

Creating a better energy future

for our members and society
by accelerating a just global transition to net zero

Technical + Innovation programme

Technical
Innovation

energy
institute

- The EI is the independent custodian of technical and innovation expertise for the global energy sector.
- Developing standards, good practice and authoritative, trusted guidance, strengthening the industry's licence to operate and its performance.
- Working across the breadth and depth of the global energy sector, from oil and gas to renewables, upstream to downstream.
- Helping to accelerate the energy transition through industry collaboration, dialogue with regulators, academia and wider stakeholders.

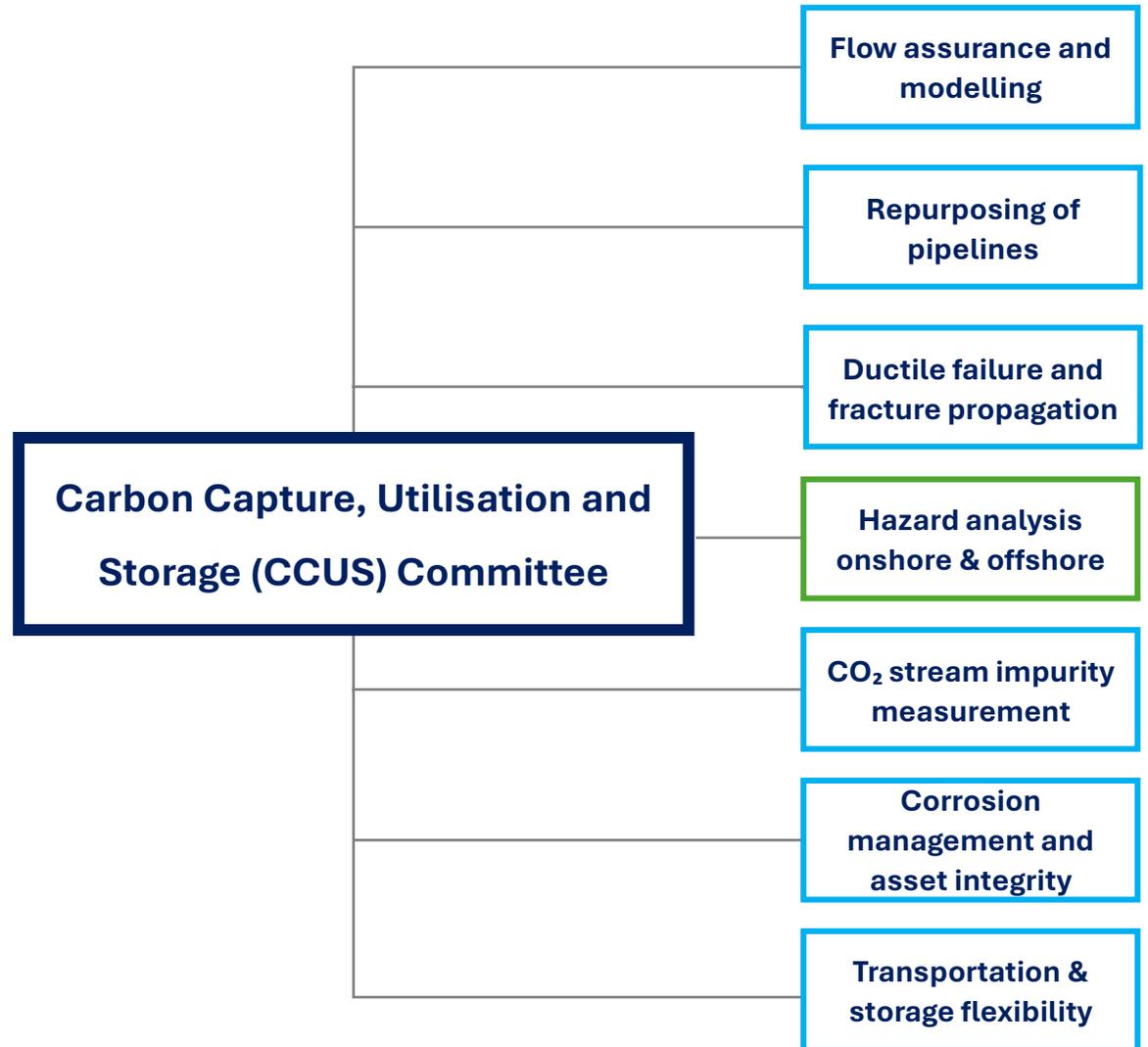


CCUS Committee

- The CCUS Committee oversees 7 working groups with total of 16 active projects
- Long-term objective is to provide guidance for all aspects of the CCUS value chain to equip developers, insurers, governments, universities and schools.
- Overarching CCUS Committee open to EI Technical member representatives and Working Group Chairs.
- Working Groups welcome new participants from EI Technical member and non-member organisations.

