

THE SKY'S LIMIT DENMARK:

WHY DENMARK MUST PHASE OUT NORTH SEA OIL AND GAS EXTRACTION



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Cover Image: Platforms in Esbjerg offshore oil harbor, Denmark. ©Frank Bach/Alamy Stock Photo.

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Oil Change International is a research, communications, and advocacy organization focused on exposing the true costs of fossil fuels and facilitating the coming transition towards clean energy.

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“The new Danish government will have the ambition to be among the governments of the world that are doing the most — both at home and internationally — to counter climate change,”

A FAIR DIRECTION FOR DENMARK,
JUNE 2019.¹

“Dear young people, you made this election the first climate election in Denmark’s history,”

PRIME MINISTER METTE FREDERIKSEN
IN HER ELECTION VICTORY SPEECH,
5 JUNE 2019.²

“If we succeed, it will be because we hurried,”

A FAIR DIRECTION FOR DENMARK,
ON LIMITING CLIMATE CHANGE
TO 1.5 DEGREES CELSIUS (°C),
JUNE 2019.³

“It is absolutely crucial that we do everything we can to get the last drops of the oil,”

FORMER MINISTER OF ENERGY, UTILITIES,
AND CLIMATE LARS CHRISTIAN LILLEHOLT,
APRIL 2016.⁴

SUMMARY

Over the past thirty years, Denmark has positioned itself as a global climate leader through its policies to support wind power, district heating, and energy efficiency, amongst other actions.⁵ Building on this, in June 2019, the newly elected Danish government committed to a new climate target of reducing emissions 70 percent below 1990 levels by 2030, surpassing its previous goal of 40 percent by 2020.⁶

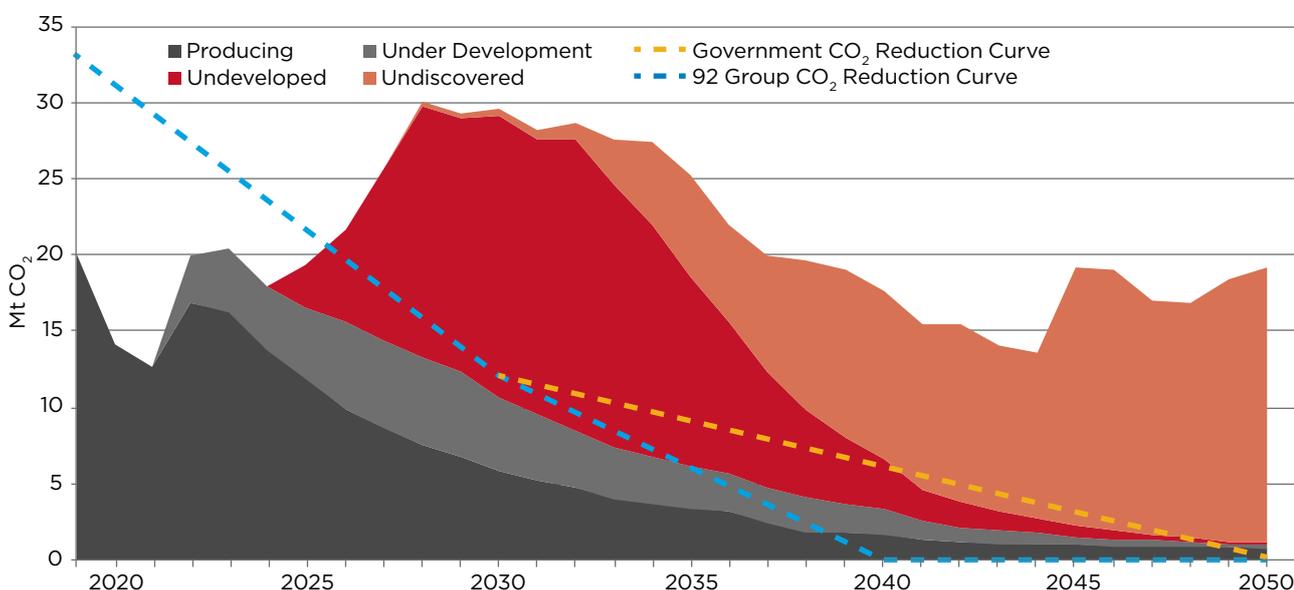
However, Denmark's plans to expand North Sea oil and fossil gas extraction undermine this record of climate action. This is because the potential carbon emissions from the oil, gas, and coal in the world's *currently operating* fields and mines would already fully exhaust and exceed carbon budgets consistent with the Paris goals.⁷ Simply put, we cannot afford to bring new extraction online — in Denmark or anywhere else.

This report applies these stark global carbon budget limits to the outlook for oil and gas production in Denmark. We find that Denmark's plans to allow new North Sea oil and gas projects in the 2020s and 2030s would undermine its aspirations of climate leadership. The carbon dioxide (CO₂) emissions from burning Danish-produced oil and gas would be substantial, overtaking Denmark's total expected domestic CO₂ emissions from energy by mid-2025 (see Figure 1, with details on the domestic reduction curves in Section 1). In other words, if current plans to expand North Sea extraction are left unaddressed, Denmark will either (a) meet its domestic emissions targets but export oil and gas with associated emissions that overshadow this domestic progress, or (b) fail to meet its emissions targets and continue to consume more oil and gas domestically than is Paris-aligned.

There is a cumulative 665 million tonnes (Mt) of CO₂ associated with Danish oil and gas between 2019 and 2050. Of these potential CO₂ emissions, 401 Mt of CO₂ would come from new projects yet to be developed that would peak between the mid-2020s and mid-2030s. This means **over 60 percent of anticipated emissions related to Denmark's oil and gas extraction in the coming decades are not yet committed — the projects they are associated with will either require new licenses from the Danish government or final investment decisions (and final government approval) to be developed.**

A phase-out of Denmark's oil and gas industry would not just have domestic implications, but international ones. There is a misconception that if Denmark (or any other country) extracts less oil and gas, another country would extract the same amount instead. However, the "leakage" effect is only partial: Only some

Figure 1: Projected CO₂ emissions from Danish oil and gas, compared to the CO₂ emissions goals for all domestic energy set by government and 92 Group NGOs, 2019-2050.



Source: Oil Change International analysis based on data from Rystad UCube, Danish Energy Agency, and 92 Group.⁸

of the reduced extraction is compensated by increases elsewhere.⁹ A 2017 study led by Taran Fæhn found that, after taking leakage into account, the most economically efficient approach would be for two-thirds of Norway's climate mitigation efforts to take place on the supply side, through cuts to oil and gas extraction.¹⁰ Additionally, there are a number of other mechanisms through which continued Danish extraction acts to *increase* net global emissions, including carbon lock-in and lower fossil fuel prices that encourage higher consumption and make renewables less competitive (see Section 3).

In the context of global plans for extraction that extend far past safe climate limits and a shortage of appropriate action from fossil fuel producers, Denmark is exceptionally well-positioned to chart a new course and clearly signal to other governments that now is the time to stop expanding fossil fuel production. Just as Denmark has increased international ambition on

renewable energy and energy efficiency by leading by example,¹¹ it could do the same for supply-side climate action.

Delayed action — or no action — to phase out extraction is likely to be much more disruptive for Denmark. Creating a phase-out plan will help ensure a just transition plan is implemented with input and buy-in from impacted workers and communities. It will also help avoid the potential stranded assets of an unmanaged decline, and the public liabilities of delayed action. In Section 3, we estimate these possible liabilities in the case that Denmark continues to approve new licenses in the near term, but eventually acts to end extraction. If Denmark continues to approve licenses until 2030, then takes actions that revoke them, we estimate possible liabilities of DKK 59 billion. In comparison, revoking existing undeveloped licenses today instead would incur a much lower possible compensation claim of approximately DKK 8.2 to 9.7 billion.

KEY RECOMMENDATIONS

Our findings mean that in order to ensure Denmark meets its Paris commitments and leverages its position as a wealthy fossil fuel producer to build global supply-side climate ambition, the Danish government must build off its existing climate leadership and:

- **Immediately freeze the granting of further leases or permits for new oil and gas extraction projects or transportation infrastructure that would enable additional exploration;**
- **Revoke undeveloped licenses and review whether existing facilities should be phased out early in order to contribute to the achievement of the Paris Agreement; and**
- **Plan and implement a just transition for affected workers and communities in consultation with trade unions and community leaders.**

1. OIL AND GAS EXTRACTION IN A WARMING WORLD

Climate science has established that cumulative carbon dioxide emissions over time will determine roughly how much average global temperatures will rise.¹² To keep warming within any particular limit — all else being equal — there is a maximum amount of carbon dioxide that may be emitted. This is the world’s carbon budget.

