CLEAN AIR TASK FORCE

Carbon Capture & Storage in Ireland



For Ireland to decarbonise its hard-to-abate sectors and realise its climate goals, carbon capture and storage (CCS) will be required. Urgent policy action is required to make this a reality and secure the abatement of millions of tonnes of CO_2.

Ireland's Potential for Carbon Capture and Storage

Ireland is an emissions-intensive economy with greenhouse gas (GHG) emissions per capita among the highest in the EU. Currently, Ireland is not on track to achieve legally binding national and EU emissions reductions targets for 2030.[1] Even if all currently planned climate measures are implemented, Ireland is still expected to miss its EU obligations, potentially resulting in compliance costs of €3-12 billion. If implementation is delayed or incomplete, these costs could rise to around €27 billion.[2] Looking beyond 2030, Ireland has a legally binding objective to achieve climate neutrality by 2050. Meeting this objective will require the deployment of permanent carbon dioxide removals (CDR) – including BioCCS and direct air carbon capture with storage – to balance residual emissions, along with carbon capture and storage (CCS) to cut emissions from some hard-to-abate industries.

Ireland currently has no CCS projects under development and existing legal and regulatory barriers remain a major obstacle to deployment. Commercial-scale CO_2 geological storage is prohibited in Ireland, with an exception for small-scale storage for research purposes.[3] Ireland also lacks a clear national regulatory framework for CO_2 and has not yet put in place the arrangements needed to export captured CO_2 for storage.

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1 Ireland's national target is to reduce greenhouse gas emissions by 51% by 2030 compared with 2018 levels. Under the EU Effort Sharing Regulation, Ireland must reduce emissions from covered sectors by 42% by 2030 compared with 2005 levels. Environmental Protection Agency (2026), "Indicators / targets", updated May 2026. Available at: https://www.epa.ie/our-services/monitoring--assessment/climate-change/ghg/indicators--targets

2 Irish Fiscal Advisory Council and Climate Change Advisory Council (2025), A Colossal Missed Opportunity: Ireland's Climate Action and the Potential Costs of Missing Targets. Available at: Ireland's climate action and the potential costs of missing targets FINAL.pdf

3 S.I. No. 575/2011, European Communities (Geological Storage of Carbon Dioxide) Regulations 2011, regs 3(3) and 4. Geological storage below 100 kilotonnes undertaken for research, development or testing falls outside the scope of the Regulations. Available at: https://www.irishstatutebook.ie/eli/2011/si/575/made/en/pdf?

Under Article 23 of the Net-Zero Industry Act, 44 oil and gas producers across the EU are required to contribute to achieving the Union-wide objective of at least 50 million tons of CO_2 per year ($MtCO_2/yr$) of available injection capacity by 2030, including 1.26 $MtCO_2/yr$ from gas producers operating in Ireland.[4] Obligated companies are allowed to develop this capacity anywhere in the EU.

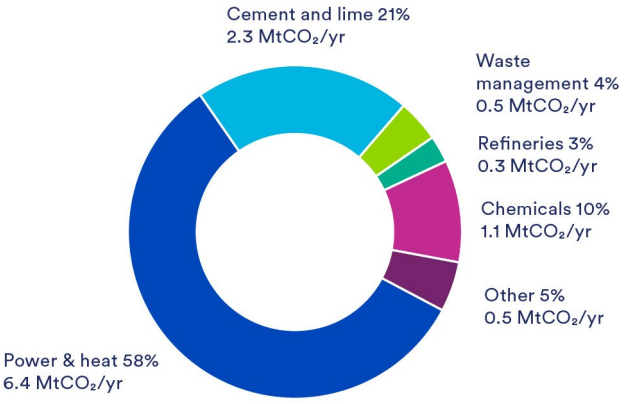
In 2025, the Irish Government established a Carbon Capture Utilisation and Storage (CCUS) Taskforce to consider how CCS could be developed in Ireland, including development of CO_2 transport, access to storage, and overall strategy, while the Departments of Climate and Enterprise are developing a CCUS Vision Statement, with publication indicatively expected by the end of 2026.[5]

