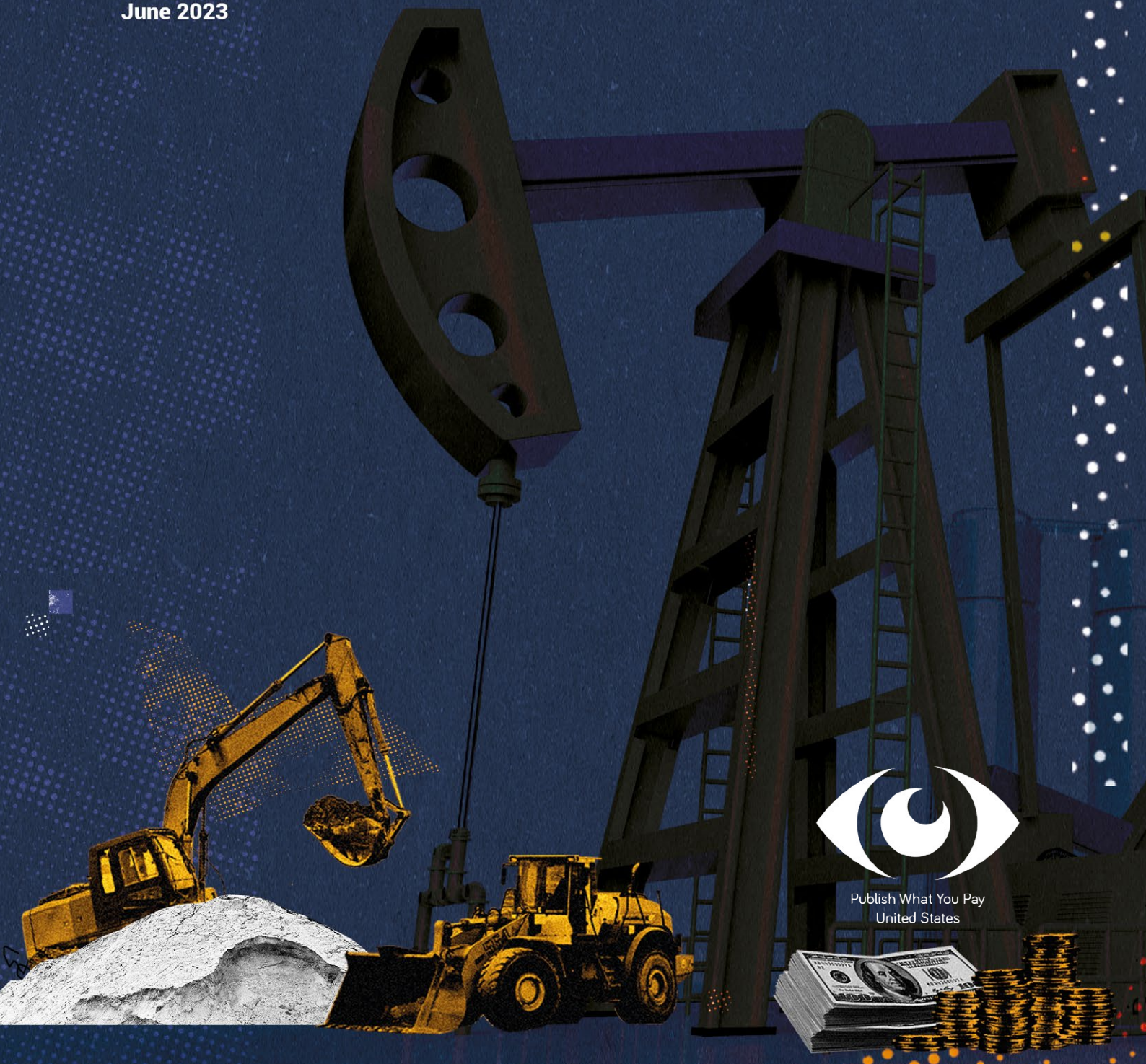
PUBLISH YOUR PLANS:

The Disclosures Needed to Support a Managed Decline of Oil and Gas Production and an Informed Energy Transition

Publish What You Pay – United States

June 2023



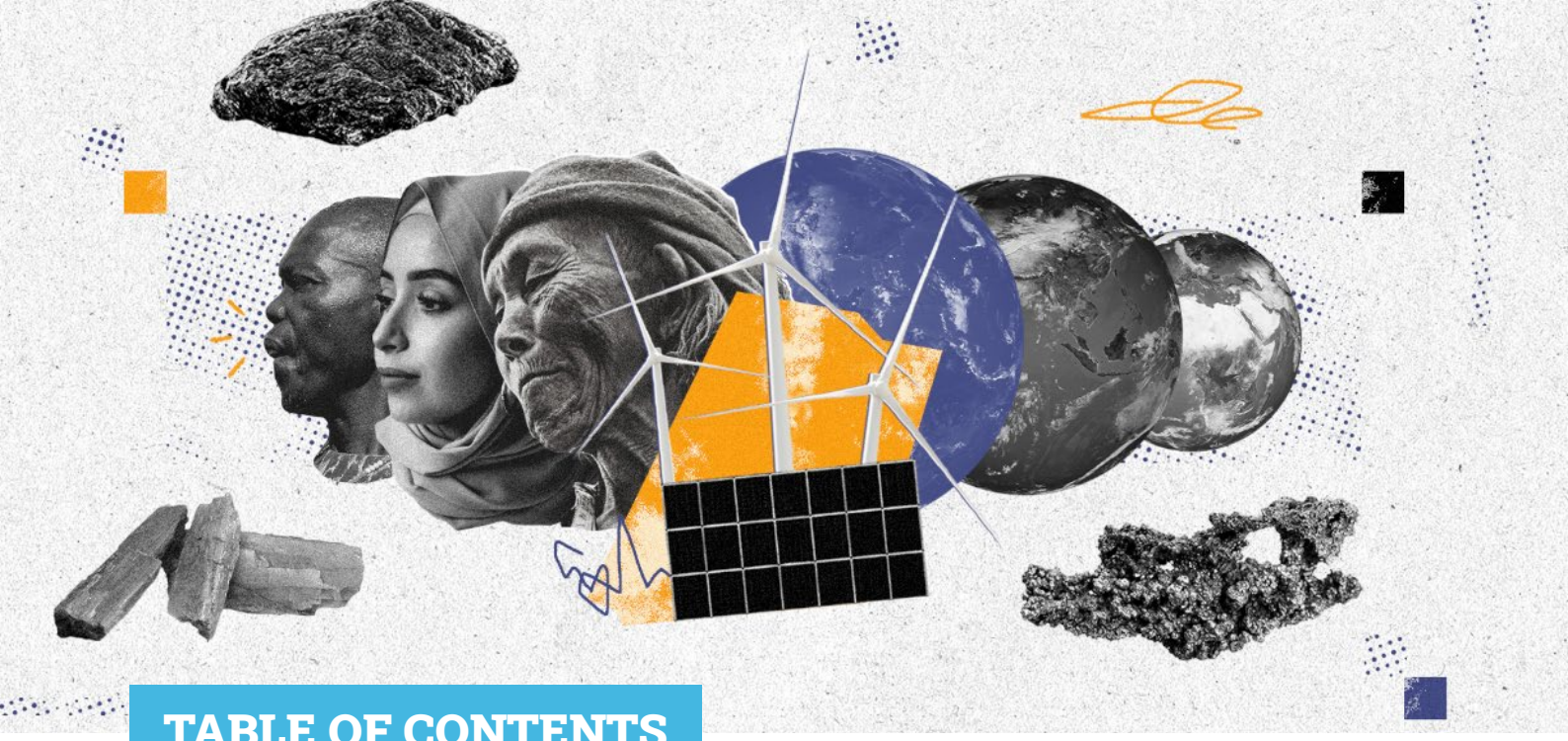


TABLE OF CONTENTS

FOREWORD

"Publish Your Plans" lands as a brilliantly timed addition to global efforts to hold the fossil fuel sector to account. The measures set out in this handbook provide essential new direction, critical in the struggle to make sure global society can navigate the complexity of the energy transition, in both an equitable and secure way. I encourage policymakers - all of whom should be focused on how human society can survive the climate crisis and build a world that is more prosperous, secure, and clean - to read this handbook and to act. Nothing less than our collective future may depend on it.

Simon Taylor, co-founder & Director, Global Witness, & co-founder of the Publish What You Pay Campaign.

"The most urgent task on planet earth is rapidly phasing out the use of fossil fuels. The oil and gas industry has done all that they can to prolong their business model, at the cost of a workable earth; we need concrete and clear plans for moving on. Now."

Bill McKibben, Author, Educator, Environmentalist and founder of 350.org and ThirdAct.org

"The fossil fuel industry has been ignoring the negative impacts that oil and gas extraction has caused to the people and the planet especially the world's poorest and most vulnerable communities. These companies must be held accountable through providing information to the people on their plans to support a just energy transition. The handbook will support our struggles as environmental activists to make our demands heard and acted upon."

Evelyn Acham, Climate justice activist from Kampala, Uganda, Founder of +1tree, Co-Founder of Climate Justice for Healthy Communities (CJHC)

Meaningful reporting by companies is not happening on the scale or the pace the current crisis requires.

EXECUTIVE SUMMARY

There is a global consensus among policymakers, scientists, financial institutions, and market regulators that the physical manifestations of climate change will devastate communities, ecosystems, and economies. As the global temperature increases, droughts, storms, heat waves, and other extreme weather phenomena will become more frequent and severe, causing the associated costs – both environmentally and financially – to continue to rise and compound.

Fossil fuel production is the leading contributor of greenhouse gas (GHG) emissions, which is speeding up global warming. Countries around the world must prioritize phasing out fossil fuel production as we navigate the path towards limiting global warming. The transition to a low-carbon economy has begun and will have sweeping impacts on nearly every corner of the global economy as future regulations and changes in consumer demand impact how energy is sourced and used. It is essential that action be taken now to steward an orderly and well-managed energy transition.

Despite the urgent need to decarbonize, critical information about how oil and gas companies are planning for the energy transition and making decisions about which projects to develop is limited. This means stakeholders like policymakers, citizens in petroleum-rich countries, advocates and investors are navigating the energy transition without the necessary disclosures needed to prepare effectively for a well-managed energy transition that benefits everyone. This handbook addresses this information gap and identifies key categories of information oil and gas companies must disclose that are essential for understanding, assessing, and managing climate risk specific to the oil and gas sector.

What is climate risk?

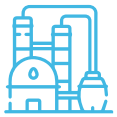
Climate-related financial risk, or climate risk, refers to the potential negative impacts of climate change on businesses, investments, and financial markets. These include physical risks, such as damage to assets from extreme weather events; transition risks, such as policy changes and shifts in market demand towards low-carbon alternatives; and liability risks, such as lawsuits and legal action related to environmental damage. These risks can lead to reduced profitability, stranded assets (described in Box 4), and reputational damage, among other consequences. Climate risk impacts every sector of the economy and demands a coordinated and widespread response.

Effective climate-related financial risk management involves identifying and assessing climate risks, integrating them into business strategies and decision-making processes, and disclosing relevant information to stakeholders about the anticipated financial impacts and how the company plans to mitigate them. By proactively managing climate risks, businesses and investors can reduce their exposure to potential financial losses and contribute to a more sustainable and resilient global economy. Climate risk is shared globally, leaving the vast majority of companies across all sectors vulnerable to varying degrees of risk. These risks may manifest as physical disruptions such as rising sea levels and severe weather that damages infrastructure, increased operating costs, and heightened compliance liabilities as regulatory ecosystems evolve.

The transition to a low-carbon economy is already underway in energy markets and will result in lower demand for fossil fuels as renewable energy sources become cheaper and more readily accessible; however, this transition is not happening quickly enough to lessen or prevent significant climate-related damage.[1] Based on the latest forecasting about the impacts of global warming and the necessity of decarbonizing, all companies, especially those in the oil and gas sector, must prepare for major market disruptions. This poses enormous risks to all those financially entwined with oil and gas companies, including shareholders, communities impacted by extraction, and governments heavily dependent on fossil fuel revenues.