The 2015 Paris Agreement aims to hold this global average temperature increase to well below 2 degrees Celsius (°C) above pre-industrial levels, and pursue efforts to limit it to 1.5°C.¹³ The importance of aiming for the 1.5°C target was underscored by the Intergovernmental Panel on Climate Change’s (IPCC) 2018 Special Report, which found that limiting warming to 1.5°C would significantly reduce impacts on the most vulnerable communities and reduce risks of systemic collapse, compared with 2°C.¹⁴

Past research by Oil Change International compared global carbon budgets to the carbon dioxide emissions from fossil fuels in already-operating fields and mines, using optimistic estimates of emissions reductions from land use change and cement.¹⁵ Figure 2 displays a summary of this research using updated budgets from the IPCC’s 2018 *Special Report on Global Warming of 1.5°C*, and shows that:

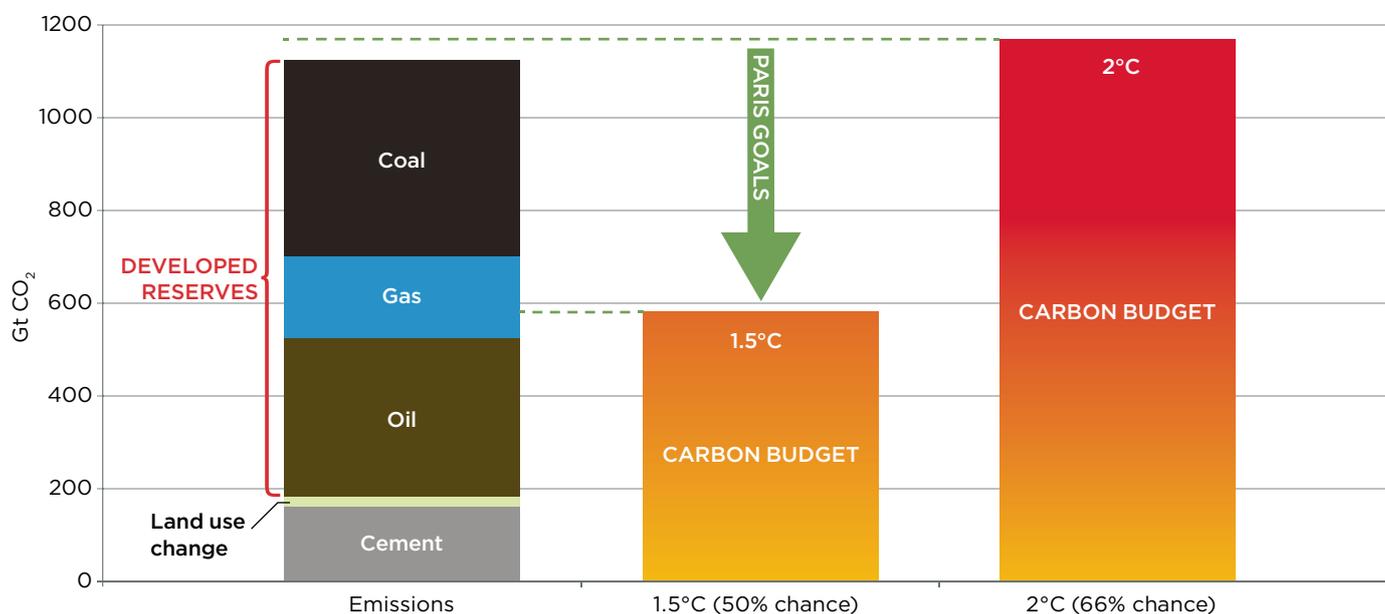
- ❶ **The oil, gas, and coal in existing fields and mines would push average global temperature rise far beyond 1.5°C, and nearly exhaust a 2°C carbon budget.**
- ❷ **If global coal use were phased out overnight, the developed reserves of oil and gas — taking into account cement and land use change — would still push the world beyond 1.5°C of warming.**

It is important to emphasise that the left-hand bar in Figure 2 does not include *undeveloped reserves*, which are roughly twice as large as the developed reserves shown, or an even more vast quantity of fossil fuel “resources” (i.e. undiscovered and uneconomic sources).

The developed reserves shown are in already-operating projects, meaning infrastructure has already been built, capital invested, and workers employed. This creates “carbon lock-in,” and means that it is more difficult, both politically and economically, to limit extraction from these projects relative to those not yet built.¹⁷

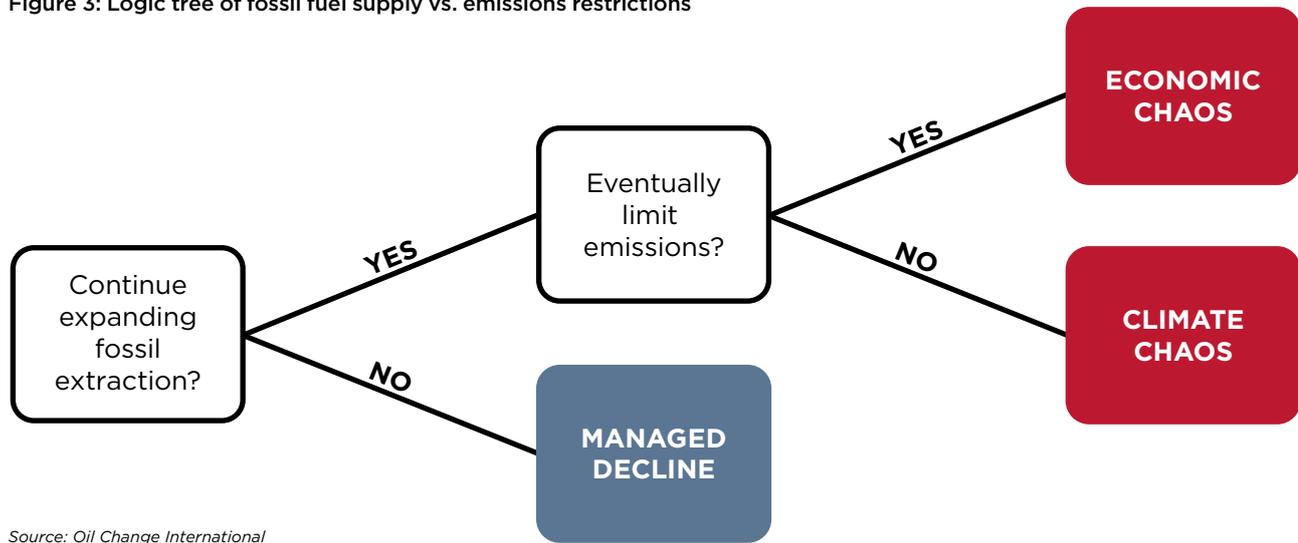
This overshoot of our global carbon budgets mean we face a collective choice between managed decline, unmanaged decline resulting in stranded assets, or climate catastrophe (Figure 3). Given

Figure 2: Carbon dioxide emissions from developed global fossil fuel reserves, compared to carbon budgets within range of the Paris goals.



Source: Oil Change International analysis based on data from Rystad Energy, IEA, World Energy Council, and IPCC.¹⁶

Figure 3: Logic tree of fossil fuel supply vs. emissions restrictions



Source: Oil Change International

these choices, a managed decline is clearly the safest choice for a liveable future and a stable society.

Against this backdrop of an urgent need for a managed decline of extraction and just transition to renewable energy, the global upstream oil and gas industry is planning to invest nearly EUR 4.5 trillion in expanded extraction through 2030, undermining all other efforts to reduce emissions in Denmark and elsewhere.¹⁸

There is a clear need for governments to intervene, and quickly. For fossil fuel-producing countries such as Denmark, this means immediately ceasing the issuing of licenses, leases, and permits for new fossil fuel projects, in order to stop pushing the ‘developed reserves’ bar on the left side of Figure 2 even higher. Governments must also examine revoking undeveloped licenses and phase out a significant number of existing projects ahead of schedule in order to achieve the Paris goals.

Given their access to resources and historical responsibility for the climate crisis, Denmark and other relatively wealthy countries should be the first to implement these limits to extraction and transition away from a fossil fuel economy most rapidly.¹⁹ In Section 3, we expand on this concept with principles for managing the transition in a justice-based manner.

BOX 1: GAS IS NOT A BRIDGE FUEL²⁰

- 1. Gas breaks the carbon budget:** As shown in Figure 2, the economically recoverable oil, gas, and coal in the world’s currently producing and under construction extraction projects would take the world far beyond safe climate limits. Further development of untapped gas reserves is inconsistent with the climate goals in the Paris Agreement.
- 2. Coal-to-gas switching doesn’t cut it:** Climate goals require the energy sector to be decarbonised globally by mid-century. This means that both coal and gas must be phased out. Replacing coal plants with new gas plants will not cut emissions by nearly enough, even if methane leakage is kept to a minimum.
- 3. Low-cost renewables can displace coal and gas:** The dramatic and ongoing cost declines for wind and solar disrupt the business model for gas in the power sector. Wind and solar will play an increasing role in replacing retiring fossil fuel capacity.
- 4. Gas is not essential for grid reliability:** Wind and solar require balancing, but gas is not the only, nor the best, resource available for doing so. Battery storage is fast becoming competitive with gas plants designed for this purpose (known as “peakers”). Wind and solar plants coupled with battery storage are also becoming a competitive, “dispatchable” source of energy. Managing high levels of wind and solar on the grid requires optimising a wide range of technologies and solutions, including battery storage, demand response, and transmission. There is no reason to favor gas as the primary solution.
- 5. New gas infrastructure locks in emissions:** Multibillion-dollar gas infrastructure built today is designed to operate for decades to come. Given the barriers to closing down infrastructure ahead of its expected economic lifespan, it is critical to stop building new infrastructure whose full lifetime emissions will not fit within Paris-aligned carbon budgets.

2. DANISH OIL AND GAS VS THE PARIS AGREEMENT

In Summer 2019 the new Danish government helped further establish its reputation as a climate leader by committing to a greenhouse gas emissions target of 70 percent below 1990 levels by 2030, bolder than its previous goal of 40 percent by 2020.²¹ This builds on past mitigation progress from Denmark like its commitment to net-zero emissions by 2050, its soon-to-be completed transition away from coal for electricity generation, its commitment to phase out the sale of new fossil fuel-powered vehicles by 2030, and its rapid growth of wind power and district heating through targeted policy support.²²

