



FROM THE SECTION CHAIRMAN



DEAR SPE COPENHAGEN MEMBERS,

Welcome to the new SPE season 2022/23!

I hope you have all had a wonderful summer vacation and a chance to relax. It was nice and warm here in Denmark and I can assure you, Danes flocked to the beaches in their thousands! I had a 'staycation' with my family, and it enabled me to explore more of Denmark – something I have done more and more of since 2020 when "you know what" happened.

Our relationship with other sections across the Europe Region is gradually developing and we look forward to more joint events with sister SPE sections.

Last season was quite eventful as SPE CPH hosted several events. As usual, the spread of technical topics discussed ranged from digitalization to the Energy transition to Carbon capture and storage. Big thanks go to our corporate hosts.

Last season events consisted of:

5 face to face events

- Maersk Drilling in September
- WellTec in November
- Calsep in March
- Innargi in April
- GEUS in May

2 virtual events

- DOTC/DTU in October
- DTU Offshore on Feb 24th

2 Distinguished Lecturer events

- SPE DL Ian Philips in December
- SPE DL Ralf Schulze-Riegert in April

*1 joint event by the SPE
Germany and SPE France*

THE STUDENT SCHOLARSHIP

The student scholarship for last season was won by Yao Xu who is studying for an MSc In Petroleum Engineering at DTU. To cap off last season, we held our Annual Section AGM, where a new Board was announced.

YAO XU

Project Title: **Near wellbore salt precipitation during geological CO₂ storage**

Real world Application: Develop a computational model to predict the change in porosity and permeability arising from salt precipitation after CO₂ flooding.

- BSc in Petroleum Engineering from Southwest Petroleum University, China (2016 - 2020)
- Studying for an MSc in Petroleum Engineering at DTU (2020 - 2022)
- Working part-time as a student assistant at the department of chemistry - DTU, mainly assisting to conduct a series of experiments that were relevant to CO₂ storage



STRATEGIC FOCUS

Our strategic focus for new season remains the same as last year and for the new season, we intend to focus more on sponsorship and funding.

SPE CPH Focus Areas 2022/23

| | | | | |
|--|---------------------------|------------|-----------------|---------|
| THE ENERGY TRANSITION AND THE PLACE OF OIL & GAS | EVENTS & ENGAGEMENT | MEMBERSHIP | STUDENT CHAPTER | FUNDING |
|--|---------------------------|------------|-----------------|---------|

The committee structure we implemented last season has been evaluated to have enhanced our efficiency, and we will therefore maintain the structure:

- **Daily Operations Committee**, headed by the section Chairperson
- **Events Committee**, headed by the Program Chairperson
- **Communications Committee**, headed by the Communications Chairperson
- **Membership Committee**, headed by the Membership Chairperson

NEW BOARD MEMBERS



JOSÉ ANTONIO PÉREZ ACERO

WellPerform

Holds a Master Degree in Petroleum Engineering at DTU from 2016, combined with student and junior positions at Schlumberger and Maersk Oil.

With a background as Business Developer for DTI Oil&Gas (Teknologisk Institut), spent 2 years as Project Engineer in Well Operations for CEPSA in North Africa (Algeria). Currently supports WellPerform Denmark and Holland business units, dealing with both oil&gas and geothermal wells projects.

José previously held several volunteer positions at SPE Copenhagen and SPE Spain and is the **Membership Chair** for SPE Copenhagen during the 2022-2023 season.

FABIO ROSAS GUTTERRES

Welltec

Completions engineer and well designer with 20 years of a comprehensive energy industry experience, Fabio has both the technical and hands-on operational background needed to overcome novel challenges. Working from Welltec's HQ in Denmark, Fabio provides technical expertise worldwide to deliver tangible results through a solutions-oriented approach in support of energy transition activity.



Fabio is the **Communications Assistant Chair** for SPE Copenhagen during the 2022-2023 season.



SØREN WEISS HARTMANN

Drillconsult

Søren Hartmann has 35 years of worldwide experience in the oil industry, leading, supervising and planning drilling operations, from jungle to ultra-deep-water operations. Furthermore he developed the framework for several drilling training courses and various optimization workshops as well as knowledge sharing programs.

At Maersk Drilling he is responsible for developing framework for optimizing the operation.

Søren's background is Mechanical Engineering from the University at Copenhagen and Drilling Engineering from The University of Texas at Austin.

Søren Hartmann is the **Outreach Chair** for SPE Copenhagen during the 2022-2023 season.

