Volume 96 Number 68 October 2023



SOCIETY OF PETROLEUM ENGINEERS

# SPE DEWS

#### WELCOME TO THE 23/24 SEASON

#### DEAR SPE COPENHAGEN MEMBERS.

I hope we are all fresh after the summer holidays. I can speak for myself - I'm energized and ready to rock and roll!

First things first though, we have a new Board. At the end of last season, we said goodbye to a few Board members. My heartfelt gratitude goes to Mette Furstnow, Jamie Cassasus-Bribian, and Darya Shingaiter for their service.

Renewal of the Board is an important part of taking our section forward and continuing the good work of predecessors. Renewal brings new ideas and opportunities for innovation in the way we engage with our members and enhance their experiences of being a part of SPE. With that said, I would like you to join me in welcoming our new Board members for the 2023/24 season:

- · Michal Stepien
- · Lucas Correa
- Bartosz Bula

The new members have been allocated into the Board Committees and have been given focus areas. I look forward to working with them.

On September 22, we had our season kick-off dinner party which, by all accounts was a resounding success. Big thanks go to Peter Tybjerg and the organizing team. I made a speech to kick off the night where I asked the question:

Why SPE? Why are you a part of this? What is in it for you?

The responses ranged from networking to career to socializing – but my favourite response was 'Sentimental love'. What an answer! As engineers and scientists, we are at our best when we solve problems for society – we love doing this. SPE CPH is us. Being in a professional community like SPE strengthens our contributions towards society while doing what we love doing. I believe there are 3 phases in our SPE membership journey

- Early phase: Usually a student or fresh graduate. More of receiving benefits from SPE
- Early to mid-career: The young professionals. More balance between receiving and giving time to SPE
- Mid to late career: Characterized by older members with significant industry experience who give back more than they receive in benefits from SPE

Irrespective of whichever of the above phases you find yourself in, you play an important role in the continuity of your local SPE section. I use this opportunity to urge all our members to engage more, participate more and volunteer more.

In the week leading up to the party, I attended the Regional Section Officers Meeting at the Hague. It was a weekend of engaging discussions, workshops, and networking.



There were several takeaways for me including the fact that SPE CPH is not doing badly from a membership retention perspective. All the sections in this region are similarly challenged by membership decline and many to a much more severe extent. The need to recognize members who have contributed to SPE is an issue. We have been poor at nominating members for regional awards, and I will personally see to it that this is improved upon in the coming years.

Finally, we have a number of events lined up for this new season which you can find in this newsletter and on our social media channels.

Follow us on LinkedIn and visit our website to keep updated about upcoming events and activities. Also feel free to come forward to volunteer for an activity or initiative with any board member. I look forward to sharing a rewarding and engaging 2023/24 SPE season with you all.



Adebowale Solarin SPE Copenhagen Section Chairman



#### **NEW BOARD MEMBERS**



#### **BARTOSZ BULA**

**INEOS** 

Bartosz Bula is a graduate from the Petroleum Engineering study line at Danish Technical University, currently working as Well Site Engineer at Ineos Energy. He gains experience offshore on the Noble Resolve rig.

Bartosz has been involved in SPE since 2016, when he started bachelor's studies at the University of Science and Technology in Krakow, Poland. Afterwards, for almost two years, he has been a board member of the SPE DTU student chapter in Denmark. Currently he is gaining experience in the Membership and Communication committee of the SPE Copenhagen section board. He is motivated

to be an active member of the section, being involved and responsible for actions within the oil and energy industry, and meeting experienced professionals with similar interests.

In his free time, Bartosz loves to spend time outside, to do paddle boarding and cycling around Copenhagen. He is a big football fan, supporting FC Barcelona and FC København, finding excitement in following their triumphs. During rainy days, Bartosz enjoys reading biographies offering a fascinating exploration into successful lives and books about geopolitics that explain the complexities of global affairs.

#### LUCAS F. F. CORRÊA

#### Calsep A/S

Lucas holds a Ph.D. in Chemical Engineering from the Technical University of Denmark, awarded in 2023. He brings more than five years of practical experience in applied research projects focused on measuring and simulating thermodynamic properties of fluid mixtures.

