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Carbon Capture & Storage at Sea

Book of Abstracts

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Carbon Capture & Storage at Sea

Book of Abstracts

AN INTERNATIONAL CONFERENCE

Carbon Capture & Storage at Sea

Regulation and Governance of Transport, Sequestration, and Liability

Book of Abstracts

CONVENED JOINTLY BY

Lund University · Faculty of Law

University of Gothenburg · School of Business, Economics and Law

Juridicum, Lund · 7–8 May 2026

Colophon

Compiled for the conference convened at the Faculty of Law, Lund University,
on 7 and 8 May 2026, jointly hosted with the School of Business, Economics and Law,
University of Gothenburg.

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Convenors: Olena Bokareva · Gabriela Argüello · Anıl Öztürk.

Edited by Anıl Öztürk.

Law must be stable
and yet it cannot stand still.

Roscoe Pound

Interpretations of Legal History

Storrs Lectures on Jurisprudence, Yale Law School, 1921

(New York: Macmillan, 1923)

A NOTE FROM THE CONVENORS

Foreword

The volume in your hands gathers the abstracts of every paper to be presented at *Carbon Capture & Storage at Sea*, a two-day international conference held at the Faculty of Law of Lund University on 7 and 8 May 2026. Convened jointly with the School of Business, Economics and Law of the University of Gothenburg, the meeting brings together legal scholars, regulators, industry practitioners, and social scientists to consider, in close detail, the law and governance of carbon capture and storage in the marine environment.

The questions before us are no longer speculative. The Northern Lights project entered commercial operation in late 2025, the ITLOS Advisory Opinion of May 2024 has reframed greenhouse-gas emissions as marine pollution, and the export amendment to the London Protocol — adopted in 2009 — remains, more than sixteen years on, not in force. Between these three points sits a regulatory architecture composed of treaties drafted before CCS was anticipated, directives written for a different generation of activities, and standards developed privately and incorporated into law by reference. The papers that follow take the measure of this architecture from many directions.

We have gathered the abstracts here in alphabetical order by author, without dividing them by panel. The intention is that the volume read as a single intellectual landscape, in which the law of the sea, the regimes of liability and insurance, the questions of justice and equity, and the comparative national regulatory experiences sit in conversation rather than in compartments. A short biographical note follows each abstract; an index of authors is given at the back. Three keynote addresses appear in their alphabetical position within the volume.

Our thanks go to the contributors who have travelled, in some cases very far, to be in Lund this week, and to those who joined us by hybrid presentation. We are grateful, too, to Fabian Vukic, whose work behind the scenes has been instrumental in bringing the conference together. The conversations recorded in these pages are the beginning of the work, not the end of it.

Olena Bokareva · Gabriela Argüello · Anıl Öztürk
Lund & Gothenburg, May 2026

TWO DAYS AT THE FACULTY OF LAW

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15:15–16:00 Closing Discussion · *Tetra Laval*

Moderator: Anıl Öztürk

Panel: Gabriela Argüello · Olena Bokareva · Thomas Muinzer · Patrick Seroogy · Viktor Weber

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The Abstracts

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Thirty-two contributions, arranged alphabetically by the surname of the first author.

Carbon Storage and Cross-Border Transport: Domestic Permitting Challenges in Iceland

Bára A. Alexandersdóttir

Reykjavík University, Iceland

Carbon Capture and Storage (CCS) is increasingly recognised as a necessary component of global climate mitigation strategies alongside emission reduction. This paper examines how Iceland's domestic legal and administrative framework addresses the permitting of ship-transported CO_2 for permanent storage, with particular focus on the legal uncertainty surrounding cross-border transport. The analysis situates CCS within Iceland's climate policy framework, including its statutory commitment under the Climate Act No. 70/2012 to achieve carbon neutrality by 2040, where negative emissions are expected to play a growing role. Iceland's extensive basalt formations, which extend both onshore and beneath the seabed, enable rapid and permanent mineralisation of injected CO_2, significantly reducing long-term leakage risk compared to conventional sedimentary storage.

Such geological advantages have attracted international interest, yet CCS projects in Iceland face considerable legal uncertainty. The Coda Terminal project by Carbfix represents a pivotal case for carbon storage governance involving ship transport. Supported by a €3.9 million EU grant, the largest ever awarded to an Icelandic company, the project was designed to receive CO_2 shipped from European emitters for onshore mineralisation. Its permitting process intersected domestic administrative procedures with international obligations under the London Protocol and the OSPAR Convention, particularly concerning transboundary CO_2 transport. The project also illustrates the relevance of the Aarhus Convention, as public concerns about Iceland becoming a repository for foreign CO_2 shaped the permitting process and contributed to administrative delays that ultimately halted the project in Hafnarfjörður. The paper situates Iceland's domestic framework within international climate-law developments, including the CCS Directive 2009/31/EC, the London Protocol, OSPAR, and recent advisory opinions from the ICJ and ITLOS.

Note *Bára A. Alexandersdóttir is a doctoral candidate in Law at Reykjavík University, supervised by Dr Snjólaug Árnadóttir. Her research examines administrative uncertainty and delay in CCS and CDR permitting in Iceland in light of international climate obligations. She holds an ML in Law and a BA in Law from Reykjavík University, and an MPA in Public Administration (Administrative Law) from the University of Iceland.*

From Waste to Cargo: The Shifting Legal Nature of Captured CO_2 at Sea

Gabriela Argüello & Olena Bokareva

University of Gothenburg & Lund University, Sweden

This paper examines the legal status of captured carbon dioxide (CO_2) transported by sea for offshore sub-seabed storage. As the European Union seeks to scale up carbon capture and storage (CCS), particularly in the Nordic and North Sea regions, legal uncertainty remains over whether captured CO_2 should be classified as waste, pollutant, cargo, commodity, property, or a regulated storage stream. The paper argues that captured CO_2 has a hybrid and lifecycle-dependent legal nature. From a public-law perspective, CO_2 is primarily framed as an environmental risk subject to State regulation under UNCLOS, the London Protocol, OSPAR, and EU law. From a private-law perspective, however, liquefied CO_2 may function as maritime cargo, a contractual object, or a tradable asset within CCS transport and storage chains.

Using doctrinal legal analysis, the paper traces CO_2 from capture, maritime transport, and injection to post-closure responsibility. It highlights tensions between environmental protection, commercial certainty, liability allocation, and cross-border infrastructure development. The paper concludes that rigid legal categorisation is inadequate. Instead, a lifecycle-based classification better reflects the evolving legal functions of captured CO_2 and supports both environmental integrity and commercially viable offshore CCS deployment.

Note *Gabriela Argüello is Associate Senior Lecturer in Environmental Law at the Department of Law, School of Business, Economics and Law, University of Gothenburg, a research fellow of the Royal Swedish Academy of Letters, History and Antiquities, and a Fulbright Arctic Initiative IV scholar (2024–2026). Olena Bokareva is Senior Lecturer and Associate Professor in Private Law at the Faculty of Law, Lund University. Together they lead the Marianne and Marcus Wallenberg Foundation–funded project Sustainable Carbon Capture, Transportation and Storage: Liability and Governance in Light of International and EU Law, the research base from which this conference emerges.*

Ensuring Good Resource Management When Developing Offshore CO_2 Storage Activities: An Appraisal of Available Regulatory Tools

Catherine Banet

University of Oslo, Norway

Good resource management has been and remains a central tenet of Norwegian petroleum policy. It is multifaceted and is reflected in many provisions of the currently applicable 1996 Petroleum Activities Act. Good resource management is also referred to by the authorities in relation to CCS because the value chains of petroleum extraction and the transportation and storage of CO_2 have multiple similarities. The similarities in the operations and the legal regimes could allow for more interaction between the two sectors.