PATRYK BIJAK

Ross DK

Patryk holds a Masters Degree in Petroleum Engineering at DTU from 2021 and B.Sc. in Drilling Engineering from AGH University in Krakow. Before joining ROSS DK, Patryk has worked in procurement at Shell and with operations digitalization at Apriside. His current role focuses on offshore rotations and drilling planning automation.

He has been an active SPE member since 2015, holding various positions at SPE AGH UST Student Chapter, SPE DTU Student Chapter and now joining SPE Copenhagen section as Assistant YP Chair.



Patryk Bijak is the **Assistant YP Chair** for SPE Copenhagen during the 2022-2023 season.

THE BOARD 2022-2023 SEASON

The 2022/23 SPE Copenhagen section board was elected at the AGM and as is the practice, these dedicated individuals have been planning for this new 2022/23 season. I would like to especially welcome the new board members: **Soren Hartmann, Jose Acero, Fabio Gutterres and Patryk Bijak.**

THE BOARD

SECTION CHAIR

Adebowale Solarin, Maersk Drilling
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PROGRAM VICE-CHAIR

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YOUNG PROFESSIONALS CHAIR

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OUTREACH CHAIR

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New type of season event

It is my pleasure to announce that through our new Outreach Chair, Søren Hartmann, we will be collaborating with IDA on an event this season. The details are still being worked out, but it certainly will be something new. I will deliberately leave you guessing!

Our Sponsors

Our gratitude goes to the companies who continue to support this society like Total Energies, Maersk Drilling, Calsep, WellTec among others. We use these funds not only to run the section, but also to deliver events that are useful to our members and support our Student chapter. However, we need more financial support.

The gradual departure of Oil & Gas and related companies from Denmark is impacting our funding base. This is a challenge that we as a Board are having to face to ensure the continuity of our section and to deliver on our focus areas.

Finally, I welcome you back and I want you to join me in looking forward to an engaging 2022/23 season!

Yours Sincerely,

Adebowale Solarin
SPE Copenhagen Section Chairman



Adebowale Solarin
SPE Copenhagen Section Chairman

THE SECOND SPE EUROPE GEOHACKATHON

The first edition of the SPE Europe GeoHackathon in 2021 was a success when more than 250 participants from more than 40 countries joined forces to predict and optimize geothermal plant operation in the Netherlands.

This year, the SPE sections of London, Netherlands, Italy, Romania, Copenhagen with the support from SPE Geothermal Technical section are hosting the second European geothermal hackathon, where the participants can learn data science, coding and computer vision analysis in order to solve a problem set by the Geological Survey of Denmark and Greenland (GEUS).

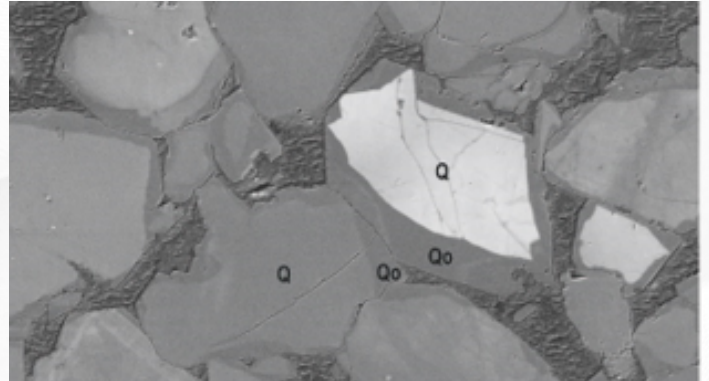
Mette Olivarius, a senior researcher at GEUS, explains the motivation for the hackathon: “A geothermal reservoir characterization includes quantification of the mineralogical composition of the reservoir rocks, since knowledge of the minerals that have formed in the pores during burial is needed to make pre-drill predictions of porosity and permeability. The mineralogy must also be taken into account when designing geothermal plants and wells to prevent scaling, corrosion, and clogging. Thus, a robust mineralogical quantification is important for several reasons.”

Specifically for sandstone reservoirs, the precipitation of quartz overgrowths along the rim of quartz grains leads to decreased porosity and permeability, thus causing inferior reservoir quality.

