HOT

ENERGY TRANSITION TRAINING SOLUTIONS

Impactful Knowledge Transfer
for a Sustainable Future

MULTIDISCIPLINARY PROGRAMS
PROFICIENCY
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PUBLIC SHORT COURSES
ON THE JOB
WORKSHOPS
EXPERIENCE
CUTTING-EDGE
IMMEDIATE IMPACT
INDUSTRY-FOCUSED
INTEGRATION
OPPORTUNITIES

ENERGY TRANSITION

MAXIMISING POTENTIALS
TEAM DEVELOPMENT
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COACHING
STRENGTHENING CAPABILITIES
GEOLOGICAL FIELD TRIPS
SUSTAINABLE
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ACCELERATING CHANGE WITH HIGH-IMPACT TRAINING FOR A SUSTAINABLE FUTURE

The HOT Energy Group (HOT) is a **multi-award winning** provider of upstream oil & gas and energy transition training solutions. We pride ourselves in delivering **excellence** with each and every training session: Quality is always at the core of what we do.

As the world shifts towards a more sustainable and carbon-neutral future, the demand for cutting-edge knowledge and practical expertise in energy transition technologies has never been greater. At HOT, we are proud to be at the forefront of this development, offering comprehensive courses and programs tailored to empower professionals and organisations with the skills needed to drive change.

Our specialised programs focus on the most important pillars of the energy transition:

- **Carbon Capture, Utilisation and Storage (CCUS / CCS)**
  Master the technologies and strategies to reduce emissions and mitigate climate impact.

- **Hydrogen**
  Explore the science and infrastructure behind hydrogen as the energy carrier of the future.

- **Geothermal Energy**
  Unlock the potential of Earth's heat as a sustainable and reliable energy source.

Designed and delivered by industry-leading experts, our courses and programs combine in-depth theoretical knowledge with real-world applications. Whether you are a seasoned professional, a policymaker, or a newcomer to the field, HOT provides the tools and insights to navigate and thrive in the rapidly evolving energy landscape.

Join us in building a sustainable future. Welcome to HOT – where knowledge powers the energy transition.

ENERGY TRANSITION TRAINING

LOOKING FOR A DIFFERENT TOPIC?

Explore our wide range of training opportunities beyond energy transition!

Discover our public sessions and our comprehensive training portfolio, designed to equip you with the skills for the future.

www.hoteng.com training@hoteng.com

INTRODUCTION COURSES

Introduction to Energy Transition

ETR10 | 2 days | Awareness / Foundation

Gijs Holstege

As the most abundant greenhouse gas in our atmosphere, CO_2 levels have risen from a pre-industrial baseline of 280 ppm to ~420 ppm leading to a rise in average global temperatures at a rate unprecedented in the geological past.
The use of energy represents by far the largest source of greenhouse gas emissions from human activities globally. About two-thirds of global greenhouse gas emissions are linked to burning fossil fuels for energy to be used for heating, electricity, transport, and industry. A rapid decarbonisation of our energy system has therefore become increasingly urgent, leading to a whole spectrum of activity collectively known as the 'Energy Transition'.
This course will cover key aspects of renewable energy solutions, including how they can integrate together to replace the reliability of supply we have been used to from fossil fuels.

DESIGNED FOR YOU, IF YOU ARE...

- An engineer or manager new to the oil and gas industry
- A professional interested in the energy transition
- Working in or with clients from the energy industry (e.g. with banking, insurance or environmental background)

HOW WE BUILD YOUR CONFIDENCE

- The course will be interactive with the inclusion of exercises, quizzes, and case studies.
- Participants are invited (but not obliged) to bring a short presentation of maximum 10 mins on the energy transition challenges they are facing in their own country. This will then be explained and discussed during the course.
- A short test or quiz will be held on each day of the course.

THE BENEFITS FROM ATTENDING

By the end of the course you will feel confident in your understanding of:

- The science of climate change, how human induced (anthropogenic) change is now the dominant factor
- How the global energy system impacts greenhouse gases with the subsequent effect on climate change
- The energy transition journey to date including the role of global stakeholders
- Different industrial sectors and fuel consumers, and how each uses energy and how they lend themselves to decarbonisation (or not)
- Key aspects of renewable energy solutions, including how they can integrate together to replace the reliability of supply we have been used to from fossil fuels
- The basics of energy transition economics and what is required in terms of regulatory and policy changes to accelerate the transition

TOPICS

Climate change. Is it happening and is it an issue?

- Introduction, climate and Earth's energy balance
- Radiative Forcing and evidence for climate change
- Climate modelling, Greenhouse gas emission scenarios
- The carbon budget

Decarbonising the Energy System

- Collaboration through IPCC, UN, and the National Determined Contributions (NDCs)
- United States NDCs discussion (example)
- The global energy system today and how it needs to change
- Decarbonisation pathways and challenges per sector, role of electrification
- CCS and hydrogen
- Intermittency, batteries, wind and solar
- Nature based solutions

Transition Dilemmas

- The Energy Transition Game (exercise)
- A just and fair transition
- Weaning us off fossil fuel
- Capital investment
- Carbon pricing and emissions trading
- Policy and regulatory collaboration
- People, behaviour, and society

Geo-Energy and the Global Energy System – An Introduction

ETR07 | 5 days | Foundation / Skill

Jürgen Grötsch

This course provides an overview of the global energy system and all its components including recent developments on all continents. It showcases present-day exploration and development of hydrocarbons as well as future sustainable new energy projects like geothermal. It also discusses the way forward in the energy transition with geo-energy and the subsurface playing a vital role.
Next to this, the course introduces the global carbon cycle and the basics of climate change with the aim to see where the main levers are in the energy transition. Thereby, it addresses some of the still remaining misconceptions around energy resources and their role in climate change. The aim is to support expediting the journey towards sustainable new energy solutions and net-zero emissions.

DESIGNED FOR YOU, IF YOU ARE...

- A geoscientist or energy professional who plans to work in energy exploration and development as well as underground storage and sequestration projects.

HOW WE BUILD YOUR CONFIDENCE

This course comprises a mixture of lectures, exercises, case studies, discussions and feedback sessions. The course follows the discover, ask and learn approach.

THE BENEFITS FROM ATTENDING

This course aims to help you achieve the following objectives:

- Provide an introduction to the global energy system
- Present a global overview of current energy production and consumption
- Introduce all main energy resources used globally
- Discuss the role of the global carbon cycle and climate change
- Understand the workflow of hydrocarbon exploration - Play Based Exploration (PBE)
- Provide insights into subsurface reservoir characterisation for clastics and carbonates
- Receive an introduction to field development planning (FDP) for energy resources
- Present and discuss a number of landmark hydrocarbon and geothermal projects
- Introduce subsurface and surface development concepts for geo-energy
- Highlight the role of uncertainties in the subsurface
- Illustrate the potential and additional benefits of geothermal energy
- Introduce the hydrogen exploration
- Provide an outlook for trends and developments in the global energy market
- Understand the present-day global LNG market and its role
- Discuss the main challenges and risks in the energy transition
- Address the role of geosciences in the energy transition

TOPICS

- Overview of the global energy system
- Introduction to all currently used energy resources
- Exploration and development of hydrocarbons, geothermal and hydrogen
- New developments in the global energy demand
- Outlook on opportunities and risks in the energy transition

Computer access required for exercises.

CUSTOMER TESTIMONIALS

CCS for Reservoir Engineers (RES75)

'It gave a fantastic perspective of the evolving CO_2 landscape across continents.'
Lead Geologist (CO_2 Storage), Saudi Aramco

'I liked the way the instructor provided the information in this new domain of CCS.'
Reservoir Geologist, Wintershall Dea

Geological Storage of CO_2: Pick the Right Reservoir (RES71)

'Amazing course with a lot of information about CCUS in general and details.'
Energy Engineer, Saudi Aramco

'Course is excellent. Clarifying many concepts I have confused before class. Learned challenges and R&D needs for us.'
Petroleum Engineer, Saudi Aramco

'The instructor is awesome, and the material is well-developed and very interesting.'
Petroleum Engineer, Saudi Aramco

'Excellent course and great delivery of knowledge and presentation.'
Petroleum Engineer, Saudi Aramco

Energy and Petroleum Economics, Business and Decision Making (PBM02)

'Very clear, accessible and engaging.'
Geoscientist, Ophir Energy

'Very good and easy-to-follow presenter and presentations, very interactive.'
Engineer, RWE Dea

'Knowledgeable instructor, practical examples related to our industry.'
Geoscientist, EBN

'Excellent coverage of appropriate content, excellent resource material, excellent instructor.'
Geophysicist, Wintershall

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CARBON CAPTURE, UTILISATION AND STORAGE (CCUS / CCS)

Geological Storage of CO_2: Pick the Right Reservoir

RES71 | 5 days | Skill

Emina Buket Ulker

CCUS / Geological sequestration of CO_2 is emerging as an important tool to get to net-zero greenhouse gas emissions by 2050 for combating global warming, and over the last few years, has developed rapidly. Much of the technology is similar to oil and gas fields operations. However, there are important differences which require adaptation of the industry's subsurface knowledge to this new application. The essential questions for any CO_2 storage project are: (a) where can we store the CO_2? (b) how much CO_2 can we inject? (c) can we store it safely? and (d) can we store it cost-effectively?
This course will address these questions by using historical practices developed in the oil and gas industry and adapting engineering design concepts to the CO_2 storage task.

