



2020 CSR representation

# A Net Zero Hub in Peterborough

## 2020 CSR representation **Cambridgeshire & Peterborough Combined Authority**





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Scheme	Business case status	Fit with CSR objectives	VfM (Benefit Cost Ratio)	Capital cost	Timescale
Cambridge Innovation Eco-System expansion into a Net Zero Hub in Peterborough	N/A	Strengthening the UK's economic recovery from COVID-19. Levelling up economic opportunity across all nations and regions of the country. Making the UK a scientific superpower. Strengthening the UK's place in the world.	BCR: 9.19	£24m	Opening September 2022





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## **1.1** A Net Zero Hub in Peterborough

Cambridgeshire and Peterborough Combined Authority (CPCA) is delighted to submit this CSR 2020 Representation to HM Treasury to support the case for a £24m public sector investment in a new Net Zero Hub in Peterborough to:

- strengthen the UK's economic recovery from COVID-19;
- level up of prosperity and opportunity for the "left behind" region of Peterborough and the Fens;
- help make the UK a scientific superpower including leading in the development of technologies that will support the government's ambition to reach net zero carbon emissions by 2050; and
- strengthen the UK's place in the world.

#### 1.1.1 Strategic context

The Oxford-Cambridge Arc is a national investment priority. It has unrivalled assets of international standing and significance; but often these are poorly connected, impacted by congestion, suffer from skills shortages and lack the benefit of clear, consistent and committed long-term investment funding to match their expected potential.

With greater investment, the area will be a world leader in new science, technologies and industries that can drive competitive growth, deliver sustainable outcomes and secure inclusive job creation for the UK economy over the coming decades. The Arc is already home to nearly four million people and two million jobs, which together generate over £110 billion of economic output each year.

Our ambition is for a *Green Arc*; home to world-leading innovations that seek to address climate change where the environment, our natural resources and our people are connected to our economic ambition. The Arc's growth will be innovation-led; aimed at helping to solve the major economic, environmental and social challenges facing the world. This will drive UK growth and create higher quality opportunities for our residents and businesses, now and in the future.

The Cambridge and Peterborough Combined Authority's Local Economic Recovery Strategy (LERS) has a bold vision:

"To lead the nation out of recession - by accelerating the recovery, rebound and renewal of our economy and achieving our ambition to double GVA by 2042 - in a new and more digitally enabled, greener, healthier and more inclusive way than ever before"

A key aspect of this recovery strategy is the work associated with the IDEAS pillar of the LERS that is focused on ensuring that the area's economic base grows by harnessing innovation, enhancing Cambridge's position nationally and globally, especially around life sciences and net zero technologies.

The Greater Cambridge area:





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- Is the fastest growing economy in the UK most likely ability to reverse the £3.7bn GVA local COVID 19 impact by 2025 and recover to previous growth trajectory, which is vital for the sustainability of the UK's economy.
- Is a net contributor to the Treasury, with the potential to regain that position quickly to aid Government in the recovery period.
- Has more patent applications per 100,000 population than any city in the UK and more than west EU countries put together.

Therefore, our economic strategy provides a varied range of interventions that will create positive impact over the short- to medium-term whilst simultaneously laying the foundations for longer term, sustainable recovery.

#### 1.1.2 Our project

Key amongst these interventions is a powerful innovation and scientific partnership between one of the most important innovation players in the Cambridge Innovation Eco-System (TWI) the new University being established in Peterborough (in partnership with Anglia Ruskin University – ARU) and the Net-Zero business network also being established in Peterborough. This initiative will build on the Net Zero scientific leadership already established by Cambridge based innovators like TWI, and embed and develop it within and across the academic and business base in Peterborough; where manufacturing industry by percentage of total GVA is twice the national average and commercialisation of ideas is much more successful, through a network of established global firms like Caterpillar, integrated into new fast growing innovators like Photocentric.

Following consultation with its industrial network, TWI has set up a £3m pa industrial fund to finance R&D that will establish a technology platform that will accelerate the development of green technologies. The CPCA is keen to match this industrial commitment of revenues with a capital commitment for new scientific equipment and capability building, that will expand the Cambridge innovation eco-system into Peterborough.