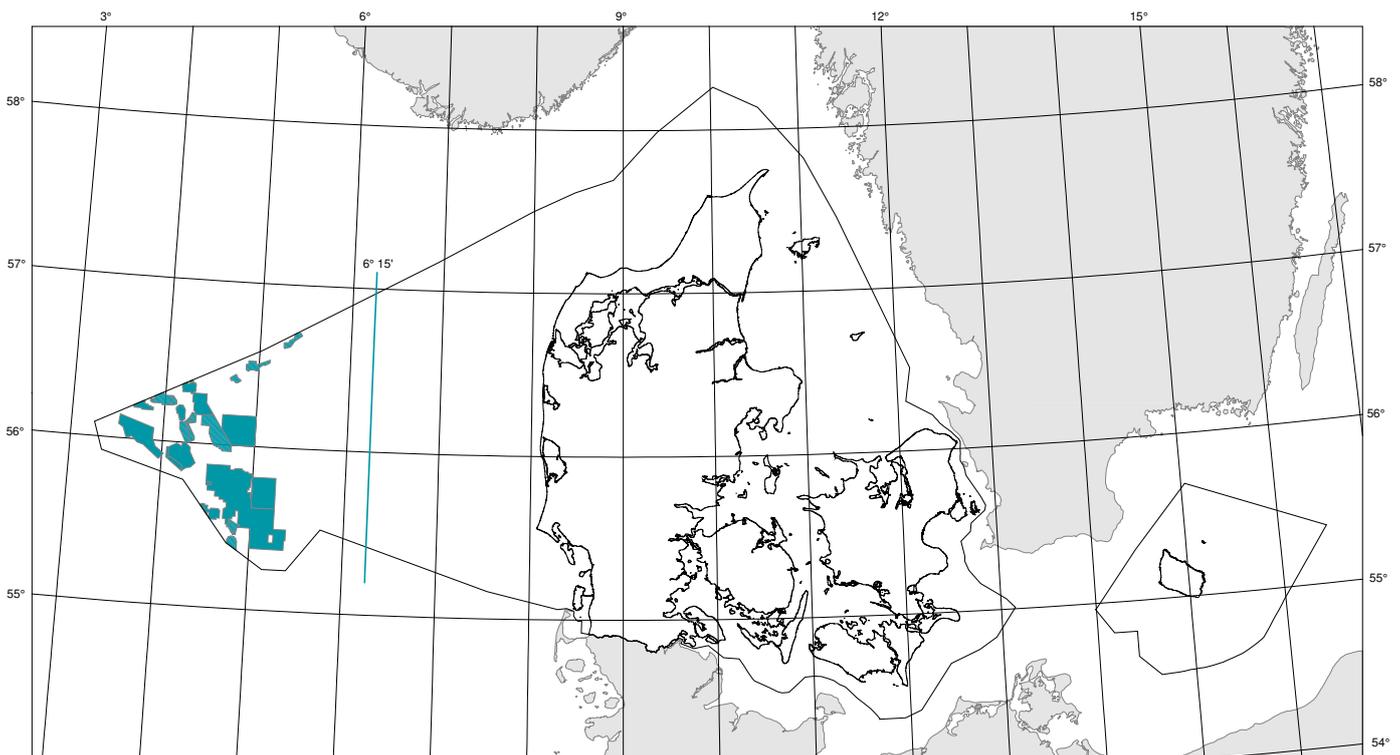
In contrast to this ambitious record and admirable future mitigation targets, Denmark is poised to significantly *expand* its North Sea oil and gas extraction from now through the early 2030s. This course of action alone threatens to overshadow the important steps Denmark is taking in other areas.

Denmark's oil and gas extraction takes place in the Danish section of the North Sea, with 11 operators — including government-owned Nordsøfonden, which holds one-fifth of each license — and 19 active fields in 2019.²⁵ Onshore extraction was banned in 2018, but this was largely symbolic, as the vast majority

of the country's oil and gas resources are offshore.²⁶ Production peaked from the mid-1990s to the mid-2000s, but is poised to grow again over the next 15 years unless action is taken to carefully phase out extraction.

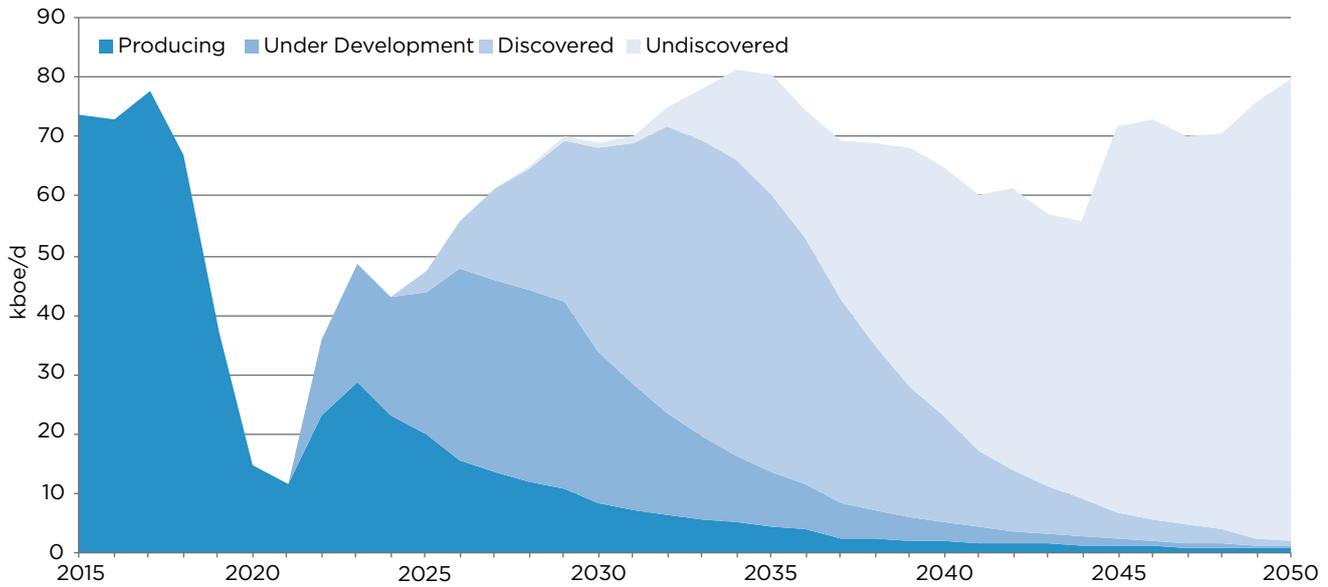
Figure 5 and 6 show projected extraction from producing fields, undeveloped fields, and anticipated new discoveries as calculated by the UCube database and model of Rystad Energy, an oil industry consultancy based in Norway. It is worth noting that the 2018 models for future gas production from the Danish Energy Agency differ from the Rystad UCube projections used, with Rystad

Figure 4: Danish license area for its 8th licensing round in 2018, with existing licenses shown in blue. Denmark's North Sea extraction is planned through licensing rounds that occur every two years. The 2018 licensing round, whose applicants were not yet approved as of Fall 2019, would grant concessions for extraction until 2056, six years after Denmark has committed to reach net-zero emissions — and 16 years after 2040, the date Danish NGOs have calculated is necessary to live up to the global 1.5°C target.²³



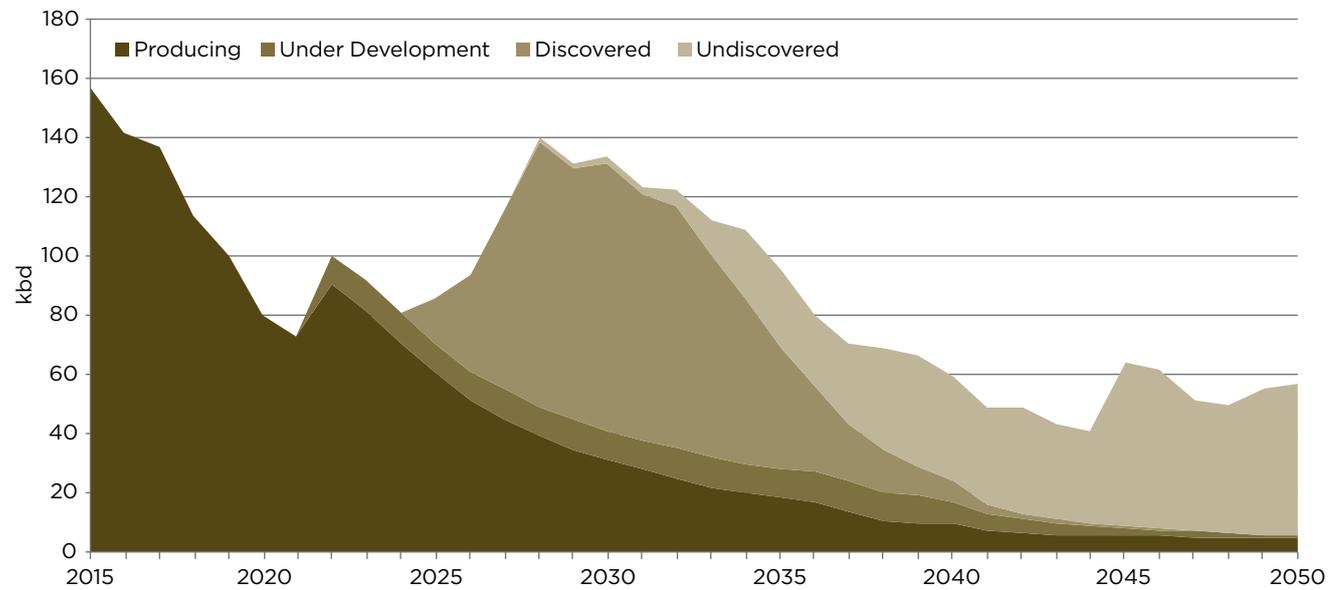
Source: Danish Energy Agency²⁴

Figure 5: Danish past and projected gas production, thousand barrels of oil equivalent per day, 2015-2050.



Source: Rystad UCube

Figure 6: Danish past and projected oil production, thousand barrels of oil per day, 2015-2050.



