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Geologic carbon storage resource requirements of climate change mitigation targets in Europe

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To limit global warming to well below 2°C, integrated assessment models have projected that gigaton-per-year-scale carbon capture and storage is needed by c. 2050. These scenarios are unconstrained by limiting growth rates or historical data due to the limited existing deployment of the technology. A new approach using logistic growth models identifies a coupling between storage resource base (pore space underground) and minimum growth rates necessary to meet global climate change mitigation targets (Zahasky & Krevor, 2020). However, viable growth trajectories consistent with carbon storage targets remain unexplored at the regional level. Here, we show the application of logistic modelling constrained by climate change targets and assessed storage resources for the European Union (EU), the United Kingdom (UK), and Norway. This allows us to identify plausible growth trajectories of CCS development and the associated discovered storage resource base requirement in these regions. We find that the EU storage resource base is sufficient to meet storage targets of 80 MtCO₂/year and 92 MtCO₂/year suggested in the European Commission climate change mitigation strategy to 2050, 'A Clean Planet for All'. However, the more ambitious goals of 298 MtCO₂/year and 330 MtCO₂/year are likely to require additional storage resources based predominantly in the North Sea. Results for the UK indicate that all anticipated storage targets to achieve net-zero economy are achievable, requiring no more than 42 Gt of the storage resource base for the most ambitious target. Furthermore, the UK and the Norwegian North Sea may be able to serve as a regional CO₂ storage hub. There are sufficient storage resources to support combined storage targets from the EU and the UK. The tools used here demonstrate a practical approach for regional stakeholders to monitor carbon storage progress towards future stated carbon abatement goals, as well as to evaluate future storage resource needs.

Zahasky, C., & Krevor, S. (2020). Global geologic carbon storage requirements of climate change mitigation scenarios. *Energy & Environmental Science*. <https://doi.org/10.1039/D0EE00674B>