TWI and its network, with an existing strong establishment in Cambridge with training capabilities, lead the Net Zero Hub supporting the strategy to widen the benefits of Cambridge and promote better-connected skills provision and wealth of expertise across the region. The Net Zero Hub will be expanding and building upon the existing TWI extensive technology, research and innovation network and form a closely linked knowledge sharing and research excellence cluster around Peterborough and into Fenland. This eco-system will promote business growth through TWI and its innovation partners (from both academia and industry) in the region achieving greater productivity. It supports innovation commercialisation through the close link with SMEs and creates greater global market access; and more effective skills development.

In order to attract investment into research and development from TWI's global industrial membership, state-of-the-art facilities are required, which is why 50% of the proposed public sector investment of £24m is for capital equipment. Investment in equipment by the CPCA will allow the outsourcing of R&D activity that the 700 global firms that are members of TWI cannot perform inhouse. The matching revenue investment from all over the world, through TWI's industrial





membership, will complement the CPCA investment to provide foreign inward industrial investment into projects based on the equipment funded by the CPCA. This will generate direct employment in increased R&D in Peterborough and significantly more indirect job creation, through the commercialisation of those technologies, into manufacturing firms around Peterborough and into global markets through TWI's global membership.

#### **Objectives**

- To lead the UK Net Zero cross-sectoral research driven by TWI's industrial membership and the manufacturing and net-zero industry cluster in Peterborough and across the Oxford-Cambridge Arc leveraging business support to finance and deliver research projects.
- To build a world-class cluster of Net Zero research partners by engaging with academic and industrial organisations nationally and internationally.
- To support growth capability of SMEs in the Net Zero supply chain by provision of innovation support and technology transfer.
- To invest in state-of-the-art infrastructure (capital equipment through the CPCA) to provide the Net Zero Hub with a unique value proposition to attract foreign investment to UK to expand the R&D programmes delivered in the Hub.
- To upskill the national workforce to meet the industrial demand in tackling net zero challenges through providing post-Graduate study opportunities.

#### **Targets**

- Create 150 direct research and engineering jobs in Peterborough with 1500 new high GVA jobs in the Net Zero supply chain through the commercialisation and manufacturing partnerships created over the next decade by the Hub's activities.
- Establish a technology advisory board with 20 industrial companies to guide the research activity
- Conduct 150 industry led research projects to provide industry with technology to help achieve Net Zero.

#### 1.1.3 Partners supporting the Net Zero Hub

#### TWI

TWI has an ongoing research around Net-Zero technologies driven by its industrial members at its Cambridge headquarters and regional centres of excellence. The establishment of the Net-Zero Hub will not only capture key research activities from TWI and its partners around the UK, but to further attract innovation-based growth into this region under one programme. The Net-Zero Hub will provide UK industry with access to technological innovation. It will accelerate growth in research, manufacturing, engineering and beyond, whilst creating high gross value added (GVA) jobs in the area. The programme will also enable the UK economy to retain scientific excellence in the global stage. The 14 Innovation Centres that TWI has jointly set up with UK leading universities and the private technology innovation partnerships that TWI formed with its industrial members will serve as a first platform in facilitating the knowledge sharing of the hub.





These Innovation centres research activities cover: Manufacturing, Renewable, decarbonisation, green solutions, Digital Technologies (monitoring, inspection), materials and Interdisciplinary – Bio/Engineering.

#### Photocentric – Manufacturing Excellence

Photocentric has been manufacturing photopolymer resin since 2002 and are the undisputed worldleaders in visible light polymerisation. For nearly two decades, Photocentric has prioritised innovation at the centre of their corporate culture, creating new products for the printing industry

Peterborough based manufacturer Photocentric is making a significant investment by creating a new battery research division. Photocentric is now focussing their entire research team on the issue of improving energy storage- one of the most important issues to face the Earth today.

Photocentric will focus on our novel 3D printing methods for battery manufacture, from the electrode up to the module, designing them for all end-use applications. They will use all possible combinations of novel chemistries including lithium ion, lithium sulphur and solid-state materials, integrating them into products, e.g. vehicles, flexible electronics, industrial and consumer products.