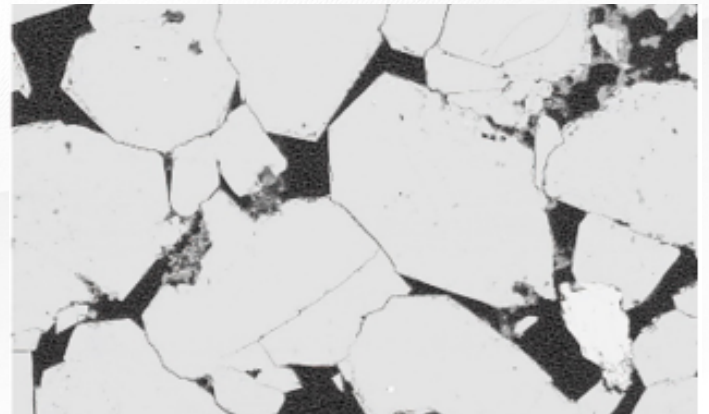
Mineral quantification is routinely obtained by SEM (scanning electron microscopy) imaging. The two types of images which can be used to distinguish between the original grains, the overgrowth, and the pore space are the cathodoluminescence (CL) and the backscattered electron (BSE) images. The distinction between the original grain and its overgrowth is best observed with CL, whereas the distinction between the grains and the pore space is best seen with BSE.

“There are cases when the available commercial solutions for automated mineral quantification are struggling with differentiating between certain mineralogical phases. On the other hand, manual interpretation is an extremely time-consuming task”, adds Nynke Keulen, a senior researcher in charge of the SEM laboratory at GEUS.

“An ultimate solution for GEUS would be to have a customizable solution which would allow for automatic classification of SEM images.



The CL image where the original quartz grain is labelled with Q, and its overgrowth is labelled with Qo.



The corresponding BSE image for the same sample.

There are several problem formulations of interest. One can think of an unsupervised learning algorithm, which will cluster different parts of SEM images as quartz, quartz overgrowth, and pore space. Furthermore, a training dataset can be created for the subsequent solution of the corresponding supervised learning problem”, says Nikolai Andrianov, senior advisor at GEUS.



The hackathon will start on September 26 with the bootcamps on geothermal energy, SEM analysis, and image processing, and data science. Several high-profile software organisations such as Microsoft, Nvidia, Mathworks, and Samsung will highlight their relevant products. The hackathon itself will take place in October - November 2022. The participants completing the bootcamps and the hackathon will receive a digital certificate of training.

Please visit the hackathon website to learn more and to register for the event!
<https://www.spehackathon-eu.com/>



DO YOU LIKE CHALLENGES?

 September 26th 2022

> ONLINE <
BOOTCAMPS
 (September - October 2022)

> ONLINE <
HACKATHON
 (October - November 2022)



ENERGY EFFICIENCY

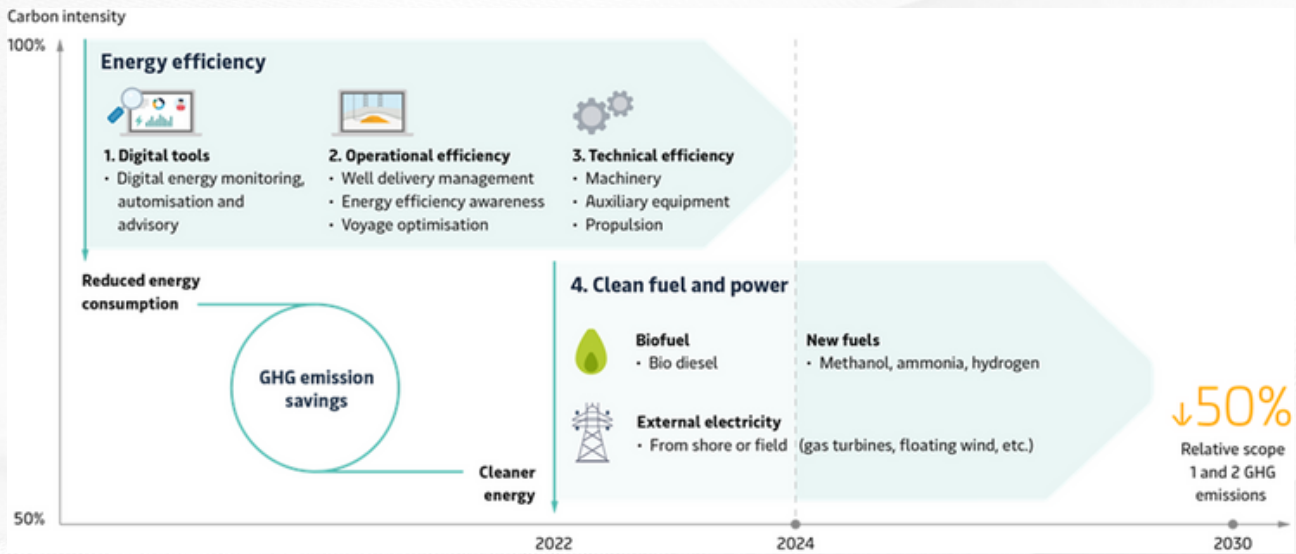


Speaker

Lola Caballero joined Maersk Drilling in 2017 and has since held several commercial and strategy positions within Business Development, Bidding and Partnerships.