Climate risk is shared globally, leaving the vast majority of companies across all sectors vulnerable to varying degrees of risk.

The disclosures recommended by this handbook will enable a broad spectrum of stakeholders to examine how current practices – even those marketed as environmental initiatives – delay meaningful progress and distract from ongoing reckless behavior. Importantly, this handbook also opens the door for dialogue on important new policy decisions.



Why focus on the oil and gas industry?

The fossil fuel industry's response to the climate crisis has so far been characterized by intransigence and deception.[2] Despite the urgency of the climate crisis, and the need to phase out heavily polluting oil and gas production, the industry plans to expand production over the next decades. These plans are fundamentally incompatible with the energy transition and greater disclosure is necessary to allow stakeholders to scrutinize companies' decision-making.

In response, regulators around the world have started working on new laws and regulations to require companies to disclose more information relating to climate-related financial risk. In the absence of such rules, global standard-setting bodies, like the Task Force on Climate-Related Financial Disclosures (TCFD), have developed new guidance for companies on the types of information they should voluntarily disclose. But while these efforts are evidence of some movement in the right direction, detailed, meaningful reporting by companies is not happening on the scale or pace the current crisis requires. Further, regulators are not looking at oil and gas climate-related risks specifically, yet the oil and gas sector presents particular challenges with respect to climate risk, so sector-specific disclosure rules are needed to address these challenges.

This fundamental information gap must be addressed. Without meaningful, comprehensive, and standardized reporting available to scrutinize oil and gas companies' planning and decision-making, a wide variety of stakeholders face significant challenges in being able to play their role in supporting a well-managed energy transition. Beyond the need for greater disclosure, the information that is disclosed must be appropriately disaggregated to enable citizens and policymakers to better assess risk at a national or local level, and to better understand the potential impacts and benefits of new projects that are being developed. At the moment, climate-related risk information is typically disclosed on a globally aggregated level, or at a company-wide level, which is not useful to all stakeholders.

Citizens in resource-rich areas, civil society, policymakers, and shareholders are currently unable to determine the risks they face from the information that oil and gas companies currently publish, and more detail is needed to adequately prepare for an energy future that does not repeat the same governance mistakes that have plagued extractive industry operations for decades.

The industry's response has largely focused on aspirational marketing rather than good-faith efforts to prepare for a managed decline of fossil fuel production.[3] Though net zero pledges and other climate-related commitments are on the rise, "most companies still do not appear to be including the financial impacts of such commitments, or indeed climate change risks, in their financial statements," according to an analysis by Carbon Tracker.[4]

Given the role of emissions from the oil and gas sector in driving global warming, there is no question that the energy transition will mean a wholesale transformation of the sector. For oil and gas companies, the reality is that "their business model fundamentally depends on [future] emissions being released."[5] The ability of market participants, regulators, and the public to effectively measure and manage these unprecedented risks, however, is hindered by the lack of information from corporations about climate-related financial risk and their plans to address these risks.

The way forward

To address this information asymmetry, the Publish Your Plans handbook describes specific disclosures that the oil and gas sector[6] should be required to disclose about its climate-related financial risks[7] to adequately inform a well-managed energy transition. Our analysis concludes that the following are the disclosures that provide the most meaningful transparency and should therefore be the biggest priorities for disclosure requirements.

In particular, oil and gas companies should disclose:

- Detailed information about **transition plans;**
- Information on **oil and gas reserves,** including **emissions embedded in reserves;**
- Data about their **GHG emissions on a project-level basis;**
- **Critical financial assumptions and estimates** underpinning financial reporting and accounting, including information on asset retirement obligations and impairment testing;
- **Project break-even prices,** or the commodity price at which a project is no longer profitable; and
- An **analysis of price sensitivity** for reserve valuations under different scenarios.

Publish What You Pay-United States (PWYP-US) and its allies urge oil and gas companies to disclose this information and urge investors and other stakeholders to demand greater transparency from them. We also encourage regulators and standard-setters around the world to integrate these sector-specific disclosures into their requirements and to facilitate the emergence of harmonized and comprehensive oil and gas climate risk disclosures.

For more information about these disclosures and their value to investors and policymakers, please see Section 6.

> **The industry's response has largely focused on aspirational marketing rather than good-faith efforts to prepare for a managed decline of fossil fuel production.**

Citizens have a fundamental right to know the basis for their government's economic decisions and the tradeoff between future revenues and climate impacts.

INTRODUCTION

The Publish Your Plans handbook explains why greater transparency from oil and gas companies is necessary for stakeholders to steward a well-managed energy transition. The handbook identifies key categories of information that are essential for understanding, assessing, and managing climate risk specific to the oil and gas sector and provides a primer on the current state of disclosure.

Climate change poses a significant risk to our planet, but exactly how and when climate events will manifest is much harder to pinpoint. Energy markets, currently saturated by fossil fuels, will face risks to infrastructure and price volatilities in a dramatically changing landscape. While energy markets are notoriously unpredictable in the short-term, even under the best of circumstances, recent disruptions have not been attributed to climate policy:[8] rather, events such as the Russian invasion of Ukraine illustrate how geopolitical risk can exacerbate climate risk and add to unpredictability in energy markets.[9]

It is also important to note that the oil and gas sector has huge influence over the global economy. [10]

Climate risk is not the only kind of risk to consider when approaching stakeholders, policymakers, investors, and financial institutions – in fact, climate risk compounds with other risk factors and enhances the urgency of action. Energy is fundamental to national security, and renewable energy sources can bolster market and political stability by allowing governments more control over domestic energy production. For example, the war in Ukraine's widespread impacts on price and economic stability has reinforced the need for a rapid transition away from the dependence on fossil fuels and the need to diversify energy supply sources as a means of increasing energy security.

In the context of such immense transition and uncertainty, transparency is a powerful tool for a wide range of stakeholders. To illustrate the value of these disclosures, this handbook focuses on four broad classes of stakeholders: resource-rich communities, policymakers, investors, and advocates; however, it is important to note that this list is not exhaustive and does not fully capture the needs and perspectives of everyone who will be impacted by climate change.

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CITIZENS OF PETROLEUM-RICH AND PETROLEUM-DEPENDENT COUNTRIES

With the right level of detail and disaggregated data, climate risk disclosures can be valuable sources of information for communities that are impacted, or may be impacted, by extraction. They can inform citizens of the economics behind the decision for specific projects to go forward, or the ability of a project to operate within the constraints of the carbon budget. Citizens also must understand the assumptions underpinning economic planning and policymaking in fossil fuel rich countries. For example, if a government has incurred debt based on the assumption that the domestic oil industry will generate significant government revenues for the next 20 years, what happens if domestic oil and gas assets are stranded early? How will that revenue gap be filled? Likely, citizens will pay the price for risky, oil-backed unsustainable economic planning. Additionally, the failure to plan adequately for the energy transition will lead to long-term oil and gas contracts lock-in, reducing the ability to transition to low-carbon energy and economic systems, and increasing the risks of communities being left behind.

This is especially important as the revenues at stake are often significant. According to Carbon Tracker, the top 40 most fossil fuel-dependent countries could see a drop of 51 percent in government oil and gas revenues in a shift to a low-carbon economy in the next two decades.[11] Of the nineteen most vulnerable countries, ten are ranked as "low" on the UN Human Development Index.[12] The vulnerability of these countries' economic stability has implications for their national energy security, political stability, and future economic prospects. Destabilizing any one of these can lead to drastic decreases in a government's ability to provide for its people.

Citizens have a fundamental right to know the basis for their government's economic decisions and the tradeoff between future revenues and climate impacts. With greater climate risk disclosures, citizens can play a critical role in holding companies and governments accountable for their actions and advocating for more ambitious climate policies and regulations. By participating in public hearings, submitting comments on proposed regulations, and supporting grassroots movements for climate justice, citizens can help create the political pressure needed to accelerate the transition to a low-carbon economy.

POLICYMAKERS

Policymakers charged with making decisions about their country's energy future need adequate information to assess whether or not oil and gas companies are making sound decisions in determining which oil and gas projects will be developed. Climate risk disclosures for the oil and gas sector can be incredibly useful for financial planning by governments in countries that have historically been dependent on fossil fuel revenues. For instance, national oil company transparency is important not only for a better understanding of current public financial management and oil sector budgets, but also to better understand how much public revenue will continue to be invested in the oil sector into the future. This handbook also prepares policymakers to understand the risk this poses for domestic economic security.

As policymakers grapple with securing their energy needs, there are many other considerations that are informed by oil and gas companies' planning for the energy transition. Given the wide-ranging impacts of decreasing society's reliance on fossil fuels, policymakers also need to prepare for the implications on employment, the infrastructure needed to facilitate low-carbon energy sources, and the cost of returning oil and gas projects to their original state.

INVESTORS

Investors are entitled to information that will impact the value of their investments. Without clear, reliable, and comparable information about how oil and gas companies plan to phase out fossil fuel production and transition to cleaner energy sources, investors may not be able to accurately assess the long-term viability of these companies. [13] As a result, investors risk inadequately allocating capital and experiencing lower returns than they would if they had adequate access to information on climate risks. Uncertainty over climate risks can also lead to lower investor confidence and potentially higher costs of capital for oil and gas companies. Further, investors face the opportunity cost of leaving their money invested in risky projects when it could be put to use in investments that are not only more secure but are better aligned with their risk tolerance so that a more efficient allocation of capital can help facilitate a well-managed energy transition.

Ultimately, investors are best-placed to decide what information they need to prudently allocate capital, and due to prior consensus that oil and gas investments were stable long-term choices,

As policymakers grapple with securing their energy needs, there are many other considerations that are informed by oil and gas companies' planning for the energy transition.

institutions ranging from universities to states and pension funds are among the key actors managing oil investments. This requires us to broaden our understanding of an investor to a huge proportion of the population that is passively connected to these investments through retirement/pension funds or education.

HANDBOOK USER GUIDE

Although the disclosures recommended by this handbook are relevant to all stakeholders, this handbook is primarily written for advocates and activists. These disclosures were initially developed by mainly US-based organizations and US-based staff of international organizations,[14] but they should be considered globally relevant.

This handbook introduces and clarifies the concepts that are necessary for stakeholders to contextualize the disclosures. This is essential because it empowers actors from varying jurisdictions and levels of power to apply the tools of transparency in their respective circumstances. Additionally, this allows advocates to tailor arguments for engagement with different stakeholders such as investors and policymakers, while providing a comprehensive resource for citizens seeking to understand the risks they face.

This handbook prioritizes the disclosures that are necessary for a just transition. Some of these items are currently being considered by regulators while others will need to be brought to the forefront of policy discussion through targeted and informed engagement. This handbook is designed to equip advocates with the tools needed to shape regulations in major capital markets as well as places where climate-related financial risk disclosures are being developed. The recommended list of disclosures can also be used as the basis for advocacy campaigns with policymakers or regulators to require standardized climate-related financial risk disclosures for the oil and gas sector. To support this advocacy, this handbook can be used as a quick reference for drafting advocacy materials and for briefing partners and policymakers.

The list of recommended disclosures can also be used to inform direct and indirect engagement with companies, their shareholders, and industry reporting standard-setters. As an example, the need for specific information on a company's transition plans or for project-specific information could be the basis for a shareholder advocacy proposal or other type of direct-action targeting companies.

Ultimately, the Publish Your Plans handbook provides a transparency lens for key climate transition policy issues, allowing users to scrutinize relevant corporate actions and policies and ask the right questions to better understand how oil and gas companies are addressing climate risks.

> **The top 40 most fossil-fuel dependent countries could see a drop of 51 percent in government oil and gas revenues in a shift to a low-carbon economy in the next two decades. – Carbon Tracker**

> **"No oil company is preparing for the scale of decline envisioned in [a 2°C] scenario. – Wood Mackenzie"**

SECTION 1: THE ROLE OF OIL AND GAS IN THE ENERGY TRANSITION

Fossil fuel combustion is the primary cause of anthropogenic greenhouse gas (GHG) emissions, which trap heat on Earth's surface and lead to the gradual heating of the planet. Climate scientists estimate that since the Industrial Revolution of the mid-nineteenth century, the Earth has warmed by an average of 1.1°C, as a result of human activity.[15] Phasing out oil and gas while maintaining energy supplies requires reallocation of resources, such as government investment and infrastructure, and low-carbon renewable technologies are poised to fill the gap. The entrenched interests of oil and gas companies, however, continue to delay and stall this much-needed decline in oil and gas production.