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Energy Institute / Health and Safety Executive

CCUS health and safety research alignment workshop

Held on 1st July 2025 in London



Workshop aims

The workshop aimed to bring together stakeholders across the CCUS sector to:

- Develop plans for future CCUS joint health and safety research projects
- Identify shared challenges across the breakout session topics of modelling, impurities, transportation, wells, materials and corrosion, and CO₂ plant and system operations
- Explore collaborative resolutions to these challenges and pinpoint areas for further initiatives/research, including actionable next steps.
- Promote collaboration and networking among CCUS stakeholders.
- Identify potential projects for the EI, HSE or through other routes (e.g. JIPs or academic research) to undertake and determine the expertise and stakeholder input required.



Attendance



Workshop structure



- **Two main parts:**
 1. Presentations
 - Insurance perspective on health and safety risks in CCUS projects
 - EI's and the HSE's completed and current CCUS health and safety research projects
 2. Parallel breakout sessions on pre-identified topics

- **Six breakout topics :**
 - Modelling (process (EoS), consequences of LoC)
 - Impurities (detection and control of impurities)
 - Transportation (pipelines, import/export, design and operation, blowdown, venting)
 - Wells (materials, equipment)
 - Materials and corrosion (low temperatures from LoC impacting materials, structural protection)
 - CO₂ plant system and operations (capture plant, buffer storage, offshore platforms, design and operation, blowdown, venting)

Parallel breakout discussion topics



Modelling

- Current modelling approaches: reliable but gaps in coverage and accuracy (LoC)
- Main challenge: lack of validation data
- JIPs in place but long timeframes for completion

Future work:

Comprehensive modelling benchmarking exercise proposed to help cover gaps and increase confidence in meantime

Impurities

- Components below limit of detection
- Verification of sampling
- Blending & control
- Response time (esp. off-line measurement)
- Responsibility and control over specification
- Alternative impurity monitoring strategies

Future work:

Interest in collaboration with research organisations (e.g. NPL, NEL); industry guidance seen as helpful while standards in development

Parallel breakout discussion topics



Transportation

- In-line inspection
- Pipeline design with inspection in mind
- Rail transport of CO₂
- Blowdown and venting protocols
- Buffer storage and the impact of location (e.g. subsea)
- Design code for pipeline thickness

Future work:

Producing new documents difficult; existing resources need better signposting (e.g. from industrial gases sector)

Wells

- Risk tolerability particularly for legacy wells
- Well control & intervention equipment
- Qualifications for subsurface safety wells
- Smallest group of experts on the day

Future work:

- Development of CCUS well construction standards as existing well standards adapted to CCUS
- Meantime: develop in industry guidance on discussed topics; adapt existing guidance (e.g. EI 3017)

Parallel breakout discussion topics



Materials & corrosion

- Understanding of corrosion mechanisms
- Impact of impurities, microbial activity on corrosion risk
- Limitations of corrosion testing methodologies and lack of data
- Challenges of repurposed infrastructure

Future work/aims:

- Short term: gather data; support clusters through collaboration
- Long term: understand corrosion on case-by-case bases through testing

