Market Intelligence Report

The European CCUS Market (Non-UK)

Carbon Capture, Utilisation & Storage

Prepared for: North East Scotland Energy Supply Chain Companies

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Executive Summary

Europe's carbon capture, utilisation and storage (CCUS) sector has crossed a defining threshold. In 2025 and 2026, the continent moved from a decade of feasibility studies and pilot programmes into real, industrial-scale deployment. Norway's Northern Lights project became the world's first open-access CO_2 transport and storage system, the Netherlands' Porthos completed construction of its offshore CO_2 injection wells, Denmark's Greensand Future reached Final Investment Decision, and Belgium's Kairos@C secured €260 million in EU-approved state aid. Across Europe, at least ten major CCUS initiatives reached FID in the 2024–2025 period, and over 130 projects are now underway across the Netherlands, Norway, Denmark, Belgium, France and Germany.

The scale of ambition is clear: the EU's Net-Zero Industry Act mandates 50 million tonnes of CO_2 injection capacity per year by 2030, rising to 280 million tonnes by 2040. The EU Industrial Carbon Management Strategy, adopted in February 2024, frames CCUS as a 'strategic net-zero technology' and commits the Commission to legislating a CO_2 transport infrastructure and market framework in Q3 2026. European carbon prices averaging €104/tonne in 2026 are making CCS economics increasingly compelling for hard-to-abate industries. The European CCUS market was valued at USD 13.72 billion in 2023 and is forecast to reach USD 41.81 billion by 2032 at a CAGR of 8.5%.

North East Scotland (NES) is exceptionally well-placed to capture a significant share of this market. The region's 50+ years of North Sea oil and gas experience has produced directly transferable capabilities in subsea well engineering, CO_2 pipeline design, offshore integrity management, subsurface reservoir characterisation, and offshore project management.

Metric	Data Point
European CCUS Market Value (2023)	USD 13.72 Billion
Projected Market Value (2032)	USD 41.81 Billion (CAGR 8.5%)
EU CO_2 Storage Target (2030)	50 Mt CO_2/year injection capacity
EU CO_2 Storage Target (2040)	280 Mt CO_2/year injection capacity
Active CCUS Projects in Non-UK Europe	130+ projects across 6+ countries
Northern Lights Phase 2 Capacity (2028)	5+ Mt CO_2/year
Porthos (Netherlands) Capacity	2.5 Mt CO_2/year (operational 2026)
EU Carbon Price (2026 average forecast)	~€104/tonne EUA

Section 1: European CCUS Market Overview

1.1 Scale and Investment Context

The European CCUS market has entered a sustained growth phase underpinned by binding regulatory targets, rising carbon prices, and the first operational projects demonstrating commercial viability at scale. The market was valued at USD 13.72 billion in 2023 and is projected to reach USD 41.81 billion by 2032 at a CAGR of 8.5%. Alternative estimates place the sector at USD 12.5 billion in 2024 growing to USD 45 billion by 2035 at a CAGR of 12.35%.

Global CCUS investment tripled to approximately USD 6.4 billion in 2024. Over 600 CCUS projects are in various stages of development globally, with a 15% year-on-year increase in activity.

1.2 EU Policy Framework and Targets

The EU has established the most ambitious regulatory framework for CCUS of any jurisdiction in the world. Key instruments creating demand for CCUS services include:

- EU Net-Zero Industry Act (NZIA): Sets a binding target of 50 Mt CO_2/year of injection capacity by 2030 and designates CCUS as a 'strategic net-zero technology.' Oil and gas producers are obligated to contribute.
- EU Industrial Carbon Management Strategy (February 2024): Sets an indicative target of capturing 280 Mt CO_2/year by 2040.
- EU ETS Carbon Pricing: EUAs forecast to average €104/tonne in 2026, making CCS cost-competitive for hard-to-abate industries.
- CO_2 Transport Infrastructure Legislation (Q3 2026): EU framework for planning, permitting, and governing CO_2 networks.
- EU Connecting Europe Facility (CEF): Supported Northern Lights Phase 2 and designated Porthos as a Project of Common Interest.
- EU Innovation Fund: Supported Greensand Future (€41M) and APOLLOCO_2 Greece (€169.3M).

