

OG21 workshop on competence June 1 Summary of group work

Rev: 5 June 2023



Competence needs and challenges are part of OG21's deep dive study on energy security

Project objective: Identify threats to the energy supply from the NCS needed to meet demand during the energy transition and describe how the Norwegian O&G sector can contribute with technology and knowledge to eliminate, mitigate, or manage such threats.

1. Background analysis:

- Energy transition scenarios – globally, Europe, Norway
- Role of oil and gas in the energy transition
- Importance of Norwegian oil and gas in the energy transition, especially for Europe
- NCS resources as compared to demand in energy transition scenarios
- Integration of Norwegian O&G facilities in domestic and regional energy systems

2. European energy security: Identify and analyze threats to the energy supply from the NCS within categories:

- Safety risks (use PSA data and categorization in DSHAs)
- Security: Malign cyber and physical activities
- Competence: Recruitment to studies, attract new talent, develop employees, cross-sector collaboration.
- Innovation capability: Production license size and ownership, business and contract models, public R&D funding, other
- Replace production competitively: Exploration, field development, IOGR
- Reduce GHG emissions: Deliver on GHG goals, contribution to energy transition, conflicts with other targets or environmental aspects
- Other to be identified

3. Select and discuss most important threats that OG21 can and should address:

- Categorize identified threats (e.g. impact on NCS energy supply vs. what OG21 can influence)
- Select the most important threats that OG21 can address and influence within its mandate and merits
- Identify and discuss measures on the selected most important threats
- Provide actionable and targeted recommendations on the selected most important threats which OG21 can do something about

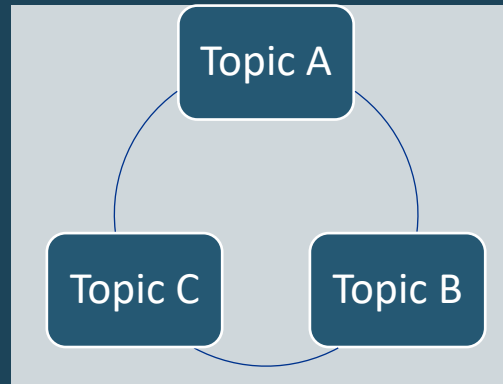
OG21-workshop June 1, 9 a.m.-3 p.m., Purpose, Approach, Use of results

Purpose:

- Discuss preliminary findings in OG21 pre-read.
- Provide input to further mature findings.

Pre-reads:

- Agenda and approach.
- OG21 note on competence needs



Approach – World Café:

- 3 topics (A-C) split on 3 tables.
- Facilitator and scribe for each table.
- Topic sessions – 40 min. Repeated 3 times with new groups each time.
- Each table's results refined from one session to next.
- Summary reports from each topic after last session.

Use of results:

- Finalize OG21 report on competence.
- Input to OG21 study on Energy security.

Topics discussed in workshop

A

Energy studies – recruitment and content:
Topic leader: Ole Eeg
Scribe: Eirik Møgedal

Key questions:

- Sufficient STEM students and study places?
- Subsurface, G&G and PTEC – Any cause for concern?
- “Fit for the future” – which skills and knowledge to include?
- Ph.D. recruitment?
- Role of digital transformation? Disruption?

B

Recruitment to the energy industries:
Topic leader: Inge Brandsæter
Scribe: Joar Dalheim

Key questions:

- How to become attractive to graduates and professionals?
- What type of candidates do we need?
- Collaboration with universities?
- Is the petroleum industry draining the job market at expense of other energy industries?
- Is there unhealthy competition for talent within the petroleum industry leading to wage inflation or competence drainage of the supplier industry?

C

Life-long learning:
Topic leader: Gunleiv Skofteland
Scribe: Gunnar Lille

Key questions:

- Twin transformation: digital and green – How do we empower the workforce to take part of the change?
- A crew change is looming – Is the industry prepared?
- Broad sets of skills needed in the future jobs – how do enterprises work to develop the workforce?
- Collaboration with universities for further training and education?
- How does the industry work to retain people?

Information to support discussions in pre-read report from OG21.