DESIGNED FOR YOU, IF YOU ARE...

- A geologist, reservoir engineer, petroleum engineer, production or completion engineer, business development manager, asset manager, project manager, government official or any other professional involved or interested in CCS

HOW WE BUILD YOUR CONFIDENCE

- Power point presentations
- Exercises
- Q&A

THE BENEFITS FROM ATTENDING

By the end of the course you will feel confident in your understanding of:

- Current state-of the-art of research in the field of CCS; screening of CCS projects worldwide
- Fundamentals of CCS, its interdisciplinary connections and the ability to appraise the role of CCS more widely within the energy transition
- Assessing the storage volume capacity by investigating the combined effects of capillary pressure, salinity, and in-situ thermodynamic conditions on CO_2-brine/reservoir fluid-rock interactions in a saline aquifer or depleted reservoir
- Addressing the potential CO_2 leakage paths; mitigating the risk by optimising the injection strategy and well completion
- Quantifying the uncertainty with different realisations to scale geological properties, major faults, and their sealing capacity as well as rock compressibility
- Monitoring the geological storage of CO_2, types of monitoring technologies and techniques, monitoring strategies, results, and modelling temporal responses accordingly
- Identifying the uncertainties affecting the future field behaviour and reduce their impact by optimising the field performance through a systematic application of integrated reservoir management and multidisciplinary technologies
- The impact of CCS on the energy landscape, society, and climate as these topics govern the success of the research that is being carried out to solve one of greatest challenges of our generation

TOPICS

- CCS projects screening
- Outline climate change evidence and rationale for storing CO_2 and how much volume can be stored: Real field and engineered CO_2 storage examples
- CO_2 storage in saline aquifers and depleted reservoirs:
  - Storage mechanisms
  - Phase behaviour
  - Physical and geochemical parameters, and constraints
- CO_2 injection as EGR/EOR
- Injection strategies
- Monitoring plan and verification
- Potential leak paths and leakage mitigation; risk assessment and management
- Flow assurance

Geomechanics and Risk Assessment for CCUS

ETR12 | 5 days | Skill

Peter van den Bogert

This training provides participants detailed geomechanics related reporting and documentation guidelines that comply with ISO 27914:2017 for CCS projects. The training facilitates effective preparation of the containment risk assessment that is an important part of the feasibility and storage site certification process offered by issuing companies. Geomechanical fundamentals, field data acquisition methods, modelling strategy and detailed evaluation aspects are covered to understand underlying assumptions and uncertainties that are important for CO_2 containment risk assessment. Relations with and input from other specialists, as well as input to the Measurement, Monitoring & Verification (MMV) plan are addressed.

DESIGNED FOR YOU, IF YOU ARE...

- A project manager overseeing a CCS development project and (geomechanics) deliverables
- A reservoir engineer, geologist, geophysicist, geomechanic or specialist responsible for or contributing to containment risk assessment of a CCS project
- A CCS project engineer
- An environmental risk assessor
- A regulatory compliance officer

HOW WE BUILD YOUR CONFIDENCE

- Classroom training with clear learning objectives for each module and descriptive hand-outs
- Examples, case studies and videos as appropriate for each module
- Discussions, quizzes and individual or group exercises for each module
- A structured Word template is provided as part of the training to kick-start the ISO certification process for your CCS project

THE BENEFITS FROM ATTENDING

By the end of the course, you will feel confident in your understanding of:

- The regulatory requirements related to CO_2 containment that are based on – or similar to – the ISO standard for CCS projects, such as EU Directive 2009/31/EC on CCS
- Detailed geological and geomechanical characterisation requirements covering geometrical aspects, initial conditions, and formation properties
- The geomechanical fundamentals of stress and strain (deformation), thermo-elasticity theory, formation failure mechanisms, and their modelling parameters
- Field data acquisition methods and rock mechanical experiments to constrain modelling parameters and their associated uncertainties
- Developing modelling scenarios (and work plan) underpinning the containment risk assessment, covering geological and geomechanical uncertainties as well as possible injection scenarios to mitigate containment and other project risks
- Detailed seal and well integrity evaluation requirements using geomechanical principles and risk assessment methodologies
- Detailed requirements on characterisation and assessment of fault stability and potential induced seismicity risks
- Application of uncertainty and sensitivity analysis techniques to establish safe operating limits for CCS projects
- How to produce detailed documented evidence covering subsurface characterisation and risk assessment results in compliance with ISO 27914:2017

TOPICS

- Methods to constrain the initial stress condition, thermo-linear-elasticity & failure parameters and their uncertainties
- Describing prior hydrocarbon production (if any), induced stress changes, deformation and potential damage done to the subsurface, and available field data for calibrating the geomechanical model
- Developing a modelling strategy addressing the ISO requirements for risk assessment and uncertainties
- Setting operational pressure and temperature limits as part of the containment risk assessment by evaluating seal integrity, fault reactivation & potential seismicity, and well deformation
- Specification of monitoring options and updating the risk assessment during injection
- Documenting the subsurface characterisation and containment risk assessment in compliance with ISO 27914:2017 (and EU CCS Directive)

CCS for Reservoir Engineers

RES75 | 4 days | Skill

Leonhard Ganzer

Carbon Capture and Geological Storage (CCS) will play a critical role in the portfolio of energy companies to meet climate goals and reach net-zero by 2050. It is seen as one method to mitigate atmospheric CO_2 concentrations while using fossil fuels in the energy system. For CCS to become a viable option for carbon reduction strategies, several challenges must be overcome. Among them, the geologic storage of CO_2 is a key technology.
The objective of this course is to discuss and present the required reservoir engineering skills for safe and effective storage of CO_2 in the subsurface geologic formations. Focus is given on depleted hydrocarbon fields and deep saline aquifers as these types of underground storage are becoming mature technologies soon.
The course will cover relevant regulatory frameworks, fluid properties of CO_2 and data collection, but the main focus will be on reservoir engineering methods during static and dynamic modelling as well as risk assessment based on the three driving pillars: (a) injectivity, (b) capacity, and (c) containment of carbon dioxide.

DESIGNED FOR YOU, IF YOU ARE...

- A petroleum engineer or reservoir engineer with some experience in the field and some basic knowledge about CCS

HOW WE BUILD YOUR CONFIDENCE

The theoretical and practical aspects of CO_2 injection and storage in the subsurface are discussed in a group setting, along with examples and case histories. You will be encouraged to engage in discussions based on your experience.
Videos and calculations will strengthen your understanding of the theoretical and operational principles. Working on examples will support the learning experience.

THE BENEFITS FROM ATTENDING

By the end of the course you will feel confident in your understanding of:

- The concepts and principles of safe underground storage of CO_2 during CCS projects
- The importance of injectivity, capacity and containment concepts during storage of CO_2 in geologic formation
- The potential fluid-fluid and rock-fluid interactions during CO_2 storage in the geological subsurface
- The relevant adjustments to classical reservoir engineering methods required for CCS projects
- The requirements by mining laws/authorities for safe storage

TOPICS

- Introduction to CCS / geological storage of CO_2
- Overview of regulatory frameworks
- PVT properties of CO_2 and reservoir fluids
- Relevant rock properties (rock mechanics, fluid transport) and rock/fluid interactions
- Site screening and selection
- Modelling aspects of storage complex
- Flow of CO_2 in wells and near-well region (injectivity)
- Storage capacity calculation and coupled dynamic modelling during injection operation
- Containment and monitoring methods during closure period
- Discussion of field case experiences

CUSTOMER FEEDBACK

'The course is very informative and provided great insights on the ongoing CCS projects as well as new initiatives worldwide.'
Petroleum Engineer at Saudi Aramco

'Excellent! Instructor is very knowledgeable and well-rounded. I learned a lot about CCS and beyond, into simulations, EoS, geomechanics, .. Many thanks!'
Petroleum Engineer at Saudi Aramco

'It gave a fantastic perspective of the evolving CO_2 landscape across continents.'
Lead Geologist (CO_2 storage) at Saudi Aramco

CCUS Drilling Engineering

DRI55 | 3 days | Skill / Advanced

Catalin Teodoriu

This course is conceived as a fast tour through drilling operations, with a focus on CCUS wells. The participants will learn how the drilling process should be planned and executed and how to deal with existing CO_2 situations. Finally, a short overview of Class VI well and the CO_2 related well integrity management is given.

DESIGNED FOR YOU, IF YOU ARE...

- A driller or petroleum engineer
- Field personnel with a background in petroleum engineering

Prerequisites:
A basic understanding of well drilling processes and drilling equipment is required.