His doctoral work concentrated on the measurement and modeling of thermophysical properties of solvents used in CO<sub>2</sub> capture. Based at Calsep's headquarters in Denmark, Lucas leverages his expertise to develop effective solutions that support the transition to alternative energy sources.

Lucas serves as the CCS Technical Chair for SPE Copenhagen for the 2023-2024 season, reflecting his role in facilitating knowledge exchange within the energy sector.





MICHAL STEPIEN

Maersk Drilling/Noble

Michal is a recent graduate with a MSc degree in Petroleum Engineering from the Technical University of Denmark where his journey with SPE community started as a member of DTU Student Chapter. The interests in innovative solutions within the exploration and production of oil and gas led his to take on the role of Technical Chair in Drilling & Data Science in SPE Copenhagen Section board.

His MSc thesis on the application of machine learning to predict flow and plume evolution in subsurface during  ${\rm CO_2}$  storage marked the beginning of his inclination towards combining engineering with artificial intelligence.

Michal's professional journey took a significant step forward during the time as a Drilling Engineer Trainee with Maersk Drilling/Noble Corporation in Drilling & Wells Support team, where he found myself drawn to the intriguing world of drilling operations.

Michal holds a deep appreciation for the bonds of community, the warmth of family and friendships in his life. As an enthusiastic traveler and amateur sportsman, he value caring for people and the planet, seeking new challenges, never stopping learning, and leading a holistic lifestyle.

#### THE BOARD 2023-2024 SEASON

## THE BOARD

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# SPE Meeting

# DESIGN OF FLEXIBLE PIPE FOR FAULT FREE OPERATION IN HARSH OFFSHORE ENVIRONMENT FOR 20 TO 30 YEARS



#### Speaker

Torbjörn Weywadt Nilsen, Vice President, Sales, NOV, Subsea Production Systems

Torbjörn holds a Master of Science in Engineering and has over 18 years of experience in large international organizations within the oil industry. Throughout his career, he has worked in various operational and strategic roles responsible for leading offshore drilling operations, developing global business strategies, and managing international customers and contracts.

He began his career as a trainee at Maersk Drilling in 2003, worked at Shell from 2009-2016 both within supply & distribution management and strategic advisory, and returned to Maersk Drilling in a commercial role before joining NOV as VP Sales in 2022.

In NOV, Torbjörn is leading an exciting transformation initiative aimed at creating a more resilient and agile organization. This effort will empower NOV to focus on seizing the most promising opportunities for a prosperous future.

Speaker

Marie H. Haahr, Lead Metallurgist, NOV, Subsea Production Systems

Marie holds a master's degree in chemical engineering from 2004 with a focus on materials and surface technology. She joined NOV in 2008 as Metallurgist and became leader of the supplier qualification group for metals in 2020. The supplier qualification group is responsible for all failure mechanisms of the raw materials in steel used for the manufacturing of flexible pipe. Marie has authored and co-authored a handful on papers within the international corrosion community and a handful of international patents and patent applications related to scientific break throughs mainly related to corrosion mechanisms and design optimization for flexible pipes.





Speaker

**Helga Nørgaard Brandt,** Lead Engineer, Polymer Laboratory, NOV, Subsea Production Systems

Helga holds a master's degree in chemical engineering and a PhD in composite materials focusing on chemical and mechanical testing. She joined NOV in 2018 as Polymer Engineer and became leader of the Polymer Laboratory in 2020. The Polymer Laboratory works with qualification of polymeric materials, screening of new materials and support to the production in root cause analysis. Helga coordinates the needs of the Polymer Qualification team amongst several internal stakeholders with the testing capacity and ensures that the current test methods are validated and ready for new materials while also looking ahead for future test method needs.