CO_2 capture opportunities

Ireland will need to tackle emissions from across the economy to be on track to meet its climate obligations, including a significant industrial sector. Around a third of the country's total CO_2 emissions are from large individual sources, which emit 11 $MtCO_2/yr$.[6] While gas power plants make up the largest contribution, industrial sites in the cement, chemicals and refining sectors account for around a third of these point source emissions. The most pressing need for CCS in Ireland relates to unavoidable process emissions from the country's four cement facilities, which together account for 2.3 $MtCO_2/yr$. In cement production, CO_2 is released by the calcination of calcium carbonate, the main component of limestone. While measures taken to reduce emissions such as reducing the energy-related emissions from cement production and switching to lower-carbon fuels have been taken, these cannot address the process emissions from calcination.

Another sector which is likely to require the deployment of CCS are Ireland's two waste-to-energy facilities which emit almost 1 $MtCO_2/yr$, approximately half of which is biogenic and can therefore be used to deliver permanent CDR. Additional CDR potential could be exploited from the CO_2 produced by biomethane facilities, which use anaerobic digestion to convert agricultural waste to biomethane – separating out CO_2 in the process. Biomethane production generates a relatively high-purity CO_2 stream with low capture costs, although the small scale of individual facilities means that aggregation through collection hubs and shared transport infrastructure is likely to be needed. Gas Networks Ireland has around 370 GWh of operational biomethane injection capacity, which would result in roughly 50 $ktCO_2$ per year. An additional 1 TWh is under development, and government policy targets scale up to 5.7 TWh by 2030.[8]

Ireland's Fossil Source CO_2 Emissions



[4] Article 23 Watch (2026), Annual report: the first year of Article 23. Available at:https://article23watch.eu/2026/03/31/annual-report-the-first-year-of-article-23/

