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UNIVERSITY OF
EXETER

Environment and Sustainability Institute

Different thinking for a better future

“The world we have created today as a result of our thinking thus far has problems which cannot be solved by thinking the way we thought when we created them.”

Albert Einstein

“Humans have made unprecedented changes to ecosystems in recent decades to meet growing demands for food, fresh water, fibre, and energy. These changes have helped to improve the lives of billions, but at the same time they weakened nature’s ability to deliver other key services such as purification of air and water; protection from disasters, and the provision of medicines. The pressures on ecosystems will increase globally in coming decades unless human attitudes and actions change.”

Millennium Ecosystem Assessment, 2005

The Environment and Sustainability Institute (ESI) is the University of Exeter’s new £30 million interdisciplinary research facility on the Cornwall Campus near Falmouth.

The University of Exeter has a long and proud tradition of pioneering research, particularly into climate and environmental change. The ESI represents more than the University’s commitment merely to further that tradition, it demonstrates its desire to collaborate, explore and innovate in order to effect the practical solutions and behavioural changes so urgently needed.

The ESI leads cutting-edge, interdisciplinary research into solutions to problems of environmental change; more simply put, it enhances people’s lives by improving their relationships with the environment.

In the following pages we’ll demonstrate how, why and with whom we’re doing this.

“Only through a collaborative effort and purpose can the greatest global challenges be addressed and tackled.”

Sir John Beddington, Government Chief Scientific Adviser,
Head of the Government Office for Science, New Scientist,
18 February 2011



What we do and who we work with

Our interdisciplinary research

The problems posed by rapid environmental change do not respect, or stay neatly within, the boundaries of academic departments. The ESI relies on close, mutually beneficial working relationships between academics, businesses, organisations and research partners, and our interdisciplinary approach to research is based on the premise that collaborating with experts from a range of disciplines, industries and sections of society helps find the best creative solutions to complex problems of environmental change.

The ESI benefits, too, from the wealth of related research projects under way across the University of Exeter at any time (which are described in more detail on p5).

Our research spans three interrelated themes: clean technologies, natural environment, and social science and sustainability. These areas encompass the challenges we'll all face as the environmental changes already under way make their mark on every facet of life.

The economic imperative to adapt, innovate and rethink will only grow as the cost of environmental change continues to rise. Many new businesses will emerge to take advantage of

these demands; many current businesses will struggle to make the change. It's hard to think of any enterprise which will not in some way feel the effect of all this. At the heart of the ESI's research is the desire to turn these new ways of thinking, living and working into a reality.

Clean technologies

We're developing research projects linked to renewable energy and sustainable mining and minerals resourcing. Research in these fields is already well established at the University of Exeter, through the Camborne School of Mines, and we will further develop such work in collaboration with local partners.

Broadly, this encompasses:

Renewable energy, by which we mean renewable heat and cooling and marine renewables, as well as both solar and wind energy; and

Sustainable mining and minerals resourcing, encompassing clean technologies in mining, environmental geochemistry, carbon footprint and energy life cycle analysis, and impact assessment.



Natural environment

The University already enjoys successful research partnerships with environmental businesses and organisations within the region, including the European Centre for the Environment and Human Health (ECEHH). The ESI is developing existing and forging new partnerships to lead research on diverse issues related to the natural environment.

This translates into wide-ranging research into biodiversity science, ecological processes, conservation biology, land use management and disease control.

Social science and sustainability

The ESI is leading research into what informs the necessary transition from resource-intensive economic growth to a more resilient, environmentally-sustainable economy. Engaging with local businesses means making a practical, measurable difference both to ecosystems and to industry, particularly in Cornwall and the Isles of Scilly. We'll be looking at behavioural change and public policy, as well as environmental governance and regulation.

Some of the people we're working with

The ESI is establishing strong links with the business sector in Cornwall and beyond. We have a team of specialist business mentors who work through our commercial arm, UEC Enterprises Ltd, supporting businesses in the environmental goods and services sector who have potential to grow into new markets. We also have a team of specialist Knowledge

Exchange Managers which helps to manage the collaboration between our academic experts and businesses in Cornwall and the Isles of Scilly. This team is building strong partnerships with local, regional and national business support providers, stakeholders and commercial investors.

Spalding Associates is an environmental consultancy which provides technical and scientific information to decision-makers for environmental planning for land use and development. ESI staff helped them find funding for a European Social Fund (ESF) Convergence-funded PhD: 'Like moths to a flame – the environmental impacts of the roll out of new street lighting in the South West'.

"We've worked with the University for a number of years now and have hugely benefited from the support of dedicated MSc students as well as the expertise of academic staff. We are now engaging with the ESI through an ESF-funded PhD programme, which will enable us to better understand light pollution on particular species." Adrian Spalding, Spalding Associates

At an early ESI group meeting, the **Cornwall Agri-food Council** (CAC) identified as key priorities the development of low cost anaerobic digestion (AD) to try to address damaging greenhouse gas emissions (livestock are responsible for 17% of Cornwall's CO₂ footprint), the need to find alternatives to costly slurry disposal (with its risks to water courses) and the importance of creating opportunities for technology development. ESI staff helped secure ESF PhD funding to work on these challenges.



