



FORCE

Annual Report

2019



FORCE Annual Report 2019

Opening remarks from FORCE Chairman

Same procedure as last 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

I am pleased to inform that 2019 has been yet another excellent “FORCE year”. We have successfully conducted 9 workshops and seminars, 14 Lunch & Learns and 1 field trip! And more than 1400 participants have attended in total. Due to solid preparations by the network groups, technical quality has been high with a good mix of topics within Petroleum Systems, Sedimentology & Stratigraphy, Geophysical Methods, Structural Geology, EOR, Production Optimization & Reservoir Management and Integrated Reservoir Modelling.

As in 2018, one of the most popular events in 2019 in terms of attendees was the “FORCE Hackathon - Applied Machine Learning and Advanced Analytics with Oil and gas Data” with 215 attendees. The most attended event was the two- day seminar “Fifty years since the first commercial discovery on NCS - lessons learned for the next generation” with 222 participants. But quantity is not the same as quality and FORCE see the more niche events with around 10-20 participants such as “Provenance in the North Atlantic”, “Wave-equation based AVO inversion” and “Advances in Integrated Biostratigraphy” as equally important when it comes to triggering step changes within E&P.

A big thank you to the hard-working network groups and FORCE enthusiast for arranging 24 excellent learning events! Most of the events have included video-conferencing, with participants phoning in to the NPD office in Stavanger from various company offices in Oslo, Bergen, Trondheim and Harstad.

As in 2018 our “2019 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 2020 challenge to the FORCE membership companies remain: Search for opportunities and synergies across companies and Licenses to generate Win-Win JIPs! One vehicle to do this is to meet up with the other E&P R&D contacts and the Academia at the seminar “Joining Forces – Industry Perspectives in Stavanger 25th-26th March. Sign up today!

Looking ahead the 2020 FORCE program already starts to fill up and 5-6 events are already lined up. Make sure you subscribe or check in on the calendar of events on the new FORCE web site: force.org and follow the discussions occurring on: basecamp.com

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In 2020, the 8 network groups will continue their knowledge sharing activities, and as you see on the box diagram on p. 5 a new group called “Carbonate Plays” was successfully added last year covering both the producing Chalk fields and the wider carbonate exploration plays on the NCS. In 2020 we also hope that a few drilling and completion engineers will join us as a network group within Drilling and Completion is about to get started.

Finally, thank you to committee members, network participants and especially the NPD secretariat for your enthusiasm and efforts in 2019! Looking forward to work with you all in 2020!

26/01-19, 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.

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

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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.

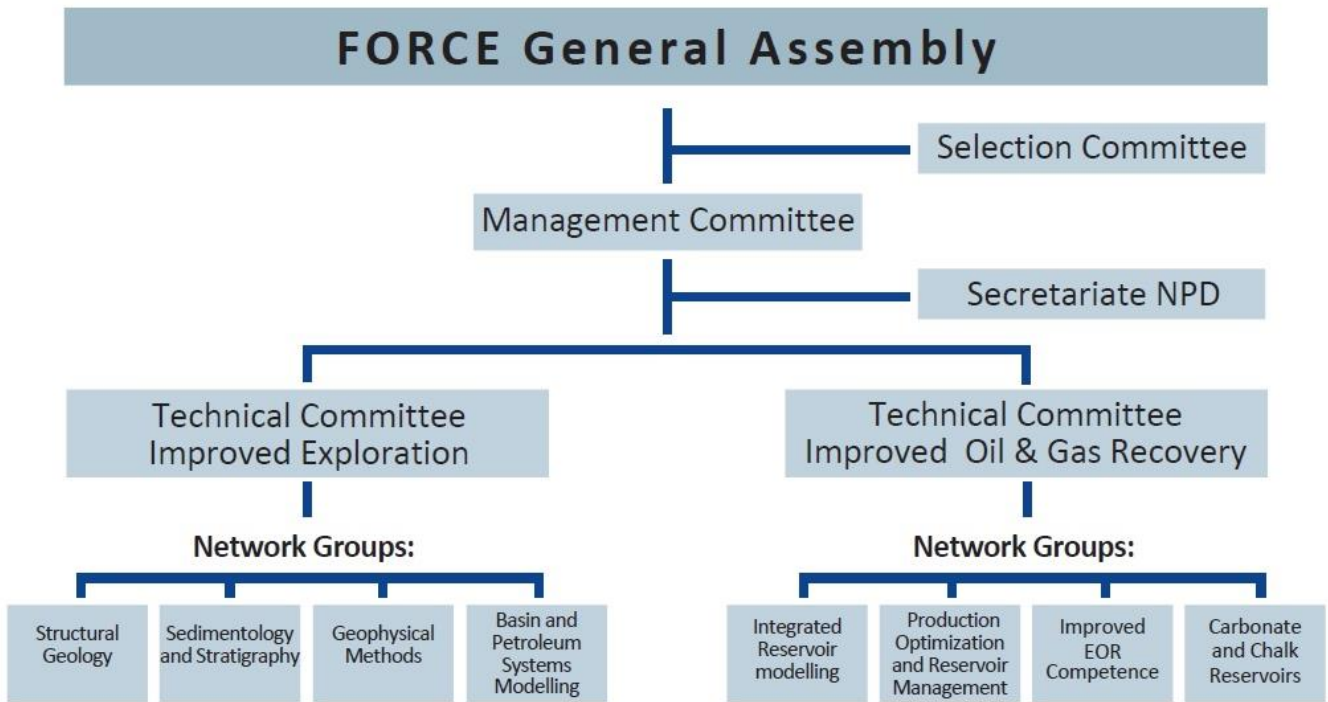
New companies must sign the FORCE Cooperation Agreement. The cost is a given amount divided equally among all members. For 2019 this was NOK 50 256,-.