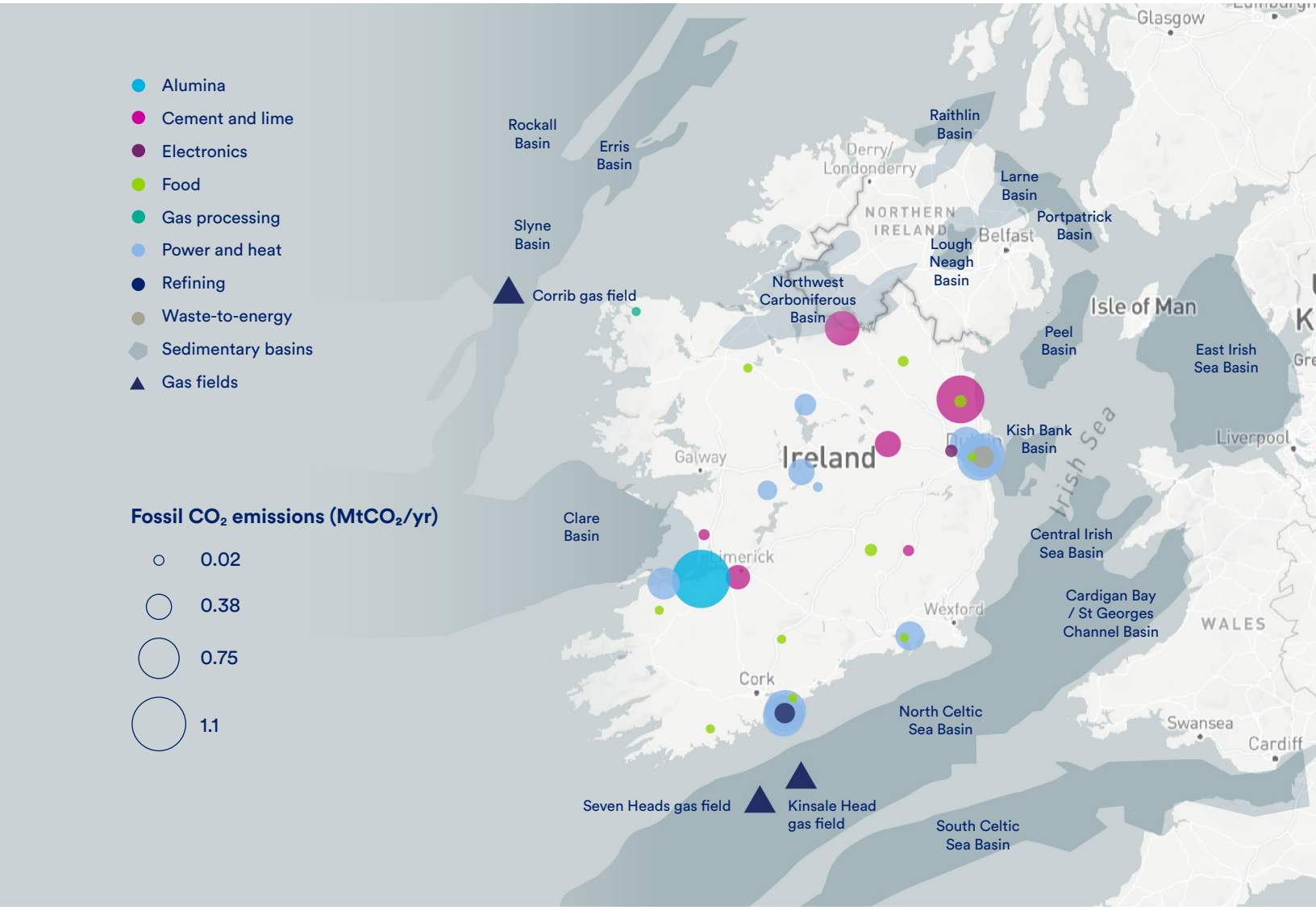
[5] O'Doherty, C. (2026), Doubts raised about companies' ability to meet EU climate targets, The Irish Times, 4 August 2026. Available at: https://www.irishtimes.com/environment/climate-crisis/2026/08/04/doubts-raised-about-companies-ability-to-meet-eu-climate-targets/

[6] Total CO_2 emissions from: European Environment Agency (2026), Greenhouse gases – data viewer (accessed September 2026). Point-source emissions from: Endrava, CaptureMap (accessed September 2026).

[7] Based on an assumption that 1 GWh of biomethane production is associated with 130 tonnes of CO_2. William Fry (2026), Biomethane production facilities in Ireland. Available at: https://www.williamfry.com/knowledge/biomethane-production-facilities-in-ireland/. Gas Networks Ireland (2026), Gas Networks Ireland connects new €30m Meath biomethane plant turning waste into energy, fuel and jobs. Available at: https://www.gasnetworks.ie/corporate/news/active-news-articles/meath-biomethane-plant. Gas Networks Ireland (2026), Mitchelstown Central Grid Injection facility. Available at: https://www.gasnetworks.ie/network/biomethane/mitchelstown-cgi.

The Sustainable Energy Authority of Ireland's (SEAI) National Heat Study identifies a role for CCS across Ireland's net-zero pathways. Even in the 'High Electrification' scenario which assumes the lowest level of CCS deployment, 2.7 $MtCO_2$/yr are captured and permanently stored in 2050. In the highest deployment 'Decarbonised Gas' scenario this increases to nearly 17 $MtCO_2$/yr being captured annually in 2050, with a large portion (up to 9 $MtCO_2$/yr) of this volume being carbon removals from the capture and storage of biogenic CO_2.[9]

Modelling suggests Ireland could be a favourable location for direct air capture with storage, with life-cycle emissions below 0.5 tCO_2 per tonne captured and net capture efficiencies of up to 87–89% under a wind-dominated electricity supply.[10]



8 Government of Ireland (2025) Biomethane. Available at: https://www.gov.ie/en/department-of-climate-energy-and-the-environment/policy-information/biomethane