The presentation discusses which regulatory instruments can contribute to good resource management of CO_2 storage capacity, reviewing the EU Net Zero Industry Act and national legislation in Norway. The main research questions are: do we have the required legal and regulatory framework to appraise CO_2 storage as a resource and ensure good resource management; and do we have the sufficient coordination tools at national, regional and EU/EEA level?

Note *Catherine Banet is Professor of Law and Head of the Department for Energy and Resources Law, University of Oslo. She has a background in private practice in Norway and France, the European Commission (DG ENV), U.S. diplomatic mission, and academia. She co-directs the LL.M. programme of the North Sea Energy Law Partnership and chairs the Norwegian Energy Law Association.*

Carbon Capture and Storage in the Nordic Context: Balancing Climate Ambitions, Environmental Justice, and Socio-Ecological Impacts

Ayat-Allah Bouramdane

Independent Researcher, Rabat, Morocco

The urgency of mitigating climate change has intensified following the outcomes of COP30, highlighting the need for rapid decarbonisation strategies across Europe. Carbon Capture and Storage (CCS) has emerged as a potential technology to achieve EU, Swedish, and Nordic climate targets, yet its socio-ecological and environmental-justice implications remain underexplored. This study investigates the role of CCS in meeting these regional climate goals, addressing the central research questions: how can CCS contribute to decarbonisation pathways in Sweden and the Nordic region, and what are the environmental-justice and socio-ecological consequences of its deployment?

Using a prospective modelling approach, the study analyses CCS integration scenarios within existing energy systems, combining techno-economic assessments with spatial and social impact evaluations. The findings indicate that CCS can significantly reduce industrial and power-sector emissions, accelerating progress toward climate targets. However, the distribution of benefits and risks is uneven, with potential socio-ecological trade-offs including local environmental burdens, community-acceptance challenges, and inequitable exposure to risk. The study underscores that, while CCS can be a valuable tool in regional climate strategies, its deployment must be guided by environmental-justice principles and robust stakeholder engagement. Policymakers should integrate CCS with complementary mitigation measures and monitor socio-environmental impacts to avoid exacerbating inequalities. Limitations include uncertainties in long-term storage capacity, modelling assumptions, and evolving regulatory frameworks, suggesting the need for adaptive, context-specific strategies.

Note *Ayat-Allah Bouramdane is an independent researcher in climate change and energy flexibility, a graduate of École Polytechnique and the Institut Polytechnique de Paris. She has taught in Rabat and held a visiting professorship in France while coordinating research and development projects on low-carbon energy systems. Her work integrates technical, economic, environmental, and social dimensions of energy transition, with a focus on green hydrogen and CCS as complementary climate solutions.*

From Operator to State: Rethinking Civil Liability in Carbon Capture and Storage

Romano Alessandro Bove

University of Siena, Italy

Geological storage of CO_2 (Carbon Capture and Storage – CCS), alongside emission reduction policies, represents a strategic tool for mitigating anthropogenic greenhouse-gas emissions and achieving the objectives of the ecological transition. The sector is currently supported even at EU level by the adoption of the Net Zero Industry Act (2024). However, as highlighted by authoritative legal scholarship, the development of investments in CCS critically depends on the existence of an adequate and efficient regulatory and civil-liability framework.

Significant challenges arise from the temporally extended nature of the risk, as potential harms — affecting human health and marine ecosystems — may materialise long after the operational phase has ended. This places considerable strain on traditional civil-liability paradigms, particularly regarding the attribution of responsibility, the proof of causation, and the application of limitation periods. Directive 2009/31/EC seeks to address these concerns by introducing a mechanism for the transfer of liability to the State during the post-closure phase of the storage site, subject to demonstration of permanent storage stability. Nonetheless, in many national legal systems a comprehensive and specific civil-liability regime for CCS activities is still lacking. Against this background, this contribution argues for the design of a special liability regime capable of reallocating risk more efficiently while simultaneously promoting the development of CCS technologies. It proposes a dual-track system: strict operator liability during site selection, injection, and closure, paired with State responsibility in the post-closure phase, supported by mandatory insurance coverage commensurate with the potentially severe consequences of CO_2 leakage.

Note *Romano Alessandro Bove is a doctoral candidate in Law and Management of Sustainability at the University of Siena (DISAG), specialising in private, tort, and environmental law. He recently completed a visiting research period at the University of Sussex and a single-cycle Master's in Law at the University of Florence. He is admitted to the Italian Bar (Court of Appeal of Florence).*

The Legal Governance of In Situ CO_2 Mineralisation Beyond National Jurisdiction

Tony Cabus

Walther-Schücking Institute for International Law, Kiel University, Germany

Carbon Capture and Storage (CCS) has attracted significant attention as a climate-mitigation strategy. However, CO_2 mineralisation — the process of converting dissolved CO_2 into stable carbonate minerals within mafic and ultramafic rock formations — has largely been overshadowed by the more straightforward practice of injecting supercritical CO_2 streams into depleted oil and gas reservoirs. This disparity in popularity should not be understood as reflecting a qualitative difference between the techniques, but rather the greater technological maturity of conventional geological storage. Nonetheless, CO_2 mineralisation is gaining momentum, with several projects demonstrating promising results and distinctive advantages, particularly in terms of long-term storage security.

As with climate-mitigation technologies more generally, mineralisation should not be regarded as a substitute for existing approaches, but rather as a complementary option within a broader portfolio of solutions. To date, most projects have focused on technical feasibility and have remained within areas under national jurisdiction, thereby avoiding complex governance questions. Should demand for mineralisation increase, however, States may begin to consider sites beyond national jurisdiction. Since oceanic ridges suitable for mineralisation extend into areas beyond national jurisdiction, some States might seek to conduct operations there. Such developments would raise significant legal and governance challenges for the international seabed regime and would need to be assessed within the framework of UNCLOS. This paper explores these challenges, with particular attention to the Common Heritage of Mankind principle and the implications of the recently adopted Agreement on the Conservation and Sustainable Use of Marine Biological Diversity of Areas Beyond National Jurisdiction (BBNJ Agreement).

Note *Tony Cabus is a Postdoctoral Researcher at the Walther-Schücking Institute for International Law, Kiel University, where he is part of the German CDRmare research mission on marine carbon dioxide removal. He holds a Doctor of Laws from Kobe University on due diligence and the high seas. He represents Germany in the JPI Ocean Blue Carbon Knowledge Hub and the Advisory Committee on Protection of the Sea (ACOPS).*

Adaptability Challenges of Ports for the Viability of Offshore CCS Projects

Josep Lluís Díez i Besora

Universitat Rovira i Virgili / Tarragona Port Authority, Spain

Offshore Carbon Capture and Storage (CCS) projects are increasingly positioned as a strategic element in energy-transition pathways, particularly for hard-to-abate industrial sectors. In this context, ports emerge as critical energy and logistics hubs, acting as interfaces between onshore carbon-capture facilities, transport networks, and offshore storage sites. The viability of offshore CCS projects is therefore closely linked to the capacity of ports to adapt their operational models, infrastructure, and governance frameworks to the specific requirements of CO_2 handling and transport.

The paper analyses the role of port adaptability in enabling offshore CCS deployment, with a specific focus on operational changes and concession-regime implications. Ports must integrate new energy-related functions — including reception, temporary storage, conditioning, and transfer of CO_2, often in liquefied or compressed form. These activities require specialised infrastructure, enhanced safety and environmental management procedures, and modifications to berth management, terminal operations, and intermodal connectivity. Such changes frequently interfere with existing port uses, generating competition for space and operational capacity. From an institutional and regulatory perspective, current port-concession regimes present a significant challenge: traditional concession models are typically structured around established cargo flows and relatively short investment cycles, whereas CCS projects are characterised by long development timelines, high capital intensity, and substantial regulatory and market uncertainty. The paper argues that ports must evolve from conventional transport nodes into adaptable energy hubs supporting emerging decarbonisation technologies.