By the end of 2019 the number of members had decreased from 41 to 39 members.

These companies were members during 2019 (this is according to invoicing).

A/S Norske Shell
Aker BP ASA
CapeOmega AS
Capricorn Norge AS
Concedo ASA
ConocoPhillips Skandinavia AS
Chrysaor Norge AS
DEA
DNO Norge AS
Dyas
Edison Norge AS
Equinor Energy AS
ExxonMobil
Faroe
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 AS
Neptune Energy Norge AS
Norwegian Petroleum Directorate
OKEA ASA
OMV (Norge) AS
Pandion Energy AS
Petoro AS
Petrolia NOCO AS
PGNiG Upstream International AS
Repsol Norge AS
RN Nordic Oil
Skagen 44 AS
Spirit Energy Norway AS
Suncor Energy Norge AS
Total E&P Norge AS
Vår Energi AS
Wellesley Petroleum AS
Wintershall

Organization



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	Member name	Company
Management Committee		
	Grete Block Vagle, Chairman	Aker BP
	Erik Hammer	Lundin
	Filippos Tsikalas	ENI
	Tim Austin	ConocoPhillips
	Patrick Stinson	Total
	Mette Eliassen	Neptune Energy
	Christian Hanitzch	Wintershall
	Thomas Gorm Theting	Equinor
Technical Committee Improved Exploration		
	Ingrid E. I. Øxnevad, Chairman	Aker BP
	Atle Folkestad	Equinor
	Adrian White	Wintershall Dea
	Janka Rom	NPD
	Jon Halvard Pedersen	Lundin
	Marli Blumenwitz	Wintershall Dea
	Paul Spencer	Vår Energi
	Richard Olstad	Pandion
Technical Committee Improved Oil & Gas Recovery		
	Roar M. Kjelstadli, Chairman	Aker BP
	Erik Søndena	Petoro
	Reza Rostami Ravari	Neptune Energy
	Eli Jens Høgnesen	NPD
	Johanna Ravnås	Wintershall Dea
	Svein Tollefsen	Equinor
	Robert Moe	ConocoPhillips
	Rune Boga	Spirit Energy

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Activity reports

2019 has been a great year for FORCE.

We have had 14 lunch and learn, 1 field trip and 9 seminars (1-2 days).

A total of 24 events.

Since 2016 the number of events has stabilized between 20-24 per year.

In total there has been 1425 participants attending FORCE seminars in 2019. That is amazing.

