

Petroleum Transition Pathways in Norway:

How do Norwegian stakeholders envision pathways to net-zero and phase-out for the country's oil and gas sector?

Authors:

David Jordhus-Lier

University of Oslo, davidcl@uio.no

Camilla Houeland

Fafo Institute for labour and social research, cah@fafo.no

Heikki Eidsvoll Holmås

Multiconsult, heikki.holmas@multiconsult.no

Kacper Szulecki

NUPI, kacper.szulecki@nupi.no

Peder Ressem Østring

University of Oslo, pederro@student.sv.uio.no

About this report

The Oil and Gas Transitions (OGT) is an evidence-based programme which aims accelerate just transitions from oil and gas in Denmark, Norway and the UK.

Our Approach:

- **Evidence-driven**, with leading researchers providing credible, academically verified recommendations on scenarios for oil and gas just transitions.
- A **trusted neutral convener**, able to effectively bring pluralistic positions to the table for effective exchange.
- We catalyse action by **empowering** key players in the oil and gas ecosystem with the evidence they need to **develop their own visions**, priorities, and interventions (e.g., campaigning, advocacy, institutional planning, policy design).

This report presents findings from research undertaken by the University of Oslo and Fafo to gather evidence on the state of the oil and gas just transition in the Norway, and to co-create transition scenarios alongside diverse stakeholders from academia, industry, civil society, the financial sector, government, and community-led organisations. The authors strove to engage a representative cross section of relevant stakeholders in the co-creation process. The conclusions herein are the result of the first stage of such process. Further ongoing and iterative engagement, particularly with groups that may have been underrepresented in the first stages of the co-creation process, is intended to continue developing and building upon the research findings presented in this report.

OGT is co-led by Climate Strategies and the SEI, and made possible by the support from KR Foundation and Laudes Foundation. The statements herein do not represent the views of Climate Strategies, SEI, KR Foundation and Laudes Foundations or other members of the OGT consortium.

For more information visit: www.oilandgastransitions.org.

Suggested citation: Jordhus-Lier, D., Houeland, C., Holmås, H.E., Szulecki, K., and Østring, P.R. (2022). Petroleum Transition Pathways in Norway: How do Norwegian stakeholders envision pathways to net-zero and phase-out for the country's oil and gas sector?. University of Oslo, Fafo.

In memory of Magnus Thue, who unexpectedly passed away shortly after taking part in the research exercise presented in this report.

Table of Contents

Executive summary	4
Introduction	5
Section 1: SCENARIOS	8
Pathway I: Towards net-zero by 2050	9
Pathway II: Phasing out oil and gas by 2050	14
Comparing across alternative transition pathways	19
Key differences between net-zero and phase-out	19
Commonalities across the pathways	20
Section 2: POLICY RECOMMENDATIONS	21
Overarching lessons learnt	21
Policy recommendations from the research team	22
Oil and gas transitions during a global energy crisis	23
References	24
GUIDE TO REPORT METHODOLOGY	26
Research protocol	27
Process design for scenario-building	28
Recruiting stakeholders	29
The workshop format	31
Focus group elicitation techniques	32
Data collection techniques	34
Operationalising visions	34
Vision I: Net-zero by 2050	35
Vision II: Phasing out oil and gas by 2050	35
Evaluation of focus group event	36

Executive Summary

In this report, we document how policy makers and representatives of businesses and civil society organisations (including trade unions and environmental groups) have outlined pathway scenarios towards net-zero carbon emissions and a phase-out vision for the Norwegian oil and gas industry. They have developed these two scenarios participating in a focus group based on a so-called 'backcasting' exercise.

There is perceived acceptance for the notion of net-zero emissions by 2050 from social actors involved in the Norwegian oil and gas industry. If this goal is to be reached with a science-based approach, however, deep-seated transformations in the global energy system will be needed, as well as concerted efforts by the Norwegian government and from other social actors. Specific targets for the electrification of offshore installations, the roll-out of large-scale offshore wind power and technologies for capturing, using and storing carbon on the Norwegian Continental Shelf are key milestones in this scenario. The main actors required to take responsibility for this pathway are the Norwegian state, in close tripartite dialogue with labour and capital, but also with institutional mechanisms that ensure the participation of local communities and civil society organisations. The net-zero pathway faces a series of obstacles. Among them are popular resistance to new renewable energy projects, increasing electricity prices and the risk this poses to plans for the electrification of offshore installations.

The other normative scenario presented in this report is the phasing out of all oil and gas extraction activities on the Norwegian Continental Shelf by 2050. This vision lacks the perceived acceptance mustered by the net-

zero target. It is also fair to say that the phase-out scenario presented here is less concrete, less detailed and more problem-oriented in its elaboration. Participants agreed that a complete phase-out of oil and gas extraction by 2050 would likely require market conditions beyond the scope of the exercise and would not be achieved without an active state intervention in the form of a ban decided by parliament, like the one agreed in Denmark in December 2020. The radical policies needed for a national phase-out were seen to carry many risks, not least in the form of a backlash from the public and challenges for the labour market. A just transition towards an oil and gas phase-out would therefore require active labour and social policies.

Finally, based on the scenario exercise, the research team who carried out this study has made broad policy recommendations for stakeholders and decision-makers in the Norwegian oil and gas industry. These include adopting the approach used for this research for climate and energy transition policies by placing the debate along clearly defined visions and timelines. The Norwegian government needs to engage in tripartite relations in all their breadth and possibly expand the scope of this co-operation to include other social actors. Moreover, the government needs to i) form a coherent transformation narrative, ii) establish unambiguous transformation goals that allow the concrete operationalisation of targets and standards, and iii) use the climate partnerships it announced with relevant industries to enter into mutually binding obligations around transition policies. Social partners should also actively develop and propose measures and interventions to support these transformational goals.

1. Introduction

Seen from a global perspective, Norway is a small player in the oil and gas market, as its production covers about 2% of the global crude oil demand and approximately 3% of that for natural gas.¹ However, Norway is the third largest gas exporter in the world, behind Russia and Qatar, and it supplies between 20 and 25% of the gas consumed in the European Union.² This share has increased in the aftermath of Russia's invasion of Ukraine, in February 2022, and as more economic sanctions are considered, Norway's contribution to the European energy system will only increase.

The petroleum industry is a major polluter as it makes up 28% of Norway's total greenhouse gas (GHG) emissions, the second largest contributor after transport, and this only considers emissions occurring on Norwegian territory, not life-cycle emissions. However, the oil and gas sector is also a major source of national wealth and a pillar of the country's robust welfare state. Almost all the oil and gas produced on the Norwegian Shelf is exported. As of 2021, the oil and gas sector represented 14% of Norway's GDP (Gross Domestic Product) and 41% of exports. This makes oil and gas the most important export commodities of the country. Depending on how we define it, between 150.000 and 200.000 people – or up to 6% of the national workforce – work directly or indirectly in the petroleum sector³. Dependence on oil and gas for revenues and employment is especially pronounced in Western regions such as Rogaland, but the impact of a rapid transition would be felt throughout the country (Karlsen 2022; Hernes, Erraia & Jose 2021).

On top of socio-economic realities, there is also the realm of culture and symbols. Oil is

important for Norway's national identity, as the titanic effort that led to the creation of the industry, starting from exploration to setting up production facilities (rigs, platforms and pipelines), by daring industrial pioneers on the cold and stormy waters of the North Sea is an understandable source of pride for many.

Climate-driven discussions about the oil and gas transition, decarbonisation and possibly even phase-out are therefore raising concerns and sparking political controversies. Were Norway to stop producing oil and gas within a couple of years, the rapid removal of these resources would create a trade imbalance with significant macroeconomic effects on the exchange rate and thus on both monetary and fiscal policies. As the state revenues from the sector are significant⁴, every citizen in Norway would be affected, not only vulnerable groups.

The significant reduction over the years of the carbon footprint related to the extraction and production of Norway's vast oil and gas resources (Masnadi et al. 2018) and good CO₂ storage capacity mean that the Norwegian Continental Shelf is well positioned for the energy transition. Moreover, strong social institutions are considered a further reason why a country like Norway should lead in the phasing out of fossil fuels (Muttitt and Kartha 2020). However, the reduction of domestic greenhouse gas emissions, the most important measure of climate action, has been modest if not marginal. As observers recently noted, over the last three decades Norway has cut its emissions by 3.2%, but over the next three decades it needs to "cut just about everything" and this "will affect all areas of society" (Mazzucato and Kattel 2021: np).

¹ Norsk petroleum, 'Exports of oil and gas', Norskpetroleum.no. Accessed 26 June 2022, <https://www.norskpetroleum.no/en/production-and-exports/exports-of-oil-and-gas/>

² Ibid.

³ Norsk petroleum, 'Employment in the petroleum industry', Norskpetroleum.no. Accessed 11 May 2022 [Employment in the petroleum industry - Norwegian petroleum.no \(norskpetroleum.no\)](https://www.norskpetroleum.no/en/employment-in-the-petroleum-industry-norwegian-petroleum-no-norskpetroleum-no)

⁴ 19% of the state budget, according to the Norwegian government's own website: <https://www.regjeringen.no/no/statsbudsjett/2022/statsbudsjettet-2022-statens-inntekter-og-utgifter/id2873448/>

As the recent Production Gap Report (United Nations Environment Programme, 2021) attests, the global emissions reductions targets capable of stabilising dangerous climate change are increasingly incompatible with the extraction of fossil fuels. In this context, the Norwegian political and business narrative is visibly changing. Norway's 2021 general election campaign, hailed as the first "climate vote" in Europe, galvanised public debate by making climate pledges and the future of oil and gas key topics for discussion. This forced all political parties and interest groups to take a stance. This also opened a discussion on whether the primary political objective should be to enforce a decline in oil and gas production or to manage climate-related economic risks (Szulecki et al. 2021).

The 2021 general election which saw the transfer of power from the centre-right government led by the Conservative Party to a centre-left coalition consisting of the Labour Party and the Centre Party, created new opportunities for Norway's gradual transition away from oil and gas. But change is unlikely to be quick. The new prime minister and leader of the Labour Party, Jonas Gahr Støre, said that while his government will oppose opening new areas for oil and gas exploration, "it is wise for Norway to continue exploring" in developed areas where infrastructure is already in place.⁵ Our earlier research identified two coalitions of political actors: one siding up with the interests of the industry and the other focusing on the need for climate action (Szulecki et al. 2021). Following the election, the pro-industry coalition is stronger, boasting 136 seats in parliament against 32 of the pro-climate coalition. However, internal dynamics within the Labour Party, which secured the most seats, alongside the pivotal role of the pro-environmental Socialist Left and other parties whose support is needed for the minority

government, may unlock opportunities for making a start on a gradual transition in the sector.

It is important to note that a rapid phase-out of Norwegian oil and gas production over the coming decade or two is not a matter of transferring investments and workforce from one sector of the economy into others. It is about transforming the entire Norwegian economy. This is certainly a challenge, but less developed countries facing deep transformations due to the looming climate crisis may ask: if Norway is not ready to face this challenge, which country would? Norway has a key asset in its sovereign wealth fund, which can work both as a 'rainy-day' relief and a trans-generational public saving resource. The transfer of funds from the petroleum sector currently depends on the production level and the oil price. But the return on investment already represents the main share of the fund's total value⁶ and thus also the basis for the annual transfer to the state budget. This reduces the importance of the oil and gas sector for the government's fiscal policy, a significant consideration given that the Norwegian public sector represents about 50% of GNP (SSB 2020).

