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Rise to the challenge

With the United Nations Climate Change Conference of the Parties (COP26) in Glasgow in November, the UK has the opportunity to lead the world’s efforts to meet net zero, says Gareth Johnson

THE UK has some of the most ambitious climate-change targets in the world, and aims to become carbon neutral by 2050. While the targets will require an almighty effort to achieve, Gareth Johnson, a Research Fellow at the University of Strathclyde, UK, is optimistic that we will meet them.

“The public consciousness of climate change and net zero has increased considerably over the last decades and the UK Parliament has now put into law our net-zero targets. This is huge. We know the destination, and we know when we have to get there, so now we just have to work out how to do it – and there’s a lot of work underway across many sectors to figure that out.”

The role for geoscientists is clear – we

won’t meet our net-zero targets without the materials, skills and experience the geoscience sector brings to the challenge.

“It’s actually hard for me to think about a technological development to meet our net-zero targets that doesn’t require geoscientists in some way. From geoscience educators making sure the next generation have the required skills, to geoscientists working on foundations for windfarms or energy storage schemes, the extraction of critical metals (such as for lithium-ion batteries or solar cells), or the energy provision or greenhouse-gas abatement sectors.

“There’s no shortage of demand for geoscientists. I’m convinced the future will be full of opportunities for geoscientists to make their mark and help get us to net zero.”

Scaling up

Gareth suggests it is the scale of the targets that present the greatest challenge, and this translates to everything from the size of the required workforce with the necessary skills, to the amount of resources and energy needed to enact the essential changes.

“To give a sense of the scale of just one component of the challenge, it is estimated that by 2050 we will need to inject somewhere in the range of 5 to 10 Gt of CO₂ into geological reservoirs every year. Globally we currently inject about 40 Mt (of which more than 75% is for enhanced oil recovery), so we’ll need to increase injection by two orders of magnitude in less than 30 years. But what does that look like? According to the International Energy Agency, oil production globally is currently about 4.5 Gt per year. So, by 2050 we need a carbon capture and storage industry that is, at a minimum, the size of the current oil industry, which took more than a century to develop to its present scale.”

New from old

Mine water offers one promising avenue as a geothermal energy source, and Gareth and his colleagues are embarking on a new project that would repurpose our old energy infrastructure for the new.

“We’re looking at the feasibility of using water stored within a number of old coal mines to provide heat for an industrial process that makes low-carbon plastics. It’s a nice story whereby the old carbon-extraction infrastructure and knowledge (we’ll be using the old coal-mine plans to develop our model) will be used to power a low-carbon future.”



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