In December 2015, 196 countries around the world adopted the Paris Agreement, which aims to limit global temperature rise to "well-below" 2°C and ideally to 1.5°C.[16] This half of a degree Celsius is critical. At global warming of 1.5°C, the Intergovernmental Panel on Climate Change (IPCC) warns of rising sea levels, increased flooding, more frequent and severe storms and extreme heat waves, which threaten the

ability for entire ecosystems to sustain life. At 2°C warming, some of these impacts could be twice as severe.[17] The urgent need to limit GHG emissions in order to avoid the worst impacts of climate change has generated the concept of the carbon budget – a global accounting of emissions that keeps track of how emissions are allocated.

BOX 1

WHAT IS THE CARBON BUDGET?

The carbon budget refers to "the maximum amount of cumulative net global anthropogenic CO2 emissions that would result in limiting global warming to a given level with a given probability"[18] and represents the finite amount of GHG emissions that can be released into the atmosphere without leading to the catastrophic impacts associated with increased global warming. Carbon budgets are "based on the fact that the amount of warming that will occur can be approximated by total – that is, cumulative – CO2 emissions."[19]

For policymakers and companies, the carbon budget is a valuable framework for setting targets and tracking global progress towards limiting global warming. It is also a useful metric for estimating the impact of future fossil fuel projects, both individually and collectively.

The IPCC estimates that the world has around 500 gigatonnes of carbon dioxide equivalent (GtCO2) remaining in the 1.5°C budget for a 50 percent avoidance chance.[20] According to the Global Carbon Project, we will reach the allowable carbon budget under a 1.5°C scenario in 9 years, or a 2°C scenario in 30 years, using 2022 emissions levels. To limit global warming, global CO2 emissions must reach net zero. To do this by 2050 would require a decrease of about 1.4 GtCO2 each year.[21]

It is important to note that most carbon budgets primarily focus only on the emissions of carbon dioxide, which accounts for about three-fourths of the total GHG emissions. This means some carbon budget figures can be misleading if they do not account for other GHGs like methane or nitrous oxide, which have a higher Global Warming Potential.[22]

The primary producers of fossil fuels represent the ultimate source of GHG emissions,[23] and as a result, they play a defining role in global efforts to limit global warming. Among business leaders and investors in the oil and gas exploration and production industry, there is a growing recognition, perhaps best stated by BP CEO Bernard Looney, that the "world's carbon budget is finite and running out fast."[24] Climate-related regulations and policy changes, as well as increasing adoption of clean energy sources, mean that decarbonizing should be in companies' best financial interest. Transitioning away from fossil fuels to a low carbon economy is essential if the world is to have any chance of keeping the global temperature increase below 2°C.

IMPLICATIONS OF PHASING OUT OIL AND GAS

Despite the fact that scientists at major oil and gas companies have been aware of the link between the combustion of fossil fuels and global warming as early as 1959,[25] the industry as a whole has so far failed to adequately prepare for the inevitable energy transition to low-carbon energy sources. Market analyst Wood Mackenzie notes that "no oil company is preparing for the scale of decline envisioned in [a 2°C] scenario."[26] An analysis of carbon-intensive sectors by credit rating agency Moody's similarly found that the "oil and gas sector as a whole is the least prepared for a

rapid transition"[27] and to address climate-related financial risks.[28]

Phasing out oil and gas production will require a massive restructuring and a complete overhaul of the sector, significantly impacting every facet of the global economy, and particularly the extractives sector and related service providers like construction, transportation, and manufacturing. Ultimately, the energy transition represents an existential concern for oil and gas companies and no other industry will be impacted to the same extent.

GROWING CONSENSUS THAT OIL AND GAS DEMAND WILL FALL

The energy transition is already underway and uncertainty over future demand for oil and gas products is heavily impacting the long-term outlook for the industry, particularly amidst growing interest in renewable energy investments, the rising popularity of electric vehicles, and growing concern about the lasting impacts of climate.[29] According to the International Energy Agency (IEA), "renewables will make up over one-third of the global [electricity] generation mix by 2025."[30] In 2050, the IEA also predicts that two thirds of the world's energy will come from renewables, and fossil fuels will fall from creating 80 percent of the market's energy to under 20 percent.[31]

In 2050, the IEA predicts that fossil fuels will fall from creating 80 percent of the market's energy to under 20 percent.

Against this backdrop, a new consensus emerged among the largest and most prominent industry forecasters, including the IEA, Rystad Energy, and Wood Mackenzie, that the demand for oil and gas in 2050 will fall below current levels of about 100 million barrels per day.[32] This is despite an expected doubling of global gross domestic product (GDP) by 2050,[33] which has been previously positively correlated with global oil demand for decades.[34]

Much of the negative forecasting about oil demand is driven by anticipated demand destruction. In its 2022 Energy Outlook report, the IEA presumes that "natural gas demand reaches a plateau by the end of the decade, and oil demand reaches a high point in the mid 2030s before falling slightly."[35] Through scenario analysis, BP similarly forecasts that "global oil demand [will] plateau over the next 10 years," citing the rise of electric vehicles and the increasing investment in renewable energy sources.[36] Though there is some debate about the exact timeframe, it is widely expected that the long-term demand for fossil fuels will significantly decline, and that the oil and gas sector must plan accordingly.

Analysts are largely in agreement that if we have not reached peak oil demand already,[37] it will happen within the next decade. However, oil markets are notoriously volatile in the short term and two recent major world events – the COVID-19 pandemic and the Russian invasion of Ukraine – have strained oil and gas supply chains and boosted prices, with particularly pronounced impacts in Europe. However, the IEA's 2022 base case forecast sees oil demand growing at about 0.8 percent annually until it peaks around 2030 at a little more than 100 million barrels per day.[38]

Both of these events have impacted the short-term outlook for the market, and in 2022, several Western oil majors announced record-breaking profits.[39] Following decreased demand for oil and gas during the global COVID-19 pandemic, global consumption has largely returned to pre-pandemic levels boosting short-term optimism for oil and gas demand.[40] Correspondingly, energy-related CO2 emissions rebounded to 36.6 Gt in 2021, the largest ever annual rise in emissions.[41] Additionally, sanctions on Russian natural gas exports have meant that European oil majors have begun increasing their production of natural gas to fill the gap.[42] However, these are short-term market impacts and they do not change the long-term outlook that the oil and gas industry is very much in decline.

> **The world's carbon budget is finite and running out fast. – BP CEO Bernard Looney**

About 80 percent of the value of most publicly-traded oil and gas companies is based on the viability of proved reserves. – IHS Markit

SECTION 2: OIL AND GAS COMPANY VALUATIONS

RECOMMENDATIONS

Oil and gas companies should disclose:

- information about oil and gas reserves, including data about GHG emissions embedded in reserves;
- the critical financial assumptions and estimates that underpin financial accounting, including information about asset retirement obligations and impairment testing.

Climate change is and will continue to be a global crisis that has significant impacts on global markets. The methodologies oil and gas companies employ to discern and represent their value are of incredible importance for emissions planning and the welfare of citizens, markets, and governments across the globe; therefore, advocates must understand how oil and gas company valuations are determined and what information they need to assess these valuations.

OIL COMPANY VALUATIONS ARE HEAVILY BASED ON THE VIABILITY OF FUTURE RESERVES

A very common means of assessing the value of a publicly-traded oil and gas production company involves the company's reserves and the timeline it expects for developing them. Put simply, an upstream oil and gas company's value is largely based on its ability to continually produce oil and gas, replacing depleted wells with new production without interruption. Even for integrated oil companies – with both upstream (exploration and production) and midstream/downstream (processing and distribution) operations – reserve estimates are among the primary determinants of the value of an oil and gas company, along with the level of production and the commodity price.[43] Industry analyst IHS Markit estimates that about 80 percent of the value of most publicly-traded oil and gas companies is based on the viability of proved reserves.[44]

Oil and gas companies should be annually and publicly disclosing information about their oil and gas reserves so that stakeholders are more accurately able to assess the economic value, risks, and potential benefits of production decisions in the context of climate policies. Additionally, oil and gas companies should report on the GHG emissions embedded in reserves, or the amount of GHG emissions that would result from production and combustion of a particular reserve, to enable stakeholders to understand the implications of developing a specific project on the global carbon budget.

The current methodology for valuing publicly-traded oil and gas companies is largely reliant on historical data and assumptions about energy markets that are not forward-looking. However, given the predicted changes in energy markets, historical data is inherently unreliable as a basis for determining the current value of companies. This results in misleading financial reports and has implications for shareholders, other market participants and policymakers. Because these valuations are used to determine the pulse of markets across jurisdictions, it is more important in the oil and gas industry than in less ubiquitous industries to use accurate numbers and disclose the degree of certainty that the companies have in their calculations.

> **Because oil and gas companies' valuations ae heavily influenced by historical data, many oil and gas companies' current demand assumptions do not account for the energy transition sufficiently.**

BOX 2

WHAT ARE OIL AND GAS RESERVES?

Oil and gas reserves are an estimate of the amount of crude oil and natural gas located in a particular economic region, with the economic potential of being extracted, based on historical data. Reserve estimates involve some degree of uncertainty and are generally divided into three categories based on how likely it is the oil and gas can be recovered using current technology:

- proved reserves have a greater than 90 percent chance that the oil and gas will be profitably recovered;
- probable reserves have a greater than 50 percent chance of profitably extracting the oil and gas; and
- possible reserves have between a 10 percent and 50 percent change of profitably recovering the oil and gas.[45]

Probable and possible reserves can be converted into proved reserves over time. Additionally, contingent resources are "[t]hose quantities of petroleum which are estimated, on a given date, to be potentially recoverable from known accumulations but which are not currently considered to be commercially recoverable."[46] Estimates of reserves quantities and the technological and economic factors that influence them are also subject to constant change.

Reserve estimates are critical for both national fossil fuel policy decision-making processes and fossil fuel companies' operational or investment decision-making processes.[47] Companies are often obligated to report these estimates to shareholders and debt-holders as an indication of financial health and future profitability.[48] Oil and gas reserves are also one of the major factors affecting oil and gas prices and the price of oil and gas futures contracts in the commodities market, which are agreements to buy or sell oil and gas at a specific date in the future for an agreed-upon price.[49] Capital markets generally assign a positive value to fossil fuel reserves in calculations of futures contracts since reserves are seen as an indicator of future revenue streams.

In 2022, Carbon Tracker, with data support from Global Energy Monitor, published the Global Registry of Fossil Fuels, which represents the first "comprehensive, independent, policy neutral and fully open-source database that demonstrates the scale of CO2 emissions associated with each country's national reserves and production."[50] The Global Registry allows a broad range of stakeholders to access the data on reserves needed to make timely analyses to inform planning and decision-making to ensure production plans are compatible with the need to limit global heating to 1.5°C.

While some financial calculations are more straightforward, company valuations depend on a variety of assumptions. Publicly-traded oil and gas companies' valuations are often based on estimated future cash flows after deducting expenses and applying a discount rate. The estimates of future cash flows are underpinned by assumptions about long-term future demand and future commodity prices, which are largely based on historical oil prices. Because oil and gas companies' valuations are heavily influenced by historical data, many oil and gas companies' current demand assumptions do not account for the energy transition sufficiently.

According to Ceres, in an analysis of investor expectations, estimates of future cash flows are the basis for determining the value of its assets, including its property, plant, and equipment needed to drill, produce, transport, refine and store such reserves,"[51] and if these estimates are inaccurate, so are the value of its assets. Additionally, assumptions and estimates about the anticipated lifetime of an asset are used

in impairment testing, which is the process of considering whether the fair value of an asset has fallen below its recorded costs are used. To mitigate this problem, companies should be disclosing the critical assumptions and estimates that underpin their financial accounting.

