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Tracking Compliance, Progress and Perspectives on the CO_2 Injection Capacity Obligation in the EU

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About this report

This report is the first annual state-of-play publication produced under Article 23 Watch, a joint project of the Carbon Balance Initiative, Clean Air Task Force, and Bellona Europa. It provides an evidence-based overview of the implementation of Article 23 of the Net Zero Industry Act (NZIA), focusing on progress by obligated entities and Member States, as well as emerging regulatory and legal developments.

Article 23 Watch aims to strengthen transparency and accountability in the implementation of Article 23, which establishes a first-of-a-kind obligation on oil and gas producers in the European Union to ensure the development of CO_2 injection capacity. By tracking developments across industry, Member States, and EU institutions, we seek to support policymaking and facilitate constructive engagement as the obligation moves from adoption to implementation. Visit us at www.article23watch.eu

Acknowledgements

We extend our sincere gratitude to the interview participants from across civil society, technical experts, industry, regulators and policymakers.

Disclaimer

The views expressed in this paper solely represent those of the authors and do not represent those of the University of Oxford, or any other associated institutions or individuals.

This report was revised on 23 April 2026 to correct errors identified in Chapter 4 relating to Progress by Obligated Entity and to address incomplete data in Chapter 5 relating to Member States. Specifically, amendments were made to the reported litigation status of two entities (MOL and Ineos), which had been incorrectly described as being involved in ongoing litigation concerning their carbon storage obligations on Table 3 (page 21). In addition, previously missing data for Romania in Table 9 (page 30) has now been included. All relevant information has been updated accordingly

Executive summary

Article 23 of the Net Zero Industry Act (NZIA) introduces a novel regulatory obligation requiring oil and gas producers operating in the European Union to contribute to the development of 50 $MtCO_2$ per year of injection capacity by 2030. This report provides the first annual state-of-play assessment of the implementation of Article 23 through the Article 23 Watch Initiative, a joint project by Carbon Balance Initiative, Bellona Europa, and Clean Air Task Force. The report examines progress by obligated entities and Member States, complemented by stakeholder perspectives and emerging litigation developments.

Overall, the analysis suggests that Article 23 is already influencing storage project development and policy planning across Europe. However, achieving the Union-wide target will depend on addressing regulatory uncertainties, strengthening Member State implementation, and accelerating the development of the broader CCS value chain.

Key insights

The analysis of project development indicates substantial momentum in CO_2 storage development in the EU, although progress remains uneven across the 44 obligated oil and gas entities. Based on current announced projects, the EU could reach approximately 43 $MtCO_2$ per year of injection capacity by 2030, with the 50 $MtCO_2$ target potentially reached closer to 2032 if projects are expanded and proceed as planned. A small group of companies is currently on track to meet their obligations through existing projects, while others face significant shortfalls relative to their targets. The Regulation allows obligated entities to fulfil their obligations through agreements with other storage developers, which could help close part of the gap between current project plans and the Union-wide target.

The effectiveness of Article 23 will also depend on Member State implementation, particularly in areas such as permitting, regulatory coordination, infrastructure planning, and enforcement. The analysis shows significant variation across Member States. Some countries have established regulatory frameworks, geological data access, and administrative structures that facilitate storage development. Others remain at earlier stages of implementation, lacking key elements such as designated single points of contact, centralised permitting portals, or clearly defined accelerated permitting timelines. As Member States play a central enabling role under the NZIA, these gaps risk slowing the deployment of CO_2 injection capacity.

Progress on penalty regimes required under Article 23 remains particularly limited. Member States hosting obligated entities must introduce effective, proportionate, and dissuasive penalties by 30 June 2026 to ensure compliance with the obligation, yet only a small number have begun developing such frameworks.

Stakeholder interviews suggest broad support for the underlying rationale of Article 23 as a mechanism to break the long-standing deadlock in CCS deployment. Many interviewees described the regulation as an

important policy signal capable of catalysing investment and accelerating storage development. At the same time, stakeholders raised concerns regarding regulatory clarity, timeline feasibility, and the need for full value chain coordination.

In October 2025, 12 obligated oil and gas companies initiated legal actions before the General Court of the Court of Justice of the EU challenging aspects of Article 23 and related implementing measures. The cases focus primarily on questions of procedural transparency, proportionality, and the methodology used to allocate individual targets. While litigation is ongoing, the legal challenge does not suspend the obligation, and companies remain required to continue making progress toward their targets.

Looking ahead

The analysis in this report suggests that Article 23 is already shaping market behaviour, regulatory planning, and investment decisions in Europe's emerging CCS sector. However, the coming years will be critical in determining whether the regulation successfully catalyses the scale of storage development required to support European decarbonisation goals. To support effective implementation, several priorities emerge from the report:

1. **Greater regulatory clarity at EU level will be essential.** Stakeholders highlighted uncertainty around how compliance will be assessed, what constitutes sufficient progress toward targets, and how delays will be treated in practice. Clearer guidance from the European Commission on these issues, including the type of agreements with third-party storage developers that could count towards compliance under Article 23(5), would help reduce uncertainty.
2. **Member States will need to strengthen enforcement frameworks.** The introduction of effective, proportionate, and dissuasive penalties by the 11 Member States hosting obligated entities will be critical to ensuring the credibility of the obligation. Guidance from the Commission on penalty design could help promote greater consistency across national penalty regimes, thereby helping to maintain a level playing field in the Union.
3. **Stronger enabling conditions for storage development will be required.** Member States can support deployment by improving access to geological data, introducing single points of contact, strengthening and expediting permitting systems, and ensuring that regulatory authorities have sufficient administrative capacity.

Developments in neighbouring jurisdictions may also influence the trajectory of the mechanism. Following a recent ruling by the EFTA Court clarifying the scope of the European Economic Area Agreement,[15] Norway may incorporate the Net Zero Industry Act, which would require the expansion of the storage injection capacity target and strengthening cross-border coordination in the North Sea.

Overall, Article 23 represents a significant step towards establishing a functioning CO_2 storage market in Europe. While implementation challenges remain, the regulation has already begun to generate momentum across industry and government. Continued coordination between the European Commission, Member States, and industry will now be essential to translate this momentum into large-scale CCS deployment in the coming decade.

Abbreviations

BECCS	Bioenergy with carbon capture and storage
CAPEX	Capital expenditure
CCfDs	Carbon contracts for difference
CCS	Carbon capture and storage
CCU	Carbon capture and utilisation
CJEU	Court of Justice of the European Union
CO_2	Carbon dioxide
DACCS	Direct air carbon capture and storage
EEA	European Economic Area
ETS	Emissions Trading System
EU	European Union
FID	Final investment decision
Mtpa	Megatonnes per annum
NZIA	Net Zero Industry Act
RVO	Netherlands Enterprise Agency
SPOC	Single Point of Contact
TFEU	Treaty on the Functioning of the European Union

1. Introduction

It is widely recognised that stabilising global temperatures requires both deep and rapid emissions reductions and balancing any remaining CO_2 emissions from fossil fuel use and industrial processes with permanent storage. Across most mitigation pathways consistent with limiting warming to 1.5°C or well below 2°C, remaining fossil and process emissions are balanced by geological-timescale storage of CO_2, a state described as geological net zero[1]. In these pathways, carbon capture and storage (CCS) plays a central role, both by capturing CO_2 directly from point sources as an emission reduction and by enabling net-negative emissions through technologies such as bioenergy with carbon capture and storage (BECCS) and direct air capture with storage (DACCS). While deployment levels vary across models and assumptions, CCS features consistently in global and regional cost-effective mitigation pathways.[2]

At the European Union (EU) level, decarbonisation pathways aligned with the EU's climate neutrality objective for 2050 similarly identify CCS as a necessary component of the transition. Electrification, renewable energy deployment, and energy efficiency improvements are expected to deliver the majority of emissions reductions; however, several industrial sectors, including but not limited to cement and lime, produce process emissions that are inherently difficult to eliminate through these measures alone. In such sectors, CCS remains one of the few technically viable options for reducing emissions. At the same time, the literature is clear that CCS is not a substitute for rapid emissions reductions elsewhere, but a complementary measure.

Despite its established role in EU decarbonisation pathways, CCS deployment to date has been limited. As of 2025, there are no full-scale capture and storage projects operational within the European Union. Although 2024-2025 marked progress, with ten capture, transport, and storage projects reaching final investment decisions in the EU and neighbouring countries,[3] the pace of deployment remains misaligned with the scale and timing required by pathways to climate neutrality by 2050.

In response, the EU has adopted a series of legislative initiatives aimed at accelerating industrial decarbonisation and strengthening the Union's net zero technology base. Among these, the Net Zero Industry Act (NZIA), adopted in 2024, establishes a regulatory framework to support the scale-up of technologies considered essential for achieving climate neutrality by 2050, including CCS. The Regulation introduces new planning, coordination, and permitting measures intended to address structural barriers to deployment, operating alongside the EU's broader climate, energy, and industrial policy framework.

Within the framework, Article 23 of the NZIA represents a significant shift in the EU's approach to CO_2 storage development.[4] Until now, progress in building geological storage has relied on the price pressure from the EU's emission trading scheme. While many stakeholders, including oil and gas producers, have publicly recognised the importance of CCS, private investment has remained limited. This reflects a persistent market failure: emitters are reluctant to invest in capture without confidence that transport and storage

infrastructure will be available, while prospective storage operators are unwilling to develop injection capacity without clear and predictable demand. This coordination challenge is often named the 'CCS paradox'.

Article 23 is designed to address this 'paradox' by introducing a mandatory injection capacity obligation on oil and gas producers, as these companies hold the relevant subsurface expertise, financial capacity, and a historic role in fossil fuel production within the Union. By requiring these entities to contribute to the development of CO_2 injection capacity, the Regulation sets a new precedent by shifting responsibility for early market creation towards oil and gas producers through binding legal obligations enforced by Member States.

With the Regulation having entered into force in mid-2024, and the obligated entities and their respective contributions identified in 2025, Article 23 has moved from adoption to implementation. This transition marks a critical phase for the credibility and effectiveness of the obligation, as enforcement arrangements are developed and early compliance decisions are made. This report examines how Article 23 is being implemented in practice, tracking early progress, identifying emerging challenges, and assessing how effectively the obligation is driving the deployment of CO_2 injection capacity across the EU.

Report structure

The report is structured as follows. **Chapter 2** introduces Article 23 within the Net Zero Industry Act, outlining the relevant legislative provisions, associated Delegated Acts, the roles of the EU and Member States, and the timeline for implementation. **Chapter 3** sets out the analytical framework underpinning the report. **Chapter 4** examines the implementation progress by obligated entities, while **Chapter 5** assesses progress at the Member State level. **Chapter 6** presents insights from stakeholders, highlighting areas of support as well as perceived challenges. **Chapter 7** provides an overview of two emerging issues shaping the next phase of implementation: ongoing litigation by a group of obligated entities against the European Commission, and forthcoming Member State decisions on penalties for non-compliance. **Chapter 8** concludes with reflections on early implementation and identifies key developments to watch in the period 2026-2027.

2. Article 23 in a nutshell

This Chapter provides a concise overview of the core elements of Article 23 of the Net Zero Industry Act. Further detail is available in the Article 23 Explainer and Article 23 Frequently Asked Questions, published on the project website.[i]

Article 20 of the NZIA sets a Union-wide target of at least 50 million tonnes per year (Mtpa) of CO_2 injection capacity by 2030. Article 23 operationalises this by placing a corresponding obligation on oil and gas producers registered in EU Member States. The individual contributions of oil and gas producers are specified through secondary legislation. In May 2025, the European Commission adopted a Decision specifying the pro-rata contributions of oil and gas producers to the Union's target, based on production data for the period 2020 to 2023.

The Decision identified 44 oil and gas producers (termed obligated entities), representing approximately 95% of the EU's crude oil and natural gas production during the reference period (**Figure 1**). The secondary legislation also specifies exclusion criteria for smaller producers, reflecting a priority to only obligate actors with sufficient production scale and capacity.

For the purpose of the NZIA, CO_2 injection capacity refers to the annual volume of CO_2 that can be injected into an operational geological storage site, expressed in tonnes per year. The obligation concerns capacity, not the physical amount of CO_2 injected in any given year.

Responsibilities of obligated entities

Obligated entities are responsible for developing sufficient injection capacity to meet their respective shares of the EU-wide target. They may fulfil their obligation through one or more non-mutually exclusive approaches:

- investing in or developing CO_2 injection capacity individually or jointly with other entities;
- entering into agreements with other obligated entities; or
- contracting third-party developers or investors.

Only injection capacity developed at storage sites permitted under the CO_2 Storage Directive 2009/31 counts towards compliance. Eligible sites must be located on EU territory, including onshore areas, territorial waters, exclusive economic zones, and the continental shelf. Storage sites must comply with EU safety and environmental standards and be designed to operate for a minimum of five years. Additional jurisdictions within the European Economic Area (EEA) may adopt equivalent provisions to the NZIA, which would allow CO_2 injection capacity developed in those jurisdictions to count

i. Read more on the website for Article 23: www.article23watch.eu

toward the cumulative targets and would trigger a proportional upward adjustment of the EU-wide 50 $MtCO_2$ annual target.

Each of the 44 entities obligated had to submit (non-public) delivery plans to the Commission by 30 June 2025, specifying the volume of injection capacity they intend to deliver and the interim milestones to achieve it. From 30 June 2026 onwards, obligated entities must submit annual progress reports, which will be made public.

Exemptions

The NZIA allows for flexibility in two specific circumstances. First, where a Member State already has storage projects with final investment decisions that collectively provide more annual injection capacity than required by the obligated entities under its jurisdiction, the Member State may request a partial exemption from the obligation already covered by those projects. Second, where there is a significant mismatch between expected demand for injection capacity and the availability of CO_2 transport infrastructure planned to be operational by 2030, Member States with obligated entities registered on their territory may exceptionally request an extension of the deadline for the individual obligated entities.

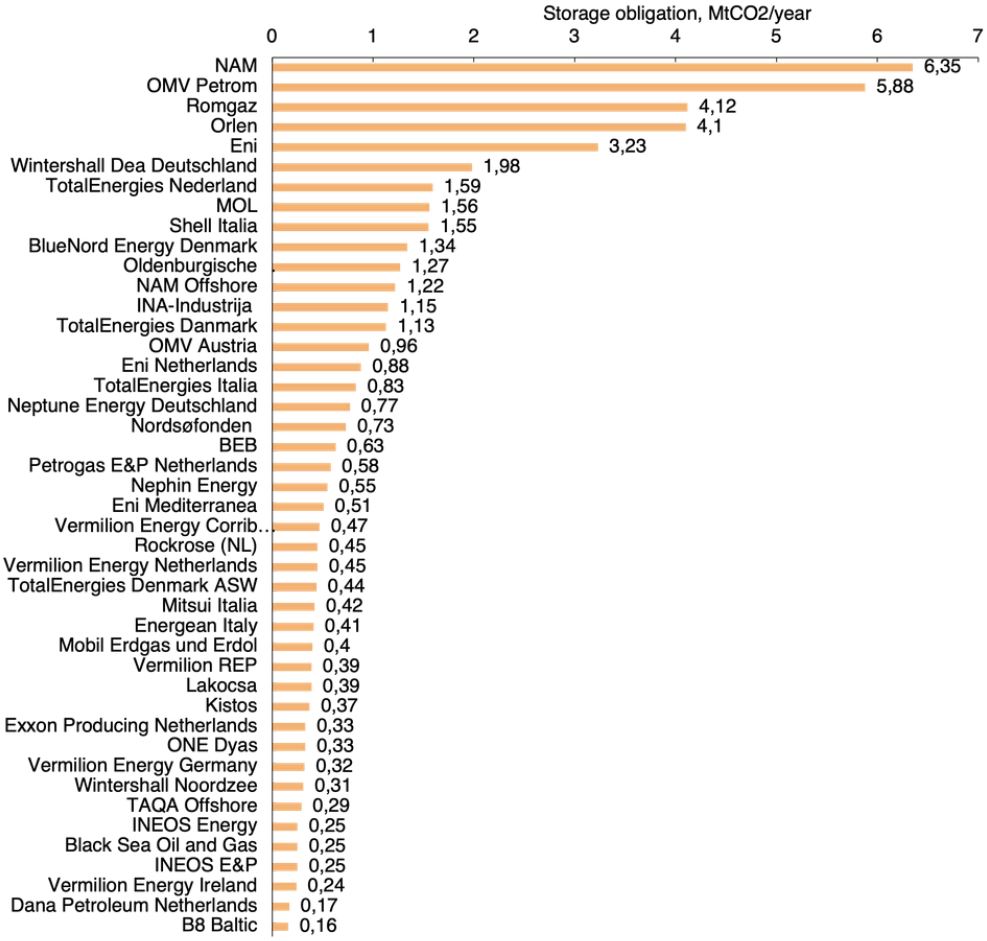


Figure 1. The 44 obligated entities and their assigned storage obligations.

Responsibilities of Member States

Member States play a dual role as both enforcers and enablers of Article 23. On the enforcement side, they are responsible for ensuring compliance by obligated entities under their jurisdiction and for adopting penalties for non-compliance. These penalties must be in place by 30 June 2026 (read **Chapter 5** for more information).

On the enabling side, Member States are required to support the deployment of injection capacity by streamlining permitting and administrative procedures, publishing maps of suitable CO_2 storage areas, sharing geological data from decommissioned fields, and facilitating the development of CO_2 transport infrastructure, including cross-border coordination where relevant. From December 2024, Member States must report annually to the European Commission on progress, including national capacity needs, ongoing projects, and support measures.

While storage capacity can be developed anywhere in the territory of the Union, there are 11 Member States in which obligated entities are registered (**Figure 2**) and which will therefore be required to adopt penalties.