Source: Rystad UCube

projecting 74 percent higher eventual gas production, largely in the Tyra Field’s ‘undiscovered’ category.²⁷ The projections for oil extraction are consistent between the two sources. This analysis employs Rystad UCube models because they are updated monthly, use bottom-up modelling on a field-by-field basis, and are used by industry and financial institutions for planning. Regardless of which model is used, both anticipate

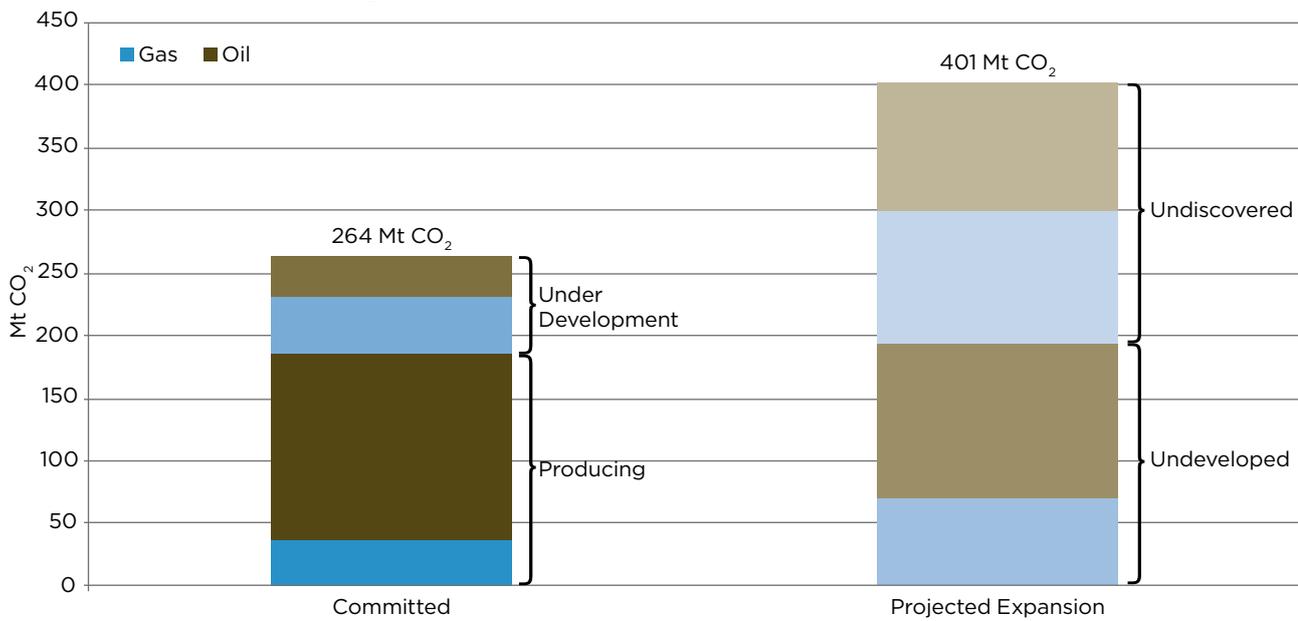
future oil and gas extraction well above what would be Paris-aligned for a wealthy country like Denmark. For added context, the cumulative emissions that would result from the production under Danish Energy Agency models are provided in Footnote A.

Figure 7 shows a cumulative 665 Mt of CO₂ associated with Danish oil and gas between 2019 and 2050.^a Of these

potential CO₂ emissions, 401 Mt of CO₂ would come from new projects yet to be developed that would peak between the mid-2020s and mid-2030s. This means 60 percent of these cumulative emissions are not yet committed — the projects they are associated with will either require new licenses from the Danish government or final investment decisions (and final government approval) to be developed.

^a If 2018 Danish Energy Agency projections for gas are used instead, there is a cumulative 554 Mt of CO₂.

Figure 7: Projected cumulative CO₂ emissions from Danish oil and gas, by reserve category, 2019-2050.



Source: Oil Change International analysis based on data from Rystad UCube

Of the future extraction in Figure 7 that is projected rather than committed, 193 Mt CO₂ is associated with ‘undeveloped’ fields that have been awarded licenses already, and the other 208 Mt CO₂ with ‘undiscovered’ fields that will require new licenses.²⁸ This provides a clear path forward for a careful phase-out of extraction. If Denmark opts to pursue a managed decline of its fossil fuel production, the ‘undiscovered’ production could be stopped by ceasing to grant new licenses. The ‘undeveloped’ production could be stopped through early retirements of existing licenses. Finally, for ‘committed’ production, Denmark could phase out existing or under construction projects early.

Figure 8 shows that if domestic climate action targets are achieved but oil and gas expansion is allowed to continue unfettered, emissions from oil and gas extracted in Denmark would surpass Denmark’s overall domestic emissions from energy use in 2025. This means the emissions from Danish oil and gas

would overshadow otherwise ambitious action from Denmark in reducing its domestic consumption of fossil fuels. Danish civil society coalition 92 Group’s recommended emissions curve is also included in Figure 8.^b The 92 Group has shown that CO₂ emissions will need to reach zero by 2040 – rather than 2050 – for Denmark to be in line with the 1.5°C aim of the Paris Agreement.²⁹

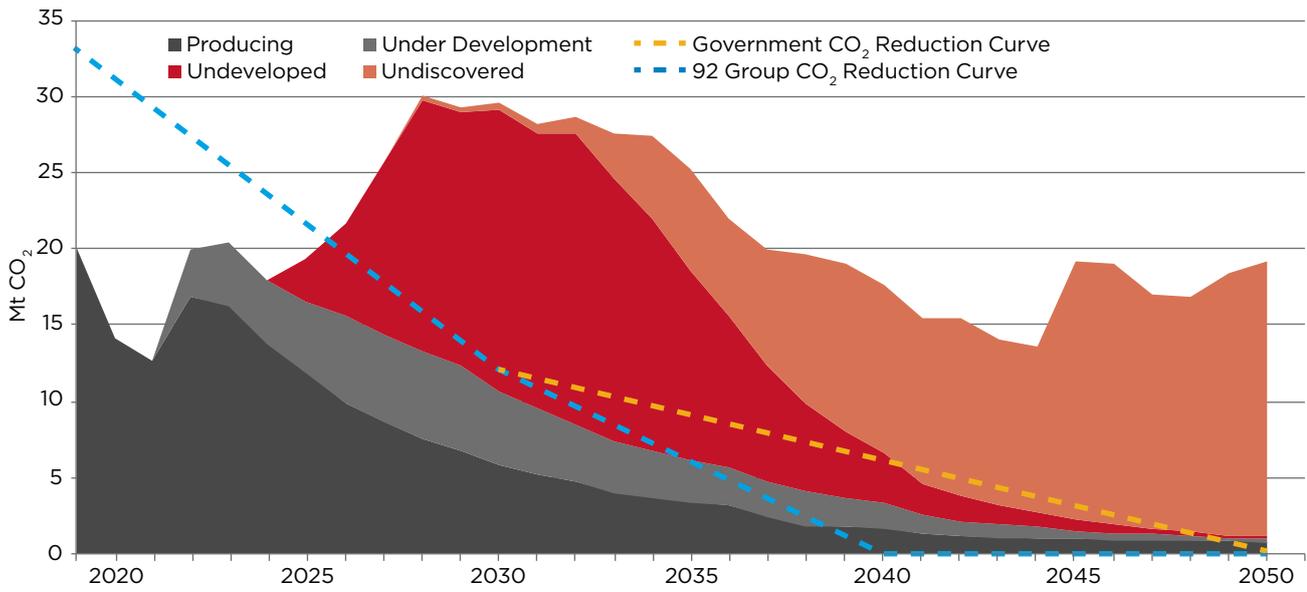
These extraction plans mean that Denmark is set to become a net exporter of oil and gas emissions, even while it pledges “climate leadership” on the global stage. If domestic emissions from oil and gas consumption fall at least as fast as the Denmark’s overall greenhouse gas emissions targets – a pace even less ambitious than the CO₂ emissions reduction curves shown in Figure 8 – it would mean Denmark would be exporting cumulative emissions of at least 40 Mt of CO₂ from oil and gas between 2019 and 2030, and at least 354 Mt between 2019 and 2050.³¹ **If Denmark does not curtail its North Sea extraction,**

it will either (a) meet its domestic emissions targets but start exporting oil and gas with associated emissions that overshadow this domestic progress, or (b) fail to meet its emissions targets and continue to consume more oil and gas domestically than is Paris-aligned.

In either scenario, Denmark will fail to do its fair share in addressing the global climate crisis. If Denmark is to align with the necessary global trajectory for 1.5°C or even 2°C, it must not develop new reserves, and must manage the decline of existing production. By expanding production while reducing domestic consumption, Denmark risks exporting an increasing share of its contribution to the climate crisis and undermining its commitment to leadership.

^b The government’s domestic emissions reduction curve shown in Figure 8 assumes CO₂ emissions from ETS sectors fall to near zero by 2030, except for some transit and the already-committed domestic emissions from North Sea extraction. This is in line with what 92 Group analysis has shown is necessary for the government to meet the stated 2030 goal for overall domestic greenhouse gases. The 92 Group emissions reduction curve shown follows this trajectory up until 2030 but falls to zero by 2040 rather than 2050, as civil society analysis has shown is necessary for Denmark to have a chance at upholding its 1.5°C commitment (on a per-capita basis rather than an equity or “fair shares” basis).

Figure 8: Projected CO₂ emissions from Danish oil and gas, compared to CO₂ emissions goals for all domestic energy set by government and 92 Group NGOs, 2019-2050.



