



WWF

REPORT

EU

2019

INVEST BELOW

1.5°C



ASSET OWNER GUIDE TO OIL & GAS PRODUCERS

Author

Jan Vandermosten,
WWF European Policy Office
jvandermosten@wwf.eu

WWF Contributors

WWF Climate and Energy Practice: Chris Weber
WWF-Denmark: Hanne Jerschild
WWF European Policy Office: Sebastien Godinot
WWF-Germany: Matthias Kopp
WWF-Italy: Matteo Leonardi
WWF-Netherlands: Nicolas Poolen
WWF-Norway: Stefano Esposito
WWF-Spain: Lennys Rivera
WWF-Switzerland: Amandine Favier

Disclaimer: This publication and related materials are not intended to provide and no constitute financial or investment advice. WWF makes no representation regarding the advisability or suitability of investing in any particular company, investment fund or other vehicle or of using the services of any particular entity, pension provider or other service provider for the provision of investment services. A decision to use the services of any pension provider, or other entity should not be made in reliance on any of the statements set forth in this publication. Whilst every effort has been made to ensure the information in this publication is correct, WWF and its agents cannot guarantee its accuracy and the shall not be liable for any claims or losses of any nature in connection with information contained in this document, including (but not limited to) lost profits or punitive or consequential damages or claims in negligence.

Graphic design: Onehemisphere, Sweden.

Cover photo: © iStock.



WWF gratefully acknowledges
the financial support of the KR
Foundation for this publication



This project has received funding from
the European Union's Life Programme
under grant agreement
No. Life17/NGO/SGA/FR/100020.

Published in June 2019 by WWF – World Wide Fund for Nature (formerly World Wildlife Fund), Brussels, Belgium. Any reproduction in full or in part must mention the title and credit the above-mentioned publisher as the copyright owners. © Text 2019 WWF. All rights reserved.

WWF RECOMMENDATIONS AT A GLANCE

LEARNING AND SEEKING ADVICE

1. Assess what the Paris Agreement implies for the oil & gas sector p.5
2. Assess the evidence of growing financial risks for the oil & gas sector p.7
Risk 1: Carbon content risk p.8
Risk 2: Cost risk p.10
Risk 3: Other environmental, social and governance (ESG) risks p.11

DECISION-MAKING

3.  Adopt a policy for oil & gas producers at portfolio level p.16

MONITORING SERVICE PROVIDERS AND ENGAGING WITH KEY STAKEHOLDERS

4.  Identify oil & gas producers suited for meaningful shareholder engagement p.18
Criterion 1: Collective engagement p.20
Criterion 2: Exposure to carbon risk, cost risk and other ESG risks p.20
Criterion 3: Oil & gas capital expenditure discipline p.22
Criterion 4: Diversification strategy towards zero-carbon technologies p.23
5.  Define meaningful requests to oil & gas producers p.24
6. Engage with policy makers p.27
7. Publicly disclose oil & gas-related decisions and activities p.28

 PRIORITY

INTRODUCTION: HOW TO USE THIS GUIDE	4
REMINDER: TOPLINE RECOMMENDATIONS FROM THE WWF CLIMATE GUIDE TO ASSET OWNERS	29
ANNEX 1. GAS IS MORE CARBON-INTENSIVE THAN PREVIOUSLY THOUGHT	30
ANNEX 2. ASSET OWNER TEMPLATE POLICY FOR OIL & GAS PRODUCERS	31
ANNEX 3. COMPANY-SPECIFIC CLIMATE-RELATED RISK ANALYSES	34

INTRODUCTION: HOW TO USE THIS GUIDE

In the Paris Climate Change Agreement ('Paris Agreement'), 195 countries agreed the Paris climate goals. They notably committed to 'hold the increase in the global average temperature to well below 2°C above pre-industrial levels and to pursue efforts to limit the temperature increase to 1.5°C'. The agreement also states that financial flows must be made 'consistent with a pathway towards low greenhouse gas emissions and climate-resilient development'.¹

With this Guide, WWF wishes to outline how asset owners can incorporate Paris alignment into their investment processes. The recommendations cover all asset classes (i.e. public equity, private equity, debt instruments, etc.) but are limited to companies that are defined as 'oil & gas producers' by the FTSE International Classification Standard.²

Based on climate science, **this Guide argues that asset owners should phase-out virtually all oil & gas investments from their portfolio by 2040 in OECD countries, and by 2050 globally.** Existing literature and market developments indicate that action to respect the Paris climate goals will accelerate the breakthrough of zero-carbon technologies (e.g. electric cars, renewable power and energy efficiency): this will impact demand for oil & gas, and primarily affect high-carbon-high-cost oil & gas projects.

This Guide complements the 2017 overarching [WWF Climate Guide to Asset Owners](#), which presents 15 high-level recommendations of a more general nature (see reminder on page 29). The Guide is structured around three key types of action:

- Learning and seeking advice
- Decision-making
- Monitoring service providers and engaging with key stakeholders

¹ UNFCCC (2015). Paris Agreement, article 2.1a and 2.1c.

² This guide covers all companies which perform oil & gas exploration and production, based on FTSE International Classification Standards as of June 2019. This includes integrated oil & gas companies. It does not include other subsectors such as 'oil equipment, services & distribution' and 'alternative energy', although these will also need to transition in line with global climate change objectives.

1. ASSESS IMPLICATIONS OF THE PARIS AGREEMENT FOR THE OIL & GAS SECTOR

WWF RECOMMENDATION 1

WWF recommends that asset owners build expertise on the implications of the Paris Agreement for the oil & gas sector, in order to understand how this will impact their investment policies and processes. Latest climate science finds that:

- The threshold of 1.5°C warming should not be exceeded (i.e. no overshoot) in order to avoid the worst effects of climate change. This implies that emissions from oil & gas must reach virtually zero by 2040 in OECD countries, and by 2050 globally.
- To avoid overshooting the 1.5°C goal, oil & gas production must fall by approximately 4.6% per year compounding between 2020 and 2040. Tolerating a low level of overshoot (less than 0.1°C) still requires a relatively swift phase out of oil (approximately 3.3% per year) and gas (approximately 2% per year) over the same period.

There is a growing consensus amongst leading investors globally that we are moving irreversibly towards a low carbon economy. Yet, this transformation is not happening fast enough and global emissions are still increasing.³ Current pledges from the Paris Agreement signatories would lead to global warming of approximately 3°C by 2100.⁴ There is thus a need to accelerate action.

The Paris Agreement indicates that reaching the Paris climate goals will require net greenhouse gas emissions to reach zero in the second half of the century. More recently, however, the Intergovernmental Panel on Climate Change (IPCC) special report on global warming of 1.5°C has underlined the importance of meeting this more stringent threshold of the Paris Agreement in order to avoid the worst impacts of climate change (extreme heat waves, severe droughts, coral bleaching, etc.). In short, they make clear that '1.5°C is the new 2°C'.

The aforementioned IPCC report draws conclusions on the basis of a wide range of climate scenarios, some of which accept that the 1.5°C target is temporarily exceeded – referred to as overshoot – before coming back down. WWF believes that such overshoot should be avoided because it would entail too high impacts and risks.

³ International Energy Agency (2019), Global energy & CO₂ status report.

⁴ Climate Action Tracker (2019), The CAT thermometer.

Meeting the 1.5°C target without overshooting or relying heavily on negative emissions implies that global greenhouse gas emissions need to reach net-zero by 2050.⁵ OECD countries should move faster, given their responsibility for historical emissions, and the EU for example should aim to reach zero net emissions by 2040.⁶ This has major implications for the oil & gas sector:

- Given the uncertainties associated with the application of carbon capture and storage (CCS)⁷ in oil & gas end-use sectors (e.g. power production, transport, heating and cooling in the residential sector), WWF believes there will be **close to zero scope for greenhouse gas emissions from oil & gas by 2040 in OECD countries, and by 2050 globally.**
- To avoid overshooting the 1.5°C goal, oil & gas production must fall by approximately 4.6% per year compounding between 2020 and 2040. Tolerating a low level of overshoot (less than 0.1°C) still requires a relatively swift phase out of oil (approximately 3.3% per year) and gas (approximately 2% per year) over the same period.

It is worth noting that, in an unprecedented move, a large group of investors and investor coalitions representing more than \$33 trillion under management recently called the International Energy Agency (IEA) to develop a transparent long term climate scenario ‘to reflect the full range of ambition of the Paris goals and make this the central reference of the World Energy Outlook. This scenario should include a reasonable probability (66%) of limiting warming to 1.5°C; a longer time horizon (beyond 2040); and a precautionary approach to negative emissions technologies’.⁸ Such an initiative re-enforces the importance of using a 1.5°C scenario with no/limited overshoot as we propose above.

Asset owners should consider how to adapt their investment policies according to the findings set out above (Recommendation 3), work with internal and external investment managers to implement those policies in their relations with portfolio companies (Recommendations 4 and 5), and engage with policy makers (Recommendation 6).

⁵ The IPCC finds that meeting the 1.5°C warming target without overshoot requires global net CO₂ emissions to decline by 58% from 2010 levels by 2030, and reach zero slightly before 2050. The European Commission’s 2050 zero carbon roadmap for the EU long term climate strategy – drawing on the IPCC report and further work by the Netherlands Environmental Assessment Agency and its own Joint Research Centre – go further, arguing that scenarios with no or limited overshoot of 1.5°C and that don’t rely heavily on negative emissions later in the century see global net greenhouse gas emissions reach zero by around 2050 and net CO₂ emissions well before that date.

⁶ WWF (2018), WWF position paper on the EU’s long-term climate strategy.

⁷ WWF finds that scenarios relying significantly on CCS are inconsistent with current developments: commercialisation of CCS remains very slow and counting on CCS to mitigate emissions without taking due account of the slow real-world pace of CCS development unrealistically increases the risk of unabated fossil fuel emissions. A high-

renewables pathway is more realistic, and no more costly: we advocate concentrating on the full range of efficiency, renewables, smart grid and interconnection technologies. It should also be noted that limited storage space argues for limited CCS: the amount of pore space practically available for storage will be far lower than the technically available amount because some sites will not be cost effective or enjoy public support. Deployment of CCS should thus be focused on industrial processes where decarbonisation may be harder to achieve, rather than vast amounts of power plant emissions for fossil fuels that can be replaced by renewable energy. WWF (2013), WWF reaction to the European Commission’s ‘Consultative Communication on The Future of Carbon Capture and Storage in Europe’.

⁸ Letter to Fatih Birol and the IEA governing council chair, 2 April 2019, IEA WEO scenarios and climate transitions.

2. ASSESS THE EVIDENCE OF GROWING FINANCIAL RISK FOR THE OIL & GAS SECTOR

WWF RECOMMENDATION 2

WWF recommends that asset owners assess the evidence of growing financial risks for the oil & gas sector, and build an understanding of how these risks can be mitigated. Analysis finds that in a 1.5°C compliant transition:

- There is extremely limited room for investments in new oil & gas fields, if any at all, but there is some limited room for continued investments in current sources of supply;
- Continuing exploration to find new oil & gas reserves is irrelevant and should be stopped.

Companies that are exposed to high-carbon-high-cost projects and/or projects with high environmental, social and governance (ESG) risks are more vulnerable to the risk of stranded assets than companies that are actively preparing for a zero-carbon transition in line with the 1.5°C target.

Very limited room for further oil & gas investments

The rate at which oil & gas is produced is driven by the energy contained in the respective reservoir: if the reservoir's energy levels fall due to production, so does the production rate. This process is called the **natural decline rate**. The exact natural decline rate is subject to discussion and varies per oil & gas source/project, but the following findings by the IEA can be taken as general guidance: 'if no new fields were to enter operation and there were to be no capital expenditure as of 2018 in all current sources of supply, then oil production would fall by more than 8% per year to 2025. In practice, companies do invest in their *current* sources of supply and this slows the aggregate drop in production to the observed decline rate of just over 4%.⁹

A comparison with the findings from Recommendation 1 reveals that:

- There is some limited room for continued investments in existing oil & gas fields: the natural decline rate in absence of further investments (approximately 8% per year) is *higher* than the decrease in oil & gas demand in no/limited overshoot 1.5°C scenarios. This does not imply that such investments are necessary: they can be largely avoided if the technological potential of zero-carbon technologies and levers for societal change are fully exploited.
- However, the actual observed decline rate (just over 4% per year) is *below* the needed decline rate in no overshoot 1.5°C scenarios (around 4.6% per year). **This would suggest there is little room left climate-wise for any new oil & gas project in addition to ongoing investments in the existing projects**, and that new projects will have a particularly high risk of ending up stranded. This will ultimately depend on a number of factors, including realistic assumptions on the potential for CCS development and exact natural decline rates.

⁹ IEA (2018) World Energy Outlook 2018.

It is crystal clear, in any case, that planned oil & gas projects vastly outnumber the developments allowed to meet the Paris climate goals. Even in the most optimistic case, very few new oil & gas projects can be developed globally. This implies that **continuing exploration to find new oil & gas reserves is irrelevant in a 1.5°C compliant transition and should be stopped.**¹⁰

As a result, asset owners should no longer assess oil & gas producers based on the size of their oil & gas reservoirs and proven reserves, but rather on whether said companies' investments are directed to projects that can or cannot be developed in a 1.5°C compliant transition. WWF believes that the latter will depend on three primary risks:

- The carbon content of the projects.
- The costs of developing the projects.
- The projects' impact on environmental, social and governance (ESG) issues.

In other words, **companies exposed to high-carbon-high-cost projects and/or projects with high ESG impacts are more vulnerable to the risk of stranded assets than companies that are actively preparing for a zero-carbon transition in line with the 1.5°C target.** The paragraphs below lay out these risks in general terms, while Recommendation 4 provides more information on criteria and analysis that allow to identify individual companies at risk.

**Risk 1:
Carbon content risk**

The IPCC has provided life-cycle emission estimates for different fuels in the power generation and transport sector.¹¹ Its power sector data indicate that life-cycle emissions from oil are generally higher than gas, while the transport sector data show that heavy crude oil and oil sands have particularly high life-cycle emissions due to energy-intensive extraction and/or transformation processes.

Recent research indicates that methane leakage at the extraction and transportation stage of natural gas will result in life-cycle emissions at the higher end of the IPCC estimates (see Annex 1).¹² This is in particular the case for shale gas and liquefied natural gas (LNG).¹³ Companies with high gas exposure relative to oil are therefore not necessarily better shielded against carbon content risk.

The high carbon content of oil & gas materialises into climate transition risk. Certain government policies and measures (such as carbon prices) that aim to curtail greenhouse gas emissions in line with the Paris Agreement will accelerate a shift in consumer demand towards zero-carbon technologies such as electric cars and renewable power (see Box 1). **Companies exposed to oil & gas – notably to high-carbon projects such as oil sands/extra heavy oil, shale oil & gas and LNG – are most vulnerable to these transition risks.**

¹⁰ Some stakeholders may argue that cost-wise exploration still makes sense if the oil and gas discovered can be exploited at a lower price than average. This is however extremely risky as it assumes (i) that exploitable reserves will be found, (ii) that they will be cheaper to exploit than others, (iii) despite the exploration costs themselves, that can be quite high (and that have already been paid for in competing existing projects and proven reserves).

¹¹ IPCC (2011), Renewable Energy Sources and Climate Change Mitigation.

¹² IPCC (2013), Anthropogenic and natural radiative forcing. Methane is a very potent greenhouse gas: over a 20-year period it is 86 times worse than CO₂ (while it is 36 times worse than CO₂ over 100 year timescale). The 2050 deadline to meet the Paris climate goals means that the 20-year period is the one that should be primarily used.

¹³ Transport and Environment (2018), CNG and LNG for vehicles and ships – the facts. Joe Romm (2014), Energy Department Bombshell: LNG Has No Climate Benefit For Decades, if Ever.