Key take-aways from June 1 Workshop on Competence (see Appendix for details)

A

Energy studies – recruitment and content

- Need more STEM student places – could vary between disciplines
- Start early – generate interest in STEM subjects early – engaged teachers/role models, guest teachers.
- Broad energy studies with a strong foundation – need to keep the motivation high through “studieforløpet”.
- Rename studies to better reflect the broad scope of the energy transition and future roles of candidates.
- Ph.D.-salaries too low to attract Norwegian graduates in a tight work market.
- Be attractive to foreign students, especially for higher level studies.

B

Recruitment to the energy industries

- Avoid competence “cannibalism” -> Increase pool of resources: (i) More STEM study places in Norway, and (ii) be attractive to foreign graduates and professionals.
- Industry needs to be part of the solution, not the problem. Bring more balance to what is the actual problem and what is the actual solution. Be better at communicating the industry’s role in the energy transition and the ongoing work on decarbonization.
- Challenging to get supply industry involved in R&D projects. NCS is mature and hence the time for return of investment is uncertain. The Government through the Research Council, has an increased role to stimulate innovation, which again leads to people development.
- Is the diversity within the operators too narrow (in background and perspectives)? Is a more strategic diversification a vehicle to improve performance (including recruitment and retainment)?

C

Life-long learning

- Need people with deep domain knowledge as well as wide scope understanding.
- Life-long learning important to match the pace of technology development, build change capability, and participate in new industry opportunities.
- Life-long learning important to motivate and retain people. Recognize that people are motivated in different ways - some have an inner drive, others must be nudged. Many are motivated by new challenges throughout their career.
- Management support and ownership important to build knowledge culture and provide strategies and tools for people to meet new challenges.
- High competition for talent, and trained employees could be lost to competitors. Public co-pay could reduce such market imperfections.
- Need better collaboration btw. universities and industry. Takes time and effort to develop high quality courses that align with industry needs.

Appendix - Group reports



Topic A: Energy studies – recruitment & content of studies

Key questions:

- Sufficient STEM students and study places?
- Subsurface, G&G and PTEC – Any cause for concern?
- “Fit for the future” – which skills and knowledge to include?
- Ph.D. recruitment?
- Digital transformation of higher education?

Perspectives from pre-read report:

- High educational level in Norway, but # of STEM professionals lower than OECD
- Increase in # of STEM graduates last few years, mainly in information technology
- Geology study places constant. Increased interest for such studies.
- Petroleum technology studies: interest decline last decade, fewer study places, uptick in interest in 2023
- Ph.D.-students: few Norwegians, mostly foreign students
- Tuition fees introduced for students outside EEA
- Petroleum’s role in the energy transition not recognized in new gov’t White Paper

New perspectives and comments from group discussion:

- Not enough STEM studie places (1 +3 group) Sufficient STEM study places (2 group)
 - Need to check if all students get a relevant job after education before concluding
- Could we have energy studies broad foundational, and a specialization later in the study run (studieforløp)
 - How to keep them interested during the heavy load of basics
 - Students generally have shorter attention span now – have the education kept up?
- Focus on the base subjects
 - A skilled person with a strong knowledge in one subject can easily change to other fields
- Cooperation Universities & Industry
 - Shorter term specific classes/subjects
 - Internships as a part of the educational flow
- Change point system to make it more attractive to select math, physics in VG
- Increase interest for STEM subject early in school
 - Start early with good experiences with STEM subjects
 - Teachers with interest in STEM will generated more STEM interested students
- Generate a curious mindset
 - Teaching what and how, but start with why
- Recruit students/workforce from Scandinavia
- Branding and content important, can we have energy studies
- How many PhD’s do we need – for academia and research (UNI) – do the industry need them?
 - How do we secure sufficient quality on PhD students

Three main take-aways:

1. Need more STEM students places – could vary from discipline
2. Start early – generate interest in STEM subjects early – engaged teachers/rolemodels, guest teachers
3. Broad energy studies with a strong foundation – need to keep the motivation high through “studieforløpet”

Topic B: Recruitment to energy industries – Key take-aways

Key questions:

- How to become attractive to graduates and professionals?
- What type of candidates do we need?
- Collaboration with universities?
- Is the petroleum industry draining the job market at expense of other energy industries?
- Is there unhealthy competition for talent within the petroleum industry leading to wage inflation or competence drainage of the supplier industry?