The addition of new reserves doesn't always have a position impact on company valuations. A recent study by WK Associates found that the addition of high-carbon, unproven reserves was correlated with diminished firm valuation.[52] The study built on research by the National Bureau of Economic Research (NBER), which found that proved undeveloped reserves growth and firm value were significantly negatively correlated.[53] In other words, as companies report more undeveloped reserves that are likely to be viable, their economic value becomes lower. WK Associates used the IPCC's Effective CO2 Emissions Factors[54] to weight the unproven reserves based on their future emissions, or emissions embedded in reserves, and found that the negative correlation between the addition of high-carbon reserves and firm value was even higher than indicated in the NBER study.[55]

CURRENT VALUATIONS OF PUBLICLY-TRADED OIL AND GAS COMPANIES DO NOT REFLECT ENERGY TRANSITION RISKS

Currently, oil and gas companies' valuations obscure climate and energy transition-related risks to investors precisely because their valuations rely on historical oil prices and are also bolstered by industry's plans for continued growth. A 2022 analysis by Global Witness of projections by Rystad Energy found that "the 20 largest oil and gas companies are expected to invest $932 billion in developing new oil and gas fields – in just 9 years. By the end of 2040 the figure grows to a staggering $1.5 trillion dollars."[56]

According to the UN Environment Programme (UNEP) Emissions Gap Report in 2022, the "policies currently in place with no additional action are projected to result in global warming of 2.8°C over the twenty-first century."[57] There is scientific consensus that this would result in worsening water scarcity, more frequent and severe heat waves, more intense storms and flooding, loss of biodiversity, increased food insecurity, more frequent wildfires, and rising sea levels.

To limit such warming, rapid and large-scale action is needed that will necessarily come with significant market disruptions and changes to many facets of the economy and society. UNEP's report finds that "global annual GHG emissions must be reduced by 45 percent compared with emissions projections under policies currently in place in just 8 years [7 years at the time of writing], and they must continue to decline rapidly after 2030 to avoid exhausting the limited remaining atmospheric carbon budget."[58]

The study by WK Associates referenced above also shows that current valuations from major oil and gas companies defy the consensus that the energy transition will bring oil and gas demand below current levels by 2050.[59] Through a reverse discounted cash flow analysis on the S&P Oil and Gas Exploration and Production Select Industry Index (SPSIOP),[60] WK Associates found that the valuations of 80 percent of the companies in the index, including Hess Corporation and Marathon Oil Corporation, are largely based on the assumption that oil and gas demand will continue to grow over the next 50 to 100 years, in line with global GDP growth.[61]

However, there is now broad agreement that oil demand will no longer track global GDP, and as WK Associates' study shows, this is not reflected in the valuation of nearly any of the 30 upstream companies included in the S&P index. In other words, little to no climate transition risk is currently priced into the oil and

gas sector today,[62] obscuring massive, systemic and divisive risks to their investors and to the broader economy. Avoiding climate catastrophe will require governments to act fast in ways that will necessitate the transition away from fossil fuels, which means substantially reduced oil and gas demand.

Despite the dismal long-term economic outlook for the oil and gas industry, recent short-term record-breaking profits appear to have resulted in new plans to increase fossil fuel production and pivot away from energy transition commitments. For example, BP "now says it will increase investment in the production of fossil fuels by about $1 billion a year above previous plans for the rest of the decade."[63] Shell also "backed away from their pledges about investments in renewable sources such as solar and wind."[64] It is hard to imagine this would be driven by something other than profit motive, and due to the intertwined well-being of markets and industry planning, companies cannot rely on bailouts or short-term booms to make decisions that fail to prepare for predicted economic shifts.

COMPANIES ARE NOT FULLY ACCOUNTING FOR ARO LIABILITIES

Oil and gas companies' valuations are also misleading because many companies are underestimating their asset retirement obligations, or AROs. If assets such as older wells fall in value, they cannot simply be written off as bad assets. In fact, oil, gas, and mining companies have a responsibility to return "tangible long-lived assets," such as the site of an oil well, to the land's "original condition upon disposal."[65] Jurisdictions differ on their practices, but these liabilities are supposed to be taken into consideration for contractual agreements, accounting and compliance purposes.[66] As companies write down oil and gas assets in light of lower expected future prices, undoubtedly some affected assets will need to be retired earlier than originally planned and thus companies will need to allocate capital to finance the anticipated costs of decommissioning, which should increase reported liabilities.[67] Companies may also have to recognize new AROs in connection with assets previously thought to have indeterminate lives.[68] As part of reporting on critical financial assumptions and estimates, companies should also be disclosing their estimated ARO liabilities.

Regulators frequently do not require companies to set aside funds ahead of time to pay for these obligations, which increases the risk to governments and taxpayers.[69] For instance, millions of oil and gas wells in the United States may become liabilities to local and state governments because firms can't afford to adequately retire them.[70] If the company does not or cannot pay, then millions of dollars in costs will be externalized, forcing local residents to endure the harms of an abandoned well or governments and the public to foot the bill.[71]

Little to no climate transition risk is currently priced into the oil and gas sector today, obscuring massive, systemic and divisive risks to their investors and to the broader economy.

BOX 3

WHAT ARE ASSET RETIREMENT OBLIGATIONS?

- An asset retirement obligation (ARO) is a company's liability for the costs to return a tangible, long-lived asset to its original condition when the company disposes of the asset.[72] This legal obligation to retire the asset is either created by law or through a binding contract between two parties and is calculated when the asset is first acquired. AROs are common in the oil and gas sector because these industries will often lease land for their industrial activities that they are obligated to decommission at the end of their lease. Oil and gas companies have historically been expected to have long-lived assets (up to 80 years) with very expensive AROs that include, for example, future liability for oil well plugging and abandonment, drilling rig removal, and underground storage tank removal.[73]
- The idea of an ARO essentially recognizes that after an oil, gas, or mining company is done with, or no longer leases, a piece of land, there is some responsibility to leave it as they found it. Defining AROs and meeting them are both inherently complicated. Nevertheless, having accurate assessments of future decommission liability is essential when a company acquires an oil or gas property because this liability affects the overall estimated profitability of the asset and the company's calculations that it will have the cash flow necessary to meet its remediation obligations. Companies may also need to periodically review their AROs to account for changing market conditions.[74] Public oil and gas companies are generally required to report their provisional AROs on their financial balance sheets, but often, these companies do not simultaneously set aside funds to settle the obligations and insufficiently report the extent of accrued liability.[75]
- As an illustration, the ARO for the plugging of an abandoned oil well at the end of its estimated useful life will include estimations of inflation rates, discount rates, plugging and abandonment costs per foot, and the estimated life of the well.[76] Because these liabilities are not due, however, until the well is closed – long after they are drilled – many countries require companies to post bonds for these liabilities. In part because AROs are often insufficiently reported, these bonding requirements are frequently much lower than the actual costs of plugging the wells.[77] As demand for fossil fuels is likely to decrease as the global economy decarbonizes, the time to decommission pipelines, processing facilities, and other oil and gas infrastructure will likely occur sooner than originally anticipated.[78] This means oil and gas companies will be on the hook for higher than planned decommission costs earlier than estimated in their ARO calculations, with implications for their available cash flow to meet these remediation obligations.[79]

If companies do not and cannot pay to decommission wells, millions of oil and gas wells in the United States may become liabilities to local and state governments.

The world's 60 largest banks have $1.35 trillion USD of exposure to fossil fuel assets. – Finance Watch

SECTION 3: FINANCIAL RISKS ASSOCIATED WITH INCREASED OIL AND GAS PRODUCTION PLANS

RECOMMENDATIONS

Oil and gas companies should disclose:

- oil and gas project break-even prices;
- Price sensitivity analysis for reserve valuations under different scenarios.

Implicit in their plans for continued growth, the oil and gas industry's demand expectations are incompatible with the carbon budget and carry immense financial risks.

Research by Finance Watch indicates that the world's 60 largest banks have US$1.35 trillion of exposure to fossil fuel assets, and the increasing financial stability risks resulting from climate change are only beginning to be fully recognized by bank supervisors. The financial system's exposure to US subprime mortgages in 2007 is estimated to have been a very similar amount, at US$1.368 trillion – only a third of which was held by banks. This exposure will approximately double over the next decade, increasing the risk of a global financial crisis and mass unemployment if fossil fuel assets rapidly lose value, or become stranded.[80]

BOX 4

WHAT ARE STRANDED ASSETS?

An asset becomes "stranded" when it is clear that it will not meet its anticipated return on investment.[81] Oil and gas production represents assets critical not only to oil and gas companies, but also to broader economic activity and governments – particularly those in producing countries or with state-owned enterprises that manage fossil fuels. Because assets represent anticipated income, firms use estimates to forecast asset values and paint a picture of their financial futures.

Stranding may affect a wide range of assets, including infrastructure, real estate, agriculture, and fossil fuel reserves. This can occur due to changes in market conditions, technology, regulation, or societal preferences. Stranded assets can include, for example, coal power plants that become unprofitable due to the rise of renewable energy, or oil and gas reserves that become unburnable due to efforts to mitigate climate change. The risk of stranded assets is important for investors and companies to consider in their decision-making, as it can lead to significant financial losses and impact the sustainability of their business models.

Globally, Carbon Tracker estimates that over US$1 trillion of oil and gas assets are at risk of becoming stranded, with these risks affecting not only producers but the entire value chain.[82] Growing investor awareness, the rapid expansion of alternative energy sources, and expanding government and regulatory policy action all have an urgent role to play in addressing the associated financial risk of asset stranding for publicly-listed companies, their investors, and the wider financial system.

Projects that are not yet developed or that require substantial capital expenditure need a higher level of scrutiny given the increasing risk of asset stranding. In particular, contingent resources – reserves that are not yet marketable due to one or more contingencies[83] – approved for development "are most at risk of becoming stranded in the future since these quantities of oil and gas may not be capable of being burned in a climate-constrained world."[84]

This information is especially important regarding the exploration and development of new projects where the risks of stranding or impairment are more likely, and more capital expenditure is at stake. To mitigate the risk of investing in projects that will ultimately become stranded, companies need to disclose the project break-even prices, or the price at which a project is no longer profitable, as well as an analysis of price sensitivity for reserve valuations under different scenarios. This data can also help identify projects that are at a higher risk of becoming stranded if the prices needed for the project to be economically viable are unrealistic in a rapidly decarbonizing economy.

> **If oil and gas asset stranding is not prevented or mitigated, financial markets are likely to suffer a domino effect through a "a cascade of stock market losses."**

BOX 5

WHAT IS A PROJECT?

Oil and gas projects are defined as "operational activities that are governed by a single contract, license, lease, concession or similar legal agreement, and form the basis for payment liabilities with a government." Extractive projects are typically governed by a legal agreement between governments and companies, such as a contract to share revenues or a license granting a company the right to extract. A single project will be based on a single such legal agreement or a set of "substantially interrelated" legal agreements, meaning that they are "geographically and operationally interrelated" and "have substantially similar terms."[85]

For example, if there were nearby oil fields that were owned and operated by the same joint venture under a single contract, relied on the same or adjacent licenses, and sold crude to the same buyers at similar rates, these oil fields would be considered one project. However, two oil fields would be considered separate projects if the fields were governed by separate contracts, were not adjacent or geographically close, had royalties assessed separately, and did not use shared project infrastructure, even if they had the same owner(s) and operator and were located in the same region of the country.

This contract-based project definition is used by the Extractive Industries Transparency Initiative (EITI) as well as the EU, UK, Canada, and Norway, in the context of payment transparency reporting by oil, gas and mining companies.86 It also aligns with industry standards for accounting for and communicating information about individual oil and gas projects.87 Additionally, disclosing data on a project-level basis is a useful way to disaggregate information, like GHG emissions, to enable analysis on a national or local level, which in some cases, may be more useful than globally or company-wide aggregated data.

