



***FORCE***

Annual Report  
2020



## Opening remarks from FORCE Chairman

Same procedure as every year, let me start with quick reminder on the purpose of FORCE

- to play a significant role in the future value creation on the Norwegian Continental Shelf, through facilitating cooperation between industry, research institutions and authorities

With the Covid-19 pandemic hitting us in combination with a significant down-turn in E&P in the spring, it is a bit odd to inform that 2020 has been yet another “excellent FORCE year”. We have successfully conducted more seminars and workshops ever, in total one live seminar, two live Lunch & Learns and 18 webinars. More than 2500 participants have attended in total. The cause of the increased activity is probably a combination of fast and successful implementation of Web based seminars and the Covid-19 tax relief keeping the activity level on NOCS going. And at least but not last due to the significant effort and solid preparations by the network groups arranging the seminars. Technical quality has been high with a good mix of topics within Petroleum Systems, Sedimentology & Stratigraphy, Geophysical Methods, Structural Geology, IOR / EOR / Production.

As in 2018 and 19, the most popular event in terms of attendees was the “FORCE Hackathon /Machine Learning Contest”. More than 400 teams / 1000 scientist and coders took part in the competitions representing all four corners of the world. In popularity this was followed by the two events “Fluvial systems Virtual field school #1”, and “Practical 4D seismic interpretation” (both webinars) arranged by the TC-IE and the Geophysical Methods network with respective attendance of 193 and 181. But quantity is not the same as quality, and FORCE see the more niche event with much fewer participants such as the lunch & learn “Open hole stability in chalk- A case study on the Radial Jet Drilling technology”, and the project proposal “FlexiGrid” as equally important when it comes to value creation on the NOCS.

A big thank you to the hard-working network groups and FORCE enthusiast for arranging 21 excellent learning events and managing the transition to Web based seminars so swiftly!

As previous years our “2020 FORCE weak-spot” is our ability to increase value from the NCS by generating and collating ideas for Joint Industry Projects (JIP). The FORCE ambition is to aid in faster technology adoption by initiating JIPs where cost and risk can be shared across several companies. Consequently, the challenge to the FORCE membership companies remain: Search for opportunities and synergies across companies and Licenses to generate Win-Win JIPs! Unfortunately, one of the vehicles to do this had to be cancelled due to Covid-19; in 2020 it was not possible to meet up with the other E&P R&D contacts and the Academia as the seminar “Joining Forces” had to be cancelled. But watch the space and if the upcoming mass vaccination is successful the intent is to arrange this event as a physical meeting in 2021.

Looking ahead, the 2021 FORCE program already starts to fill up and 8 events are so far lined up. Make sure you subscribe or check in on the [calendar of events](#) on the new FORCE web site and follow the discussions occurring in Base Camp.

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The changes in our industry to more Web based interaction, working from local and home-offices and less flight travel is here to stay, also in the event of successful vaccine and the virus dying out. FORCE will continue to improve on such interaction, building on the learnings from drone-based field trips and investigate more interactive web-based solutions. I still hope we soon can meet physically, maybe to a live celebration of the FORCE 25-year anniversary that had to be celebrated Web-based last year.

In 2021, the 9 network groups will continue their knowledge sharing activities, and as you see on the box diagram on p. 5 one new groups called “Well Technology and Drilling” was successfully added last year. We very much welcome the Drilling and Completion engineers to FORCE!

In 2021 we also hope that facility / subsea and HSE engineers will join us as a new Technical Committee, “TC Energy and Environment”, with three network groups “Energy efficient reservoir drainage”, “Carbon capture and storage” and “Facility solutions and energy efficiency”, is proposed started.

Finally, thank you to committee members, network participants and especially the NPD Secretariat for your enthusiasm and efforts in 2020! Looking forward to work with you all in 2021!

09/01-20, On behalf of the Management Committee  
Grete Block Vagle, Aker BP



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### About FORCE

FORCE is a co-operating forum for Improved oil and gas recovery (IOGR) and Improved exploration (IE) conducted by oil and gas companies and authorities in Norway. Our ambition is to play a significant role in the future value creation on the Norwegian Continental Shelf through improved exploration and enhanced recovery efforts.

The basic idea of the forum is to improve collaboration by sharing knowledge through network groups and by enabling the establishment of cross licensees /company piloting projects within exploration and enhanced oil recovery through project groups.