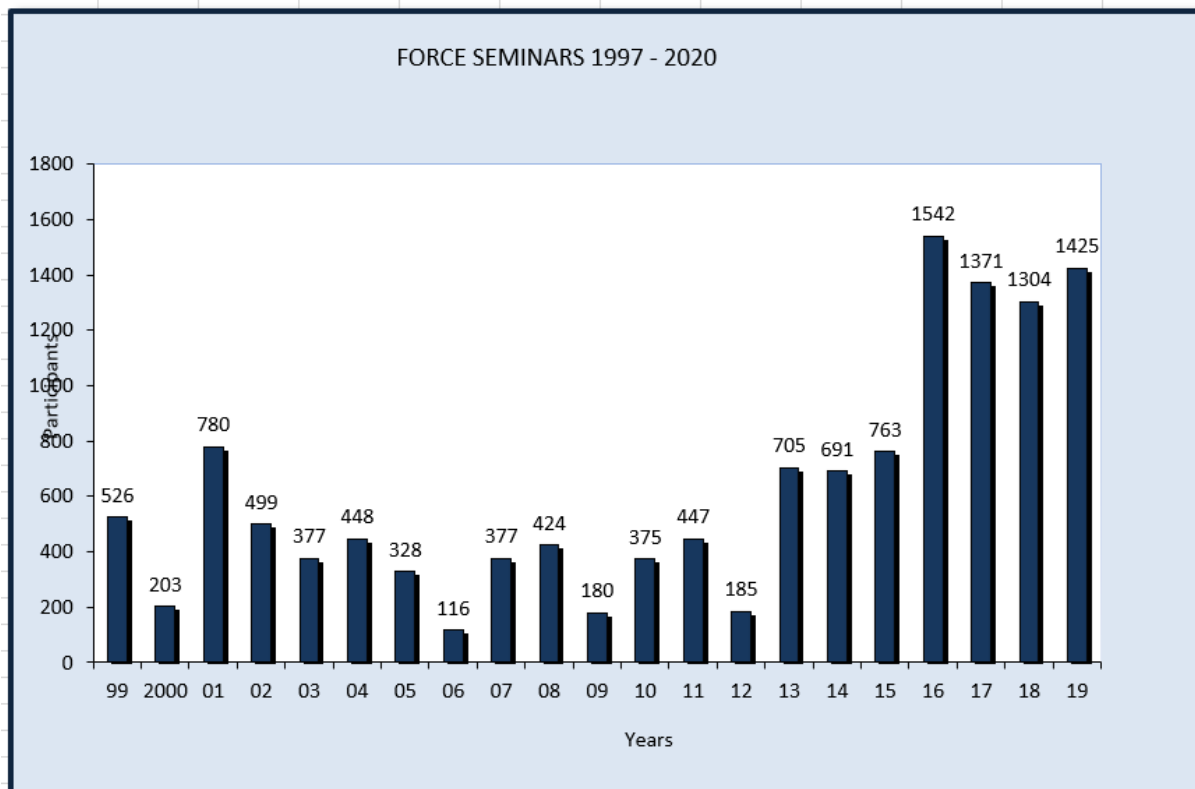
Among all the seminars we will highlight two major seminars this year. Hackathon was held for the second time. The subject choice for this year's Hackathon was Applied Machine Learning and Advanced Analytics with Oil and Gas Data. It was fully booked with a waiting list. Well done to the organizing committee.

The 50-year celebration at Atlantic Hall was a great success. Two days to celebrate the industry and the participants ranged from the retired to young students.

Both events had over 200 participants.

We are so grateful to our members who has worked so hard to organize seminars this year.

The diagram below illustrates number of attendees at the seminar/workshop through time.



Summary from highlight events in 2019

The seminar Hackathon and symposium: “Applied machine learning and advanced analytics with oil and gas data” was held at NPD on September 18-20th. Hackathon was held for the second year in a row and was sold out with 215 participants attending. Machine learning and Advanced analytics are taking the geoscience world by storm. The oil and gas industry are particularly rich in datasets and use cases where these relatively novel techniques can be tried you to amend or even revolutionize traditional work. Hackathon was a chance for coders, geoscientists, students and other interested people to get together for two days to attack an oil and gas challenge in an innovative and collaborative way. After two full days of hacking the hackers attended an evening conference and dinner at Fermenten. On the last day of the seminar the symposium was presented with a variety of presenters from the industry. In addition, Matt Hall from Agile presented the 2019 Force Machine Learning Hackathon projects. This 3- day event was highly successful, and force is positive that we will see more of Hackathons in the future.

Seminar “Fifty years since the first commercial discovery on NCS” – 11-12 December in Atlantic Hall This highly anticipated event took place in the heart of Stavanger City Centre, and was the most popular FORCE event in 2019, gathering 222 participants. The aim was to gather young and old professionals to meet and learn. Bente Nyland, director of NPD, opened the seminar followed by two round table discussions addressing the topics: “How the authorities secured the Norwegian ownership of the petroleum resources” and “Geophysical progress made over the years and the growing knowledge of petroleum systems and geology”. The discussions were by some of the most experienced people in the field, and who are also behind some of the major contributions to the petroleum industry in Norway. The two days included presentation covering ground-braking technological innovations, interesting stories from the early days in the industry, and some of our most valuable discoveries like Ekofisk, Troll, Statfjord and Johan Sverdrup. The Norwegian Sea was covered through stories from haltenbanken, Draugen and Ormen Lange and the Barents Sea story had the title “Unlocking the hydrocarbon potential of the Barents Sea”. A seismic talk covered the evolution with going from 2D-3D-4D seismic and gave an insight to this game-changing process. The young professionals showed us how they address “The big picture” by visiting young students and talking about the industry from a wider view. Day one was rounded up with a social event at The Norwegian Petroleum Museum. There it started off with a talk about the museum. Afterward, guests could walk around looking at the exhibition while enjoying tapas and drinks.



