
Project

«Competitiveness – changing tide on the Norwegian continental shelf»

- Summary and recommendations from the Committee



KonKraft in brief

KonKraft is a collaboration arena for the Norwegian Oil and Gas Association, the Federation of Norwegian Industries, the Norwegian Shipowners Association and the Norwegian Confederation of Trade Unions (LO), with LO members Fellesforbundet og Industri Energi.

It serves as an agenda-setter for national strategies in the petroleum sector, and works to maintain the competitiveness of the Norwegian continental shelf (NCS), so that Norway remains an attractive area for investment by the Norwegian and international oil and gas industry – including suppliers and the maritime sector.

The council is KonKraft's supreme body. In addition comes an executive committee and a secretariat responsible for ongoing activities and day-to-day operations.

Council members:

- Hans Christian Gabrielsen, Leder, LO (landsorganisasjonen i Norge)
- Stein Lier-Hansen, administrerende direktør, Norsk Industri
- Frode Alfheim, leder, Industri Energi
- Karl Eirik Schjøtt-Pedersen, administrerende direktør, Norsk olje og gass
- Harald Solberg, administrerende direktør, Norges Rederiforbund
- Jørn Eggum, leder, Fellesforbundet
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- Jakob Korsgaard, administrerende direktør, Mærsk
- Kristin Færøvik, administrerende direktør, Lundin
- Ann-Christin Andersen, digitalsjef, TechnipFMC global
- Odd Strømsnes, administrerende direktør, Technip
- Mads Andersen, administrerende direktør, Aibel

Executive committee members:

- Tommy Hansen, Norsk olje og gass
- Torbjørn G. Eriksen, Norsk olje og gass
- Hans Petter Rebo, Norsk Industri
- Runar Rugtvet, Norsk Industri
- Thomas Saxegaard, Norges Rederiforbund
- Olav Lie, LO
- Jørn Prangerød, Fellesforbundet
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KonKraft's secretariat:

- Roger Pedersen, sekretariatsleder KonKraft
- Inger Hoff, rådgiver KonKraft
- Ståle Tunesvik, prosjektleder

Foreword

The Norwegian oil and gas sector has developed over 50 years to become country's most important industry. This has laid the basis for making Norway one of the world's richest welfare states today. The concept of a collective welfare state is closely related to the Norwegian model and core values such as high employment, well-being for all and organised labour relations. The industry has developed and changed within the framework of the Norwegian model through a tripartite collaboration between employers, unions and government,

The industry has always been in a process of adaptation. Norwegian industrial companies have automated and improved their efficiency for more than a century, and are still doing so. High productivity is crucial for competitiveness in a country like Norway, where costs and living standards are high. Productivity growth is possible because the industry has been innovative and because the Norwegian model ensures a learning workforce and short distances between employees and management.

High levels of efficiency, productivity, HSE and carbon efficiency are crucial for the competitiveness of the oil and gas industry in an era characterised by tougher competition in an altered global energy market. Efforts to adapt in coming years will be characterised by new forms of collaboration between the players, digital technology and the need to maintain a high pace of change.

An understanding must prevail that different players can and will adopt differing approaches and solutions. The strongest and most robust solutions are often found at the interface between different interests. Helping to find such solutions is the core of KonKraft's work.

The report on Competitiveness – changing tide on the Norwegian continental shelf represents a contribution to KonKraft's continued work on maintaining the competitiveness of the Norwegian continental shelf (NCS) so that Norway remains an attractive area for investment and a dynamic home market for supplier companies and the maritime sector.

Oslo, 4. january 2018

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1. Summary and recommendations

The world energy market is changing, and this is having a substantial effect on energy nation Norway.

Norway's oil and gas industry has every prospect of succeeding in this transformation, as it has done many times before.

Recent years have been demanding, and the industry has implemented major changes and improvements. Simplification and standardisation have been crucial.

The KonKraft council established the project on Competitiveness – changing tide on the Norwegian continental shelf in January 2017. Its purpose was to secure long-term value creation, jobs and global competitiveness for the Norwegian oil and gas industry.

