TETRA TECH RPS ENERGY | TRAINING

# N535: Foundational Understanding for CCS and Hydrogen Underground Storage

Instructor(s): Srikanta Mishra

**Format and Duration**

Classroom - 2 Days
Virtual - 4 Sessions

## Summary

The course provides a practical introduction to CCS, considered to be a potentially effective technology for the reduction of CO2 emissions from large stationary sources such as power generation units or chemical processing plants. The business impact of the course is an understanding of how to evaluate the economics of CCS projects and the future outlook of CCS worldwide. Widespread adoption of carbon capture technology is needed to meet the Paris Agreement's goal of limiting the rise in the global temperature to well below 2°C. CCS is the process of: (a) capturing CO2 before it is emitted into the atmosphere, (b) compressing and transporting the CO2 to a geologic storage site, and (c) injecting it into the site for long-term sequestration. The geologic storage site could be a deep saline formation, a depleted oil field, or an active oil field conducting CO2 enhanced oil recovery (EOR). The subsurface operations part of CCS also provides a mechanism for CO2 sources to monetize their emissions through tax credits for long-term geologic storage and/or revenue from incremental oil production due to EOR operations. The course also provides an overview of the potential utilization of hydrogen as a clean energy carrier for reducing emissions in hard to abate sectors, hydrogen underground storage as an effective strategy for storing large volumes of surplus electrical energy from renewable sources, and similarities between HUS and oil and gas related subsurface operations.

Business Impact: This course will equip petroleum engineers, geoscientists, investors and policy makers with a foundational understanding of Carbon Capture and Storage (CCS) and Hydrogen Underground Storage (HUS), and also help them understand how practices and technologies developed in oil and gas exploration and production and natural gas storage can be adapted for CCS/HUS applications.

## Learning Outcomes

Participants will learn to:

1. Articulate the case for CCS.
2. Describe basic source-sink matching concepts.
3. Perform simple capacity and injectivity estimates.
4. Outline the elements of risk and economic assessment for a CCS project.
5. Analyze CO2-EOR vis-à-vis saline storage opportunities.
6. Recognize the role of hydrogen and HUS as enabling technologies.

## Training Method

This is a classroom or virtual classroom course comprising a mixture of lectures, discussion, and case studies.

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## Who Should Attend

This course is designed for petroleum engineers and geoscientists interested in learning about the basics of CCS and HUS as an emerging technology for emissions reduction with a significant subsurface operations component.

## Course Content

### Topic 1

- Rationale for CCS
- Overview of carbon capture, transport and storage
- Matching stationary sources and geologic sinks

### Topic 2

- Estimation of storage capacity
- Modeling of reservoir injectivity
- Monitoring of CO2 plume movement

### Topic 3

- Assessment of wellbore integrity and other risks
- Combining saline storage with EOR
- Evaluation of project economics
- Current status and future outlook for CCS worldwide

### Topic 4

- Role of hydrogen in Energy Transition
- Hydrogen Production, Transportation, Storage
- Utilization (End Use)
- Current Projects