A long-term strategy for the phasing out of oil and gas requires upfront investments in alternative activities. This means moving financial resources out of a well-known and highly profitable sector and into an unknown and most likely less profitable one. A gradual decline in investments in oil and gas and a gradual increase in public support for new green(er) activities is more likely. For that reason, companies in the Norwegian energy sector and policy makers have identified areas where the country's competitive advantages can be used and where the current oil and gas workforce could be channelled to (Hedegaard et al. 2016). Most importantly, the national

⁵ 'Ap sier nei til store leteoperasjoner på norsk sokkel', Nettavisen, 8 September, accessed 13 May 2022, <https://www.nettavisen.no/nyheter/ap-sier-nei-til-store-leteoperasjoner-pa-norsk-sokkel/s/12-95-3424176687>

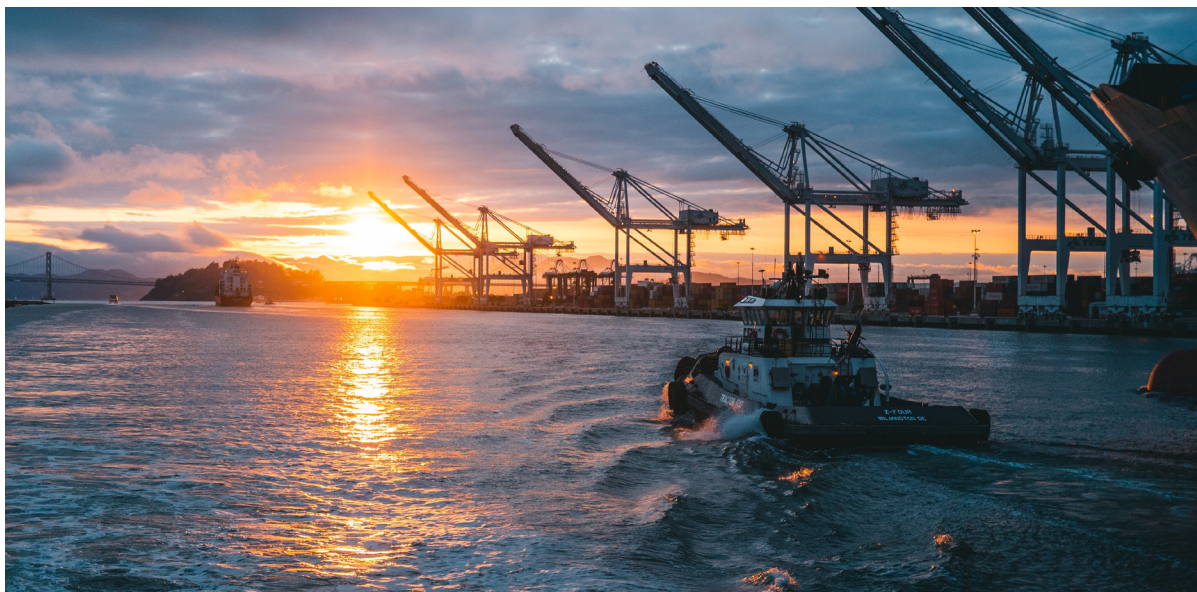
⁶ About the fund', Norges Bank Investment Management, accessed 2 August 2022 <https://www.nbim.no/en/>

oil and gas champion, Equinor, is expanding investment in offshore wind power, an attempt to utilise the existing know-how from shipping and the construction of oil platforms, as well as the country's low-emission aluminium production, in a new and cleaner industry.⁷ The Norwegian government's financing of the first industrial carbon capture and storage (CCS) project in the 2021 budget is a step in the same direction. So are government plans to establish value chains for blue and green hydrogen production by 2030, possibly driven by a state-owned hydrogen company.

As noted in our 2021 background report, Norway's debates and efforts for a 'just transition' are limited and there is an urgent need for dialogue not only within the sector, but also across the divide between pro-industry and pro-climate interest groups (Jordhus-Lier & Houeland 2021). The discussion may develop with the current government plan for a Just Transition Advisory Council⁸ (Karlsen 2022). At the time of writing, this council seems

to constitute a traditional 'social dialogue' process consisting of labour, employers and government, without participation from environmental organisations.

This report presents findings from a multi-stakeholder workshop held in February 2022. We will present two normative scenarios for the future of the Norwegian oil and gas industry co-produced with stakeholders in the sector. In the last section, the research team will reflect on the exercise and formulate a set of policy recommendations. A detailed description of the methodology utilised for this research is provided in the Annex.



Reference Oil and Gas of Norway. Photograph purchased from Envato Elements.

⁷ Equinor. 'Offshore Wind'. Accessed 16 May 2022 <https://www.equinor.com/energy/offshore-wind>

⁸ The Labour Party and Centre Party government platform, "Hurdalsplattformen". Regjeringen.no, 14 October 2021, Accessed 16 May 2022 <https://www.regjeringen.no/no/dokumenter/hurdalsplattformen/id2877252/>

Section 1: SCENARIOS

On 1-2 February 2022, 18 stakeholders joined the research team for a two-day scenario exercise. Among the participants there were representatives of a range of perspectives and positions in the Norwegian oil and gas industry, including politicians and civil servants, industry actors, environmental campaigners and trade unionists. The research exercise involved two scenario-building processes where participants traced a defined end point and worked the steps backwards in time towards the present. This method is known as 'backcasting' (Dreborg 1996). The two end targets will be referred to as *the net-zero pathway and the phase-out pathway*.

Net-zero in the context of the Norwegian oil and gas industry means a balance between greenhouse gas emissions released into the atmosphere and their removal by the year 2050. Measures in these pathways must comply with advice from the Science Based Targets initiative (SBTi)⁹ and include Scope 1, 2 and 3 emissions¹⁰ from the oil and gas industry. Participants were also asked to include both short-term (5-10 years) and long-term (by 2050) targets in their scenarios. The exercise included a break-out group specifically tasked to discuss 'electricity justice' and its social implications. Electricity justice in the Norwegian context refers to potential conflicts of interest related to electrical hydropower as a scarce resource. The Norwegian government's

ambition to electrify offshore installations with land-based electricity is putting pressure on domestic electricity resources, and this conflict is intensified by the European energy price crisis of 2021-2022.

The phase-out vision entails an end to the extraction of all hydrocarbons, including for use in petrochemical industries and blue hydrogen production. A phase-out by 2050 would imply a politically driven acceleration of an already projected decrease in employment and value generation from the Norwegian oil and gas industry. Participants in the workshop were encouraged to focus on the 'just transition' implications of this accelerated phase-out, including issues of employment security, local economic development and skills management. The exercise included a break-out group specifically tasked to discuss the social consequences of skill transfers in Norway's energy production.

In this section, the two pathways will be described in three stages: i) setting milestones indicating the actions and measures required for achieving the net-zero and phase-out visions, respectively, by 2050; ii) identifying key actors and responsibilities required to achieve these milestones; and iii) discussing opportunities and challenges or barriers at crucial points along the timeline.

⁹ The Science Based Targets initiative (SBTi) is a collaboration between CDP, the United Nations Global Compact, World Resources Institute (WRI) and the World Wide Fund for Nature (WWF), devoted to establishing criteria for emissions reduction for private companies: <https://sciencebasedtargets.org/>

¹⁰ The Greenhouse Gas Protocol (GHGP) divides emissions into three scopes: Scope 1 includes all direct GHG emissions owned or controlled by the company (including gas turbines for offshore oil operations), Scope 2 covers indirect GHG emissions from consumption of purchased electricity, while Scope 3 covers other indirect emissions (also known as value chain emissions) and, crucially for the oil and gas industry, includes emissions from the end use of petroleum products.

Pathway I: Towards net-zero by 2050

- Net-zero pathway enabled by perceived acceptance for the net-zero vision among mainstream political parties, companies and trade unions
- Strong faith in technological solutions and a market-driven trajectory among private sector representatives and mainstream political actors
- Political commitment crucial in early phase, but also dependent on detailed regulation and specific industry targets
- Pathway aligned with the principles of just transition, dependent on political priorities and tripartite processes
- Reliance on mainstream demand-side economics and transition technologies, in particular offshore wind and carbon capture and storage (CCS)
- Offshore wind capacity necessary to deal with national electricity scarcity caused by electrification of petroleum installations offshore
- Pathway for the oil and gas industry part of a broader transition founded on circular economies, renewable energy systems and democratic engagement.

The discussions about the net-zero vision were characterised by a sense of haste, but also by the feeling that participants were 'moving in the same direction'. There was general agreement on what was required in the short and long term, but not on the pace

of the transition. Many participants were concerned that several short-term goals would be unpopular and cause political controversy. In Figure 1, a graphic artist illustrated the sentiment throughout this exercise.



Figure 1: Illustration by Hands / Hanne Berkaak. Impression of the net-zero vision (1)

Milestones

Most of the milestones identified in the focus groups rely on political decisions. An important premise for reaching the net-zero vision is that all the existing and future developments of the Norwegian oil and gas industry comply with the goal of net-zero emissions by 2050. In this regard, the criteria for interpreting indirect emissions and how to compensate for them must be unambiguous. By 2030, a 50% reduction in actual CO₂ emissions will be enabled by the *electrification of offshore installations*¹¹. By 2050, Scope 1 emissions will be reduced by more than 95%.

As new oil and gas developments are expected to stall after 2026¹², a strong state-coordinated industrial package for the green transition is of vital importance for value and employment creation. The participants in the exercise outlined two parallel and mutually dependent paths: the roll-out of large-scale renewable energy production offshore and the ability to capture and store carbon (CCS)^{13,14} on the Norwegian Continental Shelf. We have labelled these *the offshore wind pathway and the CCS pathway*, illustrated in Figure 2.



Figure 2: Illustration by Hands / Hanne Berkaak. Impression of the net-zero vision (2)

¹¹ This planned reduction of Scope 1 emissions should be compared to 2005 emissions.

¹² 2026 is when the effects of the oil tax package passed in 2020 during the Covid-19 pandemic are expected to end.

¹³ The International Energy Agency defines CCUS technologies as the “capture of carbon dioxide (CO₂) from fuel combustion or industrial processes, the transport of this CO₂ via ship or pipeline, and either its use as a resource to create valuable products or services or its permanent storage deep underground in geological formations”. In the context of the NCS, usage could include [something missing?] <https://www.iea.org/fuels-and-technologies/carbon-capture-utilisation-and-storage>

¹⁴ The research institute SINTEF argues that “the storage capacity within the geological layers on the Norwegian Continental Shelf gives Norway great opportunities to create value and new green employment by realizing CCS”: <https://www.sintef.no/en/sintef-research-areas/ccs/>

Achieving the milestones in the offshore wind pathway relies on the government's ability to plan, license and develop wind power capacity in the North Sea, the Norwegian Sea and the Barents Sea. Around the time of the focus group workshop, the government unveiled proposals for developing 3 GW wind capacity in two locations in the North Sea (Utsira Nord and Sørlige Nordsjø II). The offshore wind pathway created in our exercise is based on the quick realisation of these initiatives and the successive upscaling of capacity to 5, 10, 25 and 50 GW by 2030, 2035, 2040 and 2050, respectively.¹⁵ A key premise in the offshore wind pathway is that Norway spearheads the development of floating offshore wind turbines,

a more advanced wind power technology that is still in its infancy but which Equinor expects to be profitable by 2030 through scale and industrialisation.¹⁶ The key milestones in the offshore wind pathway are summarised in Figure 3. Important milestones in the mid-term include the setting up of so-called 'hybrid cables'¹⁷ to link the European energy market (not part of the first phase of development) and the achievement of a net flow of electricity to the mainland. The break-out group tasked with discussing 'electricity justice' suggested requiring that all electrification projects be based on offshore wind by 2025, with support from a state-managed transition fund.