#### Anglia Ruskin University

ARU is both ambitious and distinctive. It is firmly anchored in the towns and surrounding areas of Cambridge, Peterborough and Chelmsford, and a key university partner in the Oxford to Cambridge Arc. As such, ARU uniquely placed to advance research, facilitate knowledge exchange, boost innovation, provide talent, enhance skills and support businesses to respond both to the net zero carbon challenge and the economic opportunity presented in the whole ARC geography

ARU's commitment to sustainability extends beyond our pledge to embed the UN Sustainable Development Goals across all of our curriculum and operations. Research at ARU also has a significant focus on net zero carbon, as we undertake to better understand the whole-life issues associated with low carbon, and through our research, innovation and impact, help to shift the conversation towards the benefits to business and communities of clean, green growth.

### 1.2 Economic recovery

This intervention will help ensure the Cambridge and Peterborough economy rebound faster and with growth that is more inclusive, greener and sustained longer at higher rebound rates than would have naturally occurred. This includes a specific focus on those sectors and places (manufacturing and Peterborough) in most need and with the longest forecast recovery rates, so that they start to recover sooner.

It will also deliver longer-term recovery by making strategic investments that enable greater future resilience, strengthen economic assets, and address the inherent disparities across sectors and place, that have presented barriers to greater inclusive growth in the past, including:

- Skills deficits in the north of the Cambridge and Peterborough economy.
- Lower quality employment in the north of the region.
- Ensuring that Cambridge and Peterborough economy is developed sustainably to contribute actively to tackling Climate Change and adapting to its impacts.





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Setting up the Net Zero Hub in Peterborough leverages and expands the Cambridge science-base to enable more inclusive growth and takes advantage of the region's largest city and one of the fastest growing in the country. It also captures Peterborough's rich heritage in manufacturing and the existing business base, helping translate them into shared prosperity. This initiative will support productivity growth in Peterborough with significant spill-over effects into the surrounding Fenland area to the east.

Peterborough is a centre of clean growth and as an Environmental Capital is a best practice exemplar for the future sustainable growth of the whole economy. It was named World Smart City in 2015 (beating Moscow and Dubai) and has since further invested in pioneering approaches to a circular economy that the Net Zero Hub will support and spread across the whole region.

It's research outputs will closely link to sectors such as transport, energy and digital infrastructure of the region and will help maximise the economic strengths within the Cambridge and Peterborough region and across the Oxford-Cambridge Arc.

As industries and sectors in UK, EU and globally work to meet the Net Zero goals set for the next decades and strive for increased sustainability, technologies need transforming. UK businesses need to meet these targets sooner to export across the globe. Setting up a Net Zero Hub will improve the long-term capacity for growth by supporting the foundations of productivity, whilst reduce the risk of any stalling in the long-term high growth rates that have been enjoyed in the city region for several decades.

Furthermore, The Future of Mobility theme features heavily across the Arc as a whole, specifically in the research, development and commercialisation of connected and autonomous vehicles. These rely on Net Zero technologies to achieve its environmental and economic goals.

Despite the current challenges faced by UK and globally, through its 700 Member companies, TWI has identified specific opportunities to support industry and realise the UK's ambitions for clean and green economic growth. Within Cambridge and the Arc innovation community, TWI is uniquely placed to support industry and the UK in its delivery of net zero technologies. The Net Zero Hub aims to bring together TWI's global industrial member network and utilise its expertise and capabilities to accelerate economic growth, support the creation of new sustainable jobs, provide industry led training and skills development opportunities in partnership with academia, and drive a green recovery from Covid-19.

Advanced manufacturing and materials sit at the heart of the Cambridgeshire and Peterborough Independent Economic Review (CPIER) (CPIER <u>www.cpier.org.uk/final-report/</u>) identified sectoral strengths and specialisms within the region to further strengthen. Opportunities are recognised in scale-up, developing facilities closely coupled to local universities where technologies can be developed and taken through the early stages of commercialisation.

The Net Zero Hub will expand the proven business model used by the TWI Innovation Network of 700 firms and 30 universities to commercialise research. UK universities are recognised globally for their research outputs. A key part of the Net Zero Hub is leveraging TWI's existing partnerships with its 30 affiliated universities through its National Structural Integrity Research Centre (NSIRC) post-graduate





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research program. Once this research has been de-risked and spun into viable applications, TWI's 14 Innovation Centre partnerships with top UK universities, will develop the research into functioning prototypes. At this point in the technology development cycle it is adopted by TWIs Technology Acceleration Partnership (TAP) Program with SMEs across the globe to conduct industrial trials and become a product ready for manufacture. The Net Zero Hub will sponsor PhD students to conduct the fundamental research with leading academics from Anglia Ruskin University and other universities across the Arc.

