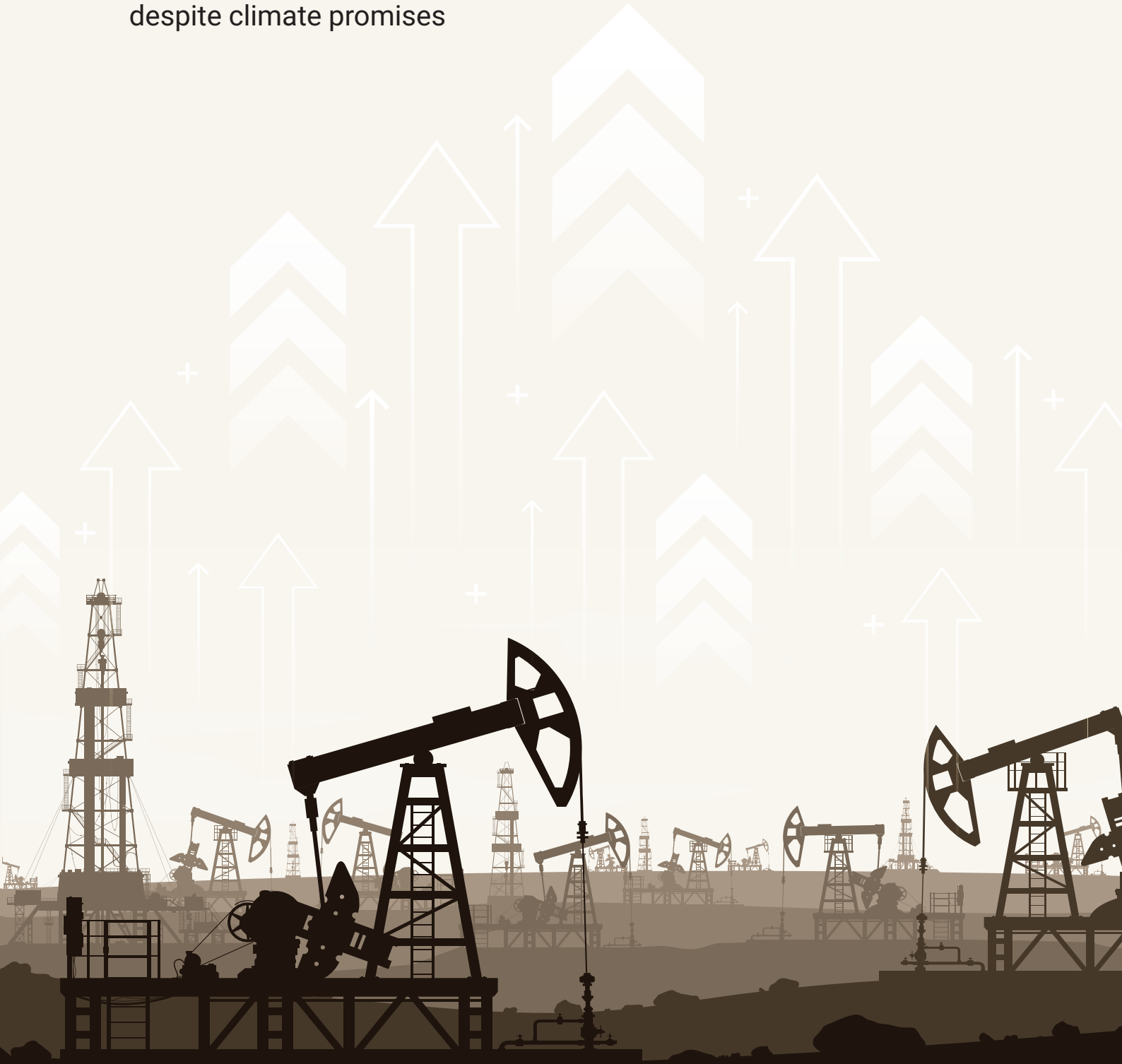


Phasing down or phasing up?

Top fossil fuel producers plan even more extraction despite climate promises



The Production Gap Executive Summary

Key Findings

Governments, in aggregate, still plan to produce more than double the amount of fossil fuels in 2030 than would be consistent with limiting warming to 1.5°C. The persistence of the global production gap puts a well-managed and equitable energy transition at risk.

Taken together, government plans and projections would lead to an increase in global coal production until 2030, and in global oil and gas production until at least 2050. This conflicts with government commitments under the Paris Agreement, and clashes with expectations that global demand for coal, oil, and gas will peak within this decade even without new policies.