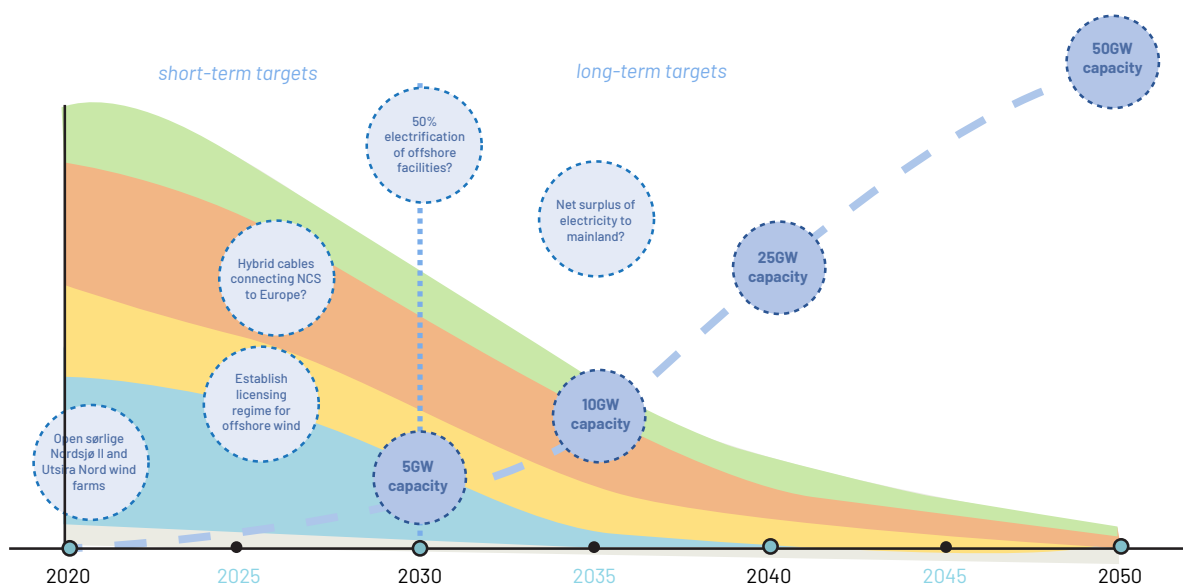


Figure 3: The offshore wind pathway

¹⁵ This is also reflected in a recent policy intervention by Konkraft (a collaboration arena for the petroleum sector, with employers' and employee associations), which set an ambition of 40-60GW capacity in 2050: <https://konkraft.no/aktuelt/innsjill-til-tilleggsmelding-om-havvind/>

¹⁶ See Equinor's own web page: <https://www.equinor.com/energy/floating-wind>

¹⁷ Hybrid cables in this context refer to a system of cables connecting an offshore wind park to a European electricity market, as well as to the Norwegian one. A more detailed explanation in Norwegian can be found here: <https://blogg.sintef.no/sintefenergy-nb/hybridkabel-enkelt-forklart/>

Milestones in the net-zero exercises were linked to the ability to capture carbon in various industrial processes and store it on the Norwegian Continental Shelf (NCS). These are presented in Figure 4. In the net-zero vision, CCS allows for the production of blue hydrogen¹⁸ and can contribute to negative emissions. At the time of the focus group workshop, the Norwegian CCS project Northern Lights had immediate plans for the storage of 1.5MT CO₂ annually. Its subsequent roll-out should

increase the annual storage capacity to 30-35MT by 2035, with further expansion foreseen but not quantified. The realisation of this pathway entails a set of industrial mid-term goals establishing full value chains and turning the NCS into a functional depository for CO₂ from industrial processes across Europe. In this scenario CCS will enable alternative uses of hydrocarbons in the form of blue hydrogen and ammonia.

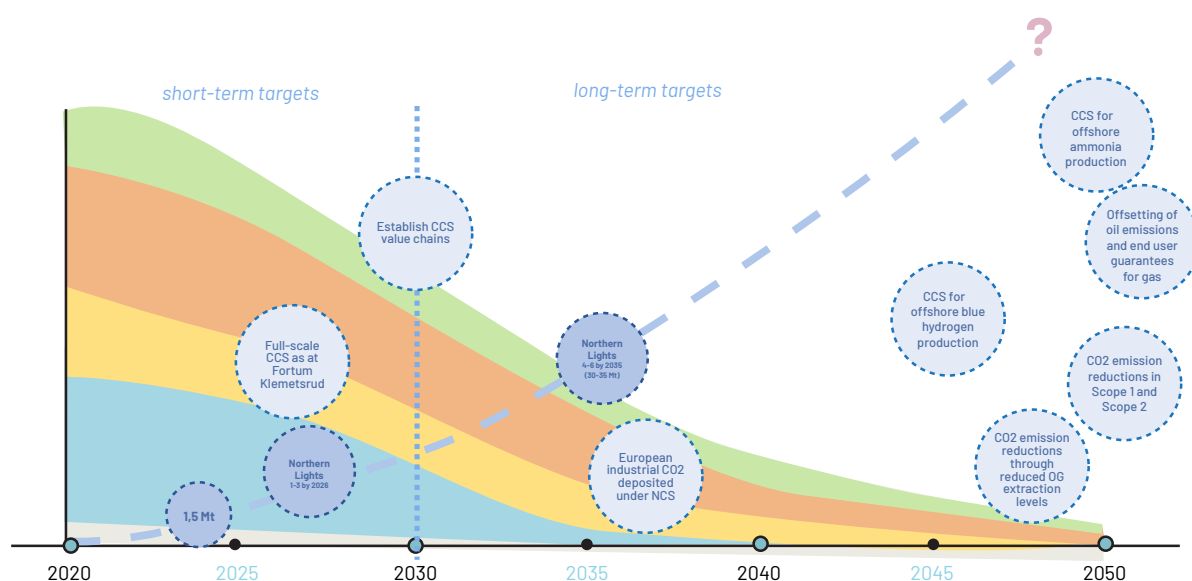


Figure 4: The CCS pathway

Actors and responsibilities

The main actor identified in both pathway scenarios is the Norwegian government. Many participants emphasised that this was partly the result of the way the exercise was designed. Treating the Norwegian oil and gas industry in isolation from the global energy market was seen as too hypothetical and therefore problematic. Some participants stressed that several milestones relied on circumstances beyond the mandate of Norwegian political or corporate actors. Still, there was broad agreement on the active role of the state required to facilitate and regulate emissions reductions and energy transitions to

achieve the net-zero vision. The government's key responsibilities identified in this scenario include:

- Creating a positive net-zero vision with a strong narrative for the transformation of the energy industry.
- Setting net-zero targets for 2050, including detailed regulation.
- Setting targets, incentivising and granting licences to activities replacing oil and gas.
- Facilitating skills development and incentivising the higher education sector to meet new industry demands.

¹⁸ Blue hydrogen refers to the production of hydrogen using natural gas and refinery fuel gas with CO₂ emissions from the process captured and stored.

- Enabling power surplus through effective concession processes and risk mitigation facilities to accommodate for industrial development with a net-positive flow of electricity onshore from offshore wind.
- Demanding zero direct Scope 1 emissions from new oil and gas activities.
- Imposing an increasingly higher CO₂ tax and possibly a transition fee for the oil and gas industry to finance the transformation.
- Appointing a transition commission to plan the lowering of oil and gas output, with a particular focus on the most affected regions.
- Stress-testing future oil fields towards climate risk and the 1.5°C global warming limit set in the Paris Agreement.
- Under this scenario, the bulk of government activities for the transition would have to be executed in the 2020s.

Responsibilities were also identified for the business sector. These include:

- Facilitating training and education to build the skills for both youth and existing workers in oil and gas and the supply chain for CCS and offshore wind
- Offering early retirement for oil and gas workers unable to obtain the required skill-

set.

- Reducing by 50% by 2030 direct Scope 1 emissions in oil and gas compared to 2005 through electrification measures.
- Gradually developing significant amount of offshore wind capacity aiming at 50 GW by 2050.
- Gradually developing the hydrogen value chain to achieve significant production and exports of both blue and green hydrogen by 2050.
- Gradually developing 10 CCS facilities of the size of “Northern Lights” by 2050.
- Promoting necessary R&D to reduce the cost of offshore wind, hydrogen and CCS.

For all important transition activities, participants in the workshop highlighted tripartite cooperation as the preferred way of establishing common goals and roadmaps. An historical precedent informing the discussions was the public resistance against the large-scale roll-out of onshore wind power in the 2010s, with participants at pains to chart a way forward that would not repeat this policy failure.¹⁹ Learning from this popular backlash was considered key to ensure the upscaling of future clean energy industries. Therefore, stakeholder inclusion will be crucial to secure support for new offshore wind projects.

Barriers and opportunities

Despite the broad agreement around the key milestones in the net-zero pathway, concerns were raised about critical barriers to the realisation of the vision. Many of these concerned public support and political resistance to the necessary short-term targets. In this regard, it is important to take into account that the exercise took place during a winter marked by historically high electricity prices that caused unrest among Norwegian consumers and the looming Ukraine crisis exacerbating energy insecurity across Europe.

Resistance to new renewable energy projects and resistance to high energy prices were critical barriers identified in the scenario. The lack of government capacity to deliver regulatory processes that could speed up renewable energy development was also seen as worrying. The planned electrification of offshore platforms powered by onshore renewables and the consequent prospects of an onshore energy deficit by 2026 would lead to higher consumer prices and a lack of competitive advantage for the Norwegian

¹⁹ After a roll-out phase in the 2000s and 2010s, where onshore wind farms became part of Norway’s climate strategy, between 2019 and 2021 local and national protests halted onshore wind developments. Inadequate licensing processes and lack of local participation and transparency were highlighted as part of the problem, as was a general concern for the natural environments (Vasstrøm & Lysgård 2021).

industry. Another key concern was *increased unemployment*, expected in the oil and gas industry from 2025-26, although this will be dependent on the evolution of oil and gas prices in the global market. While dominant corporate actors such as Equinor have signalled the intent to incorporate indirect downstream emissions (Scope 3) in their net-zero objectives, another barrier to the transition was the *lack of a policy consensus* among the public and political and administrative actors on how to implement a net-zero regulatory framework for oil and gas producers.

Alongside such barriers, a number of opportunities emerged in the scenarios. One was the *increased understanding* in public opinion and among key social actors of the need to take action and support renewable energy generation capacity. The war in Ukraine

reminded how important Norway is as a gas exporter in the short term and illustrated the vulnerabilities of fossil fuel-dependent energy systems worldwide. Placing strict limits on the indirect emissions of oil and gas activities in a net-zero pathway was also seen as an opportunity to create an *internationally competitive supply industry in the future*. In addition, the high earnings from Norwegian oil and gas, which have continued to soar following our workshop, were considered an opportunity to invest in green industrial initiatives. For the labour market, a *successful transfer of skilled workers* into renewable energy production opens the possibility to simultaneously build new, green industries and phase out extractive activities. Benefits are also available in the *roll-out of energy efficiency measures*, as well as decentralised production of solar power and energy from other renewable sources.