TWI and Photocentric, Peterborough's fastest growing innovation company specializing in 3D manufacturing and net-zero technologies, will then support the development and application of this research using the new state-of-the-art equipment based at the new University Campus in Peterborough. The technology will then be commercialised via direct spinouts using the postgraduate students and backed up via business support programs with Anglia Ruskin University or through technology transfer with Industry. This latter part will be conducted through the Net Zero Hub's growth coaching program to support local companies within the Arc. Through these initiatives we can improve knowledge sharing and allowing all parties involved to benefit from the research outputs of the program to increase competitiveness and create jobs.

The table below summarises the key conclusions from an initial, economic appraisal of the proposed project, showing a substantial BCR of 9.19 for a relatively modest public sector investment of £24m.

Appraisal outputs					
Total Net Present Benefits	£360,814,375				
Net Present Value Costs	£39,241,659				
BCR	9.19				
Headline outputs:					
Number of spinouts	25				
Headline net impacts over 15 years:					
Job creation	1,650				
Cost per job generated	£23,783				
GVA Generated	£360,814,375				
Public investment Required	£24,000,000				
Net Present GVA per £1 public money invested	£15.03				





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## **1.3** Levelling up of prosperity

Data from the CPIER updated by new econometric work ongoing to assess the extent of economic scarring resulting from the COVID Crisis, predicts that Peterborough and the Fens, will be one of the hardest hit economies in the UK. This is backed-up by the recent Centre for Cities study putting Peterborough as the 5th most "at risk" city in the UK from the economic impacts of COVID.

This is partly due to education deprivation (Peterborough is in the bottom 10% of all UK cities) making the workforce less resilient and able to adapt, which increases the chances of the city, also being one of the slowest to recover.

Changing the spatial distribution of innovation, scientific knowledge generation and economic growth across the whole of the CPCA economy, was a key recommendation from the CPEIR and formed the basis of the three priority goals of the Local Industrial Strategy (LIS):

- 1. To improve the long-term capacity for growth in Greater Cambridge to support the expansion of this innovation powerhouse and, crucially, reduce the risk of any stalling in the long-term high growth rates that have been enjoyed for several decades.
- 2. To increase sustainability and broaden the base of local economic growth, by identifying opportunities for high growth companies to accelerate business growth where there is greater absorptive capacity, beyond the current bottlenecks to growth in Greater Cambridge.
- 3. To do this by replicating and extending the infrastructure and networks that have enabled Cambridge to become a global leader in innovative growth, creating an economy-wide business support and innovation eco-system to promote inclusive growth

In the case of Peterborough and The Fens, this means the removal of the Higher Education Cold Spot, to generate more level 5, 6, 7 & 8 skills, focused on key and higher value growth sectors such as high-value manufacturing and digital. In comparison to the average city in the UK, and within a workforce of 103,000. Peterborough needs be able to mobilise 17,000 more workers at these higher skills levels, to become competitive as a place, and arrest four decades of decline in prosperity and health outcomes.

The new University for Peterborough, phase 1 of which is already underway (in partnership with ARU) and phase 3 of which is the subject of a separate CSR2020 Representation, is specifically designed to address this need. However, filling the higher-level skills gap in Peterborough and The Fens, will have limited impact without effective measures to significantly grow the business and industrial demand for those skills. This will require, concurrent development of the innovation and business support eco-system to grow indigenous high-value firms and attract new ones to the city. Improving the higher-level skills and the knowledge capacity within the human capital of a place, is to no effect, without the parallel stimulation and supply of higher value jobs to provide opportunity for the increased number of higher-level skilled people. One component of such a stimulation and supply system is an innovation eco-system.