**PROGRAM** 

**16:30 - 17:00** Welcome & networking

**17:00 - 17:45** Presentation by NOV

17:45 - 19:15

Tour of NOV laboratory and test facilities followed by networking, refreshments & sandwiches

**SPEAKERS** 

Torbjörn Weywadt Nilsen Marie H. Haahr Helga Nørgaard Brandt

### WEDNESDAY, 25 October

Please sign-up no later then 20 October 2023

## Register HERE

#### NOV | PRIORPARKEN 480, 2605 BRØNDBY

NOTICE THAT THE OFFICE IS LOCATED IN A CLOSED INDUSTRIAL AREA THAT CAN BE ACCESSED THROUGH A NORTHWARDS FACING GATE FROM ROSKILDEVEJ. THERE IS A GUARD THAT CAN LET YOU IN.



By Søren Weiss Hartmann, Drillconsult



In January, SPE-CPH will be hosting a full-day visit to the Noble Highlander and the Welltec facility in Esbjerg.

Our events Chairman, Soren Hartmann, will be your guide for the trip.

Depending on number of sign-ups, the plan is to divide attendees into 2 groups with each group visiting one facility and then switching around midday to visit the other facility.

On arrival, a Noble Personnel will give attendees a tour of the rig, and explain the processes and equipment used in drilling and completing a well. You will also have ample opportunities to ask any questions you may have.

Simultaneously, a WellTec personnel will give attendees in the second group a tour of WellTec's world class manufacturing facility, where attendees will gain insights into their equipment and manufacturing processes.

A bus will transport you from Copenhagen to Esbjerg and back, with food and drinks provided during the journey.

## SPE Meeting

# ACQUISITION OF NEW SEISMIC DATA IN DENMARK FOR THE GREEN TRANSITION

#### Abstract

Since beginning of 2022, GEUS has worked on the maturation of eight potential CO<sub>2</sub> onshore/near-shore storage sites in Denmark. New 2D seismic data has been acquired for more than 650 km onshore and 1450 km offshore over six sites. The presentation will present the progress of the seismic acquisitions leading up to the first onshore CO<sub>2</sub> storage license round ultimo 2023/primo 2024.



#### Speaker

Marie Keiding is a Senior Consultant at GEUS with a degree in geophysics from University of Iceland and 15 years experience in monitoring ground deformation due to e.g.  $CO_2$  storage, geothermal production, and landslides through use of remote sensing and microseismicity. She is involved in various activities on  $CO_2$  storage, e.g. as workstream lead for geological storage in the INNO-CCUS partnership, and is part of the project management of GEUS's current efforts in mapping the potential for  $CO_2$  storage in Denmark.

#### Speaker

Gjermund Blauenfeldt Næss is an Advisor in the Danish Energy Agency. He works in the  $CO_2$ -storage team handling the framework, evaluation and supervision of the licenses for exploration and storage of  $CO_2$  in Denmark.



18:00 - 19:00
Presentation by Marie Keiding on the acquisition of new seismic data in Denmark for the green transition | GEUS

**19:00 - 21:00**Dinner with a talk by Gjermund
Blauenfeldt Næss on the upcoming
CO₂ storage licensing round |
Danish Energy Agency

WEDNESDAY, 29 November

Please sign-up no later then 26 November 2023

**Register HERE** 

GEUS | ØSTER VOLDGADE 10, 1350 COPENHAGEN

## THE SHRINKING 'P' IN SPE

#### By Jonathan Hastings

#### What is SPE to you?

For me, I think of technical papers & conferences and the local sections, such as ours. But for most of us, the enormous library of petroleum related literature is losing relevance day by day – so where does that leave the SPE?

A couple of years ago, there were negotiations on merging with the AAPG and a very significant online discussion subject was the name – would the 'P' remain? I think it is fair to say the debate had two significant camps – those who saw the prospective merger as an opportunity to change direction, become more of an 'Energy' than a 'Petroleum' society and those who were proud of the 'P' and argued that Petroleum

would be a key energy source for decades to come and needed an institution to stand up for the value of Petroleum & Petroleum Engineers. The merger never happened, and we still have the 'P'.

But maybe the story hasn't ended ...

