

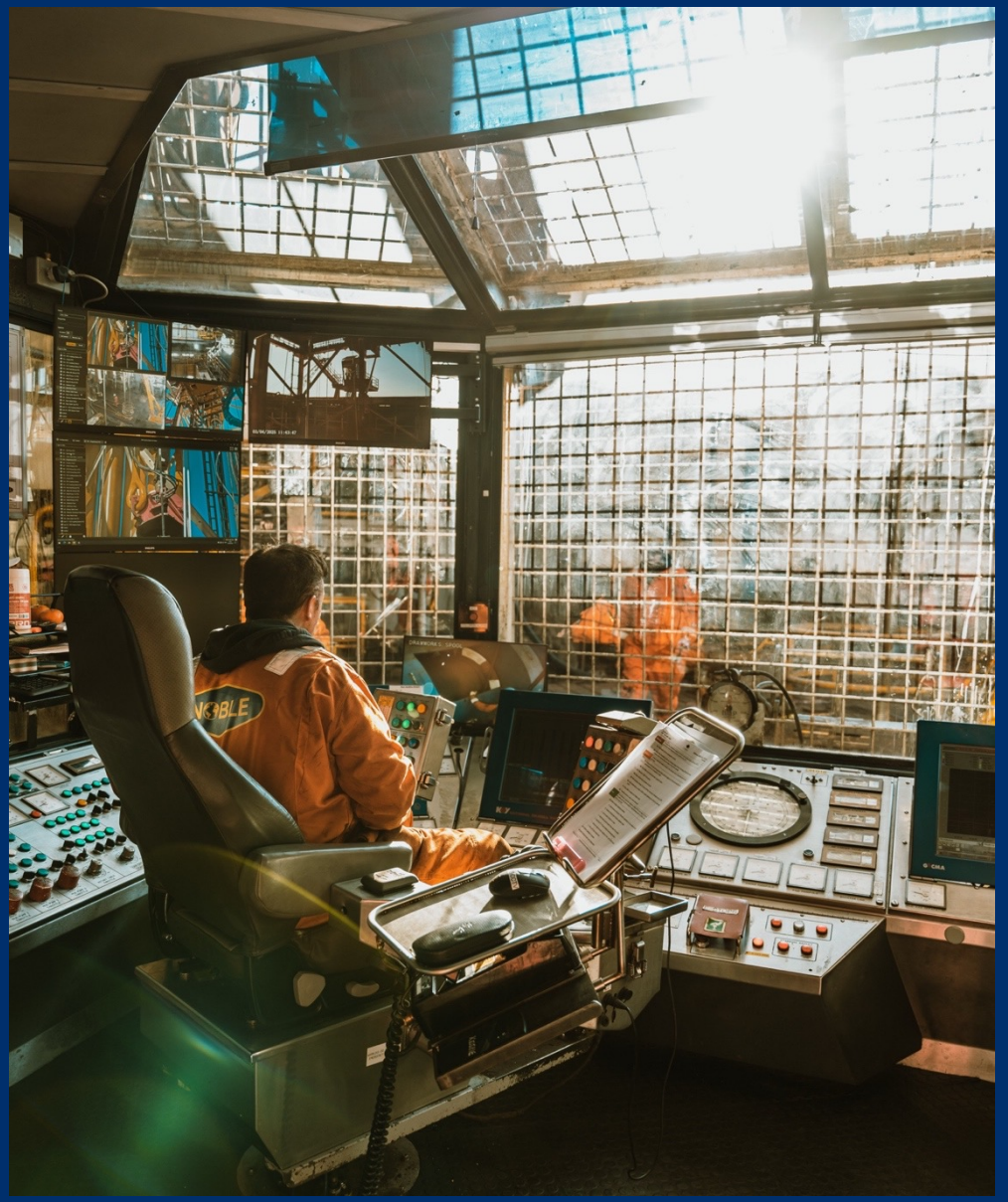
Noble's Electrical CO_2 Enabler (ECE)

A modular, deployable CO_2 well-control solution

NOBLE

Offshore CCS is moving into field life, but the current drilling systems were not designed for high-CO_2 service.

That gap creates a new requirement for drilling, intervention, and well-control readiness.



Capability on demand

ECE delivers CO_2 drilling readiness without a full rig upgrade

A modular approach shifts planning from permanent rig conversion to on-demand capability, available only when the program requires it.