Note Josep Lluís Díez i Besora is a PhD researcher in Maritime and Port Law and Associate Professor at Universitat Rovira i Virgili. He is Chief Legal Officer and Head of Public Domain at the Tarragona Port Authority and Port Security Officer for the port. He is President of the Maritime, Port and Transport Law Section of the Tarragona Bar Association.

Logistics Modelling of Norwegian CCS Network: Trade-Offs for Industrial and National Emission Reduction Targets

Erna Engebrethsen

BI Norwegian Business School, Norway

Large-scale initiatives such as Norway's Northern Lights project illustrate a rapidly evolving landscape for ship-based CO_2 transport and offshore geological storage, raising critical questions about the governance, regulatory design, and operational viability of future CCS networks. Building on this emerging context, the study develops a logistics-optimisation framework to evaluate how national-scale carbon capture, transport, and storage systems can be configured to balance economic efficiency with environmental integrity under realistic industry, geographical, and regulatory conditions. Using detailed data for Norwegian emitters and offshore storage sites, the model jointly minimises annualised CCS system costs and maximises net carbon avoidance while explicitly incorporating CO_2 losses, transport-related emissions, and operational energy use.

Through a mathematical model the study analyses varying national avoidance targets, illuminating the trade-offs confronting regulators, operators, and policymakers. The findings challenge the assumption that economies of scale naturally arise from aggregating emitters: heterogeneous capture costs, spatial dispersion, and uneven proximity to storage limit the benefits of large shared networks. Operational emissions remain below 2% of sequestered volumes across all scenarios, confirming that CCS retains high mitigation value when maritime transport and conditioning energy are fully accounted for. The study compares mandatory full-capture requirements with partial-capture strategies enabling controlled venting; full capture increases system costs by up to 5% relative to flexible designs. Multimodal versus ship-only chains and hub-based shared shipping are also assessed.

Note Erna Engebrethsen is Associate Professor at the Department of Accounting, Auditing and Operations Management, BI Norwegian School of Management (Oslo). She has previously served as Associate Dean for Executive Education at BI and as Programme Director for Executive Customised Programmes for Ocean Business. She holds a PhD from BI (2009) and has fifteen years of international industrial experience in energy, maritime, and logistics sectors.

Implications of the BBNJ Agreement on Transboundary Carbon Dioxide Transportation by Ships for Storage Overseas

Luciana Fernandes Coelho & Gustavo Leite Neves da Luz

Faculty of Law, Lund University, Sweden · Dalhousie University, Canada

Amidst the imperative for climate mitigation, Carbon Capture and Storage (CCS) is increasingly conceptualised as a critical technology for decarbonising hard-to-abate sectors. Offshore CCS — comprising the capture, maritime transport, and sub-seabed sequestration of CO_2 — operates at the intersection of fragmented jurisdictional and sectoral regimes, dominated by the 1972 London Convention and its 1996 Protocol. However, the adoption of the Agreement on Marine Biological Diversity of Areas Beyond National Jurisdiction (BBNJ Agreement) introduces a significant new layer of governance that complicates this existing framework.

This paper critically evaluates the interplay between the BBNJ Agreement and the framework governing transboundary CO_2 transportation by ships, focusing on the "not undermining" mandate enshrined in Article 5.2. Specifically, it examines how BBNJ provisions on Area-Based Management Tools (ABMTs) may impose supplementary safety obligations to mitigate CO_2 leakage in ecologically sensitive regions, and how its Environmental Impact Assessment requirements apply to CCS activities within national jurisdictions that may cause substantial pollution to the marine environment in areas beyond national jurisdiction. Central to this inquiry is whether the BBNJ Agreement functions as a complementary regime or a normative constraint. By identifying potential jurisdictional overlaps and governance gaps, the paper argues for a "collaborative interpretation" of Article 5.2. Such an approach is essential to ensure that the promotion of climate mitigation via sub-seabed sequestration does not erode the conservation of marine biodiversity in ABNJ.

Note *Luciana Fernandes Coelho is a postdoctoral researcher at the Faculty of Law, Lund University. She holds a PhD in Maritime Affairs from the World Maritime University, an MSc in Environment, Politics & Society from University College London, and an LL.M. from the University of Brasília. She has served as legal adviser to the Brazilian delegation during the BBNJ intergovernmental conference. Gustavo Leite Neves da Luz is the co-author of this paper, based at Dalhousie University, Canada; Luciana presents the paper in Lund.*

Carbon Without a Category: Liquefied CO_2, Maritime Liability, and the Limits of Existing Pollution Regimes

Akrita Kaur & Rukhsaar Dhaliwal

Panjab University, Chandigarh, India

The rapid operationalisation of carbon capture and storage (CCS) at sea has outpaced the development of a coherent international liability framework governing the maritime transport and sub-seabed sequestration of captured CO_2. While existing international maritime liability conventions have evolved to address accidental pollution from oil and hazardous substances, their applicability to CCS remains uncertain. This paper argues that this uncertainty is not merely the product of regulatory gaps, but reflects a deeper structural misfit rooted in the ambiguous legal characterisation of liquefied CO_2 within international maritime law.

Through a doctrinal analysis of UNCLOS, the London Convention and Protocol, and the principal maritime pollution liability regimes — particularly the oil-pollution and Hazardous and Noxious Substances Conventions — the paper demonstrates that liquefied CO_2 defies existing regulatory categories. Neither conventionally understood as "cargo" nor as "pollution" in the traditional sense, CO_2 transported for permanent geological sequestration occupies a liminal legal position. This ambiguity undermines the triggering conditions and scope of application of existing liability regimes, rendering them ill-suited to address leakage, environmental harm, or long-term responsibility arising from CCS operations at sea. The paper further contends that incremental adaptation of existing maritime liability instruments risks distorting their underlying logic and reallocating climate-mitigation risks to frameworks designed for fundamentally different hazards. It therefore examines the legal justification for a sui generis international liability mechanism tailored to the distinctive risk profile of CCS at sea.

Note *Akrita Kaur is a Ph.D. Research Scholar at the Department of Laws, Panjab University, Chandigarh, where her doctoral research examines the adequacy of international legal frameworks governing marine environmental protection in the Indian Ocean. She holds an LL.M. in Constitutional and Administrative Law and is a UGC-NET qualified Junior Research Fellow. Rukhsaar Dhaliwal is a Ph.D. Research Scholar at the same department, whose doctoral work examines the legal regulation of common property resources, with particular attention to processes of enclosure, state control, and privatisation. She is UGC-NET qualified and an Advocate with the Bar Council of Punjab and Haryana.*

The Void Below: Bridging the Regulatory Gaps in Sub-Seabed Carbon Storage Beyond National Jurisdiction

Mohammad Nizam Ashraf Khan & Bhavana Dhoundiyal

IILM University, Greater Noida, India

As climate-mitigation efforts intensify, sub-seabed carbon storage in Areas Beyond National Jurisdiction (ABNJ) emerges as a potentially significant solution for large-scale carbon-dioxide sequestration. However, the current international legal framework presents substantial regulatory gaps that threaten the viability and safety of such operations. This paper examines the critical research question: how can international law effectively regulate sub-seabed carbon storage in ABNJ while balancing climate imperatives with marine environmental protection and equitable governance? The existing patchwork of instruments — including UNCLOS, the London Protocol, and the emerging Biodiversity Beyond National Jurisdiction (BBNJ) Agreement — creates jurisdictional ambiguities, enforcement challenges, and liability uncertainties that must be resolved before widespread deployment.