HOW WE BUILD YOUR CONFIDENCE

The course explores CCUS wells and the associated drilling operations, common challenges, and their solutions.

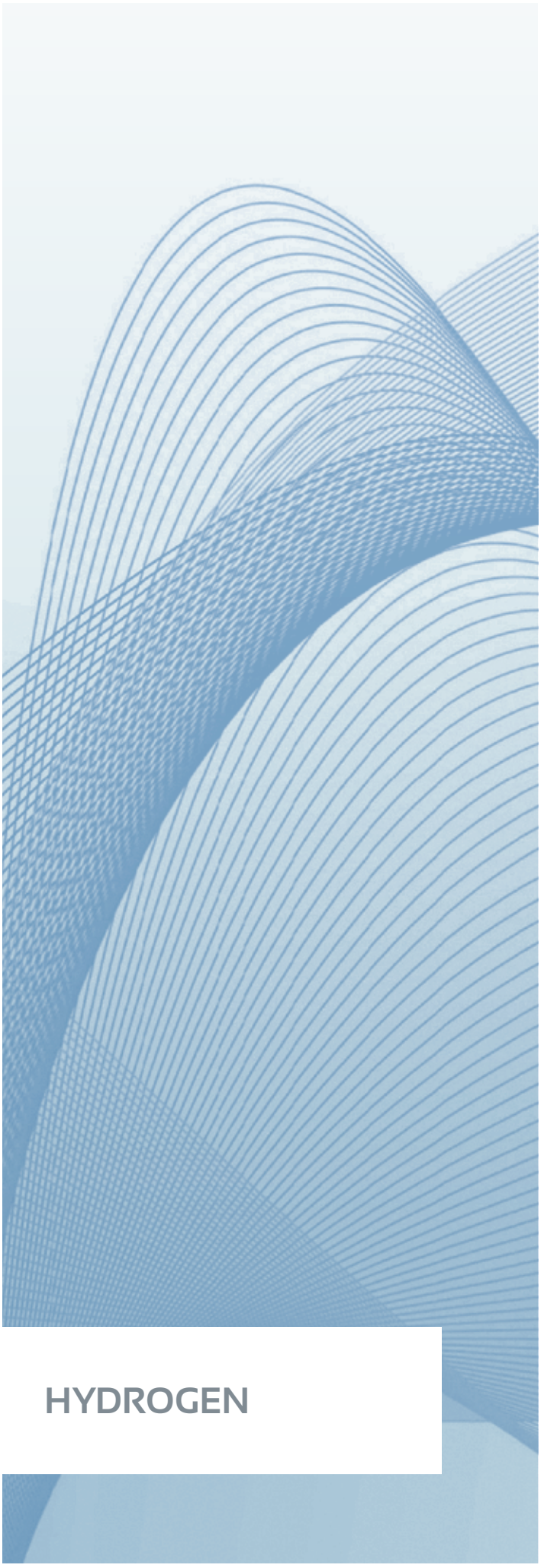
THE BENEFITS FROM ATTENDING

By the end of the course you will feel confident in your understanding of:

- Rock and drill string properties and their main features related to CCUS reservoirs
- Well construction and well completion
- The main concepts for CO_2 kick
- Well integrity management related to Plug and Abandonment (P&A)
- Economical aspects of drilling operations for P&A

TOPICS

- Well construction and well completion
- Rock properties and pore pressure prediction and their application to CCUS wells
- Well integrity management for CCUS wells
- Wellbore barriers and their significance for CCUS wells
- Drilling operations and P&A for CCUS wells
- Milling tools and casing cutters
- Drilling problems in CCUS wells
- CCUS material selection
- CCUS cementing



Hydrogen Exploration – Is it a New Game Changer?

ETR06 | 1 day | Foundation

Jürgen Grötsch

The objective of this course is to introduce natural hydrogen as a potential future clean energy resource. It will also cover how to explore for it, as it may become the next game changer in the energy industry, providing a clean and sustainable solution for part of the global energy demand.
This course provides an overview on hydrogen as an energy resource and the various colours of hydrogen. However, natural (white) hydrogen was until now not considered in the developments around the future energy system.
This course highlights the current status of knowledge and latest developments around such a potential new energy opportunity, ie natural H_2 exploration and production as part of the future energy mix. If further developments turn out to be successful, this could result in another unexpected game changer in the energy sector, similar to the unconventional revolution a few decades back. However, further research and investments in exploration are required to conclusively provide answers on size of the prize and feasibility of development of such a new energy resource.

DESIGNED FOR YOU, IF YOU ARE...

- A geoscientist or energy professional working on energy transition projects and optimising the portfolio herein
- Staff from the energy industry, from the public sector and from regulators
- Investor or decision maker who needs to set directions and priorities in the energy transition

Prerequisites:
Basic understanding of geosciences is helpful but not required.

HOW WE BUILD YOUR CONFIDENCE

This course comprises a mixture of lectures, exercises, case studies, discussions and feedback sessions. The course follows the discover, ask and learn approach.

THE BENEFITS FROM ATTENDING

This course aims to help you achieve the following objectives:

- Provide an introduction to the global energy system
- Introduce the role of different colours of hydrogen
- Present a global overview of current hydrogen production and consumption
- Showcase hydrogen development projects
- Provide an overview of natural hydrogen seeps globally
- Introduce the concept of hydrogen exploration
- Understand the main subsurface uncertainties in hydrogen exploration
- Discuss the key challenges and risks of hydrogen exploration and development
- Address the role of geoscientists in developing hydrogen as a future energy resource
- Provide an outlook for trends and expected developments in the global energy market

TOPICS

- Overview of hydrogen in the global energy system
- Introduction to the multiple colours of hydrogen
- Examples of natural hydrogen seeps
- Exploration and development of natural hydrogen
- Outlook on opportunities and risks in hydrogen exploration and development

Underground Hydrogen Storage – Storage Principles and Operations

ETR03 | 3 days | Skill

Leonhard Ganzer

Hydrogen is expected to take a leading role in a renewable energy system. Hydrogen gas can be generated in various different ways (and 'colours') but its production will not follow the market demand. Hence, there will be a need of large-scale hydrogen storage in the geological subsurface.
This course will deal with the current state-of-the-art of underground gas storage, with the special fluid properties of hydrogen and the existing experience in the field. Also, special attention will be given to policies and regulations for safe operations of underground gas (and hydrogen) storage.

DESIGNED FOR YOU, IF YOU ARE...

- A petroleum engineer or geoscientist with some experience in the field and interested in underground gas or hydrogen storage

HOW WE BUILD YOUR CONFIDENCE

- The theoretical and practical aspects of underground gas or hydrogen storage are discussed in a group setting along with examples and case histories
- You will be encouraged to engage in discussions based on your experience
- Videos will strengthen your understanding of the theoretical and operational principles
- Working on examples with calculation will support the learning experience

THE BENEFITS FROM ATTENDING

By the end of the course you will feel confident in your understanding of:

- Concepts and principles of underground gas storage with focus on hydrogen and gas mixtures (H_2 & natural gas)
- Advantages and disadvantages of gas storage in caverns, depleted hydrocarbon fields and aquifers
- Potential fluid-fluid and rock-fluid interactions during hydrogen storage in the geological subsurface
- Requirements by mining laws/authorities for safe hydrogen storage

TOPICS

- The expected role of Hydrogen in a renewable energy system
- Geological gas storage types
- Terms and definitions related to underground gas and hydrogen storage
- Properties of fluids and rocks
- Gas and hydrogen storage in caverns
- Gas and hydrogen storage in porous rocks
- Mining law regulations, policies and requirements for safe storage operations
- Challenges and special topics related to hydrogen storage in porous rocks
- Field cases

CUSTOMER FEEDBACK

'Good industry examples, making material relevant to our company, covering UG storage, not just hydrogen and CO_2.'
Reservoir Engineer at Neptune

'Excellent knowledgeable instructor, fully aware of actual knowledge developments in this field.'
Reservoir Engineer at Neptune

'I liked the relevance to my projects, course material was tailored to our business & geographic location.'
Geologist at Neptune

GEOTHERMAL ENERGY

Decision-Based Geothermal Field Development

ETR08 | 5 days | Foundation / Skill

Jürgen Grötsch

Geothermal energy is going to be the third pillar in the future net-zero energy system, next to wind and solar. It allows energy production in many ways whereby the key challenge is the matching of the subsurface geological setting with the selection of the optimal development concept. This involves similar questions as commonly known from hydrocarbon field developments projects. Therefore, an early focus on decisions and decision-based planning is key for success also in geothermal development projects of cities, communities, large office or industrial complexes.
The benefits, opportunities, but also risks of such geothermal development projects will be presented and discussed. In addition, the need for new structured workflows will be introduced and handrails for these workflows will be provided based on know-how as developed in the hydrocarbon industry. The aim is to support expediting the journey towards sustainable and decentralised new energy solutions for cities, communities or industrial applications. At the same time, project executers and stakeholders will be prepared to avoid common pitfalls in such project developments.

DESIGNED FOR YOU, IF YOU ARE...