Key assignments in the mandate were to

- ensure that cost reductions and measures lead to genuine, lasting and long-term changes
- ensure a level of activity which maintains and further develops Norway's expertise and supplies cluster
- ensure that a high Norwegian share is attractive in both commercial and socio-economic terms
- propose necessary improvements to the policy framework to government
- recommend measures from the industry and the government for realising socio-economically profitable projects
- propose short-term measures if these provide a basis for securing long-term value creation
- deal with relevant parts of "the Road map for the Norwegian continental shelf – value creation on and reduced greenhouse gas emissions from the NCS up to 2030 and 2050 action plan"
- increase the use of digital solutions, automation and robotisation
- increase the commitment to standardisation, simplification and industrialisation
- enhance operational cost-efficiency in the oil and

gas industry

- strengthen collaboration between operators and suppliers through increased interaction, effective interfaces, reuse of solutions and experience transfer.

Much has changed during 2017. The decline in the level of activity has flattened out, and signs of an upturn can be seen even though big differences exist between segments of the industry. Substantial cost and efficiency gains have been achieved. The breakeven price for a number of field developments is down by 30-50 per cent. Oil prices have developed in a stable fashion and exceeded USD 64 per barrel in December. The player picture has changed among both operators and suppliers. Trendsetting companies in the sector have established strategies and road maps for digitalisation. Optimism in the industry is greater now than it was a year ago.

The challenge for the oil and gas industry as a whole at the beginning of 2018 is that resources have not been discovered which can maintain today's level of oil and gas production beyond 2025. Nor are any major development programmes known after 2022. To succeed, the industry must

- make more discoveries for development and production
- find profitable solutions for developing a number of the small discoveries on the NCS
- continue current simplification and improvement efforts
- realise the potential offered by digitalisation, industrialised standard solutions and new forms of collaboration
- reduce CO₂ emissions and improve the level of safety
- maintain the attractiveness of the NCS and create jobs.

One of the most important competitive advantages for the NCS is the collective expertise and innovativeness concentrated in Norway's offshore cluster. This advantage has been developed over many years through both collaboration, and through labour relations based on open dialogue between employers, employees and government. Building further on this broad-based expertise will be crucial for the industry on the threshold of a new technological revolution through digitalisation.

The level of costs on the NCS has been substantially reduced over the past three years. Most parameters show that the industry has almost halved its overall cost level since 2013. Based on input and assessments, the committee takes the view that the sectors must increase its efficiency and productivity even further, so that costs by 2025 are on a par with the level seen around 2000 in order to secure profitable activity through the industry's economic cycles. Profitability must be sustainable over time for the whole value chain in the oil and gas industry.

Today's oil fields will not produce enough to meet tomorrow's demand. Oil from offshore areas such as the NCS will be crucial in meeting global energy needs. Companies on the NCS must maintain a high level of exploration in order to prove new commercial discoveries. The industry must gain access to new prospective acreage. It is important to maintain a steady and predictable pace in awarding new areas for petroleum activities through both numbered licensing rounds and awards in predefined areas (APA).

Greenhouse gas emissions from oil and gas production will become more important for the attractiveness of various provinces as a result of the global climate challenges. Today's CO₂ intensity on the NCS is about half the global average. If the industry continues its systematic climate work on the NCS, its competitiveness will be further strengthened.

The level of safety in the Norwegian petroleum sector is high. At the same time, operations in the industry are characterised by change. To ensure a sustainable development of Norway's petroleum activity, safety work must be further developed, efficiency measures implemented and costs reduced. The HSE regime must be organised to meet future safety and working environment challenges in a positive way. Responsibility for safety in petroleum operations rests with the industry itself. Follow-up of the players by the safety regulators builds on enhancing accountability and assumes openness and trust between both employees and employers and the industry and the government, as well as respect for each other's roles and responsibilities.

The committee would refer to and supports the report from the tripartite working group (the Engen report) which assessed health, safety and the working environment in the petroleum sector and was submitted to labour and social affairs minister Anniken Hauglie on 29 September 2017.

Fiscal parameters are significant for the attractiveness of the NCS. Norway's petroleum tax regime has been designed to contribute to a high level of exploration activity and a diversity of players. The introduction of the reimbursement system for exploration costs has boosted activity since 2006, and the number of players on the NCS is substantially higher today. More than half of all exploration wells in 2005-17 were drilled by operators other than Statoil and the big international companies.