1.3 Market Structure by Value Chain Stage

Value Chain Stage	Description	Key Services Required	Market Stage
CO_2 Capture	Separating CO_2 from industrial flue gas at point of emission	Process engineering, amine scrubbing systems, heat exchangers, compression, modular plant construction	Growing rapidly; FIDs accelerating
CO_2 Transport	Moving compressed/liquefied CO_2 from capture sites to storage hubs	Pipeline engineering, CO_2 shipping vessels, liquefaction terminals, flow assurance, metering	Infrastructure build beginning 2024–2026
CO_2 Storage	Geological injection into depleted offshore gas fields or saline aquifers	Well engineering, subsea injection systems, reservoir management, integrity monitoring	First commercial operations 2024–2026
CO_2 Utilisation (CCU)	Converting captured CO_2 into useful products such as e-fuels or chemicals	Chemical process engineering, synthetic fuel plant design, electrolyser integration	Early commercial; selected applications growing

Section 2: Country-by-Country Market Analysis

2.1 Norway — The World's First Commercial CCUS Market

Norway is the most strategically important CCUS market for NES companies. In 2025, the Brevik cement plant of Heidelberg Materials became Europe's first industrial facility to capture CO_2 at scale and store it permanently through the Northern Lights infrastructure. Northern Lights Phase 1, jointly operated by Equinor (33.3%), Shell (33.3%) and TotalEnergies (33.3%), handles 1.5 Mt CO_2/year at its Øygarden receiving terminal.

Following FID in March 2025, Northern Lights Phase 2 is under active construction targeting 5+ Mt CO_2/year by 2028. Phase 2 involves new onshore storage tanks, a new jetty, two new offshore injection wells, an extended subsea pipeline system, and expansion of the CO_2 transport fleet from four to eight purpose-built ships. The Hafslund Klemetsrud waste-to-energy capture project reached FID in January 2025 with a 10-year offtake agreement with Microsoft. Norway's Longship CCS programme has total government support of NOK 22 billion.

2.2 Netherlands — Porthos, Aramis and the Rotterdam Hub

The Netherlands is building the most sophisticated CO_2 transport and storage cluster in the EU. Porthos is operated by the Port of Rotterdam Authority, EBN and Gasunie. In February 2026 four former North Sea gas production wells were successfully converted into CO_2 injection wells, with first CO_2 injection targeted for autumn 2026. Porthos will store 2.5 Mt CO_2/year, with total storage capacity of approximately 37 Mt over 15 years. Aramis, the Porthos expansion project, is at FEED stage targeting 5–10 Mt CO_2/year at an estimated CAPEX of €2–3 billion.

2.3 Denmark — Greensand and the Baltic Sea Cluster

Project Greensand Future reached FID in December 2024, with storage operations commencing mid-2026 in the Nini West oilfield — the first fully operational offshore CO_2 storage site in the EU. Funded by €41 million from the EU Innovation Fund, the project targets 300,000 tonnes of CO_2/year initially, scaling to up to 8 Mt/year by 2030. Denmark has signed bilateral CO_2 storage agreements with Norway, Belgium, Germany and the Netherlands.

2.4 Germany — New Legal Framework and Industrial Decarbonisation

Germany underwent a fundamental legal reset for CCUS in November 2025 when the Carbon Dioxide Storage and Transport Act (KSpTG) entered into force. The new law lifted Germany's decade-long de facto ban on commercial CO_2 storage, creating a regulatory framework for offshore CO_2 storage in Germany's EEZ and a nationwide CO_2 pipeline transport network. Germany is deploying Carbon Contracts for Difference (CCfDs) through a €6 billion industrial decarbonisation programme rolling out from mid-2026.

2.5 Belgium — Kairos@C and the Antwerp Chemical Cluster

Belgium hosts one of Europe's highest-density clusters of industrial CO_2 emitters in the Port of Antwerp. The Kairos@C project, led by BASF and Air Liquide, will capture CO_2 from five plants in the Antwerp port area. In March 2026, the European Commission approved €260 million in Belgian state aid, targeting reductions of 1.5 Mt CO_2/year. The Antwerp@C consortium plans open-access CO_2 collection, liquefaction, and ship-loading infrastructure. Fluxys reached FID in 2025 on c-grid, a CO_2 transport pipeline network connecting Belgian emitters.

2.6 Italy — Ravenna CCS Hub and Mediterranean Ambitions

Italy's Ravenna CCS Hub, operated by Eni and Snam, started Phase 1 injection in 2024 at 0.25 Mt CO_2/year — the first CCS project to begin operations within EU offshore waters. Phase 2 targets 4 Mt CO_2/year by 2030, with potential expansion to 16 Mt CO_2/year post-2030.

2.7 France — Emerging Policy and Hard-to-Abate Industry

France is at an earlier stage of CCUS market development. France's hard-to-abate industrial sectors — cement, steel (ArcelorMittal Dunkirk), and chemicals — are under increasing pressure from EU ETS pricing. Heidelberg Materials has a French capture project preparing an EU Innovation Fund grant agreement.

2.8 Sweden, Finland and Baltic States — Cross-Border BECCS

Sweden is emerging as one of the most significant sources of CO_2 for export to Northern European storage facilities through BECCS. Stockholm Exergi's BECCS facility at Värtan reached FID and will capture up to 800,000 tonnes of biogenic CO_2/year, shipping it to Northern Lights for permanent storage from 2028 under a 15-year storage agreement.