In 2021 she took over the newly created role of Head of Decarbonisation Task Force responsible for realising Maersk Drilling's GHG emissions reduction targets.

She graduated in International Business, and before joining Maersk Drilling Lola worked in A.P. Møller-Maersk and ASAP Worldwide within Project Management and Business Development.



Abstract

The Oil and Gas Industry is changing, and it will play a critical role in the Energy Transition to secure reliable and affordable energy. However, oil companies are under pressure to reduce emissions and are increasingly demanding carbon-reduced services from the offshore drilling industry.

Maersk Drilling has committed to reducing GHG emissions from its operations by 50% by 2030, to help combat the climate challenge and support its customers in achieving their ambitions. But, how can the drilling industry adapt to meaningfully contribute to the greener world?

Two key levers have been defined to drive Maersk Drilling's decarbonization strategy: Energy Efficiency and Clean Energy Sources. While the latter, including alternative fuels or external power, is not yet mature at scale, driving more efficient daily operations supported by digital tools, and upgrading part of the equipment onboard is available today.

To unlock Energy Efficiency's vast potential and leverage savings opportunities at significantly low investments, several enablers must fall in place.

PROGRAM

17:00 - 18:00

Networking with drinks

18:00 - 19:00

Presentation by Lola Caballero, Maersk Drilling

19:00 - 21:00

Drinks and Light dinner

SPEAKER

Lola Caballero

ENTRANCE FEE

None

Wednesday, 28 September

Please sign-up no later than 25 September 2022

[Register HERE](#)

MAERSK DRILLING, LYNGBY HOVEDGADE 85, 2800 KGS. LYNGBY

LEADING THE WAY TO A CARBON NEUTRAL FUTURE BY BUILDING WORLD SCALE CLEAN AMMONIA PRODUCTION AND CARBON STORAGES

PROGRAM

17:00

Networking with drinks and snacks in the Café

17:30

Leading the way to a carbon neutral future by building world scale clean ammonia production and carbon storages, Rasmus Holmer, Horisont Energi

18:15

More networking and goodbye

SPEAKER

Rasmus Holmer

About Horisont Energi

Horisont Energi (EURONEXT: HRGI) is a Norwegian clean energy company that provides clean energy and carbon transport and storage services. The company will transform gas, water and renewable energy into cost-leading clean ammonia and hydrogen and offer CO2 transportation and storage services using proprietary technology, paving the way for a low carbon economy. The company was founded in 2019 and is headquartered in Sandnes, Norway.
<https://www.horisontenergi.no/>

Please sign-up no later than 25 October 2022

[Register HERE](#)

Thursday, 27 October



Speaker

Rasmus Holmer has a broad experience with business and strategy development in the oil and gas business (DONG Energy) as well as several years' experience from public administration (Ministry of Environment). He has mainly worked with general management and project management focusing on business development, commercialization, business and organizational processes. It has always been within the range of his major interest for energy and environment.

REBEL WORK SPACE, DAMPFÆRGEVEJ 27-29, 2100 COPENHAGEN Ø

ENERGY CRISIS

By Hans Horikx, DTU Offshore, email: horikx@dtu.dk

Europe is in an energy crisis, if we like it or not!

And it's not just Europe and the United States - exorbitant prices are creating chaos around the world.

"We are in the middle of the first global energy crisis." Fatih Birol, head of the IEA, told a WEF panel earlier this year, "In the Seventies, it was the oil crisis and now we have an oil crisis, a natural gas crisis, a coal crisis - all prices are skyrocketing, and energy security is a priority for many governments, if not all."

This is coming from the head of an organization that has been advising governments that "There is no need for investment in new fossil fuel supply in our net zero pathway." In its pivotal 2021 report 'Net Zero by 2050 - A Roadmap for the Global Energy Sector' the IEA continued: "Beyond projects already committed as of 2021, there are no new oil and gas fields approved for development in our pathway, and no new coal mines or mine extensions are required."