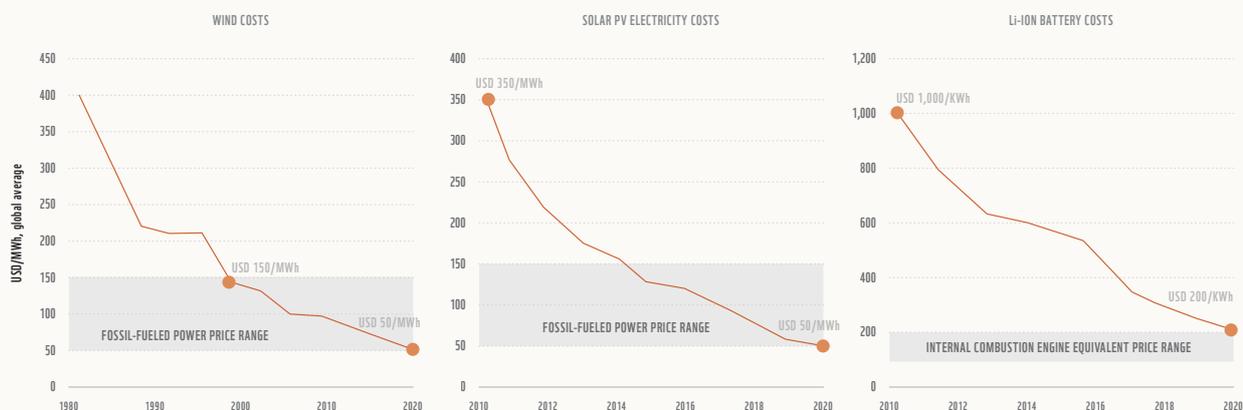
BOX 1. DISRUPTIVE ZERO-CARBON TECHNOLOGIES

Worldwide oil consumption is concentrated in the transport (61%) and industry/non-energy (24%) sectors; while the consumption of gas is divided between the power (47%), industry (27%) and residential/other sectors (26%).¹⁴ There is a growing number of zero-carbon technologies in several of these key sectors that are increasingly impacting fossil fuel consumption – including the below:

- **Renewable power.** The cost curves of wind and solar power have plummeted over the last few years. They are currently already competing with fossil fuel-based power, and are expected to be cheaper than fossil fuels in every major region of the world by 2020 according to IRENA.¹⁵
- **Energy Efficiency.** IRENA finds that energy efficiency can account for about half of energy-related emission reductions by 2050.
- **Electric vehicles (EVs).** Bloomberg New Energy Finance estimates that the initial price of EVs will be comparable to that of conventional cars by the early 2020s, on the back of decreasing costs of li-ion batteries.¹⁶ The sale of EVs is already increasing significantly, and a race-to-the-top is starting to take shape across car manufacturers.¹⁷ Bloomberg estimates that, following a realistic development, EVs could displace oil demand at a critical threshold that would cause an oil crash as early as 2028.¹⁸
- **Electricity storage.** The cost of batteries has been falling dramatically in the last few years, much quicker than analysts planned. This obviously boosts EVs, but will also make intermittent renewable power like solar and wind even more competitive.¹⁹

Zero-carbon technologies become disruptive as soon as they compete with the incumbent oil & gas technologies on price (see Figure 1), and consequently are in a position to take all growth in demand: this is the point at which oil & gas production will peak. Carbon Tracker Initiative finds that this inflection point could already be reached in 2023, which is a lot quicker than foreseen by traditional models (e.g. IEA).²⁰

FIGURE 1 DECREASING COSTS OF ZERO-CARBON TECHNOLOGIES (CARBON TRACKER INITIATIVE)



¹⁴ IEA (2018), Key world energy statistics. IEA (2018), Gas 2018.

¹⁵ Carbon Tracker Initiative (2018), 2020 vision: why you should see peak fossil fuel coming.

¹⁶ Carbon Tracker Initiative (2018), 2020 vision: why you should see peak fossil fuel coming.

¹⁷ For example, the Tesla Model 3 is amongst the best-selling sedans in the USA: Bloomberg (October 2018), Tesla's Model 3 Is Becoming One of America's Best-Selling Sedans.

¹⁸ Bloomberg (2016), Here's How Electric Cars Will Cause the Next Oil Crisis.

¹⁹ Grantham Institute, Carbon Tracker Initiative (2017), Expect the Unexpected - The Disruptive Power of Low-carbon Technology.

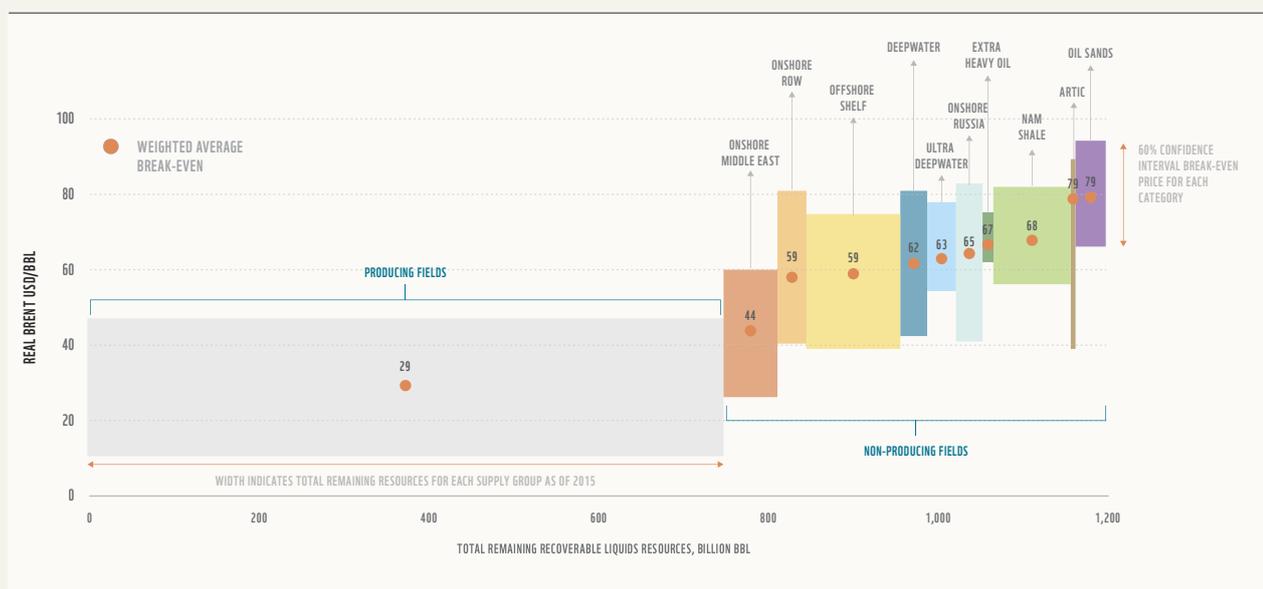
²⁰ Carbon Tracker Initiative (2018), 2020 vision: why you should see peak fossil fuel coming. Based on assumptions of total energy demand growth with 1.3% and solar PV and wind supply growth of 17%. Lower or higher assumptions for total energy demand growth and/or solar PV and wind supply growth will result in changing peak dates, ranging from 2020 to 2043.

Risk 2: Cost risk The developments set out in Box 1 will lead to lower oil & gas demand, and oil & gas projects with a too high break-even price will likely not be developed. Carbon Tracker Initiative estimates that **the potential capital expenditure associated with projects exceeding a 1.75°C carbon budget (i.e. IEA beyond 2 degrees scenario, B2DS) amounts to \$1.6 trillion between 2018 and 2025**, compared to a scenario in which current climate policies are achieved (IEA new policies scenarios, NPS, 2.7°C).²¹

Generally each oil & gas theme has a range of costs, so no blanket statements can be made about which oil & gas resources are high cost. **Arctic oil, oil sands/extra heavy oil and LNG** are comparatively higher cost than other oil & gas sources. Oil & gas producers that are disproportionately exposed to these sources face higher cost risk.²²

New projects are also higher cost, given that existing projects have already sunk their initial capital expenditure.²³ While this puts the spotlight on oil & gas producers that are actively doing exploration or developing new projects, it does not imply that companies with only existing oil & gas projects in their portfolios are free of cost risks: these project can also lose value, and struggle to recover sunk costs in light of lower oil & gas prices.

FIGURE 2 GLOBAL LIQUIDS COST CURVE (RYSTAD ENERGY)²⁴



²¹ Carbon Tracker Initiative (2018), Mind The Gap: the \$1.6 trillion energy transition risk.

²² Rystad Energy (1 October 2015), Global liquids cost curve.

²³ Carbon Tracker Initiative (2018), Mind The Gap: the \$1.6 trillion energy transition risk.

²⁴ It should be noted that the Rystad cost curve dates from 2015, and that WWF could not find more recent data. While it still gives an indication of costs of various oil & gas sources, the cost range of some of the included sources may have changed significantly since 2015. This figure should hence be interpreted with caution, and additional sources must be consulted to draw final conclusion on the cost range of oil & gas sources.

Risk 3: Other environmental, social and governance (ESG) risks

In addition to causing climate change, the exploration and extraction of oil & gas has well documented potential risks related to all dimensions of ESG. These risks can further exacerbate the climate-related financial risks that oil & gas producers are exposed to, and should hence be taken in account by asset owners. This part starts by setting out various environmental risks – providing further background in boxes – before exploring social and governance risks.

WATER RISKS

Water risks can be physical (such as pollution, scarcity or flooding), but also regulatory and reputational: they have the potential to be highly material to oil & gas producers. Water risks can be mapped at basin level by the WWF Water Risk Filter (See Box 2), and also include an operational aspect. They are most documented for the extraction of shale oil & gas and oil sands/extra heavy oil. Notable risks are:

- **Water pollution.** Shale oil & gas extraction causes contamination of shallow aquifers with fugitive hydrocarbon gases, contamination of surface water from spills and leaks, and the accumulation of toxic and radioactive elements near disposal and spill sites.²⁵ Oil sand extraction generates toxic by-products such as hydrocarbons, naphthenic acids, ammonia, mercury, arsenic and lead that contaminate the used freshwater: leaks from the tailing lakes in which these reservoirs are stored risk to negatively impact the surrounding environment and biodiversity.²⁶
- **Water scarcity.** Drilling and hydraulic fracturing of shale oil & gas resources requires between 7 and 25 million litres per well, and 38% of shale resources face high to extremely high water stress and arid conditions.^{27,28} Oil sands use at least three times as much freshwater per barrel of oil as conventional oil operations.²⁹ Water scarcity can turn into additional economic costs and related risks of asset stranding.

BOX 2. WWF TOOL: THE WATER RISK FILTER

A leading, free and [online tool](#) developed by WWF and the German Development Finance Institution DEG, the Water Risk Filter 5.0 allows users to explore, assess, value and respond to water risks.

The Water Risk Filter 5.0 is based on 32 peer-reviewed data layers along with a site-based operational risk questionnaire to assist users to understand and prioritize water risks and specific sites. Designed to be easy to use by non-water experts, it is the only water risk tool to assess both basin and operational risks. The approach in which the Water Risk Filter 5.0 calculates basin water risks is flexible, enabling the user to adjust the assessment according to the specific sector of interest (e.g. energy, agriculture, food & beverage, etc).

In addition to risk assessment, the tool also offers a Respond section that draws on a user's risk assessment results to generate a customized set of recommended response actions. Whether for one site, ten sites or 1000 sites, the Respond section can rapidly offer tailored response actions.

Trusted by dozens of Global 2000 companies for corporate water risk assessment, the Water Risk Filter 5.0 is capable of guiding oil & gas producers along their water stewardship journey from assessment to response to water risks.

²⁵ Avner Vengosh e.a. (2014), A Critical Review of the Risks to Water Resources from Unconventional Shale oil & gas Development and Hydraulic Fracturing in the United States, Environmental Science and Technology.

²⁶ A. Scarlett e.a. (2012), Predicted Toxicity of Naphthenic Acids Present in Oil Sands Process-Affected Waters to a Range of Environmental and Human Endpoints, in Science of the Total Environment, 425 (2012).

²⁷ While not a direct focus of this guide, it should also be noted that the production of power from fossil fuels requires large amounts of water, and that 47% of the world's thermal power capacity is situated in high water-stressed areas. WRI (2018), Water Stress Threatens Nearly Half the World's Thermal Power Plant Capacity.

²⁸ WRI (2014), Global Shale oil & gas Development: Water Availability & Business Risks.

²⁹ Responsible Canadian Energy (2010), Progress Report.

OFFSHORE OIL & GAS SPILLS

Oil & gas spills have been highly visible following incidents with tankers (e.g. Exxon Valdez, MV Erika, Prestige) and drilling platforms (e.g. Deepwater Horizon).³⁰ These disasters have major impacts on the local economy and environment, and carry significant reputation and litigation risks. In addition to major oil & gas spills, smaller and less-mediatised spills also have major impacts on the surrounding environment.³¹

BOX 3. HIGHLIGHT: ARCTIC OIL & GAS

The Arctic, with its unique habitats, is one of the frontiers for climate change, and the Arctic region has been warming twice as fast as elsewhere on Earth over the last 50 years. This warming is causing changes to sea ice: satellite data show that over the past 30 years, Arctic sea ice cover³² has declined by 30% in September, the month that marks the end of the summer melt season.³³

The changing conditions in the Arctic have caused a growing interest in the region from oil & gas producers. However, so far, companies that have ventured into the North-American Arctic have not been successful. Shell suspended activities in that region a first time in 2012 when a drilling rig broke free and ran aground. In 2015 it abandoned its Arctic search for oil entirely, after not finding enough crude. The company had spent about \$7 billion on exploration in the waters off Alaska without any significant return.³⁴

Oil & gas activities in the Arctic carry important risks because of:

- **Cost.** A Goldman Sachs analyst voiced the company's view as follows: 'We think there is almost no rationale for Arctic exploration... Immensely complex, expensive projects like the Arctic we think can move too high on the cost curve to be economically doable'. This is particularly the case for North-American projects.³⁵
- **Challenging environmental conditions.** This may notably lead to oil spills, for which currently no technological and commercially viable solutions exist. Major spills create liability risks, and few companies would be able to absorb related costs. In addition to there being a technology gap to clean up oil spills there is also a response gap in relation to them.
- **Unpredictable conditions.** The thawing conditions have delayed oil drilling and are impacting on infrastructure.^{36,37}
- **Impacts on the local population, environment and ecosystems.** These may originate from the destruction of livelihoods, oil spills, noise and light pollution.

³⁰ ABC (7 May 2010), Timeline: 20 years of major oil spills.

³¹ A recent example (March 2019) is an oil tanker incident in the Solomon Islands, near a World Heritage Site. The MV Solomon Trader with 700 tonnes of oil on board ran aground and started spilling oil. The sea currents fortunately carried the oil away from the World Heritage Site, but the incident is impacting on local communities. The Guardian (2019), 'We cannot swim, we cannot eat': Solomon Islands struggle with nation's worst oil spill.

³² This loss of ice is impacting on species (loss of habitat) and the Arctic people who are seeing changed weather patterns, changes in ice formation and therefore their traditions like hunting. There is a need to develop the Arctic sustainably but oil & gas is not the way forward.

³³ Arctic Monitoring and Assessment Programme (2017) Snow, Water, Ice and Permafrost in the Arctic.

³⁴ Reuters (2015), Royal Dutch Shell pulls plug on Arctic exploration.

³⁵ Foreign Policy (2017), Oil Companies Cool on Arctic Drilling, Trump Wants It Anyway.

³⁶ The Guardian (2018), US oil firm's bid to drill for oil in Arctic hits snag: a lack of sea ice.