	<b>Role/task</b>	<b>Participants</b>	<b>Meetings</b>
<b>General assembly</b>	<ul style="list-style-type: none"> <li>◆ Decide budget</li> <li>◆ Select members for committees</li> </ul>	<ul style="list-style-type: none"> <li>◆ All member companies</li> </ul>	<ul style="list-style-type: none"> <li>◆ Yearly</li> </ul>
<b>Selection Committee</b>	<ul style="list-style-type: none"> <li>◆ Propose members for committees</li> </ul>	<ul style="list-style-type: none"> <li>◆ 3 members</li> </ul>	<ul style="list-style-type: none"> <li>◆ Biennial</li> </ul>
<b>Management Committee</b>	<ul style="list-style-type: none"> <li>◆ (Re-) allocate budget</li> <li>◆ Synergies between technical groups</li> <li>◆ External communication</li> <li>◆ Monitor activities</li> </ul>	<ul style="list-style-type: none"> <li>◆ Max 8 members</li> </ul>	<ul style="list-style-type: none"> <li>◆ Quarterly</li> </ul>
<b>Secretariat</b>	<ul style="list-style-type: none"> <li>◆ Arrange meetings</li> <li>◆ Support activities</li> <li>◆ Administration</li> </ul>	<ul style="list-style-type: none"> <li>◆ NPD</li> </ul>	<ul style="list-style-type: none"> <li>◆ As required</li> </ul>
<b>Technical Committees</b>	<ul style="list-style-type: none"> <li>◆ Select project proposals</li> <li>◆ Facilitate project initiation</li> <li>◆ Manage pre-projects</li> </ul>	<ul style="list-style-type: none"> <li>◆ Max 8 members</li> <li>◆ Whereof 3 asset managers</li> </ul>	<ul style="list-style-type: none"> <li>◆ Quarterly</li> </ul>
<b>Network Committees</b>	<ul style="list-style-type: none"> <li>◆ Share information through workshops</li> <li>◆ Generate ideas for new projects</li> </ul>	<ul style="list-style-type: none"> <li>◆ All member companies</li> </ul>	<ul style="list-style-type: none"> <li>◆ As required</li> </ul>

### Members

All oil and gas companies with an office in Norway can become FORCE members. Interested parties can apply for membership by contacting the Secretariat. The Management committee, consisting of 8 members, will be consulted.

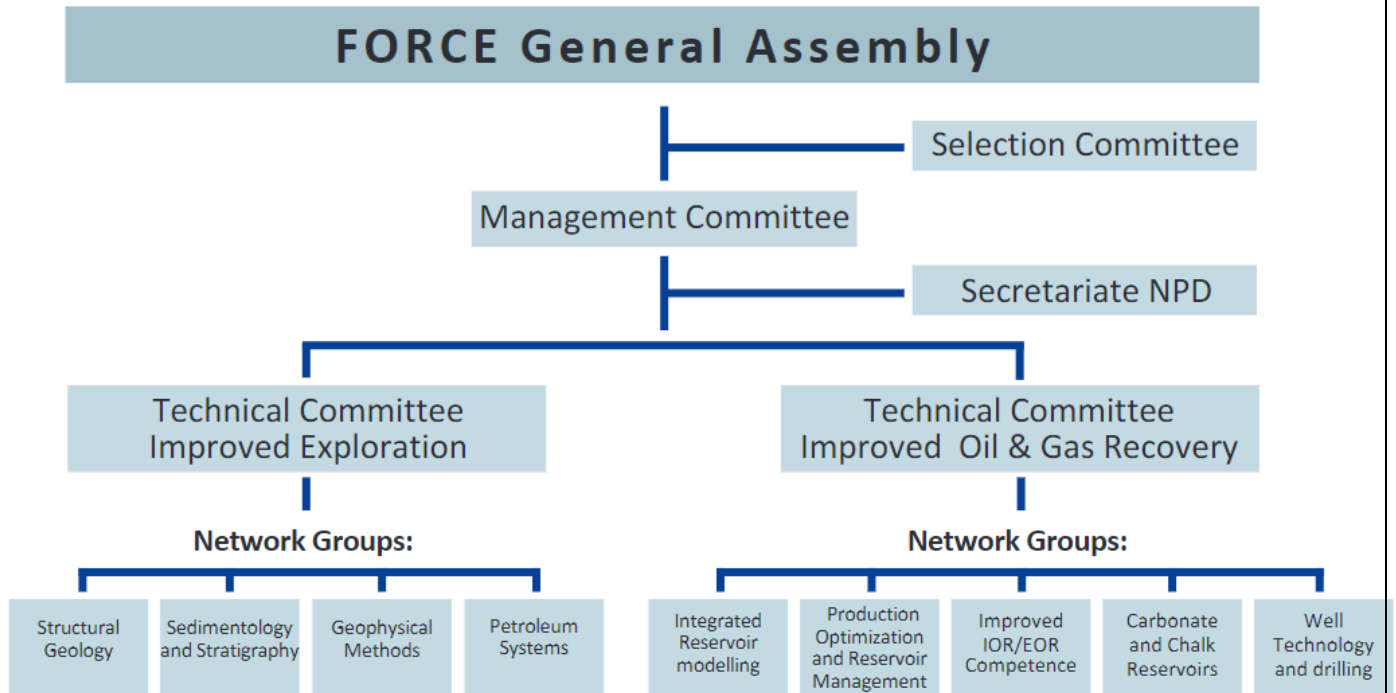
New companies must sign the FORCE Cooperation Agreement. The cost is a given amount divided equally among all members. For 2020 this was NOK 58 571,-.