The Broader Financial Implications Of Stranded Assets

How big is the problem of stranded oil and gas assets? One team of researchers calculated in their May 2022 study that "global stranded assets as present value of future lost profits in the upstream oil and gas sector exceeds US$1 trillion under plausible changes in expectations through the effects of climate policy."[88] For context, the size of global gross domestic product (roughly the size of the global economy) was roughly US$97 trillion in 2021.[89]

According to this research, most of the estimated US$1 trillion losses are owned by publicly-listed oil and gas companies.[90] In line with Carbon Tracker research, it found that the US market is particularly vulnerable to this issue. The US and Russia face the highest risks of physical stranding at roughly US$300 billion in assets each, followed by US$100 billion in assets at risk in both Canada and China.[91]

If oil and gas asset stranding is not prevented or mitigated, financial markets are likely to suffer a domino effect through a "a cascade of stock market losses"[92] that will spread across ownership networks. The study underscores the broad range of financial impacts to the oil and gas sector that would be felt throughout other industries and sectors, highlighting the cost of associated transition risks posed by the industry's inaction to decrease production. This research concludes that "the rate of industrial change required for achieving a 2°C – let alone 1.5°C – goal is so large that the rapid collapse of fossil fuels 'sunset' industries presents major transition risks."[93]

Risk Of Carbon Lock-In

In addition to asset stranding, another risk associated with industry's planned production is carbon lock-in. The Stockholm Environment Institute explains that once carbon-intensive investments are made, fossil fuel dependence, carbon emissions and their associated risks become "locked in" by these decisions.[94] In other words, furthering carbon dependency increases inertia among institutions, infrastructure, norms and technology, and therefore the costs associated with the necessary changes would be much more significant. This risk further underscores the financial implications of failing to meaningfully address the reliance on oil and gas and facilitate a managed decline in production.

Carbon lock-in only benefits oil and gas companies and their assets and poses a significant risk to planners and governments. This risk should be considered in development contexts when decision makers are considering building infrastructure, for example, in developing power plants and bringing energy to large swaths of the population.[95] The path to rapid and reliable energy sources was paved by fossil fuels in many countries, but they are no longer a secure option. Avoiding carbon lock-in may require more funds to be allocated to countries with rising urgent energy needs, and stakeholders should be wary of "gas to power" and other transition arguments that facilitate carbon lock-in.[96]

> **For decades, the oil and gas sector has sought to delay the energy transition through deception, obstruction of climate science, and aggressive political lobbying.**

SECTION 4: GREATER DISCLOSURE IS NEEDED FROM THE OIL AND GAS SECTOR

RECOMMENDATIONS

Oil and gas companies should disclose:

- detailed information about their transition plans;
- data about their GHG emissions on a project-level basis.

The oil and gas sector faces a host of climate risks that could undermine market stability. Despite these risks, current regulations make it possible for oil and gas companies to comply with current regulations without addressing climate risk in meaningful ways.

For decades, the oil and gas sector has sought to delay the energy transition through deception, obstruction of climate science, and aggressive political lobbying.[97] Companies have a history of deceiving the public both by omitting information and through fraudulent marketing. Voluntarily published sustainability reports and current mandated disclosures also generally fail to capture the net negative impact that oil and gas companies have on the environment and the scope of companies' climate-related financial risks.[98]

In January of 2023, investments in clean energy reached more than US$1 trillion, equaling for the first time in history the amounts invested in fossil fuels.[99] Shareholders are interested in genuine sustainable investments and must demand accountability for companies' energy transition-related commitments.

However, there is scant detailed information about climate risk in publicly-traded companies' financial reporting. According to an analysis of US financial reporting by the US Securities and Exchange Commission (SEC) examining how companies across all sectors are discussing climate risk in the filings, "disclosures related to climate change have … considerable variation in the content, detail, and location …of climate-related disclosures."[100] The SEC further observed "significant inconsistency in the depth and specificity of disclosures by registrants across industries and within the same industry" and "significantly more extensive information in registrants' sustainability reports … [and] websites as compared with their reports filed with the Commission."[101]

Additionally, a recent Carbon Tracker analysis of 134 "highly carbon-exposed companies" found that "98% of these companies did not provide sufficient information to demonstrate how their financial statements include consideration of the financial impacts of material climate matters."[102] Most companies "failed to disclose the relevant quantitative climate-related assumptions and estimates used to prepare the financial statements, even when they indicated that climate risks may impact these assumptions." [103]

Real or fraudulent, companies use environmental claims to compete for value narratives that attract shareholders and consumers. Many major oil and gas companies have touted ambitious net zero emissions goals and climate-related commitments, relying on a combination of carbon offsets and attempting to pivot business operations towards renewable energy technologies. Likewise, advertisements from oil majors regularly feature new renewable energy technologies and research, to seem like these are major focus areas for the company, when in reality, they pale in comparison to new fossil fuel investments. Such greenwashing – a misleading marketing approach that tries to persuade consumers that a firm is taking environmentally-friendly initiatives without disclosing their efficacy, the extent if these initiatives, or the firm's overall impact on the environment – is rampant within the industry.

Further, meaningful changes that oil and gas companies could make in research and development are underfinanced, showing a gap between genuine efforts to prepare for energy transition and the lip service paid to green initiatives.[104] The market for carbon offsets is flooded with inaccurate or unverifiable assertions, including that oil and gas companies are making progress on a greener economy, and this marketing plays to their advantage. Advocates need to be able to verify (and, in turn, encourage) genuine climate action, and offsets are so far a problematic distraction from the urgently needed emissions reductions.

98% of [134 highly carbon-exposed companies] did not provide sufficient information to demonstrate how their financial statements included consideration of the financial impacts of material climate matters.– Carbon Tracker

BOX 6

WHAT ARE OFFSETS, AND WHY ARE THEY PROBLEMATIC?

A carbon offset is a tradeable right or certificate to an activity that claims to decrease or prevent carbon emissions.105 In theory, they provide a way for companies to compensate for carbon-emitting practices by purchasing a counterbalance. Offsets are market instruments commonly used by companies as part of "net zero" and "carbon neutral" marketing claims and contribute funds towards activities such as reforestation, renewable energy investment, and landfill management.[106]

However, offsets are largely problematic and insufficient in combating climate change. Researchers have long worried that they would function like an "accounting maneuver" that allows companies to write off responsibility for a small fee and continue business as usual.[107] Expert analyses show that carbon offset schemes rarely have the impacts they claim, and there is real damage involved in offset activities that is often overlooked.

Broadly, the offsets that dominate today's voluntary carbon markets have been discredited as a means of compensating for the fossil fuel industry's GHG emissions. Investigations by several independent analysts[108] have demonstrated that these projects routinely fail to demonstrate that they are producing durable carbon removals or even meaningful emissions reduction. One analysis found that "90 percent of rainforest carbon offsets" by Verra, the world's largest offset certifier, were "worthless."[109]

In particular, land-use offsets, beyond their questionable efficacy, may increase the risk of hunger and displacement in low- and middle-income countries. Many projects rely on lands in the Global South, shifting emissions reduction responsibilities of wealthy corporations to burden historically disadvantaged communities.110 In 2021, Oxfam found that the land needed for carbon removal "net zero" pledges "could potentially be five times the size of India, or the equivalent of all the farmland on the planet."111 Oxfam's analysis showed that "just four of the big oil and gas producers (Shell, BP, TotalEnergies and ENI)" would need a landmass equal to one-third of the size of the world's farmland to meet net zero pledges, emphasizing the need for transparency from this sector.[112]

CLIMATE COMMITMENTS ARE NOT CLIMATE PLANS

Climate commitments, such as goals and targets, are significantly different from climate plans. Both are vulnerable to estimation mistakes and methodology errors, like those previously discussed in this paper, but plans require accountability mechanisms to ensure that the needed changes actually come to fruition.

An ongoing example of this emerges at UN climate negotiations, in which countries use Nationally Determined Contributions to advance the long-term goals established by international consensus to combat climate change.[113] These are incredibly important measures, but with high levels of complexity in enforcement, verification, and engagement, it is difficult to accurately track countries' progress in meeting their policy and emissions goals.[114]

According to public disclosures and other public reporting, oil and gas companies are largely paying lip service to loftier environmental goals rather than meaningfully addressing the needs

of the energy transition.[115] Without disclosures about information on climate-related financial risk as described in Section 6, investors, local communities, policymakers and civil society do not have the necessary information and tools to assess the veracity or viability of such climate plans, to assess whether the company is actually capable of meeting those plans, to track progress or hold companies to account for their commitments. Instead, companies should be disclosing comprehensive transition plans. As defined by the TCFD, "[a] transition plan is an aspect of an organization's overall business strategy that lays out a set of targets and actions supporting its transition toward a low-carbon economy, including actions such as reducing its GHG emissions."[116] Effective transition plans should set clear benchmarks for measuring progress and should clarify how the company plans to meet them.

NET ZERO EMISSION GOALS OFTEN LACK MEANINGFUL DATA TO MEASURE PROGRESS

Many oil and gas companies have set some form of a net zero target or carbon-neutral goal; however, "[n]ot all company targets of ambitions are created equal in the degree to which they reduce the impact of company activities on global temperature rise," according to a 2022 analysis of 15 major oil and gas companies by Carbon Tracker.[117]

Oil and gas companies are largely paying lip service to loftier environmental goals rather than meaningfully addressing the needs of the energy transition.

Although some Western oil majors, including Shell, ENI, Equinor, and TotalEnergies, have begun to disclose some information about their plans to transition to net zero emissions,[118] these plans are usually incomplete in that they do not capture each stage of the lifespan of their products. Companies tend to report Scope 1 and Scope 2 emissions, the ones most immediately linked to a firm's behavior, and often decline to disclose the emissions that are incurred later down the line, or Scope 3 emissions, altogether. Given the role of oil and gas combustion in driving global warming, oil and gas companies may be incentivized to downplay or underreport their emissions, and may also fail to address them in a reasonable time frame.[119] For the oil and gas sector, this makes the information largely meaningless, and likely misleading to investors, given Scope 3 emissions represent between 80 percent and 95 percent of the sector's total emissions.[120]

In one example, a recent Greenpeace report finds that TotalEnergies has been significantly underreporting its GHG emissions.[121] According to the report, the company's emissions are almost four times higher than what it has publicly reported. The report's findings are based on an analysis of data obtained from a third-party emissions monitoring system that TotalEnergies has used for over a decade. Issues in reporting included the "building blocks" approach allowing TotalEnergies to allegedly ignore several categories of emissions detailed by the Greenhouse Gas Protocol,[122] including several related to operations such as refining and petrochemicals. Self-reporting is prone to errors and biases and that independent third-party verification is necessary to ensure accurate and transparent reporting.

Additionally, reporting on GHG emissions is largely done on a globally aggregated basis, which means it is difficult for stakeholders to assess the emissions intensity of a company's operations at a national or local level. Reporting on annual Scope 1, 2, and 3 GHG emissions on a project-level basis would alleviate this issue and provide all stakeholders with more meaningful information.

BOX 7

WHAT ARE SCOPE 1, 2, AND 3 GHG EMISSIONS?

There are several methods for measuring carbon emissions, but the most widely used and accepted is the Greenhouse Gas Protocol, developed by the World Resources Institute and World Business Council for Sustainable Development.[123] The Protocol provides tools and guidance to aid organizations in calculating emissions all along the value chain. In 2001 the GHG Protocol published the first version of its Corporate Accounting and Reporting Standard[124] which contains sector-specific tools for corporations.

The Protocol classifies emissions by the scope of their origin:

- Scope 1 refers to all direct emissions resulting from sources directly owned or controlled by the reporting company, for example company vehicles or industrial sites.
- Scope 2 emissions are those from purchased sources consumed by the company, such as energy purchased to heat and cool offices.
- Scope 3 emissions account for all other emissions produced as a consequence of the activities of the company or entity. This includes both upstream and downstream activities, ranging from transport of raw materials to the combustion of gasoline in cars.

Scope 3 emissions account for the vast majority of most companies' emissions, and for oil and gas companies, Scope 3 emissions account for as much as 95% of their total emissions.[125] By nature, Scope 3 emissions are more complicated to calculate, but this complexity should not be an excuse for regulators to make Scope 3 reporting voluntary. Existing frameworks like the GHG Protocol have developed specific calculations for companies to use in determining their Scope 3 emissions.

Accurately tracking the full spectrum of carbon emissions is absolutely essential for understanding climate risks, for setting goals for emissions reduction, and for tracking progress on those goals. Accounting for Scope 3 emissions can also make companies more profitable and productive by catching inefficiencies.