It is no surprise then that due to pressure by governments, NGOs and ESG guidelines, too little has been invested in securing oil and gas production. Europe could have invested in locally produced shale gas, but instead chose to rely on easily accessible natural gas supplied from Russia without considering whether that was strategically smart. Many thought that renewable energy would rapidly replace fossil fuel, forgetting that due to their intermittent nature the market value of green energy is relatively low, while the costs of maintaining energy security when there isn't sufficient sun or wind can be crippling high - from an economic as well as a political perspective.

Today's energy crisis did not begin with Russia's invasion of Ukraine in February this year but rather last year when energy demand surged as the world emerged from the COVID-19 pandemic (see graph). The pandemic brought about a historic drop in energy demand and prices, but recovering demand is now straining markets for oil and gas, and even coal. Prices are skyrocketing as demand chases fuel supply that has not yet recovered from the pandemic drop. China needs more coal to power its industry, the world needs more oil to transport goods and people, and the global market for liquefied natural gas (LNG) tightened as new developments had been put on hold due to low prices during the pandemic.

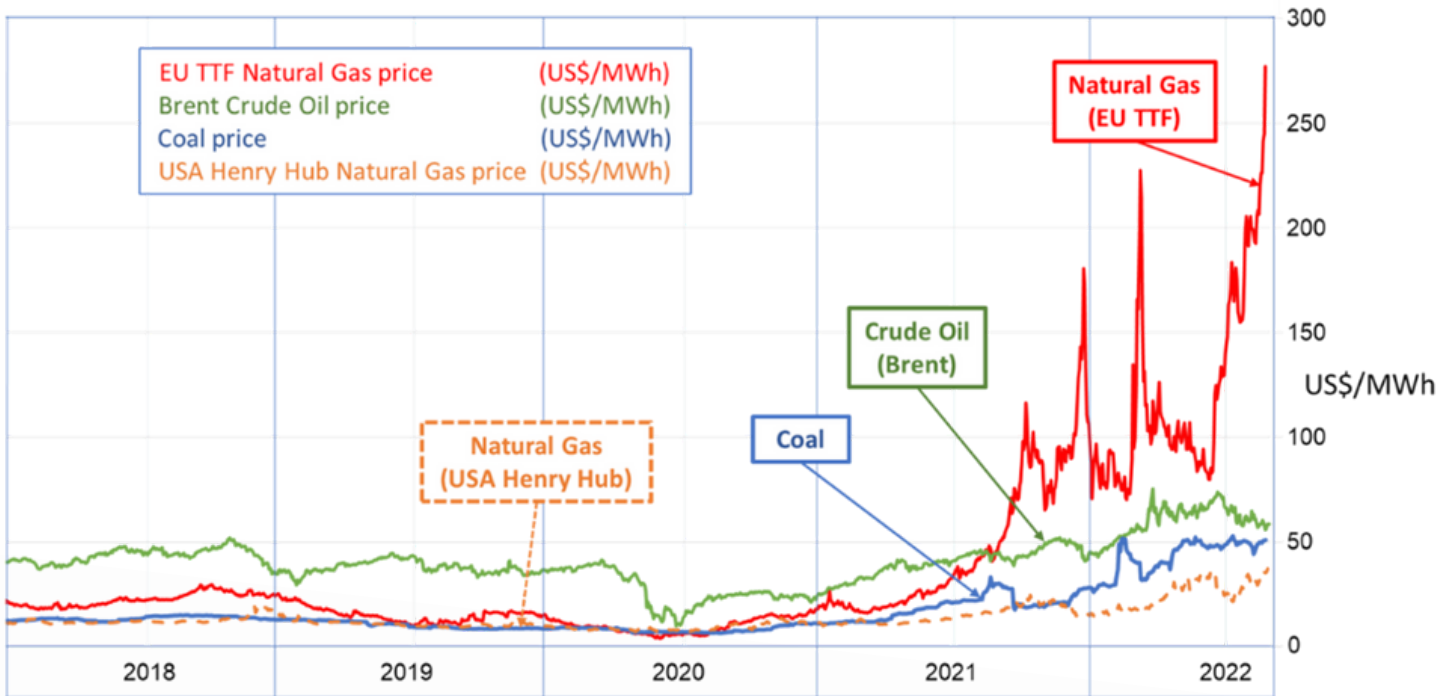
West European gas production has declined significantly in the past decade as North Sea oil and gas has peaked, and as no new investments were made to develop onshore shale gas fields due to heavy restrictions on fracking in most EU countries. Normally, with rising energy prices, a country like Russia would have stepped in to increase natural-gas sales to its main customer, Europe, above the contracted volumes. Instead, it stuck to its contracts, even though it could have produced considerably more. At the time, it appeared that Russia was trying to force prices up. But, in hindsight, the Kremlin may well have been trying to use its energy dominance to put political pressure on Europe to distance itself from American support to Ukraine, while preparing for war.