2.9 Greece and Southern Europe — Emerging Infrastructure

Greece is making a significant early entry into European CCUS infrastructure with the APOLLOCO$_2$ project, backed by €169.3 million from the EU's 5th Innovation Fund. Led by DESFA, the project links CO_2 capture investments to the Prinos offshore storage site in the northeastern Aegean, with a 35 km CO_2 collection pipeline with initial capacity of 3 Mt CO_2/year, expandable to 5 Mt by 2034.

Section 3: Technology Landscape and Value Chain

3.1 Capture Technologies

Technology	How It Works	Key Applications	NES Relevance
Post-Combustion Capture	Separates CO_2 from flue gas after combustion using amine-based solvent absorption	Power plants, cement, waste-to-energy; dominant in most current European projects	Absorber/stripper column design, heat exchanger fabrication, compression systems
Pre-Combustion Capture	Converts fuel to hydrogen and CO_2 before combustion; CO_2 separated at high pressure	Hydrogen production from natural gas; refineries	Blue hydrogen plant engineering; pressure vessel fabrication
Oxy-Fuel Combustion	Burns fuel in pure oxygen to produce concentrated CO_2 flue gas	Cement (Heidelberg Materials Brevik), industrial boilers	Air separation unit integration, high-temperature materials engineering
BECCS	Combines biomass combustion with carbon capture — achieves net negative emissions	District heating (Stockholm Exergi), waste-to-energy (Klemetsrud, Oslo)	Biomass handling systems, capture module integration, CO_2 conditioning
Direct Air Capture (DAC)	Removes CO_2 directly from ambient air using chemical or physical sorption	Niche; growing with EU Innovation Fund support	Plant engineering; compressed air systems; heat integration

3.2 CO_2 Transport: Pipelines and Shipping

CO_2 transport is the infrastructure backbone connecting capture sites to storage locations. Pipeline transport is the dominant solution for large-volume continuous flows. Porthos has built a dedicated 20 km offshore CO_2 pipeline. Germany's new KSpTG creates the legal framework for a nationwide CO_2 pipeline network. CO_2 shipping is central to the Northern Lights model and to Belgium's and Sweden's cross-border approach. Northern Lights is expanding its dedicated ship fleet from four to eight purpose-built CO_2 transport vessels.

3.3 Offshore Geological Storage

Offshore geological storage in depleted gas fields and saline aquifers is the primary storage solution for European CCUS. Key technical requirements include:

- Well engineering: Conversion of existing production wells to CO_2 injection wells, drilling new dedicated injection wells, P&A of unsuitable wells
- Subsea injection systems: High-pressure injection manifolds, CO_2-rated trees and valves, subsea control systems compatible with CO_2 chemistry
- Reservoir characterisation: 3D seismic surveys, petrophysical analysis, reservoir simulation to assess storage capacity and integrity
- Integrity monitoring: Continuous subsurface monitoring for CO_2 plume migration, microseismic monitoring, wellbore integrity surveillance, offshore ROV inspection

- Long-term monitoring and reporting: Regulatory compliance monitoring for 20+ year periods post-injection

3.4 Carbon Utilisation (CCU)

Carbon utilisation converts captured CO_2 into valuable products, creating a revenue stream that improves project economics. Key CCU applications in Europe include synthetic e-fuels, methanol and synthetic methane production, CO_2-enhanced oil recovery, and mineralisation for construction materials.

Section 4: Regulatory and Policy Environment

4.1 EU Net-Zero Industry Act and Storage Target

The EU Net-Zero Industry Act (NZIA), adopted in 2024, is the single most important regulatory driver of European CCUS market growth. The NZIA establishes a binding target of 50 Mt CO_2/year of injection capacity in the EU by 2030 and identifies CCUS as a 'strategic net-zero technology.' Critically, the NZIA obligates oil and gas producers operating in the EU to contribute to this target.

4.2 EU Industrial Carbon Management Strategy

The Industrial Carbon Management Strategy (COM/2024/62), adopted on 6 February 2024, sets an indicative target of 280 Mt CO_2/year of capture by 2040. The Commission's 2026 Work Programme includes a legislative proposal on CO_2 transport infrastructure and market design, planned for Q3 2026.

4.3 EU ETS and Carbon Pricing

The EU ETS is the primary economic driver making CCUS commercially viable for European industrial emitters. EUA prices are forecast to average €104/tonne in 2026, making CCS cost-competitive for high-emission industries such as cement, steel and chemicals.