RELIANCE ON EMISSIONS MITIGATION TECHNOLOGIES SHOULD BE RIGOROUSLY SCRUTINIZED

Too often, details about how a company plans to achieve their climate goals are typically vague, and often rely on asset divestments or emissions mitigation technologies.[126] However, there are substantial concerns with the effectiveness of these strategies.[127] Emerging technologies, such as those discussed in Box 6, are not yet well-understood or well-regulated, and effectiveness should be scrutinized by third-

> **Given the role of oil and gas combustion in driving global warming, oil and gas companies may be incentivized to downplay or underreport their emissions.**

party monitoring, especially if companies intend to rely on them to reach their proposed climate goals. Additionally, "[i]n order for net zero goals to be effective," according to Carbon Tracker, at a minimum, "such ambitions must be linked to a specific scenario with a defined temperature outcome and an understanding of the emissions pathway and the required level of emissions mitigating technologies required."[128]

The extent to which oil and gas companies rely on offsets to achieve their GHG emissions reduction targets and the quality of any offsets on which they are relying, as mentioned in Box 6, is a significant area of concern. Investors need access to detailed transition plans to fully understand how much companies plan to rely on offsets within their emissions reduction strategies. As Oxfam points out, carbon removal "relies on virtually unproven new technologies, or on a level of land use that is completely impossible and would lead to mass hunger and displacement of people across the world."[129]

Emissions reductions strategies and calculations are sometimes relevant to regulatory demands and sometimes related to competitiveness. Marketing practices to attract investors interested in sustainability or which allow firms to increase prices in order to pay for a more environmentally-friendly process or product are fair game, but when these claims are deceptive or misleading, they amount to greenwashing.

BOX 8

WHAT IS GREENWASHING AND WHY DOES IT MATTER?

Greenwashing is a fraudulent marketing practice. Though greenwashing can take many forms, a systematic review published in Environmental Sciences Europe reveals the major components of greenwashing as deliberate, misleading corporate action and a focus on deceiving stakeholders with regards to environmental performance.[130]

It is critical that all stakeholders understand how and why greenwashing is employed because it fundamentally undermines both trust in corporate actors and the ability of third parties to audit and account for the actions of companies in broader environmental initiatives. True instances of greenwashing can also have legal and reputational ramifications,[131] but despite this, recent studies demonstrate alarming error rates in the greenwashing of widely-used analytic practices such as emissions calculations.[132]

The prevalence of greenwashing allegations has grown with environmental marketing claims and the rising popularity of ESG (environmental, social, and governance) initiatives and corporate social responsibility. Goals such as net zero carbon emissions pledges and Paris Alignment are also growing popular for marketing purposes. Experts warn that deceptive practices used to keep firms competitive on these fronts can harm firms that are truly taking on environmental initiatives,[133] while activists and scientists fear the damage that greenwashing does to unified efforts against global climate change. UN Secretary General António Guterres appointed an Expert Group to combat a "surplus of confusion and deficit of credibility" regarding net zero emissions targets made by non-State actors in 2021 and called for a zero-tolerance policy for net zero greenwashing at the UN Framework Convention on Climate Change (UNFCCC)'s 27th Conference of Party talks in 2022.[134]

In a recent example, Global Witness filed a complaint with the US SEC accusing Shell of greenwashing through misleading disclosures. According to the complaint, Shell claimed that 12 percent of its 2021 capital expenditure went to "renewables and energy solutions"; however, Global Witness found that the company spent only 1.5 percent on wind and solar power generation.[135]

> **Regulators and standard-setters play a critical role in shaping the disclosures that are required to support a well-managed decline of oil and gas production.**

SECTION 5: ROLE OF REGULATORS AND STANDARD-SETTERS

Regulators and standard-setters play a critical role in shaping the disclosures that are required to support a well-managed decline of oil and gas production. The responsibility is not only in the hands of regulators that deal directly with oil and gas, but also with policymakers and standard-setters that monitor financial institutions and market stability. As the world transitions away from fossil fuels and towards more sustainable sources of energy, it is essential that these institutions provide clear and consistent guidance on the types of information that companies must disclose. This section of the handbook will explore the role of regulators and standard-setters in promoting transparency and accountability in the oil and gas industry.

VOLUNTARY APPROACHES TO CLIMATE RISK REPORTING

In response to the lack of transparency and standardization of publicly available climate risk and transition planning information, a diverse group of third parties have also developed climate-related reporting frameworks seeking to meet stakeholders' needs.

Task Force on Climate-Related Financial Disclosures (TCFD)

Although there have been a number of reporting frameworks developed by third parties, in the last five years, investors and other stakeholders have largely converged around the TCFD[136] as the most useful voluntary framework for communicating information about climate-related risks that companies may face.[137]

The TCFD was created in 2015 by the Financial Stability Board, "to develop recommendations on the types of information that companies should disclose to support investors, lenders, and insurance underwriters in appropriately assessing and pricing a specific set of risks—risks related to climate change."[138] In 2017, the TCFD published specific recommendations for disclosing clear, comparable and consistent information about the risks and opportunities presented by climate change. In particular, the TCFD encourages companies to disclose the actual and potential impacts of climate change on their businesses, as well as their processes for identifying and managing climate-related risks and opportunities. The TCFD's reporting framework focuses on four thematic areas: governance, strategy, risk management, metrics, and targets.[139]

GHG emissions reporting

There are also reporting standards for quantitative GHG emissions reporting, which helps stakeholders understand the carbon footprint of companies' operations. Created by the World Resources Institute and the World Business Council for Sustainable Development, the Greenhouse Gas Protocol developed the first standardized methodology for GHG emissions accounting in 2001. As part of their methodology, the GHG Protocol also introduced the concept of three different "scopes" of emissions (as discussed in Box 7) to help categorize emissions that are both directly and indirectly attributable to the company's supply chain and operations.[140] Since then, the GHG Protocol has become the leading accounting and reporting standard for GHG emissions disclosure.[141]

In 2017, the TCFD published specific recommendations for disclosing clear, comparable and consistent information about the risks and opportunities presented by climate change.

Extractive Industries Transparency Initiative (EITI)

The EITI is another global standard-setter for the transparent management of oil, gas, and mineral resources. The EITI is a tripartite body consisting of companies, governments, and civil society representatives that promotes transparency and accountability in the extractive industries by requiring participating countries to disclose information on the revenues they receive from these resources.[142] This includes payments made by companies to the government, as well as information about how such funds are used. The EITI is currently in the process of revising its standard and is considering a number of new energy transition-related disclosures, including some that are recommended by this handbook.

Through these new disclosure requirements and expectations, the EITI can also help to inform a well-managed decline of oil and gas production. This information will allow governments, civil society, and other stakeholders to make informed decisions about how they use fossil fuel revenues to support sustainable development and diversify their economies. In addition, broader disclosures under the EITI Standard can help to identify areas where corruption and mismanagement may be occurring, allowing for corrective action to be taken to prevent further harm to the environment and communities.

All of these developments are important shifts and demonstrate the rapidly growing international consensus around the need for substantially more information about climate-related financial risk. But much remains to be determined and the industry continues to fight against greater disclosures.

Financial accounting and auditing standards

Financial accounting and auditing bodies have also recently clarified that companies should be considering climate-related financial risks in their financial statements. For accounting, companies in most countries refer to the International Accounting Standards Board (IASB)'s International Financial Reporting Standards (IFRS),[143] which provides principles for preparing financial statements. According to IASB, "[c]ompanies must consider climate-related matters in applying IFRS Standards when the effect of those matters is material in the context of the financial statements taken as a whole."[144]

In the US, public companies use the US Generally Accepted Accounting Standards, which are developed by the Financial Accounting Standards Board (FASB). According to FASB, "when applying financial accounting standards, an entity may consider the effects of certain material ESG matters, similar to how an entity considers other changes in its business and operating environment that have a material direct or indirect effect on the financial statements and notes thereto."[145]

Concerns about how companies are incorporating climate-related financial risks into their accounts has generated a new strand of work on sustainability-related accounting standards. In November 2021, the IFRS Foundation formed the International Sustainability Standards Board (ISSB). The ISSB, was established to develop a global sustainability reporting standard that includes climate-related financial disclosures.[146]

The ISSB's sustainability reporting standards, based on the TCFD framework, will complement existing financial reporting standards, such as the IFRS, and will help ensure that companies disclose material climate-related risks and opportunities in their financial statements.[147] This information will enable investors and other stakeholders to make informed decisions about the financial performance of companies in the oil and gas sector, including their exposure to climate-related risks and opportunities.

In the context of oil and gas company valuations, the ISSB's March 2022 Exposure Draft Climate Disclosures included specific requirements for several industries, including the oil and gas sector. The ISSB's recommendations for the oil and gas exploration and production sector include disclosures on greenhouse gas emissions, emissions embedded in reserves, as well as reserves valuation, and capital expenditures.[148] This new standard will enable investors and other stakeholders to compare the climate-related risks and opportunities of different companies in the oil and gas sector.

However, standards have little value without effective enforcement. Thus, accounting standard setters' work requires that financial supervision authorities, like securities regulators and other financial oversight bodies, scrutinize disclosures to ensure that best accounting practices are being respected in order to allow investors and other stakeholders to make informed decisions about the financial performance of companies, especially in the oil and gas sector, and to support the transition to a low-carbon economy.

MANDATORY LEGAL AND REGULATORY FRAMEWORKS

In response to growing demand for standardized, comprehensive and reliable climate-related financial risk disclosures, regulators like the US' SEC, have begun to consider new reporting requirements for publicly-listed companies.

In the US, the SEC issued a proposed rule in March 2022, which proposes a number of new sector-agnostic disclosure requirements, including information on the company's governance and climate-related risk management practices as well as information on climate-related targets and goals, if the company has any set.[149] The SEC's proposed rule is informed by the TCFD's recommendations,[150] and also calls for companies to disclose Scope 1, Scope 2, and Scope 3 greenhouse gas emissions, broadly in line with the methodology used by the GHG Protocol.[151] Following an extensive comment period[152], the SEC is expected to publish its final rule in mid-2023.

In the EU, the European Council passed the Corporate Sustainability Reporting Directive (CSRD) in November 2022, which "modernizes and strengthens the rules about the social and environmental information that companies have to report."[153] Large publicly-traded companies, banks and insurance companies will be required to disclose information about investment risks arising from climate change and other sustainability issues. The CSRD defines five areas of reporting, including information about

Large publicly-traded companies, banks and insurance companies will be required to disclose information about investment risks arising from climate change and other sustainability issues.

the company's business model, policies, risks the company has identified and how they plan to manage them, which are also similar to the recommendations of the TCFD.[154] Like the SEC's climate disclosure rule, the CSRD applies the same reporting standards to all sectors, though the scope of the US proposed rule is much more limited;[155] however, sector-specific guidance is also being developed by the European Sustainability Reporting Standards.[156]

The US and EU are not alone. In December 2022, the Australian Treasury also announced a public consultation on climate-related financial disclosures.[157] Additionally, New Zealand and the United Kingdom recently passed legislation that makes climate-related disclosures mandatory for a subset of businesses, and Switzerland and Singapore are also developing mandatory climate disclosure requirements as well.[158] The International Organization of Securities Commissions (IOSCO) also notes progress in several jurisdictions, including Hong Kong, India, Japan, and New Zealand, to incorporate TCFD's disclosure recommendations into their legal and regulatory frameworks.[159]

While these are promising steps in the right direction, they are not happening fast enough and they are not on track to require the complete panoply of essential information that is needed by stakeholders to fully inform a well-managed energy transition. As addressed in more detail below, certain key issues are not currently being contemplated by these various efforts but are essential pieces of information that oil and gas companies should be required to disclose.