Permanent rig conversion

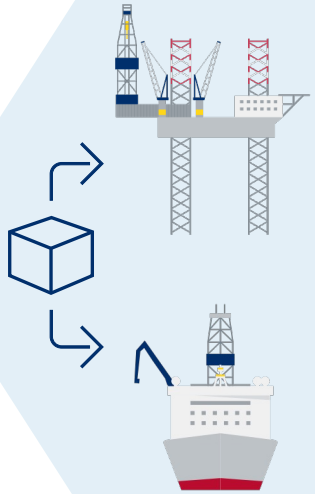
~$22–34M
Estimated deployment cost

30-120 days
Estimated rig downtime

Single rig commitment
Capability locked to one hull

Repeated per rig
Each new rig requires a new upgrade





Modular ECE approach

~$18M
Estimated initial deployment

0 days
Estimated rig downtime

Portable/shared
Capability moves across rigs or programs

Repeat-unit model
Reduced future expansion cost

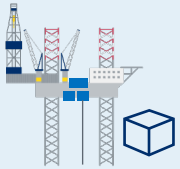
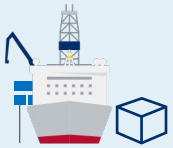
All figures are Noble estimates. Subject to project-specific assumptions.

Plan for CO_2 capability across programs, not one converted rig at a time.

Deployment flexibility

ECE follows your drilling program

Example campaign sequence: permanent rig conversion vs. the modular ECE approach

Period 1: UK Jackup – Oil and gas drilling Task: Conventional drilling	Period 2: UK Jackup: Early offshore CO_2 injection Task: New injection well / early field activity	Period 3: Denmark Drillship: Unplanned CO_2 intervention Task: Intervention / well control response
Permanent rig conversion • Conventional drilling proceeds on available Jackup  JACKUP 1	• Program waits for or plans around the converted rig • 30-120 days downtime  JACKUP 2 CO_2 CONVERTED	• Intervention depends on converted rig availability • Capability remains fixed to one rig type  JACKUP 2 CO_2 CONVERTED
Modular ECE approach • CO_2 Capability added when required  JACKUP 2	• ECE added to available Jackup on site • 0 days rig conversion downtime  JACKUP 2 + ECE	• ECE moved to available drillship • Capability deployed where needed • 0 days rig conversion downtime  DRILLSHIP 1 + ECE

Conventional activity → Planned CCS activity → Unplanned CO_2 response

Qualified system requirement

CO_2 exposure changes the well-control requirement

Intervention, infill drilling, and well-control response can expose legacy systems to CO_2 conditions they were not designed to handle.

Where CO_2 exposure appears

Workovers / interventions

Re-entering or maintaining CO_2 injection wells

Infill / new injection wells

Drilling where CO_2 may already be present

Relief / well-control response

Circulating out influx or managing unplanned CO_2 exposure

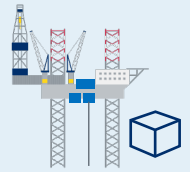
What CO_2 can change

CO_2 concentration	Potential high-CO_2 exposure during well-control events
Phase behavior	Multiphase flow through the handling system
Pressure / temperature	Conditions driving phase change and cooling effects
Water / impurities	Corrosion and contaminant assumptions
Exposure duration	Dynamic circulation case and static hold cases
Equipment interface	Which surface and well-control equipment may be exposed

How ECE addresses the requirement

ECE delivers CO_2 capability without permanent rig conversion

- Moves capability between suitable rigs and campaigns
- Uses a modular CO_2 handling architecture
- Limits exposure of legacy well-control equipment
- Focuses development on the added CO_2 system and critical interfaces
- Reduces dependence on a single converted rig



From permanent rig conversion to deployable CO_2 capability.

ECE system architecture

Designed around the CO_2 exposure envelope

From defined exposure cases to a deployable CO_2 handling architecture.

Core design principles

- Dedicated CO_2 handling and shut-in architecture
- Deployable across suitable rigs
- Isolates legacy well-control equipment from CO_2 exposure
- Integrates materials, flow handling, pressure containment, and system interfaces



From concept to qualified solution

From defined architecture to validated solution

Building on qualification, testing, simulation and rig trials, the 2027 program validates four core subsystems with operator input.

Foundation established

- Qualified the concept
- Defined the industry gap
- Developed the ECE approach
- Established the planning model

2027 engineering focus

Operating philosophy

- System architecture
- Scenario analysis



Materials qualification

- Metallic qualification
- Corrosion testing

Flow handling and surface systems

- Degassing systems
- Choke management



High-pressure containment

- Containment strategy
- Equipment interfaces



Operator input shapes the 2027 validation program.