By the end of 2020, the number of members had decreased from 39 to 35 members.

These companies were members during 2020 (this is according to invoicing).

A/S Norske Shell  
Aker BP Norge AS  
CapeOmega  
Capricorn Norge AS  
Chrysaor  
Concedo ASA  
ConocoPhillips Skandinavia AS  
DNO Norge AS  
Edison Norge AS  
Equinor Energy AS  
Idemitsu Petroleum Norge as  
INEOS E&P Norge AS  
INPEX Norge AS  
KUFPEC Norway AS  
LOTOS Exploration & Production Norge AS  
LUKOIL Overseas North Shelf AS  
Lundin Norway AS  
MOL Norge  
Neptune Energy  
Norwegian Petroleum Directorate  
OKEA AS  
OMV Norge AS  
ONE- Dyas Norge AS  
Pandion Energy AS  
Petro AS  
Petrolia NOCO AS  
PGNiG Upstream International AS  
Repsol Norge AS  
RN Nordic Oil AS  
Spirit Energy  
Suncor Energy Norge AS  
Sval Energi AS  
Total E&P Norge AS  
Vår Energi AS  
Wellesley Petroleum  
Wintershall Dea Norge ASA

**Organization**



## Management- and technical committees

<b>Management Committee</b>	
Grete Block Vagle, Chairman	Aker BP
Tim Austin	ConocoPhillips
Geir Mikkelsen	Total
Pierre Yves Raya	Wintershall Dea
Thomas Gorm Theting	Equinor
Filippos Tsikalas	Vår Energi
Rolando di Primio	Lundin
Mette Helene H. Eliassen	Neptune Energy
<b>TC Improved Exploration</b>	
Ingrid E. I. Øxnevad, Chairman	Aker BP
Atle Folkestad	Equinor
Michael Young	ConocoPhillips
Richard Olstad	Pandion
Jon Halvard Pedersen	Lundin
Marli Blumenwitz	Wintershall Dea
Paul Spencer	Vår Energi
Janka Nakken Rom	NPD
<b>TC Improved Oil &amp; Gas Recovery</b>	
Roar M. Kjelstadli, Chairman	Aker BP
Johanna Normann Ravnås	Wintershall Dea
Erik Søndena	Petoro
Reza Rostami Ravari	Neptune Energy
Robert Moe	ConocoPhillips
Rune Boge	Spirit Energy
Svein Tollefsen	Equinor
Eli Jens Høgnesen	NPD

### Activity reports

Despite the pandemic, FORCE members have risen to the occasion and organized record high attending webinars. By the end of 2020, FORCE had arranged a 2-day seminar, 2 lunch & learns and 18 webinars, gathering a total number of 2509 attendees. That is AMAZING!