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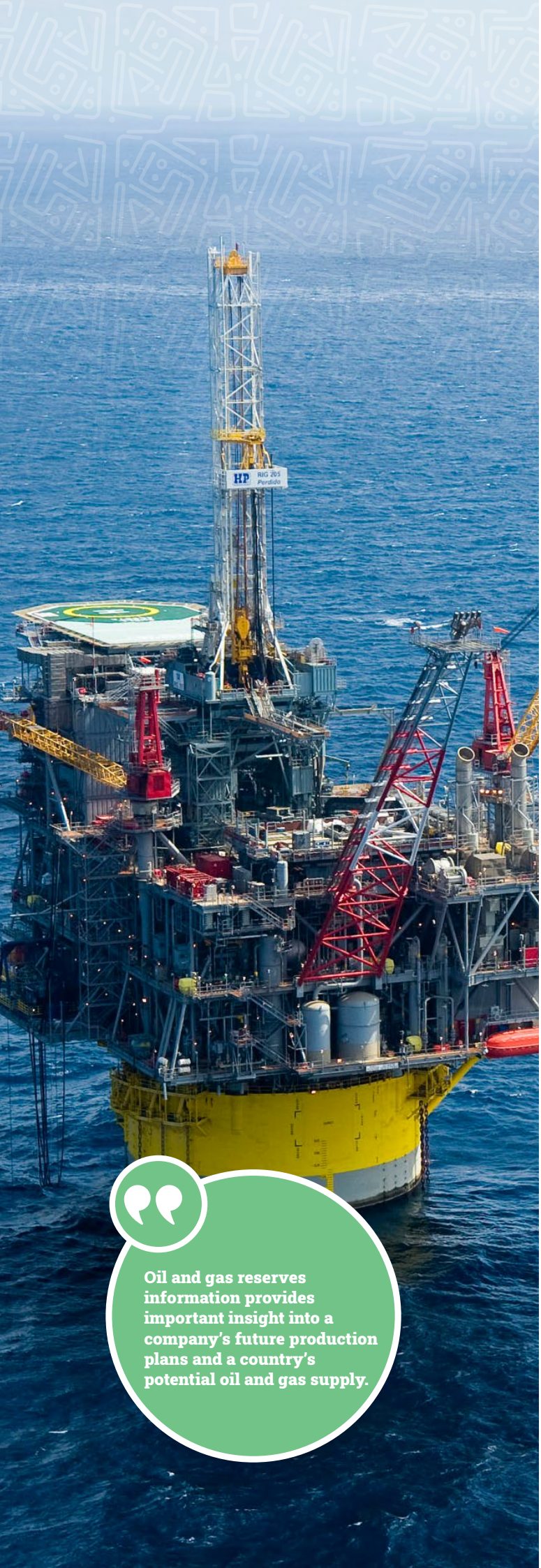

Oil and gas reserves information provides important insight into a company's future production plans and a country's potential oil and gas supply.

SECTION 6: CRITICAL INFORMATION THE OIL AND GAS SECTOR MUST BE REQUIRED TO DISCLOSE

This section focuses on the specific types of information that are essential for oil and gas companies to disclose to publicly demonstrate – and to generate public confidence in – their ability to effectively assess and manage climate-related financial risk. For each suggested category of disclosure, this handbook describes how such information is relevant for all stakeholders, with particular emphasis on how advocates can make a strong case for such disclosures with investors and policymakers.[160]

As illustrated in this handbook, meaningful transparency requires increasing volume and utility of disclosures by demanding information that is appropriately disaggregated to allow citizens and policymakers to assess climate risks at the national and local levels.

Where possible, it is essential that these disclosures be mandated, integrated into financial reporting requirements and subject to requirements for assurance. Without that, they lack reliability and are subject to manipulation, which can substantially undermine its utility

for stakeholders. In places where standardized disclosure requirements are unlikely, these suggested disclosures also provide ideas about the kinds of information companies should be able to provide and the questions stakeholders should be asking.

RECOMMENDATION 1 TRANSITION PLANS

An effective transition plan should describe how a company is planning to update its business model and operations in the context of the energy transition and "[is] of particular interest to a wide-range of users, especially when they are seeking to verify the credibility of organizations' commitments related to climate change."[161] The TCFD recommends that transition plans "articulate specific initiatives and actions the organization will undertake to effectively execute the transition plan, including regular milestones."[162] Effective transition plans should also explain the governance structures in place to oversee the plans, which should also be regularly reviewed and updated. Lastly, transition plans should be aligned with the company's overall business strategy to ensure integration with other elements of the company's operations. Ultimately, effective transition plans should be sufficiently detailed to "enable users to assess its credibility."[163]

As discussed in Section 4, oil and gas companies must disclose specific details about how they plan to meet their climate targets and goals, as such commitments are meaningless without a clear plan to explain how they plan to meet their goals and an ability to evaluate progress. This means transition plans should be anchored in quantitative targets and designed with appropriate metrics to enable stakeholders to effectively track the company's progress in implementing their plans.

- **Significance to investors:** Transition plans are a critical tool for enabling investors to understand how a company is preparing for the energy transition and making decisions about how to address climate risks. Broadly, companies whose business models rely on continued fossil fuel production and that are ill-prepared for the ongoing energy transition have little incentive to voluntarily provide reliable information about their transition plans to investors.

  There is substantial likelihood that companies with high transition risks will conceal such risks from shareholders if they are not compelled to disclose detailed transition plans. In a 2020 report, the National Whistleblower Center applied the methods of professional fraud investigators – which entails analysis of incentives, opportunities, and rationalizations to commit fraud – to the fossil fuel industry and concluded that there is a considerable risk of fraudulent concealment of transition risks in the industry. The report reviewed the industry's record of deceptions around climate risks and found that overstatements of reserves and other potential accounting frauds warranted attention from regulators, prosecutors and whistleblowers.[164] These risks highlight the critical need for detailed transition plans so that investors have adequate information to scrutinize companies' decision-making.

- **Significance to policymakers:** Policymakers in producer countries need to understand how companies are preparing for the energy transition as companies' transition plans have direct bearing on countries' abilities to meet their own climate targets and commitments. In addition, information about companies plans for specific oil and gas projects is critical to apprise policymakers of anticipated production to inform planning for energy needs and potential revenue generation.

Financial regulators also have an important role to play in protecting investors, promoting financial sustainability and aligning financial markets with climate goals by making sure that companies disclose relevant information to shareholders and the public.

RECOMMENDATION 2
OIL AND GAS RESERVES INFORMATION

Oil and gas reserves, as described in Box 2, are known resources that may be extracted in the future if found to be economically viable. Broadly, information about oil and gas reserves allows stakeholders to assess the value of production decisions in the context of the carbon budget and related climate policies. Information about oil and gas reserves, including emissions embedded in reserves (see Recommendation 3) can also be used to discern the carbon emissions footprint of planned or future projects.

Oil and gas reserves information provides important insight into a company's future production plans and a country's potential oil and gas supply. In particular, companies should be disclosing information about probable and possible reserves as well as the methodology and underlying reasoning used to value reserves. This helps stakeholders to more effectively compare reserve assets and estimate the cost of exploring, developing, and extracting specific volumes of oil or gas. Reserve reports should also provide information about the anticipated pre-tax net cash flows that could be produced from different types of reserves. To provide the necessary information for stakeholders to assess the profitability of specific projects, companies should also be disclosing information about project break-even prices (see Recommendation 6) and price sensitivity analyses (see Recommendation 7), which are described below.

- **Significance to investors:** Information on oil and gas reserves provides investors with a more meaningful and comprehensive understanding of a company's oil and gas reserve assets, which enables investors to evaluate the relative value of oil and gas companies. Given that fossil fuel reserves represent the overwhelming majority of the value of upstream oil and gas companies, information about reserves is primarily important to assure investors about the availability of new resources to replace depleted oil and gas projects. Put simply, investors want to know that companies will be able to consistently produce oil and gas without supply interruptions as oil projects conclude and new projects are developed.

- **Significance to policymakers:** Oil and gas reserve information is valuable for policymakers to understand a country's anticipated oil and gas supply and to inform the country's oil and gas supply commitments. Information on oil and gas reserves also

helps policymakers to understand the timeline for developing specific projects, while also providing the data needed to estimate the revenue-generating potential of specific reserves. In particular, whether a specific reserve is or is not considered economically viable is of substantial interest to policymakers and citizens of producer countries, where the consequences for failed investment decisions are likely severe, including possible substantial increased national debt. This is because stalled projects fail to produce the returns needed to cover costs, and thus fail to generate taxable profits and expected payments to governments, which are often a significant part of the rationale for a government to allow a project to proceed.

RECOMMENDATION 3: EMISSIONS EMBEDDED IN RESERVES

Emissions embedded in reserves refers to the amount of GHG emissions that would result from production and combustion of a particular reserve. This information represents a subset of information about oil and gas reserves and can be calculated simply by multiplying reserve quantities with their corresponding IPCC Effective CO2 Emissions Factor.[165] This recommendation aligns with the TCFD's Energy Group guidance which recommends that relevant firms in the oil and gas, coal, and electrical utilities sectors disclose a "breakdown of reserves by type and an indication of associated emissions factors to provide insight into potential future emissions."[166]

Emissions embedded in reserves data also provides a straightforward shorthand for the oil and gas sector's Scope 3 GHG emissions data, which represents between 80 percent to 95 percent of total GHG emissions.[167] Importantly, emissions embedded in reserves data also allows stakeholders to estimate the entire future emissions potential from an oil and gas company's portfolio of reserves, whereas Scope 3 emissions data represents emissions in a finite time-frame.

- **Significance to investors:** Standardized projections of GHG emissions embedded in reserves would generate critical forward-looking climate risk metrics based on existing reserves disclosure requirements.[168] The emissions embedded in reserves calculation process is straightforward, and it eliminates issues with reporting boundaries, given that Scope 3 emissions estimates usually involve determining where the boundaries of a company's emissions begin and end. Emissions embedded in reserves are limited to the emissions attributable to a company's oil and gas reserves upon combustion.

The forward-looking nature of emissions embedded in reserves data is also an important benefit as a climate risk metric, something largely lacking in the financial services industry. Currently, investors approximate future climate risk in the oil and gas sector by, among other things, discounting long-lived assets in a manner that is inconsistent between investment targets, resulting in less accurate assessments. Additionally, emissions embedded in reserves data could serve as a check on emissions goals of reporting companies as well as the carbon intensity benchmarks of funds and

other financial products. Investment analysts can also make sure their discount rates reflect the idiosyncratic risk of either growing or declining emissions potential represented by a company's reserves.

- **Significance to policymakers:** Emissions embedded in reserves disclosures are important for financial supervisors to evaluate oil and gas companies' transition risks because they provide critical forward-looking climate risk metrics based on existing reserves disclosure requirements.

  Emissions embedded in reserves disclosures can help regulators understand potential carbon emissions associated with fossil fuel reserves that companies are relying on for future revenue, which, in turn, can inform regulators' decision-making on capital requirements, stress tests, and disclosure rules for the industry. Additionally, the data can inform regulatory policies and market interventions to incentivize companies to transition to a low-carbon economy and to avoid stranded assets. By understanding the potential carbon emissions of these reserves, financial supervisors can help ensure the stability and sustainability of the financial system and protect investors from climate-related risks.

RECOMMENDATION 4: GHG EMISSIONS ON A PROJECT-LEVEL BASIS

Companies' GHG emissions are categorized into three scopes, as discussed in Box 7. Scope 1, 2 and 3 GHG emissions intensity varies markedly across oil and gas production projects, therefore GHG emissions disclosures on a project-level basis would allow stakeholders to evaluate the specific emissions intensity of individual projects, as defined in Box 5. Oil and gas companies should be reporting annually on Scope 1, 2 and 3 GHG emissions on a project-level basis, both in terms of emissions intensity and emissions in absolute terms.

Data at this level of granularity is so useful that companies such as ExxonMobil are already sharing it with company decision-makers.169 By requiring companies to disclose emissions data at the project level, stakeholders would be better equipped to identify high-risk projects that are more likely to become stranded assets as the world transitions to a low-carbon economy.

Reporting on project-level GHG emissions differs from reporting on emissions embedded in reserves because the former captures actual emissions data, whereas the latter relates to the future emissions potential of specific oil and gas reserves.

