,188	9,558	10,172	176,918
Less: Share of revenue of joint venture	-	(3,232)	-	(3,232)
Other income	5,034	-	-	5,034
Expenditure	(160,543)	(7,255)	(9,574)	(177,372)
Investment property revaluation	-	691	-	691
Operating profit/(loss)	1,679	(238)	598	2,039
Finance income	-	-	60	60
Finance expense	-	-	(10)	(10)
Share of profit/(loss) of joint venture	-	4,570	-	4,570
Profit/(loss) before tax	1,679	4,332	648	6,659
Year ended 31 March 2022				
External segment revenue	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

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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	
	2022 £k	2021 £k
Revenue		
Total revenue for reportable segments	218,479	166,746
Other revenue	7,757	10,172
Consolidated revenue per Statement of Comprehensive Net Income	226,236	176,918
Profit or loss		
Total profit/(loss) for reportable segments	15,233	6,011
Other profit/(loss)	(1,304)	648
Consolidated profit/(loss) before tax per Statement of Comprehensive Net Income	13,929	6,659

Geographical segments

In presenting information on the basis of geographical segments, segment revenue is based on the geographical location of customers.

	Group	
	2022 £k	2021 £k
Revenue		
United Kingdom	178,756	133,459
Europe	47,191	43,055
Rest of the World	289	404
	226,236	176,918

Note, the reported 2021 comparatives have been corrected from the prior year report.

Revenue from major customers

	Group	
	2022 £k	2021 £k
European Commission	38,783	37,130

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. In the future, once the UK has associated to EURATOM, this spend may be applicable for EUROfusion funding and that funding would subsequently be reported as Europe geographical revenue.

ANNUAL ACCOUNTS**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 2022 £16,556k (2021: £14,332k).

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	2022 £k	2021 £k
Trade receivables	15	2,149	1,667
Contract assets	15	1,070	579
Contract liabilities	17	(34)	(30)

Contract assets primarily relate to the direct costs incurred on unsatisfied performance obligations and performance obligations satisfied but not yet invoiced.

Contract liabilities primarily relate to invoicing and consideration received in advance.

Movement in contract assets/liabilities in the year:

	2022 £k	2021 £k	2022 £k	2021 £k
	Contract Assets	Contract Assets	Contract Liabilities	Contract Liabilities
Contract assets/liabilities at the beginning of the year	579	549	(30)	(19)
Contract assets for performance obligations satisfied but not yet invoiced	36	-	-	-
Contract liability for payments received in advance of the satisfaction of performance obligations	-	-	(4)	(11)
Changes in the measure of progress	455	30	-	-
Contract assets/liabilities at the end of the year	1,070	579	(34)	(30)

ANNUAL ACCOUNTS**6 Staff Costs and Operating profit****6.1 Staff costs**

Staff costs comprise:

	2022 £k	2021 £k
Permanently employed staff:		
Salaries, bonuses and allowances	75,836	65,544
Social security costs	8,858	7,461
Pension costs – defined contribution plans (see below)	12,183	10,486
	96,877	83,491
Other staff	29,653	24,859
	126,530	108,350

Full details of UKAEA's pension schemes are given in the Remuneration report.

The total employer's pension contributions paid by the Group to the CPS during the year were £12,086k (2021: £10,460k).

The total employer's pension contributions paid by UKAEA during the year to the SPPP were £25k (2021: £26k)

6.2 Operating profit

Operating profit has been arrived at after charging/(crediting):

	2022 £k	2021 £k
Change in fair value of investment property	(3,139)	(691)
Net foreign exchange losses/(gains)	32	346
Operating lease rentals:		
- Disclosure under IAS 17: Leases of property	-	95
- Disclosure under IAS 17: Leases of plant, machinery and vehicles	-	189
- Disclosure under IFRS 16: Short term leases - plant, machinery and vehicles	102	-
- Disclosure under IFRS 16: Leases of low value assets - plant, machinery and vehicles	7	-
Non-cash items:		
- depreciation, amortisation and impairment	8,059	3,804

7 Auditors' remuneration

The total remuneration of the Group's auditor, the National Audit Office, for services provided to the Group was:

	2022 £k	2021 £k
Audit fees		
UKAEA	106	78

2022: Includes £7k in respect of 2021. In addition, a further increase of £20k has been agreed in respect of 2022 subsequent to year end.