The committee would emphasise the importance of stable and predictable operating parameters for the attractiveness of the NCS.

The NCS has been and will remain the most important market for Norway's supplies industry. During the 2000s, it also developed into the country's second largest export industry after sales of oil and gas. Over the past three years, the supplies sector has experienced financial challenges, a big workforce downsizing and restructuring because of reduced activity nationally and globally. Contract awards in 2017 show that this industry is strongly placed and has substantially improved its competitiveness.

Norway's population has a good impression of the oil and gas industry. Its work on innovation and technology development is greatly respected, and virtually all Norwegians understand the value of oil and gas for the national economy, prosperity and development opportunities.

At the same time, we see that people have less faith in the industry's future. The younger generation, in particular, has less confidence in this now than it had five years ago. This impression has been strengthened by the poor labour market in the industry during recent years.

A "new oil" project run by Norwegian Oil and Gas in 2017 involved students asking others of their own age to explain why the oil and gas industry's communication fails to reach young people today. On that basis, the project makes four clear recommendations to the industry for reversing this trend.

The committee's mandate notes the importance of a long-term approach and the need for ambitious goals in future improvement work on the NCS. If the industry is to meet the targets of a further strengthening in competitiveness, it must not only continue company-specific improvement work but also create greater efficiency and productivity in the sector as a system. This means it must work to

- eliminate unnecessary duplication of work and documentation between players and phases in the value and supplier chain
- establish industrial, shared economies of scale for specific functions or areas on the NCS
- reduce intermediate levels, functions and operations which can be replaced by good and secure digital solutions
- achieve higher quality, productivity and efficiency at all levels in the value chain through the managed exchange and utilisation of datasets between companies
- establish portfolio and alliance models in order to create a better commercial basis for a higher level of activity – from exploration and drilling to developing groups of small fields and in operations
- involve suppliers earlier in conceptual and project development
- join forces as quickly as possible on introducing regulations and standards as well as shared solutions for storage, sharing and use of data at all levels in the value chain
- intensify the current work on standardisation and simplification in the industry.

All these areas are characterised by the fact that the potential lies between the players, and most have their origins in digitalisation and new forms of collaboration in the Norwegian oil and gas industry. The committee has therefore given special emphasis to such opportunities in its work, and drawn on experience from other sectors in looking at how companies can find solutions jointly and work in the same way.

If this potential is realised, players on the NCS will increase their competitiveness, which will in turn ensure a high Norwegian share and contribute to good commercial results.

In its efforts to identify specific improvement opportunities, the committee has sought the broadest possible range of inputs. It established four technical work groups drawn from the parties, and the project has also had external contributors and held a number of meetings and presentations with players inside and outside the industry. This work has formed the basis for the committee's recommendations. The committee

has arrived at these recommendations on an independent basis and after integrated assessments.

Furthermore, the committee has emphasised what the industry itself can do to achieve better results. Its operating parameters are discussed in areas where changes are needed in order to be able to realise an important improvement potential.

The recommendations represent a mix of new measures and reinforcement of particularly important current action. The committee believes that work in the future must emphasise rapid initiation and be based on well-established practice for worker participation in order to ensure quality, HSE and entrenchment in its execution. In order to ensure the necessary tempo, some individual players should accept a special responsibility for initiating specific recommendations.

The committee recommends that implementation should primarily occur in the individual company and the existing fora, organisations and collaboration arenas.

1.1.

RECOMMENDATIONS FROM THE COMMITTEE

Initiative for digitalised collaboration

- A collective and industry-led initiative should be established to pursue measures which involve new methods of digital collaboration between players in the oil and gas industry.
- This work should result in common standards and protocols for data storage, exchange and use.
- The project will be initiated in areas where NCS players see few conflicts in data sharing. HSE and environmental information represent appropriate initial areas of this kind, and have a potential for efficiency improvements. This work will build experience about solutions and working methods, which can then be applied to other areas/datasets in the industry.
- The initiative should ensure that such digital collaboration solutions can be used throughout the value chain. See the recommendations on well deliveries, fields, operations and exploration.
- The initiative should be launched by a core group of players who have the need for, interest in and qualifications for getting such a process going quickly. Other players are invited to participate in work on the solutions.
- This work sets specific and to some extent new requirements for efforts to realise the potential.
- The committee therefore recommends that a suitable common framework is utilised for

subjects like digitalised collaboration, and that the work is organised from a neutral arena and involves the various parties. The committee recommends adopting the framework used by Norway's banking sector for its change process. While these industries are very different, the way this work was launched, organised, managed and measured is also highly relevant for the digital transformation facing the oil and gas industry.