4.4 National Policy Highlights

Country	Key Policy Development	Status / Date	NES Implication
Norway	Longship CCS Programme; NOK 22 billion government support for Northern Lights	Operational since 2024	Immediate subcontract opportunities in Phase 2 construction
Netherlands	SDE++ support; CEF infrastructure funding for Porthos	Construction underway; injection H2 2026	Pipeline and well services; expansion design
Denmark	EU Innovation Fund €41M for Greensand Future; bilateral CO_2 storage agreements	FID Dec 2024; operations mid-2026	Storage well services; CO_2 shipping logistics
Germany	KSpTG in force Nov 2025; €6B industrial decarbonisation CCfD scheme	Law in force; CCfDs from mid-2026	FEED engineering; pipeline network design; long-term market
Belgium	Kairos@C: €260M EU-approved state aid; Fluxys c-grid pipeline FID 2025	EC approval March 2026	CO_2 collection pipeline; terminal engineering; shipping
Italy	Ravenna Phase 1 operational 2024; Phase 2 targeting 4 Mt CO_2/yr by 2030	Phase 1 operational	Well services; subsea engineering; offshore monitoring
Sweden	BECCS Stockholm Exergi FID; CO_2 shipping to Northern Lights from 2028	FID 2024	CO_2 conditioning; ship loading terminal; logistics
Greece	APOLLOCO$_2$: €169.3M EU Innovation Fund for Prinos storage	Funding awarded 2025/26	Emerging; pipeline engineering; subsea monitoring

Section 5: Key CCUS Projects in Non-UK Europe

The following table lists confirmed major CCUS projects at FEED, construction, or operational stages relevant to NES supply chain targeting.

Project/ Country	Operator(s)	Scale	Est. CAPEX	Status	Timeline	Key NES Opportunities
Northern Lights Phase 1 Norway	Equinor, Shell, TotalEnergies	1.5 Mt CO_2/yr	NOK 7.5B	Operational	2024/25 onwards	Ongoing monitoring, integrity management, O&M services
Northern Lights Phase 2 Norway	Equinor, Shell, TotalEnergies	5+ Mt CO_2/yr	NOK 7.5B (Phase 2)	FID Mar 2025 Construction	2028	Subsea pipelines, injection well drilling & completion, storage monitoring
Longship (Brevik Cement) Norway	Heidelberg Materials / Norwegian State	0.4 Mt CO_2/yr	~€2.1B	Operational	2025 onwards	Operational support; amine system maintenance; compression services
Hafslund Klemetsrud Norway	Hafslund Oslo Celsio	0.35 Mt CO_2/yr	NOK 22B (Longship total)	FID Jan 2025 – Construction	2028	Capture system engineering; CO_2 conditioning; pipeline connectivity
Porthos Netherlands	Port of Rotterdam, EBN, Gasunie + Shell, ExxonMobil, Air Liquide	2.5 Mt CO_2/yr	~€700M	Construction; injection H2 2026	2026	O&M services; metering systems; expansion design; flow assurance
Aramis Netherlands	Shell-led consortium	5–10 Mt CO_2/yr	€2–3B	FEED stage	Late 2020s	Full FEED/EPC supply chain; subsea pipeline design; well engineering
Yara Sluiskil Netherlands	Yara International	0.8 Mt CO_2/yr	Undisclosed	FID 2023 – Construction	2026/27	Capture plant engineering; pipeline connectivity; compression
Project Greensand Future	INEOS-led consortium	0.3–8 Mt CO_2/yr	€150M+ (Phase 1)	FID Dec 2024 Construction	Ops mid-2026	CO_2 shipping logistics; storage well services;

Denmark						subsea monitoring
Ørsted Kalundborg CO_2 Hub Denmark	Ørsted	0.5+ Mt CO_2/yr	Undisclosed	FID 2023	2027+	Capture engineering; pipeline services
German CCUS Pipeline Network Germany	Multiple industrial emitters	10+ Mt CO_2/yr	€5–8B estimated	Various – KSpTG Nov 2025	2030+	Pipeline network design; compression station engineering
Kairos@C Belgium	BASF, Air Liquide	1.5 Mt CO_2/yr	€260M state aid	EC approval March 2026	2027+	CO_2 liquefaction systems; ship-loading terminals; pipeline connections
Fluxys c-grid Belgium	Fluxys	CO_2 transport network	Undisclosed	FID 2025	2028+	Pipeline engineering; compression; metering; integrity management
Ravenna CCS Hub Phase 1 Italy	Eni, Snam	0.25 Mt CO_2/yr	€1–2B (full)	Operational 2024	2024 onwards	O&M; integrity management; Phase 2 well services
Ravenna CCS Hub Phase 2 Italy	Eni, Snam	4 Mt CO_2/yr	€2–3B	Development/ FID	2030	Full supply chain: wells, subsea infrastructure, pipeline engineering
BECCS Stockholm (Värtan) Sweden	Stockholm Exergi	0.8 Mt CO_2/yr	Undisclosed	FID 2024	Operations 2028	CO_2 conditioning; ship-loading infrastructure; shipping vessel O&M
APOLLOCO_2 (Prinos Storage) Greece	DESFA	3–5 Mt CO_2/yr	€169.3M EU IF	Funded 2025/26 – Dev	2028+	CO_2 pipeline engineering; offshore injection well services; subsea monitoring
Antwerp@C (Belgian Hub) Belgium	Port of Antwerp consortium	3+ Mt CO_2/yr	€2–3B total	Planning/FEED	2029+	Open-access terminal engineering; CO_2 collection infrastructure