Audit of subsidiary and joint venture

The audit fee payable to the auditors of AEAIL was £12k (2021: £10k). The audit fee payable to the auditors of HSIC PubSP, in which UKAEA has a share of one half, was £11k (2021: £11k). The audit fee payable to the auditors of HSIC LP, in which UKAEA has a share of one quarter via HSIC PubSP, was £26k (2021: £25k).

ANNUAL ACCOUNTS**8 Finance income and expense**

Profit/(loss) for the year has been arrived at after crediting/(charging):

	Group		Authority	
	2022 £k	2021 £k	2022 £k	2021 £k
Finance income				
Interest on term bank deposits	18	60	6	41
Finance expense				
Interest on lease liabilities	(41)	-	(41)	-
Revaluation of provisions:				
- Unwinding of discount	211	(1,140)	211	(1,140)
- Adjustments to reimbursement receivables	(159)	1,169	(159)	1,169
Interest on unfunded retirement benefits	(27)	(39)	(27)	(39)
	(16)	(10)	(16)	(10)

Full details of provisions and the discount rates used are provided in note 21.

9 Analysis of net income**9.1 Analysis of net income**

	Group	
	2022 Total £k	2021 Total £k
Income		
Income from activities	209,680	162,586
Contracts with customers & collaborations	16,556	14,332
Other income	2,778	5,034
Interest receivable	18	60
Less: Share of revenue of joint venture	(3,776)	(3,232)
Share of profit/(loss) of joint venture	16,282	4,570
	241,538	183,350
Expenditure		
Raw materials and consumables	53,525	36,413
Other external expenses	103,057	67,119
Staff costs	126,530	108,350
Other expense	3,350	2,376
Less: Costs charged to provisions	(1,308)	(40)
Less: Costs capitalised	(62,504)	(40,650)
Revaluation adjustment	(3,139)	(691)
Non-cash items:		
- Depreciation and impairment	8,059	3,804
- Finance expense	16	10
- Loss on disposal of assets	23	-
	227,609	176,691
Net income after interest and before tax	13,929	6,659

ANNUAL ACCOUNTS**9.2 Expenditure analysis – staff costs**

For analysis of staff costs see Note 6.1

9.3 Expenditure analysis – raw materials and consumables and other external expenses

	Group	
	2022 £k	2021 £k
Raw materials and consumables		
Plant, equipment and spares	32,270	18,062
Electricity	9,658	7,249
Gases	2,072	1,244
IT equipment	4,068	4,428
Software	3,155	2,245
Other	2,302	3,185
	53,525	36,413
Other external expenses		
Design and construction	32,816	21,776
Site maintenance and services	13,898	10,362
Inspection services	4,455	6,586
Pensions administration	1,492	1,422
Professional and technical services	34,013	20,671
Travel and subsistence	785	393
Contribution to Fusion Industry Program (UKI2S)	8,000	-
Other	7,598	5,909
	103,057	67,119

ANNUAL ACCOUNTS**10 Tax (expense)/credit**

	Group and Authority	
	2022 £k	2021 £k
Current tax		
Current tax credit (RDEC)	5,707	5,334
Adjustments relating to previous years	-	-
	5,707	5,334
Deferred tax		
Origination and reversal of temporary timing differences	(3,145)	(131)
Recognition of deferred tax asset (Note 19)	(220)	(1,262)
	(3,365)	(1,393)
Total tax (expense)/credit	2,342	3,941

The Research and Development Expenditure Credit (RDEC) became mandatory from 1 April 2016. The RDEC is beneficial for UKAEA and offsets 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:

	2022 £k	2021 £k
Profit/(loss) for the year	16,271	10,600
Add back: Tax expense/(credit)	(2,342)	(3,941)
Profit/(loss) before tax	13,929	6,659
Tax calculated at the standard UK corporation tax rate of 19% (2021: 19%)	(2,647)	(1,265)
Tax effects of:		
- Reversal of timing differences	(1,039)	224
- Expenses not deductible	3,293	256
- R&D expenditure credit under s104A CTA 2009	(1,339)	(1,251)
- Brought forward losses set against trading profits	-	861
- Current year profit offset against deferred tax asset	1,587	496
- Non-trading profits offset by RDEC credit	177	701
- Net RDEC claim 2021/22	5,707	-
- Net RDEC claim 2020/21	-	5,334
- Tax losses for which no deferred income tax asset was recognised	(32)	(22)
- Adjustments for previous periods	-	-
Current tax (expense)/credit for the year	5,707	5,334