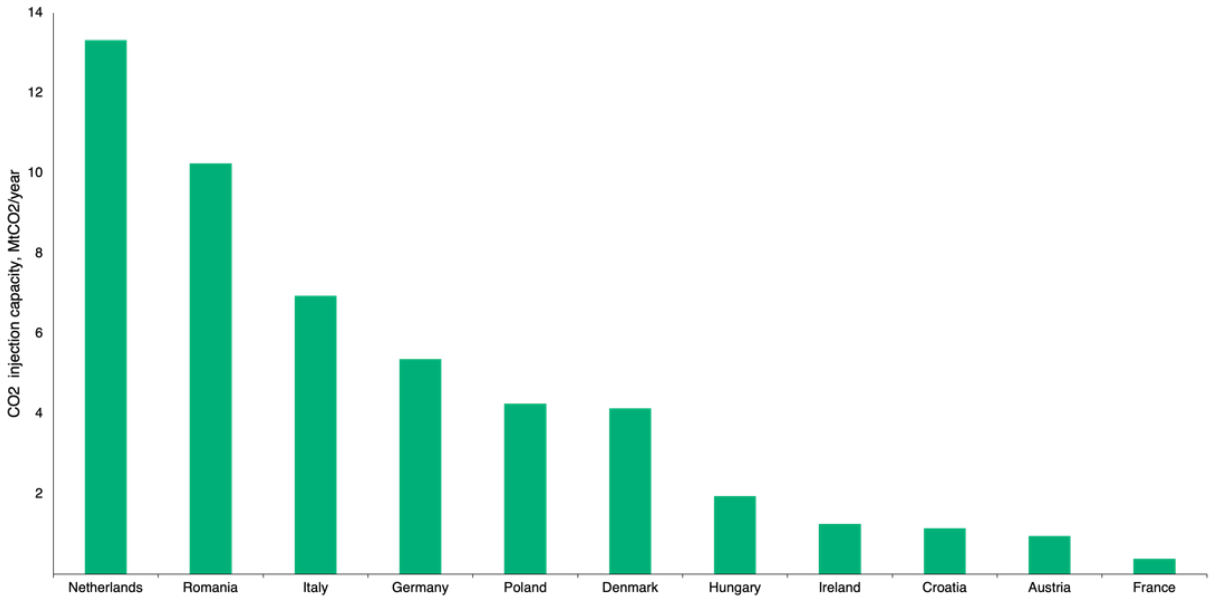


Figure 2. Article 23 obligations according to the country of origin of the obligated entity.

Responsibilities of the European Commission

The European Commission oversees the implementation of Article 23 at the Union level. It adopts the relevant Delegated Acts, monitors aggregate progress towards the 2030 injection capacity target, and ensures transparency on the developments across the EU. By 30 June 2027, and every two years thereafter, the Commission must report to the European Parliament and the Council on progress towards the Union-wide injection capacity target, including the geographic distribution of storage sites and the functioning of the CO_2 market. By the end of 2028, the Commission will assess whether a new EU-level injection capacity target for 2040 is required and may propose additional measures if the obligation is found not to be delivering the intended market development.

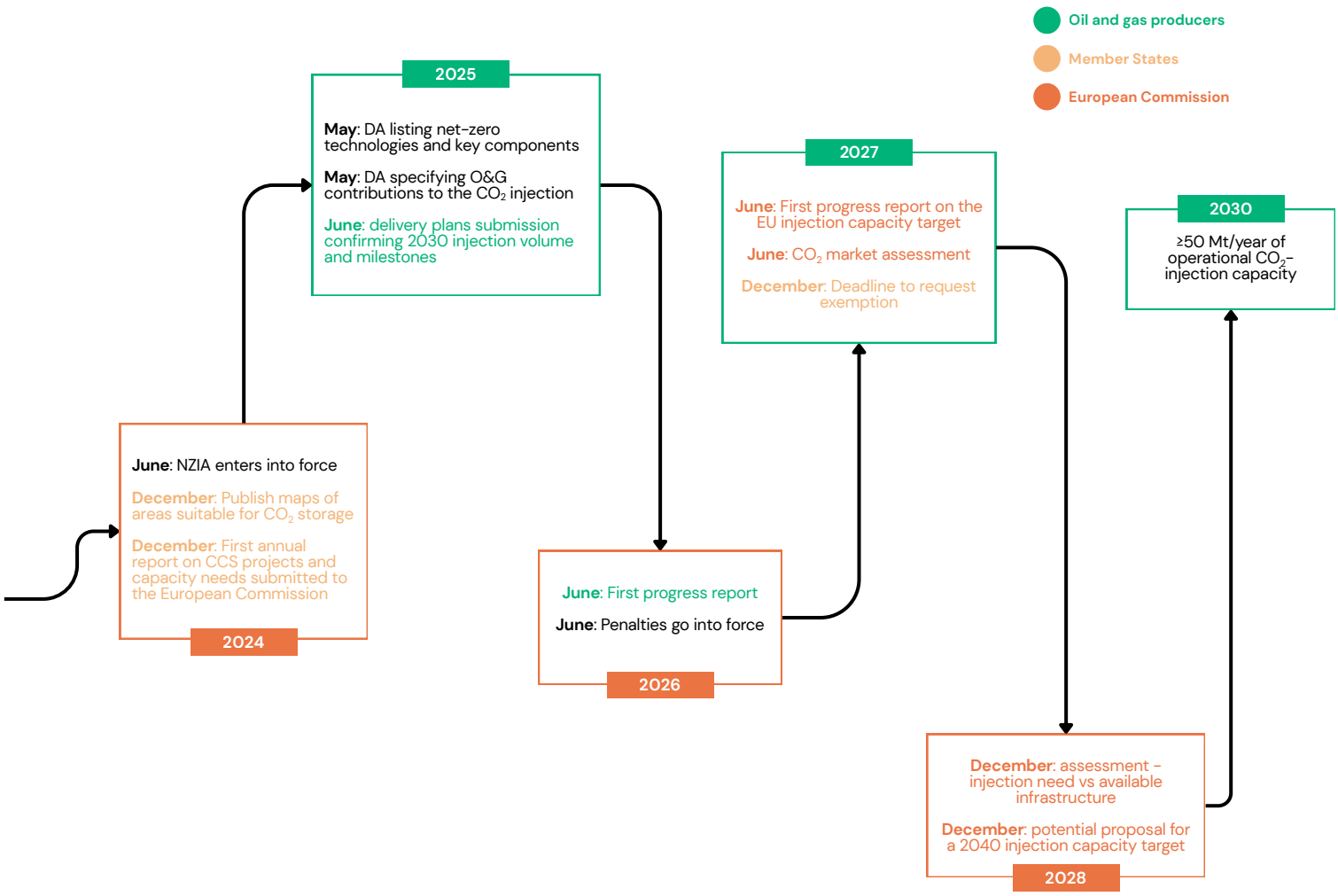


Figure 3. Expected timeline for Article 23 of the Net Zero Industry Act

3. Analytical framework

This Chapter introduces the three complementary analytical pillars of this report: (1) analysis of obligated entities' progress towards meeting their CO_2 injection capacity obligations; (2) assessment of Member State implementation and institutional readiness; and (3) qualitative analysis of stakeholder perspectives.

The three approaches in the report combine quantitative tracking, legal-institutional analysis, and qualitative insight to provide a comprehensive and nuanced assessment of how Article 23 is being implemented in practice.

3.1. Obligated entities – CO_2 injection capacity tracking

Progress by obligated entities is assessed using a dedicated injection capacity database developed by Clean Air Task Force. The tracker monitors each obligated entity's pro-rata contribution to the Union-wide target of 50 $MtCO_2$ per year by 2030. Where obligated entities are subsidiaries or joint ventures, the tracker consolidates the obligation of these parent companies (consolidated entities) for comparison with the storage capacity under development by the parent companies. The total injection capacity targeted by each EU storage project under development is assessed (estimated total capacity), as well as the capacity targeted for operation by 2030 (estimated 2030 capacity). Injection capacity estimates are derived primarily from the most recent timelines and figures announced by project developers, with reasonable assumptions applied where capacity estimates or timelines have not been publicly disclosed.

For storage projects developed by several obligated entities, projected storage capacities have been attributed to developer companies in proportion to their ownership stakes. Where projects involve both obligated entities and non-obligated partners, the whole project capacity is allocated to obligated partners. In practice, companies may adopt alternative contractual arrangements to distribute responsibility differently among partners, but ownership-based allocation provides a consistent basis for comparative assessment. Full details of sources and assumptions are provided in **Annex 1**.

This pillar provides a quantitative and comparative overview of delivery progress at the entity level, enabling assessment of aggregate progress towards the Union-wide target as well as variation across obligated entities.

3.2. Member State implementation and institutional readiness

Implementation at the Member State level is assessed through a tracker developed by Bellona Europa, focusing on those provisions of the NZIA that are directly relevant to the

delivery and enforcement of the Article 23 injection capacity obligation. The analysis examines requirements related to institutional set-up, administrative support, permitting timelines, transparency and reporting, CO_2 transport access and cross-border coordination, and penalties for non-compliance, with reference in particular to NZIA Articles 6-8, 15-16, and 21-23.

The assessment pursues three analytical objectives. First, it evaluates institutional readiness, examining whether Member States have established the legal, administrative, and procedural frameworks required to operationalise the relevant NZIA provisions. Second, it assesses practical enforcement and facilitation, considering whether these frameworks are being applied effectively in practice, including the availability of administrative capacity, priority treatment for CCS-related projects, and the existence of credible enforcement mechanisms. Third, it examines transparency and reporting, assessing whether Member States are meeting their obligations to publish geological data, report on storage and transport capacity, and coordinate across borders in a timely and comprehensive manner.

The analysis was conducted in November 2025 and focuses on the 11 Member States where the 44 obligated oil and gas entities are registered: Ireland, France, the Netherlands, Italy, Austria, Germany, Denmark, Croatia, Hungary, Poland, and Romania. While injection capacity may be developed in any EU Member State, these jurisdictions bear responsibility for enforcing and facilitating the Article 23 implementation. As implementation progresses and the geographic distribution of storage projects becomes clearer, the scope of this analysis may expand to additional Member States hosting injection capacity projects. Read more in **Annex 2**.

3.3. Stakeholder perspectives and qualitative analysis

Qualitative insights are drawn from semi-structured interviews conducted by Carbon Balance Initiative with stakeholders across governments, obligated entities, other industrial actors, technical experts, and civil society organisations. The interviews were conducted between October 2025 and January 2026 and represent the first round of qualitative data gathering.

In total, 17 interviews were conducted. The purpose of this pillar is to develop an empirically grounded understanding of how Article 23 is being interpreted, operationalised, and contested in its early implementation phase, and to identify perceived challenges, enabling conditions, risks, and opportunities associated with the obligation. The analysis focuses on stakeholder perceptions, expectations, and actions to date, as well as a forward-looking assessment of how Article 23 may evolve over time. It does not seek to adjudicate legal compliance, but rather to surface implementation-relevant insights that are directly relevant to policymakers, industry, and civil society.

The data was analysed using a thematic analysis based on an integrated inductive-deductive approach, following established qualitative research methods.[5,6] Initial deductive categories were derived from the research questions and interview guide, covering areas

such as interpretations of Article 23, responses and actions to date, implementation challenges, enabling conditions, perceived risks, and views on the future trajectory of the obligation. As analysis progressed, inductive elaboration of a priori codes was used to refine these categories, develop sub-themes, and introduce new analytical dimensions where new themes were extracted that were not anticipated in the initial framework. These themes were identified based on their relevance to the research questions, rather than frequency of occurrence. All qualitative analysis was conducted using NVivo 15, with collaborative coding and version control.

This qualitative pillar is explicitly designed as an iterative and longitudinal component of the overall analytical framework. Additional rounds of stakeholder interviews are planned for later in 2026 and 2027 to broaden the evidence base and capture how interpretations, responses, and implementation dynamics evolve as Article 23 moves further into its enforcement phase. Read more in **Annex 3**.

3.3. Integration and limitations

The three analytical pillars are designed to be mutually reinforcing. Quantitative tracking of obligated entities and Member State implementation provides a structured assessment of formal progress, while stakeholder interviews offer contextual insight into how the regulatory framework is understood and experienced in practice.

The analysis reflects an early stage of Article 23 implementation and relies on data and stakeholder perspectives available at a specific point in time. The qualitative interviews sample does not claim to be representative of specific sectors, nor of Member States or obligated entities as groups, and should be interpreted as indicative rather than exhaustive. All interview data are presented in aggregated form to protect confidentiality. No findings are attributable to identifiable individuals or organisations.

4. Progress by obligated entity

This chapter assesses early progress by obligated entities towards meeting their CO_2 injection capacity obligations under Article 23. Drawing on project-level tracking and company disclosures, it examines the current state of play across obligated entities, patterns in company strategies, and potential pathways to address projected capacity shortfalls.

4.1. State of play

Of the 44 individual obligated entities identified by the European Commission, several are subsidiaries of larger companies or joint ventures between two or more entities. In addition, a number of obligated entities have been wholly or partially acquired since the reference period used to calculate obligations (2020-2023), meaning their obligations have also passed to the new entities holding the production licences. For analytical clarity, this analysis thus consolidates the original list of 44 obligated entities into 27 companies that currently bear the obligation and are most likely to lead CCS project development on behalf of obligated subsidiaries or joint ventures (**Table 1** and **Figure 4**).

Based on project tracking, there are currently 22 CO_2 storage projects under development in the EU, of which 12 have a definite ownership stake associated with one or more of the obligated entities listed in **Table 1.** These projects are shown in **Figure 2** and **Table 2.**

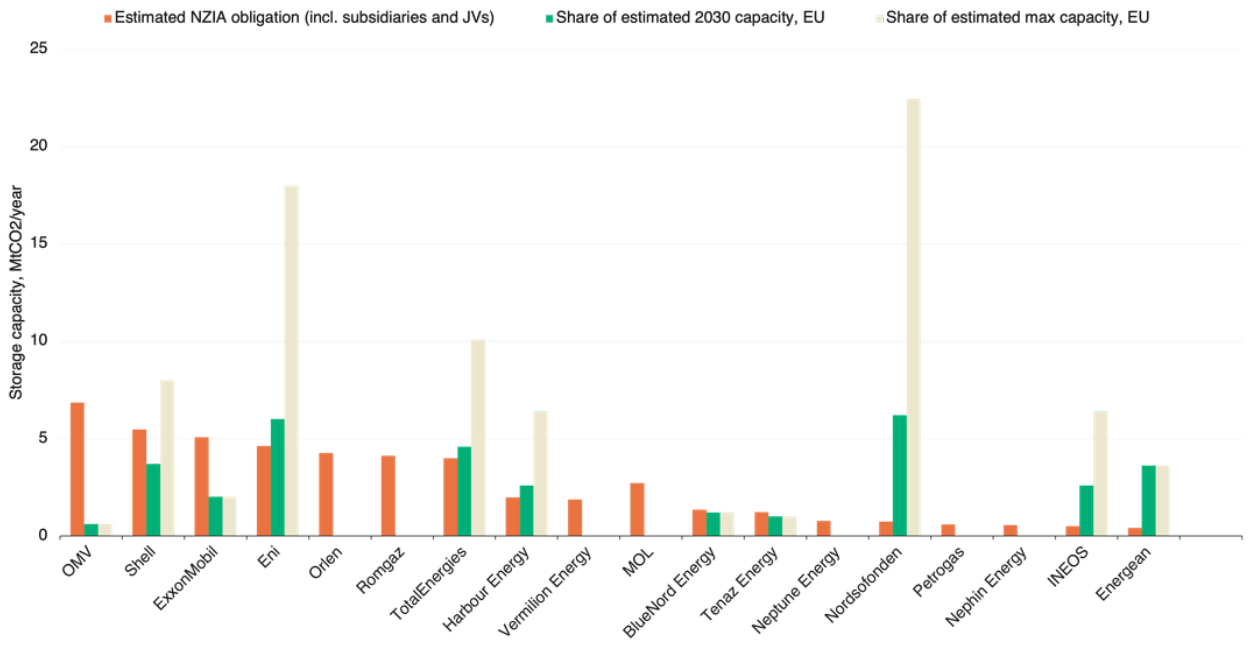


Figure 4. The estimated obligation for each consolidated entity, compared with its share of planned CO_2 storage capacity in the EU. The estimated 2030 capacity is the annual storage capacity that the entity is projected to have available by 2030, while the estimated total capacity represents the total annual capacity targeted by their projects, which may be reached post-2030. For data sources, see **Annex 1**.

Table 1. Details of the consolidated entities assessed for the purposes of Article 23 compliance tracking.