The analysis advances three main arguments. First, the current regulatory void stems from the historical absence of carbon-storage considerations in ocean-governance frameworks, resulting in fragmented competences between different treaty regimes. Second, the principle of common heritage of mankind, while potentially applicable to sub-seabed resources, conflicts with emerging carbon-storage practices that require long-term territorial stability and clear property rights. Third, effective governance requires a new multilateral framework that harmonises environmental impact-assessment procedures, establishes transboundary liability mechanisms, and creates monitoring and verification protocols specific to ABNJ contexts. The paper proposes a pathway forward through institutional coordination between relevant international bodies and the development of technical standards adapted to the unique challenges of deep-sea carbon storage.

Note *Mohammad Nizam Ashraf Khan is Professor of Law at IILM University, Greater Noida, with more than thirteen years of teaching experience and over thirty publications on intellectual-property, taxation, and corporate law. Bhavana Dhoundiyal is Assistant Professor of Law at IILM University, holding a PhD, an LL.M. in Human Rights Law, and a BA LL.B. (Hons.); she works on international, personal, and marine law.*

The ITLOS and ICJ Climate Opinions and Carbon Capture and Storage

Bastiaan Ewoud Klerk

UiT — The Arctic University of Norway (NCLOS)

The recent climate advisory opinions of the International Tribunal for the Law of the Sea (ITLOS) and the International Court of Justice (ICJ) refine the content of States' obligations under international law, with indirect implications for carbon capture and storage (CCS). While neither opinion addresses CCS explicitly, both clarify due-diligence duties under UNCLOS and the UNFCCC/Paris Agreement. They confirm that States must take all necessary measures, grounded in the best available science, to prevent, reduce, and control greenhouse-gas emissions, and that this obligation is one of conduct requiring timely and effective action. These interpretations raise the expected standard of care, including stricter requirements for regulatory oversight, environmental impact assessment, and ongoing monitoring of mitigation activities.

For CCS, this has two implications. First, it supports the characterisation of CCS as a potentially necessary mitigation measure where it reflects best available technology in specific sectors. Second, it imposes more stringent procedural and substantive constraints on CCS deployment, particularly in transboundary and marine contexts governed by UNCLOS. Taken together, the ITLOS and ICJ opinions reposition CCS as an activity not merely permitted but expected — yet only when conducted within a robust framework of due diligence, transparency, and accountability across jurisdictions.

Note *Bastiaan Ewoud Klerk is a PhD Research Fellow at the Norwegian Centre for the Law of the Sea (NCLOS), UiT – The Arctic University of Norway, where his doctoral project examines area-based management tools in changing oceans. He holds LL.M. degrees from the University of Oslo and UiT in public international law and the international law of the sea respectively. His research focuses on marine environmental protection, climate change, and the interactions between UNCLOS and the Paris Agreement.*

Biological Carbon Sequestration vs CCS: Complementing MSY with Maximum Climate Mitigation (MCM)

Niels Krabbe

University of Gothenburg, Sweden

Covering over 70 percent of the planet's surface, the oceans are fundamental to human life and play a crucial role in oxygen production, weather regulation, and the global carbon cycle. They are by far the largest carbon sink in the world and are estimated to have absorbed roughly 40 percent of anthropogenic carbon-dioxide emissions since the beginning of the industrial era. Nevertheless, contemporary climate strategies have largely focused on engineered solutions such as Carbon Capture and Storage (CCS), including offshore transport and sub-seabed geological storage, while the oceans' existing capacity to sequester carbon through biological processes has received comparatively limited legal attention. The importance of maintaining marine carbon sinks was only formally acknowledged with the adoption of the Paris Agreement and the United Nations Sustainable Development Goals in 2015, after which marine climate mitigation — often referred to as "blue carbon" — has increasingly been reflected in Nationally Determined Contributions and UNFCCC accounting frameworks.

Marine carbon sequestration is driven by the interaction between the physical and biological carbon pumps. Recent scientific evidence demonstrates that the biological carbon pump — operated by marine organisms ranging from microbes to large vertebrates — binds and sequesters vast amounts of carbon at scales comparable to, and in some respects exceeding, those targeted by CCS. Unlike geological storage, these processes are self-maintaining, generate co-benefits for biodiversity and ecosystem resilience, and avoid many of the long-term liability and leakage risks associated with offshore CCS. Despite this, marine living resources continue to be managed under the law of the sea according to principles of optimum utilisation and Maximum Sustainable Yield (MSY). This paper argues that promoting biological carbon sequestration represents a more effective and potentially more cost-efficient climate-mitigation pathway than expanding offshore CCS infrastructure, and develops the case for complementing MSY with Maximum Climate Mitigation (MCM) as a guiding objective for marine governance. While the BBNJ Agreement does not establish carbon sequestration as a central objective, its implementation provides a critical opportunity to prioritise ecosystem-based climate mitigation.

Note *Niels Krabbe is a researcher in ocean governance law at the Department of Law, School of Business, Economics and Law, University of Gothenburg, where he is course director for Law of the Sea and Environmental Law. He served as Deputy Director at the Department for International Law, Human Rights and Treaty Law of the Swedish Ministry for Foreign Affairs, where he was part of the Swedish delegation in the final negotiations of the BBNJ Agreement and co-chaired the EU working party on the law of the sea (COMAR). His research addresses biodiversity, climate, and natural resources in the law of the sea and international environmental law.*

In Search of Effective Legal Solutions for CCS: Quo Vadis, Polish Legislator?

Michał Krzykowski & Bartosz Prusik

University of Warmia and Mazury in Olsztyn, Poland

Despite possessing one of Europe's largest carbon-dioxide storage capacities, estimated at 12 to 15 gigatonnes, Poland has historically struggled to establish a functional Carbon Capture and Storage (CCS) sector. For over a decade, national regulations remained practically dormant, strictly limiting CCS exclusively to demonstration projects and prohibiting commercial utilisation. Consequently, by 2024, not a single entity had applied for a licence to transmit or store CO_2.

However, recent shifts in European energy policy, driven by the European Green Deal and the Net Zero Industry Act (NZIA), have catalysed a legislative awakening. The pivotal 2024 amendment to the Polish Geological and Mining Law Act finally abolished the demonstration-only restriction, enabling commercial deployment. Furthermore, it introduced regulatory exemptions for small-scale storage (under 100 kilotonnes) and streamlined administrative procedures by replacing rigid concession requirements with less formal geological-works approvals. Crucially, this legal evolution aligns with the progressive integration of CCS technologies into Poland's overarching energy policy and national decarbonisation strategies. The active planning of cross-border infrastructure, such as the ECO2CEE Project of Common Interest featuring a CO_2 export–import terminal, demonstrates a clear strategic commitment to decarbonising hard-to-abate industrial sectors. This paper critically examines whether these recent legislative changes are sufficient to stimulate robust CCS development.

Note *Michał Krzykowski is Professor of Law at the University of Warmia and Mazury in Olsztyn, specialising in energy law, Polish and EU regulatory frameworks, and sustainability. Bartosz Prusik is a doctoral researcher at the same institution, working on legal solutions for CCS deployment and on cross-border energy infrastructure.*

Challenges for the Insurance Market in the Logistics Chain of Projects for Offshore CCS

Albina Ladynenko

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The development of offshore carbon capture and storage (CCS) projects — from the beginning of the logistics chain in the port, through maritime transport — poses significant legal and regulatory complexities, particularly with regard to the allocation and insurability of environmental and operational risks among all operators involved. Traditional marine and energy insurance regimes may not fully accommodate the specific characteristics of long-term CO_2 storage, its temporary storage in ports, and its maritime transport between facilities.

This presentation aims to examine the challenges that the insurance market faces in addressing these emerging needs, and the gaps that still exist in both coverage and regulation as a mechanism for risk transfer that safeguards the economic viability of the business in the event of unforeseen loss within the framework of global offshore CCS projects. It also considers the responses and adaptations required in the branches of construction and installation insurance, civil liability, environmental and post-operational long-term liability coverage, as well as the guarantees and mechanisms necessary to ensure adequate risk transfer and financial security throughout the lifecycle of storage sites — particularly for those risks extending beyond the time horizons of insurers. The study forms part of the project "Insurance Law and Climate Change" at the Faculty of Legal Sciences, Universitat Rovira i Virgili, and an Industrial Doctorate conducted jointly with the Port Authority of Tarragona.

