Delivering the World's Smartest Net Zero Campus

A Platform to Accelerate the Net Zero Transition

A Living Laboratory,

Accelerating Energy Innovation and Deployment

We are going to create a new Energy Building that will accelerate the development of the new smart campus, at the centre of a living laboratory. With our partners, it will provide a platform to promote research and innovation, underpinning the education of a new generation of energy system engineers and scientists. The size of a small city, the living laboratory will be a test bed, demonstrating and validating the emerging new energy system technologies.

We are looking for partners to co-create this opportunity to:

- Design facilities for mutual research and development benefit
- Develop the test and learn capability of a new Energy Accelerator building
- Co-design the living laboratory capability
- Integrate state-of-the-art technologies into the new building
- Shape skills, education, and training programmes to create the next generation of energy systems specialists

FOREWORD

Founded in 1900, the University of Birmingham was England's first civic university, where students from all religions and backgrounds were accepted on an equal basis. Today, our global university sits at the heart of the youthful, diverse, vibrant and ambitious city of Birmingham.

Characterised by a tradition of innovation, research at the University has always broken new ground, pushed forward the boundaries of knowledge, and made an impact on people's lives. We develop and invest our intellectual capital and work with partners to tackle major global challenges in order to make important things happen.

It therefore gives me great pleasure to share with you our proposals to build on this heritage and develop new strategic partnerships that will deliver innovation, economic and social benefit.

Our strategy for energy reflects a global need to transition to a new lower-carbon energy system. We need to prepare national and urban infrastructure that is more reliant on renewable energy sources.

We are leading by example and acting as a catalyst for change. The University of Birmingham is investing in the transformation of its campus towards net zero by creating the smartest energy campus and building management system globally. This will create a dynamic living laboratory environment allowing transformative approaches in energy generation, energy systems management, social behaviour and big data to be developed and deployed. It will link developments at our Edgbaston campus to the Tyseley Energy Park, which sits at the centre of clean energy plans for the City of Birmingham, and to the new University of Birmingham Campus in Dubai. The heart of these new developments is a new Energy Acceleration Building to be constructed at Edgbaston in 2023. The building will home the Birmingham Energy Institute, the campus living laboratory control room, provide a plug and play facility for new next generation energy technologies, and an energy system digital twin.

Now is the opportunity to engage with the University to shape and co-create the functionality of the new Energy Acceleration Building, embedding collaborative research, innovation and education programmes.

Professor Adam Tickell
Vice-Chancellor, University of Birmingham

The world's smartest

NET ZERO CAMPUS

VISION

To develop the University of Birmingham's capital infrastructure into a national testbed for low carbon energy systems innovation that will support society's needs in transitioning to a low-carbon economy. With shared partner benefits, we will work together to drive growth in skills and employment, develop new multi-vector technologies and markets, address consumer needs, and place the UK as a leader and early adopter of approaches to energy system transition.

The University of Birmingham is home to a community of 35,000 students with a research base supporting nearly £1billion of activity. It contributes £3.5billion every year to the economy and almost 1 in 50 jobs in Birmingham depend on the University. The campus is a large and varied estate covering 672 acres, with over 200 buildings of different ages, complexities, physical condition and use, ranging from Grade I and II listed properties, to brand new state-of-the-art learning and research spaces. The University spends nearly £9m on energy and water each year and generates 52,000 tonnes of CO_2.

In setting out an ambition to be net zero by 2035, the University has committed to combine digital sensors, data analytics, artificial intelligence, machine learning, renewable energy and decentralised energy, generation and storage to create the smartest campuses in the world.

The Smart Campus will facilitate many of the University's strategic objectives, including a pathway to Net Zero Carbon, development of a Living Laboratory for research, industry collaboration and teaching. Data from the campus will provide insights on energy, water and space use, to inform how the university can reach net zero and enhance research collaboration.

Our Smart Campus initiative is an integrated vision set to transform the way people experience the University of Birmingham. It will enhance the physical and digital foundations of our University, whilst protecting our cultural and physical heritage, and realising cost savings.