Consolidated entity	Obligated entities covered	2030 surplus/ deficit	Consolidated entity ownership	Net profit, 2024 (MEUR)*
OMV	OMV Petrom; OMV Austria	-6.24	Publicly traded company: Gov. Austria (31.5%), ADNOC (24.9%). OMV Petrom is part owned by Gov. Romania (20.7%)	1,389
Shell	NAM (50%), Oldenburgische Erdolgesellschaft (33%), BEB (50%), Shell Italia	-1.76	Publicly traded company	15,159
ExxonMobil	NAM (50%), Oldenburgische Erdolgesellschaft (66%), BEB (50%), Mobil Erdgas und Erdol, Exxon Producing Netherlands	-3.06	Publicly traded company	31,130
Eni	Eni, Eni Mediterranea, Eni Netherlands	1.38	Publicly traded company: Gov. Italy (30.5%)	5,300
Orlen	Orlen, B8 Baltic	-4.26	Publicly traded company: Gov. Poland (49.9%)	321
Romgaz	Romgaz	-4.12	Publicly traded company: Gov. Romania (70%)	644
TotalEnergies	TotalEnergies Nederland, TotalEnergies Danmark, TotalEnergies Italia, Total Energies Denmark ASW	0.58	Publicly traded company	14,565
Harbour Energy	Wintershall Dea Deutschland (acquired)	0.60	Publicly traded company	-91
Vermillon Energy	Vermilion Energy Corrib Ireland, Vermilion Energy Netherlands, Vermilion REP, Vermilion Energy Germany, Vermilion Energy Ireland	-1.87	Publicly traded company	-32
MOL	MOL, INA Industrija	-2.70	Publicly traded company. INA-Industrija is part owned by Gov. Croatia (44.8%)	900
BlueNord Energy	BlueNord Energy Denmark	-0.14	Publicly traded company	-65
Tenaz Energy	NAM Offshore (acquired)	-0.22	Publicly traded company	-5.21
Neptune Energy	Neptune Energy Deutschland	-0.77	Privately owned by China Investment Corporation, The Carlyle Group, and CVC Capital Partners.	Not available
Nordsøfonden	Nordsøfonden	5.47	Wholly owned by the Gov. Denmark	67
Petrogas	Petrogas E&P Netherlands	-0.58	MB Holding Company (Oman)	Not available
Nephin Energy	Nephin Energy	-0.55	Privately owned by the Canada Pension Plan Investment Board	Not available
INEOS	INEOS Energy, INEOS E&P	2.08	Privately owned company	435
Energean	Energean	2.39	Publicly traded company	174
Rockrose	Rockrose	-0.45	Subsidiary of Viaro Energy, a privately owned UK company	Not available
Mitsui & Co.	Mitsui Italia	-0.42	Publicly traded company	6.5
Lakocsa	Lakocsa	-0.39	Hungarian Horizon Energy, privately owned by Aspect Holdings (US)	Not available
Wintershall Dea	Wintershall Noordzee	-0.31	Privately owned by BASF and LetterOne	Not available
Kistos	Kistos	-0.37	Publicly traded company	-48
One Dyas	ONE Dyas	-0.33	Privately owned by Oranje-Nassau Groep (51%), SHV Holdings (49%)	-23
TAQA	TAQA Offshore	-0.29	Publicly traded company, Gov. Abu Dhabi (75.1%)	1,787
Dana Petroleum	Dana Petroleum Netherlands	-0.17	Subsidiary of Korean National Oil Corporation (KNOC), wholly owned by Gov. South Korea	Not available

***Currency conversions based on average 2024 exchange rates. Data sources are listed in Annex 1.**

On the basis of the current project pipeline, six consolidated entities appear to be on track to meet their respective obligations by 2030: Eni, TotalEnergies, Harbour Energy, Nordsøfonden, INEOS, and Energean. Entities with the largest projected deficits include OMV (driven in particular by the obligation associated with its Romanian subsidiary OMV Petrom), ExxonMobil, Orlen, and Romgaz. Notably, Orlen (Poland), OMV Petrom (Romania), and Romgaz (Romania) are majority state-owned entities, underscoring the potential relevance of state ownership structures for implementation outcomes.

Nordsøfonden, the Danish state-owned producer, has the largest projected capacity surplus, partly because it is required by law to hold a 20% stake in all Danish storage projects.

For consistency, this analysis has allocated 100% of the storage capacity to Nordsøfonden in cases where the other project partners are non-obligated entities (CO_2 Storage Kalundborg, Thorning); however, in reality, these partner entities may choose to reach agreements with other obligated entities over this capacity (particularly if Nordsøfonden attains a surplus).

Since the Regulation entered into force, several obligated entities have signalled increased engagement in CCS project development within the EU. For example, OMV Petrom has begun investigating the Botesti storage site, which Romania's reporting under Article 21 indicates could become operational by 2030.

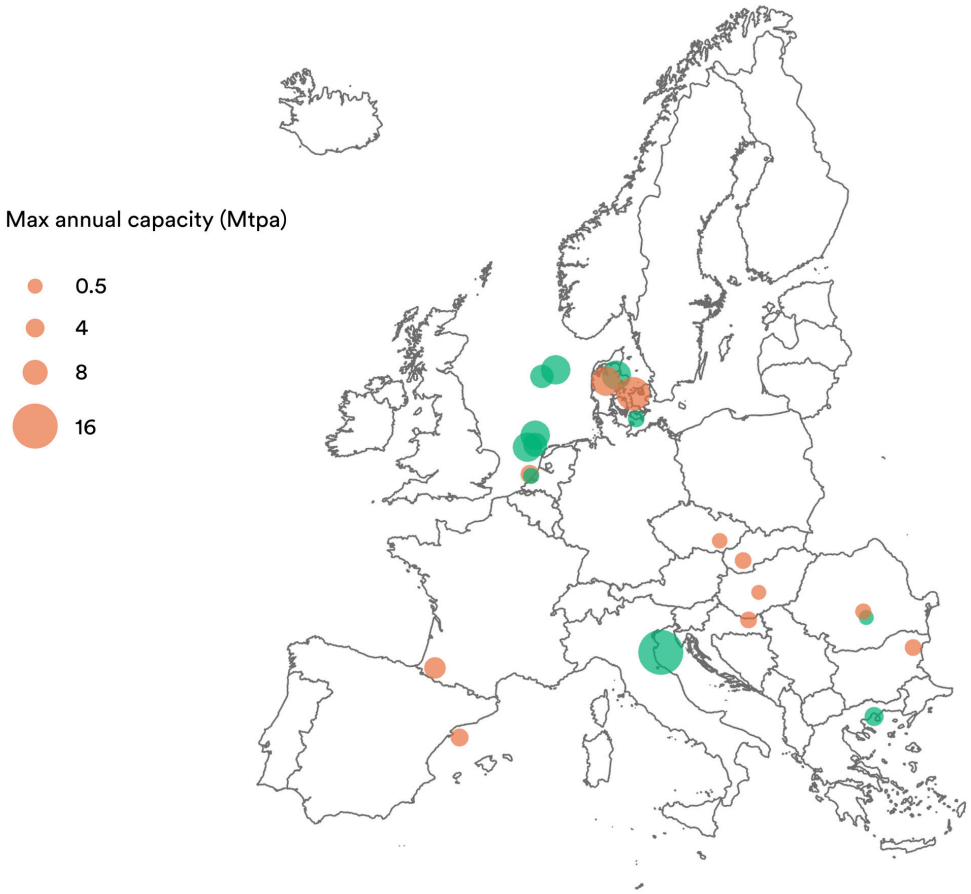


Figure 5. CO_2 storage sites currently planned in the EU, showing sites with partial or whole ownership by obligated entities (green) and sites developed by other entities (orange).

Table 2. Project capacity data used to assess the compliance status of obligated entities. Data sources are listed in Annex 1.

Project	Ownership*	Status	Max annual capacity	2030 capacity
Porthos	EBN, Gasunie, Port of Rotterdam	Under construction	2.5	2.5
Aramis (Shell)	**Shell**, EBN 40%	Storage permit	8.0	3.7
Aramis (TotalEnergies)	**TotalEnergies**, EBN 40%	Storage permit	8.0	2.5
Greensand	**Harbour Energy** 40%, INEOS 40%, **Nordsøfonden** 20%	Under construction	8.0	4.0
Bifrost	**TotalEnergies** 43.2%, Noreco 36.8%, **Nordsøfonden** 20%	Exploration licence	4.8	4.8
L10	**Eni, ExxonMobil, Tenaz Energy**, EBN	Applied for storage permit	5.0	5.0
Kompas	**ONE Dyas,** EBN	Storage permit application expected 2025	1.2	1.2
Ravenna	**Eni** 50%, Snam 50%	Applied for full-scale storage permit	16.0	4.0
Ruby	CarbonCuts (**BlueNord Energy**) 80%, **Nordsøfonden** 20%	Exploration licence	1.5	1.5
Greenstore (Gassum, part of Norne PCI)	**Harbour Energy, INEOS Denmark, Nordsøfonden** 20%	Exploration licence	8.0	2.45
CO_2 Storage Kalundborg	Equinor 60%, Orsted 20%, **Nordsøfonden** 20%	Exploration licence	10.0	1.2
Thorning (part of Norne PCI)	Fidelis 80%, **Nordsøfonden** 20%	Exploration licence	8.0	2.45
Prinos	**Energean**	Storage permit	2.8	2.8
Bockovac	Croatia Hydrocarbon Agency	Unknown	1.5	0.7
Devnya storage site	Heidelberg Materials, Enearth	Unknown	Unknown	0.8
Pycasso	Terega	Proposed over various sites	11	0.0
Tarraco2	Repsol	Exploration licence	2.0	2.0
Danube Removals	EMOV Group, Danube Energy	Applied for storage permit	0.5	0.5
Botesti	**OMV Petrom**	Proposed. No exploration licence	0.6	0.6
Romania CPT01	Holcim and partners	Proposed. No exploration licence	1.2	0.0
Engas CCS	Engas	Applying for storage permit	1.5	0.0
CCS Moravia	MND, Heidelberg Materials	Unknown	0.8	0
Total			**93.4**	**42.7**

Note. *obligated entities are reflected in bold.

4.2. Climate targets and CCS activity by company

The majority of the 27 consolidated entities have committed to achieving net zero Scope 1 and Scope 2 emissions from their own assets by 2050, and most have set interim targets for 2030 (**Table 3**). A smaller group, including Eni, Shell, TotalEnergies, and MOL, also target net zero Scope 3 emissions associated with their energy products, i.e., emissions from the combustion of the oil, gas, and other energy products they sell. Many companies explicitly identify CCS as a core component of their climate strategies.[ii]

A limited number of entities, including Eni, OMV, and Orlen, have publicly stated overall CO_2 storage capacity targets. These targets are typically derived from the expected scale-up of existing projects or articulated in direct response to the Article 23 obligation.

As noted above, several obligated entities appear to have initiated or accelerated CCS-related activity following the adoption of the NZIA. In addition to project announcements, this is reflected in corporate strategy documents and broader planning activities. In 2025, Romgaz prepared a decarbonisation strategy exploring a pathway to net zero by 2050, including a strong role for CCS with investment estimates of €698 million over the period of 2026-2029.[7] Although Romgaz has not publicly announced any CO_2 storage projects, the strategy targets CO_2 capture at its Iernut gas power plant.

Orlen references the forthcoming NZIA obligation in its 2023 annual report and provides further detail on CCS-related activities in its 2024 annual report and Group Strategy. In 2024, the company indicatively divided a storage target of 4 Mtpa[8] between efforts to reduce its own emissions and the potential provision of carbon management services to third parties.

MOL Group has stated that it "*welcomes regulations that support CCS and CCU, including initiatives under the NZIA*", and reports storage site exploration activity in Hungary and Croatia.[9] However, its 2024 annual report indicates that any large-scale CCS projects would be realised after 2030.

Several obligated entities have emphasised the need for additional incentives to establish a viable business case for CCS across capture, transport, and storage, and have made investment decisions contingent on a favourable commercial environment.

Most companies do not report CCS investment as a distinct category of expenditure, instead including it within broader low-carbon or transition investment figures. Harbour Energy is a notable exception, having reported annual CCS investment in Europe (including Norway and the UK) since 2022.[10] While investments in storage projects that reach final investment decision are generally disclosed, of the projects involving obligated entities, only Project Greensand has reached this stage within the EU to date. Greater transparency on investment at earlier project stages would provide clearer insight into whether companies are advancing storage development at the pace required.

A small number of obligated entities have established dedicated subsidiaries or joint ventures to own and operate CO_2 storage assets

ii. The analysis in this section is based on the company reports listed in Annex 1.

Table 3. Details of climate and CCS targets from key consolidated entities. Data sources are listed in Annex 2.

Consolidated entity	Climate targets (2030/2050)	CCS targets (global)	Investments in CCS	Legal challenge
OMV	Net zero scope 1,2 (2050)	OMV: 3 Mtpa by 2030 (10% of 2030 emissions target). OMV Petrom: 2 Mtpa by 2030	€5bn low-carbon CAPEX until 2030 (incl. CCS, geothermal, renewables). OMV Petrom: RON 3.6bn planned (2025-2030)	Yes
Shell	50% reduction scope 1,2 (2030); Net zero for scope 1,2,3 (2050)	Project-specific CCS targets. Recognises CCS as a core technology for decarbonising operations.	>$6bn planned CAPEX for own emissions abatement to 2034. Expected $2-3bn CAPEX in low-carbon energy in 2025 (incl. CCS)	Yes
ExxonMobil	>15% reduction scope 1,2 intensity (2030); Net zero for scope 1,2 (2050)	Up to 30 Mtpa CCS under contract by 2030; currently ~6.7–8.7 Mtpa contracted (primarily in the US)	Up to $30bn in lower-emission planned investments (2025–2030) in low-carbon solutions	Yes
Eni	Net zero scope 1,2,3 (2050)	Globally, 15 Mtpa by 2030; >40 Mtpa after 2030, ~60 Mtpa by 2050	Allocating €13bn in lower-carbon projects from 2025-2028, of which €2.5bn in "GHG emissions reduction"	No
Orlen	Net zero scope 1,2 (2050)	4 Mtpa by 2035 (1.1 Mtpa for own emissions; 1.9 Mtpa for third parties; and 1 Mtpa via agreements)	PLN 350bn and PLN 380bn CAPEX (2025-2035); >40% for low- and zero-carbon projects (incl. CCS/CCUS)	Yes
Romgaz	72% reduction scope 1,2 (2030); Net-zero scope 1,2 (2050)	No explicit CCS targets	~€700m scenario-based CCS investment (2026–2029)	Yes
TotalEnergies	40% reduction (2030); Net zero Scope 1,2,3 (2050)	10 Mtpa by 2030. CCUS contributes ~100 Mt to Scope 3 abatement in long-term 2050 scenario	Investing around 100 M$ per year in "Storage as a Service"	Yes
Harbour Energy	50% reduction scope 1,2 (2030); Net zero scope 1,2 (2050)	Aims to be a leader in CCS. No quantitative target	$139m invested (2022-2024) in UK, Norway, and Denmark	No
Vermillon Energy	25-30% reduction scope 1,2 (2030); Net zero scope 1,2 (2050)	No explicit CCS targets	Not disclosed	Yes
MOL	25% reduction scope 1,2 & 5% reduction scope 3 (2030); Net zero scope 1,2,3 (2050)	>1 $MtCO_2$ addressed via CCS in 2050	30–40% of CAPEX budget (2025-2030) for low-carbon and sustainable business initiatives	No
BlueNord Energy	40% reduction scope 1,2 (2030)	Project Ruby: 1.5 Mtpa by 2030 (operational by 2029)	Not disclosed	No
Tenaz Energy	Not disclosed	No explicit CCS targets	$1.447m in CCS (2024); $0.8m CCS CAPEX (2025); $1.7m FEED planned.	Yes
Nordsøfonden	No standalone corporate net-zero target	Mandatory 20% stake in all Danish storage projects.	Feasibility studies for storage: DKK 44m (2023); DKK 38m (2024).	No
INEOS	Not disclosed	No explicit CCS targets	Not disclosed	No
Energean	Net zero scope 1,2 (2050)	No explicit CCS targets	Not disclosed	No

including Energean's subsidiary Enearth and Eni's CCUS Holding, a joint venture with the infrastructure investment fund Global Infrastructure Partners.[11] These structures may indicate efforts to ring-fence risk and attract new sources of external capital for storage development.

In October 2025, 12 obligated entities filed 15 separate legal cases before the European Court of Justice Challenging the Delegated Regulation 2025/1477 (secondary legislation specifying rules for pro rata contribution methodology) and the Commission Decision 2025/1479 (decision on pro rata contribution specifications). The nature and implications of these legal challenges are examined in more detail in **Chapter 7**.

4.3. Pathways to compliance

There are several potential pathways through which obligated entities could address projected shortfalls in CO_2 injection capacity. First, the six consolidated entities currently projected to exceed their individual obligations together account for a combined surplus of 14.2 Mtpa. If delivered on schedule, this surplus capacity could be made available to entities in deficit through bilateral or multilateral agreements, as provided for under Article 23(5). In addition, a further 5.7 Mtpa of injection capacity is projected to be available from non-obligated entities.

Despite these potential sources of capacity, the current assessment of the project pipeline indicates a remaining shortfall of approximately 8 Mtpa relative to the Union-wide target of 50 Mtpa by 2030. Based on announced project timelines, this gap is projected to be closed by 2032, as other announced projects come online and existing projects expand capacity. The Pycasso project in south-west France has stated an ambition to capture and store at least 4 Mtpa from 2032 onwards.[12] The analysis also assumes capacity expansions at the three Dutch North Sea storage sites associated with the Aramis trunkline, with each site increasing to 5 Mtpa by 2032, resulting in a combined capacity of 15 Mtpa (the pipeline itself is designed to transport up to 22 Mtpa).[13] Additional increases are associated with offshore and onshore storage sites in Denmark, where combined capacity is projected to rise from 16.4 Mtpa in 2030 to 19.6 Mtpa in 2032.[iii]

Nevertheless, substantial uncertainty remains around many of the capacities currently targeted for 2030. This uncertainty reflects both the early stage of geological characterisation for several projects and the risk of deployment delays, including extended permitting timelines and infrastructure constraints.

On the basis of current project timelines, it would be challenging, but not impossible, for newly announced projects to deliver operational injection capacity by 2030. Projects involving depleted reservoirs and onshore developments are likely to offer the most feasible opportunities for accelerated deployment. As a result, the accelerated expansion of capacity at existing projects, particularly those with high estimated maximum capacities, appears to be the most plausible route to achieving the 50 Mtpa target by 2030.