- A geoscientist, well engineer, reservoir engineer, production technologist, concept engineer or any energy professional of an integrated team working on renewable energy developments
- A professional or decision maker from the energy or service industry or an employee in the public sector involved in or planning to work on geothermal projects
- A professional or public sector staff involved in developing heat plans for communities
- Staff from a smaller company, new venture or city planning and council aiming to avoid common pitfalls and the triggering of technical or non-technical risks

HOW WE BUILD YOUR CONFIDENCE

This course comprises a mixture of lectures, exercises, case studies, discussions and feedback sessions. The course follows the discover, ask and learn approach.

THE BENEFITS FROM ATTENDING

This course aims to help you achieve the following objectives:

- Provide an introduction to geothermal heat as a renewable energy resource
- Introduce the concept of decision-based planning for geothermal projects
- Develop a decision-based roadmap for geothermal projects
- Present the main sources and reservoirs of geothermal energy
- Highlight the impact of various geological settings for geothermal developments
- Summarise available geothermal subsurface technologies and development approaches
- Highlight the use of analogues in geothermal developments
- Present and discuss a number of leading-edge geothermal projects
- Provide an introduction to the handling of subsurface uncertainties
- Introduce well planning, execution, data acquisition and completion for geothermal projects
- Address requirements for well monitoring, surveillance and the risk of scaling
- Discuss how energy system integration can be achieved
- Summarise surface technologies and development concept options
- Introduce multi-scenario modelling for geothermal projects
- Develop the basics of geothermal cost & economics models
- Introduce decision quality and focus on value
- Present the potential of additional benefits in geothermal projects
- Discuss the main technical risks involved in harnessing geothermal energy
- Address non-technical risks, like market, policies and social in geothermal developments

TOPICS

- Fundamentals of geothermal energy
- Decision-based planning for geothermal energy
- Development of geothermal energy projects
  - Subsurface
  - Surface
  - Cost & economics
  - Multi-scenario modelling and focus on value
- Additional benefits of geothermal energy projects
- Common pitfalls and risk management in geothermal projects

Computer access required for exercises.

Geothermal Exploration & Development

ETR09 | 5 days | Foundation / Skill

Jürgen Grötsch

The course provides fundamental insights into the exploration of geothermal resources and how they can be developed successfully. It also addresses questions about why a major move towards geothermal developments is required to achieve sustainability goals and net-zero emissions. How to tap into the vast additional potential of geothermal energy for heating and cooling purposes will be at the heart of the learning experience.
The aim is to equip technical professionals and stakeholders with the required insights for this journey. Benefits, opportunities, but also challenges and risks of geothermal exploration and development projects will be presented and discussed. Involved workflows will be addressed and handrails for them provided. The course aims to support expediting the journey towards sustainable and decentralised new energy solutions, also important to provide energy security in the future. At the same time, it will prepare the attendees to avoid common pitfalls in such project developments.

DESIGNED FOR YOU, IF YOU ARE...

- A geoscientist, well engineer, reservoir engineer, production technologist or any energy professional working on renewable energy developments
- Staff involved in geothermal projects or the development of heat plans for communities
- A professional from the energy or service industry or the public sector involved in or planning to work on geothermal projects

HOW WE BUILD YOUR CONFIDENCE

This course comprises a mixture of lectures, exercises, case studies, discussions and feedback sessions. The course follows the discover, ask and learn approach.

THE BENEFITS FROM ATTENDING

This course aims to help you achieve the following objectives:

- Provide an introduction to geothermal heat as a renewable energy resource
- Present a global overview of current geothermal energy production capacity
- Illustrate the additional potential of geothermal exploration
- Highlight which countries are currently leading in geothermal developments and why
- Present the main sources and reservoirs of geothermal energy
- Discuss geothermal potential for power vs heat generation as well as cooling applications
- Highlight the differences between fracture and matrix geothermal developments
- Showcase the importance of matrix porosity and permeability in sedimentary rocks
- Understand the workflow of exploration - Play Based Geothermal Exploration (PBGE)
- Introduce various subsurface and surface technologies and development options
- Present and discuss a number of leading-edge geothermal projects
- Introduce the basics of geothermal economics
- Compare geothermal projects with other energy developments
- Highlight the potential of additional benefits of geothermal developments
- Discuss the main technical risks involved in geothermal energy
- Provide an outlook for geothermal energy in the decades ahead

TOPICS

- Fundamentals of geothermal energy
- Play-based exploration for geothermal energy (PBGE)
- Development of geothermal energy projects (GFDP)
- Synergies of geothermal energy project developments
- Pitfalls and risks in geothermal projects

Computer access required for exercises.

Geothermal Engineering

ETR02 | 5 days | Foundation / Skill

Gioia Falcone

Geothermal energy resources can play a key role towards meeting net-zero emissions targets. There is a growing need for interdisciplinary competence to untap the vast geothermal potential worldwide, with a high level of skills transferability across geo-resource sectors, including oil and gas. This course encompasses all aspects and scales of geothermal use, from preliminary resource assessment to project implementation. The course will build up the delegates' knowledge and understanding of geothermal technologies, their current level of maturity and international uptake.

DESIGNED FOR YOU, IF YOU ARE...

- An energy policy maker
- An energy stakeholder in charge of investment and funding decisions
- A geoscientist wishing to learn the engineering aspects of geothermal project implementation
- An oil and gas professional transitioning towards sustainable energy operations
- An energy educator

HOW WE BUILD YOUR CONFIDENCE

This course is presented through a mixture of lectures, tutorials and discussion of case studies. Active participation from the delegates is strongly encouraged during the whole course in order to consolidate learning. Attendees are encouraged to bring their own case studies for discussion in the class.

THE BENEFITS FROM ATTENDING

By the end of the course you will feel confident in your understanding of:

- The role of geothermal energy within the current and future energy mix
- The different types of geothermal energy resources and associated uses
- The design and operational aspects of projects harnessing geothermal energy
- The geothermal project risk
- Existing frameworks for the classification and reporting of geothermal resources

TOPICS

- Global energy statistics and the role of geothermal energy
- Fundamentals of geothermal energy
- Types of geothermal systems
- Geothermal energy uses
- Thermal energy storage
- Hybrid energy systems
- Resource characterisation and project definition
- Geothermal resources quantification and classification
- Case studies

Geothermal Drilling Technology

DRI13 | 3 days | Foundation

Catalin Teodoriu

This course provides a comprehensive understanding of the technology and engineering required to successfully design and execute geothermal wells. It covers basic drilling principles analysed from the point of view of a geothermal developer. The geothermal aspects of drilling processes and how they affect the well plan, well construction and overall budget are also presented.

DESIGNED FOR YOU, IF YOU ARE...

- An engineer with little or no background in drilling technology or petroleum science
- A geologist or any professional involved in geothermal project planning and management

HOW WE BUILD YOUR CONFIDENCE

The course is structured by presenting the basic drilling technology and then linking it with the features of geothermal drilling activities.
The course will cover the following drilling aspects:

- Design and evaluation of well drilling systems
- Identification and solution of drilling problems associated with geothermal wells
- Mud design for elevated temperatures, well control, casing design
- Well cementing

Some exercises (drilling costs calculation, casing loads) will be used to highlight the most important aspects of geothermal well construction.

THE BENEFITS FROM ATTENDING

By the end of the course you will feel confident in your understanding of:

- The basics of drilling engineering related to geothermal applications
- The interdependency between geothermal well drilling and the oil & gas business
- The specific tools needed to drill a well in general and specifically for geothermal drilling
- The technologies involved to date for drilling at rig site
- An overview of drilling costs

TOPICS

- Short history of drilling engineering
- Introduction to geothermal engineering
- Drilling a well and drilling methods
- Drilling rig components and drilling rigs classification
- Overview of rock mechanics process
- Effect of geothermal reservoir on the rock mechanics process
- Drilling fluids and wellbore hydraulics
- Drill bits and their application
- Drill string components
- Downhole motors and downhole tools
- Prime drivers, rotary system
- Hoisting system, mud circulation system
- Casing and cementing of geothermal wells
- Well completions for geothermal applications
- Special aspects of geothermal drilling
- Effect of high temperature on drilling mud
- Economic aspects of geothermal drilling
- Well control
- Drilling problems related to geothermal drilling
- Special drilling techniques for geothermal drilling

CUSTOMER FEEDBACK

'Well organised training with excellent instructor.'

Engineer at MOL

'Very good trainer with high level practical knowledge of geothermal drilling, well integrity.'

Engineer at MOL

Exploring Petrophysics in Geothermal Energy

PPH940 | 2 days | Foundation

Claudia Steiner-Luckabauer

This course offers a practical guide on using and interpreting well logs measured near planned geothermal sites, to reduce uncertainties when assessing the feasibility of geothermal energy utilisation. Both, analytical methods and (more sophisticated) reservoir simulations used for reservoir and production engineering assessment of the potential energy yield (volumes and temperature) require fundamental input such as porosity, permeability, and geothermal properties. Wells are the best source for such data. As more and more countries make well information and data publicly available, logs from the vicinity of planned geothermal targets should be used and assessed.
This course is very hands-on, result oriented and particularly powerful for those who want to make meaningful petrophysical assessments for their geothermal challenge.