³⁷ Hjort J, Karjalainen O, Aalto J, Westermann S, Romanovsky VE, Nelson FE, Eitzelmüller B, Luoto M. (2018) Degrading permafrost puts Arctic infrastructure at risk by mid-century. Nature Communications.

BIODIVERSITY DEGRADATION

Oil & gas use impacts biodiversity indirectly through climate change, but also directly through habitat loss and local pollution. Academic research³⁸ indicates that:

- Currently exploited oil & gas infrastructure tends to be found where species richness and range rarity are higher, both on land and sea.
- 181 oil & gas fields that are favourable for exploitation are located in high biodiversity places: the vast majority of these fields are currently not within protected areas, which means the astounding biodiversity they host faces severe risk of destruction.

Oil & gas companies have already been forced to stop exploration activities due to biodiversity concerns: Total and SOCO have, for instance, abandoned plans to extract oil from the Virunga National Park (UNESCO world heritage site) following pressure from amongst others UNESCO and an OECD complaint filed by WWF. Any investments from these companies in those projects ended up stranded.³⁹

BOX 4. WWF TOOL: SIGHT

WWF has developed a geo-spatial tool to map and dig into biodiversity aspects in much more detail at asset level. The tool, called [WWF-SIGHT](#), enables users to bring together diverse spatial datasets – including commercial oil & gas data which updates quarterly⁴⁰ – and combine them with satellite imagery to provide a near real-time asset-level understanding on the current status of conservation assets around the globe. By doing so, the platform aims to provide an up-to-date high-level understanding of what is happening on the ground.

WWF-SIGHT can be used to monitor places of interest, and to analyse overlap or proximity of economic assets with environmental assets. It notably allows to overlap oil & gas concessions with UNESCO World Heritage Sights (WHS), Protected Areas (PAs), Key Biodiversity Areas (KBAs)⁴¹, and Ecologically or Biologically Significant Marine Areas (EBSAs). It also allows overlapping with the world's mangroves, coral reefs, wetlands and forests. It hence enables to identify which oil & gas activities threaten key ecosystems.

WWF-SIGHT has been used to do research on WHS, finding that almost a third of all natural WHS are under threat of oil, gas and mining exploration;⁴² as well as to analyse links between those activities and financial portfolios, for example in Norway.⁴³ This work has, in turn, underpinned a global insurance industry commitment to protect WHS led by the UN Environment's Principles for Sustainable Insurance Initiative (UN PSI) in partnership with UNESCO and WWF.⁴⁴ The 11 signatories – amongst

³⁸ Harfoot MBJ, Tittensor DP, Knight S, et al. Present and future biodiversity risks from fossil fuel exploitation. *Conservation Letters*.2018;11:e12448.

³⁹ WWF (2013), UK oil company Soco's exploration in Virunga violates OECD guidelines, WWF alleges.

⁴⁰ The dataset provides up to date delineations of oil & gas concessions for 170 countries, planned wells, reported farm-ins, potential farm-ins, asset transactions, awards, operated contracts, rounds and relinquished areas. It contains 100's on attributes behind the spatial data defining

key information such as ownership, operators, data of application, grant data, etc.

⁴¹ As defined by the UN Convention on Biological Diversity.

⁴² WWF (2015), Safeguarding Outstanding Natural Value.

⁴³ WWF (2018), Norwegian investments in extractive projects threatening UNESCO World Heritage Sites.

⁴⁴ UNEP-FI, UN PSI, UNESCO and WWF (2018). Protecting our world heritage.

which Allianz, Swiss RE, SCOR and La Banque Postale – commit to take various actions in order to prevent or reduce the risk of insuring and investing in companies or projects whose activities could damage WHS.⁴⁵ UN PSI and WWF are currently working on a guidance document that insurers can use to implement their commitments.

WWF considers that oil & gas projects should not harm ecosystems of high ecological importance: this should notably cover nationally and internationally protected areas, and at the very least KBAs and WHS. Such action is also recommended by the ISO 14030 standard that is in the making, and by the IUCN motion 26 that calls for all IUCN I-VI zones to be ‘no go’ areas.

WWF-SIGHT is an internal WWF tool due to commercial licencing restrictions. However, WWF is currently facilitating discussions with financial institutions, data providers and third party financial data providers to offer corporate asset-level risk screening based on spatial data as part of the widely used risk screening tools.

SOCIAL AND GOVERNANCE ISSUES

Beyond direct environmental impacts, oil & gas producers’ activities also influence other major social and governance issues:

- **Social and human rights risks.** Research on the extent to which mining projects are subject to indigenous community opposition and/or in violation of indigenous peoples’ rights indicates that 37% of oil & gas projects have high risk exposure, and only 10% low risk exposure.⁴⁶ The oil & gas sector is performing worse than other mining sectors, and generally companies have no robust analytical processes in place for identifying and evaluating the full range of costs of conflicts with local communities.⁴⁷ Hence, the oil & gas sector can be considered to be more than average exposed to reputational and liability risks from social conflict.
- **Counterproductive climate lobbying.** Research from the think tank InfluenceMap indicates that oil & gas producers have opposed ambitious climate action as soon as prospects of regulation began to appear in the late 1980s, and have in several cases even financed climate-sceptic organisations and work.⁴⁸ Even though companies in the sector have recently launched PR campaigns that stress their support for top line measures like the Paris Agreement and a carbon price, they have spent \$1 billion since the adoption of the Paris Agreement to oppose policy streams around the world – such as a carbon tax in the Washington state – either directly or by retaining leadership positions in powerful trade associations.⁴⁹ In other words, oil & gas producers often use a double language, which exposes them to reputational and financial risks:⁵⁰ Swedish pension fund AP7 has, for instance, already divested from six oil & gas companies on the basis of their counterproductive climate lobbying.⁵¹

⁴⁵ UN PSI (2018), Statement of commitment to protect World Heritage Sites signatories.

⁴⁶ Pelosi Adamson (2014), Indigenous Rights Risk Report.

⁴⁷ Pelosi Adamson (2014), Indigenous Rights Risk Report.

⁴⁸ Influencemap, Climate Lobbying.

⁴⁹ Influencemap (2019), How the oil majors have spent \$1Bn since Paris on narrative capture and lobbying on climate.

⁵⁰ The Financial Times (2019), Oil lobby group opposes carbon tax backed by biggest members.

⁵¹ Reuters (2017), Swedish pension fund sells out of six firms it says breach Paris climate deal.

- Corruption.** Extractive industries are the world’s most corrupt sector according to the OECD.⁵² Transparency International has researched oil & gas producers’ anti-corruption policies, organisation disclosure and country-level disclosure in detail.⁵³ It finds that these companies transfer considerable funds to host governments – in the form of license fees, royalties, dividends, taxes and support for local communities. When these revenues are not managed with transparency and accountability, they can become a so-called ‘resource curse’⁵⁴ and fuel large-scale corruption, as well as poverty, injustice and conflict. First steps have been undertaken to increase transparency through the Extractive Industries Transparency Initiative (EITI), but even countries that have adopted their standard are not guaranteed to be free of corruption.⁵⁵

Which oil & gas sources are most at risk from carbon, cost and other ESG risks?

Figure 3 shows that some oil & gas sources are relatively more exposed to carbon, cost and other ESG risks. It notably finds that:

- There is a significant correlation between sources that are high carbon and high cost: oil sands/extra heavy oil, Arctic oil & gas and LNG. These are commonly identified as high-carbon-high-cost sources.
- The additional lens of ESG risks further increases the risk profile of oil sand/extra heavy oil and Arctic oil & gas, but also of shale oil & gas and deepwater oil.

Asset owners should thus scrutinise with particular care those companies that are directing investments towards oil sands/extra heavy oil, LNG, shale oil & gas, deepwater oil and Arctic oil & gas; as well as towards exploration. This does not mean, however, that companies that are less exposed to these sources do not have any climate-related risk.

FIGURE 3 OIL & GAS SOURCES MOST AT RISK FROM CARBON, COST AND OTHER ESG RISKS (WWF)⁵⁶

	CARBON RISK	COST RISK	ESG RISK
Oil sands/extra heavy oil	VERY HIGH RISK	VERY HIGH RISK	VERY HIGH RISK
Deepwater oil	ELEVATED RISK	VERY HIGH RISK	VERY HIGH RISK
Arctic oil & gas	ELEVATED RISK	VERY HIGH RISK	VERY HIGH RISK
Shale oil & gas	VERY HIGH RISK	VERY HIGH RISK	VERY HIGH RISK
Liquefied Natural Gas (LNG)	VERY HIGH RISK	VERY HIGH RISK	AVERAGE RISK

52 OECD (2014), OECD foreign bribery report.
 53 Transparency International (2011), Promoting revenue transparency: 2011 report on oil & gas companies.
 54 Bloomberg (2017), Resource curse.
 55 Extractive Industries Transparency Initiative (2019), Countries.

56 This figure attempts to summarise the findings that are included in this report: WWF recognises that the information included in this guide may not be exhaustive or include the latest data (notably on cost risk). In addition, this table does not necessarily fully reflect ranges within oil & gas sources and/or differences that can occur within those resources based on the geography or nature of individual projects. The findings of this table should thus be interpreted with some care.

DECISION-MAKING



3. ADOPT A POLICY FOR OIL & GAS PRODUCERS AT PORTFOLIO LEVEL

WWF RECOMMENDATION 3

WWF recommends that asset owners adopt a policy for oil & gas producers with the following elements:

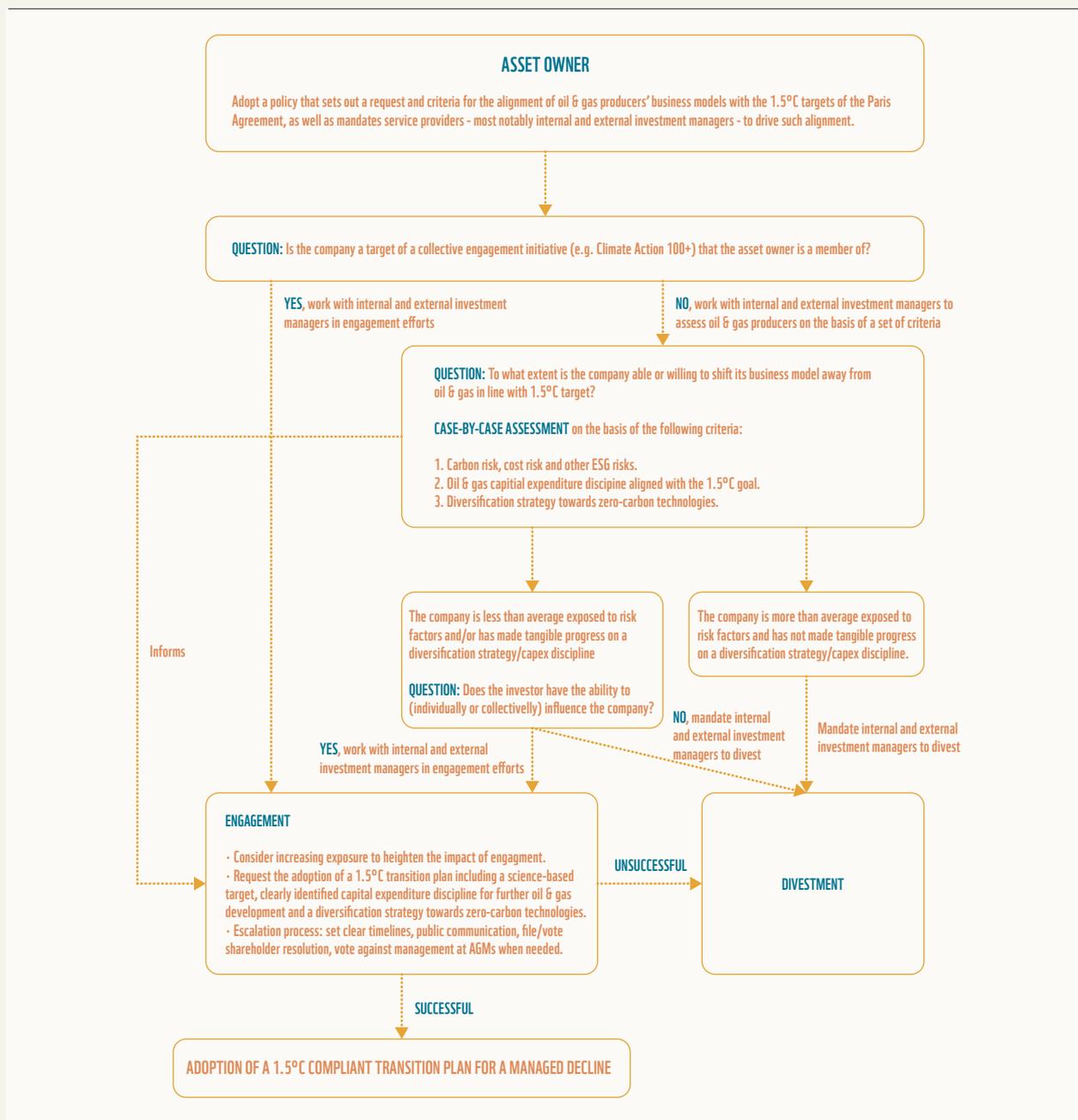
- An urgent request to all oil & gas producers to rapidly align with the 1.5°C target of the Paris Agreement (see Recommendation 5). This implies that asset owners should phase-out virtually all oil & gas investments from their portfolio by 2040 in OECD countries, and by 2050 globally.⁵⁷
- Criteria that allow internal and external investment managers to engage with targeted oil & gas producers on the basis of clear and time-bound requests, as well as an escalation process (measures and criteria) in case of unsuccessful engagement (see Recommendation 5).
- Criteria that allow internal and external investment managers to divest from oil & gas producers that are not willing or able to align with the 1.5°C target, or that are not responding to engagement in a timely manner (see Recommendation 4).
- Clear guidelines that guarantee tight implementation of the policy for oil & gas producers by investment managers and other service providers, and a related update of the proxy voting policy.
- A commitment to publicly and regularly signal oil & gas-related decisions and activities (see Recommendation 7).

WWF believes that an asset owner's policy for oil & gas producers should be able to identify companies whose business model can be influenced through effective engagement, but at the same time recognise that the oil & gas sector as it currently exists will eventually need to be phased out in light of climate constraints.⁵⁸ This implies that **asset owners should phase-out virtually all oil & gas investments from their portfolios' by 2040 in OECD countries, and by 2050 globally: investors should start by phasing out support to oil & gas producers that are least prepared, or not able/willing to shift their business model towards zero-carbon technologies, and gradually tighten their criteria over time to align with the ever more stringent carbon constraints of a 1.5°C compliant transition.** Figure 4 provides an overview of questions and criteria that will, according to WWF, help asset owners in developing their policy for oil & gas producers. Annex 2 provides a template policy for oil & gas producers.

⁵⁷ Oil & gas producers must phase out all their physical assets (i.e oil & gas production sites) located in OECD countries by 2040; and outside OECD by 2050. This requirement is unrelated to the company's headquarter: an oil & gas producer headquartered in an OECD country can,

for instance, still operate oil & gas production sites in non-OECD countries until 2050. ⁵⁸ It should be noted that there might still be some limited use of oil & gas for non-energy sectors, for example fertilisers and plastics.

FIGURE 4 DEVELOPING A POLICY FOR OIL & GAS PRODUCERS (WWF)



MONITORING SERVICE PROVIDERS & ENGAGING WITH KEY STAKEHOLDERS



4. IDENTIFY OIL & GAS PRODUCERS SUITED FOR MEANINGFUL SHAREHOLDER ENGAGEMENT

WWF RECOMMENDATION 4

WWF recommends that asset owners adopt four criteria that allow their internal and external investment managers to identify oil & gas producers suited for meaningful shareholder engagement.