Source: Oil Change International analysis based on data from Rystad UCube, Danish Energy Agency, and 92 Group.³⁰

Offshore drilling rig and storage tanks in Esbjerg harbor, Denmark. ©Frank Bach/Alamy Stock Photo



3. THE GLOBAL AND LOCAL IMPACTS OF PHASING OUT DANISH NORTH SEA EXTRACTION

The June 2019 agreement document for the Social Democrat government led by Prime Minister Mette Frederiksen, “A Fair Direction for Denmark,” is clear on the need for Denmark to act as an international leader on climate, stating “the new government will strengthen green diplomacy and thus increase Denmark’s international contributions.”³²

For the past three decades, climate policy globally has focused primarily on regulating fossil fuels at the point of combustion. This limited approach is not working — emissions are still rising, and time is running out to avoid climate breakdown. Continued investment in fossil fuel extraction leads to higher emissions through the ‘lock-in’ of infrastructure, perverse political and legal incentives, and lower fossil fuel prices. Supply and demand interact in global markets and need to be addressed in parallel. A comprehensive policy approach to limit extraction and lower demand together — to “cut with both arms of the scissors” — will be necessary for the world to close the dangerous gap between current action and what is required to meet the Paris goals.³³

Even for a relatively small fossil fuel producer like Denmark, there would be significant direct emissions impacts associated with a North Sea phase-out, as well as additional political impacts that would help build momentum for climate leadership elsewhere. Denmark is well-suited to supply this leadership for several reasons:

I. DANISH LEADERSHIP CAN CREATE MOMENTUM FOR FOSSIL FUEL PHASE-OUTS ELSEWHERE.

Climate crisis is encroaching rapidly, yet there exists a yawning gap of true climate leadership. Supply-side action from wealthy fossil fuel producers like Denmark is desperately needed. A recent *Science* article determined that wealthy, well-organised, fossil fuel-producing countries announcing moratoria on fossil fuel exploration in their jurisdictions is the lever most likely to create the political preconditions necessary for significant fossil fuel reserves to remain unextracted.³⁴ The article’s authors — alongside a growing chorus of observers, including more than 500 civil society organisations who have signed the Lofoten Declaration and more than 100 economists backing the Not a Penny More Declaration — argue that actions like these to restrict fossil fuel supply could be pivotal in creating the cooperative spirit needed to ensure the world achieves the Paris Agreement’s targets.³⁵

The Powering Past Coal Alliance catalysed a similar cascade of action when it was formed two years ago. Combined with other trends, the Alliance has achieved the nearly unthinkable since it was formed in 2017, prompting 30 countries — including Denmark — to commit to phase out coal use.³⁶

Likewise, there is modest but growing momentum for similar phase-outs of oil and gas. The World Bank announced in 2017 that it will phase out finance for oil and gas extraction by 2020, and Swedfund and the French Development Agency (AFD) have made similar commitments.³⁷ A growing number of governments, including Costa Rica, France, New Zealand, and Belize, have implemented full or partial bans on new oil and gas licensing.³⁸ Similar measures are under consideration in Spain, Ireland, Iceland, and Sweden.³⁹

Given this context and the nascent group of ‘first-movers’ on oil and gas, Denmark has a historic opportunity to accelerate this progress by becoming the largest fossil fuel producer to date to announce its intention to manage the decline of current and planned extraction based on climate limits.

II. DANISH EXTRACTION RAISES GLOBAL EMISSIONS.

There are four primary mechanisms through which continued Danish extraction acts to increase net global emissions:

- **More extraction induces higher global consumption of oil and gas:** There is a misconception that if Denmark (or any other country) extracts less oil and gas, another country would extract the same amount instead. However,

this “leakage” effect is only partial: only some of the reduced extraction is compensated by increases elsewhere.⁴⁰ Additionally, if Denmark reduces its oil and gas consumption while maximising extraction, the effect will be to increase consumption in other countries due to lower prices and the elasticity of demand for oil and gas.⁴¹ This means that to minimise leakage, the best approach is to simultaneously reduce both fossil fuel demand and supply.

➊ **More oil and gas make renewables less competitive:** While the costs of wind and solar power have fallen dramatically over the past decade, these technologies remain similar in price to fossil fuels. As a number of studies modelling the U.S. power sector have found, lower gas prices induced by increased extraction have strengthened the competitiveness of gas against clean energy.⁴² Similarly, cheaper oil makes the infrastructure transition to electric vehicles and transit less attractive.

➋ **Oil and gas suck investment away from clean energy:** Investments in clean energy are falling well short of what would be needed to achieve the Paris goals. One reason for this is that too much energy investment is going into oil and gas rather than the clean energy solutions that will be needed to align with the Paris Agreement.⁴³

➌ **Carbon lock-in:** Once a piece of fossil infrastructure is built, it is extremely difficult to take offline, because the infrastructure and its decades-long lifespan creates economic incentives to keep it operating, gives it a competitive advantages over alternatives, and erects political and legal barriers to policies that threaten it.⁴⁴

A 2017 study in *The Energy Journal*, led by Taran Fæhn of Statistics Norway, modelled many of these effects as well as the overall economic costs of policies for Norwegian oil extraction. Faehn found that – after accounting for the relative leakage from demand-

and supply-side action – two-thirds of Norway’s contribution to global emissions reductions should come from measures to restrict oil and gas extraction. The study concludes that prioritizing supply-side measures, achieving a 3 percent annual cut in oil extraction, would maximize global climate benefits at lowest cost to the Norwegian economy.⁴⁵ These conclusions reinforce that supply-side measures should be considered a core and necessary part of climate policy in Denmark and other fossil fuel-producing countries.

III. DENMARK HAS A MORAL OBLIGATION TO TRANSITION QUICKLY.

In the same way that wealthier countries like Denmark that are more historically responsible for climate damages must set more ambitious domestic emissions reduction targets in order to be in line with the Paris Agreement’s aim of 1.5°C of warming, they must also lead in phasing out fossil fuel extraction.

Oil storage tanks with wind turbines in background, Frederikshavn, Denmark. ©Thomas Kyhn Roving Hjørnet/Alamy Stock Photo



A forthcoming paper by Oil Change International and the Stockholm Environment Institute proposes five key ethical principles by which we might aim to fairly manage the transition from fossil fuels worldwide:⁴⁶

- Curb total fossil fuel extraction at a pace consistent with climate limits, as defined by the Paris goals;
- Ensure a just transition for fossil fuel-dependent workers and their communities;
- Respect human rights by prioritising for closure any extraction activities that violate rights, especially of poor, marginalised, ethnic minority, and Indigenous communities;
- Transition fastest where it is least socially disruptive, particularly in wealthier, less extraction-dependent countries; and
- Share transition costs fairly, providing poorer countries with support for an effective and just transition.

IV. DENMARK HAS A HIGH CAPACITY TO TRANSITION.

In 2017, the latest year for which all data are available, Denmark's oil and gas production accounted for 0.4 percent of its gross domestic product (GDP), 0.5 percent of government revenue, and 0.2 percent of employment.⁴⁷

Figure 9, which examines oil extraction alone, helps puts these figures into global context and shows the extent to which Denmark is well positioned to take leadership on a just transition away from fossil fuel production.

Due to the declines in oil and gas production since the mid-2000s and cuts to royalties in 2017, Denmark has already done much of the difficult work eliminating its reliance on oil and gas production. Government revenue from oil and gas has dropped from DKK 36 billion (EUR 4.8 billion) in 2008 to DKK 5 billion (EUR 674 million) in 2017.⁴⁹ The 2019 financial statement from the Danish Ministry of Finance estimated that 2019 oil and gas revenue would be about 0.2 percent of GDP in 2019, and 0% in 2020.⁵⁰ As Danish economic advisor Lars Gårn Hansen stated in *Information* in July 2019, "The latest tax reform was a reduction in already low taxation. And

there is not very much oil and gas left out there. So, no matter what, the North Sea is not especially important for Denmark economically."⁵¹

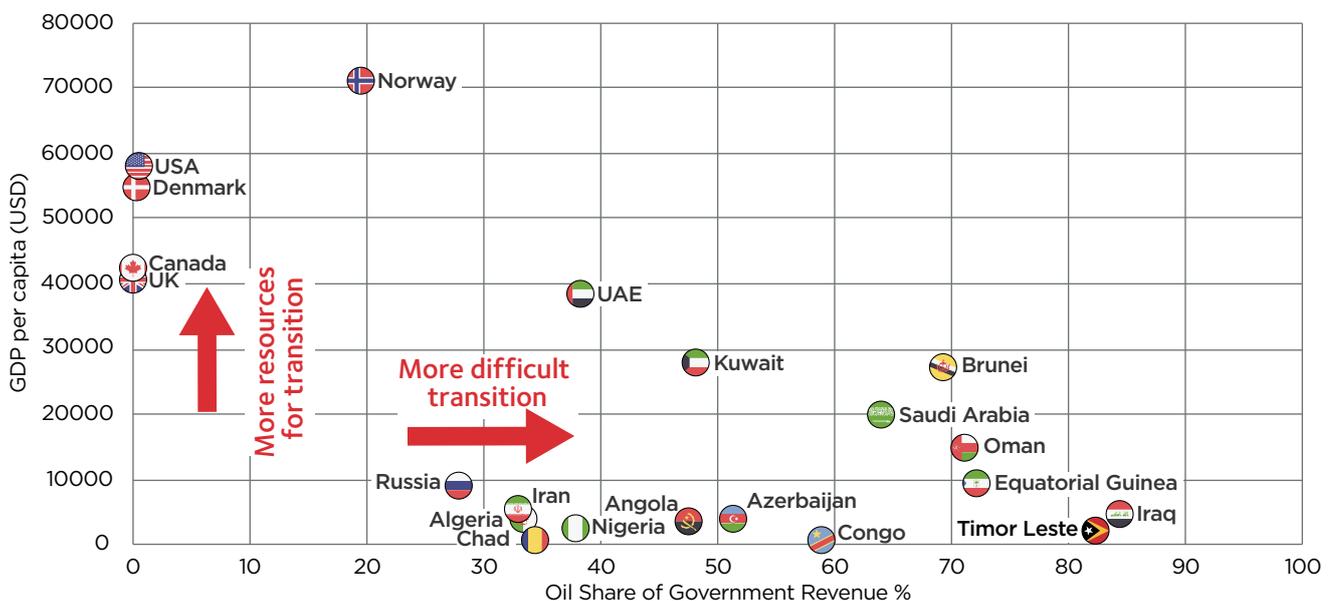
Compared to 12,700 jobs in the Danish oil and gas sector, there are already 76,000 green jobs in Denmark, and an estimated 25,000 to 95,000 more could be created by 2035 with concerted policy action.⁵²

Adding to this high capacity to transition is widespread and long-standing public pressure for climate action among the Danish population, with climate being the top priority for voters in the 2019 election.⁵³

V. FREEZING FOSSIL FUEL EXPANSION NOW WILL HELP DENMARK AVOID BILLIONS IN FINANCIAL SHOCKS AND LIABILITIES.

Section 2 shows how Denmark rejecting new license applications would not mean turning off the taps overnight. Rather, a managed phase-out would mean taking climate limits seriously and intentionally planning to wind down North Sea extraction at the pace required to meet the goals of the Paris Agreement and confront climate crisis.