Pathway II: Phasing out oil and gas by 2050

- Deep-seated reluctance to accept a planned phase-out among dominant social actors
- Radical supply-side policies for the oil and gas industry required to achieve a national phase-out (a ban on extraction by 2050 decided by parliament is an example)
- A series of dilemmas for a socially just transition, in particular regarding employment and skills, requiring political priorities and tripartite consultations
- Difficulties to ensure people believe in the vision and secure legitimacy in public opinion

Despite initial scepticism, all groups did take part in the oil and gas phase-out exercise. Civil servants and politicians were reluctant to see the phase-out vision as a political premise and found the role-play exercise to outline a way forward normally supported by 'oppositional green parties' particularly challenging.

Representatives of unions and environmental organisations struggled to agree on the premises of this exercise too, while business actors had fewer reservations.

Most of the stakeholders taking part in the workshop were openly sceptical about the

idea of an end-date for Norwegian oil and gas activities. The reasons were different, but participants from political parties, oil companies and industry unions were reluctant to support the radical supply-side policies needed for a national phase-out. They emphasised the sense of panic that would be created in the short term, which could lead to both political turmoil and increased extraction levels.

The discussions highlighted areas of concern, such as the risk of losing employment or maintaining well-paid, decent job opportunities in new, emerging sectors. Most of these concerns were also manifest in the net-zero pathway, but they were clearly exacerbated by the just transition dimension in the phase-out pathway (see Figure 6 for an overview). The graphic artist portrayed the phase-out vision in Figure 5.



Figure 3: Illustration by Hands / Hanne Berkaak. impression of the phase-out vision (2)

Milestones

None of the participants believed oil and gas activities in Norway will stop by 2050 without a ban on extraction decided by parliament.²⁰ Other policies, including a steep CO₂ tax increase and an end to new licenses, were considered as complementary measures. Discussions focused on whether to ban all new licenses or continue allowing exploration in predefined areas to optimise resources. Participants assumed that an extraction ban from 2050 would alter petroleum extraction levels in two ways: a likely increase in the

short term (unless the government sets a production cap) and a rapid and unpredictable decrease towards the end date. In other words, business strategies will change from long-term development to short-term resource optimisation towards the end date. Both these developments pose challenges for a just transition. Many of the discussions in the exercise therefore focused on how social actors could meet these challenges in a way that protects workers and local economies.

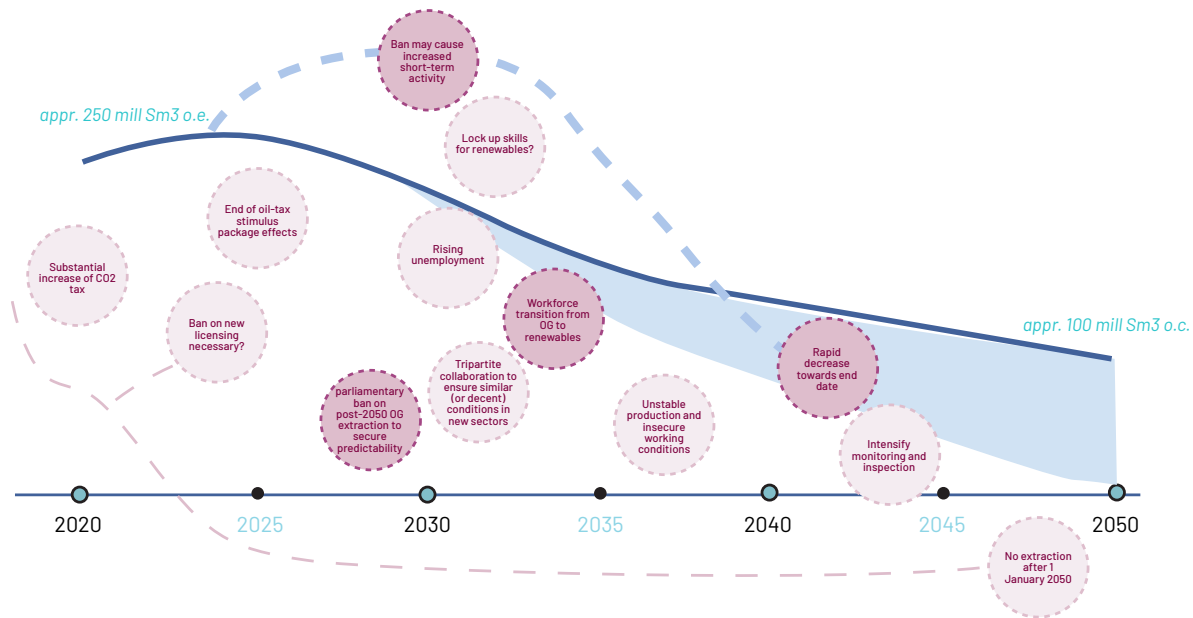


Figure 6: Areas of concern in the phase-out vision

Another premise of the exercise was that unemployment caused by a managed oil and gas phase-out would be partially or wholly compensated by new jobs in new industries, even though renewable offshore energy

production requires significantly more labour during construction than operation. However, concerns were raised on whether the conditions of these new jobs would match those in the petroleum sector.

²⁰ In December 2020, the Danish Parliament agreed to ban new exploration and end oil and gas production in the Danish North Sea by 2050.

Actors and responsibilities

The phase-out vision can only be realised via active state intervention, participants argued. The required short-term measures are all political in nature and rely on a government and a parliamentary majority willing to intervene and set conditions for Norway's most profitable economic sector. To ensure such a radical change is supported by civil society, several participants suggested the establishment of a national transition commission that would analyse social implications, identify skills requirements and assess employment needs.

From an industrial policy actively promoting extractive activities, with the stimulus package passed in 2020, during the Covid-19 crisis, aiming at further increasing extraction until 2026, the policies required for the phase-out vision would force production levels onto a very different path from the mid-2020s and onwards, as shown in Figure 12. The combined challenge of phasing out fossil fuel extraction while establishing large-scale renewable energy production in maritime areas led some groups to suggest new names and mandates for the ministries, directorates and inspection authorities currently governing the petroleum industry. They typically recommended making specific reference to the ocean or to energy production.

Many also stressed that labour and social policies should be radically transformed to ensure that a managed phase-out would happen in ways that are socially acceptable.

Both sides of the table in the industrial relations system should be actively taking part in the shaping of these policies (tripartite and bipartite relations), with references made to the German Coal Commission and other just transition commissions.

Several participants highlighted the importance of the education system to build the skills for the transition. The break-out groups discussed the role of higher education, vocational training and lifelong learning in a phase-out scenario. They identified skills in environmental sustainability, digitalisation and the ability to adapt education to individual needs as central components of an upgraded talent policy. Some suggested that regional industrial clusters should cooperate to establish new higher education programmes specifically designed for future employment needs. While trade unions and employer associations are seen as important actors in this process, some participants stressed that a managed phase-out would require industrial relations partners to become more active and revise their mandates in line with Norway's climate ambitions.

High expectations were also directed towards oil and gas companies and the emerging renewable energy sector. Operators would be required to loyally adjust to the new policy framework and to rapidly increase the share of green activities in their investment portfolios. The supply chain would be expected to develop transition skills in order to meet new demands from clean energy industries. Moreover, both the declining petroleum sector and nascent industries such as wind power, CCS and battery production were expected to maintain the high employment and health and safety standards currently in place for oil and gas. Robust industrial relations and more labour and safety inspection will be necessary to secure this aspect of a just transition.

Barriers and opportunities

All three tables were eager to stress that the feasibility of the phase-out vision depends on market conditions beyond the scope of the exercise, including electricity and gas prices, as well as carbon prices (taxation) in competing economies. Nevertheless, participants were willing to discuss the opportunities of this scenario. These included, for instance, the potential for re-purposing offshore installations and infrastructure, plugging and abandoning wells, decommissioning and recycling platforms as a transitional niche for the supply and drilling industry, although the exact scope of these options remained unclear. Figure 7 captures the ambivalence of these ambitions.

As indicated above, many of the barriers identified in the discussion were related to the expectation that a managed phase-out would cause the combined problems of a boom in production volumes driven by panic around 2030, followed by an *uncontrolled collapse in activity* in the years leading to the extraction ban.

A shift from planning for the highest extraction rate in a field's possible lifespan to the highest extraction rate by 2050 would provide a different rationale for both government and business actors. Participants mentioned the risk of using public funds to make poor investment decisions under such conditions. The *time around 2030 was clearly identified as a critical point* in the phase-out scenarios. Without strategic governance, a ban on extraction could lead to an increase in production that increases fossil fuels supply, endangers Norway's ability to meet its 2030 climate goals and locks in skills and investments that could otherwise benefit the development of new industries. An opposite situation would arise if production levels dropped too quickly and new employment opportunities were unable to compensate for rising unemployment and skill losses. Participants in the workshop argued for social dialogue mechanisms highlighting the opportunities of 'the Norwegian industrial model', with high labour organisation participation, counter-cyclical state interventions and welfare state cushioning.



Figure 7: Illustration by Hands / Hanne Berkaak. impression of the phase-out vision (1)

Representatives from unions and environmental organisations expressed concern that offshore health, safety and environmental (HSE) standards might deteriorate exponentially towards a production deadline, since investments in maintenance would be kept to a minimum. Therefore, they proposed to accompany a 2050 phase-out with an increase in official supervision and strict demands for upkeep and HSE standards,

in line with the principles of the just transition.

For all three groups, however, the most significant threat to the phase-out vision was the risk of a *political backlash from public opinion*, with short-term efforts to embark on such a pathway undermined by increased polarization and ultimately social conflict and unrest.

Comparing alternative transition pathways

In conclusion, the two pathways at the centre of the backcasting exercise generated some similar responses and revealed some important contrasts that we will briefly discuss in the next sections.

Key differences between net-zero and phase-out

The most important difference between the net-zero and phase-out vision was that the oil and gas industry embraced the net-zero vision as part of their licence to operate, while the phase-out scenario was perceived as leaving no space for existing and derived business models, such as for blue hydrogen and ammonia production. Participants in all tables hence rejected the phase-out vision.²¹ The common understanding in national mainstream politics is that 'what is good for the oil and gas industry is good for Norway' (see, for instance, Mildenerger 2020; Sejersted 2002). A scenario that is unacceptable to the oil and gas industry is therefore not acceptable to mainstream politics.

A net-zero scenario is based on *mainstream demand side economics* enforcing an internalisation of market failures (cost of pollution to society) on the producer, leading to the development of net-zero and green transition technologies. The phase-out scenario, on the other hand, promotes *supply side policies* considered by mainstream politics to have high negative economic impacts for the country and little impact on the global climate, as Norwegian gas is believed to be replaced by other producers (an issue hotly debated in the national climate policy discourse). As the phase-out-scenario is considered the most state interventionist option, the state should take a stronger role in the transformational policies for both businesses and employees.

²¹ It is important to stress that several organisations and political parties in Norway do have clear phase-out visions for the Norwegian oil and gas industry, as documented in our previous report (Szulecki et al. 2021).

Commonalities across the pathways

Both scenarios are based on a major drop in employment and revenues from oil and gas activities by 2050. Oil production is projected to decline by about 65% in 2050 compared to today's levels, according to the 2021 White Paper describing Norway's future economic perspectives ("Perspektivmeldingen"). The difference between a further drop to zero production in 2050 is after all a lesser change than the expected drop of about 65%, acknowledged by both industry and government agencies.