Asset owners should prioritise engagement through collective investor initiatives (criterion 1) such as Climate Action 100+, encourage their internal and external investment managers to follow their example, and consider additional actions where needed. Any engagement should be informed by and depend on the extent to which oil & gas producers:

- Are exposed to carbon risk, cost risk, and other ESG risks (criterion 2).
- Have capital expenditure discipline for further upstream oil & gas activities in line with the 1.5°C goal (criterion 3).
- Have in place a diversification strategy towards zero-carbon technologies (criterion 4).⁵⁹

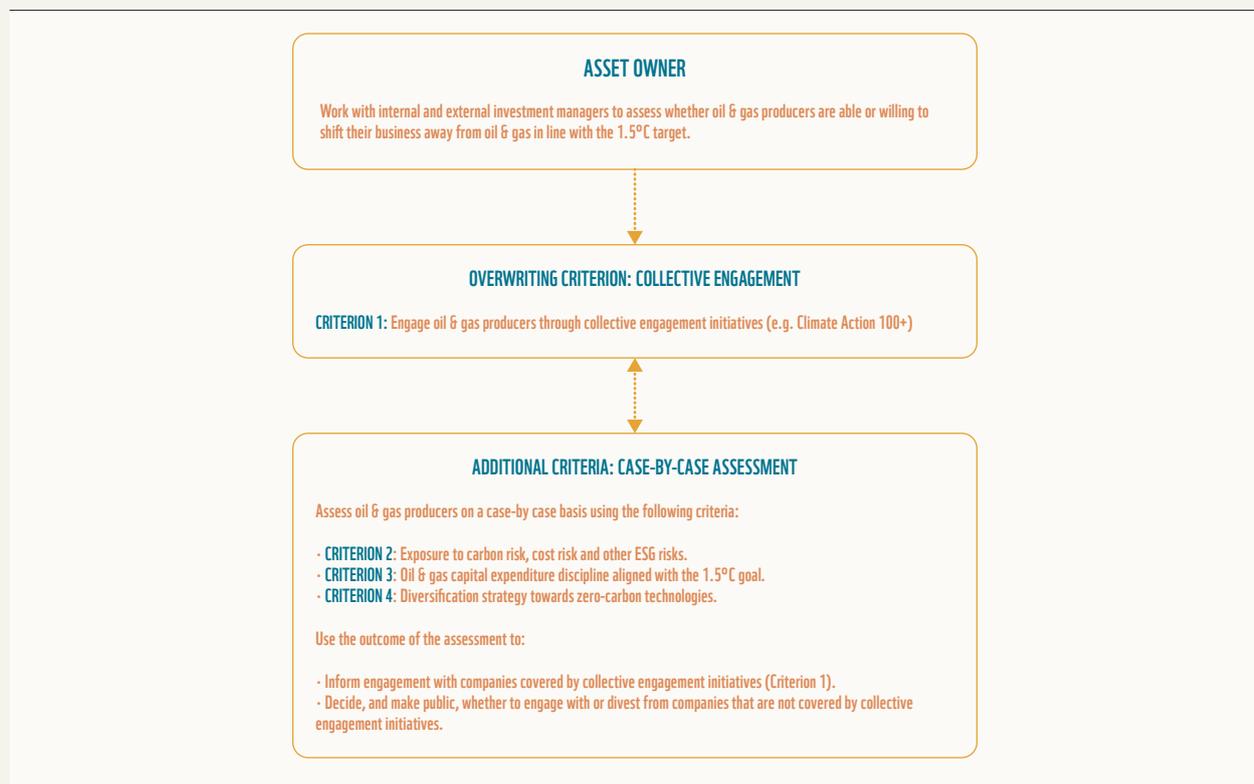
WWF believes that there is no relevance in engaging with companies that have no future in a 1.5°C economy. As per the Paris Agreement, financial flows must be consistent with a pathway towards zero greenhouse gas emissions. In order to be meaningful, engagement should thus take place with clear timelines and be able to show a measurable impact on the companies' activities (see Recommendation 5). Oil & gas producers that are not able or willing to move in line with the requirements of the 1.5°C goal should be divested from.

Shareholder engagement with oil & gas producers is critical to ensure the sector can transform itself in an orderly manner and within the relevant timeframe, and thus maintain shareholder value while complying with the 1.5°C pathway. Asset owners should also recognise, however, that some oil & gas producers are not willing or will not be able to transition rapidly enough: these companies will be the ones holding stranded assets and losing market value. Inaction is not an option: keeping in a portfolio oil & gas producers that are not willing to timely shift their business model fuels the climate crisis.

Figure 5 depicts the process and criteria that WWF recommends asset owners to mandate their internal and external investment managers to employ in order to identify their approach to oil & gas producers. Each criterion is further elaborated in the paragraphs below.

⁵⁹ Alternatively, oil & gas companies can wind down if they do not want to diversify.

FIGURE 5 CRITERIA TO IDENTIFY ASSET OWNER ACTION TOWARDS OIL & GAS PRODUCERS (WWF)



BOX 5. NORWEGIAN SOVEREIGN WEALTH FUND’S OIL & GAS DIVESTMENT

Norway has recently adopted an oil & gas divestment criterion for the Norwegian Sovereign Wealth Fund. The criterion removes all oil & gas exploration and production companies, but not the integrated oil & gas companies, from the fund’s benchmark and investable universe (more than 130 companies, \$8 billion assets under management).⁶⁰ The decision follows a recommendation from the Central bank to exclude the whole oil & gas sector.

The stated reason for this decision is to protect the fund from a lasting fall in oil prices, and thus from Norway’s exposure to climate-related financial risks (risk diversification). The proposal is not motivated by ethical or environmental risks.

⁶⁰ Oil & gas exploration and production companies include 21% of the total FTSE oil & gas sector, and do not include integrated oil & gas companies. The original proposal from Norway’s central bank was to divest from the total FTSE’s oil & gas sector, which would have covered 5.9% (\$36 billion assets under management) of the fund’s portfolio.

Criterion 1: WWF believes that collective and public engagement through asset owners' internal and external investment managers has a much higher likelihood to bear fruit. Asset owners should join relevant initiatives, starting by Climate Action 100+, and prioritise their engagement with the oil & gas sector through those initiatives. Many of the largest oil & gas producers are targeted by collective engagement initiatives.

Collective engagement

BOX 6. CLIMATE ACTION 100+

Climate Action 100+ is an unprecedented five-year global initiative led by investors to engage systemically the 160 most important greenhouse gas emitters globally. To date, 310 investors with more than \$32 trillion in assets under management have signed on to the initiative.

The initiative aims to secure three commitments from companies' boards and senior management, namely to:

- Implement a strong governance framework which clearly articulates the board's accountability and oversight of climate change risk and opportunities.
- Take action to reduce greenhouse gas emissions across their value chain, consistent with limiting global average temperature increase to well below 2°C above pre-industrial levels.
- Provide enhanced corporate disclosure in line with the final recommendations of the Task Force on Climate-related Financial Disclosures (TCFD).

The oil & gas sector is a very important focus of Climate Action 100+, with no less than 25% of targeted companies.

WWF underlines that any engagement with oil & gas producers should aim at achieving robust corporate targets that are fully aligned with the 1.5°C goal, as well as concrete plans to reach these targets (see Recommendation 5). If such commitments cannot be achieved through Climate Action 100+ alone, asset owners should explore additional actions.

Criterion 2: WWF has focused in particular on three types of risks in this guide: carbon risk, cost risk and other ESG risks (see Recommendation 2). Box 7 provides a non-exhaustive overview of **existing tools and analyses that asset owners should recommend their internal and external investment managers to actively use to assess oil & gas producers' exposure to these risks**, and annex 3 provides more details for each tool/analysis. **Asset owners should also encourage data providers to develop additional analysis and tools that cover the oil & gas sector in a more holistic manner.**

Exposure to carbon risk, cost risk and other ESG Risks

BOX 7. TOOLS TO ASSESS OIL & GAS PRODUCERS' EXPOSURE TO CLIMATE-RELATED RISKS

2 degrees of separation. Carbon Tracker Initiative has analysed how 72 of the largest publicly traded oil & gas producers potential capital expenditure plans⁶¹ are aligned with demand levels in IEA climate scenarios:⁶²

- The research assumes that companies that have a high share of high-cost projects in their portfolio will be penalised in an environment that is characterised by lower oil & gas prices, and hence lower project break-even prices.
- Risk exposure is measured by companies' share of potential capital expenditure outside well below 2°C (IEA SDS) and 1.75°C (IEA B2DS) scenarios, compared to a business as usual scenario (IEA NPS, 2,7°C).

The Paris Agreement Climate Transition Assessment (PACTA).

This tool was developed by 2° Investing Initiative within a European research project,⁶³ and is supported by UN PRI.⁶⁴ It enables investors to assess the degree of alignment of their public equity and corporate bond portfolios with climate scenarios through a free-of-charge and online tool.⁶⁵ As part of the assessment, they receive company-specific analysis for the largest oil & gas holdings. The included metrics cover:

- A comparison of the portfolio companies' change in planned oil & gas production over the next five years, compared to the required change under a selected climate scenario (e.g. IEA B2DS).
- A company resource breakdown by type of oil – covering conventional oil, unconventional oil, heavy oil, oil sands and others/unknown.

Lobbying and corporate influence. InfluenceMap has scrutinised and scored climate lobbying activities of nine large oil & gas companies: Royal Dutch Shell, Total, BP, ExxonMobil, Chevron, ConocoPhillips, Valero Energy, Phillips 66 and Koch Industries. It concludes that none of them deserves better than a D, on a range from A+ to F.⁶⁶

Transition Pathway Initiative (TPI) aims to provide a holistic view of companies' progress on integrating climate change.⁶⁷ The analysis covers 45 oil & gas producers management quality, which concerns their governance of greenhouse gas emissions and related risks/opportunities. Companies are ranked into five categories on the basis of whether they have implemented one or more particular carbon management practices (e.g. setting emission targets, undertaking climate scenario planning).

Investor climate compass. The Global Investor Coalition on Climate Change has assessed how ten large oil & gas producers have responded to five core areas of investors' climate concerns: fossil fuel asset mix, capital flexibility, climate governance and strategy, emissions and resource management and water resilience.⁶⁸

Carbon Disclosure Project (CDP). CDP ranks 24 of the largest publicly listed oil & gas companies on business readiness for a low carbon transition.⁶⁹ The ranking is based on an assessment of four criteria: transition risk, physical risk, transition opportunities, and climate governance and strategy.

⁶¹ The assessment is based on potential capital expenditure deducted from project ownership, not sanctioned capital expenditure based on company announcements.

⁶² Carbon Tracker Initiative (2018), 2 Degrees of Separation: Company-level transition risk July 2018 update.

⁶³ 2° Investing Initiative, SEI-metrics.

⁶⁴ UN PRI (2018), Launch of first online and free climate scenario based analysis.

⁶⁵ 2° Investing Initiative, Paris Agreement Climate Transition Assessment.

⁶⁶ Influencemap, InfluenceMap Scoring Table: Corporations and Influencers. These nine companies have different business models, some being integrated oil & gas companies, others focused on upstream or downstream activities.

⁶⁷ Transition Pathway Initiative (2019), TPI Tool.

⁶⁸ Global Investor Coalition on Climate Change (2017), Investor Climate Compass: Oil and Gas - Navigating Investor Engagement.

⁶⁹ CDP (2018), Beyond the cycle - Which oil and gas companies are ready for the low-carbon transition?

**Criterion 3:
Oil & gas capital
expenditure discipline**

The market currently does not sufficiently price in climate risk in oil & gas company valuations, which are mainly based on economically extractable volumes in production and near- to mid-term developments (i.e. proven reserves). These reserves are likely to be less exposed to climate-related risk, which generally materialise over longer timeframes.

Capital expenditure plans are a better indicator to measure oil & gas producers' exposure to climate risk. Whether or not an oil & gas company is actually aligning with the 1.5°C climate goal, and reducing its climate-related risks accordingly, will be defined by how oil & gas companies will use proceeds of current activities for the exploitation of future reserves. In other words, a company that intends to maintain or increase oil & gas production in a more challenging climate-constrained demand environment will be at higher risk than a company that focuses on shifting capital expenditure from oil & gas to zero-carbon technologies (e.g. renewable power, breakthrough technologies in the petrochemical industry, etc.) or cash outflows (i.e. dividends) in line with the 1.5°C climate goal.

Analysis by Carbon Tracker Initiative indicates that most oil & gas majors still use volume metrics rather than value creation metrics in their executive incentive plans.⁷⁰

BOX 8. BP RESOLUTION (FROM CLIMATE ACTION 100+) ON ALIGNING CAPITAL EXPENDITURE WITH THE GOALS OF THE PARIS AGREEMENT

In February 2019, leading shareholders in BP have proposed a resolution requesting that the company sets out its business strategy consistent with the goals of the Paris Agreement on climate change.⁷¹

The resolution notably asks BP to evaluate 'the consistency of each new material capex investment, including in the exploration, acquisition or development of oil & gas resources and reserves and other energy sources and technologies, with the Paris Goals,' as well as to disclose 'the anticipated levels of investment in (i) oil & gas resources and reserves; and (ii) other energy sources and technologies'.⁷²

The resolution was adopted at the BP 2019 annual general meeting (AGM) following support from the company management. BP has also stated that it believes its current strategy is consistent with the Paris climate goals, however, while analysis by Carbon Tracker Initiative has shown that that 20 to 30% of its capital expenditure plans are outside a 1.75°C carbon budget compared to the IEA's central scenario (NPS).⁷⁴

There will hence need to be a continued and in-depth dialogue between investors and BP to clarify what Paris-aligned capital expenditure means exactly for the company. This dialogue will also need to step up investors' requirements for BP's emission reduction target, given that the current resolution fails to include scope 3 emissions in that remit (i.e. around 90% of the total oil & gas emissions).⁷⁵

⁷⁰ Carbon Tracker Initiative (2019), Paying with fire.

⁷¹ IIGCC (2019), BP shareholder resolution.

⁷² IIGCC (2019), BP shareholder resolution.

⁷³ BP (2019), BP to support investor group's call for greater reporting around Paris goals.

⁷⁴ Carbon Tracker Initiative (2018), 2 degrees of separation – Transition risk for oil & gas in a low carbon world.

⁷⁵ BP (see notice of AGM) and Climate Action 100+ failed to support another resolution filed by Follow This that calls for a greenhouse gas emission reduction target for scope 1 to 3 emissions.

Criterion 4:
Diversification strategy
towards zero carbon
technologies

Under a Paris-aligned energy transition, oil & gas producers will ultimately need to replace their core business with new economic activities.⁷⁶ While this is a daunting task that requires an immediate shift in strategy and capital expenditure, several oil & gas producers are well placed to succeed given their financial capacity and engineering knowhow. However, recent analysis by CDP shows there is still a long way to go: on average, the 24 largest oil & gas majors are allocating only 1.3% of total capital expenditure to low carbon, with European majors spending up to 7%.⁷⁷

BOX 9. EXAMPLES OF COMPANIES THAT HAVE CHANGED - OR ARE CHANGING - THEIR BUSINESS MODEL

There are various examples of companies that have changed – or are in the process of changing – their business model. These can be divided into three types of transition:

- **Slow but steady transition.** TUI Group is at present the world’s largest travel company, but was originally founded (1923) as a coal mining and steel company.⁷⁸ It diversified its activities over time based on market pressures and opportunities, becoming an industrial agglomerate, until it refocused on its travel business in the early 2000s.
- **Radical transition.** Orsted, Denmark’s largest energy company, is moving rapidly away from fossil fuels, notably by developing offshore wind projects. In 2006 it relied on fossil fuels for 87% of its power and heat production: this had already decreased to 25% in 2018, and the company aims to have virtually no fossil fuels left in its power mix by 2025.⁷⁹
- **Challenging transition.** A.P Moller-Maersk, the world’s biggest shipping company, has recently announced its ambition to become carbon-neutral by 2050, even though currently no technologies are available to reach this target.⁸⁰ The company is spending significant resources for innovation and fleet technology to improve the technical and financial viability of decarbonized solutions, and aims to have carbon-neutral vessels commercially viable by 2030. Interestingly, the company is also driving this vision in its non-core business segments: the company will use its engineering knowhow for the development of geothermal energy in Denmark.⁸¹

None of the above examples apply exclusively to the oil & gas sector. They also do not showcase the rapid and large scale transition that this sector has to undergo, by which it will ultimately cease to exist in its current form. They show, however, that it is possible also for oil & gas producers to quickly take concrete steps towards radically diversifying their business model.