- Today there are different perceptions among the players around management structure, ownership of data, and regarding business consequences for sharing data

Each company should have its own digitalisation strategy

- All players should have established a digitalisation road map/strategy for its operations within one-two years.
- This digitalisation road map/strategy must include a clarification of how the company interacts with other players, its principles for managed data-sharing – with regard both to the value of external information and how far it shares its own data.

Improved exploration results with data-sharing

- Players involved in exploration on the NCS should have adopted standards and interface principles within three years which permit greater sharing of data than today.
- The players should establish an industry collaboration on managed data-sharing and, as part of this, define which information is suitable for and creates added value when shared on the NCS (see also the recommendation on an initiative for digitalised collaboration).

Improved efficiency in well deliveries through digitalisation

- The players should establish infrastructure and rules (APIs) for increased use of data in well deliveries.
- This must be based on common protocols for data exchange and open interfaces.
- Operators, rig contractors and suppliers should specify which data can be shared to improve the efficiency of well delivery.
- Operators should launch pilot projects in collaboration with rig contractors and well service suppliers where digital technologies related to well deliveries are quickly tested out.

Digital field development process

- Players in the field development process should establish a purposeful collaboration to harvest the effects of digitalisation and data-sharing as quickly as possible (see also the recommendation on an initiative for digitalised collaboration).
- Standardised digital plant information should be adopted so that the whole value chain can communicate through 3D models and databases and ultimately through digital twinning. This work should draw on experience from the buildingSMART digitalisation collaboration in Norway's construction industry.
- Part of the work should contribute to accelerating the current digitalisation of the NORSOK standards – particularly NORSOK Z-TI.

Upgrading the Diskos database

- The Norwegian government should upgrade the user-friendliness of the existing Diskos solution, and must collaborate with the industry to ensure interoperability.¹
- The companies must view an upgrading of Diskos in relation to an overall digital strategy and secure the right expertise for the project (strategic geological and geophysical [G&G], digitalisation and well competence).

Operational support centres for improved safety, higher value creation and reduced emissions

- The committee notes that players are well under way in establishing operational support centres for improving operations and securing the benefits of condition monitoring and predictive maintenance in existing production facilities and future developments.
 - The operational support centres will share position understanding and improve collaboration between the parties in real time.
 - Data are used to improve results through advanced analysis, artificial intelligence and advanced algorithms.
- The committee considers good progress here to be important for safeguarding Norwegian jobs.

¹ Interoperability is a property of a product or a system. This means that its interface is completely understood, so that it can work together with other products and systems now or in the future, with any form of use or access and without any restrictions.

Digital technologies – extending joint industry project on maintenance and modification (M&M JIP) and OG21

- Companies on the NCS should study and adopt the technology described in the M&M JIP and OG21 in order to boost profitability and efficiency in so far as pilots and other results prove to be profitable and energy saving.
- Follow-up of these initiatives should be systematic and integrated across the NCS, and run by established programmes such as Demo 2000 and Petromaks 2.

Common digitalised work permit system

- The industry should secure a common digitalised work permit system covering all supporting processes (safe job analysis [SJA], isolation and access to closed areas).
- This work must be provided with resources and entrenchment at a sufficiently high management level to implement such a process.
- At the same time, the process should improve the safety level and enhance the efficiency of the approval process for work permits

Stratigraphic wells

- The oil and gas companies should initiate a process through Norwegian Oil and Gas whereby they drill a set of stratigraphic² wells in collaboration with the authorities to secure additional geological and geophysical data which are made available to all companies on the NCS.
- The companies should jointly identify and mandate a player to drill these wells in close collaboration with the authorities.