By embedding emerging technologies across our physical estate, we will create a campus capable of adapting to advances in technology, together with the changing needs of our people.

The use of such technologies will unlock data and information that will be harnessed for valuable insight, facilitating living laboratory opportunities beyond the campus that will enable world-leading research, teaching, and learning.

The Birmingham Energy Institute is one of the largest energy research activities in the UK. It unites the work of over 200 energy researchers delivering programmes in excess of £200m. This is integrated into the Midlands-based Energy Research Accelerator, which combines eight regional universities and the British Geology Survey, and delivers innovation into the Midlands region.

We propose establishing a new £20m+ Energy Acceleration Building on the University campus, which will deliver a building that transforms the University campus into a living laboratory for energy usage and incorporates the campus estate management and energy system control room. A digital twin and state-of-the-art sensor data capture system will allow insights into energy management at a scale which is unrivalled.

It will be a building which itself will be a demonstrator, where, with our partners new energy technologies can be integrated, trialled, tested and commissioned.

The aim is to create an environment which is internationally leading for its ability to rapidly accelerate the development from technology to energy systems, through to digital systems. It will create a platform for understanding how people engage with a net zero transition, and provide insights into behaviours at a scale of a community of 50,000 staff and students.

This new campus facility will create the pipeline of developments which can then be translated to the industrial environment of our Energy Park in Tyseley, Birmingham, for business spin out, scaling up and deployment. In doing so, it compliments and provides a pipeline to the next level of pre-commercial scale-up supported by the City's Energy Innovation Zone at Tyseley.

The facility aims to be unique in the UK for world-class research in consumer behaviour, sustainability, energy systems, and products through circular economy concepts, encompassing the entire product life cycle from innovation and manufacture, through to reclamation and recycling.

The development of the design of the Energy Acceleration Building is happening now, with a view that construction will commence in 2023 and is anchored in the University Capital Plan. Delivery of ambitions on this scale are complex and necessitate multi-organisational collaboration, which is why the University of Birmingham is co-creating this opportunity with partners for mutual benefit.

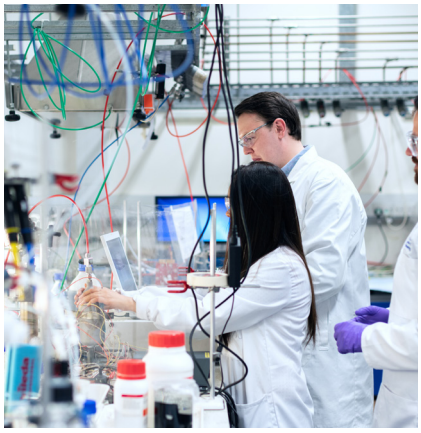
BY EMBEDDING EMERGING TECHNOLOGIES ACROSS OUR PHYSICAL ESTATE, WE WILL CREATE A CAMPUS CAPABLE OF ADAPTING TO ADVANCES IN TECHNOLOGY, TOGETHER WITH THE CHANGING NEEDS OF OUR PEOPLE.