The tax (charged)/credited to equity during the year is as follows:

	2022 £k	2021 £k
Tax (charge)/credit relating to fair value gains on property, plant and equipment	(5,730)	(1,072)

11 Property, plant & 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 2020	13,831	35,859	-	16,204	22,648	88,542
Additions	-	-	-	1,095	39,270	40,365
Disposals	-	-	-	-	-	-
Revaluation	15,549	2,668	-	-	-	18,217
Transfers within property plant and equipment	-	-	3,324	5,500	(8,824)	-
Transfer (to)/from investment property	-	-	-	-	-	-
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
Depreciation and impairment						
At 31 March 2020	-	(6,813)	-	(6,397)	-	(13,210)
Depreciation charge	-	(1,463)	(83)	(2,252)	-	(3,798)
Disposals	-	-	-	-	-	-
Transfer to investment property	-	-	-	-	-	-
At 31 March 2021	-	(8,276)	(83)	(8,649)	-	(17,008)
Depreciation charge	-	(1,838)	(166)	(5,342)	-	(7,346)
Disposals	-	-	-	150	-	150
Transfer to investment property	-	-	-	-	-	-
At 31 March 2022	-	(10,114)	(249)	(13,841)	-	(24,204)
Net book value						
At 31 March 2021	29,380	30,251	3,241	14,150	53,094	130,116
At 31 March 2022	35,577	46,645	3,075	18,129	98,286	201,712

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 2022. 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 FRoM.

The Group determined that the valuations were still appropriate as at the valuation date and the reporting date.

The additions during the year include expenditure on progress on major programmes including STEP, NFTP, MRF and RACE. For further information on these major programmes, please see the Performance Report.

At the cessation of the JET Operating Contract three JET buildings were valued by Carter Jonas and capitalised via the revaluation reserve.

The net book value under the historical cost model as at 31 March 2022 relating to classes of property, plant and equipment subject to revaluation was as follows: Land £133k (2021: £133k) and Buildings £28,570k (2021: £21,914k).

There was £9,808k capital expenditure contracted for at the reporting date but not recognised in the financial statements (2021: £8,618k). This related mainly to assets in course of construction.

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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
Depreciation			
At 31 March 2021	-	-	-
Depreciation charge	(549)	(85)	(634)
Disposals	336	-	336
At 31 March 2022	(213)	(85)	(298)
Net book value			
At 31 March 2021	-	-	-
At 1 April 2021	4,153	110	4,263
At 31 March 2022	3,940	134	4,074

During the year the Group exercised an option to terminate a lease early in order to purchase the underlying asset. This resulted in a remeasurement of the right of use asset (a reduction in right of use asset value of £638k, with a corresponding remeasurement of the lease liability (a reduction in lease liability of £498k, see Note 20), and of the lease reinstatement provision (a reduction of £140k).

Right of use assets relate to leases 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 IFRS16. 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 ROUA.

11.3 Intangible assets

Group and Authority	Software £k	Total £k
Cost		
At 31 March 2020	1,769	1,769
Additions	125	125
At 31 March 2021	1,894	1,894
Additions	125	125
At 31 March 2022	2,019	2,019
Amortisation		
At 31 March 2020	(1,769)	(1,769)
Amortisation charge	(6)	(6)
At 31 March 2021	(1,775)	(1,775)
Amortisation charge	(79)	(79)
At 31 March 2022	(1,854)	(1,854)
Net book value		
At 31 March 2021	119	119
At 31 March 2022	165	165

12 Investment property

	Group and Authority	
	2022 £k	2021 £k
At 1 April	54,549	53,857
Change in fair value	3,139	692
At 31 March	57,688	54,549

Investment properties were valued at fair value as at 28 February 2022 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.

Upon senior management review with Carter Jonas in July 2022 the Group determined the Investment property valuation was understated by £4.8m due to a variance in appropriate investment yield. This item has not been adjusted in the values presented at 31st March 2022.

The net book value under the historical cost model at 31 March 2022 relating to investment property subject to revaluation was £16,465k (2021: £16,465k).