Box 1. Guidance on Compliance Definition

Informal guidance provided by the European Commission to obligated entities has indicated that acquisition of CO_2 storage permits and contractual commitments with CO_2 emitters ('storage customers') may together be sufficient to demonstrate compliance, or partial compliance, with the obligation. Projects targeting higher capacities beyond 2030 may therefore be able to count planned capacity towards the target prior to becoming fully operational, although further official guidance on compliance definition will be critical for clarity.

iii. See data sources for Danish projects in **Annex 1**.

5. Progress by Member State

This chapter assesses Member State implementation of Article 23 and related provisions of the Net Zero Industry Act, focusing on those responsibilities that directly affect the delivery and enforcement of the EU-wide CO_2 injection capacity target. The analysis covers institutional arrangements, permitting and administrative frameworks, transparency and reporting, CO_2 transport and infrastructure, and penalties for non-compliance, with reference to NZIA Articles 6, 7, 8, 15, 16, 21, 22, and 23.

The assessment focuses on the 11 Member States in which the 44 obligated entities are registered, as these countries bear responsibilities for enforcing Article 23 and enabling compliance. As injection capacity may be developed in other Member States, future editions of this report may expand the scope as additional countries host storage projects. A detailed description of the methodology and article-by-article assessment criteria is provided in **Annex 2**, while Member State-level results are available in a Member State tracker publication.[14]

Overall, the analysis reveals uneven and incomplete implementation across Member States. While some countries have taken early and concrete steps to integrate NZIA requirements into national frameworks, others remain at a preparatory stage, with potential implications for the timely delivery of CO_2 injection capacity.

5.1. Single Points of Contact (Article 6)

Article 6 requires Member States to designate a Single Point of Contact (SPOC) to guide project developers through administrative and permitting procedures. SPOCs are intended to improve coordination across authorities, reduce procedural complexity and support timely project delivery, including CCS.

Table 4 summarises the designation and operational status of SPOCs across the 11 Member States, illustrating the variation between formally established but limited arrangements and fully operational models.

In practice, the implementation varies considerably across the 11 Member States. Only a small group – Denmark, the Netherlands, and Poland – have established SPOCs that are both formally designated and operational. Among these, Denmark provides the most comprehensive model, operating a national "one-stop shop" with dedicated coordinators, cross-agency permit planning, clear timelines, and guidance tools for project developers. The Netherlands also performs strongly, providing a user-oriented digital interface through the Netherlands Enterprise Agency (RVO), including electronic submissions and guidance, and tools to identify required permits.

Several countries have designated SPOCs but with limited functionality. Croatia and Hungary have formally identified SPOCs, but provide little public information on their operation in practice. Germany and Austria have adopted decentralised approaches, relying on state-level or general ministry contact points. In Germany, SPOC coverage varies across states (Länder)

Table 4. Implementation of Single Points of Contact		
Implementation status	**Member State(s)**	**Key characteristics**
Operational and centralised	Denmark, Netherlands, Poland	National SPOC; clear mandate; public contact points.
Designated but limited	Croatia, Hungary, Germany, Austria	Formal designation; limited guidance or decentralised coverage.
Not designated	France, Italy, Ireland, Romania	No NZIA-specific SPOC

and often consists of little more than an email contact, while Austria's listed contact points lack NZIA-specific guidance.

France, Italy, Ireland, and Romania have not designated NZIA-specific SPOCs. While relevant competent authorities exist, the absence of a clear and centralised contact point limits transparency and may increase administrative complexity for project promoters.

Overall, the analysis suggests that while formal designation of SPOCs has begun in several countries, operational effectiveness remains uneven, with only a small number of Member States providing the level of coordination envisaged under Article 6.

5.2. Centralised online access for NZIA projects (Article 7)

Article 7 requires Member States to provide centralised online access to information on permitting, support measures, and funding opportunities relevant to net zero projects. Such portals are intended to reduce information barriers and support project planning. **Table 5** provides an overview of the availability and functionality of centralised online access across the 11 Member States.

Implementation ranges from relatively integrated national platforms to the absence of any identifiable NZIA-specific portal. Denmark again stands out, offering a central online interface linked to its "one-stop shop" system, which provides administrative guidance and access to relevant procedures. Poland and Germany also provide central entry points, although functionality differs. Germany's NZIA site primarily serves as a document repository, with links to project, funding, and SPOC guidance and external resources rather than interactive services.

The Netherlands and Italy demonstrate partial implementation. The Netherlands offers a well-developed permitting portal and NZIA-related information through RVO, but EU funding and business support content remains limited. Italy has relevant information distributed across several platforms, including a CCS-specific page and geological data archives, but lacks a single consolidated entry point covering all Article 7 elements.

In France, Austria, Ireland, Hungary, and Romania, no centralised NZIA portal could be identified.

Table 5. Centralised online access for NZIA projects			
Member State(s)	**Central portal**	**NZIA-specific content**	**Interactive functionality**
Denmark	✓	✓	–
Poland	✓	–	✗
Germany	✓	✓	✗
Netherlands	✓	–	–
Italy	–	–	✗
Croatia	✓	✓	✗
France, Austria, Ireland, Hungary, Romania	✗	✗	✗

Note. (✓) represents complete implementation, (–) represents partially implemented, and (X) represents not implemented.

While environmental or industrial permitting portals exist in some cases, they are not aligned with NZIA objectives and do not provide comprehensive guidance for CCS or net zero projects.

Overall, fragmented or incomplete online access remains a common feature and may increase transaction costs for project developers, particularly in cross-border contexts.

5.3. Administrative support (Article 8)

Article 8 requires Member States to provide administrative support to project promoters, particularly for Net Zero Strategic Projects. This support is intended to complement SPOCs by offering proactive coordination and guidance throughout the permitting process.

Among the countries assessed, Denmark is the only Member State that clearly meets this requirement. Its one-stop-shop system assigns a permanent coordinator to eligible projects and actively oversees permitting procedures from initiation to completion.

Several Member States show partial alignment. Italy has established internal coordination mechanisms through its CCS Committee and Technical Secretariat under Ministry of Environment and Energy Security (MASE), which support the evaluation of storage applications and standardisation of procedures. France and Poland have developed sectoral strategies and interministerial coordination arrangements and provide access to geological data and funding instruments. However, in all three cases, support is largely internal and does not yet translate into applicant-facing administrative services or tailored NZIA-guidance tools.

In the remaining countries, including Germany, the Netherlands, Hungary, Ireland, Austria, Romania, and Croatia, no structured administrative support aligned with Article 8 could be identified. Existing arrangements rely on dispersed institutional

contacts or general information provision, rather than proactive administrative facilitation of CCS projects.

As a result, administrative support remains one of the least developed elements of NZIA implementation across Member States.

5.4. Priority/public interest status (Article 15)

Article 15 of the NZIA requires that Member States recognise net zero technology projects as being of overriding public interest and to prioritise them within planning and permitting processes. This designation is intended to support faster permitting, reduce dispute resolutions, and facilitate timely deployment of infrastructure required to meet the CO_2 injection capacity target.

Implementation across Member States remains uneven, with clear differences between countries that have formally embedded priority status for CCS, those applying it in practice without explicit NZIA labelling, and those where relevant frameworks are still absent or under development.

Table 6 summarises the status of priority and public-interest recognition for CCS projects across the 11 Member States assessed.

As shown in **Table 6**, Germany and the Netherlands are the most clearly aligned with the intent of Article 15. Germany's Carbon Storage and Transport Law (KSpTG) explicitly recognises CCS and related infrastructure as being of overriding public interest, providing a strong statutory basis for priority treatment in planning and permitting. While secondary legislation is still expected to further operationalise these provisions, the legal foundation is already in place. The Netherlands similarly provides priority treatments through its *Projectprocedure*, which enables accelerated permitting for large-scale energy projects, including CCS and associated transport infrastructure.

Denmark is substantively close to compliance, despite the absence of explicit NZIA terminology. As of late 2025, CCS infrastructure is recognised as a national planning interest, with municipal planning required to align with CCS deployment needs and recent legal reforms limiting appeal-related delays. In practice, CCS projects benefit from priority handling even though they are not formally designated as net zero strategic projects.

Several Member States fall into a transitional category. Poland is preparing a draft CCUS Act that would classify CCS projects as investments of national importance, potentially granting them fast-track status similar to offshore wind

Table 6. Priority/public interest status for CCS projects

Status	Member State(s)
Formally aligned	Germany, Netherlands
Substantively aligned (not formalised)	Denmark
In transition	Poland, Italy, France
Not aligned	Croatia, Ireland, Hungary, Romania, Austria

projects. Italy has acknowledged the strategic importance of CCS in enabling legislation adopted in 2025, but has not yet applied a formal priority or public-interest designation to CCS projects. France has existing categories for projects of national importance, but these have not been extended to CCS, despite references to CCUS in industrial strategy documents.

In contrast, Croatia, Ireland, Hungary, Romania, and Austria currently lack frameworks that grant priority or public-interest status to CCS projects. While some of these countries have broader strategic investment regimes, there is no evidence that these have been applied to CCS or NZIA projects in practice. In Austria and Ireland, additional structural constraints, most notably the continued prohibition of geological CO_2 storage, further limit the applicability of Article 15.

Overall, while a small number of Member States have embedded priority treatment for CCS either formally or in practice, most have yet to translate the requirements of Article 15 into operational planning and permitting frameworks.

5.5. Duration of permitting (Article 16)

Article 16 of the NZIA requires Member States to ensure that all permits required for CO_2 storage projects are granted within a maximum of 18 months. Predictable and time-bound permitting procedures are intended to reduce regulatory uncertainty and support timely investment in CO2 injection capacity under Article 23.

Across the 11 Member States assessed, implementation of this requirement remains uneven, with only a small number of countries having clearly codified or operationalised permitting timelines aligned with the NZIA.

Table 7 summarises Member State alignment with the permitting duration requirements set out in Article 16. Denmark and the Netherlands are the only Member States with clearly defined and enforceable permitting timelines that meet the NZIA threshold. In the Netherlands, the Mining Act establishes a 10-month evaluation period for CO_2 storage permits, with a one-time extension of up to six months, while associated infrastructure benefits from accelerated treatment under the national *Projectprocedure*. Denmark's one-stop shop system similarly imposes a strict case-processing ceiling of 12-18 months, closely aligned with Article 16.

Germany holds an intermediate position. While it does not enshrine an explicit 18-month cap in legislation, its Carbon Storage and Transport Law (KSpTG) introduces multiple procedural acceleration mechanisms, including expedited environmental information deadlines, project coordination roles, digitalisation requirements,

Table 7. Alignment with NZIA permitting timelines

Category	Member State(s)
Explicit compliant (≤ 18 months)	Denmark, Netherlands
Procedural acceleration (no statutory cap)	Germany
No binding timelines	Italy, France, Poland, Croatia
Non-applicable or non-compliant	Ireland, Romania, Hungary, Austria

and simplified legal procedures. Compliance with Article 16 therefore depends on implementation in practice rather than statutory timelines, but the framework appears to be designed to enable faster permitting.

Several Member States – Italy, Poland, Croatia, and France – have not yet codified NZIA-aligned permitting timelines. Italy has established internal review structures, such as the CCS Committee, but these are not accompanied by binding deadlines. Poland's CCS legislation remains under development, and no clear time limits have been specified so far. France continues to apply general permitting timelines for major industrial projects, which typically exceed 18 months, while Croatia's Strategic Investment Project framework has not yet been applied to CCS projects in practice.

Finally, Ireland, Romania, Hungary, and Austria fall into a category of non-compliance or non-applicability. Ireland does not operate a permitting regime for geological CO_2 storage due to the continued prohibition of storage activities. Romania and Hungary lack publicly documented timelines for CCS permitting, making compliance difficult to assess. Austria's permitting framework remains undeveloped in light of its existing restrictions on CO_2 storage.

Overall, while procedural streamlining is underway in some Member States, most lack binding guarantees that would ensure permits for CO_2 storage projects are granted within the timeframe envisaged by Article 16. This creates continued uncertainty for project developers and may affect the pace of deployment.

5.6. Transparency and annual reporting (Article 21)

Article 21 of the NZIA requires Member States to ensure public access to geological CO_2 storage data and to submit annual reports detailing capture, transport, storage potential, support measures, and cross-border cooperation. These requirements are intended to enhance transparency, support investment planning, and enable effective coordination across the emerging CO_2 value chain.

Implementation across the 11 Member States shows substantial variation in both the availability of geological data and the quality of annual reporting. While some countries have long-established data infrastructures and reporting practices, others provide only limited or minimal information.

Table 8 summarises Member State status with respect to geological data transparency and annual reporting under Article 21.

Table 8. Transparency and reporting performance

Performance tier	Member State(s)
High	France, Italy, Denmark, Netherlands, Hungary
Medium	Germany, Poland, Romania, Croatia
Low	Austria, Ireland

France, Italy, Denmark, the Netherlands, and Hungary demonstrate the highest level of alignment with Article 21. These countries have submitted comprehensive annual reports and provide publicly accessible geological data relevant to CO_2 storage. France and Italy, in particular, maintain national CO_2 storage atlases and clearly mapped project pipelines.

Hungary draws on more than two decades of geological research, offering detailed capacity estimates and public access to subsurface data. Denmark has consolidated geological information into a central public platform, while the Netherlands' portal provides long-standing, project-level and geological data.

A second group of countries – Germany, Poland, Romania and Croatia – meets the basic reporting requirements but with limitations. Germany submitted its annual report on time; however, the continued restriction on onshore CO2 storage constrains the scope of disclosed information. Poland and Romania provide geological data through national geological institutes and online portals, but their reporting offers less detail on capacity planning and future deployment pathways.

At the lowest end of implementation, Austria and Ireland show limited alignment with Article 21. Austria has not published an annual report and does not currently provide public geological data on CO_2 storage. Ireland has submitted a minimal report, but it does not meet the substantive transparency requirements set out in NZIA.

Croatia offers a more mixed picture. While work is underway to develop a national CO_2 storage atlas, the most recent Article 21 report remains high-level and lacks detailed quantitative information on storage potential and timelines.

Austria and Ireland fall into a third tier of non-compliance or minimal engagement. Austria has not published its annual report and does not yet offer public CO_2 storage data. Ireland has submitted an annual report, but it fails to meet the substantive transparency requirements of the NZIA.

Overall, while a number of Member States have established strong foundations for transparency and reporting, gaps remain. These gaps may limit the visibility needed to support investment decisions, assess progress toward the 2030 injection capacity target, and facilitate cross-border coordination.

5.7. Transport infrastructure & access (Article 22)

Article 22 of the NZIA requires Member States to make all reasonable efforts to facilitate the development of CO2 transport infrastructure, ensure transparent and non-discriminatory third-party access, and support cross-border coordination. Effective transport frameworks are a prerequisite for a functioning CO_2 market, particularly given that capture, transport and storage will often be located in different jurisdictions.

Across the 11 Member States assessed, progress on CO_2 transport infrastructure and access frameworks remains uneven, with only a limited number of countries approaching full alignment with the intent of Article 22.

Table 9 summarises the status of national frameworks for CO_2 transport infrastructure, third-party access, and cross-border coordination.

France, Denmark, and Italy form the leading group. France has already integrated CO_2 storage into law and is developing a dedicated transport regulatory framework through its

Table 9. CO_2 transport frameworks and access rules			
Member State(s)	**Legal framework**	**Third-party access**	**Cross-border coordination**
France, Denmark, Italy	Established or advanced	Developing or partial	Active
Netherlands, Germany, Poland, Croatia	Partial	Limited	Emerging
Hungary, Austria	Early stage	Not implemented	Limited
Ireland, Romania	Not implemented	Not implemented	Limited/not implemented

energy regulator (CRE), with a focus on tariff setting and third-party access. France is also actively engaged in bilateral and regional cross-border initiatives. Denmark has established a dedicated legal basis for CO_2 pipelines under its Subsoil Act and is highly active in Nordic and EU-level coordination efforts. Italy has adopted key technical rules for pipeline infrastructure is finalising legislation that assigns regulatory oversight to the Italian Regulatory Authority for Energy, Networks and the Environment (ARERA). While the framework is not yet fully operational, the direction of travel is clear.

A second group of countries – the Netherlands, Germany, Poland, and Croatia – has partially developed frameworks. The Netherlands benefits from a strong legal basis and an established regulatory authority, but detailed rules on third-party access and tariffs are still evolving. Germany's Carbon Storage and Transport Law (KSpTG) provides for fair access to transport infrastructure, but implementation is at an early stage and no operational CO_2 transport networks exist yet. Poland is preparing a CCUS law and has identified CO_2 export options via Gdańsk, but currently lacks a designated network operator or access regime. Croatia does not yet have a dedicated legal framework, but projects such as CO_2NTESSA include cross-border transport elements and implicitly assume open-access functionality.

Hungary and Austria remain at an early planning stage. While both are considering legal reforms and participate in some cross-border discussions, neither has established an operational framework for CO_2 transport or access. Romania shows early engagement through regional initiatives on cross-border CO_2 transport, though it has yet to initiate domestic legal reforms or establish a dedicated regulatory framework. Ireland currently shows no tangible progress in this area, reflecting the absence of a CCS strategy and the lack of pipeline planning, regulatory reform, or cross-border engagement.

While momentum is building across the EU, clear and enforceable third-party access rules remain a weak point in many Member States. Regulatory certainty and cross-border coordination are crucial to enable multi-user CCS networks and meet the EU's CO_2 storage targets under the NZIA. Without harmonised EU-level rules, cross-border projects face regulatory fragmentation, inconsistent access conditions, and delays in project implementation. The European Commission's upcoming CO_2 infrastructure and market regulation, expected in the second half of 2026, offers a critical opportunity to establish common standards.