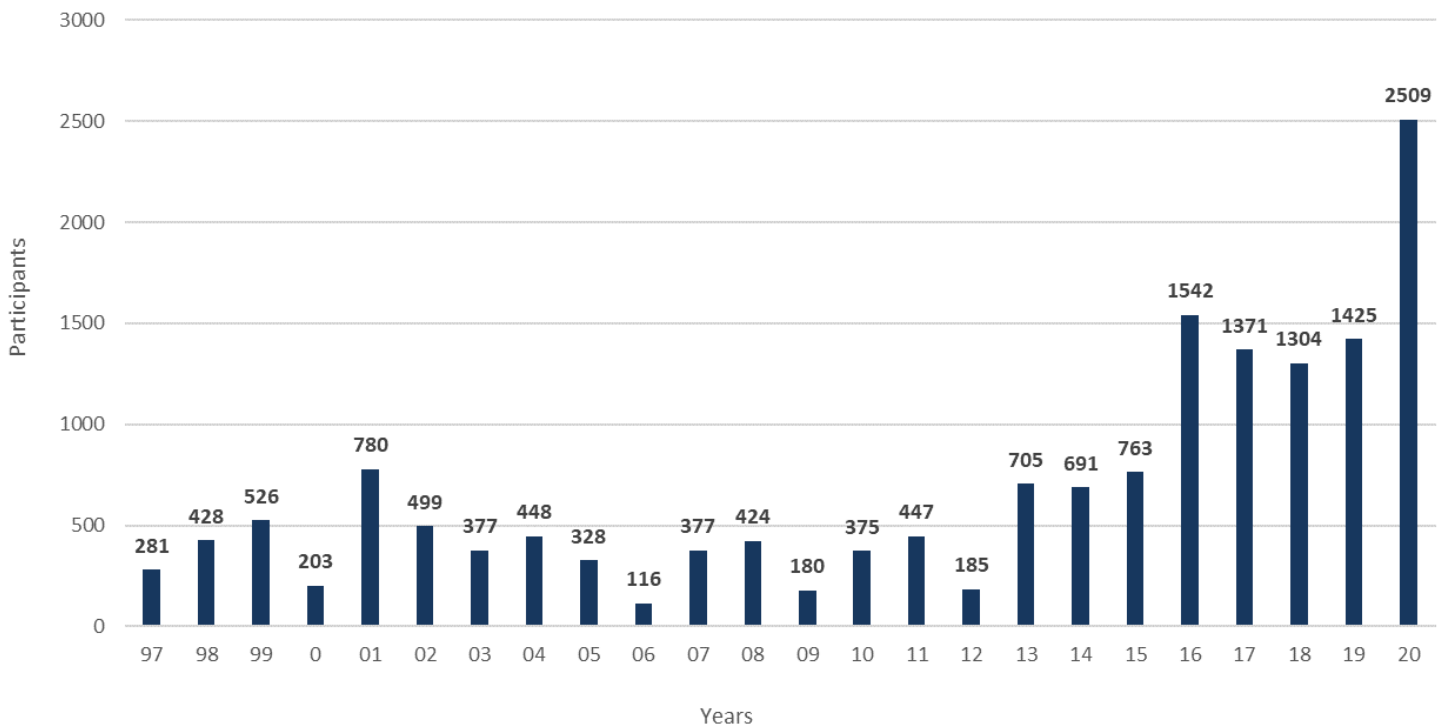
For the first time, FORCE offered virtual field trips. The Technical Committee Improved Exploration arranged 4 virtual field school where more than 650 people in total attended via Zoom.

Another highlight in 2020 was the two global competitions with focus on machine learning with well and seismic data. In August, after checking the provided lithology data and carefully designing cheat proof competition rules, we went live with the data and the competition. In the end, nearly 400 teams and/or people signed up for the competitions.

Especially the lithology prediction from well logs proved very popular with a tightly contested leaderboard and teams from all over the world contributing. The first prize went to a student from Nigeria and 2<sup>nd</sup> and 3<sup>rd</sup> prize went to university teams in Brazil. Congratulations!

The diagram below illustrates number of attendees at the seminars and workshops through time.