CO₂ plant system & operations

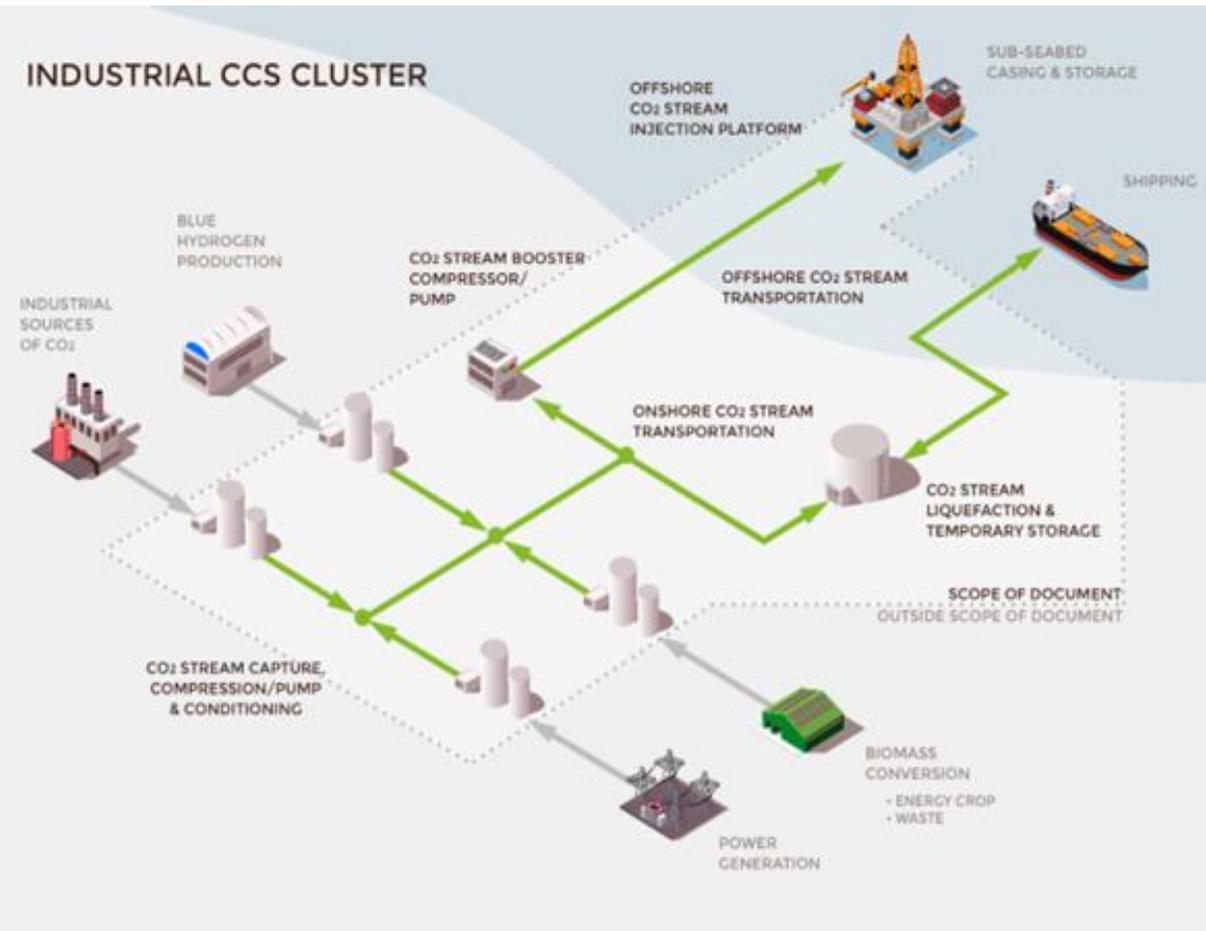
- Offshore impact
- Plant isolation
- Integrity testing
- Venting
- Start/stop operations
- Operation strategy

Future work:

- Increase awareness of existing EI CCUS documents (e.g. Good Plant Design and Hazard Analysis)
- Develop more training opportunities
- Refer to / reference existing industrial gases/cryogenic standards

Energy Institute guidance

Hazard analysis for onshore
and offshore carbon capture
installations and pipelines, 3rd
edition