5.8. Penalties for non-compliance (Article 23)

Within Article 23 of the NZIA, there is a requirement for Member States to establish penalties for failure to meet the CO_2 injection capacity obligation. These penalties must be effective, proportionate, and dissuasive, removing any economic disadvantage associated with non-compliance and providing a credible enforcement mechanism for achieving the EU-wide target of 50 $MtCO_2$ of annual injection capacity. Member States are required to have such penalty regimes in place by 30 June 2026.

As of late 2025, implementation of this requirement remains highly uneven. The majority of the 11 Member States assessed have not yet adopted NZIA-compliant penalty regimes. Only one Member State has near full compliance, while a small number are developing or consulting on proposed approaches.

Germany is currently the most advanced. Amendments to the Carbon Storage and Transport Law (KSpTG), adopted in November 2025, establish a clear legal basis for penalties linked to Article 23. The legislation empowers the Federal Ministry of Economic Affairs and Energy to specify how obligations are fulfilled and to impose fines per tonne of unmet injection capacity. The maximum penalty level is determined by the penalty for non-compliance under the EU Emissions Trading System (€100 per tonne adjusted in line with the European Consumer Price Index from 2012). In 2025, this penalty is €135/t, and could reach over €145 by 2030. This approach explicitly links penalties to the economic value of non-compliance and is designed to ensure that failing to deliver injection capacity is not financially advantageous.

Denmark and Poland are in the process of developing penalty frameworks, but neither has yet adopted an enforceable regime. In Denmark, a proposal was subject to public consultation in late 2025. Consistent with Danish legal practice, penalties were proposed to be applied through the courts rather than via set administrative fines. Under the proposal, failure to meet the obligation would trigger a criminal case, with fines calibrated according to criteria such as the cost of delivering the mandated injection capacity. This includes the cost of developing new storage sites or the cost of contracting third-party storage. This proposal also foresees adjustments for mitigation factors (e.g., unforeseen geological challenges) and aggravating factors (e.g., insufficient efforts to comply). While this model may allow for case-specific proportionality, it may offer less predictability than administratively defined penalties.

Box 2. Designing penalties under Article 23

Emerging national approaches to Article 23 penalties reflect two distinct design logics. One approach links penalties to a carbon-based metric, such as a per-tonne price aligned with the EU ETS. A second approach links penalties to the estimated cost of delivering compliance, including the cost of developing new storage sites, expanding existing capacity or contracting third-party storage. Each approach raises different trade-offs between predictability, proportionality, and administrative complexity.

Poland's draft CCUS legislation includes provisions on competent authorities and infringements, but the design of penalties remains at an early stage. No specific fine levels or calculation methodologies have yet been proposed.

All remaining Member States assessed – Italy, France, Austria, Ireland, Croatia, Hungary, Romania, and the Netherlands – have not introduced NZIA-compliant penalty regimes as of late 2025. In some cases, broader CCS or industrial decarbonisation legislation is under discussion, but penalties specific to Article 23 have not yet been defined. The absence of clear enforcement mechanisms in these jurisdictions raises questions about the credibility of compliance incentives in the short-term.

6. Stakeholder perspectives

This chapter presents findings from 17 semi-structured interviews conducted between October 2025 and January 2026. Interviewees included Member State representatives from relevant ministries and regulatory authorities, obligated entities, CCS project developers, industrial emitters and associations, technical experts, and civil society organisations. An overview of stakeholder distribution can be found in **Annex 3**.

The purpose of this qualitative pillar is to develop an empirically grounded understanding of how Article 23 is being interpreted, operationalised, and contested in its early implementation phase. The analysis explored stakeholder perspectives on design choices, implementation challenges, enabling conditions, risks, opportunities, and the anticipated future trajectory of the obligation. The analysis is exploratory in nature. It does not claim to be statistically representative of all affected actors, Member States, or obligated entities. Findings are presented in aggregated and anonymised form to protect interviewee confidentiality, and should be interpreted in light of the evolving regulatory context and ongoing legal proceedings.

A wide outreach effort was undertaken. However, due to ongoing legal cases related to Article 23 (see **Chapter 7**), several stakeholders who would otherwise have participated declined the invitation due to internal legal scrutiny and parallel regulatory processes. Additional interview rounds are planned for later in 2026 and 2027 to deepen and broaden the evidence base as implementation progresses.

6.1. Perceived rationale and legitimacy of Article 23

Across interviews, stakeholders broadly understood that the core rationale of Article 23 lies in breaking the long-standing deadlock in CCS deployment by mandating a defined volume of CO_2 injection capacity. The obligation was described as a mechanism to "*solve the chicken-and-egg problem*" (S15) that has hindered the development of a functioning CCS value chain in the EU. Other interviewees similarly framed the measure as a necessary intervention to overcome the "*deadlock*" that has marked the last two decades of European policy debate and limited project realisation (S12).

Stakeholders supported the assignment of responsibility for developing storage infrastructure directly to oil and gas companies, rather than sharing the burden with Member States. This allocation was justified on the basis of these companies' technical expertise in subsurface geology and their financial capacity to undertake large-scale infrastructure investments. One interviewee highlighted the benefit of placing "*responsibility back [onto] those who produce the matter which [...] causes the emissions",* while also suggesting that the

Commission's approach made more efficient use of existing industrial capabilities "*rather than asking Member States*" (S10).

Overall, 13 of 17 interviewees expressed support for the rationale of Article 23, three expressed mixed views, while one interviewee entirely opposed the policy. The support was often caveated: many stakeholders endorsed the underlying idea while raising concerns about design choices and feasibility. One interviewee described Article 23 as "*an excellent idea with very poor implementation and very poor regulation behind it*" (S8), capturing a broader pattern of conditional legitimacy.

Support for the measure was partly grounded in the view that establishing a functioning CCS market and full value chain requires Union-wide regulation. Breaking the longstanding CCS deadlock was seen as a prerequisite for enabling CCS to play a meaningful role within the EU ETS. This, in turn, was understood to require a coordinated European approach to market development rather than fragmented national initiatives. Participants further emphasised that an EU-level framework could provide stronger and more durable investment signals, observing that EU legislation "*does not just get changed overnight*" (S15).

Article 23 was widely regarded as a move in the right direction, described as "*moving the line*" and "*calling people to the table*" (S4), in many cases for the first time. This assessment was shared across stakeholder groups, including government representatives, industry actors, and the obligated entity.

Notwithstanding the broad support for the concept of the obligation, several reservations were expressed regarding its legislative design and its implications for the emerging CCS market. Some interviewees suggested that the measure was adopted under considerable time pressure and did not fully account for existing infrastructure constraints and project realities within the EU. Reflecting on the legislative process, participants noted that a more extended preparatory phase, whether in relation to the scope of the obligation, its timeline, or its quantitative targets, might have resulted in closer alignment with the current maturity and capacity of the European CCS market (S2).

Even where reservations were expressed, interviewees emphasised the importance of decisive legislative intervention in catalysing a European CCS market to contribute meaningfully to decarbonisation objectives, though support was framed as contingent upon credible implementation, regulatory clarity, and effective alignment with broader market development.

Table 10. Distribution of positions on Article 23 rationale

Position	Number of interviewees	Example framing
Supportive	13	Necessary push; accountability mechanism; unlocks deadlock
Mixed	3	Good idea in principle; strong concerns about design and feasibility
Opposed	1	Misalignment with existing developments

6.2. Design choices shaping early reception

Interview responses highlight recurring tensions around who should hold the injection capacity obligation and how targets should be calculated.

6.2.1. Institutional placement of the obligation

Many stakeholders viewed the approach of the Commission to directly legislate private entities as both innovative and politically significant. Several noted that shifting the burden to Member States could have created fiscal and political constraints, particularly where national budgets are limited. As one representative explained: "*oil and gas [...] have the knowledge, [...] expertise and the experience of developing this kind of infrastructure [...] I think it's a pragmatic solution*" (S9). A few regulatory authorities also expressed the view that placing the obligation on Member States, whereby Member States would divide the obligation among their energy producers, could have massively slowed down the process. This framing aligns with the logic of both accountability and efficiency in deciding who should bear the obligation for delivering injection capacity.

Others argued that there were sovereignty concerns arising from the limitation of the Member State's role in tailoring the obligation to the domestic context. A few stakeholders argued that several of the perceived policy design issues would not have occurred if Member States had been empowered to receive the overall targets and "*delegate to entities within [the Member State]*" (S8).

Some interviewees also raised potential conflicts around sovereignty and the Commission's overreach into Member State areas of competence. It is worth noting that these arguments were not primarily raised by Member State or regulatory authority representatives. Among those raising sovereignty concerns, the critique centred on the governance architecture rather than constituted a rejection of the policy objective itself.

6.2.2. Target calculation and transparency

A key issue that was raised by stakeholders surrounded the data and methodology used to create the storage target and the individualised obligations. Several raised concerns around fairness, transparency of data and methodology, as well as how targets were derived and communicated.

Amongst some stakeholders, there was support for the methodology applied. For example, some found that the pro-rata production-based allocation logic followed a similar approach to other EU-level environmental directives, including the Environmental Liability Directive and extended producer responsibility schemes in Waste Law. Some representatives expressed normative support, stating that linking the obligation to production volume reflects a clear polluter-responsibility logic (S15); in particular as higher production levels correspond with higher ability to pay and greater access to subsurface infrastructure.

One of the issues raised in interviews is the perceived fairness of the distribution of the targets. Several interviewees pointed out divergent levels of CCS readiness in the

jurisdictions they are operating in, including regulatory maturity and diverging availability of public subsidies for both those building and purchasing carbon storage capacity (see **Chapter 7** for litigation relevance). Questions were raised as to whether the allocation should have included a consideration of structural differences and readiness between Member States.

Related to the issue of fairness was the retroactive nature of the obligation. The obligation, calculated on the basis of production between 2020 and 2023, was described by some as counterintuitive or politically difficult to defend, both because of its retroactive nature and because of the years of production chosen. 2020–2023 covers both the Covid-19 pandemic and the European energy crisis, which saw uncharacteristically high domestic production by European oil and gas producers. Many of the concerns were not related to an opposition to the principle of oil and gas allocation but rather as discomfort with the temporal structure of the obligation.

A further recurring theme concerned transparency in the data collection and reporting process. Interviewees, including Member States and regulatory authorities, described uncertainty regarding the data required by the Commission for the allocation of individual targets and the methodology used to calculate historical volumes. It was raised that in some cases, divergent interpretations across countries appear to have contributed to perceptions of inconsistency. This perceived procedural opacity was explicitly linked to the legal challenges (see **Chapter 7**).

Importantly, however, the critique was directed less at the existence of targets and more at the clarity and communication surrounding their operationalisation. The tension lies in the early-stage institutional learning process associated with implementing novel regulatory instruments across diverse national contexts.

6.3. Implementation considerations: clarity, timeline, and missing value chain

Across interviews, a consistent finding is an implementation gap between the intent of Article 23 and stakeholders' confidence that it can be delivered as designed. This discussion connects to **Chapter 4**, which lays out the progress of obligated entities and corresponding injection capacity development. The gap is shaped by three linked issues: (i) ambiguity regarding the definitions of compliance, (ii) concerns regarding the feasibility of the 2030 timeline, and (iii) the limited scope of Article 23 relative to the full CCS value chain.

6.3.1. Clarity of regulation

Interviewees repeatedly highlighted uncertainty about what counts as compliance under Article 23 and what evidence will be considered sufficient. Participants raised questions, including:

- Is compliance defined by permit, FID, contracts, or operational injection?
- What constitutes sufficient progress by 2030?
- What documentation demonstrates reasonable effort for MS and entities?
- What qualifies for derogation?
- How will penalties be calculated and applied?

Several Member State representatives noted the difficulty with being able to justify the large investment necessary for compliance without a legislative definition of either injection capacity, compliance, or reasonable efforts. They expressed that the difficulty was further exacerbated due to the undefined penalty regime. One interviewee noted, "*If you don't know what the penalty is [...] and you don't have a very clear understanding of how you comply [...] it's difficult to attach a value to this*" (S5).

Several interviewees suggested that regulatory ambiguity can delay investment decisions. One interviewee noted that obligated entities and customers might postpone their decisions until there is more regulatory clarity (S3). Other Member State representatives echoed this sentiment, citing uncertainty in defining reasonable effort as a complicating factor in their derogation decision-making. In contrast, other stakeholders were clear that complete regulatory clarity is rarely achievable when working to deliver on time by 2030 target.

Moreover, one interviewee contended that the Commission has underplayed the structural importance of phasing out free allowances under the EU ETS. In their assessment, the phase-out is not merely a tightening measure but a demand-creation mechanism: by exposing emitters to the full carbon price, it generates a durable customer base for carbon storage. This reduces the risk that captured CO_2 becomes a stranded asset or a balance-sheet liability for obligated entities, and instead helps unlock a critical market segment within the Union. The constraint, they argued, is therefore less about regulatory clarity and more about market credibility - specifically, whether participants trust that the carbon pricing framework will remain stringent and predictable enough to sustain long-term investment.

> ***"You'll never get to the end of clarity. [...] No matter how much clarity they give, there will never be enough clarity" (S5).***

Stakeholders emphasised that a credible cross-Union penalty mechanism is essential to maintaining the integrity of Article 23. This includes relative penalty mechanisms uniformity to ensure that divergent penalty regimes do not undermine internal market coherence: "*[penalties] will encourage either incentivisation or disincentivisation of companies investing in storage in various countries*" (S8). Connected to this were concerns expressed by interviewees around national political willingness or administrative capacity to implement sanctions.

Table 11. Dimensions of regulatory clarity

Dimension	Key questions	Reported effect
Compliance definition	Permit vs. FID vs. operational capacity?	Hesitation in structuring projects
Derogation criteria	What counts as "reasonable efforts"?	National discretion and uncertainty
Penalty design	Level, timing, uniformity across Member States?	Difficulty pricing regulatory risk; national divergence
Data and reporting framework	What data had to be submitted by Member States and how should it be calculated?	Transparency concerns and legal challenges

6.3.2. Timeline feasibility

Many interviewees questioned whether the 2030 target is technically and institutionally realistic. Technical experts and regulators described multi-year exploration, permitting, environmental assessment, financing, and infrastructure development processes. The perspective that the timeline is unfeasible was raised more than once by representatives across stakeholder groups.

Several interviewees emphasised that the 18-month permitting clock under NZIA begins running only after site characterisation and application submission, meaning it does not capture earlier exploration phases that can take several years. However, some interviewees framed 2030 not as an absolute operational deadline, but as a milestone for demonstrating substantial progress (S15).

A recurring theme was that achieving the 2030 target, though challenging, may be attainable. Stakeholders suggested that carefully calibrated regulatory flexibility, signalled without compromising credibility, may be key to sustaining momentum. When asked whether the target was impossible, one interviewee responded in the negative, stating: "*Impossible is a strong word. [It will be] very, very difficult*" (S2).

Several interviewees noted that the feasibility of the prescribed timeline lies at the heart of the ongoing legal challenges (see **Chapter 7**). However, since the NZIA was adopted in 2024, subsequent delays cannot be attributed solely to regulatory design, but also reflect project- and firm-level decisions. This is particularly relevant given that the obligation may be fulfilled anywhere within the Union, including in Member States with comparatively advanced CCS regulatory frameworks.

Another point raised regarding the timeline was the difficulty of developing a first-of-its-kind project within a Member State by 2030. One stakeholder advocated for differentiated timelines based on the varying levels of maturity across Member States, noting that the short timeframe would likely concentrate carbon storage development in the same regions where it is already established. As they explained, "*I appreciate that part of why [Article 23] was introduced was to try to spread storage across the European Union and not just the North Sea. [In the current arrangement] this is not happening*". (S17)

6.3.3. Value chain considerations

A third pillar of the implementation gap centers on the limited scope of Article 23 relative to full-value chain CCS developments. Many stakeholders argued that focusing on storage capacity alone risks creating stranded assets if transport and capture do not develop in parallel: "*NZIA placed an obligation to develop injection capacity […] nothing has addressed transport*" (S8). Industrial stakeholders highlighted that capture investment decisions depend on credible guarantees that CO_2 can be transported and stored. One industrial emitter noted that a CCS market would not have materialised organically in the absence of mandated storage obligations, observing that currently "*there is no guarantee that when you capture the CO_2 in Europe, you can do something with it*", referring to the lack of storage availability (S6). Another

interviewee noted that the current design of the Article 23 obligation allows oil and gas companies to select storage locations based primarily on their own economic considerations. They observed that this flexibility may have downstream implications for transport planning, as storage and transport components were not developed through an integrated, cross-value-chain design process. As a result, storage sites chosen for commercial efficiency may not align geographically with the needs of industrial emitters, particularly hard-to-abate sectors for whom the obligation was ostensibly intended to create access, potentially increasing transport complexity and associated costs.

Several stakeholders described transport as the "missing link" and stressed that infrastructure planning must occur in parallel with storage development. Others defended the storage-first logic, arguing that credible storage sites are necessary to unlock infrastructure investment: "*If you have storage and permission, then the infrastructure will come*" (S14). The interviews, therefore, reveal a strategic sequencing debate on whether storage should provide the demand-pull for infrastructure development or whether coordinated infrastructure planning should precede storage investments.

6.4. Enabling conditions

Stakeholders consistently emphasised that Article 23 will only succeed if supported by parallel enabling conditions. Three elements were repeatedly highlighted: (i) funding support and financial de-risking, (ii) national regulatory preparedness, and (iii) public trust and long-term monitoring.