⁷⁶ Alternatively, oil & gas companies can wind down if they don’t want to diversify.

⁷⁷ CDP (2018), Beyond the Cycle. Reuters (2018), Big Oil spent 1% on green energy in 2018.

⁷⁸ Tui Group (2013), Journey through time.

⁷⁹ Orsted (2019), Our green transformation. It should be noted that Orsted is also developing biomass, for which WWF believes strict sustainability standard should be applied: this is further developed in recommendation 5 and Annex 3 of the WWF asset owner guide on coal and renewable electric power utilities.

⁸⁰ Maersk (2018), Maersk sets net zero CO₂ emission target by 2050.

⁸¹ AP Moller Holding (2018), Geothermal energy has the potential to cover 30% of Denmark’s district heating supply.



5. DEFINE MEANINGFUL REQUESTS TO OIL & GAS PRODUCERS

WWF RECOMMENDATION 5

WWF recommends that asset owners develop an engagement strategy in close collaboration with their internal and external investment managers, in order to ensure that oil & gas producers in their portfolio develop integrated 1.5°C transition plans. Such plans should include a commitment to phase-out all oil & gas production by 2040 in OECD countries and by 2050 globally (starting with the most financially risky assets), as well as a climate science-based target that covers scope 1 to 3 emissions.

A litmus test for engagement is a corporate commitment to immediately and rapidly reduce capital expenditure for oil & gas development. This includes in particular: an immediate stop of capital expenditure in exploration, an extremely cautious approach towards investments in new project given the limited room for further development, and a thorough double check of any capital expenditure in existing projects. Freed up capital should be invested into the development of zero-carbon technologies and/or directed to shareholder cash returns.

If engagement efforts do not result in the targeted companies publishing meaningful transition plans in a timely fashion, asset owner should implement escalation processes: this can comprise public messaging, filing/supporting resolutions and/or voting against management at AGMs, and ultimately divestment.

The explicit and ultimate objective of engagement should be the alignment of oil & gas producers' business models with the 1.5°C goal. Asset owners should mandate their internal and external investment managers to request oil & gas producers to adopt and publish time-bound 1.5°C transition plans composed of the seven following elements:

- A **long term goal** that includes a commitment to align business models with the 1.5°C goal of the Paris Agreement, notably to phase-out virtually all oil & gas production by 2040 in OECD countries and by 2050 globally (see Recommendation 1).
- The adoption of a time-bound, climate science-based and absolute **greenhouse gas emission reduction** target that covers scope 1 to 3 emissions, and that builds on Paris-aligned forward looking climate-scenario analysis.⁸² This target should respect the scientific imperative to quickly reduce greenhouse gas emissions in the coming decade in order to respect the 1.5°C target.

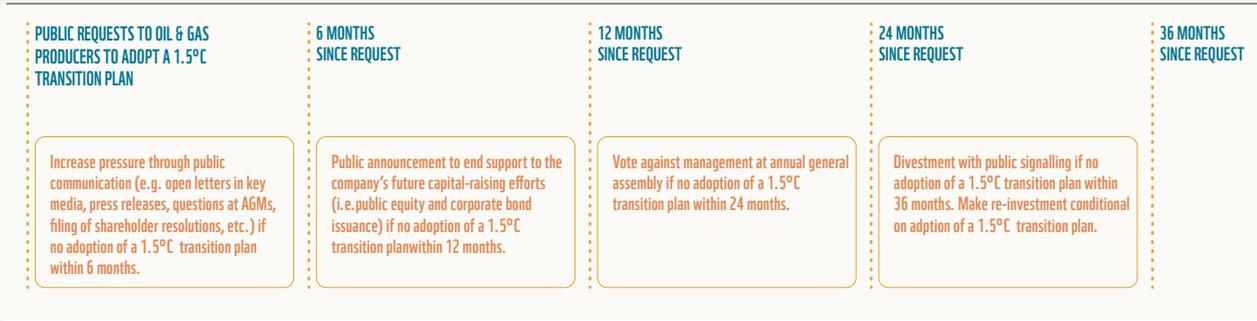
⁸² The Science-Based Targets initiative (SBTi) is currently developing a target-setting methodology for oil & gas producers that is expected to be ready by the end of 2019. WWF recommends oil & gas producers to use this methodology as soon as it is available. In the meantime, oil & gas producers should define targets based on robust 1.5°C scenarios (e.g. IPCC P1 and P2) or – recognising that currently available 1.5°C scenarios

are not always sufficiently granular for undertaking forward-looking climate scenario analysis and target-setting – scenarios that approximate as closely as possible the 1.5°C threshold (e.g. IEA B2DS or IEA SDS). WWF considers that scenarios developed by oil & gas producers, or scenarios that do not correspond to the Paris climate goals (e.g. IEA NPS) are not acceptable for setting climate targets.

- **Oil & gas capital expenditure discipline** based on the recognition that a 1.5°C transition implies a rapid demand decrease. Oil & gas producers should ultimately bring capital expenditure for oil & gas projects to virtually zero – starting with those projects most vulnerable from carbon risk, cost risk and other ESG risks. Oil & gas producers should immediately end capital expenditure in oil sands/extra heavy oil, Arctic oil & gas, shale oil & gas, deepwater oil, and LNG, as well as in exploration.
- A clearly articulated **diversification strategy** that sets out how the oil & gas producers are going to shift their activities, both in terms of research and development and capital expenditure, towards zero-carbon technologies (e.g. renewables, breakthrough technologies in the petrochemical industry, etc.). Such a strategy should not include selling off oil & gas assets, given that this does not lead to actual greenhouse gas emission reductions, and can be developed in tandem with a capital management strategy that aims to increase shareholder cash returns (i.e. dividends). It should finally ensure a just transition for affected workers and regions.
- **Meaningful TCFD-aligned disclosure** that includes the above-mentioned goals, capital expenditure plans and diversification strategy. The reporting should also, in line with the TCFD recommendations, set out governance structures that define board and senior management responsibilities and accountability for overseeing the transition plan, and how the remuneration policy is adjusted accordingly.
- A public commitment to **not undertake counterproductive lobbying**. This implies not opposing policies that aim to reduce emissions in line with the Paris Agreement, be transparent about lobbying activities and related expenditures, and leave third party organisations (e.g. business and trade organisations) that promote policies that risk to derail the Paris Agreement.
- A public commitment to **review and ratchet up science-based targets and transition plans** in light of evolving science, in particular the development of more granular 1.5°C scenarios.

Given the urgency to tackle oil & gas-related climate change, asset owners should have an escalation process in place for when the engagement does not lead to significant results within set timeframes (6, 12, 24, 36 months) Asset owners possess over a range of options: open letters, filing/supporting shareholder resolutions and voting at AGMs, end support to companies' efforts to raise capital, and ultimately divestment. Figure 6 gives a potential timeline for such an escalation process.

FIGURE 6 ESCALATION PROCESS IN CASE OF UNSUCCESSFUL ENGAGEMENT (WWF)

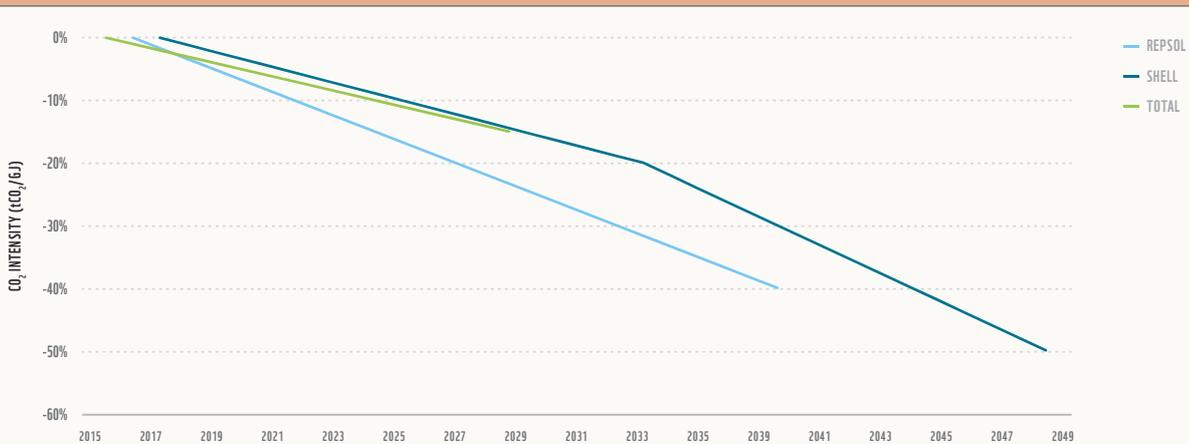


BOX 10. OIL & GAS PRODUCERS' CLIMATE COMMITMENTS

Shell, Total and Repsol have adopted ambitions to tackle the full greenhouse gas emissions of their products (scope 1-3) in relative terms (emissions produced per unit of energy). The companies use different baseline scenarios and timeframes, resulting in different levels of ambition.⁸³ Shell differentiates itself from the other companies by also setting rolling short-term targets (e.g. to reduce the emission intensity by two to three percent over the next three years compared to 2016).

WWF believes these ambitions are only an incremental step forward, because their relative nature leaves room for the companies to expand oil & gas operations, as long as this increase in greenhouse gas emissions is offset elsewhere in the business. The targets are, moreover, not aligned with what is required to respect the Paris Agreement (see Recommendation 1).⁸⁴

FIGURE 7 SCOPE 1 TO 3 OIL & GAS CORPORATE CARBON INTENSITY AMBITION (CARBON TRACKER INITIATIVE)



⁸³ Carbon Tracker Initiative (2019), Scope for improvement. Repsol's target is to reduce emission intensity by 40% by 2040, and is based on the IEA's SDS. Total's target is to reduce emission intensity by 15% by 2025, and is set between the SDS and the IEA NPS. Shell's ambition is to reduce emission intensity by 50%, and is based on their own scenario.

⁸⁴ Some additional oil & gas producers have set targets that cover scope 1 and 2 emissions only. WWF regards those targets as fully inadequate given that they disregard the greenhouse gas emissions coming from the consumption of oil & gas: these constitute the vast majority (up to 90%) of greenhouse gas emissions from oil & gas.

6. ENGAGE WITH POLICY MAKERS

WWF RECOMMENDATION 6

WWF recommends that asset owners engage with policy makers to support:

- Climate and energy policies that drive and create a supporting environment for a timely implementation of the Paris Agreement by/in the oil & gas sector.
- Adequate climate and wider ESG corporate disclosure policies and regulations.
- Financial policies and regulations that drive a better understanding of oil & gas-related risks for financial institutions.

Government policies and regulations are key drivers of systemic change. WWF believes that given the urgency of the climate challenge, asset owners should swiftly and unequivocally engage with policy makers in favour of the proper implementation of the Paris Agreement and what it implies for oil & gas: a phase out by 2040 in OECD countries, and by 2050 globally.

In 2018, 420 investors representing \$32 trillion in assets publicly stated that the current ‘ambition gap is of great concern to investors and needs to be addressed, with urgency.’⁸⁵ It is vital for our long-term planning and asset allocation decisions that governments work closely with investors to incorporate Paris-aligned climate scenarios into their policy frameworks and energy transition pathways’. Asset owners should build on this statement, and support oil & gas specific policies and regulations that ensure:

- A just and rapid phase-out of all fossil fuel subsidies.
- Enhanced carbon pricing, in particular by tightening ETS policies in the EU.
- Net-zero emissions by 2040 in OECD countries, in particular as part of the EU long-term climate strategy,⁸⁶ and by 2050 globally.
- 1.5°C-aligned oil & gas phase out plans by governments that are accompanied by systemic just transition measures for regions with large oil & gas infrastructure.
- Scaled-up climate and wider ESG reporting requirements for oil & gas producers, for instance through the EU non-financial reporting directive.⁸⁷
- Increased understanding of oil & gas-related risks for financial institutions, notably through the adoption of a fully-fledged EU taxonomy that allows to better understand how each oil & gas producer is positioned in term of environmental sustainability.⁸⁸

⁸⁵ Global Investor Coalition on Climate Change (2018), 2018 global investor statement to governments on climate change.

⁸⁶ WWF (2018), Position paper: The EU’s long term climate strategy.

⁸⁷ European Commission (2014), Directive 2014/95/EU.

⁸⁸ WWF (2019), MEPs reject all-encompassing environmental ranking. WWF (2019), MEPs to vote on environmental ranking for economic activities.

7. PUBLICLY DISCLOSE OIL & GAS-RELATED DECISIONS AND ACTIVITIES

WWF RECOMMENDATION 7

WWF recommends that asset owners publicly disclose their oil & gas-related decisions and activities to increase impact. This notably covers the adoption of a policy for oil & gas producers, the integration of the policy in mandates to investment managers and other service providers, a regular assessment of engagement impact, the filing of or support to relevant shareholder resolutions, and divestment decisions if engagement is not deemed relevant or does not deliver within set timeframes

By signalling (i.e. making public) key oil & gas-related decisions and activities, asset owners will significantly amplify their impact. Given the climate urgency, the signalling effect is critical to raise the awareness of peer investors, oil & gas producers, service providers, policy makers and other stakeholders. It emphasises the importance of the issue, and helps to accelerate efforts from the above-mentioned stakeholders.

Signalling is particularly critical for a meaningful engagement strategy. Asset owners should make public which oil & gas producers they are engaging with through their internal and external investment managers, what their specific demands are, and publish at regular intervals an assessment of the engagement impact. This will increase pressure on corporations, and drive deeper and faster changes. The Climate Action 100+ initiative (see Box 5) is a promising step towards such joint and public shareholder engagement – and an implicit recognition that bilateral engagement behind closed doors will not have enough impact to get oil & gas producers shift their business model at the pace and scale required by the Paris Agreement.

Asset owners should also indicate the names of companies from which they have divested or decided not to invest in, following the example of financial institutions in countries like Denmark and Norway. For very liquid asset classes, such as public equity and corporate bonds, the rapid exchange of assets can quickly cancel out potential impact of divestment on oil & gas producers – so public signalling is critical for amplification.

TOPLINE RECOMMENDATIONS FROM THE WWF CLIMATE GUIDE TO ASSET OWNERS

In 2017, WWF published an overall ['Climate Guide to Asset Owners'](#). The recommendations contained in that guide are reproduced below.