Note *Albina Ladynenko is an Industrial PhD researcher at the Department of Private, Procedural and Financial Law, Universitat Rovira i Virgili. In 2025 she was awarded an Industrial PhD scholarship for a joint research project with the Port Authority of Tarragona on risk analysis in port operations and coordination of insurance coverage. She holds a Master's in International Legal Relations from the National University "Odesa Law Academy".*

Marine CCS and Basaltic Rocks: Inaccessibility and Promises

Clément Lasselin

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There are a growing number of Carbon Capture and Storage (CCS) projects involving carbon storage in the seas, oceans, and other hydrological systems — hereafter "marine CCS" — either in the water itself or in underlying geological formations. Among these projects are those of in situ carbon storage in mafic and ultramafic lithologies, particularly basalt. An expanding body of research has indeed emphasised the feasibility of carbon storage in basaltic lithologies, as it could produce stable carbonate minerals and imply long-term, potentially permanent storage. Marine CCS in seabed basaltic rocks would provide advantages compared to onshore or ex situ alternatives, including broader resource availability, elimination of surface extraction, and greater separation from habitations.

However, geological formations are by definition subsurface and therefore difficult to access. Hence, it is also difficult to generate detailed knowledge of how specific formations may respond to CO_2 injection. This means that knowledge of geological carbon-storage projects tends to concentrate among specialised experts, which may hinder informed participation by local communities. Such access difficulties are compounded when target geological formations lie beneath hydrological systems. The objective of this paper is to explore how promises related to marine CCS in basaltic rocks are shaped by — and, in turn, shape — the epistemic context of projects, drawing on cases of research and industrial projects, and to consider the modalities of public regulation appropriate to marine basaltic storage.

Note *Clément Lasselin is a postdoctoral researcher at Lund University working on the science and politics of geological carbon storage from an epistemological and sustainability-science perspective. He recently completed a thesis on the governance of bioenergy in the European Union from the same standpoint, and is broadly interested in the ethical and epistemic conditions of low-carbon technologies.*

Governing CO_2 in Shipping: Strengthening the IMO–UNCLOS Framework in Light of the ITLOS Advisory Opinion on Climate Change and International Law

Simone Mamini

City St George's, University of London, United Kingdom

The rapid emergence of CO_2 ship transport and sub-seabed sequestration as essential components of global decarbonisation strategies exposes significant regulatory gaps in international law. As offshore storage becomes indispensable and CO_2 shipping expands across borders, unresolved questions of liability, marine environmental protection, and jurisdiction highlight the inadequacy of the current fragmented framework, which relies on the London Protocol, UNCLOS, and MARPOL. Addressing these challenges requires not only technical and economic arrangements, but above all a coherent and legally binding international architecture capable of governing CCS activities at sea.

It is argued that the strengthening of the IMO's GHG framework, grounded in a harmonised interpretation of UNCLOS and MARPOL, is a prerequisite for the safe, effective, and equitable development of CO_2 transport and offshore storage. The recent ITLOS Advisory Opinion on Climate Change provides a pivotal legal foundation: by confirming that anthropogenic GHG emissions constitute marine pollution under UNCLOS, the Tribunal activates binding obligations on States to prevent, reduce, and control such emissions and to cooperate in developing necessary international rules and standards. Building on this jurisprudential guidance, the paper demonstrates that the current reliance on economic instruments within the IMO GHG Strategy alone cannot support the CCS sector. A unified legal framework, integrating ITLOS-informed obligations into the IMO regulatory process, represents the most credible pathway to govern both CO_2 shipping and maritime decarbonisation.

Note *Simone Mamini is a doctoral candidate in International Environmental and Maritime Law at City St George's, University of London, with an LL.M. in Maritime Law (City) and a Master's in Law (University of Genoa). He completed an IMO Internship on the IMO GHG Strategy and is a Visiting Lecturer in Maritime and International Law at City.*

Climate Litigation, Due Diligence Obligations, and Public Interest Concerns in CCS Projects under the Paris Agreement

Rosa Manzo

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The rapid expansion of climate litigation has significantly influenced the interpretation and enforcement of international climate obligations. In particular, courts and quasi-judicial bodies are increasingly engaging with the normative implications of the Paris Agreement when assessing States' duties of conduct in relation to climate-mitigation strategies. This paper examines how recent decisions by international and regional courts contribute to the evolving understanding of climate-related due-diligence obligations, with a specific focus on carbon capture and storage (CCS) projects.

The central research question is whether, and to what extent, international adjudicatory practice is reshaping the legal standards applicable to CCS projects by embedding public-interest considerations, human-rights protection, and precautionary reasoning into the assessment of State responsibility. The paper argues that recent case law reflects a shift towards a more substantive conception of due diligence, requiring States not merely to adopt formal regulatory frameworks but to actively evaluate the long-term compatibility of CCS projects with the objectives of the Paris Agreement. Drawing on selected international and regional decisions, the analysis highlights three emerging trends: courts increasingly frame climate obligations as dynamic and context-dependent, due diligence is interpreted as encompassing robust risk assessment and lifecycle monitoring, and public-interest concerns — environmental integrity, intergenerational equity, and human-rights protection — are becoming central to judicial scrutiny of climate-mitigation technologies.

Note *Rosa Manzo is a researcher in environmental and climate law affiliated with the University of Bergen (COAST Project). She holds a PhD in law from Norway and works on international environmental law, climate justice, human rights, and State responsibility, with a particular interest in due-diligence obligations and accountability in climate-mitigation policies.*

Regulation of Cross-Border Carbon Transport & Storage: Legal Issues in Enabling Multi-State CCS Projects in the North Sea Carbon Basin

Michael J. T. McElhinney

University of Bergen — NorthCarb Project, Norway

This part of the doctoral project, presented at the conference, focuses on transboundary storage, its legal definition in different scenarios, applicable instruments, and regulatory pathways for management in the North Sea. Two principal questions are addressed. First, how to define transboundary storage and the legal considerations: the analysis seeks to determine the extent to which the law should encapsulate different CCS operations under definitions of this novel concept. Second, how cross-border governing agreements for storage can be formulated, drawing comparisons with existing unitisation agreements for straddling oil and gas fields in the North Sea. This involves an assessment of the suitability of those instruments for the different scenarios and the extent to which unitisation agreements would need to be altered to regulate transboundary carbon-storage projects.

In analysis, consideration is given to issues of carbon-plume migration and pressure propagation, and their effects on both leakage risk and capacity limitations in a shared reservoir. These are key in assessing how to uphold legal duties of transboundary cooperation and equitable utilisation of shared resources. The presentation also considers liability in transboundary storage projects from both private and public perspectives.

Note *Michael J. T. McElhinney is a doctoral candidate at the Faculty of Law, University of Bergen, working on the NorthCarb project — the North Sea Carbon Basin: governance for transporting, storing, and building CCS infrastructure in the climate transition. He holds an LL.B. from the University of Glasgow and an LL.M. from the Nordic Master's Programme in Environmental Law (NOMPEL).*

A Shield or a Double-Edged Sword? An Environmental and Social Justice Appraisal of Offshore Carbon Capture and Storage

Howard Mwesigwa

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Carbon Capture and Storage (CCS) has emerged as a revolutionary technological proposition in global decarbonisation pathways, particularly in the context of hard-to-abate sectors. Increasingly, attention has turned to the deployment of CCS in offshore and marine environments, framed by proponents as a climate-mitigation "shield" with the potency to reconcile continued industrial activity with net-zero ambitions. Yet the expansion of CCS at sea raises profound environmental and social-justice concerns that remain under-interrogated within international environmental-law and policy discourse. This article critically appraises the deployment of offshore CCS through an environmental and social-justice lens.