Major producer countries have pledged to achieve net-zero emissions and launched initiatives to reduce emissions from fossil fuel production, but none have committed to reduce coal, oil, and gas production in line with limiting warming to 1.5°C.

Governments should be more transparent in their plans, projections, and support for fossil fuel production and how they align with national and international climate goals.

There is a strong need for governments to adopt near- and long-term reduction targets in fossil fuel production and use to complement other climate mitigation targets and to reduce the risks of stranded assets.

Given risks and uncertainties of carbon capture and storage and carbon dioxide removal, countries should aim for a near total phase-out of coal production and use by 2040 and a combined reduction in oil and gas production and use by three-quarters by 2050 from 2020 levels, at a minimum. The potential failure of these measures to develop at scale calls for an even more rapid global phase-out of all fossil fuels.

An equitable transition away from fossil fuel production must recognize countries' differentiated responsibilities and capabilities. Governments with greater transition capacity should aim for more ambitious reductions and help finance the transition processes in countries with limited capacities.

Executive Summary

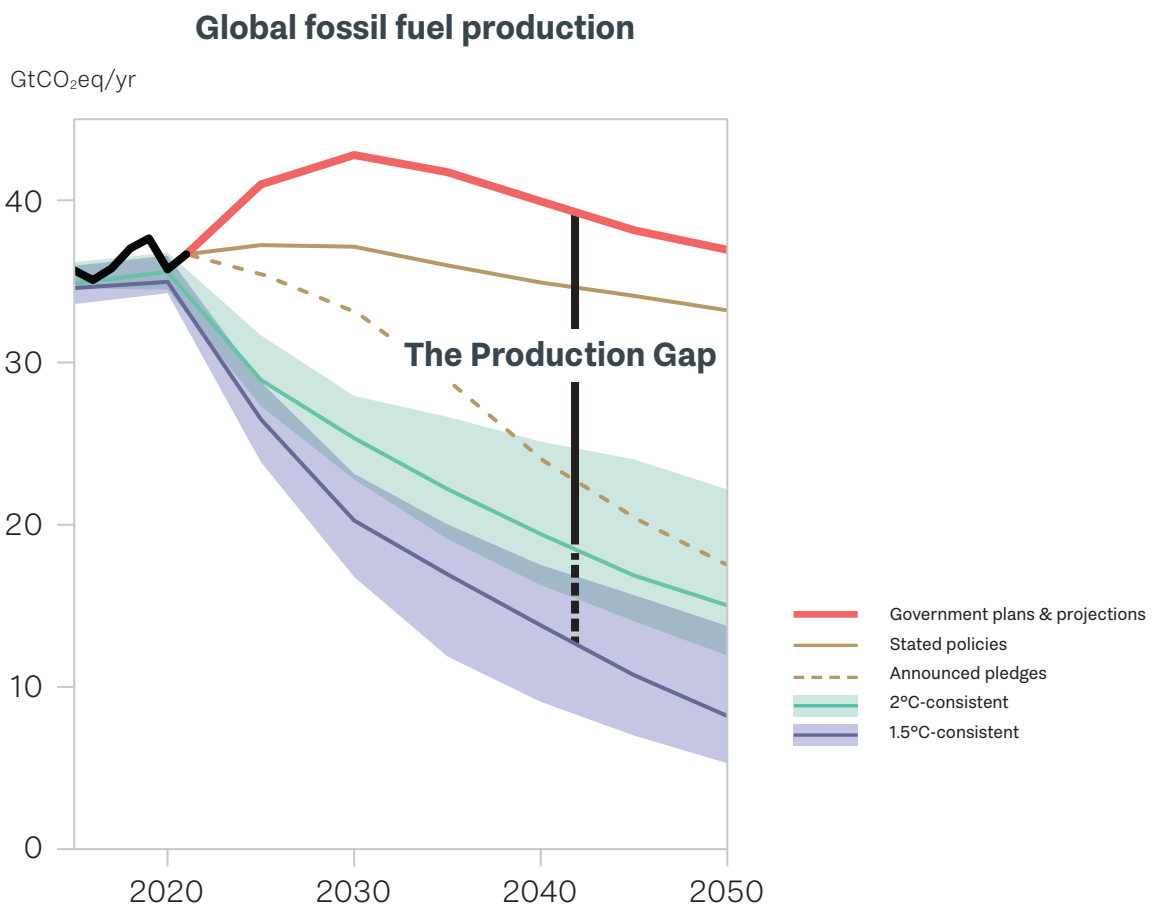
Soon after the release of the 2021 Production Gap Report, governments agreed to accelerate efforts towards “the phasedown of unabated coal power” at the 26th Conference of the Parties (COP) to the United Nations Framework Convention on Climate Change (UNFCCC) in Glasgow. It was a significant milestone in the history of international climate governance: for the first time, an explicit reference to fossil fuels appeared in a COP decision text.