9 Sustainable Energy Authority of Ireland (2022), National Heat Study: Carbon Capture Utilisation and Storage (CCUS): Suitability, Costs and Deployment Options in Ireland, Report 6, February 2022. Available at: https://www.seai.ie/sites/default/files/publications/Carbon-Capture-Utilisation-and-Storage.pdf

10 Casaban, D. and Tsalaporta, E. (2023), Life cycle assessment of a direct air capture and storage plant in Ireland. Scientific Reports, 13, 18309. https://doi.org/10.1038/s41598-023-44709-z

CO_2 storage opportunities

Ireland possesses genuine but largely unproven potential for the geological storage of CO_2, primarily in offshore sedimentary basins that ring the island. The basins located along the eastern and southern coastlines are the most suitable, given their relatively shallow water depths (typically around 30-150 metres) and proximity to emission clusters in major towns and cities including Dublin, Cork, and Drogheda. These include the Kish Bank, Central Irish Sea, and North Celtic Sea basins. An early study investigated the potential of these sedimentary basins for CO_2 storage, using legacy geological and geophysical data from oil exploration, and estimated effective capacities of 270 Mt and 630 Mt for closed structures in the Kish Bank and Central Irish Sea Basins, respectively.[11] However, a later study by the British and Irish geological surveys found more limited potential in the Central Irish Sea Basin due to small, densely faulted structures.[12] An initial estimate of gigatonne capacity has been published for the North Celtic Sea Basin[13], but requires further investigation. Further site-specific appraisal will be required to determine how much of this resource could ultimately be developed for storage.

The most promising near-term storage sites are depleted hydrocarbon fields, where existing infrastructure can be adapted for CO_2 storage purposes. These include the Kinsale Head gas field, located in the North Celtic Sea basin offshore County Cork, and the Corrib gas field, in the Slyne Basin offshore County Mayo. Studies suggest the Kinsale Head gas field has a capacity of around 320-330 Mt CO_2 while the Corrib gas field has an estimated capacity of 15-119 Mt CO_2.[14] The Kinsale Head gas field is considered the most mature near-term option for geological carbon storage; however, as a shallow and faulted reservoir with decommissioned wells, further detailed appraisal for storage suitability will be necessary. There are also competing interests in the field, with electricity utility ESB announcing plans to use it for energy storage purposes, which would likely preclude geological carbon storage at the site.[15] Conversely, the Corrib gas field is actively producing natural gas and is expected to continue operations to 2035 and beyond[16], which would delay its use as a CO_2 storage site for at least another decade. The surrounding Slyne basin and other sedimentary basins on the Atlantic margin could offer significant additional potential.[17] The recently announced GeoStorIE project, led by UCD and funded by the SEAI and GSI, aims to produce a storage resource atlas for the basins offshore Ireland and is expected to conclude in 2028.[18]

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11 Lewis, D., Bentham, M. et al. (2009), Assessment of the potential for geological storage of carbon dioxide in Ireland and Northern Ireland, Energy Procedia, 1(1), pp. 2655–2662. https://doi.org/10.1016/j.egypro.2009.02.033

12 Bentham, M., Williams, J. and Hannis, S. (2014), Appendix 2: An assessment of the potential for subsurface CO_2 storage in two regions of the Central Irish Sea Basin, British Geological Survey, Report CR/14/128.

13 Rodríguez-Salgado, P., Walsh, J.J., Childs, C. and Manzocchi, T. (2022), Unlocking the CO_2 storage potential of the Celtic Sea Basins from hydrocarbon exploration legacy data, Proceedings of the 83rd EAGE Annual Conference & Exhibition, Madrid, Spain.