Figure 9: Relative challenges of just transition away from oil extraction: Oil's share of government revenue versus per-capita GDP, selected countries, 2016 (or nearest year for which data available).



Source: World Bank, Danish Energy Agency, International Monetary Fund⁴⁸

However, Denmark runs the risks of much higher and more disruptive transition costs if it waits and delays policy action to limit extraction in line with Paris goals. If the Danish government continues to approve licenses, and then later identifies a need for more robust climate action — either by revoking licenses or enacting other policies that companies can argue diminishes their value — Denmark could face compensation claims from the companies.⁵⁴ Such claims could be made in international investment tribunals under bilateral or multilateral investment treaties, many of which constitute an extensive set of protections for company profits at the expense of the public interest.⁵⁵ So while we contend that fossil fuel companies do not have a moral case to be compensated for the effects of climate policy, they may nonetheless have a legal case to demand recompense, and the Danish public may suffer as a result.

Based on principles of global arbitration law and past precedents,⁵⁶ we used Rystad projections of Danish oil and gas expenditures and discoveries to estimate the approximate value of compensation claims that could be expected if Denmark decides to pursue policies that act to effectively revoke licenses in 2030 after approving new ones up until then. We found that compensation in 2030 for *new* licenses awarded during 2020 to 2029 could be around DKK 8.9 to 11.2 billion (EUR 1.2 to 1.5 billion). Additionally, whereas revoking *existing* licenses in 2020 might lead to a compensation claim of DKK 8.2 to 9.7 billion (EUR 1.1 to 1.3 billion), doing so in 2030 after more installations, wells, and pipes have already been built could be roughly DKK 47.7 billion (EUR 6.4 billion).^c This means that by failing to act in line with climate goals today, **Denmark could incur liabilities of an additional DKK 51 billion (EUR 7 billion) more than if immediate action was taken.**

These estimates are based on Rystad’s projections of oil and gas prices and the

calculations described in Footnote C. Arbitration tribunals may use different assumptions, including those resulting in even higher compensation awards. For example, the case between Process and Industrial Development Limited and the Government of Nigeria established compensation based on a dramatic 2.65 percent discount rate for future profits, compared to the 10 percent used here, resulting in an overall DKK 60.4 billion compensation cost from one single cancelled Nigerian project.⁵⁷

In contrast, a managed phase-out of fossil fuel production would better allocate money toward climate solutions while ensuring that government, financial institutions, workers, and communities would have time to plan for an orderly and equitable wind-down of offshore extraction. It would also help avoid shocks to the Danish economy in the form of potential devaluation of stranded oil and gas assets from climate action being taken in other jurisdictions.

VI. FREEZING EXPANSION NOW GIVES DENMARK TIME TO ENSURE A JUST TRANSITION.

Both morally and for continued political support for climate action, it is imperative that the transition to a zero-emissions economy protects the workers and communities most impacted by the shift, within Denmark and around the world. This requires a “just transition” plan that is built with full participation from worker representatives and impacted communities.

Trade unions have been early and vocal supporters of a just transition away from fossil fuels around the world. When New Zealand announced the end to offshore oil and gas exploration, it was done with full support of the New Zealand Council of Trade Unions, because a just transition plan had already been crafted with affected regions.⁵⁸ Similarly, the Danish Trade Union Confederation has called for

a just transition plan to be developed in cooperation with unions.⁵⁹

With two-thirds of its overall workforce unionised, and the oil and gas sector representing 0.2 percent of all jobs,⁶⁰ Denmark is well-poised to set a global example for a fair and effective just transition away from oil and gas extraction.

Past research from trade union meetings and academic literature has determined a set of minimum safeguards that a just transition strategy should aim to deliver, including:⁶¹

- ➊ Accountability to worker representatives and affected communities;
- ➋ Long-term investment into industry cluster locations such as Esbjerg;
- ➌ Creation of new jobs with equivalent terms and conditions and permanent contracts where jobs are lost;
- ➍ Support for workers’ education, relocation, and retraining, along with wage and pension protection; and
- ➎ Trade union rights for workers affected by energy transitions, including union recognition and sectoral bargaining.

It is critical that a just transition be planned at the community level, not solely for individual workers or the sector as a whole. Esbjerg would likely be the Danish region most impacted by a managed phase-out of extraction, as it has the highest proportion of oil and gas jobs, with 8 percent of its 115,000 residents employed in the industry.⁶² However, Esbjerg is also expected to experience the highest sea level rise of major Danish cities. This means we can expect an added need for climate adaptation and resilience work in Esbjerg, in addition to new green energy and infrastructure jobs.⁶³

^c We considered two possible bases for compensation claims: (i) total past expenditures by companies prior to the policy implementation, plus a 10% (nominal) interest rate, or (ii) present value (at 10% nominal discount rate) of companies’ assets at the time of policy. The resulting estimates are as follows:

4. CONCLUSION AND RECOMMENDATIONS

As a country with a strong legacy of climate leadership, a public keen to see strong climate action, and a relatively low dependence on fossil fuels for employment, gross domestic product, and government revenue, Denmark is well suited to lead on supply-side climate policy.

The climate science is clear that there is no room to build any new fossil fuel developments. Put another way: When you are in a hole, you should stop digging.

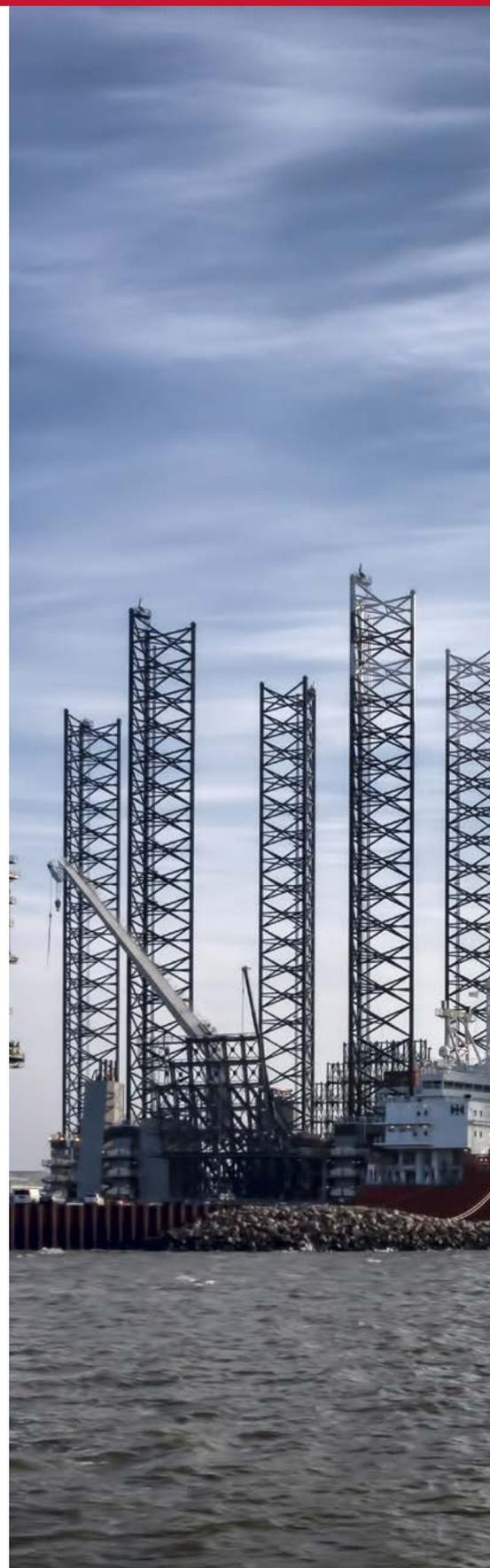
Climate science is also clear that the actions we take in the next decade will have a decisive impact on our collective fate — to have a decent chance at limiting warming to 1.5°C, we must reach peak emissions by 2020 and cut emissions 45 percent **globally** by 2030.

Our immediate actions also have critical importance for the politics of climate change. Communities, institutions, and states are increasingly mobilising for climate justice. This has created a situation in which seemingly singular actions can gain momentum and become pathbreaking. The Powering Past Coal Alliance has gained 30 nation-state members in less than two years. A lone striking student has inspired a global general strike in the course of a single school year. Danish supply-side climate policy has the same potential to cascade, raising the bar for global climate leadership by showing that oil and gas production must be wound down everywhere if we are to avoid the worst of the climate crisis.

As soon as possible, Denmark should:

- ❶ Immediately freeze further leases or permits for new oil and gas extraction projects, or transportation infrastructure that would incentivise additional exploration;
- ❷ Revoke undeveloped licenses, and review whether existing facilities should be phased out early in order to contribute to the achievement of the Paris Agreement's goals; and
- ❸ Plan and implement a just transition for affected workers and communities, in close consultation with trade unions and community leaders.