Yet since that time, the production and use of fossil fuels have reached record high levels. If global carbon dioxide (CO₂) emissions — of which close to 90% stem from fossil fuels — continue at the current pace, the world could exceed the remaining emissions budget compatible with a 50% chance of limiting long-term warming to 1.5°C by 2030.

Both global CO₂ emissions and fossil fuel production need to peak and swiftly decline to keep the Paris Agreement’s temperature goal within reach. Informed by the latest scientific evidence, this report identifies global pathways for coal, oil, and gas production from now until 2050 that are consistent with this goal. It then assesses governments’ plans, projections, and policies for fossil fuel production and how aligned — or misaligned — they are with respect to these pathways.

Figure ES.1

The fossil fuel production gap — the difference between governments’ plans and projections and levels consistent with limiting warming to 1.5°C and 2°C, as expressed in units of greenhouse gas emissions from fossil fuel extraction and burning — remains large and expands over time. (See details in Chapter 2 and Figure 2.1.)



The report's main findings are as follows:

Since it was first quantified in 2019, the global production gap has remained largely unchanged. Despite encouraging signs of an emerging clean energy transition, the world's governments still plan to produce more than double the amount of fossil fuels in 2030 than would be consistent with limiting warming to 1.5°C.

The production gap is the difference between governments' planned fossil fuel production and global production levels consistent with limiting global warming to 1.5°C or 2°C. This year's production gap assessment features two major updates. First, the "government plans and projections" global pathway reflects how major fossil-fuel-producing countries have adjusted their coal, oil, and gas production targets in light of developments since late 2021, including a global energy crisis and increased climate mitigation ambitions. Second, global pathways for fossil fuel production consistent with limiting warming to 1.5°C or 2°C have been updated using the new scenario database compiled for the Working Group III contribution to the Intergovernmental Panel on Climate Change (IPCC)'s Sixth Assessment Report (AR6).

The resulting analysis finds that, in aggregate, governments are planning on producing around 110% more fossil fuels in 2030 than would be consistent with limiting warming to 1.5°C, and 69% more than would be consistent with

limiting warming to 2°C, as shown in Figure ES.1. The magnitude of the production gap is also projected to grow over time: by 2050, planned fossil fuel production is 350% and 150% above the levels consistent with limiting warming to 1.5°C or 2°C, respectively.

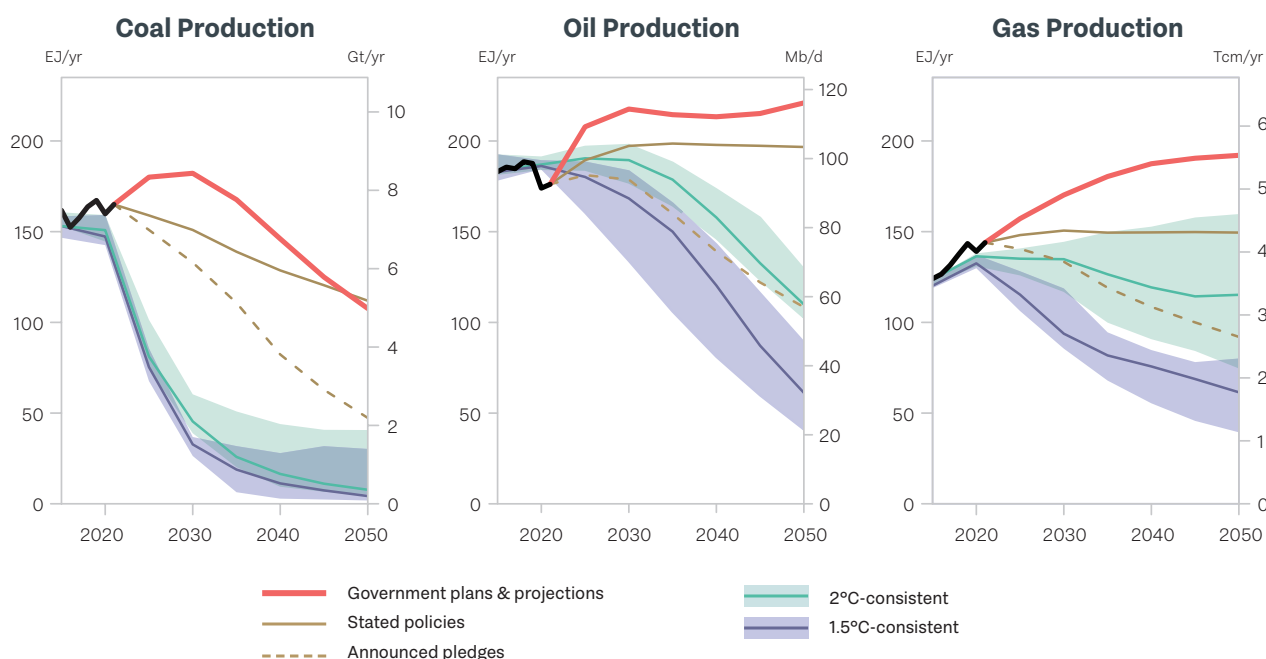
The global levels of fossil fuel production implied by governments' plans and projections, taken together, also exceed those implied by their stated climate mitigation policies and implied by their announced climate pledges as of September 2022, as modelled by the International Energy Agency. As discussed below, few countries have developed fossil fuel production projections that are aligned with their national climate goals or with limiting warming to 1.5°C.