- **Significance to investors:** Globally or company-wide aggregated emissions data may enable companies to obfuscate the extent of risk inherent in asset portfolios by hiding high-risk projects in pools of less risky assets. Aggregated data also prevent investors from being able to see how companies are working to address emissions risks within their portfolios. With project-level data, an investor can determine whether a company is working to lower emissions by simply selling off dirty assets or by cleaning up operations. With project-level data, an investor can also determine whether a company is protecting corporate value by

reducing its dependence on emissions in its business strategy. Lastly, carbon regulations vary between countries, states, and provinces. Project-level GHG emissions disclosure would allow investors to evaluate the costs, risk and opportunities of carbon regulations more accurately, which would result in valuations that indicate how companies are addressing climate issues more accurately.

- **Significance to policymakers:** GHG emissions on a project-level basis are important to legislators and financial supervisors regulating climate risk because they provide a more accurate picture of a company's emissions profile and the associated risks. This information can inform regulatory decisions, such as setting emissions reduction targets, or implementing policies that incentivize companies to transition away from high-carbon assets. GHG emissions data from specific projects also allow policymakers to more accurately understand the climate risks associated with projects on which citizens and communities depend.

RECOMMENDATION 5
CRITICAL FINANCIAL ASSUMPTIONS AND ESTIMATES

There are a number of different variables – referred to as critical financial assumptions and estimates – that are used in calculating key financial indicators that make up a company's financial outlook. According to Carbon Tracker, "climate-related matters such as declining demand for oil and gas, the switch to renewable energy for power, regulations to limit emissions, and the phase out of internal combustion engines can directly and significantly affect financial statement results." [170] These variables can greatly impact current financial reporting because many of the figures in the financial statements inherently include estimates and assumptions about the future.

Key assumptions and estimates that are critical for fossil-fuel companies to disclose include the commodity prices used in financial accounting, information about anticipated supply and demand, estimates about the remaining useful lives of assets used in forecasting revenue, variables used in impairment testing and the estimated costs used to calculate asset retirement obligations (AROs). Without this information, it is extremely difficult for stakeholders to interpret and compare reporting made by competitors or properly vet companies' assumptions and estimates to ensure they are in line with external indications.

While accounting standards generally require disclosure of relevant critical estimates and assumptions used in companies' financial accounting, especially when estimates and assumptions are related to material claims, this is not happening in practice on a consistent or standardized basis. A study of 2020 financial statements by Carbon Tracker found that a majority of fossil fuel companies did not disclose the basic quantitative estimates and assumptions that were used to prepare their financial statements.[171] This included failure to disclose commodity prices used for asset valuations and impairment testing, and absence of detail about undiscounted estimated costs and other assumptions used to calculate AROs.[172] In some cases where figures were provided, there were inconsistencies between the estimates and assumptions referenced in strategy discussions in management reports and those used in financial statements.[173]

- **Significance to investors:** Given that the inherent unpredictability of commodity prices, for example, is made even more uncertain due to the prospect of a transition to low-carbon energy sources, this information is essential for investors to be able to adequately evaluate the financial health of oil and gas companies based on publicly available forecasts and investors' assumptions about long-term fossil fuel demand.

  Fossil fuel companies often voluntarily disclose these projections with investors to demonstrate their profitability. However, this information is not provided on a systematic basis and there is no standard format for these disclosures. While companies have often argued that cost information is commercially sensitive, the growing relevance of project viability factors in climate risk assessments means that investors have legitimate and prevailing interests in such information.

- **Significance to policymakers:** Information about the financial estimates and assumptions used by a company in its planning is also relevant to policymakers involved in preparing for the energy transition.

  If a company's plans for a future project are not aligned with realistic price or demand scenarios, for example, it may not be economically feasible, which means it will not be able to generate the projected revenues as anticipated. More broadly, some countries may be behind the private sector in fully appreciating the transition risks associated with their domestic oil and gas industries. Making information publicly available about the assumptions and estimates companies are using in their own accounting can help ensure that governments are aligning their expectations with the risks that companies are flagging to their investors.

  As another example, information about companies' AROs – and the estimates and assumptions used to determine them – are relevant to policymakers, especially as undoubtedly some assets will need to be retired earlier than originally planned. Often, companies fail to pay the necessary costs to decommission oil and gas assets, placing the burden on local governments to pay for decommissioning costs. In the US alone, hundreds of billions of dollars will be needed to "close the estimated 3.3 to 4 million active, idle and abandoned but unplugged onshore wells."[174]

A majority of fossil fuel companies did not disclose the basic quantitative estimates and assumptions that were used to prepare their financial statements. – Carbon Tracker

RECOMMENDATION 6
PROJECT BREAK-EVEN PRICES

The disclosure of project break-even prices – the price point at which a project is no longer profitable – is critical to enable stakeholders to fully and meaningfully evaluate project profitability (including the risk of stranded assets in a company's asset portfolio) and determine project compatibility with Paris-aligned transition pathways and other scenarios.

- **Significance to investors:** Oil and gas companies often voluntarily disclose to investors projections of the average long-term commodity prices necessary for specific projects to generate positive financial returns, and this information may be available through third party sources, often at cost. However, this information is not provided on a systematic basis and there is no standard format for these disclosures. Given the inherent unpredictability of commodity prices, making this a standard disclosure for all oil and gas producers would help put all investors on a level playing field in being able to make well-founded estimates about the financial health of oil and gas companies. Standardizing the disclosure of project break-even prices would improve transparency and allow investors to compare the financial risks and returns associated with different fossil fuel investments.

- **Significance to policymakers:** Project break-even prices matter to policymakers and financial regulators because they provide valuable information about the financial risks associated with fossil fuel investments, which can inform regulatory and investment decisions and promote greater transparency and accountability in the fossil fuel industry.

By knowing the break-even price for a specific project, policymakers and regulators can assess the potential impact of fluctuations in commodity prices on the financial viability of fossil fuel companies and the broader financial system. Because reduced fossil fuel demand will affect commodity prices, an oil price that could make a project profitable today may not suffice to allow the project to break-even at a later point in the energy transition. Information on the project's break-even price can also inform decisions about whether to provide financial support to fossil fuel projects or impose regulatory measures to limit emissions and promote low-carbon alternatives. Additionally, project break-even prices can be useful for policymakers to better understand whether public finance is at risk in projects where the government has an equity stake or where a state-owned company is involved.[175]

RECOMMENDATION 7: PRICE SENSITIVITY ANALYSIS

Price sensitivity is the degree to which the price of a product affects consumers' purchasing behaviors. Generally speaking, this is how demand changes with the change in the cost of products. To show how a company's reserve valuation would perform under different price scenarios, companies should be required to disclose a price sensitivity analysis. Assuming the company also discloses price information and the assumptions on which the reserve estimates are based, a price sensitivity analysis would help all stakeholders assess the feasibility of developing specific reserves and would also provide stakeholders with a better view of the company's analysis of future prices.

Disclosing price sensitivity analyses for oil and gas reserves is currently optional for US publicly-listed companies as part of the SEC's Modernization of Oil and Gas Reporting Rule[176] and should be mandated for all companies and required in other jurisdictions. Price sensitivity analysis is also included in the proposed industry-based disclosure requirements for the oil and gas industry as part of the ISSB Exposure Draft on Climate-Related Disclosures.[177]

- **Significance to investors:** Price sensitivity analysis provides the market with up-to-date projections on the sensitivity of oil and gas reserves to a range of possible supply and demand scenarios. Investors can use this information to better understand whether developing resources would be profitable under different price scenarios. This information can also be used to identify which oil and gas assets are at risk of potential future stranding.

- **Significance to policymakers:** For financial regulators and central bankers, price sensitivity analysis is important because it can help them to monitor and manage risks in the financial system. By understanding how changes in price may affect the feasibility of specific projects, regulators can develop appropriate policies to mitigate the risks associated with price fluctuations.

CONCLUSION

The world is currently undergoing a transition to a low-carbon economy in response to the threat of climate change. This transition requires a managed decline of oil and gas production, which will have significant economic, social, and environmental impacts. To support this transition, comprehensive disclosures are needed from the oil and gas industry in particular to inform decision making, protect investors, and facilitate transparent communication between governments, industry stakeholders, and fossil fuel-dependent communities.

Comprehensive details about transition plans, information on oil and gas reserves, and GHG emissions is necessary for informed decision making. Policymakers need this data to develop policies and regulations that support a managed decline of oil and gas production, while investors need detailed climate risk disclosures to assess the financial risks associated with the energy transition. Communities also need this data to understand the potential impacts of oil and gas production on their health and the environment.

As the world transitions to a low-carbon economy, the demand for oil and gas will decrease, and the financial value of oil and gas assets will decline. This decline in value will have significant financial impacts on the oil and gas industry, as well as on the full spectrum of investors who hold oil and gas assets. Therefore, it is essential that oil and gas companies disclose the financial risks associated with a decline in production to protect investors' interests. This disclosure should include information on the potential impacts of climate policies, changes in consumer behavior, and technological advancements on the value of oil and gas assets.

Transparent communication between governments, industry stakeholders, and impacted communities is critical for a successful, well-managed transition to a low-carbon economy. This communication should include regular updates on the progress of the transition, as well as information on the potential impacts of the transition on different stakeholders. Governments should also engage with industry stakeholders and affected communities to develop policies and regulations that support a just and equitable transition. This communication is essential to build trust and ensure that the transition is inclusive and participatory.

There are multiple initiatives underway to standardize the way that companies report on climate-related financial risks including efforts to produce sector-specific guidance for oil and gas companies. This presents an important opportunity for all extractive industry stakeholders. With the right level of disaggregation, much of this data could be directly used to inform multi-stakeholder dialogue and policymaking at the national level. But important challenges remain. Sustainability reports tend to be global in scope with globally aggregated figures that are difficult to apply to national policy discussions. Moreover, few companies are engaging with stakeholders to discuss the climate risks they face and to ensure that their decision-making is prudent, responds to the urgency of the climate crisis, and aligns with the needs of communities who will be most impacted. Meeting these challenges head on will be critical to ensure that it is not just investors who benefit from these initiatives.

To steward a well-managed decline of oil and gas production and facilitate a smooth energy transition, comprehensive climate risk disclosures are critically needed from the oil and gas sector in particular, given the industry's leading role in contributing to global warming and its specific type of climate-related financial risks, to inform decision making, protect investors, and facilitate transparent communication between governments, industry stakeholders, and communities impacted by extraction. By providing the information recommended in this handbook, we can ensure that the transition to a low-carbon economy is efficient and adequately informed by careful planning and broad stakeholder engagement.

Comprehensive disclosures are needed from the oil and gas industry in particular to inform decision making, protect investors, and facilitate transparent communication between governments, industry stakeholders, and fossil fuel-dependent communities

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NOTE: Contributions to this handbook do not constitute explicit organizational endorsements.

About PWYP-US

Publish What You Pay (PWYP) is a global civil society coalition made up of over 1000 organizations operating in more than 70 countries. The US coalition (PWYP-US) was founded in 2004 and consists of 40 anti-corruption, financial transparency, anti-poverty, tax justice, environmental, faith-based, and human rights organizations representing over five million constituents across the US. PWYP-US members have almost two decades of experience advocating for greater financial transparency and good governance in the oil, gas, and mining sectors, including specific experience with SEC rulemaking on payment transparency.

For almost two decades, PWYP-US has brought together a broad range of experts in pushing forward reforms that have increased transparency in the extractives sector. From exposing and deterring corrupt oil deals, to advocating for and defending disclosures of payments to governments, demanding extractives contract transparency, and advocating for disclosure of climate-related financial risk, PWYP-US has continued to evolve as a leader in advocating for good governance in the extractive industries and fighting for meaningful accountability.

The Publish Your Plans handbook was written primarily to harness the collective expertise from the PWYP-US coalition to inform advocates about the climate-related financial risks associated with the oil and gas sector. This handbook explains why enhanced disclosures are essential to limit global warming and to ensure a well-managed transition.

Endnotes

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14 These recommendations were developed by PWYP-US' Oil and Gas Climate Risk Working Group, which includes members from Carbon Tracker, the Sunrise Project, Natural Resource Governance Institute, Oxfam America, Sierra Club, Union of Concerned Scientists, EarthRights International, and a number of independent experts.

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