14 Lewis, D., Bentham, M. et al. (2009), Assessment of the potential for geological storage of carbon dioxide in Ireland and Northern Ireland, Energy Procedia, 1(1), pp. 2655–2662. https://doi.org/10.1016/j.egypro.2009.02.033; English, J.M. and English, K.L. (2022), Carbon Capture and Storage Potential in Ireland—Returning Carbon Whence It Came, First Break, 40(5), pp. 35–43. https://doi.org/10.3997/1365-2397.fb2022035; O'Sullivan, C.M., Rodríguez-Salgado, P. et al. (2024), Subsurface storage capacity in structural traps in underexplored sedimentary basins: hydrogen (H_2) and carbon dioxide (CO_2) storage on the Irish Atlantic margin, Energy Geoscience Conference Series, 1(1). https://doi.org/10.1144/egc1-2023-10; Corrib range indicates P90 to P10 values from O'Sullivan et al. (2024).

15 ESB (2021), ESB and dCarbonX launch Kinsale Head Hydrogen Storage project, 12 August 2021. Available at: https://esb.ie/media-centre-news/press-releases/article/2021/08/12/esb-and-dcarbonx-launch-kinsale-head-hydrogen-storage-project

16 Nieuwland, F., Colleran, P. et al. (2025), A Case History: Different Paths, Same Destination – Two Modelling Approaches for the Corrib Gas Field, SPE Offshore Europe Conference & Exhibition, paper 226771-MS. https://doi.org/10.2118/226771-MS

17 O'Sullivan, C.M., Rodríguez-Salgado, P. et al. (2024), Subsurface storage capacity in structural traps in underexplored sedimentary basins: hydrogen (H_2) and carbon dioxide (CO_2) storage on the Irish Atlantic margin, Energy Geoscience Conference Series, 1(1). https://doi.org/10.1144/egc1-2023-10

18 University College Dublin (2025), GeoStorIE. Available at: https://www.ucd.ie/earthsciences/research/ongoingresearchprojects/geostorie/

In addition to offshore storage in sedimentary basins, potential exists onshore Ireland for CO_2 storage through mineralisation in mafic rocks such as basalt and peridotite. This carbon storage technique has been demonstrated in several pilot and small commercial projects globally. Preliminary studies indicate that sites in Galway and Limerick may have theoretical capacities in excess of 1.2 Gt CO_2.[19]

Benefits of developing CCS in Ireland

Ireland's energy-intensive industries face mounting pressure from rising EU Emissions Trading System (ETS) carbon prices, which are projected to increase from current levels of approximately €75 per tonne CO_2 to around €164 per tonne by 2035.[20] Irish industries will face a stark choice in the coming years: pay escalating carbon costs that threaten competitiveness, relocate production outside Ireland, or cease operations entirely. The deployment of CCS offers a critical pathway to maintain industrial activity while meeting climate obligations. Irish CCS projects could also benefit from existing EU funding mechanisms, including the Innovation Fund, which uses EU ETS revenues to support the deployment of innovative low-carbon technologies, including CCS.

Additionally, agricultural biogenic-CO_2 is emerging as a high-value CDR sector, providing a vital business case to kickstart early CCS value chains such as Denmark's Greensand project.[21] Given the significant role planned for biomethane in Ireland's decarbonisation strategy, there is strong potential to use growing market demand for CDR as an additional source of revenue. In addition to voluntary corporate demand for CDR, the European Commission's proposal for a revised ETS sets out an ambition for EU to procure 250 Mt of CDR by 2040.[22]

Ireland's domestic geological storage potential requires further characterisation, but could offer a lower-cost option for decarbonising emitters and CDR operators in the 2030s, compared with the export of CO_2 for storage elsewhere in Europe. Should the storage resource prove favourable, the country could even act as a regional provider of storage services to other European emitters. Investment in this capacity would be offset by savings for domestic emitters and potential storage service revenues, while creating strategic infrastructure assets that enhance Ireland's role in the European energy transition.