LEARNING AND SEEKING ADVICE

1. Assess the evidence of climate-related financial risks and opportunities
2. Use tools to measure portfolio climate risks and portfolio alignment with climate goals
3. Assess the regulatory and policy context and ensure TCFD-aligned reporting

DECISION-MAKING

4. Adopt climate-related investment beliefs
5. Establish a climate governance structure
6. Integrate climate change in investment policy
7. Adjust strategic asset allocation to harness climate-related opportunities
8. Adopt sector-specific policies
9. Develop tools and metrics to set climate science based targets

MONITORING SERVICE PROVIDERS AND ENGAGING WITH KEY STAKEHOLDERS

10. Work collectively with other institutional investors
11. Closely monitor investment managers
12. Closely monitor other service providers
13. Engage forcefully with portfolio companies
14. Engage forcefully with policy makers
15. Engage with members and beneficiaries

PRIORITY

ANNEX 1. GAS IS MORE CARBON-INTENSIVE THAN PREVIOUSLY THOUGHT

Methane: a very potent greenhouse gas

The IPCC has adjusted its estimates of the global warming potential of methane over the years.⁸⁹ Its latest assessment states that methane is 86 times worse than CO₂ over a 20-year period, and 34 times worse over a 100 year timescale. Given the urgent action required to keep global warming below 1.5°C, it is more relevant to look at a shorter timeframe.

As a consequence, the latest studies (including a very recent one published in Nature) conclude that total fossil fuel-related methane emissions in tonnes of CO₂ equivalent are 60% to 110% greater than initially estimated.⁹⁰

Methane leakage: at least twice as high as previously thought

Natural gas is mostly made up of methane. It is also typically under pressure (either underground or within gas infrastructure) and therefore escapes into the atmosphere at many different points in the natural gas supply chain. Scientific knowledge on methane leakage, sometimes referred to as fugitive methane emissions, has progressed rapidly over the past years. For conventional natural gas, the scientific community now commonly agrees that between 3.6% and 5.4% of the lifetime production of a gas well escapes to the atmosphere.⁹¹ This compares with an estimate used until recently of 1.8%.

The US Environmental Protection Agency recognised in 2016 that methane emissions from existing sources in the oil & gas sector are ‘substantially higher than previously understood’.⁹² The figure is even higher for US shale oil & gas: up to 12% of lifetime production.

Given the above, it is possible to update the calculation of the climate impact of natural gas to take account of both the higher figures for fugitive emissions and the higher figures for global warming potential. Doing so shows that over a 20-year timeframe, coal-fired power generation has a lower carbon footprint than LNG if the upstream methane emissions for the latter are over 1.6 to 1.9%, which is very likely the case for US shale and other unconventional sources of natural gas.⁹³ Using latest figures on methane’s Global Warming Potential, if the higher end of the above range (i.e. 5.4%) for fugitive emissions is used, then LNG-fuelled gas power plants are worse than coal-fired power plants even over a 100 year timeframe.⁹⁴

⁸⁹ IPCC (2013), Anthropogenic and natural radiative forcing.

⁹⁰ Stefan Schwietzke e.a., Upward revision of global fossil fuel methane emissions based on isotope database, in Nature volume 538, pages 88–91 (06 October 2016)

⁹¹ Including both leaking and venting at the well site and during storage & delivery to consumers. Sources: Miller et al (2013), Anthropogenic emissions of methane in the United States.

⁹² Reuters (2016), U.S. energy industry emits more methane than thought: EPA chief.

⁹³ Joe Romm (2014), Energy Department Bombshell: LNG Has No Climate Benefit For Decades, if Ever.

⁹⁴ Joe Romm (2014), By The Time Natural Gas Has A Net Climate Benefit You’ll Likely Be Dead And The Climate Ruined.



ANNEX 2. ASSET OWNER TEMPLATE POLICY FOR OIL & GAS PRODUCERS

Policy coverage This policy covers all asset classes (i.e. public equity, private equity, debt instruments, etc.) of the [asset owner]’s portfolio

This policy applies to companies that are defined as ‘oil & gas producers’ by the FTSE International Classification Standard.⁹⁵

Implications of the Paris Agreement on the oil & gas sector In the Paris Climate Change Agreement, 195 countries committed to ‘hold the increase in the global average temperature to well below 2°C above pre-industrial levels and to pursue efforts to limit the temperature increase to 1.5°C’.

More recently, the Intergovernmental Panel on Climate Change (IPCC) special report on global warming of 1.5°C has underlined the importance of respecting the more stringent threshold of the Paris Agreement in order to avoid the worst impacts of climate change. This report draws conclusions on the basis of a wide range of climate scenarios, some of which accept that the 1.5°C target is temporarily exceeded – referred to as overshoot – before coming back down. [Asset owner] believes that such overshoot should be avoided because it would entail too high impacts and risks of failure.

Respecting the 1.5°C target without overshoot implies that global greenhouse gas emissions have to reach net-zero before 2050. OECD countries should already reach net-zero emissions by 2040 given their considerable responsibility for historical emissions. Given the uncertainties associated with the application of carbon capture and storage (CCS) in oil & gas end-use sectors (e.g. power production, transport, heating and cooling in the residential sector), there will be close to zero scope for greenhouse gas emissions from oil & gas by 2040 in OECD countries, and by 2050 globally.

Overall objective [Asset owner] will phase-out virtually all oil & gas investments from its portfolio by 2040 in OECD countries, and by 2050 globally: it will start by phasing out support to those companies that are least prepared, or not able/willing to shift their business model towards zero-carbon technologies, and gradually tighten its criteria over time to align with the ever more stringent carbon constraints of a 1.5°C compliant transition.

Engagement [Asset owner] will apply four criteria that allow internal and external investment managers to identify oil & gas producers suited for meaningful shareholder engagement.

It will prioritise engagement through collective investor initiatives (criterion 1), and encourage its internal and external investment manager to follow its lead. Any engagement should be informed by and depend on the extent to which oil & gas producers:

⁹⁵ This policy is following the FTSE International Classification Standards: the sector ‘oil & gas producers’ includes companies that are classified under the subsectors ‘exploration & production’ and ‘integrated oil & gas’.

- Are exposed to carbon risk, cost risk, and other ESG risks (criterion 2). This includes in particular companies that are directing investments towards oil sands/extra heavy oil, LNG, shale oil & gas, deepwater oil and Arctic oil & gas; as well as towards exploration.
- Apply capital expenditure discipline for further upstream oil & gas activities in line with the 1.5°C goal (criterion 3).
- Have in place a diversification strategy towards zero-carbon technologies (criterion 4).

The explicit and ultimate objective of our engagement is the alignment of oil & gas producers' business models with the 1.5°C goal. [Asset owner] will mandate its internal and external investment managers to request oil & gas producers to adopt and publish time-bound 1.5°C transition plans composed of the seven following elements:

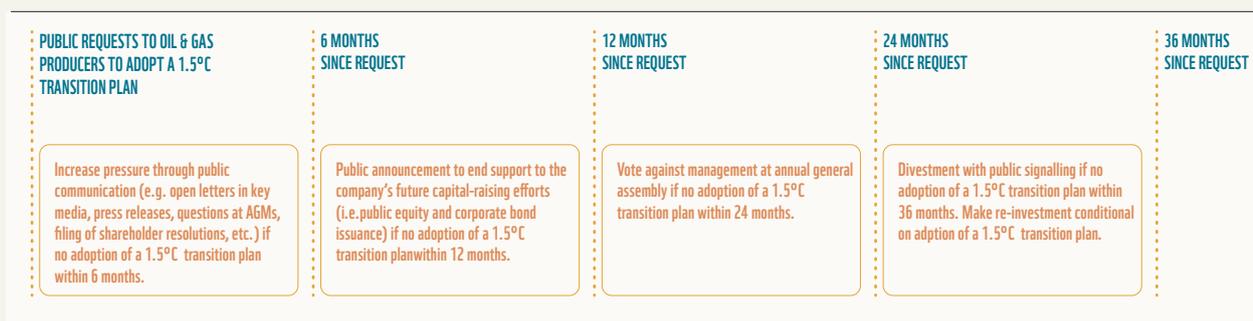
- A long term goal that includes a commitment to align business models with the 1.5°C goal of the Paris Agreement, notably to phase-out virtually all oil & gas production by 2040 in OECD countries and by 2050 globally.
- The adoption of a time-bound, climate science-based and absolute greenhouse gas emission reduction target that covers scope 1 to 3 emissions, and that builds on Paris-aligned forward looking climate-scenario analysis. This target should respect the scientific imperative to quickly reduce greenhouse gas emissions in the coming decade in order to respect the 1.5°C target.
- Oil & gas capital expenditure discipline based on the recognition that a 1.5°C transition implies a rapid demand decrease. Oil & gas producers should ultimately bring capital expenditure for oil & gas projects to virtually zero – starting with those projects most vulnerable from carbon risk, cost risk and other ESG risks. Oil & gas producers should immediately end capital expenditure in oil sands/extra heavy oil, Arctic oil & gas, shale oil & gas, deepwater oil, and LNG, as well as in exploration.
- A clearly articulated diversification strategy that sets out how the oil & gas producers are going to shift their activities, both in terms of research and development and capital expenditure, towards zero-carbon technologies (e.g. renewables, breakthrough technologies in the petrochemical industry, etc.). Such a strategy should not include selling off oil & gas assets, given that this does not lead to actual greenhouse gas emission reductions, and can be developed in tandem with a capital management strategy that aims to increase shareholder cash returns (i.e. dividends). It should finally ensure a just transition for affected workers and regions.
- Meaningful TCFD-aligned disclosure that includes the above-mentioned goals, capital expenditure plans and diversification strategy. The reporting should also, in line with the TCFD recommendations, set out governance structures that define board and senior management responsibilities and accountability for overseeing the transition plan, and how the remuneration policy is adjusted accordingly.
- A public commitment to not undertake counterproductive lobbying. This implies not opposing policies that aim to reduce emissions in line with the Paris Agreement, be transparent about lobbying activities and related expenditures, and leave third party organisations (e.g. business and trade organisations) that promote policies that risk to derail the Paris Agreement.
 - A public commitment to review and ratchet up science-based targets and transition plans in light of evolving science, in particular the development of more granular 1.5°C scenarios.

Escalation process and divestment

[Asset owner] recognises that some oil & gas producers are not willing or will not be able to transition rapidly enough. [Asset owner] will therefore mandate internal and external investment managers:

- To immediately divest from any oil & gas producer in its portfolio that is more than average exposed to carbon/cost/other ESG risk factors *and* has not made tangible progress on a diversification strategy/capital expenditure discipline aligned with the 1.5°C goal.
- Put in place an escalation process if engagement does not lead to significant results within set timeframes (6, 12, 24, 36 months). Such strategy will use a variety of options for increasing pressure on oil & gas producers: open letters, filing/supporting shareholder resolutions and voting against management at AGMs, end support to companies' efforts to raise capital, divestment. The figure below gives an indicative timeline for such an escalation process.

ESCALATION PROCESS IN CASE OF UNSUCCESSFUL ENGAGEMENT



Public signaling

[Asset owner] will publicly signal any decisions and activities related to this policy. This notably includes publicly disclosing: this policy, the integration of the policy in mandates to investment managers and other service providers, a regular assessment of engagement impact, the filing of or support to relevant shareholder resolutions, and divestment decisions if engagement is not deemed relevant or does not deliver within set timeframes.

ANNEX 3. COMPANY-SPECIFIC CLIMATE-RELATED RISK ANALYSES

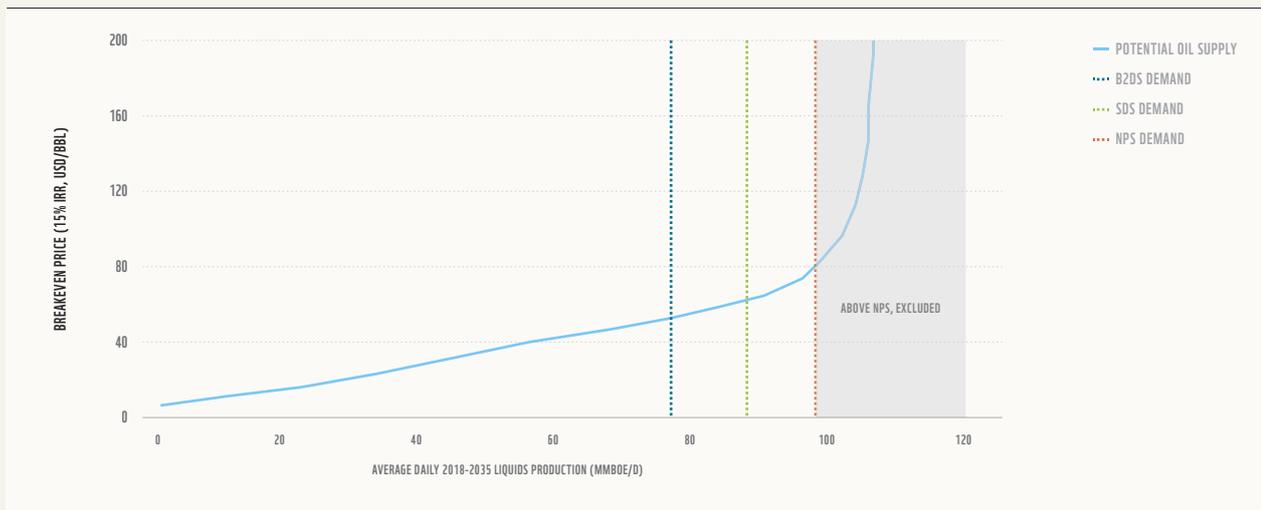
Box 6 summarizes tools that allow asset owners to assess oil & gas producers' exposure to climate-related risks. This Annex provides more background to each of these tools. It also summarizes key data in a colour-coded overview table that allows to quickly get a sense of which companies are covered by which analysis, and how they are exposed to particular risks according to these analyses.

Carbon Tracker Initiative: 2 degrees of separation

Carbon Tracker Initiative has developed a framework for estimating relative transition risk to a universe of major oil & gas producers, looking through the lens of capital expenditure that might in future be committed to high-cost projects that would be outside 1.75°C (IEA B2DS) and 2°C (IEA SDS) pathways for their products.⁹⁶

The analysis takes the IEA NPS as a reference scenario. The NPS is the IEA's central scenario, assuming no further climate policy developments beyond those already enacted or announced, and is consistent with a temperature rise of 2.7°C. Any high-cost projects above this level have been assumed not to go ahead. This approach in effect assumes that companies are already aligned with this scenario, and focuses on the 'surprise' or 'misread' differentials down to the SDS and B2DS demand levels – the capital at risk if companies collectively (but not necessarily consciously) invest to deliver NPS demand but are caught out by a lower level.⁹⁷

FIGURE 8 GLOBAL OIL AGGREGATE POTENTIAL COST CURVE, 2018-2035 (RYSTAD ENERGY, IEA, CARBON TRACKER INITIATIVE)



⁹⁶ Carbon Tracker Initiative (2018), 2 Degrees of Separation: Company-level transition risk July 2018 update.

⁹⁷ Carbon Tracker Initiative notes that disclosures to date do not suggest that all companies

expect long-term demand to be as low as in the IEA NPS, even if the industry seems to increasingly recognize the scale of the ongoing energy transition. They therefore consider it important to view the results holistically and not ignore the higher cost projects completely.

The assessment includes 71 companies from the S&P Global Oil Index that were categorised as either ‘integrated oil & gas’ or ‘oil & gas exploration and production’, plus Saudi Aramco.

- For each company, a percentage of 2018-2025 potential capital expenditure under the New Policies Scenario which is outside the IEA SDS and IEA B2DS is calculated.
- Companies are then organised alphabetically within quartiles, which are allocated based on the percentage of each company’s capital expenditure outside the IEA SDS.
- The average levels of NPS capital expenditure outside the SDS and B2DS budgets for industry as a whole are 16% and 33% respectively (excluding open acreage); company-level figures should be considered with this in mind.