It situates offshore CCS within the evolving international legal architecture governing the marine environment, including UNCLOS, the London Protocol, and emerging climate-governance norms. The paper interrogates whether existing regulatory frameworks adequately address long-term socio-ecological risks, transboundary harm, liability gaps, and the cumulative impacts of sub-seabed carbon storage. Beyond environmental risk, the article foregrounds questions of social justice and equity. It examines how offshore CCS projects may perpetuate or exacerbate structural inequalities by externalising environmental risks to coastal communities, marginalised fishing populations, and future generations, while delivering disproportionate benefits to major emitters in the Global North. The paper concludes by proposing normative principles and governance reforms to align offshore CCS deployment with environmental integrity, social justice, and the precautionary principle.

Note *Howard Mwesigwa is a Chevening Scholar and LL.M. candidate in Global Environment and Climate Change Law at the University of Edinburgh and an Earth Fellow at the Edinburgh Earth Initiative. He has served as the inaugural Chairperson of the EU Youth Sounding Board – Uganda, National Coordinator for the GCF-funded Parliamentarians for Climate Finance Project, and Speaker of the National Environment Parliament Uganda.*

International Subject Matter Experts Impact European Legal Framework for CCS Through Technical Standardisation

Ingvild Ombudstvedt

IOM Law, Norway

Technical standards are privately developed and owned documents, which are voluntary to use and have no direct link to legal frameworks. That said, industries such as oil and gas have a long tradition of technical standards being referenced in legal frameworks, relying on industry best practices rather than technical specifications embedded directly in regulations. For CCS, a similar trend is emerging. Since 2011, the International Organization for Standardization has developed technical standards for CCS under technical committee (TC) 265, several of which are already referenced in legal frameworks and permitting procedures globally. In Norway, for example, the ISO/TC 265 standards for pipeline transportation (ISO 27913) and geological storage (ISO 27914) are referenced in the guidelines to the CO_2 Safety Regulation, advising operators to use these standards to meet safety requirements for CO_2 transport and storage operations.

In 2023, TC 474 was established under the European Committee for Standardization (CEN) to standardise CCS and CCU; it has already adopted ISO 27913 as a European standard in 2025 and is developing euro-centric standards, including CO_2 specifications for transportation. Meanwhile, the European Commission has the power to issue standardisation requests to populate frameworks, and TC 474 is likely to receive its first request in 2026, related to transportation and interoperability in Europe. This paper highlights the role of technical experts and how technical standards developed by them are used in legal frameworks for CCS, focusing on CO_2 specifications for transport and storage.

Note *Ingvild Ombudstvedt is a lawyer and economist and the CEO of IOM Law, with nearly fifteen years of experience in CCUS and petroleum law globally. She heads the Norwegian delegation to ISO/TC 265 and CEN/TC 474. She holds a Master of Laws from the University of Oslo and an LL.M. from Lewis & Clark Law School (Portland, Oregon).*

Lessons from Norway's First-Mover CCS Projects: Regulatory Insights

Lena Østgaard

IOM Law, Norway

Carbon Capture and Storage (CCS) is a key enabler for reaching our climate goals. Today, industry is waiting for clearer regulatory guidance, while regulators depend on industry input and project development to inform the framework, ensuring that it is fit for purpose. This circular dependency risks slowing progress.

The presentation explores how industry and regulators work together to develop effective frameworks, emphasising the importance of a learning-by-doing approach. It illustrates this by examining three offshore Norwegian examples — Sleipner, Snøhvit, and Northern Lights. These first-mover projects have played a crucial role in helping both regulators and industry identify gaps and barriers across the CCS value chain and have directly influenced updates to Norway's CCS regulatory framework, currently under development. The Norwegian Sleipner and Snøhvit projects further informed the EU's drafting process for the 2009 CCS Directive. While Sleipner and Snøhvit serve to reduce and store CO_2 from petroleum production in Norway, Longship intends to receive CO_2 from a wide range of European emitters in addition to national emissions from land-based industry; it has therefore tested not only national frameworks but also contributed to developments under the London Protocol enabling cross-border value chains. The aim of the presentation is to show that projects can begin even when the regulatory framework is not yet fully mature, to illustrate how frameworks need to be tested on real-world projects to become fit for purpose, and to highlight key cross-jurisdictional learnings.

Note *Lena Østgaard is Senior Legal Advisor at IOM Law, specialising in the energy transition with particular expertise in decarbonisation technologies. She has a strong record of conducting gap analyses across multiple jurisdictions to support effective CCUS regulatory frameworks, and is a globally recognised expert on the London Protocol. She is appointed National Expert for Norway to ISO/TC 265 and Technical Expert for Working Group 7 on CO_2 Transport by Ship. She holds a Bachelor of Laws and an LL.M. in Public International Law from the United Kingdom.*

Purpose Over Category: A Jheringian Diagnosis of CCS Regulation at Sea

Anıl Öztürk

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The legal life of a CO_2 molecule travelling from an emitter to a sub-seabed reservoir is, at present, divided across at least eight competing categories: emission, captured input, dumping, waste, pollutant, cargo, noxious substance, and commodity. This paper argues that the resulting fragmentation is a textbook case of what Rudolf von Jhering called Begriffsjurisprudenz — a jurisprudence of concepts severed from purpose — and that the law of the sea now requires a purposive reconstruction along the lines of his Zweckjurisprudenz, in which legal categories are tested by the ends they actually serve.

The argument unfolds in three stages. The first reads the current sub-seabed CCS regime through Jhering's satire "Im juristischen Begriffshimmel": the London Protocol's 2006 listing, the unentered 2009 export amendment, and the 2019 declaration of provisional application together construct a climate-protective activity as "dumping," yielding a regulatory architecture that struggles against its own purpose. The second stage develops the doctrinal claim that, under Article 31(1) VCLT and the purposive reasoning of the 2024 ITLOS Advisory Opinion (paras 219–223), the legal status of captured CO_2 should follow the climate-mitigation purpose of the operation rather than inherited treaty taxonomies; this resolves the apparent paradox that CO_2 is, simultaneously, a substance whose introduction is "pollution" and a "necessary measure" States must take to prevent it. The third stage answers the Hartian objection that purposive reasoning collapses into arbitrariness: Jhering disciplines concepts by function, and a purposive reading of the 2009 export amendment, the BBNJ Article 28 EIA threshold, and the BIMCO CO2TIME charter party can together carry the doctrinal weight that the existing categories cannot. The paper concludes, in the spirit of Der Kampf ums Recht, that the struggle for law in the climate transition is not passive evolution but active contestation: purpose over category.

Note *Anıl Öztürk is a postdoctoral researcher at the Faculty of Law, Lund University, working on the law of the sea, CCS governance, and the legal philosophy of climate-mitigation infrastructure. He convenes the CCS at Sea conference and contributes to the Wallenberg-funded project on offshore CCS led by colleagues at Lund and Gothenburg.*

Recalibrating Maritime Liability for Ship-Borne CCS: From Conventional Pollution Paradigms to Climate Mitigation Infrastructure

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In a first-of-its-kind move, Capital Clean Energy Carriers Corp — a globally present shipping and carrier company — announced in January 2026 the delivery of the world's first low-pressure liquid CO_2 carrier vessel labelled the Active, which has proven to be a game-changer in transporting gases sustainably through ocean-bound vessels. Hitherto, oceanic carriage liabilities found their anchor in the fragmented and assumptive structures of conventional pollution accidents rather than in sound climate-mitigation frameworks. A look at current instruments — the Convention on Limitation of Liability for Maritime Claims and the HNS Convention established by the International Maritime Organisation — shows that ship-owners have been pegged to bear the brunt of any and all liabilities almost exclusively. This makes the current legal framework maligned with a plethora of lacunae: the lack of recognition of CO_2 as a climate-mitigation substance and the absence of redress for civil liability of transboundary carbon transport under the CCS regime.