Jack up rig with six legs in Esbjerg oil harbor, Denmark. ©Frank Bach/Alamy Stock Photo





ENDNOTES

- Mette Frederiksen, Morten Ostergaard, Pia Olsen Dyhr, and Pernille Skipper, "Political understanding between Socialdemokratiet, Radikale Venstre, SF og Enhedslisten: A Fair Direction for Denmark," 25 June 2019, https://www.altinget.dk/misc/Retf%C3%A6rdig%20retning%20for%20Danmark_2019-06-25_ENDELIG.pdf.
- Florian Elabdi, "Left wins election as Danes reject far-right," *Al Jazeera*, 6 June 2019, <https://www.aljazeera.com/news/2019/06/left-wins-danes-reject-190606155819541.html>.
- Frederiksen et al., "A Fair Direction for Denmark."
- Sofie Synnove Herschend and Ole Hall, "Overseer: Perhaps it is best to leave the North Sea gold," *DR (Danish Broadcasting Corporation)*, 17 April 2016, <https://www.dr.dk/nyheder/penge/overvismand-maaske-er-det-bedst-lade-nordsoe-guldet-ligge>.
- Benjamin K. Sovacool, "Energy policymaking in Denmark: implications for global energy security and sustainability," *Energy Policy*, 61, 2013, pp. 829-839, <https://doi.org/10.1016/j.enpol.2013.06.106>; Stephanie Ropenus, *A Snapshot of the Danish Energy Transition: Objectives, Markets, Grid, Support Schemes and Acceptance*, Agora Energiewende and DTU Management Engineering, November 2015, https://www.agora-energiwende.de/fileadmin2/Projekte/2015/integration-variabler-erneuerbarer-energien-daenemark/Agora_Snapshot_of_the_Danish_Energy_Transition_WEB.pdf.
- Frederiksen et al., "A Fair Direction for Denmark."
- Greg Muttitt, *The Sky's Limit: Why the Paris climate goals require a managed decline of fossil fuel production*, Oil Change International, September 2016, <http://priceofoil.org/2016/09/22/the-skys-limit-report/>.
- Rystad UCube, accessed 29 July 2019; Danish Energy Agency, "Annual Energy Statistics – Preliminary Energy Statistics 2018," Table 3, <https://ens.dk/en/our-services/statistics-data-key-figures-and-energy-maps/annual-and-monthly-statistics>; Tarjei Haaland, "Government CO₂ emissions in 2018-2050 are miles from meeting the global 1.5 degree target," *Greenpeace*, 8 November 2018, <https://www.greenpeace.org/denmark/vi-arbejder-med/klima/greenpeace-analyse-regeringens-co2-udslip-i-2018-2050-er-milevidt-fra-at-leve-op-til-det-globale-15-gradsmaal/>.
- Michael Lazarus, Pete Erickson, and Kevin Tempest, *Supply-Side Climate Policy: The Road Less Taken*, Stockholm Environment Institute, 2015, pp. 14-15, <http://www.sei-international.org/publications?pid=2835>; A. Q. Gilbert and B. K. Sovacool, "US Liquefied Natural Gas (LNG) Exports: Boom or bust for the global climate?" *Energy*, Volume 141, 15 December 2017, pp. 1671-1680, <https://doi.org/10.1016/j.energy.2017.11.098>.
- Taran Fæhn et al., "Climate Policies in a Fossil Fuel Producing Country: Demand versus Supply Side Policies," *Energy Journal*, 38 No. 1, 2017, http://www.frisch.uio.no/publikasjoner/pdf/2016/Formatert/Faehn_et_al_Climate_Policies_Energy_journal_2016_CREE_Cri1380439.pdf.
- Frede Hvelplund, Soren Roth Djørup, and Karl Sperling, "Fossil Fuel Systems to 100 Per Cent Renewable Energy-Based Smart Energy Systems: Lessons from the Case of Denmark, 1973-2017," in Marc Ozawa, Jonathan Chaplin, Michael Pollitt, David Reiner, and Paul Warde (Eds.), *In Search of Good Energy Policy*, (Cambridge: Cambridge University Press, 2019), pp. 165-186.
- Specifically, the rise in global temperature is understood to be roughly proportional to cumulative carbon dioxide emissions over time, assuming a given level of emissions of short-lived greenhouse gases such as methane. This means that in order to limit warming to any level, carbon dioxide emissions have to fall to net zero at some point: As long as emissions continue, the temperature will keep rising. IPCC, *Climate Change 2013*, Working Group 1 report, sec.12.5.4, pp. 1108ff, http://ipcc.ch/pdf/assessmentreport/ar5/wg1/WG1AR5_Chapter12_FINAL.pdf.
- UNFCCC, The Paris Agreement, 2015, Article 2.1(a), <https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement>.
- IPCC, *Special Report on Global Warming of 1.5 Degrees (SR15)*, October 2018, pp. 11-12, <http://www.ipcc.ch/pdf/special-reports/sr15/>
- Muttitt, *The Sky's Limit*.
- Muttitt, *The Sky's Limit*; Carbon budgets updated: IPCC, SR15, Table 2.2, p. 108; Oil and gas developed reserves updated: Rystad UCube, accessed 7 April 2019.
- Gregory Unruh, "Understanding carbon lock-in," *Energy Policy*, 28, 12, 2000, pp. 817- 830, [https://doi.org/10.1016/S0301-4215\(00\)00070-7](https://doi.org/10.1016/S0301-4215(00)00070-7); Karen Seto et al., "Carbon Lock-In: Types, Causes, and Policy Implications," *Annual Review of Environment and Resources*, 41 (2016); pp. 425-52, <https://www.annualreviews.org/doi/abs/10.1146/annurevenviron-110615-085934>.
- Overexposed: How the IPCC's 1.5°C report demonstrates the risks of overinvestment in oil and gas*, Global Witness, 23 April 2019, <https://www.globalwitness.org/en/campaigns/oil-gas-and-mining/overexposed/>.
- Christian Holz, Sivan Kartha, and Tom Athanasiou, "Fairly sharing 1.5: national fair shares of a 1.5 C-compliant global mitigation effort," *International Environmental Agreements: Politics, Law and Economics*, 18(1), 2018, pp. 117-134, [10.1007/s10784-017-9371-z](https://doi.org/10.1007/s10784-017-9371-z); Sivan Kartha, Simon Caney, Navroz Dubash, and Greg Muttitt, "Whose carbon is burnable? Equity considerations in the allocation of a 'right to extract,'" *Climatic Change* 150(1-2), 117-129. <https://doi.org/10.1007/s10584-018-2209-z>.
- From Lorne Stockman, *Burning the Gas 'Bridge Fuel' Myth: Why gas is not clean, cheap, or necessary*, Oil Change International, May 2019, <http://priceofoil.org/gas-is-not-a-bridge-fuel/>.
- Frederiksen et al., "A Fair Direction for Denmark."
- Danish Energy Agency, "The government closes exploration and drilling for oil and gas on land in Denmark," 22 February 2018, <https://presse.ens.dk/news/regeringen-lukker-for-efterforskning-og-boring-efter-olie-og-gas-paa-land-i-danmark-295546>; Hvelplund et al., "Lessons from Denmark"; Frederiksen et al., "A Fair Direction for Denmark."
- Tarjei Haaland, "Government CO₂ emissions in 2018-2050 are miles from meeting the global 1.5 degree target," *Greenpeace Denmark*, 8 November 2018, <https://www.greenpeace.org/denmark/vi-arbejder-med/klima/greenpeace-analyse-regeringens-co2-udslip-i-2018-2050-er-milevidt-fra-at-leve-op-til-det-globale-15-gradsmaal/>.
- "Licensing Rounds," *Danish Energy Agency*, <https://ens.dk/en/our-responsibilities/oil-gas/licensing-rounds>.
- "Who is a member," *Oil Gas Denmark*, <http://www.oilgasdenmark.dk/uk/about-ogd/become-a-member/who-is-a-member/>; Danish Energy Agency, "Exploration and drilling for oil and gas on land."
- Danish Energy Agency, "Exploration and drilling for oil and gas on land."
- Comparison based on figures in Danish Energy Agency, "Resource Assessment and Production Forecasts," 30 August 2018, https://ens.dk/sites/ens.dk/files/OlieGas/ressourcer_og_prognoser_20180829_rev_en.pdf.
- Rystad UCube, "New Oil and Gas by Asset Type – Denmark."
- Tarjei Haaland, "Half as many cows and pigs: 2030 Climate analysis of Danish agriculture and non-ETS sectors to meet for 1.5 degrees goals," *Greenpeace*, 9 May 2019, <https://www.greenpeace.org/denmark/vi-arbejder-med/klima/halvt-saa-mange-koeer-og-svin/>.
- Rystad UCube, accessed 29 July 2019; Danish Energy Agency, "Annual Energy Statistics," Table 3.
- Domestic oil and gas use data from Danish Energy Agency, "Annual Energy Statistics – Preliminary Energy Statistics 2018," Table 3, accessed 29 July 2019, <https://ens.dk/en/our-services/statistics-data-key-figures-and-energy-maps/annual-and-monthly-statistics>; Tarjei Haaland, "Government CO₂ emissions in 2018-2050 are miles from meeting the global 1.5 degree target" *Greenpeace Denmark*, 8 November 2018, <https://www.greenpeace.org/denmark/vi-arbejder-med/klima/greenpeace-analyse-regeringens-co2-udslip-i-2018-2050-er-milevidt-fra-at-leve-op-til-det-globale-15-gradsmaal/>.
- Frederiksen et al., "A Fair Direction for Denmark."
- Fergus Green and Richard Denniss, "Cutting with both arms of the scissors: the economic and political case for restrictive supply-side climate policies," *Climatic Change* 150, 2018, pp. 73-87, <https://link.springer.com/article/10.1007/s10584-018-2162-x>.
- G.B. Asheim, T. Fæhn, K. Nyborg, M. Greaker, C. Hagem, B. Harstad, M.O. Hoel, D. Lund, and K.E. Rosendahl. "The case for a supply-side climate treaty." *Science*, 365, no. 6451 (2019): 325-327, [10.1126/science.aax5011](https://doi.org/10.1126/science.aax5011).
- Lofoten Declaration, <http://www.lofotendeclaration.org/>; Not a Penny More Declaration, <https://notapennymore.info/declaration/>.
- Powering Past Coal Alliance, "Members," 2 July 2019, https://poweringpastcoal.org/about/Powering_Past_Coal_Alliance_Members.
- World Bank Group, "World Bank Group Announcements at One Planet Summit," 12 December 2017, <https://www.worldbank.org/en/news/press-release/2017/12/12/world-bank-group-announcements-at-oneplanet-summit>; Swedfund, "Swedfund's