Many interviewees highlighted financial support as indispensable to unlocking storage development, particularly in the early phases of project development. One interviewee noted that early financial support – even if limited – has a catalytic impact, particularly with public funding as contractual agreements between governments and companies often specify a delivery date as a condition on funding transfer (S7).

Several stakeholders highlighted a persistent funding gap between ETS price signals and full CCS value chain costs, where some argued that "*without government support, without Carbon Contracts for Difference, without [...] de-risking tools [...] projects will not start*" (S1). At the same time, it was noted that uneven access to funding across Member States and competition for EU-level instruments remain a blocker.

Interviewees stressed that enabling implementation requires mature national regulatory frameworks and clear institutional roles. For some, this has not been the experience with NZIA, with responsibility for Article 23 of NZIA split between multiple government departments, agencies and regulatory authorities. In several jurisdictions, legislation implementation is ongoing, as highlighted in **Chapter 5**, particularly regarding Member State transport and geological storage regulations.

> ***"If you don't know what the penalty is [...] and you don't have a very clear understanding of how you comply" (S5)***

6.5. Opportunities and expected benefits

Across stakeholder groups, despite concerns regarding design and implementation, interviewees identified meaningful opportunities associated with Article 23, specifically in terms of institutional momentum, domestic co-benefits, market formation, and Europe's strategic positioning in CCS development.

Firstly, several interviewees described Article 23 as having catalysed CCS market interest within the Union. By introducing a mandated storage obligation, the provision was widely perceived as creating demand certainty in an otherwise nascent and fragmented market. As one interviewee noted, the regulation is "*moving the things around*" (S1). A Member State regulatory representative highlighted that Article 23 prompted increased regulatory staffing and internal focus on carbon storage and CCS value chain creation (S7). Industry representatives similarly observed that the obligation has accelerated engagement across the value chain, even where reactions have been mixed. As one interviewee explained, "*Emitters have been loving [it]*" (S8). Taken together, interviewees broadly perceived Article 23 as an accelerating force for projects, mobilising relevant authorities, and converting policy ambition into operational momentum.

Secondly, interviewees identified potential domestic economic and industrial co-benefits where enabling conditions align. In some Member States, the obligation has strengthened the case for permitting storage development and retaining industrial activity. One regulator expressed that it is an opportunity to develop different industrial facilities in regions that are underdeveloped, particularly regions where the oil and gas industry is disappearing (S2). It was also expressed that in jurisdictions with suitable geology, subsurface expertise, and regulatory readiness, the obligation was viewed as comparatively advantageous, enabling them to offer storage services to emitters across the Union. This, in turn, was framed as generating jobs and new industrial activity linked to subsurface management and infrastructure development. More broadly, interviewees positioned Article 23 as reinforcing a narrative of competitive decarbonisation. As free allowances phase out under the EU ETS, access to carbon storage was described as providing emitters with a compliance pathway that does not necessarily entail industrial relocation or a loss of competitiveness.

Thirdly, some interviewees characterised Europe as comparatively well-positioned to lead in CCS deployment under Article 23. One industry participant described Europe as "*apart from Canada, maybe the best place to be developing CCS*", citing regulatory maturity and funding stability (S17). The NZIA was frequently framed not as a disruptive intervention, but as a consolidation and refinement of an already evolving framework: "*It's not introducing a [fundamentally new] framework […] but building on it and helping the industry develop*" (S17). Storage development was also seen as aligned with the technical strengths of integrated energy companies, particularly in managing depleted fields and subsurface risk. Interviewees framed Article 23 as providing a regulated pathway for oil and gas companies to participate constructively in the energy transition.

6.7. Risks and unintended consequences

Stakeholders identified several perceived risks and unintended consequences related to the implementation of the Net Zero Industry Act that could potentially undermine the effectiveness of Article 23. These perspectives are summarised in **Table 12**.

Some of the issues raised may be addressed in the coming year through Member State action or further EU policy development, including the forthcoming CO2 Market and Infrastructure Regulation. Additional considerations for addressing these concerns are discussed in **Chapter 8**.

Table 12. Stakeholder perspectives on risks, challenges and unintended consequences

Category	Description	Select quotes
Regulatory uncertainty, transparency & litigation risk	Several interviewees linked perceived ambiguity to investor hesitation and diversion of industry resources toward litigation rather than deployment.	*"Clear, actionable policy is not saying we're going to give you an obligation on a methodology that we have not yet defined and then release the methodology and the definitions and the obligation a year later" (S8)* *"I mean like one of them, which we've kind of been pushing for a long time is what compliance looks like (...) Yeah, they're like, what allows you to qualify for a derogation? I don't think we ever found that either." (S17)*
Internal market coherence & governance tensions	Divergent national approaches to penalties, permitting, and political willingness risk uneven implementation across jurisdictions. Concerns were raised about potential distortions to cross-Europe investment and tensions between EU-level obligation and Member State control over permitting and resources.	"*It is not necessarily going to be an even system of penalties across all jurisdictions... and it will encourage either incentivisation or deincentivisation*" (S8) "*You end up potentially getting this conflict of interest where we can generate revenue off the penalties we assign you, but we also decide whether you can proceed*" (S8)
Administrative bottlenecks	Many interviewees questioned permitting complexity, legal appeals, infrastructure delays, and administrative constraints as structural risks to the 2030 target.	"*Some even say that 2035 is more realistic... maybe it will be faster, but it's good to make room for a more real-world suited regulation*" (S13) "*For the new carbon capture facility that they are planning in the cement plant in [X], I think they mentioned to us that they need 114 permits. Good luck [before 2030]*" (S6) "*The administrative and physical limits to speed this up is real*" (S13)
Value chain misalignment & infrastructure risk	A dominant concern relates to storage developing without parallel progress in capture and transport. Interviewees warned of stranded assets, pipeline delays, and lack of capture FIDs undermining storage viability.	"*There is no guarantee that when you capture the CO_2 in Europe, you can do something with it*" (S6) "*Maybe they will develop the projects that they prefer, not necessarily the projects which are most well located from an emitters standpoint and that could be an issue*" (S15)
Market design, profitability & competition dynamics	Interviewees raised concerns about both excessive and insufficient profitability. Some warned against natural monopoly pricing and market power; others cautioned that forcing unprofitable operations would undermine long-term storage development. Concerns were also raised about competitive impacts on independent storage operators.	"*If you make carbon storage operate at a loss... you will get no more [projects] than that*" (S8) "*In a monopoly, you need to regulate it*" (S3)
Geological, operational & political risk	Subsurface uncertainty, legacy well issues, and safety standards impose physical limits that cannot be accelerated by regulation alone. These risks intersect with political sensitivity and public acceptance challenges in some jurisdictions.	"*What happens [reputationally] if they set out to develop a million tons and end up at 0.6?*" (S5) "*The time needed to develop a project... depends on the reservoir and geological data*" (S1)

6.7. Future trajectory

Participants' forward-looking reflections on Article 23 converged on a set of structural priorities that extend beyond the initial design and focus on making Article 23 operate as a durable industrial instrument rather than a one-off obligation.

Several interviewees noted that the dual purpose of the obligation is to build up domestic European carbon storage capacity and enable hard-to-abate sectors to decarbonise. Some warned that legislators need to be more focused on hard-to-abate sectors (S4), suggesting that the needs of industrial emitters are underrepresented in discussions around this topic. Stakeholders also pointed to emerging offers from regions such as the Middle East that are promising cheaper energy and integrated CCS value chains. These dynamics are relevant not only to the obligation's present implementation but also to any post-2030 policy in this area.

Many interviewees described Article 23 as a necessary first step, but insufficient on its own. The next phase should focus on a coordinated infrastructure framework: "*Now that we have […] Article 23, we have at least some guarantee on […] storage. The next step is infrastructure*" (S6). As one interviewee noted, we need to "*see the Commission make sure that the whole value chain is ready*" (S13). This is related to forthcoming legislation from the European Commission, including but not limited to the CO_2 Market and Infrastructure Regulation.

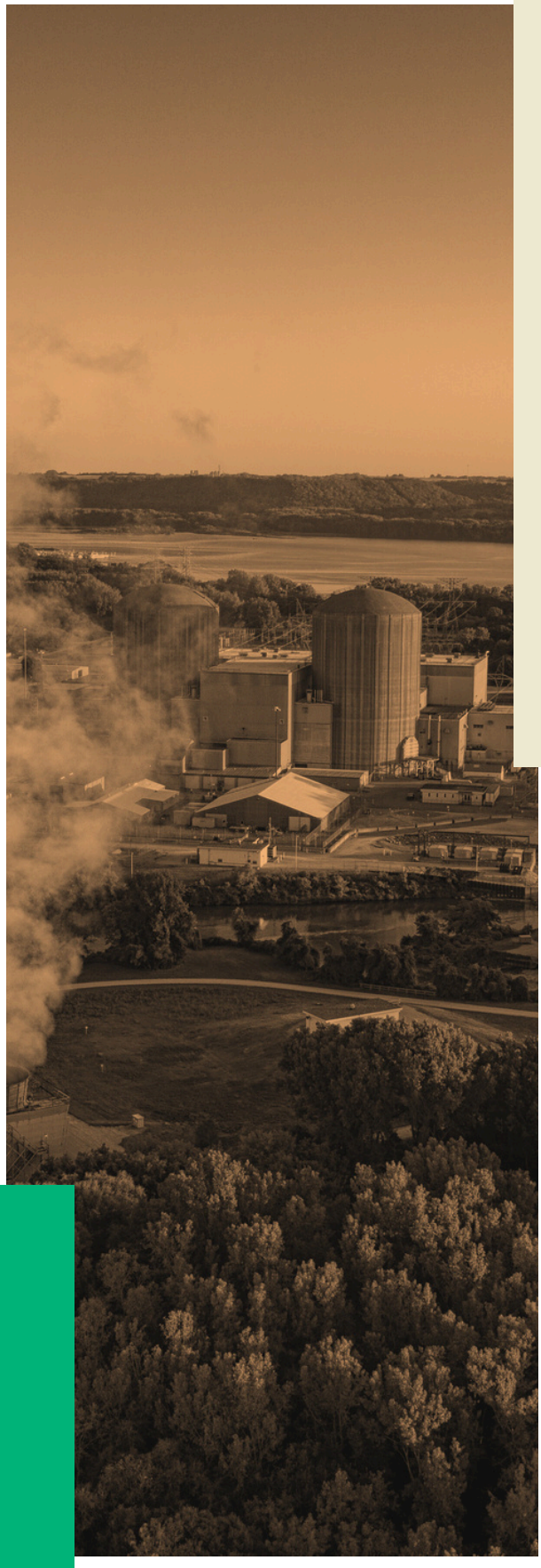
Interviewees stressed that without reducing risk exposure across the value chain, emitters will not commit at scale: "*we urgently need to address de-risking*" (S6). Interviewees highlighted various instruments, including Carbon Contracts for Difference (CCfDs) across Member States, ETS-based stabilisation mechanisms, liability waivers for temporary transport/storage failures, use of ETS revenues for financial support, and early-stage state-backed coordination of capacity.

A recurring structural recommendation concerned governance fragmentation at both the EU and national levels. One interviewee requested: "*I would like to have one convoy at the European Commission in charge of all the CCS and also at national level […] a one stop shop", and further reflected that various industries are "split between different DGs [and] different administrations*" (S4). Overall, stakeholders reported multiple ministries with partial mandates, a lack of cross-ministry coordination, and inconsistent maturity across Member States. For more information on Member State progress, see **Chapter 5** above.

Interviewees from several stakeholder groups called for improved engagement with the Commission. One interviewee requested that "*the Commission needs to come back to the table and listen*" (S4), with another noting that the current dialogue, or lack thereof, is "*creating a bigger kind of barrier and distance between the regulation and the stakeholders*" (S12). Improving communication could involve the implementation of structured dialogues and the issuance of additional guidance, rather than requiring the reopening of legislative files.

Some interviewees raised the question of expanding the geographic and entity (including

importers of oil and gas) scope of Article 23 beyond the EU, but emphasised that any such expansion should be approached cautiously and strategically. Discussions frequently referenced the potential inclusion of Norwegian and UK storage, given their advanced CCS frameworks, proximity to EU emitters and existing ETS price structures. However, stakeholders warned against ad hoc expansion without a clear regulatory rationale.[iv] As one interviewee noted, "*If we're including UK and Norwegian [storage], why are we not also including North African storage?*" (S8). This reflects a broader concern that geographic expansion raises questions of regulatory alignment, liability, enforcement, and competitiveness.



iv. A recent ruling by the European Free Trade Association (EFTA) Court clarified that the Norwegian continental shelf falls within the scope of the European Economic Area (EEA) Agreement, including activities related to offshore oil and gas extraction and offshore geological storage. Initial analysis suggests that Norway may therefore be required to adopt the Net Zero Industry Act (NZIA), including Article 23, which would distinguish its regulatory position from that of the United Kingdom and other non-EU neighbouring countries. Reference 15: Directive 2008/104/EC – Labour law – Temporary-work agencies – Homogeneity – Reciprocity – Applicability of the EEA Agreement to petroleum activities on the continental shelf of an EEA State – Seafarers. https://eftacourt.int/cases/e-06-25/

7. State of litigation

In October 2025, 12 of the 44 obligated entities initiated 15 actions before the General Court of the CJEU challenging Article 23 of Regulation (EU) 2024/1735 and its secondary legislation (Commission Decision 2025/1479 and Delegated Regulation 2025/1477). The companies bringing the cases are primarily seeking to have the implementing measures, including their individual targets, set aside, with some also bringing the legality of Article 23 itself into question.

The challenges concern both the substance and procedure of the obligation, alleging procedural deficiencies, infringement of fundamental rights and general principles of EU law, and overreach of the Commission's implementing powers. As a legal challenge does not automatically suspend the measure being contested, the storage obligation remains legally in force for the duration of the proceedings. Obligated companies are therefore expected to continue making progress toward their targets while the case is pending.

7.1. Litigating entities

The obligated entities bringing legal action include Romgaz, Tenaz (NAM Offshore), Vermilion Energy, Shell Italia, TotalEnergies Danmark, Italia and Nederland, RockRose Netherlands, Orlen Petrobaltic Poland, Nederlandse Aardolie Maatschappij, BEB Erdgas, ExxonMobil Netherlands, Black Sea Oil and Gas, and OMV Petrom. Collectively, these entities account for over 65% of the Union's total injection capacity target. Of the 12 litigating entities, only TotalEnergies is currently assessed as being on track to meet its 2030 obligation under present project timelines (**Chapter 4**).

7.2. Grounds of challenge

Legal challenges cluster around three broad categories: procedural concerns, substantive proportionality, and equality of allocation. These categories are not mutually exclusive, and most cases invoke multiple grounds. Procedural concerns are the most frequently raised, followed by substantive and equality arguments.

On **procedural grounds**, most entities contend that the design and adoption of individual targets lacked sufficient transparency, consultation, and access to the underlying data and methodology used by the Commission. One concern relates to the reference period for average production (2020–2023), which the litigants argue was selected without adequate justification. Entities also argue that individual targets relied on incomplete or inconsistent data submitted by Member States. There are likewise concerns over the absence of an impact assessment and public consultation, with entities arguing this constitutes a breach of Union procedural commitments.

Substantive challenges focus primarily on proportionality and economic rights. Applicants argue that the targets are excessive and insufficiently calibrated to market realities, particularly for companies without active CCS projects or operating in jurisdictions with limited geological potential or public support. They argue that less restrictive alternatives, for example, extended compliance timelines, could achieve the Union's carbon storage market objectives without imposing the burden of the current scale. This is argued despite the legislation's allowance for entities to create

carbon storage capacity anywhere within the Union, including in Member States where conditions are more favourable.

Several entities invoke the Charter of Fundamental Rights, arguing that the obligation infringes the freedom to conduct a business and the right to property. A further line of argument questions whether the Commission exceeded the limits of its conferred powers in adopting the Delegated Regulation and specifying individual contribution methodologies.

Equality and non-discrimination arguments oppose the strictly pro-rata allocation methodology based on historical production. These litigants contend that applying a uniform model fails to account for differing national circumstances, geological conditions, infrastructure availability, and market maturity, treating materially different situations alike.

7.3. Possible outcomes

Should the Court decide that an allegation carries merit, it has two principal options. Under Article 263 TFEU, it may order the annulment of the implementing measure in question, which is not Article 23 itself but rather the legislation setting out the pro-rata contribution and individual targets. Annulment would have a general effect, requiring the Commission to revise the measure for all entities, though Article 23 itself would remain in force. Alternatively, under Article 277 TFEU, the Court may declare Article 23 inapplicable in a specific case, exempting a particular obligated entity rather than invalidating the measure's application more broadly.

Given that the Article 23 obligation is designed primarily to establish a Union market for CO_2 storage services, this obligation falls within the remit of internal market policies. The Court typically grants the Commission a wide margin of discretion in these areas. Litigants therefore face a substantial burden in demonstrating a serious procedural defect, a clear excess of competence, or a manifestly disproportionate measure. The outcome of these proceedings will have significant implications for the trajectory of Article 23 and the broader development of the EU's carbon storage market.

It is essential that the ongoing litigation does not suspend entities in their compliance efforts towards their individual targets, as the obligations remain binding pending judgement. This underscores the importance of a clear and consistently applied enforcement framework at a Member State level. Effective, proportionate and dissuasive national penalties are necessary to ensure that obligated entities undertake a reasonable effort in complying with targets whilst the litigation is ongoing. Without meaningful enforcement mechanisms, the practical force of the 2030 target risks being undermined as proceedings continue.

This report summarises the arguments put forward by the litigating entities. It does not assess the merits of these claims or take a position on the grounds of litigation. Further analysis will be published by Article 23 Watch in spring 2026.