DESIGNED FOR YOU, IF YOU ARE...

- A fresh graduate petrophysicist with limited experience
- A team leader or project manager working on a geothermal project
- A professional looking to build fundamental skills in reading logs, extracting petrophysical parameters, and interpreting geothermal-specific data

HOW WE BUILD YOUR CONFIDENCE

- Examples of intuitive log reading
- Practical examples on how to visually pinpoint key aspects of a log section
- Discussion of literature examples

THE BENEFITS FROM ATTENDING

By the end of the course you will feel confident in your understanding of:

- How to read old and modern logs, and how to extract petrophysical parameters
- Fundamental differences between calculating properties from carbonate or clastic environments
- How to assess log quality, how to qualitatively extract fundamental information such as horizon-based water salinity changes, how to derive basic lithologies, and how to differentiate between tight and permeable zones
- Applying fundamental petrophysical equations and how to extract properties such as porosity, shale volume, permeability and main lithologies

TOPICS

- Fundamentals of practical log interpretation
- Logging effects
- The interlink between permeability and mud filtrate invasion
- Critical evaluation (deficiencies, mis-interpretations, etc.) of (literature) examples deriving thermal properties from logs

GREENHOUSE GAS (GHG) ACCOUNTING

Direct GHG Emissions Inventory Compiling for Upstream Oil & Gas

ETR11 | 3 days | Foundation / Skill

Aleksandar Mirkovic

This course delves into the technical aspects of Green House Gas (GHG) accounting, focusing on methodologies, standards, and strategies for successful compiling of carbon inventories. The focus is specifically tailored to address the unique challenges faced in the oil & gas industry.
The course is designed not only to enhance understanding of carbon accounting principles but also to contextualise these skills within the specific complexities and operational realities of the oil & gas sector, preparing attendees for practical application and advancement in this area.

DESIGNED FOR YOU, IF YOU ARE...

- An environmental engineer
- A sustainability officer or manager
- An environmental consultant
- An oil & gas industry professional

HOW WE BUILD YOUR CONFIDENCE

- Mixed, instructor-led delivery of theoretical content with a blend of PowerPoint overview, whiteboard explanations of details, and class interactions
- Case studies
- Hands-on exercises

THE BENEFITS FROM ATTENDING

By attending this course, you will gain:

- Comprehensive understanding of GHG emissions: Understanding the nature, sources, and impact of greenhouse gas emissions, particularly in the context of the oil & gas industry.
- Proficiency in GHG accounting: Getting familiar with the principles and best practices of GHG accounting, including the use of global standards and methodologies specific to the oil & gas sector.
- GHG inventory compiling skills: Ability to assess the organisational boundaries, identify the emitters, set up the business processes required to track and aggregate the activity data, perform the Q/C of input data, and make appropriate assumptions in case of missing data. Skills to compile inventory models based on available data, and fine tune the models based on physical measurements.
- Knowledge of emission reduction strategies: Understanding of various strategies and technologies for reducing GHG emissions in oil & gas operations.
- Hands-on experience through case studies: Practical experience from real-world case studies, helping you understand the challenges and solutions in managing GHG emissions.
- Networking opportunities: Connection with peers and experts in the field, facilitating knowledge exchange and professional networking.

TOPICS

Introduction to technical aspects of GHG accounting in the oil & gas industry

- Introduction to climate change and greenhouse gas emissions
- Fundamentals of GHG accounting
- Identification of emission sources
- Establishing business processes for data collection and validation
- Calculation of emissions for stationary and mobile emitters
- Practical exercise in emission calculation for mobile and stationary emitters

Direct methane emissions and their impact on GHG inventory

- Impact of methane on climate change and its sources
- Fugitive emissions
- Emissions from gas flaring
- Emissions in the gas dehydration process
- Practical exercise in calculation of fugitive, process, and flaring emissions

Development of an integrated GHG emissions model; assessing emission reduction potential

- Creation of a complete GHG inventory
- Analysis and evaluation of emission reduction strategies
- Developing plans to achieve Net-Zero goals

Computer access required for exercises.

CROSS-DISCIPLINARY COURSES

Business Development for Subsurface Decarbonisation Projects

PBM45 | 1 day | Foundation

Martin Fleckenstein

Upstream organisations seem to be ideally prepared to engage in subsurface decarbonisation ventures like geothermal and the storage of CO_2. The safe and cost-efficient delivery of these projects is likely to become a critical element for the future competitiveness of E&P companies. However, successful business development needs to consider several challenges which need to be overcome if future projects should become a sustainable element in corporate portfolios. Risk factors include the lack of a realistic approach to project definition and design, failure to achieve truly integrated projects and the challenges to increasingly cooperate with stakeholders unfamiliar with the E&P business.
This course highlights the case for change, criteria for successful business development projects and a range of medium-term scenarios for these business segments.

DESIGNED FOR YOU, IF YOU ARE...

- A member of the leadership team, a strategic planner, or a controller involved in the early identification and development of geothermal or CCS strategies and project portfolios

HOW WE BUILD YOUR CONFIDENCE

- Highlighting selected case histories
- Exercises to understand opportunities, challenges, risk mitigation strategies

THE BENEFITS FROM ATTENDING

By the end of the course you will feel confident in your understanding of:
- The business case for subsurface decarbonisation projects
- Challenges of geothermal and CCS projects based on track record to date
- Prerequisites for the implementation of successful business development

TOPICS

- Business case for geothermal and CCS projects
- Track record of geothermal and CCS projects
- Risk management specific to geothermal and CCS projects
- Case histories, successes and failures, lessons learned
- Competitive landscape
- The role of technology and R&D
- The critical role of team dynamics and decision processes
- Stakeholder management
- Public perception, opportunities and challenges

Energy and Petroleum Economics, Business and Decision Making

PBM02 | 4 days | Skill

Reidar Bratvold

Engineers, geoscientists, and economists perform technical work to support the 'business' objectives of the organisation they work for (corporation, government). It is therefore important that they understand that 'business' because it will influence the judgments they make. Economic evaluations provide the main source of the organisation's information by which investment and operational decisions are made regarding the most effective use of resources. Through these decisions that corporate value is created (or destroyed).
Many subtleties and assumptions underlie the seemingly straightforward economic calculations that are often seen. Consequently, a fundamental understanding of the concepts behind economic evaluation and of techniques for performing them within a corporate decision-making context are essential skills. Furthermore, as all investment decisions are made without knowing what the future holds, understanding the uncertainties we face in any given decision situation is essential for good decision-making.
This course provides the tools necessary for engineers to evaluate their uncertainties and decisions economically. It also allows engineers and geoscientists to communicate with the 'business' world, which is generally more interested in monetary values and their risks than engineering tolerances and specifications. It also provides understanding and knowledge of economic and business concepts, time-value of money, discounted cash flow, cash-flows, net present value and other economic decision criteria, the decision-making process, multi-objective decision making, decision-tree analysis, and value-of-information & flexibility. Some psychological and judgmental aspects of how people respond to uncertain and complex decision situations will be discussed.

DESIGNED FOR YOU, IF YOU ARE...

- A surface or sub-surface technologist (engineer of any discipline, geoscientist, geophysicist and petrophysicist) who directly or indirectly contributes information or data to economic evaluations and decisions

HOW WE BUILD YOUR CONFIDENCE

- The course combines lectures, group work, and individual exercises
- Several examples and practical decision problems will be addressed - both in the lectures as well as in the practice sessions
- Microsoft Excel with add-ons for decision trees and Monte Carlo simulation will be used for many of the examples and exercises

THE BENEFITS FROM ATTENDING

By the end of the course you will feel confident in your understanding of:
- The principles underlying the economic evaluation of projects large and small - from the economics of a fracture stimulation, through side-tracking a well, to major field development decisions
- How to develop cashflow models that are typical for oil & gas valuations
- Tax regimes and the impact of discounting
- The impact of uncertainties in the data that goes into economic calculations, and how risk is dealt with
- The use of decision analysis as a method to deal with the complexity and uncertainty involved in many real-world decisions
- The value of information concepts and their application to the E&P setting

TOPICS

- Context and purpose of economic evaluation
- Developing Net Cash Flow (NCF) estimates
- Revenue and expense (capital and operating) streams
- Depletion, depreciation, and abandonment provisions
- Taxes, royalties and production-sharing contracts
- Discounted cash flow analysis: time value of money and discount rates
- Value and investment metrics: net present value, rate-of-return, return-on-investment, investment efficiency, hurdle rates
- Incremental vs. acceleration projects
- Strengths and weaknesses of DCF and NPV
- Sources of uncertainty and accounting for risk

Computer access required for exercises.