There is therefore great scope for further discussion around treating "carbon" as a climate-service input rather than a mere pollutant, the lack of differentiated liability around accidental leakage, the treatment of transboundary harm from CO_2 leakage, and the absence of adequate compensation or insurance mechanisms. The paper asks: how should the existing maritime liability regime be revised to govern ship-borne CCS operations in an environmentally protective and climate-mitigative manner? Its end goal is to treat ship-borne CO_2 transport as robust climate-mitigation infrastructure rather than a residual variant of hazardous-cargo carriage.

Note *Ashima Pury is Assistant Professor of Law at Delhi Metropolitan Education (GGSIPU, New Delhi), UGC-NET qualified and a doctoral candidate at Gujarat National Law University. Prapti Chaturvedi is a fourth-year BBA LL.B. student at Delhi Metropolitan Education with a college rank-1 record, an active member of international legal organisations and Co-Convenor of the Linkages International Collaboration Cell.*

The Importance of the Entry into Force of the HNS Convention to Regulate Liability in Seaborne Transboundary Transportation of CO_2

Morgane Querel

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The current international legal framework for the seaborne transboundary transportation of CO_2 is flawed. It fails to guarantee the protection of the marine environment. Indeed, if a maritime casualty occurs, no international regulation currently provides a mechanism to establish liability or to guarantee clean-up operations, environmental reinstatement, and victims' compensation. De facto, this role is fulfilled by the 1976 Convention on Limitation of Liability for Maritime Claims (LLMC); yet that Convention is not tailored for the transportation of CO_2. Its liability regime and compensation limit are inadequate and do not allow for a proportionate response to protect the marine environment in the event of an incident.

This better alternative exists in the 1996 International Convention on Liability and Compensation for Damage in Connection with the Carriage of Hazardous and Noxious Substances by Sea (HNS), as amended by the 2010 Protocol. While this Convention is not exclusively dedicated to the seaborne transport of CO_2, its material scope allows for a more effective liability framework in the event of casualty, governing the carriage of hazardous and noxious substances by sea — a category whose provisions are inherently better suited to address the damage that liquefied CO_2 can cause. Unfortunately, the HNS Convention is not currently in force, as the conditions required for its entry into force have not yet been met. This paper analyses those conditions and asks whether a regulatory amendment might be appropriate to facilitate entry into force without compromising the Convention's effectiveness.

Note *Morgane Querel completed her PhD at Nantes Université in 2024, at the Centre de Droit Maritime et Océanique (CDMO), with a thesis on the legal framework for the ecological transition of maritime transport, supervised by Professor Martin Ndendé. She works with D-ICE Engineering, a Nantes-based deeptech company addressing maritime decarbonisation. Her research interests cover maritime liability, IMO regulation, and the legal framing of CCS at sea.*

Due Diligence in Carbon Storage: An Appraisal of Time in the Law of the Sea

Vonintsoa Rafaly

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Time has complex and multifaceted aspects in international affairs. This is so with regard to environmental matters, for instance in addressing future environmental damage to the marine environment. Legal tools exist to address time-related matters, primarily through due diligence, the precautionary approach, and environmental impact assessment. Yet questions remain on the extent of the temporal scale within which such tools could operate.

Due diligence is core to risk management and liability for activities that pose continuous risks to the marine environment. The temporal scope of due diligence, as Besson rightly pointed out, is based on "the rights and interests to protect and the duty-bearers controlling the sources of the (risk of) harm to these rights and interests." Drawing on these two elements, this study assesses the temporal scale of due diligence in the law of the sea and its applicability to carbon-storage activities. Suppose that, at the end of the century, a carbon storage in areas beyond national jurisdiction has leaked and severely impacted marine biodiversity and the environment: how would due diligence play out to address risk management and liability? The study first reviews existing literature and State practice through adjudication to analyse the temporal scope of due diligence in the law of the sea and, to a certain degree, in environmental law, before applying its findings to century-scale risks arising from carbon storage. The paper sheds light on the relevance and scope of due diligence in addressing long-term risks to the marine environment from legitimate ocean activities and the trade-offs they entail.

Note *Vonintsoa Rafaly is a Postdoctoral Fellow at the WMU–Sasakawa Global Ocean Institute, World Maritime University. Her research rethinks ocean governance to address global environmental challenges, examining how norms, institutions, and legal processes generate distributional effects across spatial and temporal conditions. Her work has appeared in the Canadian Yearbook of International Law, the Yearbook of Polar Law, and Ocean Development and International Law.*

Balancing Climate Goals and Environmental Risks Through Strict Application of the Precautionary Principle to Carbon Sequestration in the Baltic Sea

Patrick Seroogy

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In the face of climate change, carbon capture and storage (CCS) represents a serious measure for achieving climate neutrality. Due to limited onshore capacity, countries are considering sub-seabed sequestration of CO_2 in geological formations that promise secure, long-standing storage. However, this method presents challenges for marine ecosystems — for example CO_2 leakage, sufficient long-term monitoring, and liability. CCS regulation is emerging but patchwork, and effective management of such issues lacks the needed physical and legal infrastructure.

In the Baltic Sea, coastal States have begun assessing sub-seabed sites for carbon sequestration. They are simultaneously considering redefining "dumping" under the Helsinki Convention to allow for sub-seabed sequestration, as seen in other international agreements like the London Protocol. Relative to other seas, the Baltic's unique properties — shallow depth, brackish water, hypoxic seafloor — make it particularly vulnerable to environmental pollution and degradation. From CCS operations, CO_2 leakage is one potential failure that threatens further ecological damage and consequently requires adequate regulation. This article argues that, to best balance climate goals with CCS-associated risks, any Baltic CCS project should require strict application of the precautionary principle, as the Helsinki Convention codifies. Central to this application is the establishment of cross-boundary scientific consensus that a given CCS operation does not present serious risk of environmental harm. The Helsinki Commission could oversee this process, with consensus requiring multinational agreement; absent such consensus, a CCS operation, including sub-seabed sequestration, shall not proceed.

Note *Patrick Seroogy holds a J.D. with an Energy Law concentration from The George Washington University Law School (2025) and a B.A., summa cum laude, from The Ohio State University in Economics and Political Science. He works as an Environmental, Health, Safety and Sustainability regulatory consultant at Enhesa and has held research appointments at the Administrative Conference of the United States and the U.S. Department of Commerce.*

After the Pilot: Building Governance and Public Trust in Cross-Border Carbon Storage

Cody Skahan

University of Oxford, United Kingdom

Carbfix's proposed Coda Terminal is a novel cross-border carbon-capture and storage (CCS) project that aims to import up to three million tonnes of CO_2 annually to Iceland for onshore mineral storage. Although a distinct project, perceptions of the now-defunct Running Tide project — a marine carbon-dioxide-removal startup that aimed to sequester carbon in the ocean through ocean alkalinity enhancement and algae production — have affected the regulatory and political environment for CCS projects like Coda. Both Carbfix and Running Tide were first-of-their-kind projects in Iceland, requiring the development of bespoke regulatory and permitting frameworks.

Carbfix has played a key role in fostering the development of cross-border CO_2 transport and the place of mineralisation in EU ETS schemes, but proper governance and policy mechanisms for Iceland to utilise CCUS to help contribute to its greenhouse-gas-emission-reduction targets are lacking. These oversights are worrisome given that Running Tide has been widely perceived as circumventing regulatory requirements — an approach that ultimately backfired and damaged confidence in offshore and transboundary CCS/CDR initiatives among critical experts, politicians, and the public. Drawing on anthropological fieldwork conducted in Iceland and abroad with regulators, policymakers, and other actors involved in cross-border carbon transport and storage at sea, this paper examines how these two projects have shaped perceptions of environmental governance and political integrity in emerging CCS and CDR regimes. It argues that positive public attitude — alongside formal regulatory compliance — is critical for securing social licence and policy continuity.