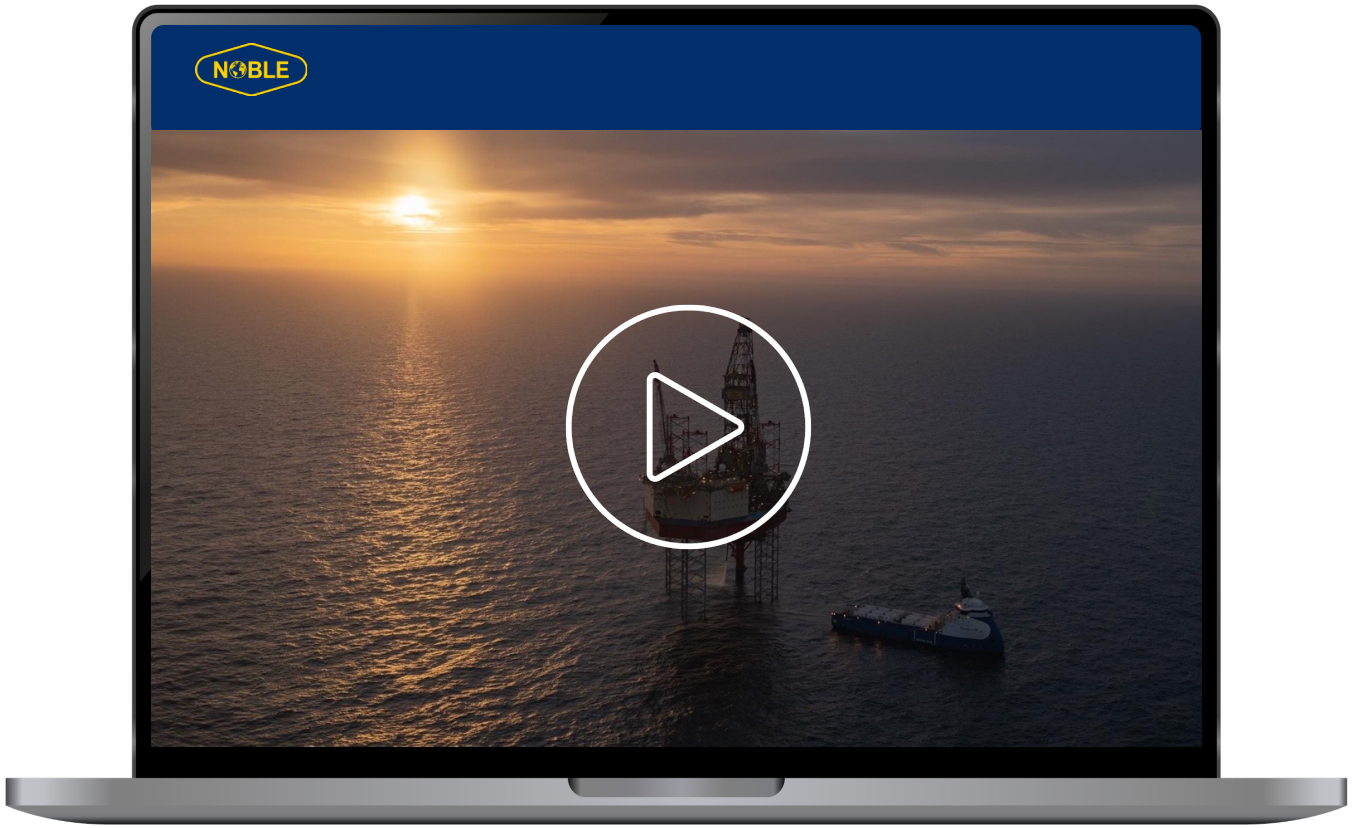
Project Greensand

Operational experience informed Noble's CO_2 qualification pathway

Through Project Greensand, Noble gained operational context for offshore CO_2 storage: CO_2-specific procedures, safety assumptions, qualification work, and the need for reliable well-control readiness.

What Project Greensand helped establish:

- A real offshore CO_2 storage setting
- Practical input into Noble's CO_2 qualification and de-risking work
- Operational context for drilling, intervention, and response scenarios



Watch the video here

Qualification pathway

ECE is progressing through a structured qualification process

DNV-supported qualification work has identified the CO_2-specific risks that now define the 2027 engineering and validation program.



Qualification basis

Noble partnered with DNV using **DNV-RP-A203** to assess CO_2-specific operational risks, failure modes, and mitigation work.

1. Assess

CO_2-specific risks, exposure cases, and operating scenarios

2. Qualify

Testing, simulations, studies, and mitigation work

3. Advance

ECE subsystem validation through the 2027 program

Why this matters

- Independent engineering methodology
- DNV-supported qualification process
- Risk-driven validation program
- Operators participate in project-specific validation

Operator collaboration

Bring your CCS roadmap into the 2027 validation program

The 2027 validation phase aligns ECE development with operator scenarios, project requirements, validation priorities, and commercial deployment.

Early participants help define the validation basis before the architecture is finalized.

Operating scenarios

Which drilling, intervention, and response cases should the system be developed around?

Project requirements

What field, rig, reservoir, and operating assumptions need to be reflected?

Validation priorities

Which subsystems, exposure cases, and interfaces matter most for operator confidence?

Commercial model

How should participation, access, funding, and future deployment be structured?

How participation works

1. Define project scenarios
2. Prioritize validation needs
3. Align scope and participation

Join the validation program

Help define the next standard for offshore CO_2 drilling



Noble is advancing ECE as a modular, rig-agnostic CO_2 well-control solution through a structured engineering and validation program.

The 2027 validation phase gives operators the opportunity to shape scenarios, engineering priorities, and deployment requirements before the solution is finalized.

Start the conversation

Discuss your project, validation priorities, and participation in the 2027 program.