FIGURE 9 SHARE OF UPSTREAM CAPITAL EXPENDITURE OUTSIDE IEA B2DS AND IEA SDS (CARBON TRACKER INITIATIVE)

QUARTILE (4 IS HIGHEST % OF CAPEX OUTSIDE 2 °C/SDS BUDGET, 1 IS LOWEST)	COMPANY (ALPHABETICALLY BY QUARTILE)	COUNTRY OF HEADQUARTERS	PERCENTAGE OF NPS UPSTREAM CAPEX OUTSIDE 2 °C/SDS BUDGET (% BAND)	PERCENTAGE OF NPS UPSTREAM CAPEX OUTSIDE 1.75 °C/B2DS BUDGET (% BAND)
4	Apache	United States	30% - 40%	50% - 60%
4	Concho Resources	United States	40% - 50%	60% - 70%
4	Crescent Point Energy	Canada	40% - 50%	40% - 50%
4	Devon Energy	United States	20% - 30%	30% - 40%
4	Ecopetrol	Colombia	20% - 30%	40% - 50%
4	Energen	United States	50% - 60%	50% - 60%
4	ExxonMobil	United States	20% - 30%	40% - 50%
4	Hess	United States	20% - 30%	40% - 50%
4	Imperial Oil (Public traded part)	Canada	20% - 30%	60% - 70%
4	Murphy Oil	United States	20% - 30%	30% - 40%
4	Petrobras	Brazil	20% - 30%	40% - 50%
4	Repsol	Spain	20% - 30%	30% - 40%
4	Sinopec	China	30% - 40%	40% - 50%
4	Surgutneftegas	Russia	20% - 30%	40% - 50%
4	Total	France	20% - 30%	30% - 40%
4	Tullow Oil	United Kingdom	30% - 40%	40% - 50%
4	Vermilion Energy	Canada	30% - 40%	50% - 60%
4	WPX Energy	United States	40% - 50%	60% - 70%
3	Aker BP	Norway	20% - 30%	40% - 50%
3	Canadian Natural Resources (CNRL)	Canada	20% - 30%	20% - 30%
3	Chevron	United States	10% - 20%	30% - 40%
3	CNOOC	China	20% - 30%	30% - 40%
3	Encana	Canada	10% - 20%	30% - 40%
3	Eni	Italy	10% - 20%	30% - 40%
3	Galp Energia SA	Portugal	10% - 20%	40% - 50%

QUARTILE (4 IS HIGHEST % OF CAPEX OUTSIDE 2 °C/SDS BUDGET, 1 IS LOWEST)	COMPANY (ALPHABETICALLY BY QUARTILE)	COUNTRY OF HEADQUARTERS	PERCENTAGE OF NPS UPSTREAM CAPEX OUTSIDE 2 °C/SDS BUDGET (% BAND)	PERCENTAGE OF NPS UPSTREAM CAPEX OUTSIDE 1.75 °C/B2DS BUDGET (% BAND)
3	Gazprom	Russia	10% - 20%	30% - 40%
3	Gulfport Energy	United States	20% - 30%	50% - 60%
3	Husky Energy	Canada	20% - 30%	60% - 70%
3	Lukoil	Russia	20% - 30%	40% - 50%
3	Marathon Oil	United States	10% - 20%	50% - 60%
3	OMV	Austria	20% - 30%	40% - 50%
3	PetroChina	China	10% - 20%	20% - 30%
3	Rosneft	Russia	20% - 30%	40% - 50%
3	Shell	Netherlands	20% - 30%	30% - 40%
3	Statoil	Norway	20% - 30%	40% - 50%
3	Suncor Energy	Canada	10% - 20%	10% - 20%
2	Anadarko	United States	0% - 10%	10% - 20%
2	Arc Resources	Canada	0% - 10%	50% - 60%
2	BP	United Kingdom	10% - 20%	20% - 30%
2	Cenovus Energy	Canada	10% - 20%	20% - 30%
2	Chesapeake	United States	0% - 10%	20% - 30%
2	ConocoPhillips	United States	0% - 10%	30% - 40%
2	Continental Resources	United States	0% - 10%	20% - 30%
2	Diamondback Energy	United States	10% - 20%	10% - 20%
2	Inpex	Japan	0% - 10%	10% - 20%
2	Newfield Exploration	United States	10% - 20%	20% - 30%
2	Noble Energy	United States	0% - 10%	20% - 30%
2	QEP Resources	United States	10% - 20%	50% - 60%
2	Range Resources	United States	10% - 20%	30% - 40%
2	RSP Permian	United States	0% - 10%	0% - 10%
2	Santos	Australia	0% - 10%	10% - 20%
2	Tatneft	Russia	0% - 10%	10% - 20%
2	Tourmaline Oil	Canada	0% - 10%	0% - 10%
2	Woodside	Australia	10% - 20%	10% - 20%
1	Antero Resources	United States	0% - 10%	0% - 10%
1	BHP Billiton	Australia	0% - 10%	20% - 30%
1	Cabot Oil and Gas	United States	0% - 10%	0% - 10%
1	Cimarex Energy	United States	0% - 10%	20% - 30%
1	EOG Resources	United States	0% - 10%	20% - 30%
1	EQT Corporation	United States	0% - 10%	10% - 20%
1	Lundin Petroleum	Sweden	0% - 10%	0% - 10%
1	Novatek	Russia	0% - 10%	20% - 30%
1	Oil Search	Papua New Guinea	0% - 10%	0% - 10%

QUARTILE (4 IS HIGHEST % OF CAPEX OUTSIDE 2 °C/SDS BUDGET, 1 IS LOWEST)	COMPANY (ALPHABETICALLY BY QUARTILE)	COUNTRY OF HEADQUARTERS	PERCENTAGE OF NPS UPSTREAM CAPEX OUTSIDE 2 °C/SDS BUDGET (% BAND)	PERCENTAGE OF NPS UPSTREAM CAPEX OUTSIDE 1.75 °C/B2DS BUDGET (% BAND)
1	Origin Energy	Australia	0% - 10%	0% - 10%
1	Oxy	United States	0% - 10%	30% - 40%
1	Parsley Energy	United States	0% - 10%	40% - 50%
1	Peyto	Canada	0% - 10%	10% - 20%
1	Pioneer Natural Resources	United States	0% - 10%	0% - 10%
1	Sasol	South Africa	0% - 10%	10% - 20%
1	Saudi Aramco	Saudi Arabia	0% - 10%	0% - 10%
1	Seven Generations Energy	Canada	0% - 10%	0% - 10%
1	Southwestern Energy	United States	0% - 10%	0% - 10%

Transition Pathway Initiative

Transition Pathway Initiative (TPI) assesses the carbon management and performance of 183 of the world's largest and highest-emitting public companies across seven sectors, amongst which oil & gas.⁹⁸ TPI's assessment is divided into two parts:

- Management quality covers companies' management/governance of greenhouse gas emissions and the risks and opportunities arising from the low-carbon transition.
- Carbon performance assessment involves quantitative benchmarking of companies' emissions pathways against the international targets and national pledges made as part of the 2015 UN Paris Agreement, for example limiting global warming to below 2°C.

Currently only the management quality is available for oil & gas producers, while a methodology for assessing carbon performance is under development. TPI's management quality framework is based on 17 indicators, each of which tests whether a company has implemented a particular carbon management practice (Yes/No), for example formalising a policy commitment to action on climate change, setting emissions targets and undertaking climate scenario planning. These 17 indicators are used to map companies on to the following five levels:

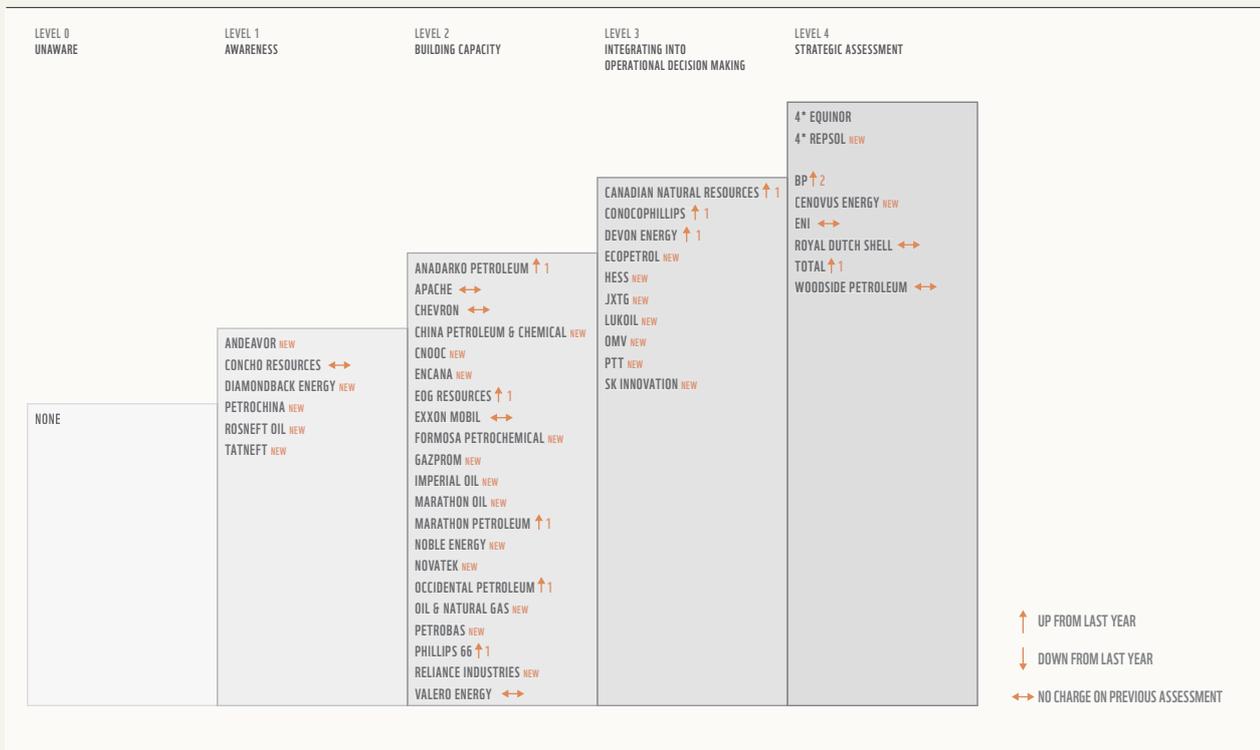
- Level 0. Unaware of (or not acknowledging) climate change as a business issue.
- Level 1. Acknowledging climate change as a business issue: the company acknowledges that climate change presents business risks and/or opportunities, and that the company has a responsibility to manage its greenhouse gas emissions. This is the point where companies adopt a climate change policy.
- Level 2. Building capacity: the company develops its basic capacity, its management systems and processes, and starts to report on practice and performance.

⁹⁸ Transition Pathway Initiative (2019), TPI Tool.

- Level 3. Integrating into operational decision making: the company improves its operational practices, assigns senior management or board responsibility for climate change and provides comprehensive disclosures on its carbon practices and performance.
- Level 4. Strategic assessment: the company develops a more strategic and holistic understanding of risks and opportunities related to the low-carbon transition and integrates this into its business strategy decisions.

This TPI assessment looks at 45 of the world’s largest oil & gas producers, including both integrated producers and specialist exploration/production companies. Companies have been selected primarily on the basis of market capitalisation. These companies usually constitute the largest holdings in investor portfolios. TPI also includes an additional seven smaller companies, which are subject to investor engagement as part of the Climate Action 100+ Initiative. These companies are systemically important for climate change.

FIGURE 10 MANAGEMENT QUALITY OF 45 LARGE AND HIGH-EMITTING OIL & GAS PRODUCERS (TPI)



**Global Investor Coalition on Climate Change: Investor climate compass on oil & gas**

A 2017 report by the Global Investor Coalition (GIC)⁹⁹ on Climate Change assesses how ten large oil & gas companies (BP, Chevron, ConocoPhillips, Eni, ExxonMobil, Occidental, Shell + BG, Statoil, Suncor and Total) have responded on five core areas of investor concern, and found that:

- **Governance.** Five linked executive compensation to GHG emissions performance, but only two companies link remuneration incentives to upstream or strategic intent to reduce emissions.
- **Strategy.** Seven had conducted a scenario analysis to identify how their business strategies should evolve to adapt to the implications of the Paris Agreement aimed at reducing GHG emissions to levels that will limit global temperature rise to less than 2°C. Only three companies, however, had sought to quantify the financial impacts of the IEA's 450ppm scenario.
- **Implementation.** Three had divested from high carbon assets such as oil sands so as to reduce their stranded asset risk exposure. Across the sample group only around 1.5 % of 2016 capital expenditure was directed into low carbon investments.
- **Transparency.** Eight had disclosed their Scope 3 emissions alongside Scope 1&2 emissions (in 2015) but only four had set emissions reduction targets.
- **Public policy.** Eight had signalled clear support for the Paris Agreement, but all needed to be more active in offering public support for robust national and international climate policies.

CDP: beyond the cycle

CDP ranks 24 of the largest publicly listed companies on business readiness for a low carbon transition.¹⁰⁰ The ranking is based on an assessment of four criteria:

- **Transition risk.** CDP assess company portfolios, looking at production and reserve splits by hydrocarbon type as well as looking across various measures of carbon efficiency such as emissions intensity (including methane and flaring levels) and Wood Mackenzie's NPV/tonne metric.
- **Physical risk.** CDP analyses company exposure to localized water stress issues on a facility-by-facility basis across onshore upstream production and downstream assets. It compares this water stress exposure with companies' freshwater withdrawal intensity and governance frameworks.
- **Transition opportunities.** CDP examines which companies are investing in low-carbon assets, R&D and embracing innovative technologies. It also analyses levels of capital flexibility; looking across exploration and production costs, reserve life, discretionary future spend, cash margins and financial gearing.
- **Climate governance and strategy.** CDP analyses companies' governance frameworks including emissions reduction targets and the alignment of governance and remuneration structures with low-carbon objectives. It looks at which companies are conducting scenario analysis and stress-testing their portfolios against a low-carbon energy transition.

⁹⁹ Global Investor Coalition on Climate Change (2017), Investor Climate Compass: Oil and Gas - Navigating Investor Engagement.

¹⁰⁰ CDP (2018), Beyond the Cycle.

FIGURE 11 LEAGUE TABLE OF 24 OIL & GAS PRODUCERS (CDP)

LT RANK	COMPANY	COUNTRY	AVERAGE MARKET CAP Q3 2018 (US\$BN)	PRODUCTION 2017 (MILLION BOE/D)	2017 EMISSIONS (5Y+2 Mt CO ₂ e)	WEIGHTED RANK	TRANSITION RISKS RANK	PHYSICAL RISKS RANK	TRANSITION OPPORTUNITIES RANK	CLIMATE GOVERNANCE & STRATEGY RANK	2017 ADJUSTED EBITDA SPLIT BY BUSINESS AREA (%)			
											UPSTREAM	MIDSTREAM	DOWNSTREAM	OTHER
1	Equinor	Norway	78	1.9	16	6.72	3	4	2	4	100%	0%	0%	0%
2	Total	France	152	2.5	40	8.0	10	5	3	1	100%	0%	0%	0%
3	Shell	UK/Netherlands	275	3.7	84	8.11	9	14	1	2	100%	0%	0%	0%
4	Eni	Italy	64	1.7	43	8.16	6	8	7	3	100%	0%	0%	0%
5	Repsol	Spain	29	0.7	23	8.58	5	12	5	5	100%	0%	0%	0%
6	Woodside	Australia	22	0.2	10	10.29	2	1	18	11	100%	0%	0%	0%
7	BP	UK	139	2.5	56	10.75	11	16	6	6	100%	0%	0%	0%
8	Gazprom	Russia	54	9.7	247	10.81	4	3	21	9	100%	0%	0%	0%
9	OMV	Austria	19	0.3	11	12.50	7	17	20	12	100%	0%	0%	0%
10	ConocoPhillips	USA	72	1.4	21	12.57	15	9	14	7	100%	0%	0%	0%
11	Hess	USA	17	0.3	4.1	12.73	14	7	16	8	100%	0%	0%	0%
12	Chevron	USA	230	2.6	60	12.89	16	15	4	14	100%	0%	0%	0%
13	Anadarko	USA	32	0.7	6.6	12.91	8	6	15	21	100%	0%	0%	0%
14	INPEX	Japan	17	0.4	0.9	13.32	20	13	12	10	100%	0%	0%	0%
15	Noble Energy	USA	15	0.4	2.5	13.33	1	21	23	22	100%	0%	0%	0%
16	Petrobras	Brazil	73	2.5	67	14.08	17	2	17	17	100%	0%	0%	0%
17	ExxonMobil	USA	343	4.0	125	14.17	23	20	9	15	100%	0%	0%	0%
18	Occidental	USA	56	0.6	16	14.51	22	22	11	13	100%	0%	0%	0%
19	Apache	USA	16	0.5	8.9	14.54	13	10	22	20	100%	0%	0%	0%
20	PetroChina	China	215	4.0	193	14.84	12	23	19	16	100%	0%	0%	0%
21	Sinopec	China	117	1.2	163	15.35	18	24	10	19	100%	0%	0%	0%
22	Marathon Oil	USA	15	0.4	3.8	15.85	19	18	13	23	100%	0%	0%	0%
23	Rosneft	Russia	61	5.7	76	15.89	21	11	24	18	100%	0%	0%	0%
24	CNOOC	China	68	1.3	7.8	16.60	24	19	8	24	100%	0%	0%	0%
WEIGHTING							35%	10%	30%	25%				

**InfluenceMap: Lobbying and corporate influence**

InfluenceMap has introduced the concept of the Carbon Policy Footprint for corporations.¹⁰¹ These footprints are not measured in tons of greenhouse gases, but instead compare the impact that a company or trade association is having on the development of climate policy.