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 income statement:

	Group and Authority	
	2022 £k	2021 £k
Rental income	2,544	2,143
Direct operating expenses:		
- Investment properties that generated rental income	1,909	2,073
- Investment properties that did not generate rental income	294	318
- Expected Credit Loss	10	376

The Expected Credit Loss is in respect of outstanding rent and direct costs due from a Culham commercial tenant which entered administration.

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13 Financial assets

	Group		Authority	
	2022 £k	2021 £k	2022 £k	2021 £k
Non-current				
Movements during the year				
At 1 April	56,171	51,588	18,623	18,623
Investment in joint venture	-	-	-	-
Revaluation and profit on joint venture	22,552	4,583	-	-
At 31 March	78,723	56,171	18,623	18,623
Total non-current assets				
Investment in subsidiary undertakings	-	-	3,000	3,000
Investment in joint venture	78,723	56,171	15,623	15,623
	78,723	56,171	18,623	18,623
Current				
Total current assets				
Term bank deposits	-	4,611	-	-
	-	4,611	-	-

13.1 Investment in subsidiary undertakings

Name	Country of incorporation	Ownership interest %	
		2022	2021
AEA Insurance Limited	Isle of Man	100	100

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 office:
AEA Insurance Limited
1st Floor, Goldie House
1-4 Goldie Terrace
Upper Church Street
Douglas
Isle of Man
IM1 1EB

ANNUAL ACCOUNTS**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 Limited Partnership (HSIC LP), which is responsible for the development of the Harwell Oxford Campus. The interest in the joint venture is accounted for using the equity method in the Group financial statements.

	Group	
	2022 £k	2021 £k
At 1 April	56,171	51,588
Share of profit/(loss) net of tax	16,282	4,570
Revaluation	6,270	13
At 31 March	78,723	56,171
Analysed as follows:		
Cost or valuation	38,519	32,249
Share of retained profits/(losses)	40,204	23,922
	78,723	56,171

The £16,282k share of profit of the joint venture (2021: profit of £4,570k) represents UKAEA's share of the operating profit of HSIC 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 LP investment properties.

The following amounts represent the Group's share of the income, results, assets and liabilities of HSIC LP via HSIC PubSP. They are included in the Statement of Comprehensive Net Income and Statement of Financial Position:

	Group	
	2022 £k	2021 £k
Profit/(loss) net of tax		
Income	3,776	3,232
Expenditure	(3,252)	(3,393)
Net revaluation gain	15,758	4,731
	16,282	4,570
Assets		
Non-current assets	85,276	59,951
Current assets	22,998	20,625
	108,274	80,576
Liabilities		
Current liabilities	924	751
Non-current liabilities	28,626	23,654
	29,550	24,405
Net assets	78,723	56,171

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.

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Within current/non-current assets there is £77.4m of investment properties (2021: £45.4m). The investment properties have been valued at market value as at 31 March 2022 using information provided by Bidwells, 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

There were no term bank deposits held at 31 March 2022. Term bank deposits were held during the year with major UK banks. The average interest rate on the deposits held at 31 March 2021 was 0.15%. The credit risk associated with these investments was considered to be low because of the size and status of the banks involved.

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 subsidiary 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 2022 and 31 March 2021. All financial liabilities of the Group were held at amortised cost at both 31 March 2022 and 31 March 2021.

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.

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15 Trade and other receivables	Group		Authority	
	2022 £k	2021 £k	2022 £k	2021 £k
Amounts falling due after more than one year				
Reimbursement receivables:				
- Site restoration	476,982	442,513	476,982	442,513
- Restructuring	31,759	34,143	31,759	34,143
Corporation tax	5,707	5,334	5,707	5,334
Other receivables	-	390	-	390
	514,448	482,380	514,448	482,380
Amounts falling due within one year				
Trade receivables	5,475	2,783	5,475	2,783
Reimbursement receivables:				
- Site restoration	12,411	548	12,411	548
- Restructuring	3,122	3,144	3,122	3,144
Prepayments and accrued income	39,245	20,788	39,232	20,768
Contract assets - re revenue	44	8	44	8
Contract assets - direct costs (re WIP)	1,026	571	1,026	571
VAT	7,331	5,173	7,331	5,173
Corporation tax	5,334	4,528	5,334	4,528
Other receivables	17	112	808	1,036
	74,005	37,655	74,783	38,559

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. This is £458k (2021: £436k).

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.