Carbonate Reservoir Characterisation and Modelling for the Energy Transition

RES62 | 5 days | Skill / Advanced

Sebastian Geiger

This interdisciplinary course integrates modern reservoir modelling and reservoir engineering concepts to address and overcome the key challenges encountered when creating meaningful static and dynamic reservoir models of (fractured) carbonate reservoirs across a range of subsurface reservoir applications that support the transition to a sustainable low-carbon energy future.

DESIGNED FOR YOU, IF YOU ARE...

- A geomodeller, reservoir engineer or petrophysicist working on (fractured) carbonate reservoirs, wishing to build a strong foundation in characterising and modelling these complex reservoirs, specifically in the context of the energy transition

HOW WE BUILD YOUR CONFIDENCE

- Participants are encouraged to engage in discussions on the integration of core and log data for creating robust reservoir rock-typing approaches for carbonates.
- Case studies are reviewed to understand challenges and best practices when characterising and modelling (fractured) carbonate reservoirs.
- Practical exercises are conducted to enhance learning and maximise training objectives.

THE BENEFITS FROM ATTENDING

By the end of the course you will feel confident in your understanding of:
- Why carbonate reservoirs are important for the energy transition
- How oil and gas expertise for carbonate reservoirs can be applied to other subsurface applications such as CCUS and geothermal energy
- Integrating core and log data for reservoir rock-typing in carbonates
- How fractures in carbonates can be detected and incorporated in static and dynamic reservoir models
- Modern reservoir modelling approaches for carbonate reservoirs and how the multi-porosity nature is captured (not specific to certain software packages)
- State-of-the-art carbonate reservoir modelling approaches and best practices
- How uncertainties in carbonate reservoir modelling can be quantified using static and dynamic data, and how these data can be used for model calibration

TOPICS

- The role of carbonate reservoirs in the energy transition (e.g., geothermal energy or CCUS)
- Heat and mass transfer in (fractured) carbonate reservoirs
- Petrophysics for carbonate reservoirs
- Reservoir rock-typing for carbonates
- Detecting, characterising and modelling fractures
- Multi-scale and multi-porosity reservoir modelling and upscaling
- Model ranking and clustering using static and dynamic data
- Uncertainty quantification for carbonate reservoir modelling

CUSTOMER FEEDBACK

'The course is delivered with extensive coverage of both static and dynamic aspects.'

Lead Reservoir Engineer at Trident Energy

'I liked the integrated nature of the course material which combined the different disciplines.'

Reservoir Engineer at Trident Energy

'Up to date and recent methods were shown on the course. Lots of papers were referenced with interesting aspects.'

Lead Geologist at Trident Energy

Computer access required for exercises.

Naturally Fractured Reservoir Modelling and Simulation for the Energy Transition

RES61 | 5 days | Advanced / Specialised

Sebastian Geiger

This course addresses the key concepts and challenges encountered when modelling and simulating naturally fractured reservoirs and will provide practical guidelines for creating meaningful reservoir simulation models across a range of subsurface reservoir applications that support the transition to a sustainable low-carbon energy future.

DESIGNED FOR YOU, IF YOU ARE...

- An experienced reservoir engineer working on naturally fractured reservoirs, wishing to refine your expertise in modelling and simulating these complex reservoirs, specifically in the context of the energy transition

HOW WE BUILD YOUR CONFIDENCE

- Participants are encouraged to engage in discussions on modern reservoir modelling approaches for naturally fractured reservoirs
- Case studies are reviewed to understand the challenges encountered during the characterisation and operation of naturally fractured reservoirs
- Practical exercises are conducted to enhance learning and maximise training objectives

THE BENEFITS FROM ATTENDING

By the end of the course you will feel confident in your understanding of:

- Why fractured reservoirs are important for the energy transition
- How oil and gas expertise for naturally fractured reservoirs can be applied to other subsurface applications such as CCUS and geothermal energy
- State-of-the-art naturally fractured reservoir modelling
- Creating and upscaling fracture network models
- How to quantify the fundamental processes that drive fluid flow in naturally fractured formations
- The physics of multiphase flow in naturally fractured formations
- Running dual-porosity and dual-permeability models
- Available concepts in modern reservoir simulation packages and their advantages and disadvantages when modelling single- and multi-phase flow processes in naturally fractured reservoirs
- Using assisted history matching techniques to forecast future production
- How dynamic data can be used to calibrate fractured reservoir models

TOPICS

- The role of naturally fractured reservoirs in the energy transition (e.g., geothermal energy or CCUS)
- Introduction to naturally fractured reservoirs and their performance
- Heat and mass transfer in naturally fractured reservoirs
- Fracture network modelling and upscaling
- Principles of fluid flow in fractured formations
- Reservoir simulation using dual-porosity and dual-permeability models
- Calibrating fractured reservoir models using dynamic data

Computer access required for exercises.

Integration of Oil & Gas Infrastructure for the Energy Transition

FAC14 | 3 days | Skill

Chandrasekhar Ramakrishnan

Pursuing the international Net-Zero Greenhouse Gas Emission targets for 2050 poses significant challenges for the entire energy industry. While various new energy carriers and concepts for net-zero emissions are being developed in parallel during the ongoing operation of our industries and transportation sectors, most experts believe that there will not be one single new technology arising, but that the solution will be a co-existence of several technologies, including hydrogen, electrification, e-fuels, etc.
For both technology and infrastructure development, the quickest and most efficient way forward will be to utilise most of the existing oil & gas infrastructure, from production of these new energy carriers to storage and distribution.
This course will provide an insight into the currently emerging technologies like Green & Blue Hydrogen, sustainable fuels (HVO), green ammonia and green methanol and SAF, as well as e-fuels and e-chemicals. Emphasis will also be placed on changing legal boundaries and the potential of the existing oil & gas infrastructure to accommodate these developments, including required improvements and modifications as well as obstacles and success factors for project financing.

DESIGNED FOR YOU, IF YOU ARE...

- A professional in the energy industry
- Management or commercial staff involved in energy transition or working for energy companies, technological start-ups, etc.

HOW WE BUILD YOUR CONFIDENCE

- Mixed, instructor-led delivery of theoretical content with blend of PowerPoint overview and detailed explanations
- Case studies for energy transition projects
- Participants are encouraged to bring own case studies for class discussion

THE BENEFITS FROM ATTENDING

By the end of the course you will:

- Understand the concept of energy transition and net-zero greenhouse gas emissions
- Get familiar with the driving legal framework for energy transition, especially in Europe, incl. the European Green Deal, RED II, international sustainable fuel guidelines like CORSIA, etc.
- Be aware of technical challenges and legal restrictions in the handling of new energy carriers with existing infrastructure
- Understand the difficulty of project financing and key success factors to reaching FID

TOPICS

- Overview of the most promising concepts and future energy carriers for industry and global mobility, incl. their specific characteristics, advantages/ disadvantages
- Chemistry and physical characteristics of CO_2, H_2 and carriers like NH_3, e-fuels, etc.
- Overview of the available oil & gas infrastructure today, covering Upstream / Midstream / Downstream and their respective potential roles for energy transition
- Technical challenges in the handling of new energy carriers with existing infrastructure
- Legal frameworks and restrictions for handling new energy carriers with existing infrastructure
- Case studies for energy transition projects incl. re-assignment of existing infrastructure, incl. hydrogen transport in gas pipelines, CCUS projects, green hydrogen applications for conventional oil & gas industries, green ammonia production and handling, e-fuels synthesis, storage and handling, etc.
- Feasibility of energy transition projects and potential improvement by using existing infrastructure
- Project risks and key success factors
- Energy transition from a financing point of view

SHAPING THE ENERGY FUTURE

Our Expertise – Your Solution

The HOT Energy Group (HOT) is a technology driven and independent organisation serving the energy industry. HOT provides best-in-class solutions for underground energy storage, oil and gas field development, enhanced oil recovery, and deep geothermal energy utilisation.

RESERVOIR EXPERTISE

- Underground Energy Storage (UGS, CCS / CCU, Hydrogen)
- Field Development Planning (FDP / MDP / IAM)
- Improved / Enhanced Recovery (IOR/EOR)
- Reservoir Characterisation

TRAINING AND KNOWLEDGE TRANSFER

- Energy Transition
- Oil & Gas
- Business & Management

LABORATORY EXCELLENCE

- High-Pressure High-Temperature Microfluidics
- InspIOR® Turnkey Microfluidic Technology Platform
- Characterisation of Complex Gas Mixtures (Hydrogen, CO_2)

InspIOR®
The leading HPHT microfluidic technology platform for accurate and efficient fluid testing and flooding experiments

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HOT TRAINER TEAM

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Jürgen Grötsch
Gijs Holstege
Aleksandar Mirkovic
Chandrasekhar Ramakrishnan
Claudia Steiner-Luckabauer
Catalin Teodoriu
Emina Buket Ulker
Peter van den Bogert

Reidar B. Bratvold is Professor of Petroleum Investment and Decision Analysis at the University of Stavanger and at the Norwegian Institute of Technology where he is teaching and supervising graduate students doing research in decision analysis, project valuation, portfolio analysis, real-option valuation and behavioral challenges in decision-making.
Prior to academia, he spent 15 years in the industry in various technical and management roles including as Vice President in Landmark Graphics Corporation in Houston, Managing Director of Smedvig Technology Software Solutions (now Roxar), Senior Scientist with IBM, and Reservoir Engineer with Statoil. He spent his early working years as a roughneck and roustabout in the North Sea.
Reidar has published numerous papers on topics such as investment modelling, decision-making, stochastic reservoir modelling, fuzzy logic and reservoir management. He is a co-author of the SPE book 'Making Good Decisions'.
He has three times served as an SPE Distinguished Lecturer. He is the 2017 recipient of the SPE Management & Information award and has served as the executive editor for the SPE Economics & Management journal. He is a Fellow in the Society of Decision Professionals and the Norwegian Academy of Technological Sciences.
Reidar holds a Ph.D. in petroleum engineering and an M.Sc. in mathematics, both from Stanford University and has business and management science education from INSEAD and Stanford University.