The focus group identified for both scenarios a strong need for short-term, state-driven transition initiatives in the current decade, in particular the setting of targets and incentives

for offshore wind and CCS. Both scenarios differ from today's business-as-usual option and leave a role for the state in developing criteria for either a 2050 net-zero target (Scope 1, 2 and 3) or an oil and gas phase-out.

It is important to emphasise that the projected decline in production towards 2050, that all participants in the workshop seemed to acknowledge, is yet to be adopted by mainstream politics and the broader public. In addition, projections for Norwegian oil and gas development have usually fallen short of actual production. Current projections also remain uncertain as they depend on expected oil prices.



Reference Oil and Gas of Norway. Photograph purchased from Envato Elements.

Section 2: POLICY RECOMMENDATIONS

In this section, the research team reflects on the scenario co-production exercise, highlighting lessons learnt and formulating policy recommendations that are applicable in the Norwegian policy context as of the summer

of 2022. These policy recommendations reflect the judgment and opinion of the research team and cannot be attributed to the participants of the backcasting exercise.

Lessons learnt

One of the results of the focus group was that the backcasting method, and the insistence on connecting broader policy debates with a concrete timeline, was very productive. Ideally, the Norwegian policy discourse should make a habit of connecting climate and energy transitions with clearly defined visions and timelines. The ongoing attempts to integrate arguments for a short-term increase in natural gas exports due to the European energy crisis resulting from the war in Ukraine with long-term plans for an energy transition on the Norwegian Continental Shelf exemplify this imperative.

Secondly, the short-term goals and milestones suggested in these visions can only be achieved through government decisions and political regulation. While many stakeholders held firm beliefs in market mechanisms as the key driver to phase in a new energy system (and hence phasing out petroleum extraction), these long-term goals rely on regulation and active state investment in the short term. As none of these interventions are uncontested, the role of the state in the oil and gas transition must continuously be subject to democratic debate.

Thirdly, the pace required for these transition processes and the enormity of the change mean that the normative scenarios presented

in the research – and any alternative scenarios presented in the realm of Norwegian realpolitik – carry a huge risk of democratic deficit and public resistance. A just transition for the Norwegian oil and gas industry must therefore be based on participatory processes that include vulnerable communities and the affected workforce, and which is based on tripartite industrial relations, possibly through novel institutional arrangements.

A fourth note concerns the somewhat artificial boundaries that were placed on the exercise by a case study focusing on a specific country, Norway, although the national oil and gas industry is highly integrated in global markets. While the backcasting technique overcame some of the temporal constraints and the short-termism often impacting transition conversations, it was fraught with its own spatial contradictions. Several participants stressed the need to “lift the conversation” and reflect on the transnational dimension of the net-zero and phase-out visions. Some of these caveats will undoubtedly be addressed through the research project, which focuses on the North Sea region, and future plans for cross-country dialogue. But a truly global outlook on oil and gas transition pathways would require designing a research that transcends the regional limitations of this study.

Policy recommendations from the research team

Which steps can the Norwegian government and key social actors take to effectively develop transition pathways for the oil and gas industry? The research team has formulated four concrete recommendations:

1) The government should establish unambiguous transformation goals. These will enable the setting of clear milestones, standards and regulations for all companies operating on the Norwegian Continental Shelf, through a tripartite approach.

2) The government should take responsibility for and ownership in forming a transformation narrative, meaning a coherent story of change over the course of a well-defined timeline that is communicated to the public and that can get support from key social actors.

- For the petroleum industry in particular, developing such a narrative would entail operationalising the mantra “develop, not wind up” (Norwegian “utvikle, ikke avvikle”) in ways that are compatible with the targets of the Paris Agreement.

- This narrative should be developed in close tripartite dialogue, a process that should also explicitly engage with other groups, such as environmental organisations, local communities and other relevant stakeholders to ensure long-term legitimacy and engagement. A commission with broad representation could be appointed to deliver a report establishing common foundations for this dialogue.²²

3) The government plans for industry partnerships and mutually binding agreements with social partners²³ should be **firmly based on a just transition framework**. These initiatives should be founded in the tripartite system and include in their scope:

- clear targets for CO₂ cuts in petroleum production (scope 1, 2 and 3), including clear criteria and regulations on how to achieve net-zero emissions, taking into account (scope 3) emissions from oil and gas consumption.

- a roadmap for sufficient renewable energy production to avoid conflicts with energy-intensive, land-based industries and robust long-term investments in transformational technologies such as offshore wind and CCS

- a zero-emission maritime sector, including associated businesses

- plans for developing the skill-set needed in the transformation of the industrial workforce.²⁴

- a strong social safety net to reduce insecurity for the future of staff.

4) The social partners should actively develop and propose measures and interventions in line with the overall goals. These could include business standards, financing frameworks, new regulation, funding arrangement, research and innovation frameworks as well as skills training programmes.

²² The government platform promises social dialogue with labour and capital around their climate transition policies and the establishment of a national council for a just transition where the social partners “play a central role”. While the role of other civil society actors, and in particular environmental organisations, has been subject to public debate, the Minister of Climate and the Environment limited the invitation to the first council meeting in the early autumn of 2022 to the main employer and employee confederations. Read more here: [KM_C654e-20220530081452 \(regjeringen.no\)](https://www.regjeringen.no/km_C654e-20220530081452(regjeringen.no)).

²³ The government platform explicitly states that the government will enter into mutually binding partnerships with each sector to ensure that climate transition policies are realised. Read more here: <https://www.regjeringen.no/no/dokumenter/hurdalsplattformen/id2877252/>

²⁴ A commission for future skills that will be key in achieving this goal has been appointed by the government in 2021 (Norwegian: Kompetansebehovsutvalget). Read more here: <https://kompetansebehovsutvalget.no/>

Oil and gas transitions during a global energy crisis

Around the time of the backcasting exercise, in early February 2022, the European energy and security landscape was marked by growing insecurity. The Russian invasion of Ukraine, later in the month, led the International Energy Agency (IEA) to declare a global energy crisis. In the wake of short-term gas shortages, IEA Executive Director Fatih Birol urged investors and governments not to make investment decisions that would increase the fossil fuel dependence of the European energy system.²⁵

The combination of an energy price crisis in the Norwegian hydropower-based electricity system in 2021-2022²⁶ and in the European natural gas market has changed the premises of the debate in Norway. Participants in the exercise showed acute awareness of the dilemmas posed by this situation, particularly with regard to impacts on public opinion. Some opposition politicians also tried to capitalise

on this crisis by using the Ukraine war as a pretext for delegitimising long-term oil and gas transition policies.²⁷

Rather than making the pathways and the backcasting approach presented in this report obsolete, the research team would argue that the current energy crisis demonstrates the importance of linking short-term and long-term thinking. In 2022, Norwegian policy makers deal with electricity price hikes and reduced Russian gas deliveries while also evaluating the effects of the stimulus package offered to the oil and gas industry during the Covid-19 pandemic.²⁸ Without a clear transformation narrative that integrates short-term and long-term targets, Norway risks letting these overlapping crisis responses fall into the kind of maladaptive pathways the IEA leader warned against.

²⁵ Reuters reported on Birol's appearance at the World Economic Forum in May 2022 in this article: <https://www.reuters.com/business/energy/iea-warns-against-energy-crisis-deepening-fossil-fuel-reliance-2022-05-23/>

²⁶ For details, see the Financial Times story "Norway's unexpected energy crisis" (10 August 2022): <https://www.ft.com/content/99b698e9-5a82-4988-9d4c-f76ba63564eb>

²⁷ In this newspaper story, Progress Party leader Sylvi Listhaug argues that Norway should be "the last oil-producing nation to turn off the taps": <https://www.vg.no/nyheter/innenriks/i/y4oLv2/frp-vil-samle-oljevennene-skal-vaere-den-siste-til-aa-stenge-krana>

²⁸ A political consensus, which includes the former prime minister and leading representatives of the oil and gas industry, seems to be emerging on the fact that tax incentives have created an excessive activity in the oil and supply industry that will last until 2026-27.

References

- Agora Energiewende and Aurora Energy Research (2019) The German Coal Commission. A Roadmap for a Just Transition from Coal to Renewables.
- Atteridge, A. & Strambo, C. (2020) Seven Principles to Realize a Just Transition to a Low-Carbon Economy. SEI policy report. Stockholm Environment Institute, Stockholm. Available at: <https://cdn.sei.org/wp-content/uploads/2020/06/seven-principles-for-a-just-transition.pdf>
- Baxter, J & Eyles, J. (1997) Evaluating qualitative research in social geography: establishing 'rigour' in interview analysis. *Transactions of the Institute of British Geographers* 22: 505–25
- Collste, D., Cornell, S., Randers, J., Rockström, J., & Stoknes, P. (2021). Human well-being in the Anthropocene: Limits to growth. *Global Sustainability*, 4, E30. doi:10.1017/sus.2021.26
- DNV (2021a) Energy Transition Outlook 2021. A global and regional forecast to 2050. Available at: <https://download.dnv.com/eto-2021-download#about>
- DNV (2021b) Energy Transition Norway 2021. Available at: <https://www.dnv.com/Publications/energy-transition-norway-2021-212201>
- Dreborg, K.H. (1996) Essence of backcasting. *Futures* 28, 813–828.
- Equinor (2021) Energy Perspectives 2021. Available at: <https://www.equinor.com/sustainability/energy-perspectives> [Accessed June 27, 2022]
- Hedegaard, C., Kreutzer, I., Sandberg, P. R., Alstadheim, E. R., Eikeland, S. T., Gjersem, C., Haraldstad, M., Karlsen, M., Kostøl, S. J., Laird, S and Knut Moum (2016) Grønn konkurransekraft. Rapport fra regjeringens ekspertutvalg.
- Hernes, S, Erreia, J and Fjose, S. (2021) Ringvirkninger av olje- og gassnæringens aktivitet i 2019. Report, Menon economics.
- IEA (2021) Net Zero by 2050: A Roadmap for the Global Energy Sector. International Energy Agency.
- Jordhus-Lier, D. & Houeland, C. (2021) Polarisering i klimadebatten. Report 1/2021, Manifest Tankesmie. Available at: <https://manifesttankesmie.no/polarisering-i-klimadebatten/>.
- Karlsen, A. (2022) Politikk for en rettferdig og grønn omstilling i olje- og gassavhengige regioner. NTRANS Report 01/2022: 1-42.
- Mazzucato, M. and Kattel, R. (2021) Waking the Norwegian Green Giant. Project Syndicate, 2021. Available at: <https://www.project-syndicate.org/commentary/use-norway-sovereign-wealth-fund-for-green-transition-by-mariana-mazzucato-and-rainer-kattel-1-2021-05>
- Masnadi et al. (2018) 'Global carbon intensity of crude oil production: New data enable targeted policy to lessen GHG emissions', *Science*, Vol 361, Issue 6405, pp. 851-853. See also: <https://www.osti.gov/pages/servlets/purl/1485127>
- Mildenberger, M. (2020) Carbon captured: How business and labor control climate politics. The MIT Press, Cambridge, Massachusetts
- Ministry of Trade, Industry and Fisheries (2022) Roadmap for a green industrial initiative [Veikart for grønt industriløft].
- Muttitt G and Kartha S. (2020) Equity, climate justice and fossil fuel extraction: principles for a managed phase out. *Climate Policy* 20(1): 1-19.

The Norwegian Government (2021) Meld. St. 14 (2020–2021). Long-term Perspectives on the Norwegian Economy 2021. White paper. Available at: regjeringen.no/en/dokumenter/meld.-st.-14-20202021/id2834218/

SBTi (2021) SBTi Corporate Net-Zero Standard. Science Based Targets initiative. Available at: <https://sciencebasedtargets.org/resources/files/Net-Zero-Standard.pdf>.