ARU and TWI, will develop an innovative adaption of the German, Franhofer-Gesellschaft Model for technical universities that will ensure the Net Zero research partnership is able to:

- Build on the CPIER and LIS which set out the threats and challenges facing Peterborough's economy and its key sector-clusters, along with the potential skills and innovation interventions to overcome those challenges.
- Deliver against clear targets for ecosystem-level innovation outcomes in terms of inputs, such as volume of R&D and knowledge generation, and outputs such as the value and volume of new products and services created, generating outcomes in terms of new, higher value, jobs.
- Operate locally with connectivity to a truly global, sector network through TWIs 700
   Industrial Member companies across 4500 sites in 80 countries, with combined revenues of
   £35bn and a combined annual R&D activity of £1.5bn pa. Connecting local firms into
   innovation partnerships through the thematic R&D programme, individual projects and inter company alliances provided through the TWI membership.
- Provide expert eco-system coordination providing cross-sector collaborations, management advice and technology development, harnessing TWI's experience in building and managing a global innovation eco-system across the oil and gas, automotive and aerospace sectors. This will in turn provide access to facilities and an extensive portfolio of R&D, as well as the provision of commercialisation, incubation and growth services

Productivity is gained not through the investment in increasing staff numbers, but via adopting new technology and processes. The Net Zero Hub will be investing £24m into new equipment in Peterborough via the CPCA and a further £24m into researching into global challenges and transferring that knowledge to UK industry, via TWIs industrial member investment.

## **1.4** Scientific Superpower

The UK is currently leading the world drive to 'Net Zero' and is the first major economy in the world to pass this into law, seeking to end its contribution to global warming by 2050. Clean Growth through low carbon technologies, manufacturing and materials, and the efficient use of resources is paramount to the UK's future economic prosperity and is a grand challenge pillar of the UK Government's Industrial Strategy. The Paris Agreement aims to strengthen the global response to the threat of climate change by keeping a global temperature rise this century well below 2 degrees Celsius above pre-industrial levels and to pursue efforts to limit the temperature increase even further to 1.5 degrees Celsius. Achieving these ambitious targets will require significant investment in low carbon technologies and efficient use of resources.

To achieve Net Zero, it will be necessary to revolutionise technologies including advanced materials (together with those that are bio-based), energy efficient industrial processes, sustainable and smart transport, energy and resource efficient buildings and the continued advancement of clean energy solutions. A focus on circular economy principles needs to underpin all product and process design and manufacture.





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The UK's 2020 Budget has set out a plan for significant investment in research and development (R&D) in cutting-edge technologies, and to provide support for people in every nation and region of the UK to gain the skills that they will need as the economy evolves to meet these future challenges. In order to decarbonise UK industry, it is well recognised that this the R&D has to be industry led.

The Net Zero Hub aligns well with the plan to further develop the key recognised sectors from the region including clean tech, high-value engineering and information and communication technologies. It also responds to the Grand Challenge that government sets out in the National Industrial Strategy on energy and circular economy practices that pioneer clean growth in which Net Zero is a focus.

The Net Zero Hub will enhance Cambridgeshire and Peterborough position as a global leader in knowledge and innovation. It will allow for harnessing the collective strength from the Cambridge and Peterborough region and the wider collective Arc's research base – driving greater collaboration on net zero related research to develop a network of "living labs" to trial and commercialise new technologies, attracting international firms to the region. The Net Zero hub, set up to be a world-leading research and innovation hub, supports the aims of the UK Government R&D Roadmap (https://www.ukri.org/about-us/the-uk-government-r-d-roadmap/) and the National Industrial Strategy by boosting productivity and it also supports CPCA's goal of raising productivity per hour by 2024.

The Net Zero Hub's research outputs closely link to sectors such as transport, energy and digital infrastructure of the region and will help maximise the economic strengths within the region. As industries and sectors in UK, EU and globally work to meet the Net Zero goals set for the next decades and strive for increased sustainability, technologies need transforming. UK businesses need to meet these targets sooner to export across the globe. Setting up a Net Zero Hub will improve the long-term capacity for growth by supporting the foundations of productivity, whilst reduce the risk of any stalling in the long-term high growth rates that have been enjoyed in the city region for several decades. Furthermore, The Future of Mobility features heavily across the Oxford-Cambridge Arc as a whole, specifically in the research, development and commercialisation of connected and autonomous vehicles. These rely on Net Zero technologies to achieve its environmental and economic goals.

## **1.5** Strengthening the UK's place in the world

The Net Zero Hub will make a significant contribution to promote world-class research, innovation and technology assets to strengthen the UK's global profile, including:

- Places That Attract and Retain: The Arc's global connectivity, knowledge-based job opportunities and high-quality places make the Arc a desirable location to live and work. Enhancing our region's places by protecting the environment, ensuring developments are well-designed, sustainably built, connected and inclusive, will strengthen our offer further.
- A Global Magnet for Knowledge and Talent: 10 universities, including Oxford and Cambridge which consistently rank in the top four in the world. Together with our leading businesses and science parks, the Arc provides the UK with an unrivalled concentration of world leading





academic and commercial innovation expertise across many disciplines which draw international talent and harness innovation-led growth.