Gioia Falcone is currently Rankine Chair, Professor of Energy Engineering at the University of Glasgow. Until June 2018, she was Professor and Head of the Geo-Energy Engineering Centre (formerly Oil & Gas Engineering Centre) at Cranfield University. Between 2011 and early 2016, she held the Endowed Chair and Professorship in Geothermal Energy Systems at Clausthal University of Technology, Germany, where she was also the Director of the Institute of Petroleum Engineering. Gioia was formerly an assistant and then associate professor in petroleum engineering at Texas A&M University, Chevron Corporation faculty fellow and faculty member of the Ocean Drilling and Sustainable Earth Science partnership. Prior to joining academia, she worked with Eni-Agip, Enterprise Oil UK, Shell E&P UK and Total E&P UK, covering both offshore and onshore assignments.
Gioia holds a Laurea Summa Cum Laude in environmental-petroleum engineering from Sapienza University of Rome, a M.Sc. degree in petroleum engineering from Imperial College London and a Ph.D. in chemical engineering from Imperial College London.
Gioia has served on several expert review panels, as technical editor/reviewer for several peer-review journals, and as member of several program committees of technical conferences around the world. She has co-authored over 140 scholarly articles and one US patent, edited the 2012 Multiphase Flow Metering SPE Reprint Series "Getting up to Speed" and co-authored the 2009 book on Multiphase Flow Metering, published by Elsevier.
Along with being actively engaged with the SPE, she is one of the 23 members of the United Nations Economic Commission for Europe (UNECE) Bureau of the Expert Group on Resource Classification, and of its Renewable Reserves Working Group. She has led the development of the Specifications for the application of the UNFC to Geothermal Energy Resources.

Martin Fleckenstein is Honorary Professor for Applied Petroleum Geology at the University of Bremen. He is a member of the Supervisory Council at VNG AG in Germany, active in the gas and gas infrastructure sector and working towards a sustainable, secure and increasingly climate-neutral energy system for the future. Previously he was Director New Ventures Exploration for Wintershall Holding AG, a subsidiary of BASF. He started in the upstream business in 1982 with BEB Erdgas and Erdoel in Germany, a joint venture of Exxon and Shell, in a variety of technical and executive positions. Assignments included exploration and development in Northern Europe, the US Rocky Mountain region, the Gulf of Mexico, West Siberia and the Caspian as well as global gas commercialization and business development projects with ExxonMobil and Wintershall. Current focus areas include global energy demand and supply, subsurface geoscience, the dynamics, resource intensity and financial implications of the energy transition, technology transfer for subsurface energy decarbonization projects as well as technical and economic evaluation of energy investments. Martin holds a M.Sc. in Geology from the Colorado School of Mines and a Ph.D. in mineralogy from the University of Cologne. He is a member of the American Association of Petroleum Geologists (AAPG), where he represents the Europe Region in the House of Delegates, member of the Association of German Geoscientists (BDG), the European Association of Geoscientists and Engineers (EAGE), the Society of Petroleum Engineers (SPE) and the Swiss Association of Energy Geoscientists (SASEG).

Leonhard Ganzer is Professor of Reservoir Engineering and Head of the Institute of Subsurface Energy Systems at the Technical University Clausthal in Germany, as well as Managing Director of HOT Reservoir Solutions GmbH and CEO of fluidXlab GmbH in Goslar, Germany. In 2022, he also has joined Underground Energy Storage Technologies (UEST) as Managing Director. Previously, he was Professor of Reservoir Engineering at the Mining University Leoben, Austria; he held the position of Technical Director of SST Simulation Software Technology GmbH, worked for HOT Engineering GmbH and Reservoir Characterisation and Research Inc. in several technical and software development related positions serving in the Leoben (Austria), Houston and Denver (USA) offices. Leonhard holds a PhD in Reservoir Engineering and a MSc in Petroleum Engineering (with honours) from the Mining University Leoben. He has more than 25 years of experience in the petroleum industry and academia, with key qualifications in reservoir engineering, reservoir simulation and software development. His primary interests are compositional and fractured reservoir simulation, hydrocarbon fluid phase behaviour and multiphase flow in porous media, enhanced oil recovery (EOR), underground hydrogen storage, CO_2 injection, carbon capture and storage (CCS) or usage (CCU). He is experienced in leading roles of R&D projects and technology development for reservoir simulation, enhanced oil recovery and underground storage of hydrogen and CO_2. He also acts as expert for the Austrian mining authority for underground gas storage projects. Leonhard is an experienced instructor for post-graduate industry courses in reservoir engineering and simulation topics and is author and co-author of numerous publications. He is member of SPE, DGMK and EAGE.

Sebastian Geiger is Professor for Sustainable Geoenergy at Delft University of Technology. Previously he was Director of Research for the School of Energy, Geoscience, Infrastructure and Society at Heriot-Watt University and Director of the Institute of GeoEnergy Engineering at Heriot-Watt University. He spent time as a visiting researcher at the Australia National University, Imperial College London, and Aramco Research Centre in Houston, and was a post-doctoral researcher at ETH Zurich. Sebastian's research interests include the characterization, modelling, and simulation of naturally fractured (carbonate) reservoirs across all scales, with applications to hydrocarbon production, CCUS, and geothermal energy. He has authored or co-authored more than 190 technical papers and edited one book.
Sebastian holds a Ph.D. degree in Computational Geology from ETH Zurich and an M.Sc. degree in Hydrogeology from Oregon State University. He is a member of EAGE, SPE, and Interpore Society. Sebastian received the 2017 Alfred Wegener Award from the EAGE for his pioneering research into carbonate reservoir modelling and simulation. He was elected as a Fellow of the Energy Institute in 2019 and as a Fellow of the Royal Society of Edinburgh, Scotland's Academy for Sciences and Letters, in 2020.

Jürgen Grötsch is Lecturer Geo-Energy in the Master Program at the Friedrich-Alexander University (Erlangen, Germany). He also works as Assurance Consultant for the national Nuclear Waste Site Program in Germany and as Energy Transition Advisor. Next to this, he is a member of the OSDUTM Forum, a game changing open-source software development consortium on Subsurface Data & Workflow Management.
Jürgen has a background in carbonate sedimentology, stratigraphy and palaeoceanography. Following a brief career in academia, he worked for 31 years with Shell where he had various functions around the globe like Chief Geologist and Head of Geological Services. Since 2010 his focus was

on digital technology development, ultimately leading into the global project of the OSDUTM data platform. End of 2022, he retired from Shell. Jürgen published many widely cited scientific papers and books on geoscience.

Gijs Holstege studied Geophysics at Delft University before joining Shell International. He has 31 years' experience in technical and leadership roles throughout the entire upstream lifecycle from mature field production, through to exploration including several years in finance, planning and strategy. He has worked in the United Kingdom, New Zealand, Thailand, Syria, Saudi Arabia, the Netherlands, and Brunei, where he was exploration manager. He is passionate about planet sustainability and has developed interest in climate change over the past decade leading to his involvement in energy transition.

Aleksandar Mirkovic is a dynamic and versatile engineer. He is currently working as a consultant and technical product manager with expertise spanning across carbon management consulting, GHG accounting, petroleum engineering and technical product management. Aleksandar has a proven track record in conducting extensive carbon footprint audits, notably for Seplat Energy, and helping upstream oil & gas clients in compiling GHG emissions inventories. In the realm of software development and product management he has led the team in developing specialised tools and systems for advanced carbon management tailored to the needs of the oil and gas industry.

Chandrasekhar Ramakrishnan is currently Managing Director of an Austrian based engineering and consulting company. He holds a Ph.D. in Process Engineering from the Institute of Process Engineering, Austria and an M.Sc. in Chemical Engineering from the Technical University Vienna, Austria. Chandrasekhar has 15 years of work experience in the international oil & gas industry and has worked as consultant to companies such as OMV, PETROM S.A., SIBUR, MAERSK and LUKOIL in a range of engineering, project management and consultancy roles. He has managed, led and supervised numerous on- and off-shore projects dealing with oil & gas production, gas storage facilities, process plants and refineries. Areas worked include Europe, the Middle-East and CIS countries. His key qualifications and areas of interest include project management, oil & gas engineering, refinery engineering, explosion protection, conceptual design and acquisition. He is also an experienced HAZOP Chairman. Chandrasekhar is author and co-author of several publications and a member of the Austrian Society of Petroleum Sciences (ÖGEW).