Broader collaboration on drilling activities

- Rig campaigns in the Barents Sea should be coordinated between the operator companies either jointly or through parallel campaigns with shared support and emergency preparedness functions.
- Smaller projects should be coordinated to ensure continuity as well as the basis for synergies and a low cost base. Portfolio collaboration should be standardised on the choice of solution and suppliers to avoid expensive reconfigurations and duplication of back-up solutions.
- Resource-sharing should be assessed in this context. Examples are spare part stocks shared between rig owners and various sub-contractors for drilling services, and shared logistical services.
- Operators and suppliers should conduct an active dialogue to identify cost-driving contractual

requirements, such as short mobilisation times, back-up solutions and unlimited access to rarely used equipment throughout the contract period.

- Greater use should be made of performance-based remuneration in supplier contracts. Such models must be developed cooperatively by operator and supplier, and based on mutual trust and openness. How performance is to be measured and improvement gains are to be shared between the two sides must occupy a key place. Performance-based remuneration should be followed up with a transfer of authorities for choosing solutions to the supplier. This should be accomplished as a gradual process or a pilot project.

Raise the reference level for measuring performance in wells

- Rig contractors and suppliers should define the actual capacity³ of their equipment by changing the reference for performance measurement from the best theoretically attainable to the design capacity of equipment and well.
- Rig contractors should establish an objective and theoretical measure of total rig efficiency.

Portfolio approach to make small fields profitable

- Two or more operators with several discoveries (<10) in their portfolios should join forces to establish a portfolio collaboration where this is appropriate for realising projects.
- In processes with suppliers, the operators must review such portfolios of discoveries in order to seek standardised solution which make it possible to realise further profitable developments.
- In such processes, suppliers should clarify what value they can add through working on portfolios of developments.
- The government should actively make provision for portfolio collaboration across companies.

² Stratigraphic wells are shallow boreholes intended to increase geological knowledge of an area.

³ Capacity means the functionality of the equipment including safety margins without exceeding the safe level.

Joint logistics and emergency preparedness solutions

- The logistics and emergency preparedness project, initiated after discussions in Norwegian Oil and Gas and led by Aker BP, should continue as a collaboration between the operators.
- The operator companies must open for more sharing and cooperation over logistics.
- Further development of joint logistics and emergency preparedness solutions should be implemented within the collaboration between the parties.

Marketplace to improve overview and use of equipment stocks

- The current joint industry project on a common market place to improve the overview and use of equipment stocks should continue. This JIP comprises seven operators led by Statoil.

Collaboration models for field developments

- Operators and suppliers are recommended to share experience, gains, resources and risks to a greater extent than today through alternative forms of collaboration, and to assess this when establishing the contract strategy for a field, an area or a project portfolio. Alternative forms of collaboration could be long-term frame agreements, partnerships, alliances and remuneration models with varying degrees of collaboration, openness, risk-sharing and incentives.
- Operators should involve suppliers early and begin dialogues on interfaces and optimisation when these could still influence plans and solutions for a development.
- Greater use of performance-based requirements is recommended in preference to specific demands and specifications in order to increase the use of standard designs and reuse of solutions, and to make savings related to fabrication of larger series of identical or similar products. This could involve standardisation at both product and component levels.

Standard "alliance" contract

- The players should take an initiative on starting to develop a new type of standard contract based on partnership thinking, which makes provision for involving main contractors from the early project phases, encourages the development of long-term collaborative relationships, and facilitates common management principles and close interaction.

- The standard contract board (SKS) should prepare a mandate for the negotiating committee on standard contracts to draw up a standard alliance contract. This could build on existing standard contracts (NTK15, NF15, NIB16 or NSC05).

Industrial approach to developments in the far north

- Operators, suppliers and other players with activity in the far north should establish a JIP. The aim of such a collaboration should be to (further) develop industrial expertise clusters in this region, ensure increased activity and spin-offs, and simultaneously secure robust solutions for the companies. An example of a similar initiative is the Barents Sea Exploration Collaboration (BaSEC).
- An important part of this work must be to identify which functions could be shared, and to establish collaboration rules for the companies with activities in the region.

EPIM collaboration must be strengthened

- The E&P Information Management Association (EPIM)⁴ must be strengthened and gain the necessary status in the industry to contribute further through its work in the future.
- Management in the operator companies should take stronger ownership of EPIM's role and governing bodies.

