

Planet Earth Editor Sylvie Kruiniger looks at how cutting-edge environmental research supports the growth of the UK economy.

Making clean growth happen

Words like 'clean' and 'growth' can sometimes sound a little like they have been thrown together in a well-meaning way with little hope of them actually sticking. But at NERC we know environmental science often leads to important innovations that not only protect our natural resources and our wellbeing but also helps companies and the economy grow. I went to find out more about how that happens by speaking to some key players who commission, use and conduct the research that supports clean growth.



“Our economy and the natural environment are inseparable,” said NERC’s Chief Executive, Professor Duncan Wingham. “Every business and every consumer benefits from natural resources while incurring the costs of environmental hazards, pollution and degradation. Governments and industry recognise the dependency of our economy on the natural environment as it directly enables, and can limit, productivity and growth across all sectors. To give some idea of the scale of economic dependence on the environment, the global value of beneficial services we derive from the environment (‘ecosystem services’) is estimated in tens of trillions of pounds, accounting for more than half of total world output.”

“We work with business, government and civil society to deliver regulation that works better for people, industry and the environment and to find new ways of living, doing business and growing economies.

CASE STUDY: Clean air for clean growth

UK air pollution causes 40,000 premature deaths annually, reduces agricultural yields, and damages buildings and the environment. Since 1990, NERC research has influenced policies which have reduced major air pollutants in the UK, generating a range of benefits worth at least £31bn and perhaps as much as £82bn.

“Our Knowledge Exchange Fellowships are one important route we use to help turn research findings into actions. Fellows like Dr Prue Addison at Oxford University and Dr Jennifer Loxton at the University of the Highlands and Islands work directly with industry to understand how they can use environmental research to grow sustainably.”

Dr Prue Addison works with a number of different industries on biodiversity.

“Businesses can cause host of biodiversity impacts through different aspects of their operations, which can be both positive and negative,” she said. “Businesses are increasingly motivated to address



Professor Duncan Wingham, NERC Chief Executive.

Dr Prue Addison is working with a range of industries – including oil and gas, fashion and supermarkets – to help them understand and minimise their impacts on biodiversity.

their negative impacts due to legislative and contractual requirements, and a range of other social, environmental and reputational risks that they face.

“Actually minimising their impacts can be tricky because businesses must map out complex processes to see how and where they might affect biodiversity. For example, a pair of trainers can have a huge environmental footprint: the laces are often made in a different factory to the rest of the shoe, so where are they and how are they affecting their local environment? From there the questions multiply. Is there leather involved? What animal did that come from? Where did it live, what did it eat and how was it killed?

Then you could look at the soles, they’re probably made of several different synthetic materials that originated as oil in the ground. So... how was that extracted and where from? Who processed it and how? All these questions and we’ve not even touched on dyes, textiles, transportation or the box you take them home in.

“Once we understand that, I translate academic research about how to measure and evaluate biodiversity into something accessible and practical for businesses to use.”

According to Juliet Davenport, CEO of the first renewable energy company in the UK, the translation process Prue describes is essential.



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Juliet Davenport, founder and CEO of Good Energy – the first renewable energy company in the UK. She also sits on our top-level decision making body, the NERC Council.

CASE STUDY: Enabling new industries

Development of a gigawatt of wind energy capacity in Eskdalemuir, Scotland will go ahead after NERC science showed it posed no threat to human health or to a nearby Ministry of Defence installation. This will create gross value added for the UK economy estimated at £1.2bn over 25 years in present value terms, or an annual average of £50m.

“To make clean growth a reality, CEOs and boardrooms need information we can easily understand and use. I’d love to see more videos and podcasts by scientists – they’re easy to share amongst your peers, that makes them really powerful.

“At Good Energy, we’ve been able to use biodiversity research at our solar panel installations where we’ve sown 187 acres of wildflowers to support pollinators, providing an essential ecosystem service to crops in those areas.”

The UK has set a target to generate 15% of energy from renewable sources by 2020. I asked Juliet if she thought the energy sector was ready to meet that target: “About 25% of the UK’s electricity already comes from renewables but heating and transport are miles behind at well under 5%. It’s not just the energy targets we need to meet, the UK has also signed an agreement committing us to keep global warming under 1.5 degrees centigrade and that means keeping around 80% of the fossil reserves currently owned by companies, underground. We should focus on switching more



Dr Jennifer Loxton at the University of the Highlands and Islands is helping solve a major barrier to the success of ocean energy technology – large quantities of sea life growing on the machinery.

CASE STUDY: Tracking carbon

NERC-funded scientists developed a methodology for ‘cradle to grave’ carbon footprint estimates for commercial products. It’s enabling over 6,500 users to reduce their carbon footprint. Kellogg’s could reduce its greenhouse gas emissions and water use by up to 20%. GSK learnt how a change to asthma inhaler manufacture could save 10% of the company’s total emissions.

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transport and heating to electricity, and get even better at producing renewable electricity.”

One way to do that is to support home grown renewable technologies like ocean energy.

Dr Jennifer Loxton said: “Half of Europe’s tidal energy potential and over a third of the wave energy swells around our shores. If we can harness that power, the seas could help us meet a huge chunk of our 2020 renewable energy targets.”

Jennifer is working with ocean energy technology companies using research to overcome a particularly slippery barrier. “A huge range and volume of sea life can make their home on ocean energy devices,” said Jennifer, “I’m looking at how this can be managed sustainably, so the machinery doesn’t get damaged or clogged up and avoiding or reducing the need for expensive coatings.”

As well as Jennifer’s work, NERC-funded innovations in impact monitoring have already enabled government licensing and reduced operating costs for offshore renewable energy in Scotland, Northern Ireland and northern England.

“The UK is currently leading the way in ocean energy,” said Jennifer. “There are more wave and tidal devices being tested in our waters than the rest of the world combined. If we keep up the research to solve problems like this, and support our manufacturing sector to meet demand when the technology is ready, ocean energy could hugely benefit the UK economy and the environment.”

“Markets for renewable energy services are growing around the world, notably in Asia and the USA,” said Duncan. “The UK also has huge potential for geothermal, nuclear and shale gas energy, carbon capture and waste storage, together with world-leading capability in visualising underground geology. While other nations, such as China, make huge investments in environmental projects, it is important for the UK to remain a net exporter, rather than importer, of environmental science, skills and services.”

Want to find out more? Read NERC’s 2016 Impact Report at bit.ly/NERCimpact2016 and our response to the Industrial Strategy at bit.ly/industrialresponse