Germany is one of the countries which has been badly hit by a dependence on Russian gas. Robert Habeck, Federal Minister for Economic Affairs and Climate Action, acknowledged that this had been a strategic error and told the WEF panel in May "that the country is ready to fight the energy crisis and is now looking to diversify its fossil fuel imports at incredible speed - with processes that once took decades now taking months."

What can we do?

The world still needs oil and gas. Right now, the problem isn't with excessive consumption, but rather with supply. The efforts required to fix the supply problem are in the political domain (e.g. Russian gas versus Middle East and US sourced LNG), the regulatory domain (fracking permits, pipeline permits) and corporate governance domain (ESG policies of investment banks). The below graph shows what impact a more relaxed investment climate, such as in the US, can have on natural gas price, with US gas prices five to seven times lower than in the EU. >>

Cost of Fossil Fuels - normalized for calorific value



From a consumer perspective the most cost-efficient way to deal with high prices are to reduce energy demand, for instance through improved home insulation, while switching to cheaper forms of energy, if possible. Contrarily it is now more cost effective to heat a house, or to generate electricity, with coal or oil than with natural gas! District heating and heat pumps are excellent ways to improve system energy efficiency and thus lower operating costs, but those require high initial investments and have long lead times.

Carbon capture from electrical power stations are opportunities to reduce CO₂ emissions while keeping costs low. Incinerators can burn low-cost fuels, such as waste, while capturing and storing CO₂ in underground formations, preventing it from reaching the atmosphere. When waste heat from power generating turbines is subsequently used for district heating, something that is widely done in Denmark, then overall energy costs are significantly lower than when electrical power is generated using wind or solar, which do not provide waste heat.

Meanwhile, the head of the IEA, Fatih Birol, maintains: "Clean electricity generation, network infrastructure and end-use sectors are key areas for increased investment. Enabling infrastructure and technologies are vital for transforming the energy system." While this is true, the main challenges in this transition are how to keep costs low and how to speed up necessary technology breakthroughs.

Healthy cooperation between government and the private sector is required to stimulate investments and generate revenue that can then further finance the energy transition.

Governments across Europe will need to make up their minds whether that includes investment in LNG infrastructure and shale gas development, or coal and nuclear, or whether they will just allow growth of renewables.

EVENT CALENDAR

SEPTEMBER 13 | 17:00 | Strædet 13, 1208 K

SPEAKER Hong Chung Lau
TYPE Combined: DL & Summer Events
SPONSOR SPE CPH

SEPTEMBER 28 | 17:00 | Maersk Drilling

TOPIC Reducing the Carbon Intensity of Drilling Operations: A Maersk Drilling Journey
SPEAKER Lola Caballero
TYPE Face to Face
SPONSOR Maersk Drilling

OCTOBER 27 | 17:00 | Rebel Work Space

TOPIC Hydrogen
SPEAKER Rasmus Holmer
TYPE Face to Face
SPONSOR Horisont Energy

NOVEMBER 14 | 12:00 | Online

TOPIC From Digital Rocks to Gigatonne Scale CO₂ Storage: Two Revolutions in One
SPEAKER Samuel Krevor
TYPE DL
SPONSOR SPE DL

DECEMBER 8 | 17:00 | TotalEnergies

TOPIC Tyra II
SPEAKER
TYPE Face to Face
SPONSOR TotalEnergies

DECEMBER 15 | 17:00 | Online

TOPIC A Case Study of Design Choices and their Economic Impact in a Low Temperature Geothermal Project
SPEAKER George C. Brindle
TYPE DL
SPONSOR SPE DL

JANUARY 15 | IDA Facility/ TBD

TOPIC Biogas / Russia
SPEAKER Soren W. Hartmann / IDA
TYPE Face to Face - including other members IDA, COWI, etc..., other members pay
SPONSOR SPE CPH / IDA

FEBRUARY | DTU

TOPIC Geology Focused
SPEAKER TBD
TYPE
SPONSOR DTU & DORTC

Making a difference

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