SEI, IISD, ODI, E3G, and UNEP (2021) The Production Gap Report 2021.

<http://productiongap.org/2021report>

Sejersted, F. (2002) Når politikk blir business: utviklingen av det olje-industrielle kompleks, *Nytt norsk tidsskrift* 19:4, 368–378

Shell (2021) The Energy Transformation Scenarios. Available at: [shell.com/promos/energy-and-innovation/download-full-report/_jcr_content.stream/1627553067906/fba2959d9759c5ae806a03acfb187f1c33409a91/energy-transformation-scenarios.pdf](https://www.shell.com/promos/energy-and-innovation/download-full-report/_jcr_content.stream/1627553067906/fba2959d9759c5ae806a03acfb187f1c33409a91/energy-transformation-scenarios.pdf)

SSB (2020) Konsekvenser av redusert petroleumsvirksomhet – Makroøkonomiske effekter av politiske tiltak for å redusere norsk produksjon av olje og gass. Report 2020/38, Statistics Norway. Available at: <https://www.ssb.no/nasjonalregnskap-og-konjunkturer/artikler-og-publikasjoner/konsekvenser-av-reduisert-petroleumsvirksomhet>. Accessed June 27, 2022

Szulecki, K., Chitra, A., Claes, D. H., Houeland, C., Jordhus-Lier, D. (2021) Norwegian Oil and Gas Transition: Building Bridges Towards a Carbon Neutral Future. Oil and Gas Transitions Activity 1 Country Report, University of Oslo.

Vasstrøm, M., and Lysgård, H. K. (2021). What shapes Norwegian wind power policy? Analysing the constructing forces of policymaking and emerging questions of energy justice. *Energy Research & Social Science*, 77, 102089.

Wangel, J. (2011) Exploring social structures and agency in backcasting studies for sustainable development. *Technol. Forecast. Soc. Change* 78, 872–882. <https://doi.org/10.1016/j.techfore.2011.03.007>

York R, Bell, S. E. (2019) Energy transitions or additions?: Why a transition from fossil fuels requires more than the growth of renewable energy. *Energy Research & Social Science*, Volume 51, Pages 40–43

Guide to the Co-production of Just Transition Pathways in Norway

Methods

In order to co-produce normative scenarios for the future of oil and gas, Norway's most important industrial sector, the research team at the University of Oslo prepared a bespoke methodological framework. This aimed to meet

the research objectives while at the same time ensuring the results' compatibility with co-production activities conducted in the other countries within the *Oil & Gas Transition* (OGT) project.

Research protocol

The research protocol²⁹ (hereafter referred to as "the Protocol") developed by the OGT consortium served to balance the specific features of the Norwegian context with the overarching goals of the *Oil & Gas Transitions project*. The Protocol detailed the objectives of the exercise, specified its design and contained suggestions about the selection and format of stakeholder engagement, as well as a report template that was later revised. The Protocol also contained a reference list with sources about backcasting as an approach to scientific co-production (e.g. Dreborg 1996; Wangel 2011).

The backcasting exercise was devised as a hypothetical and normative scenario-building workshop where participants started from two end-point goals – that the oil and gas industry achieved net-zero emissions by 2050 and that existing oil and gas extraction was phased out by 2050³⁰– and traced a set of milestones backwards through time to the present. These end points were the same for all three North Sea countries which are part of the OGT project.

The Protocol encouraged the researchers to recruit participants from four different stakeholder groups: i) government (i.e. policy makers), ii) business representatives (i.e. decision makers from oil and gas industries, dependent sectors and across the value chain), iii) civil society, trade unions and international labour organisations, and iv) academia.

The just transition was a central concept in the Protocol (Atteridge & Strambo 2020) and a key research question was: *what should happen for the oil and gas just transition to materialise?* The participants were encouraged to discuss the social, economic, political and technological dimensions of a just transition. In the spirit of academic co-production, the Protocol suggested a number of innovative research techniques, including developing narrative visions and experimenting with the focus group format. Finally, the report template suggested building on the co-production scenario workshop to generate policy recommendations.

²⁹"Integrated framework and research protocol for co-producing oil and gas transition pathways" was a 18-page internal document circulated to all country teams ahead of the research process.

³⁰We detail how these two visions were operationalised in the Norwegian context under the section "Operationalising visions".

Process design for scenario-building

The workshop was set up as a *backcasting* exercise using the focus group approach. With reference to the Protocol, the research team sought to recruit relevant stakeholders representing a range of perspectives and positions in the Norwegian oil and gas industry. It was up to the participants to work out how to trace the steps backwards from the end point to the present. To assist researchers in interpreting these end points and making them applicable to a Norwegian context, representatives of the stakeholder groups were asked to comment and provide input prior to the focus group event.

The research team decided to reduce the four stakeholder groups identified in the Protocol to three, letting representatives of the academic

community taking part as commentators and observers, but not as distinct stakeholders.

To recruit relevant participants for the exercise, the research team drew on their network, including previous research and political experience. Furthermore, to ensure relevant participants could be recruited for each group and to facilitate good communication and a sense of ownership among group members, the research team recruited a *focal point* representing each stakeholder group prior to the event (see Figure 8). Persons targeted as focal points had strong networks and legitimacy in their domain. They advised participants, functioned as peer reviewers for the research design and served as chairs in the respective focus group discussions.

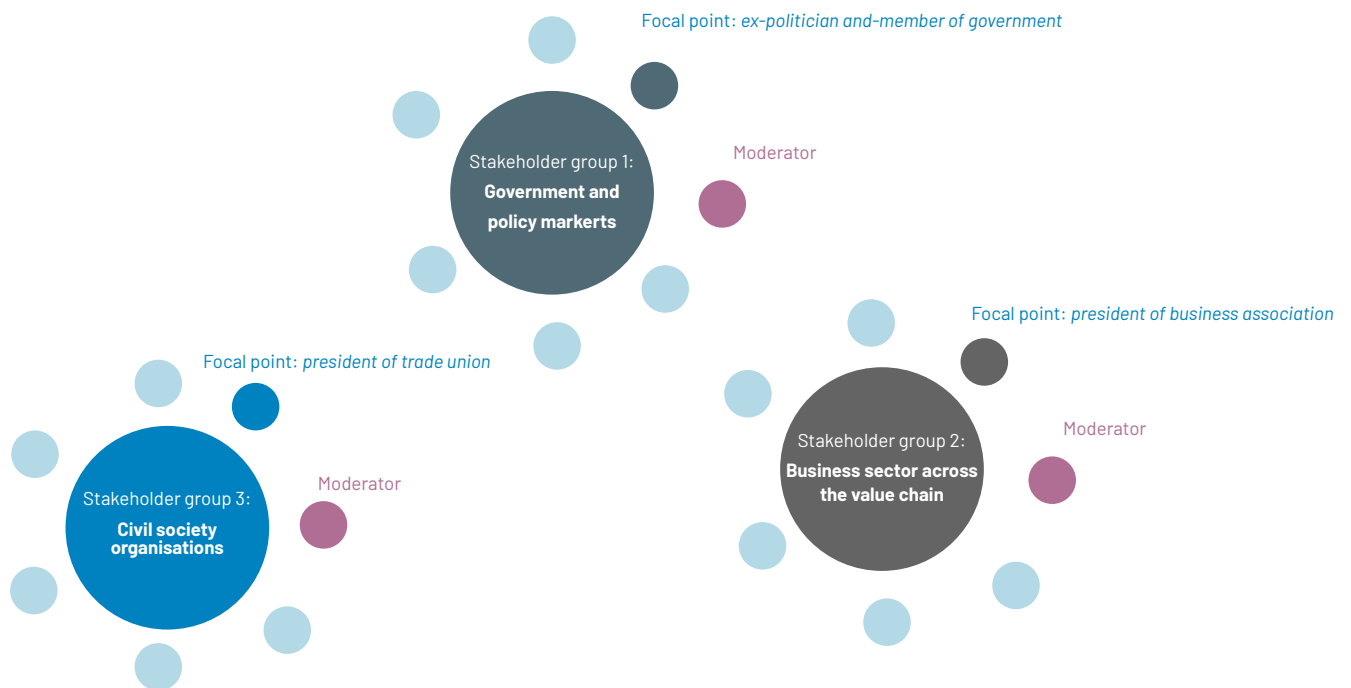


Figure 8: Set-up of stakeholder groups

Policy recommendations from the research team

The research team chose to target individual participants who were well-known and in relevant positions, and who were likely to be willing to engage in the backcasting exercise. Invitations were thus personal, clarifying that participants were not expected to represent their organisational mandates and that neither the participants nor the organisations they represented would be held accountable for the

data generated by the focus group exercise. The team strove for a broad representation of viewpoints and experiences including, but not limited to, gender, age, geographical constituency and political position. Vulnerable actors and regions were given particular attention, in line with the principles of the just transitions (Atteridge & Strambo 2020).

Stakeholder group 1: Government and policy makers	
Marianne Sivertsen is Labour Party Tony and Magnus are from Conservative Party	
Tony Tiller (focal point)	Deputy minister, Oil and Energy (2020-2021)
Elen Richter Alstadheim	Chief Director, The Norwegian Environment Agency
Magnus Thue	Deputy minister, Education (2016-2018), Trade and Fisheries (2018-2020) Finance (2020-2021)
Truls Nordahl	Special adviser, Norwegian Labour and Welfare Administration (NAV), Rogaland County
Marianne Næss Sivertsen	Member of Parliament, Energy and environment committee (2021-), deputy major/major Hammerfest (2011/2019-2021),

Stakeholder group 2: Business sector across the value chain	
Idar Kreutzer (focal point)	Finance Norway (business/employers association)
Runar Rugtvedt	Director Oil & Gas Technology Suppliers, The Federation of Norwegian Industries (business/employers association)
Julie Wedege	Senior Vice President, Politics and Ownership, Statkraft (hydropower company, state owned)
Jarand Rystad	CEO, Rystad Energy (energy consultancy)
Marte Johnsen Stensrud	Vice President Human Rights and Social Responsibility, Equinor
Håvard Slettahjell Skjefstad	Senior Engineer, low carbon solutions, Equinor
Marianne Hagen	Vice President for sustainability and communications, Aker Solution

Stakeholder group 3: Civil society organisations	
Jan Olav Andersen (focal point)	President, EI & IT (union, organising electricians in petroleum and renewables)
Jørn Prangerød	Adviser (on energy, industry and climate policies), Fellesforbundet (union organising across industries, including the petroleum supply industry)
Mikael Schevik	President, Industri Energi Youth (union organising in petroleum and process industry)
Silje Lundberg	Senior Campaigner, Oil Change International
Halvard Raavand	Political Adviser, Greenpeace Norway
Stig Schjøset	Chief Adviser, Zero (climate policy foundation)

The recruitment experience differed according to political and institutional dynamics in ways that are worth considering for methodological and policy-related reasons.

The 'government and policy makers' in Group 1 proved the most difficult to recruit. As the workshop took place a few months after a government change, the political leaders at the Ministry of Climate and Environment, the Ministry of Labour and Social Inclusion and the Ministry of Petroleum and Energy were reluctant to set aside time in their busy schedule to take part in discussions around policy positions that were still under discussion. The research team therefore chose to draw on the insights of people who held until recently high-level positions in the former conservative government, as well as on a Member of Parliament from the Labour Party (new government) with close ties to an oil and gas region in the North of the country.