Without the fanfare of a merger, or a big name-changing ceremony, there is ever increasing evidence of a grassroots-driven change in the SPE. The Vision & Mission statements have quietly been updated to add a phrase that enables much more activity related the Energy Transition and non-Petroleum energies – our Mission is now:

"To connect a global community of engineers, scientists, and related **energy** professionals to exchange knowledge, innovate, and advance their technical and professional competence regarding the exploration, development, and production of oil and gas **and related energy resources** to achieve a safe, secure, and **sustainable** energy future."

So, what does this mean in practice, and what are 'related energy resources'? A good indication comes from the 'technical sections' of the SPE – these are member-run communities within the overall framework of the SPE, typically organizing physical and online events and with online discussion forums. The list of traditional oil and gas subjects has been rationalized a little, and now we see the appearance of 'Carbon Dioxide Capture, Utilization and Storage', 'Geothermal', 'Hydrogen', 'Methane Emissions Management' and 'Sustainable Development' – of which at least the first two are extremely active at the moment.

The big conferences are also changing. Both CCS and Hydrogen subjects are now appearing in all the major SPE conferences and the recent announcement of the first SPE Europe Energy Conference in Italy next year, with an article full of statements like "Enabling the energy transition is a top priority for SPE...", and I write this article on the last day of the 'SPE Asia Pacific Hydrogen Week'. Hopefully this will result in a rapid growth in technical articles to build a complementary knowledge base to the one we have for Oil and Gas related subjects.

Local sections are also representing this shift, SPE Aberdeen hosted Geothermal seminars in 2022 and 2023 and will shortly hold an online CCUS conference; in Copenhagen, we have now had talks on geothermal energy and regularly on CCS and will

have an SPE Distinguished Lecturer in January talking about a CO<sub>2</sub> storage project.

So has the 'P' quietly disappeared? Well, to put it simply, no, one can argue that it has shrunk, but there are still plenty of indications that this is not a global and all-encompassing change. The headline on the SPE website still proclaims to be 'the place for oil and gas professionals', and to join the SPE there is still a requirement that you are employed in the 'petroleum' industry or studying for a related degree (with a small loophole, that once you are a member, it is not required to remain in the industry). In January, the SPE revealed its new 5-year strategic plan, and honestly, it is something of a disappointment - you have to hunt for words related to the energy transition, geothermal and CCS, and even then, they tend to be in outreach and education sections and not core SPE activities.

Next page \_\_\_\_

# FOR SPE COPENHAGEN, WE WILL DO OUR BEST TO TRY TO REPRESENT THE EVER-BROADENING ACTIVITIES AND MEMBERSHIP HERE

- > If you are still working in oil and gas or studying a related subject, SPE-CPH aims to provide you an interesting technical programme, along with all the opportunities we have always done, and the resources of the SPE are still there for you
- If your role has moved partially, or completely, into Geothermal, Hydrogen or CCUS, please take a look at what the SPE has to offer, and you might realise that the SPE is still for you. SPE-CPH will try to provide you the same technical presentations and networking opportunities that we have done for nearly 40 years to the oil and gas industry
- If your role has moved even further away, we hope you will remain a member until the SPE catches up, and please let us know how we can continue to provide something useful for you

## STATE OF THE ART OF CCS



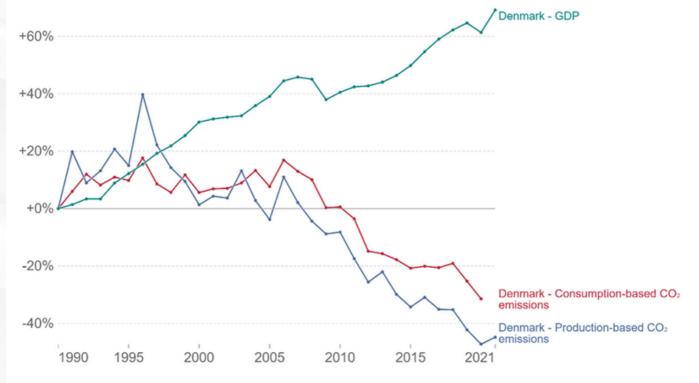
Denmark has come a long way in curbing their carbon dioxide (CO<sub>2</sub>) emissions by introducing innovative technologies. This ambition is shared by many other countries and companies alike that see in Carbon Capture and Storage (CCS) a strong ally to achieve their climate commitments. As these technologies mature, companies seeking to deploy CCS see a continuously stronger business case to support their investments.