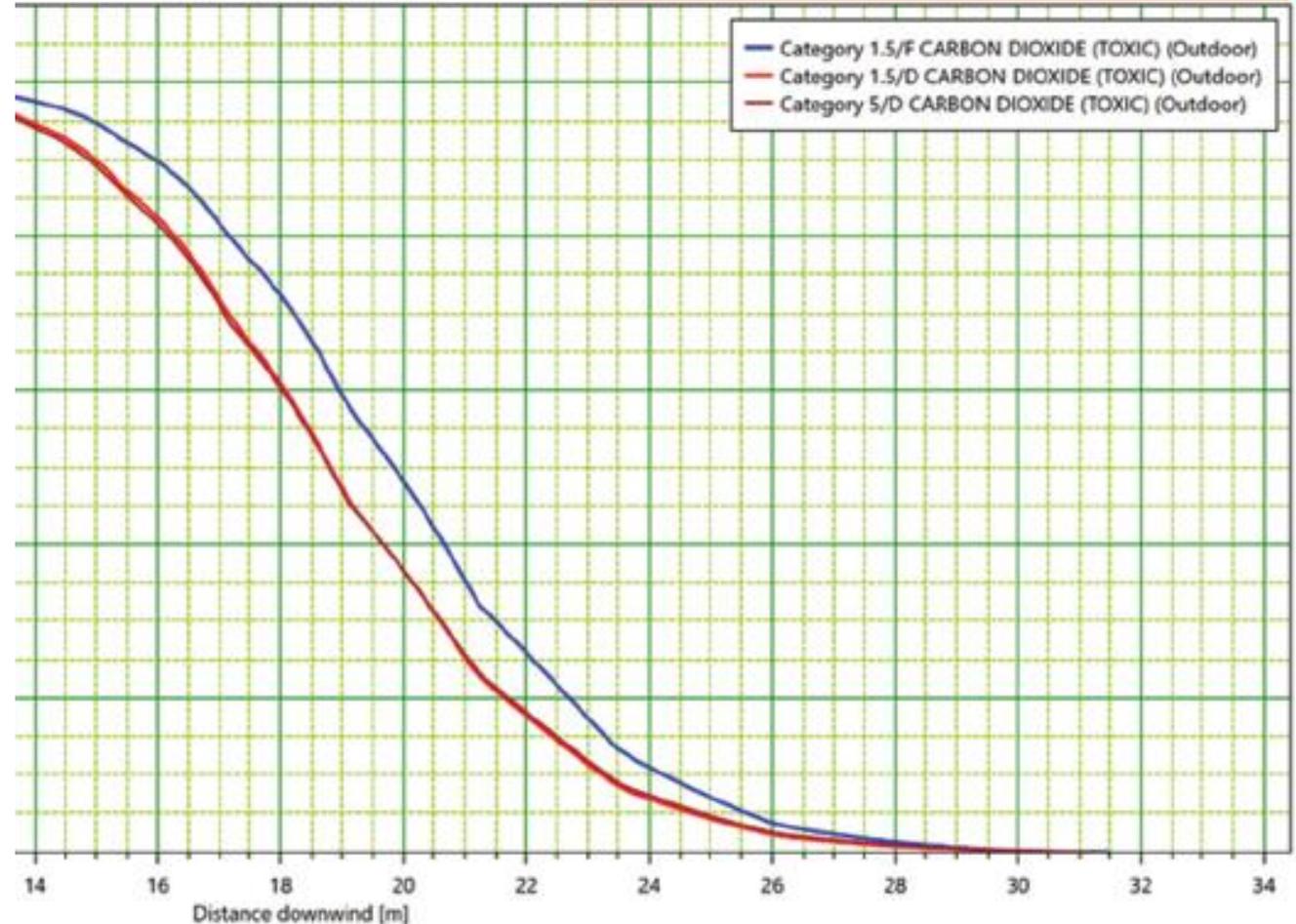
2nd edition scope and contents

Contents

- Properties and hazards of CO₂
- Legislation
- Hazard analysis methods
- Hazard identification/potential scenarios
- Example Dispersion Results – **TO BE UPDATED**
- Further work
- Annex C – Modelling of CO₂ – **TO BE UPDATED**
- Annex E – Previous Incidents Involving Carbon Dioxide

Toxic Probability of Death vs Distance
Gase Phase Leak 100mm

CAUTION This is an example. The results must not be used as a substitute for project specific dispersion analysis.



Dispersion modelling scope

- Update and expand dispersion modelling examples to include full bore release (to provide worse case) with a wind speed of 1.5 m/s for the following:
 - Accidental release from buried pipeline for dense phase on flat terrain
 - Accidental release from buried pipeline for gaseous phase on flat terrain
 - Accidental release from buried pipeline for dense phase on terrain with a 30-degree slope
 - Accidental release under water
 - Accidental release on platform

How to get involved

- If you are interested to join any of the EI CCUS Working Groups and/or contribute to specific projects, reach out to Eva Leinwather (eleinwather@energyinst.org)
- Visit the EI's website for more information on the Technical + Innovation programme and our membership options.
- Visit our publications website to access all EI technical publications.

EI CCUS publications:

<https://www.energyinst.org/technical/publications/sectors/ccus>





Thank you.
Questions?