Section 6: Supply Chain Gap Analysis

6.1 Overview of Supply Chain Demand

The European CCUS sector faces a structural supply chain challenge: ambition is accelerating faster than the available pool of specialist contractors, engineers, and equipment suppliers. The number of projects simultaneously reaching procurement stage across Norway, the Netherlands, Denmark, Belgium, Germany and Italy is creating demand that existing European CCUS supply chains cannot fully satisfy. This demand-supply imbalance is the commercial opening for NES companies.

6.2 Key Bottlenecks and Unfulfilled Demand

Supply Chain Category	Gap Description	Relevance to NES	Priority Level
Offshore Well Engineering & Completion	Very few contractors globally have experience drilling and completing CO_2 injection wells to HPHT specifications. Converting legacy gas production wells requires specialist CO_2-compatible metallurgy, cement formulations, and completion design.	Direct match: NES well engineering firms, directional drilling contractors, casing and cementing specialists have fully transferable skills	VERY HIGH
Subsea CO_2 Infrastructure	Subsea manifolds, CO_2-rated trees, flexible pipelines, control umbilicals, and ROV services for CO_2 injection systems are in acute short supply.	Aberdeen holds 75% of global subsea engineering capability — this is precisely the NES competitive advantage	VERY HIGH
Integrity Monitoring & Inspection	Long-term CO_2 plume monitoring, wellbore integrity surveillance, microseismic monitoring, ROV-based subsea inspection, and corrosion management are required for all storage sites over 20+ year periods.	NES subsea inspection, ROV, and integrity management firms are directly applicable. Acorn experience is a differentiator.	VERY HIGH
CO_2 Pipeline Engineering	Design, fabrication, and installation of onshore and offshore CO_2 pipelines is a specialist skill set.	NES pipeline engineering consultancies and fabrication firms have strong transferable capabilities from North Sea oil and gas.	HIGH
CO_2 Compression & Processing Systems	High-pressure CO_2 compression stations, CO_2 conditioning, and liquefaction facilities are under-supplied across European CCUS projects.	NES rotating equipment specialists, process engineering firms, and compression service companies are directly relevant.	HIGH
Reservoir Characterisation & Subsurface Services	Seismic survey and interpretation, geomechanical modelling, reservoir simulation, and storage site characterisation are required at every storage site.	NES subsurface service firms have deep transferable capability from North Sea operations.	HIGH
Project Management & Engineering Consultancy	FEED and EPCM management for complex offshore CCUS installations requires teams experienced in offshore infrastructure lifecycle management.	Aberdeen engineering consultancies (Wood, Vysus, Aker Solutions UK) and specialist PMCs are naturally positioned.	HIGH
CO_2 Shipping & Marine Logistics	Dedicated CO_2 transport vessels, loading arms, cryogenic terminals, and marine operations management are in short supply.	NES marine operations firms have strong LNG and cryogenic logistics parallels.	MEDIUM-HIGH
Digital & Measurement Systems	Advanced metering, CO_2 flow measurement, digital twins for storage management, and remote SCADA systems are needed.	NES digital technology and instrumentation companies can supply CO_2 metering, SCADA, and remote monitoring solutions.	MEDIUM

Section 7: Export Opportunities for NES Supply Chains

7.1 Transferable Skills and Capabilities

North East Scotland's oil and gas supply chains possess capabilities that are almost uniquely aligned with the technical requirements of European CCUS. The assessment by Scottish Enterprise of Scotland's CCUS supply chain identifies particular strengths in control and instrumentation, pumps and valves, subsea engineering, and operations and maintenance. The Acorn CCUS project at St Fergus has directly engaged NES engineering firms in CO_2 injection well design, pipeline feasibility, subsurface storage assessment, and project development. These Acorn credentials are directly transferable as evidence of European CCUS project experience.