8. Looking ahead

Key takeaways

- **Article 23 is already influencing company planning, project development, and regulatory attention, but delivery gaps remain.**
- **The current project pipeline suggests that around 43 $MtCO_2$ per year of injection capacity could be realised by 2030,** with the Union-wide 50 $MtCO_2$ potentially reached closer to 2032 if projects proceed as announced and existing sites expand. However, several obligated entities still face significant shortfalls relative to their individual targets.
- **Implementation of the Net Zero Industry Act remains uneven across Member States.** While some countries have made progress in permitting frameworks, geological data transparency, and infrastructure planning, most have not yet introduced penalty regimes for non-compliance or fully operationalised the necessary administrative structures to support Article 23 implementation.
- **Stakeholders broadly support the rationale of Article 23 as a mechanism to unlock CCS deployment,** but concerns remain regarding clarity and guidance, timeline, and insufficient coordination across the CCS value chain, particularly transport and capture infrastructure.
- **Legal challenges brought by 12 obligated entities currently do not suspend the obligation,** and companies remain legally required to make progress toward their targets while proceedings continue. The cases focus primarily on procedural transparency, proportionality, and allocation methodology used to determine individual obligations.

The analysis in this report suggests that Article 23 is beginning to move the European CCS market in a meaningful direction. Across the current project pipeline, there is evidence of increasing momentum in storage development, and several stakeholders described the obligation as an important catalyst for accelerating planning and investment. While some obligated entities face large shortfalls based on their company storage development plans, there should be significant potential to reach agreements with other obligated entities with capacity surpluses or non-obligated developers. In the most positive outlook, the accelerated development of existing projects towards their maximum target capacities could bring the 50 Mtpa within reach by 2030.

However, announced project timelines often already reflect optimised development schedules, including rapid characterisation, permitting, and construction phases, and there is significant uncertainty around capacity estimates for pre-characterisation storage sites. There is therefore a pressing need for implementing measures, Member State policy, and other support which can create the optimum environment for rapid project development.

Looking ahead to 2026-2027, three issues appear particularly important. **First**, regulatory clarity is needed on what constitutes compliance, what evidence will be sufficient to demonstrate progress, guidance on how

Recommendations

1. **The European Commission should clarify how compliance with Article 23 will be assessed.** This should include clearer guidance on what constitutes sufficient progress, how "reasonable effort" will be interpreted, and how delays will be treated in practice.

2. **The European Commission should provide guidance on penalty design to Member States.** A more standardised approach would support consistency across Member States and reduce uncertainty for both regulators and obligated entities.

3. **The European Commission should clarify how agreements with third-party storage developers can count towards compliance under Article 23(5c).** This is particularly important where obligated entities rely on storage capacity developed by non-obligated entities.

4. **The 11 Member States hosting obligated entities should establish effective, proportionate, and dissuasive penalties by the required deadline of 30 June 2026.** Penalty regimes will be central to the credibility and enforcement of the obligation.

5. **Member States should strengthen the enabling conditions for storage development.** This includes lifting any restrictive legislation, making geological data widely available, opening up areas for exploration, and appropriately expanding their capacity to process storage permits.

obligated entities can enter into agreements with third-party storage developers (Art 23.5c), and how delay, derogation, and penalty enforcement will be handled in practice. Second, Member State implementation will be critical, particularly for those Member States with obligated entities on their territory to introduce effective, proportionate, and dissuasive penalties in a timely manner. All Member States planning to contribute CO_2 storage capacity must implement a number of other enabling measures required under the NZIA. This includes establishing key administrative and regulatory frameworks that facilitate the development of CO_2 storage projects, such as designated single points of contact for project promoters, centralised online access to fast-tracked permitting procedures, and clear administrative support. In addition,

Member States must ensure that national frameworks provide priority status for strategic projects, transparent geological data and reporting, and appropriate permitting timelines. Finally, progress is needed to develop legal and regulatory frameworks for CO_2 transport infrastructure and access, which will be essential to connect capture sites, hubs, and storage locations across Europe. **Third**, there is a clear need for better coordination across the CCS value chain – a responsibility shared between the EU and individual Member States.

The wider regional context may also become significant. Following the recent European Free Trade Association (EFTA) Court ruling on the scope of the EEA Agreement, Norway may be required to incorporate the NZIA, including Article 23. If implemented, this would require a proportionate upward adjustment of the storage capacity target that should be made available to European emitters and increase the overall scale of the obligation.

The stakeholder feedback and progress stocktakes communicate how, despite being challenging as a target, Article 23 is moving the CCS value chain in the right direction, towards deployment. Companies are already accelerating their storage progress and Member States are seriously considering how they can enable the development of this market.

There is now a need to build on this first step and advance a coordinated approach to value chain development. Informed by the forthcoming progress reports, the Commission, Member States and storage developers (both obligated and non-obligated) must work together to identify a viable pipeline of 50 Mtpa total project capacity, address any bottlenecks to deployment at the national or EU level, and develop an ambitious but achievable pathway to meet the target.

Article 23 represents a significant step towards establishing a functioning CO_2 storage market in Europe. While implementation challenges remain and further guidance is forthcoming, the regulation has already begun to generate momentum across industry and government. Continued coordination between the European Commission, Member States, and industry will now be essential to translate this momentum into large-scale CCS deployment in the coming decade.

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Annex 1. Obligated entity tracker

1.A. References and assumptions for CO_2 storage project tracker

Netherlands

Project	Relevant excerpt	Source
Porthos	"Porthos will store about 37 Mtonnes of CO_2, which is about 2.5 Mtonnes of CO_2 per year for 15 years." "Construction of the Porthos infrastructure started in early 2024. The system is expected to be operational during 2026."	Project - Porthos
Aramis*	Timeline: 2030, ready for start-up. Beyond 2030: Expansion and scale-up to 22 Mtpa.	Aramis CCS
	"To be able to launch the project, we aim to transport a minimum of 7.5 Mtpa of CO_2."	Aramis Brochure
	Aramis Launch Stores aims to market 5 Mtpa across both TotalEnergies and Shell sites. No timeline is provided.	Aramis Launch Stores
	"The transport infrastructure will be operated by a consortium that includes TotalEnergies, Shell, EBN and Gasunie, and plans to start operations with at least 5 Mt/year of carbon dioxide transported to storage locations under the North Sea. The total estimated storage capacity is more than 400 Mt."	Aramis - The CCUS Hub
Aramis (Shell)	"Shell Offshore Carbon Storage Solutions NL (SOCS NL) will offer CO_2 storage capacity in the Dutch sector of the North Sea and transportation solutions using Aramis infrastructure. The aim is to have the first store (3.7 Mtpa) operational by 2029-2030 with more capacity to become available after 2032."	Partner With Us To Meet Net Zero Targets | Shell Global
Aramis (Total Energies)	"Section on Project Aramis: "The project plans to start CO2 storage operations by 2029 with an initial capacity of 2.5 million tons CO2 per year, with future expansion planned."	TotalEnergies: Our vision
L10	"L10CCS is one of the large stores to be connected to the Aramis CO_2 transport and storage initiative in the Dutch part of the North Sea. L10CCS seeks to store 5 Mton CO_2 annually..." ;	L10CCS | Safe storage in the North Sea at low costs
	"The timeline of L10CCS is fully aligned with the Aramis project timeline with FID in 2025 and is planned to be connected and operational as of day 1 of the opening of this CO2 transport system, now planned in 2028."	L10CCS | Carbon Capture Storage
Kompas	Maximum capacity: approximately 15 $MtCO_2$. Up to 1.2 $MtCO_2$ is permanently stored annually. The expected start is planned for 2030.	Kompas is een project van ONE-Dyas – ONE-Dyas B.V

***Aramis-linked stores**: According to SOCS NL, Shell Aramis stores are allocated 3.7 Mtpa from 2030. However, combined with L10 and TotalEnergies Aramis stores, this brings the total for Aramis-infrastructure based sites to 11.2 Mtpa – over the 7.5 Mtpa targeted as the minimum launch volume for the offshore pipeline.

Annex 1. Obligated entity tracker

1.A. References and assumptions for CO_2 storage project tracker

Denmark

Project	Relevant excerpt	Source
Greensand	"In its first phase commercial phase, Greensand Future, Greensand aims to offer storage of 400,000 tonnes of biogenic CO2 per year - large volumes of which are readily available. Scaling operations in the coming years will see both biogenic and fossil CO2 stored with an ambition to reach full capacity of 4 to 8 mtpa stored by 2030."	Greensand Future Next Chapter
	"In addition, the maximum permissible volumes to be injected (total quantity of CO2 authorised to be geologically stored) have been set in the draft permit at a maximum of 2.4 million tonnes of CO2, equivalent to approximately 0.3 million tonnes per annum."	European Commission (2025) Commission opinion of 19.11.2025 on the draft permit to permanently store carbon dioxide in the Nini West area of the Danish continental shelf.
Bifrost	"As part of Project Bifrost, we aim to start CO2-injection in 2030 and develop a storage capacity of a minimum 5 million tons per year. "	TotalEnergies: Our vision - Bifrost
	"Phase 1 – Establishment of the Danish key infrastructure elements with Harald West and Dagny as storage sites: start up 2030 with 23 years of injection (global capacity mid-case 110 MT, average injection 4,8 MTPA)"	European Commission (2025) Executive summaries of the CO2 candidate projects; Bifrost.
Ruby	"A CO_2 storage facility on Lolland is expected to store up to 1.5 Mtpa for many years to come". "The schedule in brief: 2028-2030: Construction approval and commissioning." (machine translated from Danish)	Velkommen til Ruby projektet - Project Ruby
Greenstore**	"GEUS estimates that the subsurface in the Greenstore licence area may have a total storage capacity of up to 250 million tonnes of CO2." 2029, first half of the year: Possible first injection.	About Greenstore
	The Norne Project of Common Interest (PCI) encompasses CO_2 transport to both the Gassum (Greenstore) and Thorning structures, noting "Permanent CO2 storage is expected to ramp from 4.9 million tonnes per year ("MTPA") beginning in 2029, to 16.7 MTPA by 2031."	European Commission (2025) Executive summaries of the CO_2 candidate projects; Norne.
	Norne (at time of reference covering Gassum and Havnsø licences) is attributed 2.3 Mtpa of planned capacity before 2030.	KEFM (2024) Proposed bill on pipeline transport of CO_2 in Denmark. Presented at: Workshop CO_2 transport, Brussels, 29th April 2024.

****Greenstore:** As an annual injection rate is not provided by the storage project developers, we allocate Greenstore half of the 2030 target for the Norne PCI, which expects to ramp to 4.9 Mtpa across the Thorning and Gassum licences. This is also well within the bounds of the estimated total capacity (250 Mt) reported by the project.

Annex 1. Obligated entity tracker

1.A. References and assumptions for CO_2 storage project tracker

Denmark cont.

Project	Relevant excerpt	Source
CO2 Storage Kalundborg***	The surveying phase starts in early 2025. Site characterisation and testing will take four years. 'COD possibly end 2029'. CO_2 storage Kalundborg. Potential volumes: 3-12 Mt/y, total capacity estimated +250 Mt Norne (at time of reference covering Gassum and Havnsø licences) is attributed 2.3 Mtpa of planned capacity before 2030.	CO2 Storage Kalundborg Ulrik Olbjørn (2025) CO2 Storage Kalundborg. Presentation at: DTU CCS conference, slide 4 Søren Alsing (2025) Ørsted CCS business. Presentation at: WPAC conference, slide 11. KEFM (2024) Proposed bill on pipeline transport of CO_2 in Denmark. Presented at: Workshop CO_2 transport, Brussels, 29th April 2024.
Thorning (Norne)	"Norne is designed for large volumes of CO_2 and has the ambition to store over 15 million tonnes per year by mid-2030s." "aims to begin storing by 2030". No details on 2030 rate, or if this covers just Thorning or other sites. Framed as infrastructure as much as storage facility. "Permanent CO_2 storage is expected to ramp from 4.9 million tonnes per year ("MTPA") beginning in 2029, to 16.7 MTPA by 2031". But this also seems to include Gassum/Greenstore. Divide 4.9 Mtpa across both sites to give 2.45 Mtpa each.	Norne Carbon Storage Hub – CO2 Reception Facilities in Denmark European Commission (2025) Executive summaries of the CO_2 candidate projects; Norne.

***CO2 Storage Kalundborg**: An initial annual injection rate is not provided by the storage project developers, but a target injection range of 3-12 Mtpa is provided. We therefore conservatively allocate CO2 Storage Kalundborg half of 2.3 Mtpa originally allocated by KEFM to the Norne project (which at that time covered Gassum and Havnsø licences).

Annex 1. Obligated entity tracker

1.A. References and assumptions for CO_2 storage project tracker

Southern Europe

Project	Relevant excerpt	Source
Ravenna CCS	Annual CO_2 injection capacity by 2030: 4 Mtpa Annual CO_2 injection capacity beyond 2030: 16+ Mtpa	CCS Eni-Snam
Prinos	"The first phase of the Prinos Carbon Storage project is focused on re-purposing existing infrastructure and rapidly achieving an injection capacity of 1 MtCO2/year. The facility will be able to receive CO_2 in compressed form in 2026-2027". "The second phase of the project is designed to accommodate an injection capacity in the range of 2.8 MtCO2/year of liquid CO_2 by 2029-2030 for app. 20 years."	Prinos CO2
Prinos	"Phase 1 with an initial nominal capacity of up to 1 million tonnes of CO_2 per annum for 20 years" "Phase 2 envisages an expansion of the injection capacity of up to 3 million tonnes of CO_2 per annum" The storage permit covers Phase 1 only.	Commission opinion of 21.1.2026 on the draft permit to permanently store carbon dioxide in the Prinos field located on the Greek continental shelf
Tarraco2	"At a planned rate of 2 million tonnes per annum (Mtpa) of CO_2 equivalent." Entry into operation date: 31 December 2030.	TarraCO2 Innovation Fund
Pycasso	"Thanks to the capture of over 4 million tonnes (Mt) of both fatal and biogenic CO_2 emissions per year from 2032, rising to over 11 Mt from 2035".	European Commission (2025) Executive summaries of the CO_2 candidate projects; Pycasso.

Annex 1. Obligated entity tracker

1.A. References and assumptions for CO_2 storage project tracker

Central and Eastern Europe

Project	Relevant excerpt	Source
Bockovac	Geothermal CCS Croatia states 15.77 Mt cumulative storage over 25 years. Total capacity is 26 Mt. Start in 2031. However, Nasice developers target 0.7 by 2029. Have put 0.7 in 2030 and 1.5 final (potentially ambitious).	First Union list of PCIs and PMIs (EU) 2024/1041 of 8 April 2024.
Engas Golianova****	"The site is expected to hold up to 20 million tonnes of CO_2, roughly half the country's annual emissions. Annual injection rates could reach 1.5 million tonnes…"	ENGAS CCS - About CCS; Spectator (2025) Slovakia's first CO2 storage site takes shape
Danube Removal	"It will collect more than 500 000 tonnes of biogenic CO_2 per year." "The project will deliver over 1% of Europe's 2030 annual CO2 storage capacity target…" Entry into operation date: 30 September 2027	Danube Carbon - Danube Removals Project Danube Removals Project Innovation Fund
Carbon Hub CPT01	"It will enable Holcim to produce 2 million tons of near-zero cement per annum from 2032" "Another flagship CCS project in Romania is the one developed by Holcim, who also applied for a grant through the EU Innovation Fund. The project estimates that 1.2 million tons of CO_2 per year could be captured from multiple sources over a period of 20-25 years, with the minimum storage requirement for Holcim alone being around 25-30 million tons CO_2."	Carbon Hub CPT01 Romania's report under NZIA Article 21 (2025)
Devnya storage site	"The Fieni-Boteşti project is a major initiative in the field of geological CO_2 storage in Romania. It aims to store approximately 600,000 tons of CO_2 annually in a depleted onshore gas reservoir, with a total estimated capacity of more than 10 million tons." "The ANRAV project includes the capture of 800ktpa of CO_2 from Heidelberg's cement plant in Devnya, situated in the wider Varna region, followed by transport and permanent onshore storage at a location close to the facility." "…the Project is intended to be operational before 2030."	Romania's report under NZIA Article 21 (2025) EnEarth and Heidelberg Materials press release, 9 Dec 2025

****Engas Golianova:** No start-up date is provided on the project website. However, Engas social media posts have indicated a Phase 1 'anchor CO2 chain' would commence in 2027/2028 (target, indicative).

Annex 1. Obligated entity tracker

1.B. Company reports and presentations

Company Name	Company reports and presentations
OMV	Annual Report 2024 Annual Report 2023
OMV Petrom	Annual Report 2024
Shell	Annual Report and Accounts 2024 Shell Energy Transition Strategy 2024
ExxonMobil	Advancing Climate Solutions Report 2025 Annual Report 2024
Eni	Annual report 2024
Orlen	Management Board's Report on the operations of the ORLEN Group and ORLEN S.A. in 2024 Energy transition Nec temere, nec timide: neither timidly nor rashly in 2023 Consolidated Financial Results Q4 2024
Romgaz	Decarbonization Strategy 2025–2050 Consolidated Board of Directors' Report 2024
TotalEnergies	Universal Registration Document 2024 including the Annual Financial Report Sustainability and Climate 2025 Progress Report
Harbour Energy	Annual Report & Accounts 2024
Vermilion Energy	Annual Report 2024
MOL	Integrated Annual Report 2024
BlueNord Energy	BlueNord Annual Report 2024
Tenaz Energy	Third Quarter Interim Report 2025 Annual Report 2024
Nordsøfonden	Annual Report 2024
INEOS	Annual Report 2024
Energean	Annual Report 2024
Mitsui & Co	Integrated Annual Report 2024
Kistos	Annual Report and Accounts 2024
ONE Dyas	Annual Report 2024
TAQA	Reports Full Year 2024 Net Income of AED 7.1 Billion and Revenue of AED 55.2 Billion for FY2024

Annex 2. Member State tracker

Objective

This methodology outlines the criteria used by the Article 23 project to assess whether, and to what extent, EU Member States are implementing the enforcement and enabling measures required under the Net Zero Industry Act (NZIA). The Regulation obliges 44 oil and gas companies registered across the EU to develop 50 million tonnes of CO_2 injection capacity per year by 2030. The tracker's purpose is to provide an objective, evidence-based assessment of if and how effectively national legal, policy, and administrative frameworks enable and enforce this obligation to be undertaken by obligated entities. We evaluate if the enabling and enforcement structures required under the NZIA to help deliver the EU-wide obligation are in place, operational, and functioning as intended.

