



NET ZERO
INDUSTRY
INNOVATION
CENTRE



Teesside
University

NORTHERN
GOVERNMENT
POWERHOUSE



European Union
European Regional
Development Fund

**TEES
VALLEY**



**At Teesside University,
our net zero research
is shaping a cleaner,
greener future which
will be transformative
for our region, the UK,
and beyond.**

INTRODUCTION

The Net Zero Industry Innovation Centre (NZIIC) is a thriving hub of innovation at the forefront of cutting-edge research, driving the development and implementation of transformative net zero technologies and strategies across a range of industrial sectors.

The Centre facilitates the delivery of net zero research, innovation, and enterprise activity at Teesside University, working collaboratively with industry partners, academic experts and policymakers to deliver on regional, national and global ambitions.

The Tees Valley has a proud industrial heritage and is home to a diverse cluster of industrial, power, and hydrogen companies employing thousands of people. These companies are united by a common challenge to decarbonise their operations to help the UK reach net zero by 2050.

NZIIC operates at the heart of this industrial cluster to develop and implement innovative solutions that address the challenges of decarbonizing industrial processes, promoting energy efficiency, and sustainable practices.

By fostering a collaborative ecosystem, the Centre is already playing a vital role in the delivery of global net zero ambitions. Over the next few years, the Centre will become a national and global leader in driving impactful and scalable initiatives that contribute significantly to achieving net zero emissions and creating a resilient, sustainable future for industries worldwide.

VISION

We will accelerate the transition to a sustainable and net zero carbon future for industries through interdisciplinary research, technology development, and strategic partnerships.

MISSION

The NZIIC convenes industry knowledge and academic expertise to drive high-quality, high-impact research and innovation activity in net zero.

Global impact: Our purpose extends beyond national borders. We are a global player, actively contributing to the international effort to achieve net zero emissions. Through strategic partnerships and collaboration, we seek to influence policies, share and absorb knowledge, and inspire sustainable practices worldwide.

Interdisciplinary excellence: Recognizing the complexity of the net zero challenge, the Centre excels in interdisciplinary research. By integrating expertise from diverse fields such as engineering, environmental science, policy, and business, we aim to provide holistic and impactful solutions.

CARBON CAPTURE



HYDROGEN



SMART ENERGY



CIRCULAR ECONOMY



DIGITAL INNOVATION



OUR EXPERTISE

CARBON CAPTURE AND STORAGE



New funding secured will allow two Teesside University academics based at the NZIIC to explore how carbon capture technology can be used alongside waste-to-energy (WtE) plants.

The research will address a critical need for the East Coast Cluster by assessing the techno-economic and carbon footprint of advanced WtE with carbon capture and storage (CCS).

The East Coast Cluster; an industrial hub comprising Teesside and the Humber, delivering a range of carbon capture projects, aims to remove nearly 50% of the UK's industrial emissions. To achieve this, there is a need for innovative solutions like CCS retrofits to WtE plants.

CIRCULAR ECONOMY

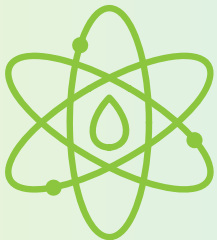


Through a collaborative project, researchers from Teesside University and Stuff4Life identified an opportunity to contribute towards the circular economy with workwear and PPE used within industry.

By utilising a chemical recycling process (alkaline hydrolysis) on polyester (PET), Stuff4Life and the NZIIC have been able to recover terephthalic acid (TPA), a monomer which can be used again for the synthesis of polyester (PET).

Teesside University will continue to work with Stuff4Life on a chemical recycling demonstration plant, to provide the company with access to academic experts, world-leading research capabilities and state-of-the-art facilities.

HYDROGEN



Teesside University worked with Micropore Technologies, a specialist particles and emulsion technology producer based at Wilton, Redcar, to develop a catalyst membrane required for a hydrogen catalytic membrane reactor (CMR).