7.2 Priority Target Markets by Tier

Tier	Countries	Rationale	Priority Actions
Tier 1 — Immediate (2026–2028)	Norway, Netherlands	Both countries have projects under active construction with procurement for specialist CCUS services underway now.	Direct engagement with Equinor, Northern Lights JV, Aker Solutions, Gasunie, and Rotterdam Port Authority; respond to FEED/EPC tenders; use INTSOK/Norwep
Tier 2 — Medium-Term (2026–2029)	Denmark, Belgium	Greensand Future is operational from mid-2026. Kairos@C and the Antwerp@C cluster are entering engineering procurement stages.	Engage INEOS (Greensand), Air Liquide, BASF and Fluxys procurement chains; explore CO_2 shipping and terminal engineering opportunities
Tier 3 — Developing (2027–2032)	Germany, Italy, Sweden	Germany's KSpTG creates a large long-term market. Italy's Ravenna Phase 2 is in development. Sweden's BECCS creates CO_2 shipping demand.	Monitor German CCfD procurement; engage Eni (Ravenna) through Italian consortium; explore Stockholm Exergi BECCS supply chain via Nordic contacts
Tier 4 — Emerging (2028+)	Greece, France, Baltic States	Greece's APOLLOCO$_2$ is funded and in development. France's hard-to-abate industries are beginning CCS feasibility.	Track EU Innovation Fund award lists; monitor French CCUS policy development; engage DESFA (Greece) through engineering consortium

7.3 Priority Capability Areas

Capability Area	Specific Services	Key Projects to Target	Competitive Advantage
Subsea Well Engineering & Completion	CO_2 injection well design, directional drilling, CO_2-compatible metallurgy, well intervention, P&A planning	Northern Lights Phase 2, Porthos well conversion, Ravenna Phase 2, APOLLOCO$_2$, German EEZ offshore wells	Aberdeen subsea engineering firms have direct technical capability; Acorn project experience is unique credential
Subsea Infrastructure Engineering	CO_2 subsea manifolds, flexible pipe systems, umbilicals, ROV-based installation and inspection	Northern Lights Phase 2 subsea pipeline extension, Porthos O&M, Aramis FEED, future German and Italian offshore systems	Aberdeen holds 75% of global subsea engineering capability
Integrity Management & Monitoring	Corrosion monitoring, wellbore integrity surveillance, CO_2 plume tracking, microseismic methods, ROV subsea inspection	All operational storage sites (Northern Lights, Porthos, Greensand, Ravenna) require ongoing monitoring	NES inspection and monitoring firms have 50 years of offshore integrity management experience

Pipeline Design & Flow Assurance	CO_2 pipeline sizing and design, flow assurance modelling for dense-phase CO_2 transport, corrosion inhibition systems	German CO_2 pipeline network development, Aramis expansion, Antwerp@C collection network, APOLLOCO_2 pipeline	NES pipeline engineering consultancies have deep transferable experience from North Sea
Compression & Process Systems	High-pressure CO_2 compressor specification, CO_2 dehydration, impurity removal, liquefaction for ship loading	Kairos@C, Antwerp@C terminal, Swedish BECCS ship loading, German industrial capture plants	NES rotating equipment and process engineering firms have direct applicability
Reservoir & Subsurface Services	Storage site characterisation, 3D seismic acquisition and interpretation, geomechanical assessment, reservoir simulation	German EEZ storage site development, Aramis storage assessment, emerging Greek and French storage evaluation	NES geoscience and reservoir engineering firms are world-class from 50+ years of North Sea work
Project Management & FEED/EPCM	Offshore CCUS FEED management, EPCM, project controls, commissioning, pre-operations qualification	Northern Lights Phase 2 (FEED ongoing), Aramis FEED, German project development, Ravenna Phase 2	Aberdeen has the highest concentration of offshore project management firms and engineers in Europe
Digital Solutions & Measurement	CO_2 flow metering, SCADA systems, digital twins for storage management, remote monitoring, AI-assisted anomaly detection	All operational sites need metering and compliance systems; German market building new digital infrastructure	NES digital technology and energy tech companies can supply CO_2-specific digital solutions

Section 8: Competitive Landscape and Key Players

8.1 Major Operators and Developers

Company	Country	Role in CCUS	NES Entry Point
Equinor	Norway	Northern Lights JV (33.3%); key operator across entire Norwegian CCUS market	Engage through Equinor Supply Chain; attend ONS Stavanger; leverage decommissioning relationships
Shell	Netherlands/Norway	Northern Lights JV (33.3%); Porthos customer; CO_2 transport and storage developer	Shell supply chain development; Porthos procurement contacts
TotalEnergies	France/Norway	Northern Lights JV (33.3%); French industrial decarbonisation projects	TotalEnergies procurement; monitor French CCS project pipeline
Gasunie	Netherlands	Porthos infrastructure operator; CO_2 transport network developer; Aramis project lead	Porthos/Aramis FEED procurement; Dutch gas infrastructure contacts
Eni / Snam	Italy	Ravenna CCS Hub Phase 1 operator; Phase 2 developer; Mediterranean CCUS ambitions	Eni CCUS procurement programme; Italian industry events
INEOS	Denmark	Greensand Future project lead; cross-border CO_2 storage pioneer	Greensand supply chain; INEOS UK contacts for introductions
BASF	Belgium/Germany	Kairos@C CO_2 capture operator; major German industrial emitter	Kairos@C procurement; BASF chemical engineering supply chain
Air Liquide	Belgium/France	Kairos@C capture operator; hydrogen and industrial gas specialist	Air Liquide CCUS supply chain contacts
Fluxys	Belgium	c-grid CO_2 transport network operator; major gas infrastructure operator	Gas infrastructure engineering procurement contacts
DESFA	Greece	APOLLOCO$_2$ project lead; Greek CO_2 pipeline and Prinos storage developer	Engage through EU Innovation Fund project supply chain
Stockholm Exergi	Sweden	BECCS Stockholm operator; cross-border CO_2 shipping to Northern Lights	BECCS supply chain; Nordic energy industry contacts
Heidelberg Materials	Multi-country	Brevik (Norway) cement CCS operator; projects in Belgium, France, Italy, Poland	Heidelberg Materials CCUS procurement; cement sector supply chains