Perspectives from pre-read report:

- Access to STEM professionals is a bottle neck for the energy industries
- Energy industries compete with other industries for talent. Also fierce internal competition w/ peers and suppliers
- Petroleum industry is aging. New talent needed to maintain NCS production and help Europe rebalance energy supplies
- Energy companies, including pure petroleum companies, are popular with engineering graduates in Norway. Internationally, O&G is less attractive
- Attractiveness is dependent on factors such as job security, work environment, challenging assignments, purpose, and climate change action.

Four main take-aways:

- Competence cannibalism. Downturns enhances cannibalism. We have to increase the pool of resources (less cannibalism if there are enough). There will always be competition (if there are enough of every competence, companies will still compete about the best within each competence category).
- Being part of the solution, not the problem (“tomorrow’s heroes does not work within the petroleum industry”). Can we refine this perspective? Bring more balance to what is the actual problem and what is the actual solution?
- More challenging to get supply industry involved in R&D projects? We are on tail production, short time for return of investment. Does this mean that the authorities (research council) has a special responsibility to catalyse innovation (and hence development of our employees)?
- Is the diversity within the operators too narrow (in background and perspectives)? Is a more strategic diversification a vehicle to improve performance (including recruitment and retainment)? PS! No skilled workers engineers in today’s OG21 workshop..

Topic B: Recruitment to energy industries (first group)

Key questions:

- How to become attractive to graduates and professionals?
- What type of candidates do we need?
- Collaboration with universities?
- Is the petroleum industry draining the job market at expense of other energy industries?
- Is there unhealthy competition for talent within the petroleum industry leading to wage inflation or competence drainage of the supplier industry?

Perspectives from pre-read report:

- Access to STEM professionals is a bottle neck for the energy industries
- Energy industries compete with other industries for talent. Also fierce internal competition w/ peers and suppliers
- Petroleum industry is aging. New talent needed to maintain NCS production and help Europe rebalance energy supplies
- Energy companies, including pure petroleum companies, are popular with engineering graduates in Norway. Internationally, O&G is less attractive
- Attractiveness is dependent on factors such as job security, work environment, challenging assignments, purpose, and climate change action.

New perspectives and comments from group discussion:

- Average age has increased with one year per year (Equinor), i.e., aging work force
- Has profitability changed between operators and service industry (Equinor's working together)?
- (Young) people can use general experience in new areas. Same competence can be used in different industries. Can government facilitate incentives to work and study simultaneously?
- Life-long learning is not supported in the (support) industry. Does government have a special responsibility in setting this up?
- Competence cannibalism. Downturns enhances cannibalism. We have to increase the pool of resources (less cannibalism if there are enough). There will always be competition (if there are enough of every competence, companies will still compete about the best within each competence category).
- Being part of the solution, not the problem ("tomorrow's heroes does not work within the petroleum industry"). Can we refine this perspective? Bring more balance to what is the actual problem and what is the actual solution? A survey in Stavanger has revealed that students in general are not "hostile" towards the petroleum industry (but they need to see it in a wholistic perspective of its role in transition to sustainable energy)
- Combining industries (e.g., offshore wind, gas production) can allow for students to be more open to enter the energy industry
- We need to grow the STEM attitude already at lower grades (primary school) to prepare for more and better candidates at the universities
- A significant part of the foreign student are from countries which may have restricted abilities for business with Norway. Is this a challenge? Do we need to stimulate students from certain areas of the world?
- Strengthen the connections between the teachers and the industry. Develop more industry-based learning and using examples directly applicable for the industry in the training

- AI

Three main take-aways:

1. Xx
2. Yy
3. Zz

Topic B: Recruitment to energy industries (second group)

Key questions:

- How to become attractive to graduates and professionals?
- What type of candidates do we need?
- Collaboration with universities?
- Is the petroleum industry draining the job market at expense of other energy industries?
- Is there unhealthy competition for talent within the petroleum industry leading to wage inflation or competence drainage of the supplier industry?

