CONCEPT

Carbon Capture, Utilization and Storage (CCUS): Capture, Transport and Geological Storage

6 – 10 December 2026
Riyadh - KAFD district five-star



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Ref: 113_14971 **Date:** 6 – 10 December 2026 **Location:** Riyadh - KAFD district five-star **Fees:** 20000 SAR

Introduction:

Carbon Capture, Utilization and Storage CCUS is moving from pilot plants to industrial projects, yet many emitters still struggle to judge which sources are worth capturing, how the CO2 will reach a store and what each tonne will cost. Weak early screening leads to stranded studies, unproven storage assumptions and projects that stall at the investment decision. This Core Concept course equips technical managers to compare capture routes, size compression and transport, assess geological storage and build a cost-per-tonne model. Participants leave with a CCUS Project Screening and Concept Plan.

Course Objectives:

- Evaluate where CCUS fits in an organisation's decarbonisation pathway alongside efficiency, fuel switching and electrification options
- Select a capture route for a given emission source by comparing post-combustion, pre-combustion, oxy-fuel and direct air capture characteristics
- Specify CO2 compression, dehydration and transport requirements for pipeline and ship-based chains
- Assess a candidate geological store for capacity, injectivity and containment and outline its monitoring, measurement and verification plan
- Estimate levelised cost of capture, transport and storage per tonne and test it against carbon pricing and utilisation revenue
- Produce a CCUS Project Screening and Concept Plan covering source, chain design, storage, cost, risk and stakeholder approach

Target Audience:

- Engineering managers responsible for process units, power plants or industrial furnaces that are candidates for CO2 capture
- Project development managers accountable for concept selection and feasibility studies of low-carbon projects
- Subsurface and reservoir managers responsible for evaluating CO2 storage prospects
- Pipeline, logistics and asset integrity managers responsible for CO2 transport infrastructure
- Commercial, planning and strategy managers who build the business case for decarbonisation investments
- HSE and stakeholder managers accountable for project risk, safety cases and community engagement

Course Outline:

Day 1: CCUS Foundations and Decarbonisation Pathways

- CCUS Value Chain Map: Capture, Conditioning, Transport, Storage and Use
- Role of CCUS in Hard-to-Abate Sectors: Cement, Steel, Chemicals and Power
- Emission Source Screening by CO2 Concentration, Volume and Location
- Operating CCUS Facilities and Lessons From Early Projects
- Organisational CCUS Readiness Assessment Checklist

Day 2: Capture Technologies and CO2 Chain Architecture

- Post-Combustion Capture With Amine Solvent Absorption and Regeneration Energy
- Pre-Combustion Capture Through Gasification, Reforming and Shift Conversion
- Oxy-Fuel Combustion and Air Separation Unit Integration
- Direct Air Capture and Emerging Membranes, Sorbents and Chemical Looping
- Capture Technology Selection Matrix and Energy Penalty Comparison

Day 3: CO2 Compression, Transport and Geological Storage

- CO2 Phase Behaviour, Compression Stages and Dehydration Specification
- Dense-Phase Pipeline Design Basis, Impurity Limits and Routing
- CO2 Shipping, Intermediate Storage Terminals and Loading Logistics
- Storage Site Characterisation: Saline Aquifers, Depleted Reservoirs and Caprock
- CO2 Enhanced Oil Recovery, Injection Well Design and Storage Capacity Estimation

Day 4: Monitoring, Economics, Policy, Risk and Hubs

- Monitoring, Measurement and Verification Plan and Leakage Pathway Analysis
- Levelised Cost of Capture, Transport and Storage per Tonne
- Carbon Pricing, Tax Credits and Contract-for-Difference Mechanisms in General Terms
- CO2 Utilisation Routes: Mineralisation, Synthetic Fuels, Chemicals and Building Materials
- Risk Register, Pipeline Safety Case, Induced Seismicity and Public Acceptance Strategy

Day 5: CCUS Modelling Build and Project Concept Plan

- Cement Plant Case Build: Capture Unit Sizing and Cost-per-Tonne Model
- Industrial Cluster Case Build: Shared Hub Pipeline and Storage Tariff Model
- Sensitivity Analysis on Capture Rate, Energy Price and Carbon Price
- CCUS Project Screening and Concept Plan Drafting
- Investment Committee Panel and Concept Plan Defence

Skills You Will Gain:

- Capture Route Selection
- CO2 Chain Design
- Storage Prospect Evaluation
- MMV Planning
- Cost-per-Tonne Modelling
- Carbon Price Sensitivity Analysis
- CCUS Hub Structuring
- Stakeholder Risk Communication

Why Attend This Course:

- Return with a CCUS Project Screening and Concept Plan that sets out a source, chain design, storage option and cost per tonne
- Challenge vendor and consultant capture proposals with a clear view of energy penalty, capture rate and cost drivers
- Explain to investors and communities how CO2 will be kept in the store and how that will be demonstrated
- Build cost and hub models alongside managers from power, cement, steel, chemicals and upstream energy organisations

Conclusion:

A CCUS project succeeds when the capture unit, the transport chain and the store are designed as one system with a cost per tonne that holds up against carbon prices. The course moves from the CCUS value chain and source screening, through capture technologies, compression, transport and geological storage, to monitoring, economics, policy mechanisms, utilisation, risk and hub structures. The final day applies these methods in cement and industrial cluster modelling builds and produces a CCUS Project Screening and Concept Plan for participants to take back to their organisation.