8.2 Engineering and Technology Providers

NES companies compete in the CCUS supply chain alongside established European and global engineering firms. Key competitors and potential partners include Aker Solutions (Norwegian engineering, already positioned for Northern Lights Phase 2), SLB (global oilfield services with dedicated CCUS division), Baker Hughes (subsurface services and CCUS), TechnipFMC (subsea and offshore engineering), Wood PLC (Aberdeen-headquartered; pivoting to energy transition), Petrofac (EPCM), and Worley (project management). NES SMEs may partner with these firms as sub-contractors, particularly for projects where their scale or EU market presence is required to win prime contracts.

8.3 The NES Competitive Position

NES companies occupy an unusual competitive position in European CCUS markets: they have among the most relevant technical credentials in the world, yet their market visibility in Continental European CCUS procurement channels is limited. The primary competitive advantage — subsea engineering, well services, offshore integrity management, project management — is directly scarce in Europe. The primary competitive challenge — EU presence, certification, language, and established relationships with European developers — is an access problem, not a capability problem.

Section 9: Market Drivers, Risks and Barriers

9.1 Market Drivers

EU ETS Carbon Pricing: At ~€104/tonne in 2026, carbon pricing makes CCS commercially compelling for cement, steel, chemicals and refining. Hard-to-abate industries with no other viable decarbonisation pathway are now actively investing in capture technologies.

Binding Regulatory Targets: The NZIA's 50 Mt CO_2/year target by 2030 creates a legally mandated market, with oil and gas producers obligated to contribute. This is regulatory compulsion creating contractual demand for CCUS services.

Operational Proof Points: Northern Lights Phase 1, Porthos (Netherlands, 2026), Greensand (Denmark, 2026) and Ravenna Phase 1 (Italy) provide commercial proof of concept, de-risking the CCUS investment proposition for European industrial emitters.

Germany Market Opening: The November 2025 KSpTG removes Germany's decade-long de facto ban on CCS. With Europe's largest industrial base, Germany's entry represents the most significant long-term demand signal on the continent.

Cross-Border CO_2 Trade: Bilateral CO_2 storage agreements are creating a cross-border CO_2 market. The EU's planned Q3 2026 CO_2 transport infrastructure legislation will formalise and accelerate this, creating demand for shipping, logistics, and terminal infrastructure.

Industrial Emitter Economics: Hard-to-abate sectors face a binary choice: pay the EU ETS carbon price or invest in CCS. Heidelberg Materials, BASF, ArcelorMittal, and Yara are all committing capital.

9.2 Risks and Barriers

Risk / Barrier	Severity	Mitigation
High upfront capital cost of CCUS infrastructure	High	EU ETS pricing, Innovation Fund grants, CCfDs, CEF funding, and government loan guarantees are reducing effective project cost.
Permitting complexity and delays	High	Germany's KSpTG streamlines permitting; EU NZIA fast-track status for strategic projects; planned CO_2 transport legislation in Q3 2026 will create standardised frameworks.
Reservoir performance uncertainty for offshore storage	Medium-High	Extensive pre-injection characterisation; Porthos and Northern Lights demonstrating reliable reservoir performance in North Sea formations.
CO_2 pricing/offtake risk for emitters	Medium	CCfD mechanisms provide long-term price certainty; EU ETS trajectory makes CCS economics increasingly robust above ~€80/tonne.
Limited European CCUS specialist contractors	Medium	This is the opportunity for NES companies — projects may face delays finding qualified suppliers. NES firms should position early in FEED phases to be qualified.
Post-Brexit CE Marking and EU Access	Medium	Establish EU subsidiary (Ireland/Netherlands preferred); ensure CE marking compliance; enter market through EU-registered consortium partners or joint ventures.
Public acceptance of geological CO_2 storage	Medium	Positive track records from Northern Lights, Greensand and Ravenna are building public confidence.
Technology risk (CO_2 corrosion, well integrity)	Medium-Low	Proven CO_2-resistant materials and completion designs exist; operational experience from Sleipner (since 1996) provides decades of precedent.
Competition from Asian/US engineering firms	Low-Medium	EU NZIA preference for European value chains and CBAM create structural advantages for NES/European suppliers in EU-funded projects.

