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## Geoscientific Training to Address the Energy

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### Summary

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The drive to decarbonise the energy system places a responsibility upon academic trainers, educators and researchers to equip the next generation of geoscientists with the right technical skill sets needed to address the global challenge the issue presents. Whilst the need to change and evolve our geoscience provision may be perceived as a threat to well-established and long running courses, it also represents a new opportunity to tailor undergraduate and postgraduate training to address the increasing need. The skills that the graduates need to address will include characterisation and parameterisation of the subsurface.

However, many of the key issues associated with the energy transition will also demand new ways of working and wider synergies with disciplines that geoscientists have not traditionally engaged with (e.g. economists and social scientists) as well as engineers in order to articulate the message and deliver effective outcomes. Fortunately, changes in the political and research funding landscape, which has seen the instigation of a Global Challenge Research Fund (GCRF), the development of a new industrial strategy, launch of the National Productivity Investment Fund (NPIF) and cross-Research Council initiatives under the umbrella of UK Research & Innovation (UKRI), all face this challenge. New undergraduate and MSc courses and modules are already springing up in many Universities but arguably, in an ad hoc, case-by-case and competitive manner befitting the local need rather than tackling the national or global one, which demands a more strategic national approach to training.

The success of the NERC Centre for Doctoral Training (CDT) in Oil & Gas, a partnership between 17 Universities, 2 Research Centres and 8 industry partners shows how a perceived demand or need can be addressed through collaboration. Now in its fifth year, the CDT has over 120 PhD students enrolled, the first of whom are graduating and moving to jobs over the past year. The students have not only been doing bespoke doctoral research on their chosen topic but importantly, also undertaking a 20-week training program alongside, consisting of a mix of mandatory and optional modules. Such has been the success of the scheme that students have been obtaining internships and going into employment directly thereafter.

Whilst the CDT has been led and managed by Heriot-Watt University, the PhDs are split equitably and undertaken at all of the 17 degree-awarding Higher Education Institutes (HEIs). The training aspect is provided by academic and industry practitioners. Its success has led to the CDT receiving the prestigious Geological Society's Accreditation meaning that students that complete the program receive a diploma recognising their added training.

The CDT has a number of committees that undertake quality assurance and provide important feedback including a Research Committee that vets and approves PhD topics, a Training Committee that oversees the taught elements, a Graduate Committee that provides student feedback and an Industry Advisory Board, who advise on their skill needs. The CDT was ascribed four themes by NERC in the original tender: Extending the Life of Mature Basins; Exploration in Challenging Environments; Unconventionals; and Environmental Impact and Regulation. The program has evolved to include Carbon Storage and Decommissioning in its remit and has also been expanding to cover other geoscience-based energy applications such as hydrothermal, particularly where that is tied to the (re)use of depleted oil and gas fields or coal mines.

The opportunity therefore exists to build upon, reframe and expand the remit of the CDT to cover sustainable low-carbon geo-energy research and training and in so doing, provide the right skill sets to address decarbonisation.