The scoring methodology is applied to all the included companies and trade associations using the same formula. It relies on a consistent set of objective benchmarks:

- The definition of ‘policy influence’ is derived from the 2013 UN Guide for Responsible Corporate Engagement in Climate Policy.
- All company or trade association positions are measured against a benchmark of ‘Paris-aligned’ climate and energy policy put forward by relevant regulatory bodies, including the European Commission Directorate-General for Climate Action and national climate regulators.
- All company and trade association assessments are based on thorough analysis of their public disclosures, including legislation consultations, websites, financial filings and transcripts of CEO and senior management messaging.
- For each company, hundreds of pieces of evidence are assessed and scored. These are aggregated with an algorithm to compute metrics that indicate corporate behaviour.

InfluenceMap has scrutinised and scored climate lobbying activities of nine large oil & gas companies: Royal Dutch Shell, Total, BP, ExxonMobil, Chevron, ConocoPhillips, Valero Energy, Philips 66 and Koch Industries,¹⁰² and concludes that these companies continue to represent a highly influential and negative influence on Paris-aligned climate policy. This is expressed in two indicators:

- The performance band (A+ to F) measures the extent to which a corporation is supporting or obstructing the climate policy process either directly or through industry bodies. None of the oil & gas producers scores better than a D.
- The engagement intensity measures the extent to which the company is engaging on climate change policy matters, whether positively or negatively. It is a number from 0 (no engagement at all) to 100 (full engagement on measured data points).

¹⁰¹ Influencemap, InfluenceMap Scoring Table: Corporations and Influencers.

¹⁰² These nine companies have different business models, some being integrated oil & gas companies, others focused on upstream or downstream activities.

FIGURE 12 OIL & GAS PRODUCERS CORPORATE LOBBYING (INFLUENCEMAP)

COMPANY NAME	PERFORMANCE BAND	ENGAGEMENT INTENSITY
Royal Dutch Shell	D	27
Total	D	29
BP	E+	26
ConocoPhillips	E	22
ExxonMobil	E	28
Valero Energy	E-	28
Chevron	F	31
Phillips 66	F	11
Koch Industries	F	30

Overview table Figure 13 collates key company-level data points from the above-mentioned analyses. It allows to quickly get a sense of which companies are covered by which analysis, and how they are exposed to particular risks according to these analyses. A four range colour-coding (from worst to best: see legend) was included in this table to facilitate a quick understanding of how companies are exposed to risks.¹⁰³

FIGURE 13 ANALYSIS AND TOOLS ON EXPOSURE OF OIL & GAS PRODUCERS TO CLIMATE-RELATED RISKS (WWF)

AUTHOR	CARBON TRACKER INITIATIVE	TRANSITION PATHWAY INITIATIVE	CDP	INFLUENCEMAP
WHAT IS MEASURED?	PERCENTAGE OF CAPITAL EXPENDITURE OUTSIDE IEA SDS (2°C SCENARIO) AND IEA B2DS (1.75°C SCENARIO)	COMPANIES' MANAGEMENT/ GOVERNANCE OF GREENHOUSE GAS EMISSIONS AND THE RISKS AND OPPORTUNITIES ARISING FROM THE LOW-CARBON TRANSITION	BUSINESS READINESS FOR A LOW CARBON TRANSITION BASED ON FOUR CRITERIA: TRANSITION RISK, PHYSICAL RISK, TRANSITION OPPORTUNITIES, CLIMATE GOVERNANCE AND STRATEGY	LOBBYING AND CORPORATE INFLUENCE
HOW IS IT SCORED?	1 IS BEST, 4 IS WORST	1 IS BEST, 4 IS WORST	1 IS BEST, 24 IS WORST	A+ IS BEST, F IS WORST
BP	2	4	7	E+
Chevron	3	2	12	F
ConocoPhillips	2	3	10	E
Exxon Mobil	3	2	17	E
Royal Dutch Shell	2	4	3	D
Total	4	4	2	D
Anadarko	2	2	13	N/A
Apache	4	2	19	N/A
CNOOC	3	2	24	N/A

¹⁰³ For Carbon Tracker Initiative (quartiles) and Transition Pathway Initiative (scoring management from 0 to 4) the colour coding was applied based on a categorisation that was included in the analysis itself. For the research by IGC and InfluenceMap, WWF developed its own colour coding.

ANNEX 3. COMPANY-SPECIFIC CLIMATE-RELATED RISK ANALYSES

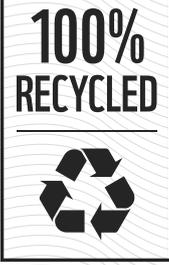
AUTHOR	CARBON TRACKER INITIATIVE	TRANSITION PATHWAY INITIATIVE	CDP	INFLUENCEMAP
WHAT IS MEASURED? 	PERCENTAGE OF CAPITAL EXPENDITURE OUTSIDE IEA SDS (2°C SCENARIO) AND IEA B2DS (1.75°C SCENARIO)	COMPANIES' MANAGEMENT/ GOVERNANCE OF GREENHOUSE GAS EMISSIONS AND THE RISKS AND OPPORTUNITIES ARISING FROM THE LOW-CARBON TRANSITION	BUSINESS READINESS FOR A LOW CARBON TRANSITION BASED ON FOUR CRITERIA: TRANSITION RISK, PHYSICAL RISK, TRANSITION OPPORTUNITIES, CLIMATE GOVERNANCE AND STRATEGY	LOBBYING AND CORPORATE INFLUENCE
HOW IS IT SCORED?	1 IS BEST, 4 IS WORST	1 IS BEST, 4 IS WORST	1 IS BEST, 24 IS WORST	A+ IS BEST, F IS WORST
Eni	3	4	4	N/A
Equinor (Statoil)	4	4	1	N/A
Gazprom	3	2	8	N/A
Hess	3	3	11	N/A
Marathon Oil	4	2	22	N/A
Noble Energy	1	2	15	N/A
OMV	1	3	9	N/A
Petrobras	3	2	16	N/A
PetroChina	1	1	20	N/A
Repsol	3	4	5	N/A
Rosneft	2	1	23	N/A
Woodside	2	4	6	N/A
Canadian Natural Resources (CNRL)	3	3	N/A	N/A
Cenovus Energy	2	4	N/A	N/A
Concho Resources	4	1	N/A	N/A
Devon Energy	4	3	N/A	N/A
Diamondback Energy	2	1	N/A	N/A
Ecopetrol	4	3	N/A	N/A
Encana	3	2	N/A	N/A
EOG Resources	1	2	N/A	N/A
Imperial Oil	2	2	N/A	N/A
Lukoil	1	3	N/A	N/A
Novatek	1	2	N/A	N/A
Tatneft	2	1	N/A	N/A
Sinopec	1	N/A	21	N/A
Suncor	3	N/A	10	N/A
Inpex	3	N/A	14	N/A
Occidental	N/A	2	18	N/A
Phillips 66	N/A	2	N/A	F
Valero	N/A	2	N/A	E-
Aker BP	3	N/A	N/A	N/A
Antero Resources	1	N/A	N/A	N/A
Arc Resources	2	N/A	N/A	N/A

AUTHOR	CARBON TRACKER INITIATIVE	TRANSITION PATHWAY INITIATIVE	CDP	INFLUENCEMAP
WHAT IS MEASURED? 	PERCENTAGE OF CAPITAL EXPENDITURE OUTSIDE IEA SDS (2°C SCENARIO) AND IEA B2DS (1.75°C SCENARIO)	COMPANIES' MANAGEMENT/ GOVERNANCE OF GREENHOUSE GAS EMISSIONS AND THE RISKS AND OPPORTUNITIES ARISING FROM THE LOW-CARBON TRANSITION	BUSINESS READINESS FOR A LOW CARBON TRANSITION BASED ON FOUR CRITERIA: TRANSITION RISK, PHYSICAL RISK, TRANSITION OPPORTUNITIES, CLIMATE GOVERNANCE AND STRATEGY	LOBBYING AND CORPORATE INFLUENCE
HOW IS IT SCORED?	1 IS BEST, 4 IS WORST	1 IS BEST, 4 IS WORST	1 IS BEST, 24 IS WORST	A+ IS BEST, F IS WORST
BHP Billiton	1	N/A	N/A	N/A
Cabot Oil and Gas	1	N/A	N/A	N/A
Chesapeake	2	N/A	N/A	N/A
Cimarex Energy	1	N/A	N/A	N/A
Continental Resources	2	N/A	N/A	N/A
Crescent Point Energy	4	N/A	N/A	N/A
Energen	4	N/A	N/A	N/A
EQT Corporation	1	N/A	N/A	N/A
Galp Energia SA	3	N/A	N/A	N/A
Gulfport Energy	4	N/A	N/A	N/A
Husky Energy	4	N/A	N/A	N/A
Lundin Petroleum	3	N/A	N/A	N/A
Murphy Oil	2	N/A	N/A	N/A
Newfield Exploration	2	N/A	N/A	N/A
Oil Search	3	N/A	N/A	N/A
Origin Energy	1	N/A	N/A	N/A
Oxy	1	N/A	N/A	N/A
Parsley Energy	4	N/A	N/A	N/A
Peyto	1	N/A	N/A	N/A
Pioneer Natural Resources	2	N/A	N/A	N/A
QEP Resources	2	N/A	N/A	N/A
Range Resources	4	N/A	N/A	N/A
RSP Permian	1	N/A	N/A	N/A
Santos	1	N/A	N/A	N/A
Sasol	1	N/A	N/A	N/A
Saudi Aramco	3	N/A	N/A	N/A
Seven Generations Energy	4	N/A	N/A	N/A
Southwestern Energy	3	N/A	N/A	N/A
Surgutneftgas	4	N/A	N/A	N/A
Tourmaline Oil	2	N/A	N/A	N/A
Tullow Oil	4	N/A	N/A	N/A
Vermilion Energy	4	N/A	N/A	N/A
WPX Energy	4	N/A	N/A	N/A



ANNEX 3. COMPANY-SPECIFIC CLIMATE-RELATED RISK ANALYSES

AUTHOR	CARBON TRACKER INITIATIVE	TRANSITION PATHWAY INITIATIVE	CDP	INFLUENCEMAP
WHAT IS MEASURED? 	PERCENTAGE OF CAPITAL EXPENDITURE OUTSIDE IEA SDS (2°C SCENARIO) AND IEA B2DS (1.75°C SCENARIO)	COMPANIES' MANAGEMENT/ GOVERNANCE OF GREENHOUSE GAS EMISSIONS AND THE RISKS AND OPPORTUNITIES ARISING FROM THE LOW-CARBON TRANSITION	BUSINESS READINESS FOR A LOW CARBON TRANSITION BASED ON FOUR CRITERIA: TRANSITION RISK, PHYSICAL RISK, TRANSITION OPPORTUNITIES, CLIMATE GOVERNANCE AND STRATEGY	LOBBYING AND CORPORATE INFLUENCE
HOW IS IT SCORED?	1 IS BEST, 4 IS WORST	1 IS BEST, 4 IS WORST	1 IS BEST, 24 IS WORST	A+ IS BEST, F IS WORST
Andeavor (formerly Tesoro)	N/A	1	N/A	N/A
China Petroleum & Chemical	N/A	2	N/A	N/A
Formosa Petrochemical	N/A	2	N/A	N/A
JXTG	N/A	3	N/A	N/A
Oil & Natural Gas	N/A	2	N/A	N/A
PTT	N/A	3	N/A	N/A
Reliance Industries	N/A	2	N/A	N/A
SK Innovation	N/A	3	N/A	N/A
Koch Industries	N/A	N/A	N/A	F



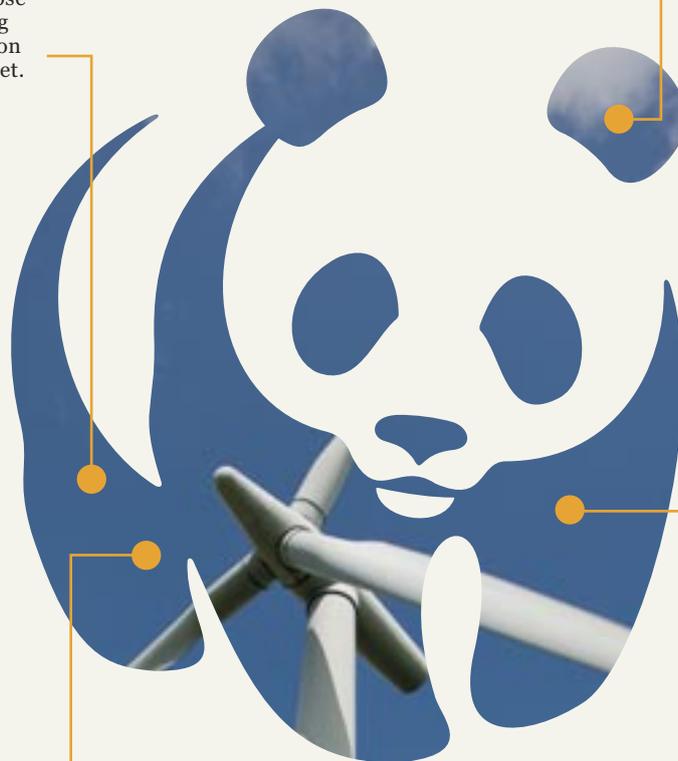
WWF ASSET OWNER GUIDE ON OIL & GAS PRODUCERS

RISKS

Oil & gas producers that invest in risky projects are more vulnerable to the risk of stranded assets than those that are actively preparing for a zero-carbon transition in line with the 1.5°C target.

OPPORTUNITIES

Asset owners should drive oil & gas producers to harness the growing opportunities in zero-carbon sectors.



JOURNEY

Asset owners' engagement should not stop before oil & gas producers have adopted integrated 1.5°C transition plans.

LEADERSHIP

Leading asset owner should adopt a policy for oil & gas producers ensuring alignment with the 1.5°C target.

	<p>Why we are here To stop the degradation of the planet's natural environment and to build a future in which humans live in harmony with nature.</p> <p>wwf.eu</p>
---	--