A Practical Guide to Hydrogen and Carbon Capture & Storage Technology

LIVE ONLINE TRAINING | 5 days

Live Digital

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info@wisenergyuk.com

Course Information

LIVE ONLINE TRAINING

Key Learning Objectives

- What is carbon capture and storage (CSS)?
- Carbon capture by emission sources and fundamental approaches: pre- and post-combustion, oxyfuel, and industrial processes
- Overview of current technologies applied (how to remove the CO2 from process streams, solvents, amines)
- Evaluation of technologies: techno-commercial (including licensors)
- Cost structure, learning curves: challenges and opportunities
- CCS business models, CO2 pricing and negative emissions
- CCS projects: overview, discussion and deep dives into case studies
- H+CCS and other paths in the energy transition
- Policy and regulatory perspectives: global initiatives and national nuances

Who Will Benefit

- Existing energy companies particularly those who are already part of the engineering, oil and gas, steel, construction and shipbuilding oil and gas supply chain and those looking to future-proof their capabilities.
- The CCS clusters who well-placed to drive the regional industries forward, often including a significant hydrogen component.
- Those with steelmaking, shipping, construction and automotive interests.
- Companies seeking to enter the CCS sector and wider hydrogen value chain with its myriad opportunities in a market valued in the billions of dollars.

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Course Information

About the Course

Carbon capture and storage (CSS) is seen by many as a necessary transition technology whilst the world builds out the renewable energy system. And this is not limited to power generation.
Today, more than 95% of the world's hydrogen is made from fossil fuels (coal and natural gas), so CCS can play a significant role in reducing the CO2 emissions related to this production. With the hydrogen sector expected to grow exponentially across the globe in the coming years, it has become a necessary innovation.

For example, the United Kingdom (UK) recently set a target to produce five gigawatts of hydrogen by 2030, representing a 40-fold increase from the current situation.
This ambition is replicated worldwide where national hydrogen strategies, often explicitly citing the need for decarbonising industrial sectors such as construction, steel and cement, have appeared regularly over the past year. The journey to a new, low-emission energy system will be challenging and require much innovation

.

This momentum towards netzero continues to build, calling for many industrial sectors to find ways of decarbonising their operations. Hydrogen is likely to play a significant role, especially in sectors where eliminating emissions is particularly difficult. Early engagement with those low- or zero-emissions projects will enable fast movers to reap the maximum from the opportunity presented. This carbon capture and storage online course aims to provide a practical guide to enable companies to make informed decisions and plans based on the real opportunities that are emerging as the global CCS sector develops. Delegates will be guided to where early opportunities are most likely to lie, who is involved and how to get in front of them.

Meet Your Course Director

Dr Elif Selin Calik
Scientist - CCUS advisor and trainer

The course is led by Charley Rattan, international hydrogen expert and respected energy insider and facilitator bringing over 12 years' real-world renewable experience and a track record of successful major project delivery. Dr Calik is a trusted strategic advisor to global energy companies and an advocate and facilitator for the emerging innovation energy market with University of Oxford education.

Dr Calik"s is respected as a leading authority in hydrogen and renewables providing consultancy and training at high level across the globe including for key stakeholders, governments, consenting authorities and world organisations such a the United Nations.

Course Outline

FUTURE PROOFING THE FOSSIL FUEL SECTORS OR AN ACHILLES' HEEL?

The objective of carbon capture and storage training course is to describe CCS and the role it is and could be playing in the energy transition. However, they also illustrate how it could be an Achilles' heel for the fossil fuel sector. This course is designed to be as interactive as possible for participants.

STRUCTURE/HYPOTHESES

Introduction

•CO2 emissions classification
•CO2 emissions by sector
Netzero target setting
•Importance of CCS

CCS: What is it?

- Carbon capture (by emission sources)
  - Fundamental approaches: pre- and post-combustion, oxyfuel, industrial processes
  - Power plants (coal or NG combined cycle)
  - Industrial sectors (cement, iron and steel, refineries
    - particularly blue hydrogen)
- Transport (pipelines – Example: US CO2 pipeline infrastructure, compression, shipping)
- Carbon Storage
  - CO2 / CCUS hazards and safe CO2 operations
  - Compression
  - Subsurface sequestration (EOR, depleted reservoirs, saline aquifers, monitoring systems, risks)
- Storage capacity
- Other forms of sequestration (NL greenhouses, turquoise hydrogen)

A brief history of CCS

- How and when did CCS emerge, and who are the trailblazers?
- Early pilot projects: Callide (AUS), Ciuden (ES), Schwarze Pumpe (D)
- Ramp up
- Impact of fluctuating CO2 pricing (the crisis after 2011 and –recently – the European rebound)
- Successful projects during the crisis (Boundary Dam and Petra Nova)

CCS technologies

- Overview of current technologies applied (how to remove the CO2 from process streams, solvents, amines)
- Evaluation of technologies: techno-commercial (including licensors)
- Modelling of subsurface aspects of CO2
- Cost structure and learning curves: challenges and opportunities
- Operations and maintenance (e.g., store monitoring systems)
- Future technology outlook: opportunities and challenges (includes start-ups by TRL status)

CCS business models

- How does CCS make (or not make) money? Subject to technology applied. CO2 pricing, negative emissions
- CCS clusters: Liverpool Bay, Net Zero Teesside, Net Minus Humber, Ravenna Hub (Italy), Northern Lights (Norway, final investment decision taken), Acorn (UK), US (GoM, onshore) and Canada examples, Gorgon (AUS), Deep Purple (Nordic), Tomakomai (Hokkaido, Japan)
- Other supply chain requirements to make CCS happen
- Strategic partnerships focusing on CCS: overview, vision or objectives of each
- Thermal hydrogen

CCS projects – overview and discussion, deep dives into case studies

- Description/discussion of plants currently in operation
- Operations and maintenance, employment opportunities
- Plants and schemes under development/planning process (consenting, implementation, construction)
- Lessons learnt from plants/projects with x years of operation
- Project pipeline/future outlook

Policy and regulatory perspectives: Global initiatives and national nuances

- The IPPC perspective
- United Nations perspective
- EU CCS directive
- National nuances: Canada, UK, US, Australia, Saudi Arabia (?), UAE (?), China, Japan, Korea

Key stakeholder perspectives

- Independent oil and gas companies. Discuss Shell, BP, Equinor, ENI
- National oil and gas companies. Discuss Aramco, Gazprom, Petronas.
- IEA
- NGO's and local community engagement (related to pilot projects, e.g. Barendrecht – Shell Netherlands, Porthos Kingsnorth)
- Investors
- Irena

CCS and other paths in the energy transition (wind, solar, hydrogen etc.)

- Synergies
- Clashes
- Dilemma's

10 points to consider when investigating a CCS project

- Issues to address (e.g. permitting, operational requirements, HSE)

Summary, wrap up, final questions