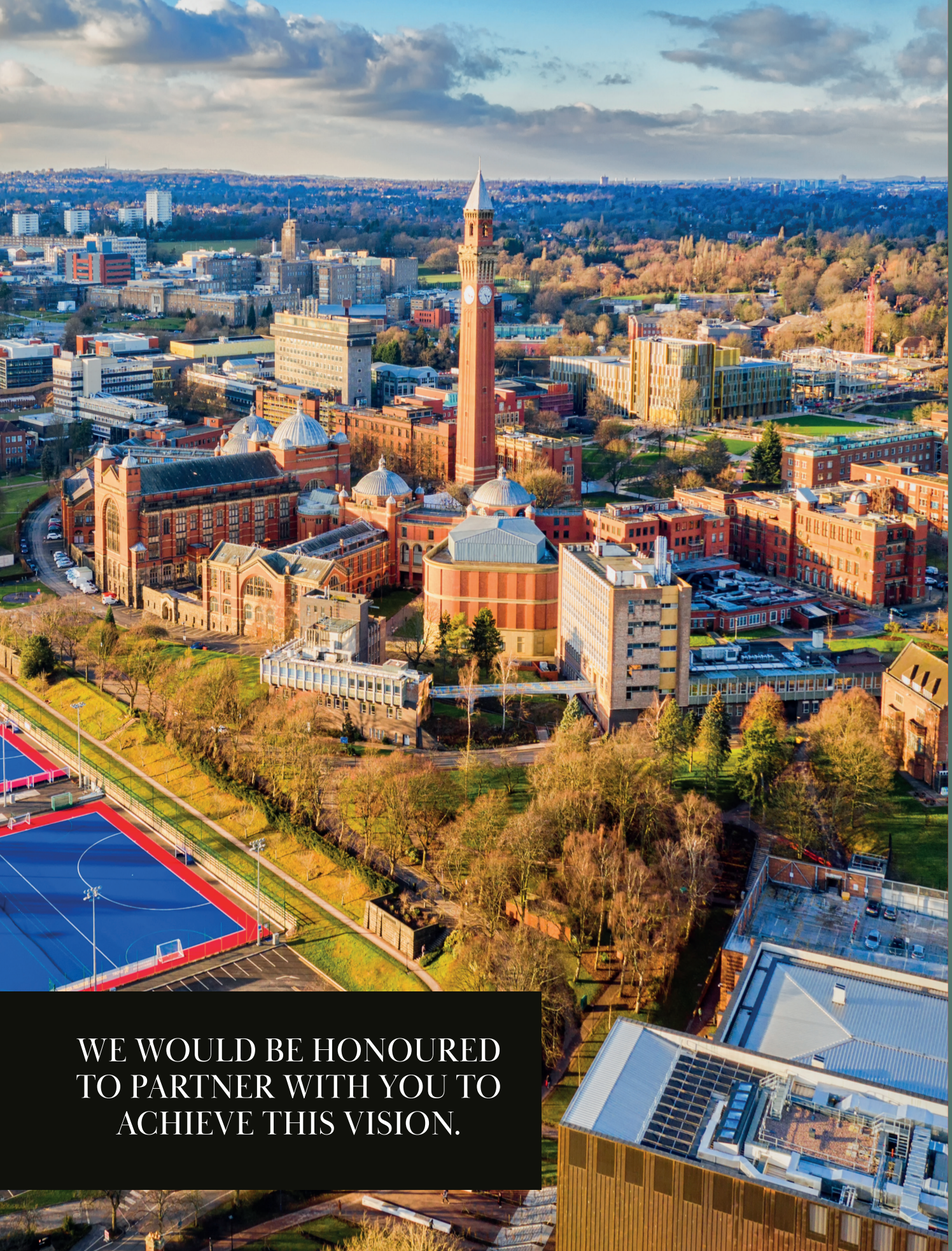
The Birmingham Energy Accelerator

KEY ELEMENTS AND OUTCOMES

In our mission towards delivering a net zero carbon campus by 2035, we will lead by example and invest in the transformation of our own capital assets. This will deliver:

- An internationally-leading smart living laboratory campus. A large city-scale demonstration eco-system working in synergy with our industrial Energy Park at Tyseley
- At the heart of the living laboratory, a new state-of-the-art building, co-created with ambitious partners to develop, test, validate and deliver new energy systems innovations to scale up and deployment
- The new facilities will be underpinned by expanding our whole system energy modelling of local areas through our data science tools to optimise system, policy and investment planning decisions to achieve a city-wide transition to a lower carbon energy system
- Over the next 10 years we will train up to 1000 graduates and over 200 people to doctoral level in energy sector disciplines, including technologies, whole energy systems modelling, analysis and problem solving, essential for the national transition to net zero





WE WOULD BE HONOURED TO PARTNER WITH YOU TO ACHIEVE THIS VISION.

UNIVERSITY OF BIRMINGHAM

Edgbaston, Birmingham,
B15 2TT, United Kingdom
www.birmingham.ac.uk

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