Scope

The tracker looks at NZIA obligations that impact the delivery of the injection capacity obligation of 50MtCO_2/annum of Article 23, including: single points of contact and online information, administrative support to projects, priority/public-interest status, permit-granting timelines for storage sites, publication of storage-suitable areas and geological data, annual reporting, CO_2 transport access and cross-border coordination, and penalties for non-compliance – focusing mainly on NZIA Articles 6, 7, 8, 15, 16, 21, 22, and 23.

Specifically, the tracker focuses on three objectives:

- **Assess national implementation and institutional readiness**: Verify that each Member State has put in place the necessary legal, institutional, and procedural frameworks to operationalise the relevant NZIA provisions. This includes the establishment of single points of contact, centralised online access, administrative support mechanisms, permitting timelines, and penalties for non-compliance, covering Articles 6–8, 15, 16, 22, and 23.

- **Evaluate practical enforcement and facilitation**: Determine whether Member States are effectively applying and enforcing these frameworks in practice, that permit processes are streamlined with sufficient administrative capacity, that CCS-related projects benefit from priority handling, and that enforcement mechanisms (including penalties) are active and dissuasive, covering Articles 6, 8, 15, 16, 22, and 23.

- **Monitor transparency and timely reporting compliance**: Confirm that Member States are meeting the NZIA's transparency and reporting obligations, including the publication of geological and project data, annual reports on storage and transport capacity, and information on cross-border coordination, to track transparency and accountability across the Union. The tracker also evaluates the timeliness and completeness of reporting, as timely and comprehensive reporting is essential for keeping the 2030 injection capacity target on track. This will cover Articles 21 and 22.

Annex 2. Member State tracker

The analysis focuses on Member State enabling and enforcement measures in Q4 2025, according to the criteria outlined below, with a specific focus on the 11 Member States where the 44 obligated oil and gas entities are registered: Ireland, France, the Netherlands, Italy, Austria, Germany, Denmark, Croatia, Hungary, Poland, and Romania. Only these countries are responsible for enforcing the injection capacity obligations under Article 23.

However, since injection capacity can be developed in any EU Member State (not only where obligated entities are registered) other countries may still play an important role by hosting storage sites. In such cases, enabling measures such as permitting, transport access, and administrative support will also be relevant. As it becomes clearer which Member States host injection capacity development that contributes toward the obligation, the tracker will gradually expand to include those countries as well.

Sources

Progress was primarily assessed through publicly available, official online sources. These include, but are not limited to:

- national laws and regulations;
- ministry websites and websites of relevant agencies (e.g., mining authority),
- Article 7 central online portal (once implemented);
- geological/CCS portals for storage-suitability (e.g., national geological surveys),
- maps and data from decommissioned fields
- permitting registers;
- Article 21 annual reports and National Energy and Climate Plans;
- publicly announced cross-border agreements;
- national funding programmes; and
- project-level documentation (annual reports, permits, FIDs, entry-into-operation).

Insights was also gathered through interviews with stakeholders in Member States around the implementation of Article 23. These insights may be used to update the tracker with Member State progress. A key question of qualitative engagement is that on the steps that Member States have taken and their progress thus far (laws, delegated acts, enforcement structures, penalties, data disclosure, etc.) to enable the implementation of Article 23.

Criteria & assessment

This section outlines the eight specific criteria assessed, including specific aspects for evaluation and their significance in enabling or enforcing the delivery of the Article 23 oil and gas obligation. While the information helps determine whether requirements have been met, we also, wherever possible, assessed the accuracy and adequacy of the reported outputs. The tracker's role is strictly factual: it looks at whether Member States have implemented the provisions of the NZIA in a proper, comprehensive, and timely manner, ensuring that obligated entities can meet their Article 23 obligations. It does not provide subjective opinions.

Annex 2. Member State tracker

Criterion 1: Single points of contact | Article 6

As of December 2024, each Member State had to establish or designate one or more single points of contact (SPOC) at the relevant administrative level. The SPOC should be the primary interface for project promoters during permitting and administrative processes for net-zero technology manufacturing projects (including strategic projects). It must

- coordinate and facilitate submissions,
- provide information on streamlined procedures via the Article 7 portal (described in Criteria 2),
- enable electronic document submission,
- avoid duplicative studies or permits (unless required by law),
- ensure easy access to dispute-settlement procedures,
- maintain adequate staffing and resources, and
- publish pre-application information requirements.

Where more than one SPOC exists, an online tool must help promoters identify the appropriate contact point.

Tracking the establishment and functioning of SPOCs is important because they directly enable project promoters to navigate permitting and administrative processes efficiently, reducing delays and barriers. Ensuring SPOCs meet these requirements supports the timely deployment of CO2 injection capacity, which is important for meeting the Article 23 obligation.

Assessment

- **Designation and accessibility**: Verify that a SPOC has been formally designated by the deadline at the relevant administrative level and that the contact details are clearly displayed. If multiple SPOCs exist, we will assess whether an online tool or guidance helps project promoters identify the appropriate SPOC, including for CCS projects specifically.

- **Functionality**: Assess the SPOC's overall functionality in fulfilling its core responsibilities: coordinating and facilitating submissions; providing information on streamlined procedures via the Article 7 portal; enabling electronic document submission; avoiding duplicative studies or permits (unless legally required); ensuring access to dispute-settlement procedures; maintaining adequate staffing and resources; and publishing pre-application information requirements.

Annex 2. Member State tracker

Criterion 2: Centralised online access | Article 7

Member States must make accessible all key information relevant to net-zero technology manufacturing projects (including Net-Zero Strategic Projects) online and in a centralised and easily accessible manner. The portal must include:

- the single point(s) of contact (described in Criterion 1/Article 6),
- the permit-granting process, including dispute-settlement information,
- information on financing and investment services,
- information on funding possibilities at the Union and national level, and
- information on business support services (e.g., corporate tax declaration, local tax, labour law).

Tracking the centralised portal is important because it ensures project promoters have easy access to all key information needed to navigate permitting, funding, and administrative processes efficiently. This transparency and accessibility support the timely deployment of CO_2 storage projects, which is important for meeting the Article 23 target.

Assessment

- **Existence and accessibility**: Verify that a centralised portal exists and is easy to locate, with a single landing page linked from relevant ministry sites.
- **Functionality**: Verify if the portal contains all required elements: the single point(s) of contact (Criterion 1/Article 6), the permit-granting process including dispute-settlement information, information on financing and investment services, details of funding possibilities at both Union and national levels, and information on business support services (e.g., corporate tax, local taxes, labour law). We will also assess whether the information provided is sufficiently detailed and practical to support project promoters.

Criterion 3: Administrative support | Article 8

Member States must provide administrative support to net-zero technology manufacturing projects to ensure timely and effective implementation. This includes:

- assistance with compliance with administrative and reporting obligations; and
- assistance in informing the public to increase acceptance; and
- assistance along the permit-granting process.

Tracking administrative support is important because it helps ensure that net-zero technology projects have assistance in navigating permitting, reporting, and public engagement, reducing delays and barriers. Effective support contributes to the timely deployment of injection capacity, which is important for meeting Article 23 obligation.

Annex 2. Member State tracker

Assessment

- **Identify the availability of any type of administrative support measures**, including but not limited to guidance notes and compliance/reporting tools; templates and FAQs for the permit process; and public-acceptance resources like communication toolkits.

Criterion 4: Priority/public-interest status | Article 15

Member States must ensure that Net-Zero Strategic Projects are processed as quickly as possible under both Union and national law. Where applicable, such projects must be granted the highest national significance, meaning they are recognised as being in the public interest, and, where relevant, of overriding public interest. Any dispute resolution, appeals, or judicial remedies related to these projects should be treated as urgent whenever national law provides such procedures.

Tracking this criterion is important because granting projects the highest national significance and ensuring their swift processing reduces delays. This can accelerate project deployment, which is important for achieving the Article 23 target on time.

Assessment

- **Applicable to CCS**: If a legal mechanism exists to grant projects the status of highest national significance/public interest, we will verify whether CCS projects designated as net-zero strategic have actually been granted this status.

- **Appropriate handling**: verify whether accelerated handling is evident in administrative practice, and if national law provides urgent procedures for disputes/appeals, in case of a dispute, it is handled accordingly.

Criterion 5: Permit-granting duration | Article 16

Member States must ensure that the complete permit-granting process for all permits required to operate a CO_2 storage site (under the CO_2 Storage Directive 2009/31/EC) is completed within 18 months.

Tracking this criterion is crucial because timely permitting of CO_2 storage sites is a prerequisite for meeting the Article 23 obligation.

Assessment

- **Verify that national rules or guidance** explicitly apply the ≤18-month cap to storage sites and clarify the scope of procedures included.

Annex 2. Member State tracker

Criterion 6: Storage transparency and annual reports | Article 21

As of December 2024, Member States must publish data on all areas where CO_2 storage sites could be permitted (including saline aquifers) and require former hydrocarbon license-holders to make geological data from decommissioned fields publicly available on a non-reliance basis, including (where available) cost assessments to enable CO_2 injection and notes on site suitability and transport availability/needs.

As of 2024, Member States must publish a report annually on:

- mapping of CO_2 capture projects and needs;
- storage and transport projects (with their permitting status, expected FID and entry-into-operation);
- national support measures (including cross-border);
- national strategy and targets for capture, bilateral/regional cooperation and its implications for non-discriminatory access; and
- an assessment of transport capacity versus capture and storage needs. If there are no storage projects, the report must set out plans to facilitate industrial decarbonisation, including cross-border transport and CO_2 utilisation where relevant.

Tracking this criterion is vital because transparent publication of data and annual reporting on storage potential, project status, and national strategies provide the foundation for coordinated CO_2 transport and storage development. This visibility enables investment, planning, and cross-border cooperation, essential for delivering the Article 23 obligation.

Assessment

- **Transparency**: Confirm that a public map/dataset of all storage-suitable areas has been published and is accessible (geological data from saline aquifers and decommissioned fields), including statements/reports on suitability and transport needs/availability, and that any available cost assessments to enable the injection capacity objective are provided.

- **Annual report publication**: Verify that Member States:
  - submitted their annual reports to the Commission;
  - the reports have been submitted on time (by the deadline of the end of December of each year).

- **Adequacy and accuracy of the content**: Assess completeness, adequacy and accuracy against the list provided in Article 21.2 of the NZIA. Where no storage projects are in progress, confirm the presence of plans, including but not limited to cross-border agreements and Memorandums of Understanding, to facilitate industrial decarbonisation and cross-border solutions.

Annex 2. Member State tracker

Criterion 7: Transport infrastructure & access | Article 22

Member States must take all reasonable efforts to develop the CO_2 transport infrastructure needed for storage.

Tracking this criterion is essential because developing adequate CO_2 transport infrastructure is a prerequisite for connecting capture sites to storage locations.

Assessment

- **Legal framework**: Verify if a national legal framework, plan or strategy for CO_2 transport infrastructure exists.
- **Fair third-party access rules**: Verify that national rules (if available) require non-discriminatory access to CO_2 networks and storage sites, and identify the competent authority for access decisions.
- **Cross-border coordination**: Confirm other evidence of coordination with other Member States (e.g. MoUs, regional CCS coordination).

Criterion 8: Penalties | Article 23

By 30 June 2026, Member States must establish penalties, via administrative procedures, legal proceedings, or both, for infringements by obligated oil and gas entities under Article 23. These penalties must be effective, proportionate, and dissuasive.

Tracking this criterion is important because clear and enforceable penalties ensure compliance by obligated entities, creating accountability for delivering the required storage volumes. Without effective, proportionate, and dissuasive penalties, the Article 23 obligation is at risk of not being met.

Assessment

- **Adoption and scope**: Confirm that a penalty regime has been adopted by 30 June 2026, is in force, names the competent authority, and clearly covers obligated entities and the relevant infringements under Article 23(3). In addition, if the European Commission publishes penalty guidelines, we will compare the national regimes to them and note any gaps or deviations.
- **Effectiveness, proportionality, dissuasiveness**: We will assess whether the penalties are likely to achieve compliance, taking into account their severity relative to the infringement, the potential impact on obligated entities, and whether they provide a credible deterrent against non-compliance. This includes evaluating the range of penalties available, how they are applied in practice, and whether they can effectively ensure that obligated entities meet their Article 23 obligations

Annex 3. Stakeholders: Analytical approach and coding methodology

Stakeholder distribution

Between October 2025 and January 2026, 17 semi-structured interviews were conducted with 22 individuals representing 16 organisations. Interviewees were selected to reflect a range of perspectives relevant to the implementation of Article 23 of the Net Zero Industry Act, including policymakers and regulators, obligated entities, CCS project developers, industrial emitters, technical experts, and civil society organisations.

Interviews were conducted under conditions of confidentiality. Findings are therefore presented in aggregated form throughout the report.

Table A.3.1. Summarises the distribution of interviewees by stakeholder group. To protect confidentiality, organisations and individuals are not identified.

Table A.3.1. Distribution of interviewees by stakeholder group

Stakeholder group	Number of organisations	Number of interviews
Member State (ministries/regulators)	3	4
Obligated entities	1	1
CCS project developers	2	2
Industrial emitters / industry associations	3	3
Technical experts (CCS / subsurface)	3	3
Civil society organisations	4	4
Total	**16**	**17**

Coding framework and thematic analysis

Interview material was analysed using a structured thematic coding framework designed to identify recurring perspectives on the design and early implementation of Article 23. The coding framework was developed prior to analysis based on the research questions and interview guide, and was subsequently refined as themes emerged during the coding process.

The initial coding structure consisted of a set of high-level analytical categories, each capturing a key dimension of stakeholder perspectives on Article 23.

During the analysis process, interview transcripts and detailed notes were coded using NVivo 15 qualitative analysis software. Each interview was reviewed and coded against the high-level categories above. Where relevant, additional subcodes were created to capture more specific issues raised by interviewees, such as regulatory clarity around compliance definitions and cross-border infrastructure coordination. Some themes were subdivided to reflect distinct analytical issues (for example, separating value chain challenges from broader regulatory uncertainty), while other codes were merged where interview material overlapped substantially.

Following coding, segments of interview material associated with each category were reviewed collectively to identify recurring patterns, points

Annex 3. Stakeholders: Analytical approach and coding methodology

of convergence across interviews, and areas of disagreement. These themes formed the basis for the analytical sections presented in **Chapter 6**.

To protect confidentiality, all interview material was analysed and presented in aggregated and anonymised form. Quotations are attributed only to numbered identifiers, and no information is included that could be linked to identifiable organisations or individuals.

Table A.3.2. Main analytical codes used in the stakeholder analysis

Code category	Analytical focus	Examples of sub-themes identified
Rationale and legitimacy	How stakeholders understand the purpose and justification of Article 23	Breaking CCS deployment deadlock; polluter responsibility; industrial policy
Design choices	Perceptions of how the regulation was designed and implemented	Institutional placement of obligation; target calculation; fairness of allocation; transparency of data
Implementation challenges	Barriers affecting delivery of the obligation	Regulatory uncertainty; permitting timelines; infrastructure gaps; value chain coordination
Enabling conditions	Conditions required for successful implementation	Financial support; national regulatory readiness; institutional coordination
Opportunities and benefits	Positive effects or expected advantages of the obligation	Market formation; increased regulatory attention; industrial development opportunities
Risks and unintended consequences	Potential negative impacts associated with the regulation	Regulatory uncertainty; market concentration risks; infrastructure bottlenecks; administrative constraints
Future trajectory	Stakeholder views on how the policy may evolve	Infrastructure planning; financial de-risking; expansion of storage markets

About us

Article 23 Watch is a joint initiative.

Carbon Balance Initiative is an independent think tank founded at the University of Oxford, working with academia to develop evidence-based policy pathways to reach the Paris Agreement temperature goals. In partnership with world-renowned research institutions, Carbon Balance translates climate science into practical, bespoke recommendations for policymakers, with the goal of reaching geological net zero for fossil fuel and industrial sectors. Visit us at carbon-balance.earth.

Clean Air Task Force (CATF) is a global nonprofit organisation working to safeguard against the worst impacts of climate change by catalysing the rapid development and deployment of low-carbon energy and other climate-protecting technologies. With more than 25 years of internationally recognized expertise on climate policy and a fierce commitment to exploring all potential solutions, CATF is a pragmatic, non-ideological advocacy group with the bold ideas needed to address climate change. CATF has offices in Boston, Washington D.C., and Brussels, with staff working virtually around the world. Visit catf.us and follow @cleanaircatf.

Bellona Europa is an independent, non-profit organisation that meets environmental and climate challenges head-on. We are result-oriented and have a comprehensive and cross-sectoral approach to assess the economics, climate impacts and technical feasibility of necessary climate solutions. To do this, we work with civil society, academia, governments and polluting industries. Visit us at eu.bellona.org

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