That meant there were no participants from parties breaking with mainstream positions on petroleum and climate politics, neither the smaller and environmentally oriented one (left and centre) in favour of a managed phase-out, nor the right-wing populists branding themselves as champions of continued oil and gas extraction. While politicians expressed interest but lacked time, civil servants typically voiced reluctance to participate due to their role as knowledge providers, not opinion

makers. Participants in this group probably felt constrained by their own role as they often mentioned "responsibility" and "realism". High expectations on the state and political actors discussed at the workshop were likely a contributing factor.

The business sector participants in Group 2 represented a wide range of interests in the oil and gas industry, including extraction and production activities, the supply chain, finance, electricity, renewable energy, as well as consultancy services. Nevertheless, there were notable omissions, for instance the shipping industry and the main employer association in fossil energy extraction. This group proved to be the most comfortable with the backcasting exercise and tended to produce more detailed timelines with more concrete suggestions than other groups.

Group 3, representing civil society, was the most diverse. Participants were recruited from trade unions, environmental organisations and youth associations. Two youth politicians who had accepted the invitation were unable to attend, but otherwise this group covered a breadth of perspectives. In contrast to Group 2, who were able to define many of the founding premises of the backcasting exercise, Group 3 highlighted areas of concern, particularly with regard to social policies. This group was therefore instrumental in connecting both exercises to the notion of just transition.

The workshop format

Each focus group was run as a separate exercise. To reduce transport and logistics, however, the exercises took place on consecutive days. A climate policy adviser

from the 'civil society table' and an energy consultant from the 'business table' were invited to intervene to set the stage for each exercise.

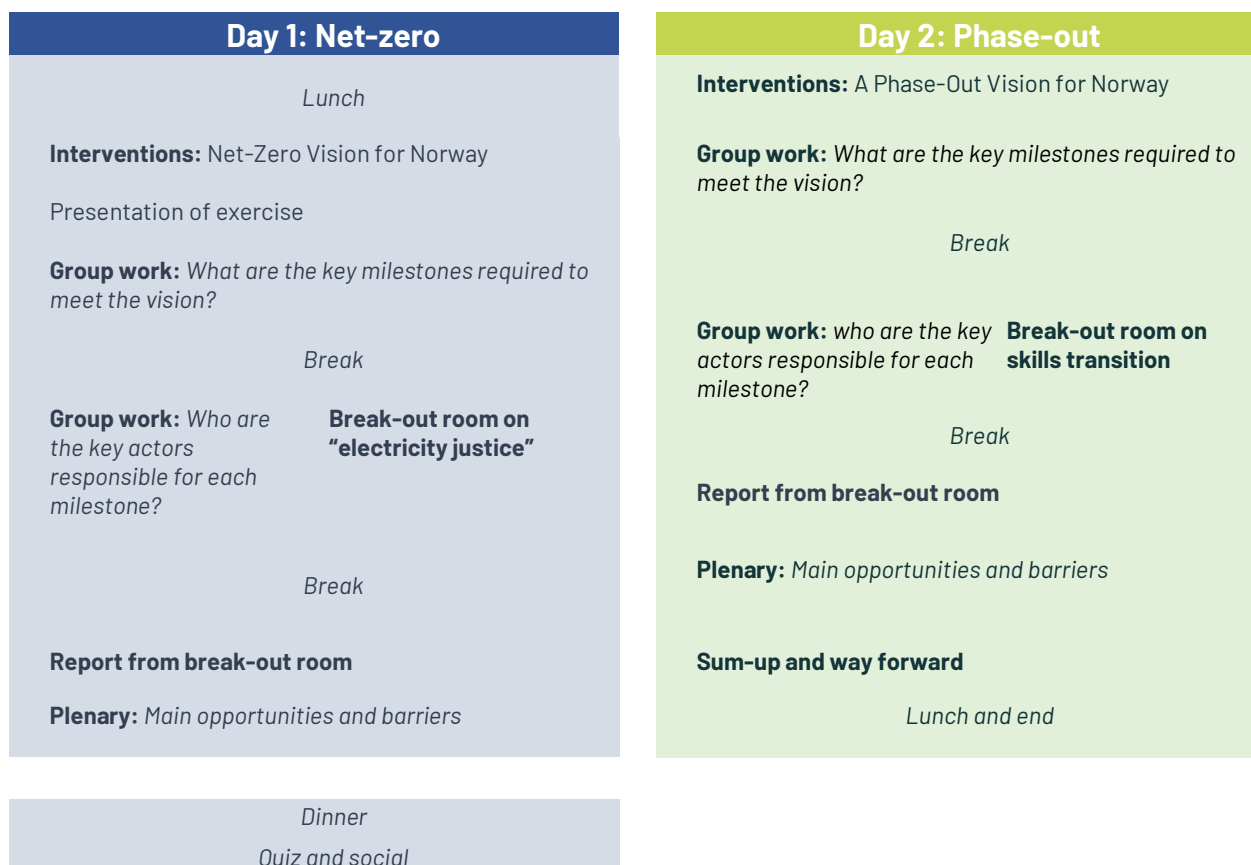


Figure 9: Format of two-day focus group event

To maintain consistency in the execution of the backcasting exercise, the Protocol suggested to i) identify milestones, ii) identify actors and responsibilities, and iii) highlight potential barriers and opportunities. Each focus group therefore held three successive sessions ending with a plenary presentation and discussion.

The Protocol also encouraged a broad discussion covering the social, economic, political and technological dimensions of

the just transition, and suggested breaking up existing groups as a way of stimulating conversation across stakeholders. The research team decided to nominate a break-out group for each day tasked with discussing a critical dimension of the transition with particular pertinence for the given vision, and report back during the final plenary session of the day. For the net-zero vision, the discussion was about "electricity justice". For the phase-out vision, it was about the skills transition for workers.

Focus group elicitation techniques

In line with the Protocol, the research team also developed a series of elicitation and facilitation techniques designed to focus the conversation. First, we developed *short narratives* (1-2 pages in Norwegian) describing and operationalising each vision in a Norwegian context. These were formulated in collaboration with the focal points and distributed to all participants ahead of the meeting. Second, each day was introduced by an *expert intervention*, where a speaker with specialised knowledge was asked to provide insights for the exercise. Third, the research team prepared 16 *measure cards*, suggesting possible policy measures available to government, parliament or the industrial relations partners. The measure cards covered issues as varied as carbon taxation, subsidies for renewable energy, salary and skill guarantees, industry-managed investment funds and early retirement. The cards were distributed to the participants in advance and

placed on each table during the focus group discussions. Fourth, and importantly, the focus group discussions took place around large *board visualisations* specifically designed for each day and vision. These large cardboard sheets displayed a timeline from 2020 to 2050, plus a graphic visualisation of required emission reductions (for the net-zero vision) and projected petroleum extraction (for the phase-out vision). These allowed participants to place suggestions, milestones and developments onto the board. As in Figures 10 and 11 below, the graph in the net-zero vision was adapted from the IEA's pathway document *Net Zero Emissions by 2050 Scenario (NZE)*. Figures 12 and 13 show how the phase-out vision board was adapted from a baseline scenario projection of expected oil and gas production from the Norwegian Continental Shelf (Stoknes et al 2021).

Key milestones in the pathway to net zero

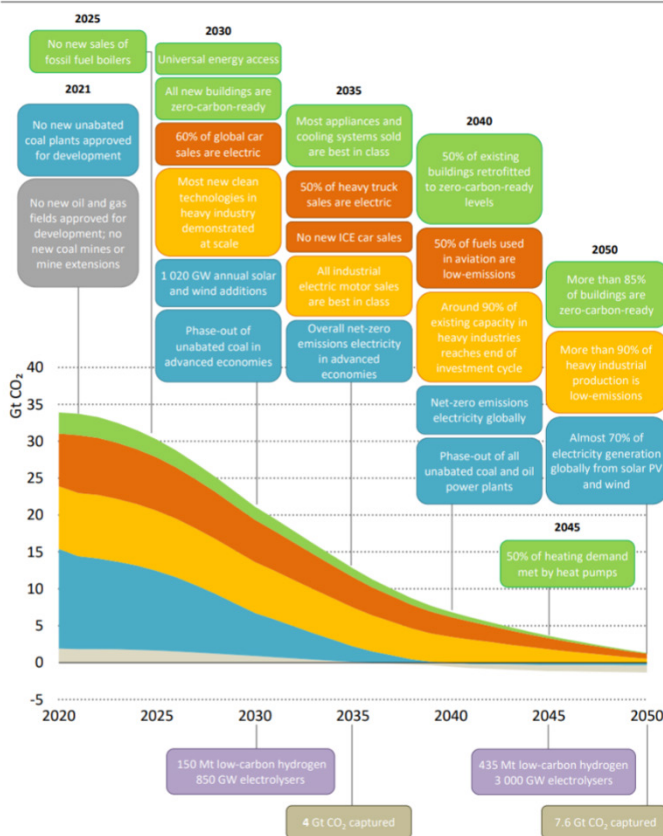


Figure 10: IEA's Net-Zero Pathway to 2050.

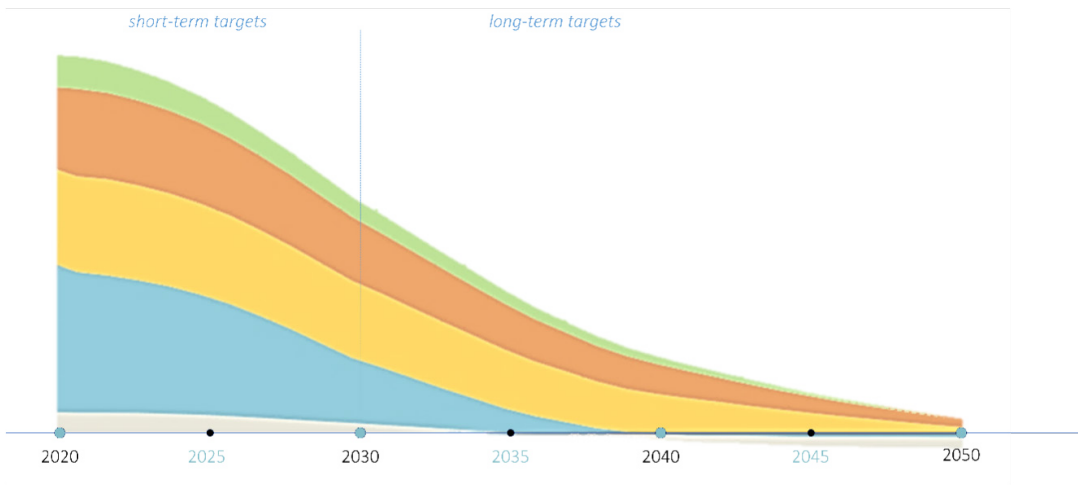


Figure 11: Board visualisation used for net-zero vision

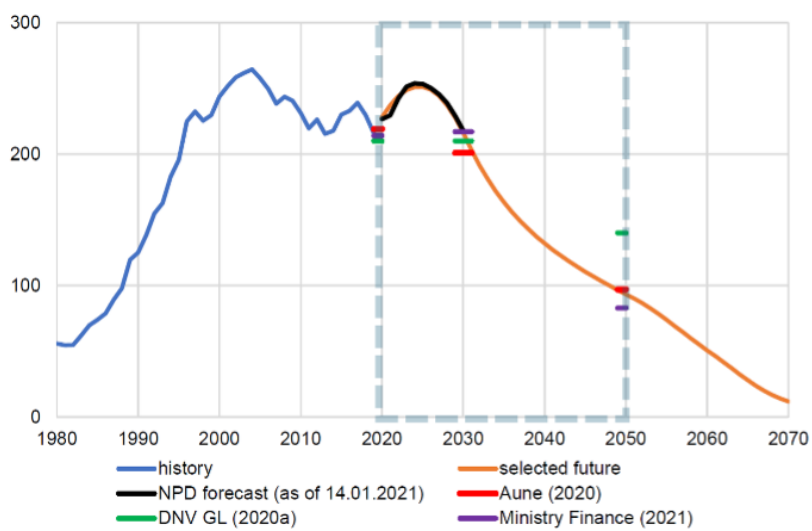


Figure 4. Historic and expected oil and gas production from NCS with business-as-usual to 2030, 2050 and 2070 in million standard cubic meters of oil equivalents per year. The black line is the official prognosis from Norwegian Petroleum Directorate to 2030. The orange line is our 1) Business As Usual scenario. Green dots show DNV GL (2020a) baseline and red dots show baseline Statistics Norway (Aune et al., 2020) prognoses to 2050. Purple dots are the baseline scenario from the Long-term outlook by Norwegian Ministry of Finance (2021)

Stoknes, Aslaksen, Goluke, Randers, Garnåsjordet (2021).