In the near term, Ireland will likely rely on export of CO_2 to neighbouring countries with storage sites at a more advanced stage of development. In particular, the United Kingdom is scheduled to commission the Liverpool Bay CCS project in the East Irish Sea by 2028[23], while the nearby Morecambe Net Zero[24] project is currently undergoing characterisation and offers a promising option for Irish CO_2 exports via a planned shipping terminal. Connection to these sites via offshore pipeline is also possible. However, as the EU ETS does not currently recognise CO_2 storage sites outside the European Economic Area (EEA), there is no incentive to export fossil CO_2 to the UK. While this could be addressed through the planned linkage of the UK and EU ETS, a near-term resolution should be sought. Alternatively, Denmark, the Netherlands and Norway offer storage capacity which could be exploited by Irish CO_2 emitters or removal projects by 2030. Any export of CO_2 for offshore storage would require a bilateral agreement according to the requirements of the London Protocol.[25]

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19 Alexander, J. (2024), The Potential for In-situ Mineral Carbonation in Ireland. University of Galway; O'Sullivan, C.M., Slezak, P. et al. (2025), From carbon to climate action: harnessing basalt for geological carbon dioxide (CO_2) storage onshore and offshore, Earth Science, Systems and Society, 5, esss2024-016. https://doi.org/10.1144/esss2024-016

20 ABN AMRO (2026), Carbon Market Strategist – EU ETS review signals less scarcity and more industrial policy, 24 August 2026. Available at: Carbon Market Strategist - EU ETS review signals less scarcity... | ABN AMRO

21 Greensand (2026) A world-leading CO_2 storage facility. Available at: https://greensandfuture.com/next-chapter (accessed October 2026).

22 European Commission (2026), Proposal for a Directive of the European Parliament and of the Council amending Directive 2003/87/EC and Decision (EU) 2015/1814 as regards driving competitiveness and cost-effective decarbonisation, COM(2026) 616 final, 17 July 2026, procedure 2026/0212 (COD).

23 Liverpool Bay CCS Ltd (2026), System Development Statement, March 2026. Available at: Liverpool Bay CO_2 T&S - Transportation and Storage

24 Spirit Energy (2026), Major milestone for MNZ Peak Cluster CCS project, 9 June 2026; Spirit Energy, Morecambe Net Zero (MNZ) project information. Available at: https://www.spirit-energy.com/our-operations/mnz/ (accessed September 2026)

25 IEAGHG (2021), Exporting CO_2 for Offshore Storage – The London Protocol's Export Amendment and Associated Guidelines and Guidance, Technical Review 2021-TR02, 12 April 2021. Available at: Exporting CO_2 for Offshore Storage – The London Protocol's Export Amendment and Associated Guidelines and Guidance - IEAGHG

Policy Recommendations

For Ireland to fully realise these economic opportunities and tackle millions of tonnes of emissions from its hard-to-abate sectors, immediate action is required to remove regulatory barriers to domestic storage, establish permitting frameworks, develop international cooperation agreements, and provide financial support for CCS development. The window of opportunity to position Ireland as a regional CO_2 storage hub is limited, as competing jurisdictions are already advancing their storage capacity and establishing market positions. Strategic action in the next 2-5 years will determine whether Ireland captures these benefits or remains solely a purchaser of international storage services.

1 Develop a national carbon management strategy.

The CCUS Vision Statement should set out a clear pathway for CCS deployment, establish responsibilities across government, and put in place the regulatory and permitting framework needed for projects to progress. It should also establish a dedicated support framework for CCS projects, building on existing national and EU funding and providing additional revenue certainty where needed, for example through carbon contracts for difference or an equivalent long-term mechanism.

2 Enable access to CO_2 transport and permanent storage.

Ireland should develop the port and transport infrastructure needed to export captured CO_2 and remove the remaining barriers to cross-border storage. This should include ratification of the 2009 amendment to the London Protocol concerning the export of CO_2 for offshore storage, reaching bilateral agreements with storage partners, and establishing a pathway for access to UK storage as EU-UK ETS linkage progresses. Access to storage in the EEA should be pursued in parallel.

3 Enable, characterise and de-risk domestic CO_2 storage.

Ireland should remove the prohibition on commercial CO_2 storage and establish a clear permitting framework for storage projects. It should also fund further appraisal of potential storage sites and make the resulting data publicly available through a national storage assessment, helping to determine where storage could be developed safely and economically.

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