• **Pioneering at the Frontier of Discovery:** Throughout history, the Arc has been the place of breakthroughs. Today, Arc scientists, entrepreneurs, academics are focused on solving the next generation of social, environmental and technological challenges. Industry-government-academic partnerships are innovating in areas from electric powered and autonomous flight to leading the fight against COVID-19.

The Arc has a long-term vision for transformative change. This will enable the UK to strengthen its global competitive standing and position the economy for a long-term transition ensuring our businesses, institutions, communities and residents are able to capitalise on the emerging opportunities for growth, innovation and prosperity and respond to the global and local challenges we face.

Our ambition is **to create a future for people living and working here** through the development of a Zero Carbon Corridor.

We will become at least carbon neutral before 2050 and secure transformative economic growth through innovation, increased productivity and a more inclusive economy which harnesses the potential of all our communities. In practice, we will:

- Spearhead a world-leading cluster of businesses that use the very latest technology to solve global sustainability challenges.
- Attract and concentrate R&D investment on the global effort on to tackle climate change, natural resource depletion and quality of life.
- Revolutionise our use of renewable energy to power our growth and upgrade our infrastructure, housing and to maximise resource efficiency.
- Safeguard, nurture and enhance our wildlife and natural green spaces to provide vital green infrastructure for the Arc.
- Increase community and economic resilience by investing in infrastructure to manage our greatest threats i.e. flood prevention and protection, sustainable and renewable energy, green corridor turning these into positive attributes for our communities

The foundation of success in Cambridge is great people doing great things. Within the Universities, research institutes, commercial research and development centres and start-ups, teams are working to push back the boundaries of knowledge. This culture of knowledge discovery comes with a shared confidence to tackle and solve global challenges.

Cambridge has global reputation and track record across many disciplines in research and development of new technologies and their applications. TWI is delivering research around Net-Zero technologies driven by its global and UK based industrial members at its Cambridge headquarters and throughout its regional centres of excellence. The establishment of the Net-Zero Super Hub will not only capture key research activities from TWI, ARU, Photocentric and their partners around the





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UK, but to further attract global innovation-based growth into this region all under one programme. The Net-Zero Hub will provide UK industry with access to technological innovation to enable them to become global leaders in their field and allow development of the technologies that will deliver change across the world.

The Net Zero partners have a proven record of accomplishment in delivering large programme management through NIC, NSRIC etc. A challenge led co-funding model will be established based on and led by industry needs which will, in turn, attract global interest from TWI's industrial network. The combined investment will enable joint industry projects (JIP) to be launched that will further fund and accelerate research in net zero challenges. TWI has an existing successful JIP model for collaborative research. These ideas have already been tested with TWI's industrial network and we would note that energy companies in the Middle East, Central Asia and South East Asia area equally interested and active in delivering net zero.

TWI will utilise its presence in these regions to engage and encourage investment and participation in the JIPs, hence leveraging TWI's unique capabilities to secure additional investment into a UK research programme that will deliver work for wider and often international benefit, bringing the work and future supply chains that develop into the UK. State-of-the-art equipment and capabilities developed through this programme will help strengthen the case and attract future large-scale investments to UK, a model already proven by TWI's collaborations with Saudi Aramco and Abu Dhabi National Oil Company (ADNOC) through the Private Technology Innovation Partnership programme.

The Net Zero programme aims to make the UK a world-leader in new technology and industries in zero-carbon aviation, future mobility and energy. With investment, we can better connect and realise the potential of the critical mass of assets and know-how created by our area's people, businesses and institutions. We aim to be a test bed for new ways of living and working. This will unlock the connected potential across our sector strengths to propel Cambridge and Peterborough through the Arc and the UK into an era of global growth at the vanguard of innovation.

The part this programme can deliver towards Cambridge, Peterborough and the Arc's economic potential is clear. We need government backing and investment to upgrade critical parts of our innovation infrastructure to secure the future competitive edge of these knowledge assets. We can bring forward our energy and our vision, we can unlock co-investment and we can deliver success.