The Tees Valley Hydrogen Innovation Project (TVHIP) run by Teesside University and funded by the European Regional Development Fund (ERDF), supported SMEs in the Tees Valley to become part of a cross-industry collaborative hydrogen network for knowledge and technical exchange.

DIGITAL INNOVATION



A research collaboration between data science company SeerBI and Teesside University academics and researchers will work with UK maritime stakeholders to test and explore how to decrease the harmful CO2 emissions put out by ports worldwide.

The project will develop better analysis methods along with innovative prediction and prevention technology, that supports delivery of the UK government's 2050 Maritime strategy.

SeerBI will then seek external funding to take the project forward from the research into a real-world application to be applied in ports around the globe.

SMART ENERGY SYSTEMS



The growth of the mobile food industry over the last few years has seen larger numbers of Mobile Food Units (MFUs) leading to increases in energy consumption and emissions in urban areas.

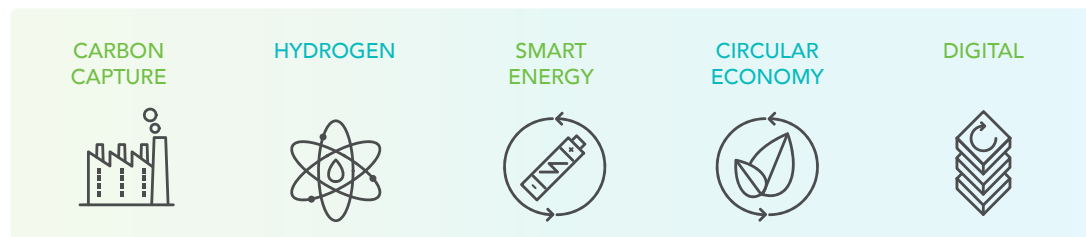
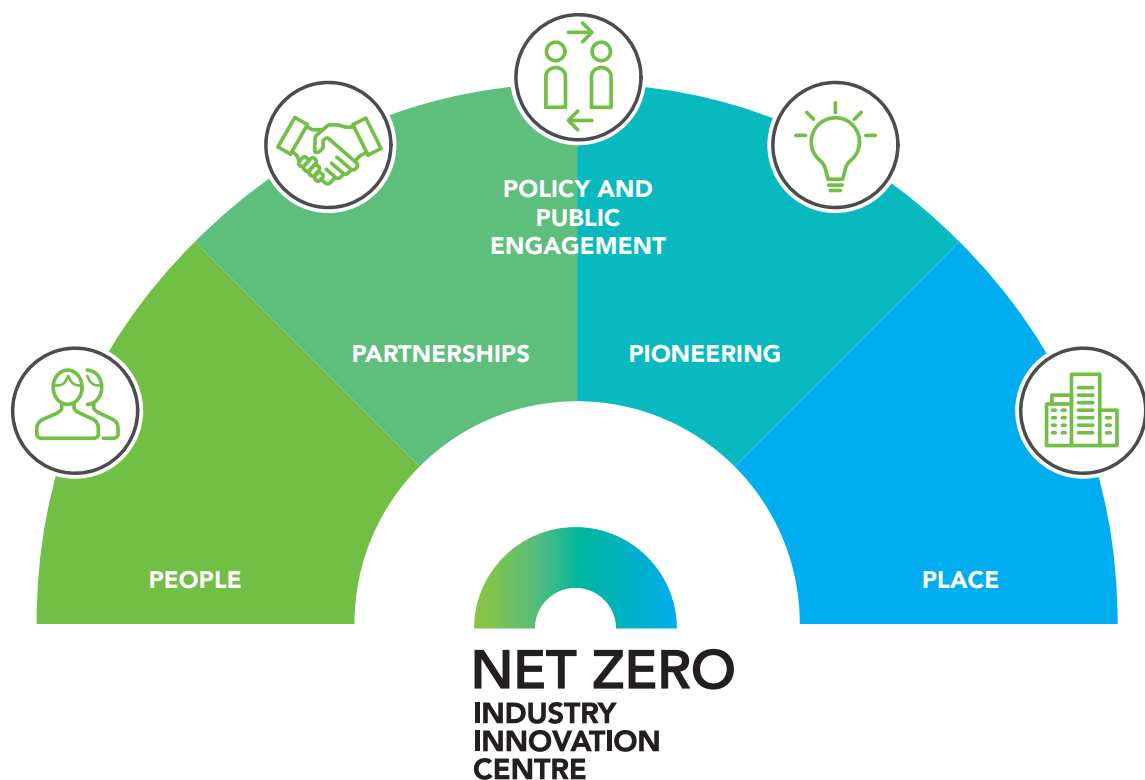
The University worked with Raojis Enterprises Ltd to examine viable solutions to reduce their environmental footprint while maintaining their economic sustainability.