Perspectives from pre-read report:

- Access to STEM professionals is a bottle neck for the energy industries
- Energy industries compete with other industries for talent. Also fierce internal competition w/ peers and suppliers
- Petroleum industry is aging. New talent needed to maintain NCS production and help Europe rebalance energy supplies
- Energy companies, including pure petroleum companies, are popular with engineering graduates in Norway. Internationally, O&G is less attractive
- Attractiveness is dependent on factors such as job security, work environment, challenging assignments, purpose, and climate change action.

New perspectives and comments from group discussion:

- From Norwegian Public Health Sector: Most important to retain, not to recruit?
- Operator has strict requirements to quick delivery at low cost. Not sufficiently accepted to train juniors on projects? This may be managed by using KPI for use in the industry?
- More challenging to get supply industry involved in R&D projects? Is this something that “everybody” knows? We are on tail production, low time for return of investment. Does this mean that the authorities has a special responsibility to catalyse innovation (and hence development for our employees)?
- Can we improve reputation? Better as energy companies are also including ocean wind in energy portfolio. How can petroleum industry offer better “life balance” for new starters?
- Can we adjust the image being painted in media about our industry? Provide a deeper insight in what we actually are providing for the society? Safety important for reputation (cannot allow high margins with frequent releases..)
- Strengthen collaboration with industry and universities (e.g. masters and PhD programs or tasks)? Time available for industry to follow up such programs seems to be on a decay? Is this linked to pressure on operational margins?
- Is the diversity within the operators too narrow (in background and perspectives)? Is a more strategic diversification a vehicle to improve performance (including recruitment and retainment)? PS! No hand-on engineers in OG21 workshop..
- Continue the wider profile narrative towards energy (more than petroleum)
- Competition? Yes, but not unhealthy? On the other hand, we are loosing core competence (not able to meet other sectors salary increase, perception of being a “dark side” industry)
- Universities have financial challenges, cannot set up the projects they wants (linked to operators taking more margins?)
- Financing within renewables, not within general petroleum industry

Three main take-aways:

1. Xx
2. Yy
3. Zz

Topic B: Recruitment to energy industries (third group)

Key questions:

- How to become attractive to graduates and professionals?
- What type of candidates do we need?
- Collaboration with universities?
- Is the petroleum industry draining the job market at expense of other energy industries?
- Is there unhealthy competition for talent within the petroleum industry leading to wage inflation or competence drainage of the supplier industry?

Perspectives from pre-read report:

- Access to STEM professionals is a bottle neck for the energy industries
- Energy industries compete with other industries for talent. Also fierce internal competition w/ peers and suppliers
- Petroleum industry is aging. New talent needed to maintain NCS production and help Europe rebalance energy supplies
- Energy companies, including pure petroleum companies, are popular with engineering graduates in Norway. Internationally, O&G is less attractive
- Attractiveness is dependent on factors such as job security, work environment, challenging assignments, purpose, and climate change action.

New perspectives and comments from group discussion:

- Is it a problem that too many begins directly at the operator (compared to obtaining experience from the service industry)?
- Working together. Is the current situation sustainable with profits seeming to be accumulated at the top (at operators)?
- Increased differentiation is important for sustainability? Are decision makers becoming too streamlined?
- We need to motivate younger students (primary) to see value in STEM and energy industry.
- Are we finding all talents? Recruitment process is streamlined (form based)? May also contribute to lack of diversity?
- Working together. Increased collaboration between companies/authorities/schools will provide a better platform for learning
- Perception (reputation) of industry can be improved. How can we provide a more balanced understanding of what we provide and which role we have in the solution of future energy?
- Can petroleum industry be to blame if renewable projects are stopped due to e.g. cost calculations? Is there a need to meet this narrative (petroleum to blame) before it consolidated in population? How can this be done?
- We need energy to maintain way of living in Europe. Is this a part of the solution of our narrative to our mission and mandate?
- Salary (isolated) is not a solution. At least as long as we are sufficiently wealthy. Attraction is mainly in growth and fun at work (within a meaningful mission).
- Collaboration between industry, academia and research entities are suffering somewhat from the reduced horizon of anticipated production on NCS. Does this put the authorities in a more important role to facilitate (catalyse) innovation?
- Why are we not utilizing nuclear energy as part of the solution? We have local resources (thorium) to be more efficient than others?
- Research council has a responsibility in stimulating the whole energy production, not only renewables?