“The opportunity to explore ways to address a key industry issue via a dedicated PhD has created a useful dialogue between the farming sector and academia. AD itself is not new, but the ability to tailor the technology to meet the needs of local farmers is an exciting area of research. With over 600 dairy farms in Cornwall, the potential application of AD technology would provide significant GHG reductions and make a significant contribution to our renewable energy targets.” David Rodda, Rural Delivery Manager, Cornwall Development Company

Wadebridge Renewable Energy Network (WREN) is a social enterprise aiming to establish a low carbon economy in and around Wadebridge (an area with a population of around 10,000 people) and to invest the benefits locally. The ESI helped them secure an ESF PhD project firstly to understand the costs and benefits of renewable energy options, secondly to monitor the impact of their interventions, and, thirdly, to understand how best both to maximise benefits locally and assess the project’s potential transferability.

“It is essential that programmes like WREN are evaluated externally, so that others can then replicate aspects that are successful. We are very lucky to have the support and interest of a world-class academic institution on our door-step, and benefit hugely from the ESI’s input.” Stephen Frankel, Chair of the Board of Directors of WREN

National Lobster Hatchery (NLH) want to know whether their restocking programme actually works and their desire to find out coincided with existing research links with the University. A successful bid for ESF Convergence funding – with

NLH – now means PhD research will establish their stock enhancement programme’s effectiveness off the Cornish coast.

“Support from the University of Exeter’s ESI is helping us to move forward; the new projects that we are working on are really exciting and are likely to provide major benefits to the marine environment and our coastal communities in years to come.” Dom Boothroyd, General Manager, NLH

Kraft Maus began life as a student project, supported by the University’s Proof of Concept Fund; it now designs portable renewable power systems and produces a range of integrated solar-wind generators as a cost-effective alternative to fossil fuel in off-grid, hard-to-reach places. A wide range of organisations – mobile telecoms, humanitarian groups, the security sector and the military – has benefited from the company’s innovative approach. Kraft Maus’s current focus is on working with groups trying to fund the electrification of rural regions in developing countries, where mains power varies between intermittent and non-existent.

“Power is an important ingredient in education and healthcare in communities on and off grid all over the world, and Kraft Maus is trying to combine the benefits of modern technological thinking with the realities of the developing world to develop a package which is useful to those who need it most, and will benefit long term from energy independence and low energy costs. Many of the contacts which make this continuing work possible have been made through the ESI and the University of Exeter’s professional and academic networks, and they continue to be an enormous source of support and knowledge.” Jonah Kinross, Director and Founder, Kraft Maus



Cornwall: the challenge and the opportunities

As a living laboratory, Cornwall and the Isles of Scilly are the perfect location for the ESI; they provide easy and convenient access to a diverse range of marine and terrestrial habitats, a wealth of natural resources, and creative and resilient communities.

The county's resources include – to name but a few – a coastline of almost 300 miles, unique ecological and social landscapes, reputedly one of the world's largest natural harbours at Falmouth, annual sunshine hours that are among the UK's longest and a legacy of marine, earth and environmental technologies.

Cornwall's been a pioneer before; its wealth and world leadership in the 19th century grew from innovations in steam-power and mining engineering. The breakthroughs made in Cornwall boosted mining's efficiency and safety, and, in doing so, helped to power the industrial revolution. The opportunity now exists, similarly, for 21st century progress to be defined by

Cornwall's expertise and energy, in a way that also benefits not just the region and country but the world more broadly.

Cornwall possesses a distinct identity and knowledge base related to the environment; the ESI aims to transform this growing identity into an international reputation. European Convergence funding has given the county a unique opportunity to prepare for environmental change: dynamic business engagement and knowledge exchange, allied to pioneering research, will see us make the very most of that opportunity. And Cornwall in particular – with its recent history of post-industrial decline – will benefit from the economic opportunities such a partnership promises. The resulting resilience offers the prospect of an economic future in which Cornwall's children are encouraged and inspired, so they become young people who feel they can make their way in – and contribute to – the world, while continuing to live in the county they love.



The ESI: part of the University of Exeter's commitment to research

The ESI further strengthens the University of Exeter's reputation as a leader in cutting-edge research; recent strategic investments have built our capacity in science, engineering, mathematics and medicine, and the ESI forms part of a broader commitment – of over £120 million – to building new research infrastructure.

One of the five themes in the University's Science Strategy is Climate Change and Sustainable Futures; the ESI will be at the heart of our interdisciplinary research effort. By adding to our existing world-leading research in climate prediction, adaptation and migration, and our strong links to the Met Office, the ESI significantly enhances the University's strengths, which also encompass measuring the effects of environmental change on ecosystems and human and animal health, as well as studying public attitudes, government policy and behaviour change.

While all this work falls under the remit of the University's Science Strategy, input from the social sciences and humanities – both of which are well represented on the Cornwall Campus – is not just crucial, but telling.

That's because to understand our existing relationships with the environment, as well as how to enhance them in the future, might sound like a challenge for science but is actually a challenge for us all, regardless of discipline, sector or size of business. And it's a challenge we can rise to only through the kind of collaborative, interdisciplinary approach which the ESI is proud to embody and lead.

“...by 2030 we'll need 50% more food, something in the order of 50% more energy... and about 30% more fresh water. And we have to do all that while mitigating climate change, that's an enormous challenge.”

Sir John Beddington, Government Chief Scientific Adviser,
Head of the Government Office for Science, interview in Civil Service World, 3 June 2009

We're grateful for the generosity of both the South West Coast Path and the Cornwall AONB Unit; the former have allowed us to use the photographs 'Crantock Beach at Sunset' by Nick Cockman and 'Coast, Trevone near Padstow' by Lindsay Philp, the latter have donated photographs by Simon Devetta, Paul Young and Aiden Zralka.

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