ANNUAL ACCOUNTS

16 Cash and cash equivalents	Group		Authority	
	2022 £k	2021 £k	2022 £k	2021 £k
At 1 April	75,453	60,455	73,109	58,239
Net change in cash and cash equivalent balances	(8,887)	14,998	(12,726)	14,870
At 31 March	66,566	75,453	60,383	73,109
The following balances were held at 31 March:				
Commercial banks and cash in hand	66,566	75,453	60,383	73,109
	66,566	75,453	60,383	73,109

17 Trade and other payables	Group		Authority	
	2022 £k	2021 £k	2022 £k	2021 £k
Amounts falling due within one year				
Trade payables	11,198	4,843	11,198	4,843
Accrued costs	34,376	28,068	34,324	28,056
Payments received on account	26,655	36,138	26,655	36,138
Contract liabilities	34	30	34	30
Social security and other taxes	2,223	1,965	2,223	1,965
Other payables	1,578	1,362	1,578	1,362
	76,064	72,406	76,012	72,394
Amounts falling due after more than one year				
Payments received on account	59	766	59	766

18 Deferred income	Group and Authority	
	2022 £k	2021 £k
At 1 April	9,237	10,749
Deferred income received	1,700	2,219
Released to income statement	(785)	(3,731)
At 31 March	10,152	9,237

The majority of UKAEA's deferred income relates to capital grants for the purchase of equipment for the Materials Research Facility and grants for the RACE building and new facilities for RACE.

**19 Deferred income tax
Group and Authority**

	Investment property £k	Land and buildings £k	Total £k
Deferred tax liability			
At 31 March 2020	7,342	5,403	12,745
Movements during 2020/21:			
Charged/(credited) to income statement:			
- Revaluation	132	-	132
- Change in tax rate	-	-	-
Charged/(credited) directly to equity:			
- Revaluation	-	1,072	1,072
- Change in tax rate	-	-	-
At 31 March 2021*	7,474	6,475	13,949
Movements during 2021/22:			
Charged/(credited) to income statement:			
- Revaluation	785	-	785
- Change in tax rate	2,360	-	2,360
Charged/(credited) directly to equity:			
- Revaluation	-	3,684	3,684
- Change in tax rate	-	2,046	2,046
At 31 March 2022	10,619	12,205	22,824

Deferred tax asset

At 31 March 2021			1,981
Increase/(decrease) in deferred tax asset			(220)
At 31 March 2022			1,761

Net deferred tax liability

At 31 March 2021	11,968
At 31 March 2022	21,063

* The prior year comparative allocation between Investment Property and Land & Buildings has been corrected.

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 recalculated 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 £1,493k in respect of RDEC set-off amounts that can be carried forward against future taxable income. It is expected that UKAEA will utilise the RDEC set-off amounts to 31 March 2022 in year 2022/23, and so the deferred income tax asset has been calculated at 19%, the tax rate expected to be in force in that year.

The total deferred tax asset of £1,761k (2021: £1,981k) has been netted off UKAEA's deferred tax liability in the Accounts as it fulfils the conditions for offsetting within IAS 12.

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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
Due within one year	187	76	263
Due after one year	3,525	40	3,565
	3,712	116	3,828

During the year the Group exercised an option to terminate a lease early in order to purchase the underlying asset. This resulted in a remeasurement of the lease liability (a reduction in lease liability of £498k), with a corresponding remeasurement of the right of use asset (see Note 11.2).

A maturity analysis of lease liabilities at 31 March 2022 is given in the table below:

Group and Authority	Total £k
Undiscounted lease payments to be made after the reporting date:	
Not later than one year	257
Later than one year and not later than two years	222
Later than two years and not later than three years	201
Later than three years and not later than four years	202
Later than four years and not later than five years	207
Later than five years and not later than ten years	1,072
Later than ten years and not later than twenty years	2,005
Total lease payments	4,166
Less: Interest element	(338)
Total present value of obligations	3,828