Three main take-aways:

1. Xx
2. Yy
3. Zz

Topic C: Life-long learning – Summary

Key questions:

- Twin transformation: digital and green – How do we empower the workforce to take part of the change?
- A crew change is looming – Is the industry prepared?
- Broad sets of skills needed in the future jobs – how do enterprises work to develop the workforce?
- Collaboration with universities for further training and education?
- How does the industry work to retain people?

Perspectives from pre-read report:

- Twin transition: Digital transformation requires new digital skills, collaboration and interaction skills, as well as willingness and capability to change. Green transition and branching out to CCS, offshore wind and other new industries require new skills.
- Companies need to train their employees for changing and new job requirements, which they do to a varying degree. More opportunities appear to be offered in large companies than in small.
- Universities respond to industries' needs by offering further education
- The petroleum industry has not been good at retaining people through down-cycles

Reference workshop 1 June 2023

Main take-aways:

1. Why:

- Life-long learning – both for mastering new tasks and to retain people
- Deep domain knowledge as well as wide scope understanding
- Up-skilling of people for new industry opportunities & match the pace of technology development

2. How:

- Management support and ownership – build knowledge culture
- Personal motivation
 - Be change willing and have skills to do that. Inner drive. External motivation – recognition
 - Need new challenges throughout the career to motivate and retain people.
 - Provide tools for people to meet new challenges.
 - Market imperfections -> Public co-pay also for life-long learning
- Better collaboration btw. universities and industry. Takes time and effort to develop high quality courses that align with industry needs.

Topic C: Life-long learning – Session 1

Key questions:

- Twin transformation: digital and green – How do we empower the workforce to take part of the change?
- A crew change is looming – Is the industry prepared?
- Broad sets of skills needed in the future jobs – how do enterprises work to develop the workforce?
- Collaboration with universities for further training and education?
- How does the industry work to retain people?

Perspectives from pre-read report:

- Twin transition: Digital transformation requires new digital skills, collaboration and interaction skills, as well as willingness and capability to change. Green transition and branching out to CCS, offshore wind and other new industries require new skills.
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- The petroleum industry has not been good at retaining people through down-cycles

New perspectives and comments from group discussion:

- Life-long- learning - Applies to academia as well as to industry
- Invite external resources to give short courses in organizations, example: nuclear in DNV
- Understand whether rules and regulations are up to speed – aligned with new technology. Part of learning
- Problem that people believe O&G is over – it's always been like that. Need longer perspective.
- Experience from a long working life: The fundamental subjects have been the most important.
- Need to be clear on where we are heading – clear vision
- Be aware of new tasks – take one step at the time.
- Team-work important – put the right people on the teams – variety of backgrounds
- Interaction academia & industry to collaborate on identifying and developing courses – ensure high quality.
- Need to offer people competence development to retain them. And new challenges.
- People are curious – need to trigger people's curiosity
- “Always student” – “T-shaped employees” -> deep domain and understand wide scope and context. Kaos-pilot.
- Need to start early – be role-models. Engage early with young people.
- Understand that you will work with different things through your life
- Professionals should have more practical experience – a challenge. But it could be motivating to have practical experience.
- Academics should be in the industry for some time – back and forth btw. Academia and industry. Cross-discipline.

Three main take-aways:

1. Life-long learning – both for mastering new tasks and to retain people
2. Deep domain knowledge as well as wide scope understanding
3. Be change willing and have skills to do that.

Topic C: Life-long learning – Session 2

Key questions:

- Twin transformation: digital and green – How do we empower the workforce to take part of the change?
- A crew change is looming – Is the industry prepared?
- Broad sets of skills needed in the future jobs – how do enterprises work to develop the workforce?
- Collaboration with universities for further training and education?
- How does the industry work to retain people?