The research findings from our modelling software recommended investment in renewable energy technologies that would be profitable in the long term and the payback period for the investment was estimated as low as four years. The research also found using renewable energy technologies in mobile food units could reduce carbon emissions by 43% and could contribute to achieving the UK's greenhouse gas emissions targets and improving air quality in urban areas.

Find out more about our projects and get in touch:



OUR PRIORITIES



PEOPLE

Our profile, facilities and commitment to the net zero agenda attract high-quality researchers, professors, and experts from across the world to work at the Centre, which fosters a positive, inclusive, and dynamic research environment where our students, staff and partners can thrive.

Over the next few years, we will:

- > provide a pipeline of researchers and innovators who have built their industrial experience in a collaborative environment
- > promote a positive research environment that prioritises wellbeing, engagement, and development, contributing to a positive team-based culture, high levels of employee satisfaction, and overall business success.

PARTNERSHIPS

The NZIIC acts as a catalyst for change, fostering a dynamic ecosystem that brings together academia, industry leaders, policymakers, and communities to collectively address the complex challenges associated with achieving net zero through partnership working, knowledge exchange and innovative research.

Over the next few years, we will:

- > deepen our partnerships with industry through a programme of collaborative research and through developing new networks with regional, national, and international organisations, institutes, and education providers
- > develop the Centre's expertise and reputation as a convener of ideas and innovation through facilitating joint projects that address the interdisciplinary challenges of achieving a net zero carbon footprint.

POLICY AND PUBLIC ENGAGEMENT

At the NZIIC, we understand that coordinated efforts can lead to the harmonisation of policies and regulations related to climate change mitigation. This can create a more consistent and supportive global environment for businesses and industries transitioning to net zero.

Over the next few years, we will:

- > deliver an ambitious programme of social research, public outreach and stakeholder engagement that positions the Tees Valley as a beacon for just energy transition
- > engage in advocacy efforts to influence policies at the local, national, and international levels that support the transition to net zero emissions.

PIONEERING APPROACH

Our innovative solutions, co-created with industry are already powering the growth of this sector across the Tees Valley; and our expertise, experience and facilities are gaining national and global traction. Our commitment to supporting companies and communities in this space will spearhead the transition towards a sustainable future.

Over the next few years, we will:

- > facilitate the commercialisation of intellectual property through the creation of spin-out companies to drive the growth of this sector
- > establish a venture fund to support the creation and growth of companies emerging from the Centre.

PLACE

Climate change and net zero is a global challenge that transcends national boundaries. To effectively address the issue of carbon emissions and achieve net zero, we need to work together on a coordinated, international scale.

Over the next few years, we will:

- > develop and embed novel technological responses to ensure Tees Valley businesses take advantage of opportunities presented by the hydrogen economy
- > facilitate an ambitious programme of visits, exchanges, and cooperation projects with hydrogen-focused groups in America, Saudi Arabia, and South Africa.



DELIVERY/SUCCESS

A model of continuous improvement will drive delivery of these priorities, enabling the Centre to adapt to new and emerging technologies, pivot to national and global trends and drivers, and support Teesside University to fulfil its mission of transforming lives and economies through impactful research, innovation and knowledge exchange.

We will monitor our success in this space across a range of performance indicators, including, but not limited to those below:



Contact us to find out more about the Net Zero Industry Innovation Centre and to work with us:

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