ANNUAL ACCOUNTS**21 Provisions for liabilities and charges**

Group	Site restoration £k	Restructuring £k	Other £k	Total £k
At 31 March 2020	425,472	45,352	6,434	477,258
Changes in price levels	-	197	22	219
Unwinding of discounting	1,169	(209)	(3)	957
Discount charge	2,943	-	-	2,943
Provided in the year	13,477	509	2,013	15,999
Provisions not required written back	-	-	-	-
Provisions utilised in the year	-	(3,400)	(321)	(3,721)
At 31 March 2021	443,061	42,449	8,145	493,655
Changes in price levels	-	1,101	359	1,460
Unwinding of discounting	(159)	(372)	(3)	(534)
Discount charge	14,609	-	-	14,609
Provided in the year	32,113	260	4,359	36,732
Provisions not required written back	-	-	-	-
Provisions utilised in the year	(230)	(3,271)	(1,468)	(4,969)
At 31 March 2022	489,394	40,167	11,392	540,953
At 31 March 2021				
Non-current	442,513	39,119	5,812	487,444
Current	548	3,330	2,333	6,211
	443,061	42,449	8,145	493,655
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

ANNUAL ACCOUNTS**21.1 Site restoration**

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 was conducted in 2018/19. Annual updates have subsequently refreshed assumptions including pricing and results from discrete risk reviews. The historical cost base is uplifted to current prices, based on the information available at 31 March 22. In 2021/22 specific agreed changes included the removal of a modular intermediate level waste encapsulation plant from the decommissioning plan and the addition of a waste processing and consignment facility, as better suited for the waste expected from JET.

This is the basis, together with high level assessment of changes, of the site restoration provision at 31 March 2022.

The best estimate of the cost of dealing with the liabilities at 31 March 2022 is discounted to the reporting date at inflation and nominal (discount) rates advised by HM Treasury. The rates are set out below:

General provisions		
Nominal rates	Short-term	0.47%
	Medium-term	0.70%
	Long-term	0.95%
	Very long-term	0.66%
Inflation	Year 1	4.00%
	Year 2	2.60%
	Into perpetuity	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 discount in the year to 31 March 2022 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. The discount charge for the year to 31 March 2022 represents the effect of changes in the discount rates as advised by HM Treasury in comparison to prior year rates, this is the difference between the current year's cash flows discounted at the current year's rates and the same cash flows discounted at the previous year's rates.

The analysis of expected timing of discounted cash flows is as follows:

	Group and Authority	
	2022 £k	2021 £k
Not later than one year	12,411	548
Later than one year and not later than five years	237,417	88,462
Later than five years and not later than ten years	175,053	237,310
Later than ten years and not later than twenty years	64,513	116,741
	489,394	443,061

The real terms discount rate is sensitive to changes in inflation and nominal discount rates, as illustrated below:

	Group and Authority 2022 (£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	12,411	12,411	12,411	12,411	12,411
Later than one year and not later than five years	237,417	240,523	234,340	234,281	240,616
Later than five years and not later than ten years	175,053	181,196	169,099	169,031	181,331
Later than ten years and not later than twenty years	64,513	68,204	61,006	60,980	68,271
	489,394	502,334	476,856	476,703	502,629

The best estimate of the undiscounted cost of dealing with the liabilities is £446,721k (2021: £413,838k). The best estimate of the discounted cost is £489,394k (2021: £443,061k). This figure includes a contingency, as illustrated below:

	P50 - 50% chance of actual costs being higher or lower £k	P80 - 80% chance of actual costs being lower £k
Undiscounted costs	446,721	463,643
Discounted costs	489,394	507,931

The best estimate (P50) value is supported by a statistical analysis of cost and estimation uncertainties, along with other discrete risks. The discounted cost of contingency is applied proportionally.

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 BEIS in July 2022. On the basis of these assurances a matching receivable in included in the statement of financial position.

UKAEA has assessed the impact of the date of JET closure, which is a key variable, on the best estimate recognised in the 2021/22 Annual Accounts.

A later start date to decommissioning programme, if the cashflows were delayed by 2 years, would increase the discounted cost to £499.7m (compared to £489.4m), due to the inflation rate provided by HM Treasury exceeding nominal rates in all periods.

21.2 Restructuring

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 (1.3)% in 2021/22 (2021: (0.95)%). The undiscounted cost of the group provisions is £36,626k (2021: £39,591k) 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	
	2022 £k	2021 £k
Not later than one year	3,289	3,330
Later than one year and not later than five years	12,260	12,655
Later than five years	24,618	26,464
	40,167	42,449

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 in July 2022, and expenditure related to these provisions is reimbursed 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 £4,031k (2021: £2,069k) 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(a) above.

The undiscounted cost of the provision is £3,995k (2021: £2,063k).