Perspectives from pre-read report:

- Twin transition: Digital transformation requires new digital skills, collaboration and interaction skills, as well as willingness and capability to change. Green transition and branching out to CCS, offshore wind and other new industries require new skills.
- Companies need to train their employees for changing and new job requirements, which they do to a varying degree. More opportunities appear to be offered in large companies than in small.
- Universities respond to industries' needs by offering further education
- The petroleum industry has not been good at retaining people through down-cycles

New perspectives and comments from group discussion:

- Shift from deep domain job to wider perspective. Important to have the opportunity to new tasks. On-the-job training, cross-disciplinary teams, experience transfer.
- Few work with what they studied – continue change. Need employers that facilitate people development.
- Expensive to train new people – important to retain – need to facilitate people development
- Less loyal young people
- Management that enforce people development – build culture – allow mistakes, allow people to work with new tasks
- External courses need to be offered at different complexity and scope. Also allow shorter courses.
- Need deep domain knowledge as well as broad skills – maybe young people don't want to develop deep domain knowledge
- Renewables very popular. Important to also motivate those that continue within O&G.
- Culture – “always student”. Seek knowledge.
- Need to develop also senior employees. Many 70 year-old are 20 in their mind. Re-programming our mindset.
- Experience transfer – coupling between universities and industry.
- Society thinks “middle age” approach to education: Overlearning early, society pays.
- Need public support to co-pay for long-term education.
- Need variety of challenging task to motivate employees.
- People are busy – difficult to find time for knowledge development
- Need inner drive to succeed in life-long learning
- Create interest early for natural science and mathematics – e.g. invite teachers to learn what industry is doing, tell good stories
- Best way to learn is to teach others – motivate for that with incentives.

Three main take-aways:

1. Management support and ownership – build knowledge culture
2. Need people with deep domain knowledge as well as people with broad knowledge
3. Market imperfections -> Public co-pay also for life-long learning
4. How to create motivation among different people. Some have more inner drive – others need nudging

Topic C: Life-long learning – Session 3

Key questions:

- Twin transformation: digital and green – How do we empower the workforce to take part of the change?
- A crew change is looming – Is the industry prepared?
- Broad sets of skills needed in the future jobs – how do enterprises work to develop the workforce?
- Collaboration with universities for further training and education?
- How does the industry work to retain people?

Perspectives from pre-read report:

- Twin transition: Digital transformation requires new digital skills, collaboration and interaction skills, as well as willingness and capability to change. Green transition and branching out to CCS, offshore wind and other new industries require new skills.
- Companies need to train their employees for changing and new job requirements, which they do to a varying degree. More opportunities appear to be offered in large companies than in small.
- Universities respond to industries' needs by offering further education
- The petroleum industry has not been good at retaining people through down-cycles

New perspectives and comments from group discussion:

- Curiosity – passion to learn. Some are more motivated than other for life-long learning.
- We should be better to engage industry in the education at the universities.
- Retain people until they are at least 67.
- Should be better at engaging industry in the universities.
- Need a system to organize courses at universities to align with industry needs.
- Skilled workers have requirements for courses over time – maybe we need the same for professionals?
- Do we really need to further educate employees? -> Need courses, not necessarily B.Sc./M.Sc..
- Takes time and effort to develop good courses – need clear ideas on which courses to develop and deliver
- Life-long learning is about having new challenges all the time – then you will stay in the company
- Up-scaling, re-training people for new tasks is a tremendous challenge.
- Cyclical – loose people during low-cycles. Suggest grants to people to take courses during down-cycles.
- Need internal courses especially to older employees to understand new technologies.
- Always learning. T-shaped skills: deep domain knowledge and broad understanding.
- Nærings-Ph.D. is a good opportunity for industry.
- At-the-job training most important. But university courses – how are they suited for employees with vocational background?
- How do we match people development with the pace of technology and industry change
- Open courses on-line – e.g. Stanford AI-courses.

Three main take-aways:

1. Better collaboration btw. universities and industry. Takes time and effort to develop high quality courses that align with industry needs.
2. Need new challenges throughout the career to motivate and retain people.
3. Up-skilling of new industry opportunities & match the pace of technology pace -> re-train people is a big challenge

The background of the image is a photograph of ocean waves. The water is a deep, dark blue, and the waves are breaking, creating white foam and spray. The perspective is from a slightly elevated position, looking down at the water. The overall tone is somewhat desaturated, giving it a cinematic or professional feel.

OG21