This article lists some of the some of the key CCS projects, as reported by *The Global CCS Institute in their State of the Art CCS Report 2023*. The authors refer to the original report for more information on the project from more than 40 companies.

#### Change in CO<sub>2</sub> emissions and GDP, Denmark



Consumption-based emissions<sup>1</sup> are national emissions that have been adjusted for trade. This measures fossil fuel and industry emissions<sup>2</sup>. Land use change is not included.



Source: Data compiled from multiple sources by World Bank; Global Carbon Project (2022) Note: Gross Domestic Product (GDP) figures are adjusted for inflation.

OurWorldInData.org/co2-and-greenhouse-gas-emissions • CC BY

<sup>1.</sup> Consumption-based emissions: Consumption-based emissions are national or regional emissions that have been adjusted for trade. They are calculated as domestic (or 'production-based' emissions) emissions minus the emissions generated in the production of goods and services that are exported to other countries or regions, plus emissions from the production of goods and services that are imported. Consumption-based emissions = Production-based – Exported + Imported emissions

<sup>2.</sup> Fossil emissions: Fossil emissions measure the quantity of carbon dioxide (CO<sub>2</sub>) emitted from the burning of fossil fuels, and directly from industrial processes such as cement and steel production. Fossil CO<sub>2</sub> includes emissions from coal, oil, gas, flaring, cement, steel, and other industrial processes. Fossil emissions do not include land use change, deforestation, soils, or vegetation.

#### **Capture**

Air Liquide has leveraged their century-long experience in developing gas separation technologies to create a portfolio of technologies for CO<sub>2</sub> capture. Their proprietary cryogenic process target CO<sub>2</sub> emissions from hydrogen, steel, and natural gas production.

Linde has established a joint venture to build and operate a CO<sub>2</sub> capture and liquefaction plant at *Heidelberg Materials* in Germany. They have also signed a long term agreement with ExxonMobil for the off-take of Linde's new H<sub>2</sub> production. ExxonMobil will transport and store up to 2.2 million metric tons of CO<sub>2</sub> each year from Linde's production facility.

Shell and Technip Energies have partnered up to offer a leading amine-based post-combustion carbon capture technology. Their technology can capture up to 99% of the  $\rm CO_2$  emitted by post-combustion stream from power stations and other industrial facilities. Units have been designed to capture  $\rm CO_2$  in concentration from 3.5 to 27% and treating gas flow rates from 11.000 to 4.500.000 Nm³/h.

#### **Transport**

Most of the projects reported are dedicated to the capture of  ${\rm CO_2}$ , but three companies are listed as key players in developing technologies for  ${\rm CO_2}$  transport: *GHD*, *JFE*, and *Maxtube*. They share a common goal of developing state-of-the-art tubing that can cope with the harsh environment that is typically present in the liquefaction and transportation of highly pure  ${\rm CO_2}$  with various types of impurities.

#### Storage

Halliburton drew from over 20 years of insights from subsurface activities to develop a tools that can rapidly screen sequestration targets around the globe, to simulate plume dispersion, and to monitor caprock and well integrity.

#### **Full Value Chain**

Some companies take a broader scope in their CCS projects development and target the full value chain. *Baker Hughes* is developing offshore flexible pipes for transportation of CO<sub>2</sub> to the reservoir. They have also invested in regenerative technology to recover pure CO<sub>2</sub> streams and on various types of capture technologies.

Chevron New Energies is using their experience injecting CO<sub>2</sub> in the United States for the last 40 years to scale up their CCUS acitivities.



DESIGNED BY VECTORJUICE / FREEPIK

In Australia, the *Chevron*-operated Gorgon LNG incorporates onte of the larges integrated CCS. Overall, they have captured and stored more than 7.8 MM tones of GHG.