FORCE SEMINARS 1997 - 2020





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### Seminars and L&L 2020

Date	Type	Title	Attendees
17.01.2020	L&L	Organizational Decision Quality: value creation by high quality decisions	46
23.01.2020	2 day Seminar	Petroleum Charge and Migration Understanding a Major Exploration Risk on the Norwegian Continental Shelf	86
05.03.2020	L&L	Open hole stability in chalk- A case study on the Radial Jet Drilling technology	13
13.05.2020	Webinar Teams	Webinar: The Application of Machine Learning Technology to Elastic Log Prediction & Earth Model Generation	89
19.05.2020	Webinar Teams	Webinar: Oil and Gas outlook with Covid-19 and Energy transition – Macro to NCS perspectives by Rystad Energy	145
27.05.2020	Webinar Teams	Webinar: Svalbox- An interactive digital Svalbard geological-geophysical portal	44
28.05.2020	Webinar Teams	Webinar: Understanding Anisotropy	111
18.06.2020	Webinar Teams	Webinar: AI and Petroleum system risk assessment	95
18.06.2020	Webinar Teams	Webinar: Practical 4D seismic interpretation	181
10.08.2020	Online Competition	Machine Learning Contest	329
08.09.2020	Webinar Zoom	Webinar: Fluvial systems Virtual field school #1	193
24.09.2020	Webinar Teams	Webinar is development of Low Reservoir Quality Chalk – experiences and lessons learned from the most complex Danish chalk field	163
29.09.2020	Webinar Zoom	Webinar: Shallow Marine 1 – Paralic Systems Virtual field school #2	151
05.10.2020	Webinar Teams	Webinar: Maximising the use of geochemistry for reservoir understanding and increased production	104
03.11.2020	Webinar Zoom	Webinar: Shallow Marine 2 – Tidal Systems Virtual field school #3	155
24.11.2020	Webinar Zoom	Webinar: Deep Water System- Virtual field school #4	155
25.11.2020	Webinar Teams	Webinar: Multilateral Wells	163
26.11.2020	Webinar Teams	Webinar: FlexiGrid Proposal	28
26.11.2020	Webinar Teams	Webinar: Advanced EOR screening for the NCS	65
08.12.2020	Webinar Teams	Webinar: Wedge Proposal	39
09.12.2020	Webinar Teams	Webinar: Salt tectonic talk	154

**Total: 2509!**

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**Budget and annual accounts 2020**

2020	Budget		Result	
	Income	Expenses	Income	Expenses
Transferred from 2019	1 794 494		1 794 494	
Pre-projects TC group		400 000		200 000
Payment (seminar fees)	700 000		140 500	
Sponsors	460 000		460 000	
Seminar expenses		680 000		536 813
Accessories for seminars		20 000		68 674
Seminar buffer		300 000		
Lunch & learn	30 000	70 000	10 400	36 945
Invited speaker - IE		200 000		50 638
Invited speaker - IOGR		200 000		
Membership fees	1 940 000		1 940 000	
Admin cost NPD		1 640 000		1 640 000
New members				
Secretariat expenses NPD		300 000		212 770
Extra funding web development				
<i>Service at meetings</i>	<i>Incl. Secr.ex</i>	<i>50 000</i>		<i>16 880</i>
<i>Marketing</i>	<i>Incl. Secr.ex</i>	<i>10 000</i>		<i>7 891</i>
<i>Web page</i>	<i>Incl. Secr.ex</i>	<i>185 000</i>		<i>160 910</i>
<i>PayEx fee (monthly)</i>	<i>Incl. Secr.ex</i>	<i>5 000</i>		<i>4 189</i>
<i>Div.</i>	<i>Incl. Secr.ex</i>	<i>50 000</i>		<i>22 900</i>
<b>Total</b>	<b>4 464 494</b>	<b>3 810 000</b>	<b>4 345 394</b>	<b>2 745 840</b>
<b>Balance 31.12.2020</b>	<b>654 494</b>		<b>1 599 554</b>	

Budget	
Estimated balance 2020	654 494
Balance	1 599 554
	<b>945 060</b>
Seed funds/Pre-projects	200 000
Seminars	-4 987
Seminar buffer	300 000
Lunch & Learn	13 455
Invited speakers	349 362
Admin fee and secretariat	87 230
	<b>945 060</b>

Result	
Transferred from 2019	1 794 494
Outgoing balance	1 599 554
Profit 2020	<b>-194 940</b>
Pre-projects	-200000
Result seminar	-4 987
Late participant	0
Lunch & learn	-26 545
Invited speakers	-50 638
Membership fee (income)	1 940 000
Admin cost (NPD)	-1 640 000
Secretariat	-212 770
Sum	<b>-194 940</b>