Note *Cody Skahan is a doctoral researcher in anthropology at the University of Oxford, focusing on the governance, political economy, and public engagement of CCS and CDR. He holds an MA with honours in Anthropology from the University of Iceland and is Principal Investigator of the UK ARIA-funded project Exploring Climate Cooling (2025–2029) on governance and public engagement around CCS, CDR, and other climate interventions.*

Emerging Regulatory Strategies Across the North Atlantic for Carbon Capture and Storage Technology Deployment: Critical Lessons for Emerging Economies

Daopu Somoni

University of Aberdeen, United Kingdom

Carbon Capture and Storage (CCS) technology is one of the solutions identified and being deployed to address decarbonisation of CO_2 emissions in the energy-transition process. The technology is presently predominantly deployed in advanced economies such as Norway, Canada, Australia, the United Kingdom, and the United States. Similar efforts are also being advanced in emerging jurisdictions such as South Africa and Nigeria. What are the emerging regulatory and deployment strategies in the above advanced jurisdictions, and how are they relevant to the sustainable deployment of CCS in emerging economies and to the overall success of global decarbonisation efforts?

An examination of the above advanced economies reveals the adoption of the following regulatory strategies: a "value chain regulatory strategy," a "whole-of-government regulatory strategy," and multi-tier (governance) strategy (predominant in federal systems of government). All these strategies are embedded in an overarching "command-partnership" regulatory approach. Therefore, given that emerging economies are developing CCS-deployment policies and regulatory frameworks, verifiable lessons from CCS regulatory strategies in the above jurisdictions are relevant in deepening and expanding seamless global CCS deployment.

Note *Daopu Somoni is Barrister and Solicitor of the Supreme Court of Nigeria and a doctoral candidate at the School of Law, University of Aberdeen. He holds an LL.M. in Oil and Gas Law from Aberdeen and is a member of the African Natural Resources and Energy Law Network (ANREL), the Nigerian Bar Association, the Nigerian Gas Association, and the Energy Institute (UK).*

Transboundary Maritime Transport of CO_2: Regulatory Vacuum and Legal Fragmentation

Rekhil Sukesan

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The accelerated deployment of Carbon Capture and Storage (CCS) as a climate-mitigation strategy has elevated maritime transportation of liquefied carbon dioxide (CO_2) into a critical enabler of transboundary access to offshore sequestration sites. While ship-based CO_2 transport offers operational flexibility and circumvents the geographical and political constraints of pipeline infrastructure, it simultaneously exposes profound legal, environmental, and governance challenges that remain insufficiently resolved within existing international regulatory frameworks.

This paper critically interrogates the legal and environmental risks associated with the transboundary shipment of captured CO_2 by sea, focusing on three interrelated problem areas: the contested legal classification of CO_2 as cargo or waste, the applicability and scope of marine-dumping prohibitions, and the attribution of liability for leakage during carriage, transhipment, or incidental discharge. Central to the analysis is the IMO's London Protocol, particularly Article 6 and its 2009 amendment operationalised through the 2019 resolution, which conditionally permits the export of CO_2 streams for sub-seabed sequestration. Through a doctrinal analysis of international treaty law, supplemented by comparative regulatory assessment and an industry-informed examination of maritime operational practices, the study evaluates the interaction between the London Protocol, UNCLOS, MARPOL, and emerging regional CCS frameworks including EU directives, identifying significant lacunae relating to environmental impact assessment, emergency preparedness, long-term monitoring, and post-injection liability. Without regulatory harmonisation, clearer waste-classification standards, and bespoke liability mechanisms, transboundary CO_2 shipping risks undermining both marine environmental protection and the legal certainty necessary for the scalable deployment of offshore CCS.

Note *Rekhil Sukesan is a maritime and commercial-law professional currently associated with Global Feeder Shipping in Dubai, where he handles maritime claims, contracts, regulatory compliance, and decarbonisation initiatives. He holds an LL.M. in International Commercial and Maritime Law from Swansea University, with distinction, and a B.Com. LL.B. from the Cochin University of Science and Technology, India.*

Implications of Justice on the Evolving Law Governing Carbon Sequestration at Sea

Amanda Wee

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Governance of carbon sequestration at sea remains deficient and fragmented despite its increasing potential as a tool to mitigate climate change by permanently locking away large amounts of carbon dioxide at sea. This paper argues that existing problems with the law emanate from the lack of firm undergirding principles in the governance of carbon sequestration at sea. As such, principles of justice should be incorporated into the legal framework governing carbon sequestration at sea, as it will illuminate the gaps in existing law and guide the law to evolve and be applied in a just and equitable manner, considering the circumstances of developing States and the reliance of vulnerable communities and small island developing States on the oceans.

Such principles of justice include fairness, intergenerational equity and obligations owed to future generations, recognition of the marginalisation of developing or vulnerable States, ecological responsibility, ethics, and distributive justice. In using these principles, the issues of unequal distribution of risks and benefits among States and generations, transboundary pollution, uncertain application of laws, uncertain long-term liability, compensation, and protection of the marine environment in the London Convention and its 1996 Protocol are highlighted. These principles will provide the basis in this paper for examining the laws and reforms that must be implemented into the legal framework, and for ensuring that gaps and issues in the present law are well addressed. Instead of taking a reactionary approach to current deficiencies in the law, a principled deliberation of the law governing carbon sequestration at sea, rooted in justice, will promote the fair distribution of burdens and benefits and robustly engage with the long-term trajectory and uncertain risks of carbon sequestration at sea.

Note *Amanda Wee is a Research Assistant in the Ocean Law and Policy Programme at the Centre for International Law, National University of Singapore, under the MPA-CIL Ocean Governance Research Programme funded by the Singapore Maritime Institute, supervised by Dr Tara Davenport and Emeritus Professor Robert Beckman. She graduated with an LL.B. from NUS in 2024 and was admitted to the Supreme Court of Singapore in 2025.*

Carbon Storage: Work Towards Simplification of Rules

Henrik von Zweigbergk & Anna Månsson

Geological Survey of Sweden (SGU), Sweden

The Geological Survey of Sweden has a governmental assignment on investigating the possibilities for simplification of rules regarding carbon storage. The purpose in the long term is to lessen the administrative burden, facilitate permitting, and accelerate the permitting processes regarding carbon storage. There has been an interim report in November 2025; a further interim report will follow in November 2026 and a final report in November 2027. The goal is to present relevant measures for simplification of rules regarding carbon storage.

So far in the project there has been an analysis of barriers to carbon storage presented in the first interim report. This list of barriers will be the ground for further analysis and work toward presenting measures for simplification, which would yield both short- and long-term effects for companies interested in carbon storage. Examples of areas for further analysis are how to give carbon storage a stronger planning and national legal interest, how to increase knowledge about carbon storage, and how to effectively coordinate administrative processes and permit reviews. Legal barriers under examination include the dumping prohibition in the Helsinki Convention, the ban in the CCS Directive on storing outside the EU, and the ban in Swedish regulation on storing on land. The conclusion of SGU is that the main barrier is a combination of unclear regulation, knowledge gaps, and institutional challenges, and that a national goal and strategy for CCS is missing.

Note *Henrik von Zweigbergk and Anna Månsson are lawyers at the Geological Survey of Sweden (SGU) working on environmental law and the simplification of rules for carbon storage. Henrik previously worked at the County Administrative Board of Jönköping; Anna previously worked at RISE and at the County Administrative Board of Skåne, where she chaired the Environmental Review Delegation, and served as Inquiry Secretary in Government Commission Inquiries on offshore wind and the environmental permitting process.*

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