Figure 12: Future oil and gas production scenarios as presented in Stoknes et al. (2021)

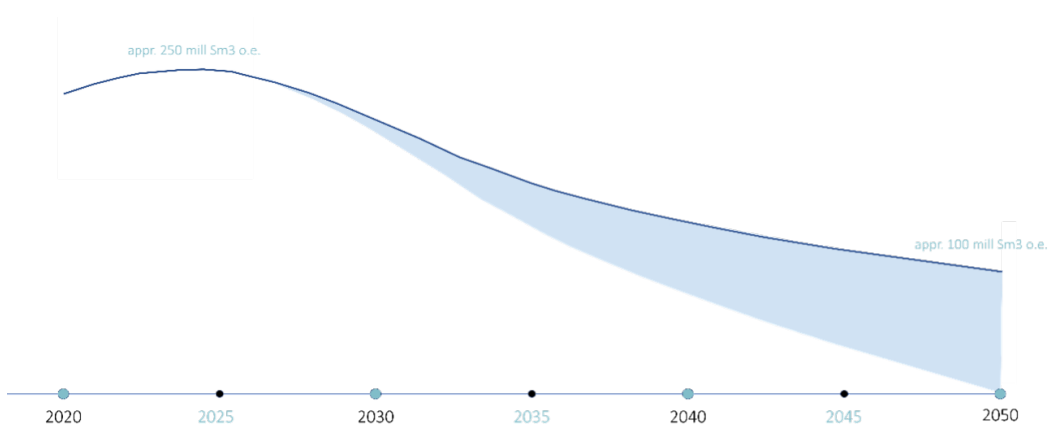


Figure 13: Board visualisation used for phase-out vision

Data collection techniques

To avoid constraining the focus group conversation, and because of limited time and resources for transcriptions and coding, the research team decided not to audio record the workshop and instead rely on four forms of data collection ensuring rich and varied qualitative information.

First, a member of the research team acted as a moderator and note-taker during the focus group discussion. While the focal point often chaired the meeting, the moderator served as a time-keeper and steered the conversation if needed. The jotted notes from each moderator were collected and systematised. Second, the researchers conducted debriefing conversations with the focal points one week

after the event, to gather their impressions and interpretations of the exercise. Third, the team collected and took pictures of visualisation boards, with drawings, annotations and post-it notes. Fourth, a drawing artist was invited to listen the focus group discussions and document impressions from these conversations in the form of four drawings, two representing each vision. These drawings were presented to the research team in draft form and were revised after a round of feedback from the researchers. A draft of the findings was presented to the participants in what Baxter and Eyles (1997) call member checking, whereby preliminary outcomes from the focus group are open to comments.

Operationalising visions

The research team developed short narratives for the two visions, adapted to the national context and based on ongoing discourses among stakeholders about the oil and gas transition. The Norwegian team prepared the narratives between December 2021 and January 2022 in two stages.

First, we conducted a 20-page background desk study summarising existing knowledge with regard to the most likely operationalisations of the net-zero target and plans to phase out oil and gas in Norway.³¹ There is widespread support in the country for the notion of net-zero emissions by 2050, but a lack of consensus on how to operationalise it. While policy makers often have defined net-zero, or 'near net-zero' according to direct Scope 1 emissions from energy generation offshore, business actors in the oil and gas industry have defined net-zero targets which include the direct Scope

1 emissions, the indirect Scope 2 emissions from electricity use and Scope 3 emissions from the end use of oil and gas. The notion of an oil and gas phase-out, on the other hand, is hotly contested, lacks both industry and government support and is therefore not well operationalised by stakeholders in Norway.

Second, we prepared two one-page documents in Norwegian explaining the country-specific narratives for the set visions. Given the uneven degree of consensus attached to the two visions and the implications each has for the ongoing debate around electrification, exploration and state investment, it was important to bring all participants 'on the same page' to avoid time-consuming discussions about definitions. In the spirit of co-production, we asked the focal points to comment on our tentative vision documents before these were circulated to the participants ahead of the focus group event.

³¹ Including IEA's net-zero pathway, the Science Based Targets initiative (SBTi), DNV Energy Transition Outlook 2021, government white papers, Stats Norway publications and policy documents from Equinor, Shell and others. See the bibliography for a detailed list of sources.

Vision I: Net-zero by 2050

In the exercise, we followed the advice of the Science Based Targets initiative (SBTi) and encouraged the groups to limit their share of 'neutralisation activities' for emissions within the oil and gas value chain and to offset those outside to a maximum of 10%. SBTi states that targets must include Scope 1, 2 and 3³² emissions if the latter amount to more than 40% of the total (which is the case in the oil and gas industry)³³. The researchers were also open to accommodate alternative usage of hydrocarbons in the groups' contributions to the net-zero vision.

Furthermore, to avoid a 'burn now, pay later' dynamic, the focus groups were asked to include both short-term (5-10 years) and long-term (by 2050) targets, with measures

and milestones planned for 2022-2030 as preparatory steps for 2030-2050. In addition, as the 2050 target is a global minimum, we emphasised that actors in the global North should reach it earlier.

Finally, we acknowledged that dealing with Scope 1 and 2 emissions in the net-zero vision in the Norwegian context is closely related to political ambitions for the electrification of installations on the Norwegian Continental Shelf, amidst an ongoing electricity crisis with high prices for consumers and land-based industries. We therefore organised a break-out group with participants from all three tables to discuss how to tackle the combined concerns for 'electricity justice' and offshore electrification.

Vision II: Phasing out oil and gas by 2050

Given that this vision is not operationalised in any policy documents by state actors, companies or dominant political parties, this exercise was based on fewer instructions and operational criteria. This leg of the backcasting event was not aided by the same level of acceptance as the net-zero vision and was therefore more contested by the focal points and by the focus group participants.

An oil and gas phase-out by 2050 would imply a politically enforced acceleration of an already projected decrease in employment and value generation from the Norwegian oil and gas industry.³⁴ In the hand-out, we listed

four distinct approaches that the state could pursue, possibly in combination, to achieve this vision: a) a market-driven phase-out, b) government influence on business decisions, e.g. through subsidy removal and/or taxation, c) a politically planned phase-out through the licensing regime, or d) political expropriation.³⁵

We encouraged the participants to consider the 'just transition' implications of this accelerated phase-out, including issues of employment security, local economic development and skills management. We also nominated a break-out group to discuss the skills transition.

³² According to Greenhouse Gas Protocol (ghgprotocol.org), Scope 1 emissions emanate from sources own or controlled directly by a company, Scope 2 include emissions from electricity consumed by the company, while Scope 3 emissions are a consequence of the activities of the company throughout the value chain (upstream and downstream activities), but do not emanate from sources owned or controlled by the company.

³³ We note that SBTi have paused the validation of fossil fuel sector targets and commitments from these companies, see: <https://sciencebasedtargets.org/sectors/oil-and-gas#what-is-the-sb-tis-policy-on-fossil-fuel-companies>.

³⁴ Projections vary on expected production levels in 2050 compared to current levels. While we used a moderate estimate in the board exercise (approximately 55% decrease), the White Paper "St. meld. 14 (2020-2021) Perspektivmeldingen" suggests a decrease of approximately 65%.

³⁵ These tools were developed on the basis of an internal review of policy options for the phasing out of oil and gas made by Dag Harald Claes.

Evaluation of the focus group event

Following the focus group workshop, the research team distributed an evaluation form to all participants. Out of 18 participants, 10 responded. The overall impression was that they were very satisfied with the planning, information and design of the exercise and that the event was a rewarding experience. They appreciated that the two exercises were conducted on consecutive days as this allowed time to socialise and debrief on the eve of day one. The use of focal points and prepared interventions worked very well and made it easier for participants to engage meaningfully in the exercise, the evaluation showed.

The participants were asked to comment on the decision to keep the stakeholder groups on three different tables, rather than mixing them. On this point, their opinions differed. Most were satisfied with the set up and found this created focused discussion. Others would have preferred mixed tables and suggested to allow for mixed composition on day two and in future data collection.

Some constructive criticisms were also raised. These concerned the recruitment of participants. At the policy-maker table, several pointed out the lack of representatives of non-mainstream political parties. The business table noted the lack of representation from the main business association in the oil industry (The Norwegian Oil and Gas Association, renamed Offshore Norway from August 2022). Finally, some participants found that the time allocated to digest each narrative was insufficient.

As a last step, the research team asked participants whether they believed the findings of the exercise would be interesting for user groups in Norway. Most responded positively, but said this would depend on how the process was analysed, documented and presented. Several participants expressed a desire to follow the research and findings from other countries, and to take part in cross-country conversations facilitated by the research consortium.

The research team also evaluated the exercise internally. The team noted that because of the political context in Norway, the two scenarios were not met with the same level of constructive engagement. The phase-out vision appeared so far from mainstream consensus that actors at all three tables seemed reluctant to engage in a scenario-building exercise in the same way as they did for net-zero. Using focal points as liaisons between the research team and participant tables was therefore crucial to enable a constructive process before, during and after the workshop.

The other conclusion was that different elicitation techniques had different levels of success. The narratives worked relatively well and distributing them in advance helped adjust expectations and prepare participants for the exercise, although busy schedules meant that not all participants were equally acquainted with the visions. The expert interventions were also fairly successful, as they created a shared sense of the problem in real-time. However, all expert interventions seemed to work better in the net-zero exercise. In hindsight, we would have tried to secure an intervention that would have "argued the case" for a phase-out vision in the same way as what was done with net-zero. The board visualisation was arguably the most effective technique, as it served to focus the discussions around the timeline and invite participants to make their suggestions in sequence. The break-out groups were also found to have added value to the exercise, particularly given that they centered around topics that also emerged in the other discussions but were not allowed sufficient time and focus. Finally, the measure cards were used less than anticipated, but this was likely due to the limited time available and the abundance of other elicitation techniques.

One possible way to address these outcomes in a revised version of the exercise would be to focus on one vision (the net-zero vision) on both days and use day two to operationalise the timelines from day one, possibly with a more active use of measure cards and break-out groups.

For more information visit: www.oilandgastransitions.org.