Work on simplification and standardisation must be further strengthened

- The players should utilise efficiency targets together with profitability goals to ensure that improvements continue even with higher oil and gas prices.

⁴ The E&P Information Management Association (EPIM) is a non-profit membership organisation, established in November 2007 and governed by the operators on the Norwegian continental shelf. Its main objective is to facilitate the best possible flow of information between operators, partners, the authorities and other stakeholders. <https://epim.no/>

Increased use of NORSOK

- Work on standardisation is very important and must be given higher priority.
- Work on the NORSOK standards is and must involve the parties jointly.
- The sector board for petroleum standardisation should maintain ambitious goals for the work of establishing and further developing industry standards which promote solutions which are good in terms of safety, cost-efficiency, technology and competitiveness.
- The PSA-referenced standards (95) – both NORSOK and others – should be applied as far as possible without company-specific requirements.

Standard contracts must be used

- Operators and suppliers must increasingly adopt the new standard contracts.

Change APA timetable.

Seismic multi-client activity. Sam-X

- The government should consider changing the time for inviting APA applications so that it accords better with the seismic survey season. This means an application deadline in April/May. The current work in Norwegian Oil and Gas on coordinating activity between the petroleum and fishing sectors is regarded as very important.
- Operators in adjacent licences should hold fixed annual meetings with the aim of avoiding possible overlaps in seismic surveying and identifying opportunities for possible joint surveys.
- Operators should share preliminary survey maps (outlines) on Sam-X as early as possible in the planning phase to avoid overlapping surveys.
- Operators must ensure that the Norwegian Fishermen's Association is kept updated from an early planning phase.
- Sam-X should be further developed in line with specific oil and fishing industry requirements.

Regulations for forward-looking solutions

- The regulations and standards must be adapted to new technological solutions as quickly as possible, so that future requirements and guidelines take account of the opportunities offered by digital solutions and remote operation from land. That can ensure the safe and efficient introduction of new technologies.
- The players should actively utilise the annual updating of regulations by the Petroleum Safety Authority Norway and present proposals for amendments where the regulations are perceived as an obstacle to modernising operating models

and new digitalised solutions. This review must be entrenched in the tripartite collaboration.

Expansion plan Demo 2000 and Petromaks 2

- The government should produce a binding plan for increasing appropriations to the Demo 2000 and Petromaks 2 research programmes. Contributions from the oil and gas industry are matched to official funding in accordance with the applicable formula. A continued commitment to research and development is considered crucial for the industry's progress.

Increased commitment to CCS

- Carbon capture and storage is a major opportunity for Norway and Norwegian industry.
- The government must appropriate sufficient funds for full progress with the CCS project, so that preliminary engineering can be finalised in 2018 as originally planned.
- The government must strengthen its dialogue and collaboration with countries in continental Europe and around the North Sea with a view to entering into agreements on infrastructure and carbon storage beneath the bed of the North Sea.

The industry reputation and attractiveness

- The oil and gas sector (companies, chief executives, key personnel, organisations and government agencies) must participate actively through a committed dialogue about the industry's future role. The industry needs more spokespeople.
- The whole oil and gas sector should make a bigger contribution to highlighting the expertise, innovativeness and opportunities for growth/innovation found within it. The industry must communicate better how oil and gas activities contribute to developing other sectors, such as other ocean space activities, renewables and an expanding data industry.
- The oil and gas industry must make frequent use of contemporary fora and methods for reaching different groups – particularly the younger generation.
- The digitalisation process which the Norwegian oil and gas industry is now entering offers many new opportunities for both young people and small start-up teams. This creates interesting job opportunities and will be important in future communication.

The industry's collaboration with the educational system

- The industry has a substantial requirement for expertise to overcome future challenges.
- Education of skilled workers and engineers must be further developed in close collaboration between the industry and the education sector nationwide.
- Companies in the oil and gas industry should maintain a continuous dialogue with the education system regardless of economic cycles. A number of players have established collaboration arenas, and a stronger coordination should be assessed.
- The industry must continue to build on the broad-based expertise it currently possesses, and ensure that today's personnel obtain the necessary updated continuing and further education.