- Position Paper on Climate Change,” 27 October 2017, <https://www.swedfund.se/media/2015/swedfunds-position-paper-onclimate-2017-10-27.pdf>; Agence Française de Développement, “Energy Transition Strategy 2019-2022,” June 2019, <https://www.afd.fr/en/energy-transition-strategy-2019-2022>.
- 38 Greg Muttitt, “Climate Limits and Fossil Fuel Production,” Joint Oireachtas Committee on Communications, Climate Action and Environment, detailed scrutiny of the Petroleum and Other Minerals Development (Amendment) (Climate Emergency Measures) Bill 2018, p.5, https://data.oireachtas.ie/ie/oireachtas/committee/dail/32/joint_committee_on_communications_climate_action_and_environment/submissions/2018/2018-07-10_openingstatement-greg-muttitt-oil-change-international_en.pdf.
- 39 Christina Finn, “Dáil votes to ban oil and gas drilling in Irish waters,” *The Journal IE*, 28 March 2019, <https://www.thejournal.ie/oil-and-gas-exploration-ban-ireland-4565618-Mar2019/>; Arthur Neslen, “Spain plans switch to 100% renewable electricity by 2050,” *The Guardian*, 13 November 2018, <https://www.theguardian.com/environment/2018/nov/13/spain-plans-switch-100-renewable-electricity-2050>; Althingi (Parliament of Iceland), “A bill to the law: amending the Hydrocarbons Exploration, Research and Processing Act, no. 13/2001 (license),” 149. Legislative Assembly 2018-2019; Maz Plechinger, “Sweden seeks to ban oil and gas extraction,” *EnergyWatch*, 14 January 2019, <https://m.energywatch.eu/article/11123883>.
- 40 Lazarus et al., *Supply-Side Climate Policy*, pp. 14-15; A.Q. Gilbert and B.K. Sovacool, “US Liquefied Natural Gas (LNG) Exports: Boom or bust for the global climate?” *Energy*, Volume 141, 15 December 2017, pp. 1671-1680, <https://doi.org/10.1016/j.energy.2017.11.098>.
- 41 Green and Dennis, “Cutting with both arms of the scissors.”
- 42 Hillard Huntington, “Changing the Game? Emissions and Market Implications of New Natural Gas Supplies,” *Energy Modeling Forum*, September 2013, pp. vii, 10, 13-14, <https://emf.stanford.edu/projects/emf-26-changing-game-emissionsand-market-implications-new-natural-gassupplies-0>; Christine Shearer et al., “The effect of natural gas supply on US renewable energy and CO₂ emissions,” *Environmental Research Letters*, 9, 24 September 2014, <https://iopscience.iop.org/article/10.1088/1748-9326/9/9/094008/pdf>; Haewon McJeon et al., “Limited impact on decadal-scale climate change from increased use of natural gas,” *Nature*, 514, no. 7523, 23 October 2014, pp. 482-5, <https://doi.org/10.1038/nature13837>.
- 43 The study used six integrated assessment models to compare investments in scenarios with 66 percent probability of keeping below 2°C and with 50 percent probability of keeping below 1.5°C, compared to a business-as-usual scenario based on no new policies being introduced beyond those enacted by 2015. David McCollum et al., “Energy investment needs for fulfilling the Paris Agreement and achieving the Sustainable Development Goals,” *Nature Energy*, 3, 2018, pp. 589-599, <https://doi.org/10.1038/s41560-018-0179-z>.
- 44 Seto et al., “Carbon Lock-In.”
- 45 Fæhn et al., “versus Supply Side Policies.”
- 46 Greg Muttitt and Sivan Kartha, *Extraction and Equity*, Oil Change International and Stockholm Environment Institute, 2019, forthcoming.
- 47 World Bank, “Oil rents (% of GDP),” <https://data.worldbank.org/indicator/NY.GDP.PETR.RT.ZS>; Danish Energy Agency, “Economic Key Figures,” 2018, https://ens.dk/sites/ens.dk/files/OlieGas/oekonomiske_noegletal.pdf; “The Future of the Danish Oil and Gas Sector,” *The Committee for the Development of an Oil and Gas Strategy*, July 2017, p. 13, https://www.oilgasdenmark.dk/wp-content/uploads/2017/11/The-Future-of-the-Danish-Oil-and-Gas-Sector_July-2017_UK-til-tryk.pdf.
- 48 We have used 2016 data where available, or otherwise projections. Denmark revenue share: Danish Energy Agency, “Economic Key Figures,” 2018, https://ens.dk/sites/ens.dk/files/OlieGas/oekonomiske_noegletal.pdf; Other countries’ revenue share: IMF Article IV reports; Other countries’ revenue share: IMF Article IV country reports; GDP per capita: World Bank, <https://data.worldbank.org/indicator/ny.gdp.pc.ap.cd>.
- 49 Martin Bahn, “Denmark must be climate neutral in 2050, but new oil exploration in the North Sea can continue several years after,” *Dagbladet Information*, July 2019, <https://www.information.dk/indland/2019/07/danmark-vaere-klimaneutralt-2050-ny-oliejagt-nordsoeen-kan-fortsaeette-flere-aar>.
- 50 Ministry of Finance, “Økonomisk Redegørelse,” August 2019, p. 172, <https://www.fm.dk/publikationer/2019/oekonomisk-redegoerelse-aug-19>.
- 51 Bahn, “Denmark must be climate neutral.”
- 52 Sara Petrycer Hansen, “Danish Green Employment,” *Concito*, March 2019, p. 23, <https://www.concito.dk/sites/concito.dk/files/media/document/DKGv-Besk%C3%A6ftigelsesanalyse.pdf>; “The Future of Danish Oil and Gas,” *The Committee for the Development of an Oil and Gas Strategy*, p. 13.
- 53 Ropenus, *Snapshot of Danish Energy Transition*, pp. 59-64; Frederiksen et al., “A Fair Direction for Denmark.”
- 54 Benjamin M. Kefford, Benjamin Ballinger, Diego R. Schmeda-Lopez, Chris Greig, and Simon Smart, “The early retirement challenge for fossil fuel power plants in deep decarbonisation scenarios,” *Energy Policy*, 119 (2018): 294-306.
- 55 N. Bernasconi-Osterwalder and J. Haass,, “When Climate Leaders Protect Dirty Investments,” *Project Syndicate*, 7 November 2017, <https://www.project-syndicate.org/commentary/climate-trade-agreements-clean-energy-investment-by-nathalie-bernasconi-osterwalder-and-j-rg-haas-3-2017-11>; N. Hildyard and G. Muttitt, “Turbo-Charging Investor Sovereignty: Investment Agreements and Corporate Colonialism,” In Bello, W, (ed), 2006, *Destroy and Profit: Wars, Disasters and Corporations*, Bangkok: Focus on the Global South, <http://www.focusweb.org/pdf/Reconstruction-Dossier.pdf>; Public Citizen, (2014), *Case Studies: Investor-State Attacks on Public Interest Policies*, https://www.citizen.org/sites/default/files/egregious-investor-state-attacks-case-studies_4.pdf.
- 56 Mark W. Friedman and Floriane Lavaud, “Damages Principles in Investment Arbitration,” *Global Arbitration Review: The Guide to Damages in International Arbitration – Second Edition*, (Washington D.C.: Wilmer Hale, 2018), <https://globalarbitrationreview.com/chapter/1151332/damages-principles-in-investment-arbitration>; V.V. Veeder, Brigitte Stern, David Haigh, “Claimant’s memorial — In The Matter of an Arbitration Under Chapter Eleven of the North American Free Trade Agreement and the UNCITRAL Arbitration Rules — between Lone Pine Resources Inc. and Government of Canada,” 10 April 2015, http://icsidfiles.worldbank.org/icsid/ICSIDBLOBS/OnlineAwards/C4406/DC5878_En.pdf.
- 57 Shola Oshodi-John, “UK Court Rules In Favour of Pand ID To Seize \$9bn FGN Assets, Nigeria To Appeal Decision,” *Proshare Intelligent Investing*, 16 August 2019, <https://www.proshareng.com/news/Debtors---Recovery/UK-Court-Rules-In-Favour-of-Pand-ID-To-S/46659>.
- 58 Jenn Lawless, “Petroleum industry needs to get on board with a just transition,” *New Zealand Council of Trade Unions*, 13 April 2018, <https://www.union.org.nz/5441-2/>.
- 59 Lizette Risgaard, “Bål og brand i byen får ikke just CO₂-niveauet til at falde,” *FH*, 25 June 2019, <https://fho.dk/blog/2019/06/25/vi-skal-passe-paa-at-klimakamp-ikke-bliver-klassekamp/>.
- 60 Committee for the Development of an Oil and Gas Strategy, “The Future,” p. 13.
- 61 Greg Muttitt, Anna Markova, and Matthew Crighton, *Sea Change: Climate Emergency, Jobs and Managing the Phase-Out of UK Oil and Gas Extraction*, Oil Change International, Platform, and Friends of the Earth Scotland pp. 50-55. These recommendations drew from, among others: International Labour Organization. (2015), Guidelines for a just transition towards environmentally sustainable economies and societies for all, Geneva: ILO, http://www.ilo.org/global/topics/green-jobs/publications/WCMS_432859/lang--en/index.htm; ITUC/CSI/IGB, Trade Union Statement to the G7 Labour and Employment Ministers’ Meeting, Turin, September 2017, <https://www.ituc-csi.org/trade-union-statement-to-the-g7-19112>; International Trade Union Confederation, “Climate Justice: There are no jobs on a dead planet,” March 2015, <https://www.ituc-csi.org/itucfrontlines-briefing-climate>; Labor Network for Sustainability, “‘Just Transition’ – Just What Is It?” 2016, <https://www.labor4sustainability.org/uncategorized/justtransition-just-what-is-it/>.
- 62 “Esbjerg,” *World Energy Cities Partnership*, <https://energycities.org/member-cities/esbjerg-denmark>.
- 63 William Colgan, Jason E. Box, Sofia Ribeiro, and Kristian K. Kjeldsen, “Sea-level rise in Denmark: Bridging local reconstructions and global projections,” *Geological Survey of Denmark and Greenland Bulletin 43*, 2019, <https://doi.org/10.34194/GEUSB-201943-01-01>.



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