In addition, UKAEA has made provision of £1,253k (2021: £765k) 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.

ANNUAL ACCOUNTS**22. 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:

2021 - disclosure under IAS 17 - The future minimum lease payments under non-cancellable leases are as follows:

	2022	2021
	£k	£k
Not later than one year	-	1,772
Later than one year and not later than five years	-	3,263
Later than five years	-	30,223
	-	35,258

2022 - disclosure under IFRS 16 - Undiscounted lease payments to be received after the reporting date are as follows:

	2022	2021
	£k	£k
Not later than one year	2,287	-
Later than one year and not later than two years	2,101	-
Later than two years and not later than three years	1,543	-
Later than three years and not later than four years	1,137	-
Later than four years and not later than five years	887	-
Later than five years and not later than ten years	3,103	-
Later than ten years and not later than twenty years	5,193	-
Later than twenty years and not later than forty years	9,858	-
Later than forty years and not later than sixty years	9,000	-
Later than sixty years and not later than eighty years	8,783	-
	43,892	-

ANNUAL ACCOUNTS**23 Related party transactions**

UKAEA is an NDPB sponsored by BEIS which is regarded as a related party.

During the year, UKAEA had various material transactions with BEIS and with other entities for which BEIS is regarded as the responsible department, in particular UKRI (EPSRC). UKRI (STFC) is UKAEA's partner in the Harwell Science and Innovation Campus Public Sector Limited Partnership (Note 13). Other material transactions took place with UKRI (STFC), UKRI (MRC), the Civil Nuclear Constabulary, Innovate UK and the NDA, organisations within the BEIS Group.

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.

24 Statutory borrowing limit

During 2021/22, 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.

25 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 Report of the Comptroller and Auditor General.

LIST OF ABBREVIATIONS

AVC	Additional Voluntary Contribution	ITER	Next generation international experimental fusion reactor
AEAIL	AEA Insurance Ltd	JET	Joint European Torus
AI	Artificial Intelligence	MDF	Material Detritiation Facility
ARM	Active Risk Manager	MRF	Material Research Facility
BEIS	Department for Business, Energy and Industrial Strategy	MAST-U	Mega Amp Spherical Tokamak Upgrade
CRC	Carbon Reduction Commitment Energy Efficiency Scheme	MTL	Materials Test Laboratory
CETV	Cash Equivalent Transfer Value	MTF	Module Test Facility
CEO	Chief Executive Officer	NAO	National Audit Office
CDT	Centre for Doctoral Training	NDPB	Non-Departmental Public Body
CPS	Combined Pension Scheme	NDA	Nuclear Decommissioning Authority
CCFE	Culham Centre for Fusion Energy	OAS	Oxfordshire Advanced Skills
DEMO	Demonstration fusion power station	OGC	Office of Government Commerce
DT	Deuterium-Tritium campaigns	OSR	Radioactive and Out of Scope of Regulations
ED&I	Equality, Diversity & Inclusion	PPSS	Protected Persons Superannuation Scheme
EDS	Exhaust Detritiation System	PNISS	Principal Non-Industrial Superannuation Scheme
ELMs	Edge Localised Modes	RACE	Remote Applications in Challenging Environments facility
EPSRC	Engineering and Physical Sciences Research Council	R&D	Research & Development
FReM	Government Financial Reporting Manual	RDEC	Research and Development Expenditure Credit
FTE	Full Time Equivalent	RoSPA	Royal Society for the Prevention of Accidents
FTF	Fusion Technology Facilities	STFC	Science & Technology Facilities Council
H3AT	Hydrogen-3 Advanced Technology – tritium facility	SIRO	Senior Information Risk Officer
HMT	Her Majesty's Treasury	SPPP	Shift Pay Pension Savings Plan
HSIC	Public/private sector partnership for the Harwell joint venture	ST	Spherical Tokamak
PubSP/LP		STEP	Spherical Tokamak for Energy Production
IAS	International Accounting Standards	WDS	Water Detritiation System
IET	Institution of Engineering and Technology	UKAEA	UK Atomic Energy Authority
IFRS	International Financial Reporting Standards	UKRI	UK Research and Innovation
IPA	Infrastructure and Projects Authority		

Notes

The UK Atomic Energy Authority's mission is to lead the delivery of sustainable fusion energy and maximise the 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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