*ENI* is targeting a leadership position as a provider of decarbonization services. They have a broad scope of interest in a project pipeline that spans over different countries, from Australia to Norway going through Algeria.

Fully commercial post-combustion carbon capture is also delivered by NOV. In addition to capture technology, NOV is uniquely positioned to select the most optimum  ${\rm CO_2}$  dehydration technology. Of course, they also draw from their experience to provide tubing for transport of  ${\rm CO_2}$ .

Finally, *SLB* is actively involved in CCS technologies and business development to enable widespread adoption of CCS. The company has a vast investment portfolio ranging from capture and gas processing technologies to development of simulation tools that can support design of CO<sub>2</sub> transportation systems.

For a complete list of the state-of-the-art of CCS technology, please refer to the full report available at:

https://www.globalccsinstitute.com/resources/publications-reports-research/state-of-the-art-ccs-technologies-2023/

#### **EVENT CALENDAR**

#### OCTOBER 25 | 16:30 - 19:15 | National Oilwell Varco | Face to Face

TOPIC Design of Flexible Pipe for Fault Free Operation in Harsh Offshore Environment for

20 to 30 years

HOST National Oilwell Varco | Priorparken 480, 2605 Brøndby

#### NOVEMBER 29 | 17:00 - 21:00 | GEUS | Face to Face

TOPIC Recent Seismic Acquisitions in Denmark

HOST GEUS | Øster Voldgade 10, 1350 København K

#### JANUARY | TBD | Field trip to Esbjerg

TOPIC Guided tours at Highlander Rig and Welltec
HOST Welltec & Noble Corp. | Field trip to Esbjerg

#### JANUARY 18 | TBD | TBD | TBD

TOPIC CO<sub>2</sub> Geological Storage from 8 Years of Dynamic Injection at the Aquistore CO<sub>2</sub>

Storage Site

SPE DL Rick Chalaturnyk

HOST TBD

#### MAY 16 | TBD | Noble Drilling | Face to Face

TOPIC Early Kick Detection: Sensors, Data Acquisition, and Analysis

SPE DL Jaideva Goswami

HOST Noble Drilling | Lyngby Hovedgade 85

#### JUNE 1 | TBD | TBD | TBD

TOPIC Annual General Meeting & SPE CPH's 40 Years Anniversary

HOST SPE Copenhagen at Rebel Workspace



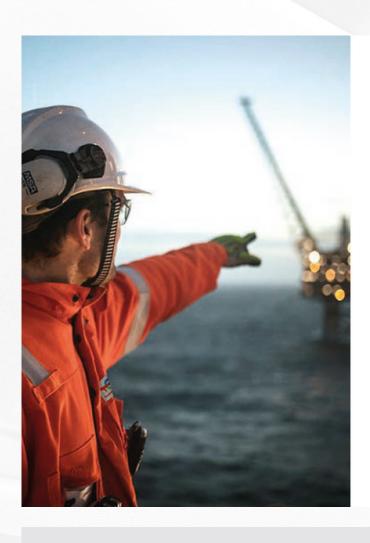


# A dynamic leader in offshore drilling

Since 1921, Noble has been a world-class offshore drilling company with industry-leading safety and operational performance. Noble focuses on deep and long-term partnerships as the foundation for driving efficiency and increasing certainty for our customers in the pursuit of operational excellence.

noblecorp.com





## Denmark's long-term energy partner

We are in the middle of a global energy and climate crisis that highlights the need for energy solutions here and now. As one of the world's largest energy companies, TotalEnergies knows that the future belongs to renewables. This is why we are in full swing transforming our business to help secure a green future for Denmark.

Our focus is on maintaining an energy-efficient and safe production of oil and gas, with the rebuilt Tyra platform at the center, while leveraging our many years of experience as an energy supplier in Denmark. We will do this by expanding our activities to wind, solar, and Carbon Capture and Storage (CCS).

TotalEnergies has great ambitions to be at the forefront of green energy production with the objective of being among the top five players in renewables by 2030.

(f) @TotalEnergiesDenmark





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