Section 10: Strategic Outlook and Recommendations

The European CCUS market has crossed from aspiration to execution. The combination of binding regulatory targets, rising carbon prices, operational proof points, and major new project FIDs creates a long-duration, high-value market for specialist supply chain services. Germany's entry — the largest industrial economy in Europe — confirms that CCUS is not a niche technology but a mainstream industrial decarbonisation tool. The EU's planned Q3 2026 CO_2 transport infrastructure legislation will mark the next structural acceleration.

For NES energy supply chain companies, the strategic conclusion is clear: the technical credentials exist, the demand is growing, and the window to establish first-mover supply chain relationships in Norway, the Netherlands, Denmark and Belgium is open now.

Priority Recommendations

1. Make Norway Your CCUS Beachhead

Norway is the most immediately accessible and strategically aligned European CCUS market for NES companies. Northern Lights Phase 2 is under active construction with procurement for specialist services ongoing. NES companies should establish direct relationships through INTSOK/Norwep, ONS Stavanger (August 2026), and through Equinor's formal supply chain development programme.

2. Target Porthos O&M and Aramis FEED in the Netherlands

Porthos enters operations in autumn 2026 and will immediately require O&M services for its offshore injection infrastructure, measurement systems, and onshore compression. NES companies should engage Gasunie, the Rotterdam Port Authority, and the Netherlands Enterprise Agency (RVO) now, while projects are still in relationship formation stages.

3. Engage Greensand and the Danish CO_2 Shipping Market

Greensand Future commences operations mid-2026 and has ambitions to scale to 8 Mt CO_2/year by 2030. Denmark's bilateral CO_2 storage agreements will create significant cross-border CO_2 shipping logistics demand. NES companies in marine engineering, CO_2 ship design, terminal operations, and subsea storage monitoring should engage INEOS (Greensand lead) and the Danish Energy Agency.

4. Position Early in Germany's Emerging CCUS Market

Germany is the single largest long-term CCUS market opportunity in Europe. Engineering feasibility studies, site characterisation work, and FEED contracts will begin procurement from late 2026 and 2027. NES companies should attend German energy transition industry events and identify partnerships with German engineering firms seeking North Sea offshore expertise.

5. Leverage the Acorn CCUS Credential Systematically

The Acorn project at St Fergus is one of Europe's most technically developed CCS initiatives. NES companies involved in Acorn development work have a unique and highly bankable credential for European CCUS markets. This involvement should be documented systematically in capability statements and procurement pre-qualification submissions.

6. Establish EU Legal Presence

Post-Brexit, the single most structurally impactful step for NES companies with European CCUS ambitions is establishing an EU-registered subsidiary. Ireland (English language, common law, energy sector presence) or the Netherlands (proximity to Rotterdam CCUS hub) are the recommended jurisdictions.

7. Form Multi-Discipline CCUS Consortia

European CCUS operators increasingly prefer supply chain partners that can offer integrated multi-discipline capability packages. NES companies should form structured consortia combining: well engineering + subsea inspection + reservoir monitoring, or pipeline engineering + flow assurance + integrity management.

8. Engage Scottish Development International and ETZ CCUS Programmes

Scottish Development International's CCUS capability marketing programme, and the Energy Transition Zone's international export development activity, are specifically focused on helping NES firms win business in European low carbon markets. NES companies should actively participate in SDI export missions and utilise SDI market introduction services in Norway and the Netherlands.

9. Monitor EU Innovation Fund Award Lists

The EU Innovation Fund is the primary mechanism funding European CCUS projects. Each funded project represents a defined supply chain procurement opportunity with publicly named developers. NES companies should monitor Innovation Fund award announcements and immediately identify engineering procurement channels for each funded project.

10. Track the Q3 2026 EU CO_2 Transport Infrastructure Legislation

The European Commission's planned Q3 2026 legislative proposal on CO_2 transport infrastructure and markets will be the most important regulatory signal of the decade for the CCUS supply chain. NES companies should track this legislation closely and use it as a trigger for accelerating European market entry discussions.

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Report compiled by ExportCentral AI | Sources: EERA CCS, EU Commission, Northern Lights, Porthos, Project Greensand, CCSA, Carbon Herald, ING, DNV, Scottish Enterprise, SDI, and primary project disclosures. All data reflects the most recently available public domain information as of April 2026. Market conditions and project timelines are subject to change.

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