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Seminars and L&L 2019

Dato	Type	Tittel	Antall
17.01.19	L&L	NPD Shelf Library - Access to data from Factpages and Diskos	31
14.02.19	L&L	Biostratigraphy NCS Operators Meeting Q1 2019	24
18.03.19	L&L	Provenance in the North Atlantic	9
19.03.19	1d seminar	Carbonate Plays on the Norwegian Continental Shelf	53
26.03.19	L&L	Integrated production optimization on Skarv	36
11.04.19	1d seminar	To re-process or re-acquire? The seismic decision	102
27.05.19	L&L	Poor production forecast. Here's why and what you can do about it	82
11.06.19	L&L	Fishbones Completion Technology	38
12.06.19	L&L	Wave-equation based AVO inversion	18
14.06.19	L&L	Salt tectonics in the North Sea	55
18.06.19	Field trip	Jæren Field Trip	5
26.06.19	L&L	Disentangling Paleokarst Reservoirs	30
08.08.19	L&L	Force Triassic Research Proposal	16
13.09.19	L&L	Oil vs gas: What are the limits to prospect-level hydrocarbon phase prediction?	78
18.09.19	3d seminar	Hackaton - Applied Machine Learning and Advanced Analytics with Oil and Gas Data	215
26.09.19	1d seminar	Cores of the year 2019	55
03.10.19	L&L	Practical insights and techniques in seismic velocity estimation, SEG 2019	69
16.10.19	2d seminar	Cretaceous park	96
29.10.19	2d seminar	Advances in Integrated Biostratigraphy	55
19.11.19	L&L	Advanced structural geological approach to understand fault systems and basin evolution	55
20.11.19	L&L	Advances in petroleum system assessment and evaluation of the possibilities for zero emission energy recovery from petroleum reservoirs	26
11.11.19	3d seminar	The thrill at the edge: Seismic Geometry, Reservoir Architecture, Trapping Mechanism and Forward Modelling of Clinoforms	55
11.12.19	2d seminar	Fifty years since the first commercial discovery on NCS - lessons learned for the next generation	222
Total		1425 participants	

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Budget/Annual accounts 2019

Budget 2019

Result 2019

	Income	Expenses	Income	Expenses
Transferred from 2018	1 576 015		1 576 015	
Pre-projects TC group		400 000		
Payment (seminar fees)	800 000		638 000	
Sponsors			775 000	
Seminar expenses		770 000		1 204 537
Accessories for seminars		30 000		378
Seminar buffer		300 000		
Lunch&Learn		40 000	34 000	72 653
Invited speakers - IE		150 000		
Invited speakers - IOGR		50 000		
Membership fees	1 940 000		1 960 000	
Admin cost NPD		1 640 000		1 660 000
New members				
Secretariat expenses NPD		300 000		260 210
Extra funding web development		175 000		
<i>Service at meetings</i>	<i>Included secretariat expences</i>	50 000		40 492
<i>Marketing</i>	<i>Included secretariat expences</i>	20 000		
<i>Web page</i>	<i>Included secretariat expences</i>	350 000		210 073
<i>PayEx fee (monthly)</i>	<i>Included secretariat expences</i>	5 000		4 189
<i>Div/travel expenses</i>	<i>Included secretariat expences</i>	50 000		5 456
Total	4 316 015	3 855 000	4 983 015	3 197 778
Estimated balance 31.12.2019	461 015		1 785 237	

Resultat		Budsjett/balanse	
Overført fra 2018	1 576 015	Balanse 2019	1 785 237
Utgående balanse	1 785 237	Budsjettert balanse 2019	461 015
			1 324 222
Overskudd 2019	209 222		
Resultat seminar	208 085	Seed funds	400 000
Late participant	0	Seminars	208 085
Lunch & learn	-38 653	Seminar buffer	300 000
Membership fee (income)	1 960 000	Lunch & Learn	1 347
Admin cost (NPD)	-1 660 000	Invited speakers	200 000
Secretariat	-260 210	Secretariat	39 790
Sum	209 222	Extra funding web	175 000
			1 324 222