Claudia Steiner-Luckabauer holds a Ph.D. in Geophysics and an M.Sc. degree in Applied Geosciences from the Montanuniversität Leoben, Austria and has more than 15 years' experience. Claudia started her career as a wireline engineer and petrophysical interpreter at Fugro before focussing on seismic processing, AVO and seismic interpretation at the Department of Geophysics at the Montanuniversität Leoben. At Montanuniversität Leoben she also gave lectures on geophysical well logging, advanced borehole geophysics, geophysical modelling, inversion and interpretation, seismic and seismic processing. Claudia joined HOT in 2012 as Senior Petrophysicist and has worked in a leading role on numerous integrated reservoir characterisation and field development projects, focussing on integrated petrophysical evaluation and formation evaluation. She has assessed mature oil fields, heavy oil fields, gas condensate fields, gas fields, underground gas storage, clastic and carbonate settings, low-salinity environments, unconsolidated reservoirs, and fractured reservoirs (chalk, carbonate, granite basement, sandstone). She has also contributed her expertise to several geothermal energy projects. Claudia is an experienced instructor in academic and industry workshops on various topics in geosciences and author of numerous scientific papers, and she is also a Certified Scrum Master.

Catalin Teodoriu is Petroleum Engineering Professor at University of Oklahoma, Norman, Oklahoma, USA. Until 2014 he was head of the Sub-department for Drilling Technology, Completion and Workover at Clausthal University of Technology. Previously, he was an assistant professor at Texas A&M University, teaching courses on drilling topics such as Drilling Engineering, Introduction to Drilling Engineering, Completion and Workover, and Advanced Drilling Engineering. He now serves as an adjunct assistant professor in the Harold Vance Department of Petroleum Engineering at Texas A&M University and as adjunct professor at the Oil and Gas University of Ploiesti in addition to his position at Clausthal University of Technology.
He holds a Ph.D. in Technical Sciences, with a specialty in oilfield equipment and an M.Sc. in Mechanical Engineering from the Oil and Gas University of Ploiesti and a Ph.D. in Engineering from Clausthal University of Technology.
He has more than 20 years of experience in the petroleum industry and academia, with key qualifications in drilling and production equipment, drilling technology, integrated computer aided analysis, well completion, testing of OCTG, design of downhole and surface equipment, software development, EOR and geothermal wells, and in the design of laboratory specific equipment. Catalin is also an experienced instructor in drilling engineering, drilling facilities, casing, workover and drilling technologies topics, holding courses on Stuck Pipe, Drilling Hydraulics, Casing Design, Directional and Horizontal Drilling, Drillstring Mechanics and is author of numerous publications.

Emina Buket Ulker holds a Ph.D. in Reservoir Engineering from the Technical University Clausthal in Germany and has almost 20 years of reservoir engineering experience in international operating companies in Kazakhstan, Iraq, Norway, Germany and Turkey including oil and gas fields in Malta, Morocco, Yemen, Egypt, Algeria, Libya, Denmark and UK. Among others she has worked on Norwegian offshore fields, Middle East complicated carbonate reservoirs and Caspian gas condensate fields. Emina has many years of hands-on experience in Reservoir Management and has gone through the changes from old sequential approach to new integrated/iterative methodology in reservoir management. She has in-depth practical experience with reservoir simulation tools such as PETREL RE, ECLIPSE and simulation techniques and can cover both the analytical reservoir engineering and the sophisticated reservoir simulation. Emina is competent in well test design, testing operations and interpretation with KAPPA and INTERPRET. She is an expert on field development planning and reservoir management of onshore, offshore platform/subsea oil and gas condensate assets and she has extensive experience in fractured carbonate reservoirs. Emina is also an experienced instructor of industry courses for reservoir engineering related subjects. Furthermore she has vast multi-disciplinary team working experience, particularly in subsurface/surface integration, for field development and routine operations and she is used to working in multicultural environments. She is a natural mentor and has proven management, analytical and decision-making skills.

Peter van den Bogert has over 30 years of experience identifying, assessing, and mitigating technical risks in the oil & gas industry, with a focus on subsurface risks and geomechanical risks in particular.
Peter is a geomechanical expert, founding father of various innovations and assessment tools, e.g., for bore hole stability, fault reactivation and probabilistic analysis. Peter was part of the technical core team to assess induced seismicity in the Groningen gas field (Netherlands) between 2012 and 2020 and became a recognised specialist among renowned earthquake researchers. He is one of the two authors of Shell's global minimum standard on top-seal integrity (CCS containment assessment), provided (geomechanical) technical assurance to many development projects, contributed to or led many technical projects, and was responsible for the Geomechanical competence framework and associated virtual and classroom training program for all petroleum engineers in Shell for 10 years.
Currently, Peter conducts risk identification and assessment for Carbon, Capture and Storage (CCS) projects as an independent consultant, is involved in CCS ISO certification, conducts geomechanical studies and provides international training in both CCS and geomechanics to exploration and production operators and regulators.

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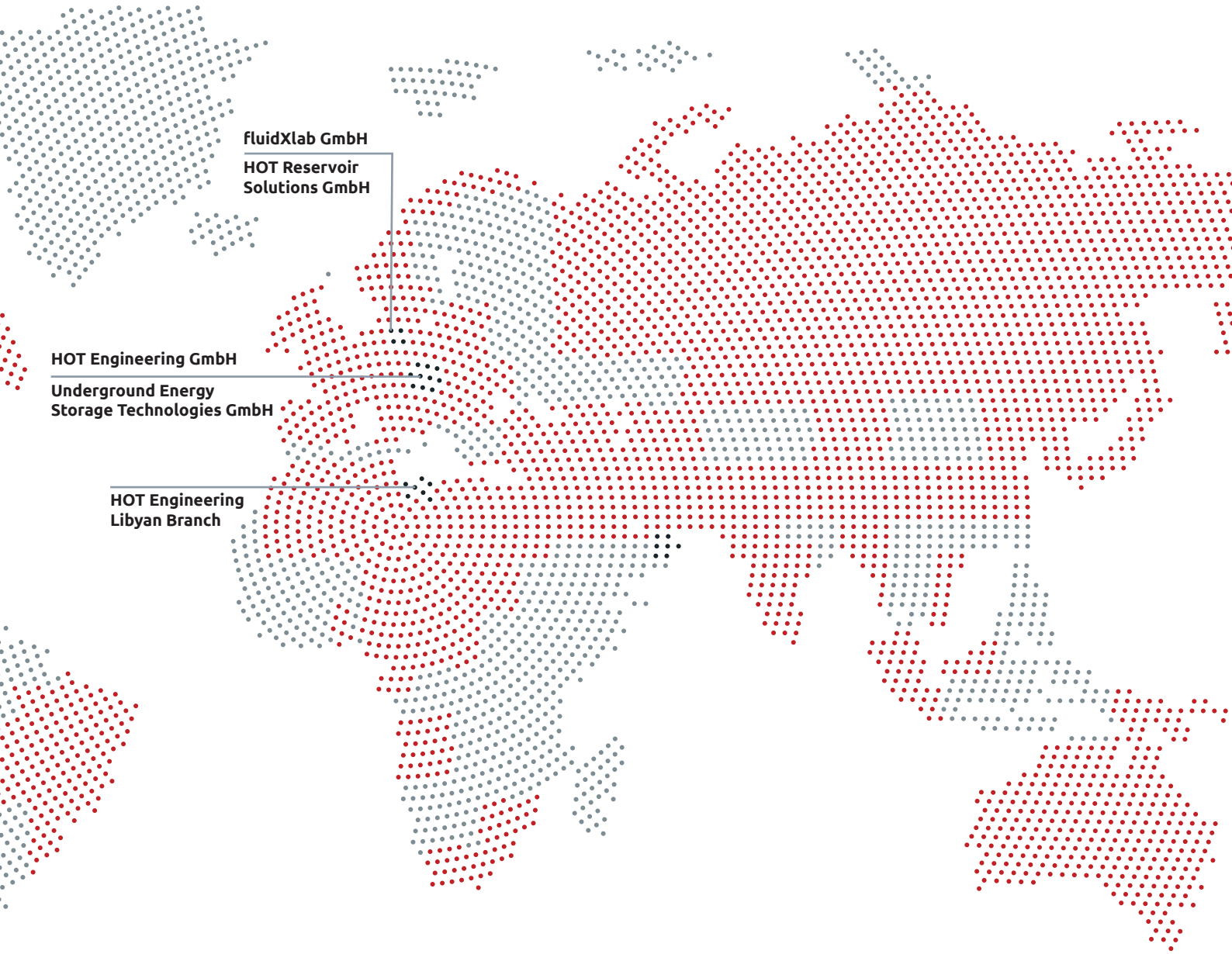

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