Many major fossil-fuel-producing governments are still planning near-term increases in coal production and long-term increases in oil and gas production. In total, government plans and projections would lead to an increase in global production until 2030 for coal, and until at least 2050 for oil and gas, creating increasingly large production gaps over time.

To be consistent with limiting warming to 1.5°C, global coal, oil, and gas supply and demand must instead decline rapidly and substantially between now and mid-century. However, the increases estimated under the government plans and projections pathways would lead to global production levels in 2030 that are 460%, 29%, and 82%

Figure ES.2

Government plans and projections would lead to an increase in global coal production until 2030, and in global oil and gas production until at least 2050. (See details in Chapter 2 and Figure 2.2.)



higher for coal, oil, and gas, respectively, than the median 1.5°C-consistent pathways, as shown in Figure ES.2. The disconnect between governments' fossil fuel production plans and their climate pledges is also apparent across all three fuels.

The size and nature of the global production gap also raise the question of how it can be closed in a managed and equitable way, especially given that countries are expected to uphold “the principle of equity and common but differentiated responsibilities and respective capabilities, in light of different national circumstances” under the UNFCCC framework.

As explored in the 2020 Production Gap Report and informed by emerging literature on this topic, an equitable transition should recognize that countries' circumstances differ widely depending on their financial and institutional capacity, as well as their level of socioeconomic dependence on fossil fuel production. Based on these principles, one might expect higher-income countries and those less dependent on fossil fuel production to lead the transition, while lower-capacity countries will require assistance and finance to pursue alternative low-carbon and climate-resilient development pathways.

However, the combined levels of coal, oil, and gas production being planned/projected by 10 high-income countries alone would already exceed 1.5°C-consistent pathways for each fuel by 2040. Similarly, the trajectories of oil and gas production being planned and projected by 12 countries with relatively lower levels of economic dependence on their production would exceed the respective 1.5°C-consistent pathways by 2040 (see Section 2.5). Without active dialogue and engagement between higher- and lower-income countries, these inequities may continue to exist and to erode trust in global cooperation on climate action.

In addition to government plans and projections for fossil fuel production that inform the global production gap analysis in Chapter 2, this report also reviews, in Chapter 3, the climate ambitions and fossil fuel production policies and strategies of 20 major producer countries: Australia, Brazil, Canada, China, Colombia, Germany, India, Indonesia, Kazakhstan, Kuwait, Mexico, Nigeria, Norway, Qatar, the Russian Federation, Saudi Arabia, South Africa, the United Arab Emirates, the United Kingdom of Great Britain and Northern Ireland (UK), and the United States of America (US). Altogether, these countries account for 82% of production and 73% of consumption of the world's fossil fuel supply. The status of discourses and policies towards a managed and equitable transition away from fossil fuel production in these countries is also evaluated.

While 17 of the 20 countries profiled have pledged to achieve net-zero emissions, and many have launched initiatives to reduce emissions from fossil fuel production activities, most continue to promote, subsidize, support, and plan on the expansion of fossil fuel production. None have committed to reduce coal, oil, and gas production in line with limiting warming to 1.5°C.

As shown in Table ES.1, some countries are planning on increasing their coal production until 2030, banking on continued and growing domestic and international coal markets. Meanwhile, the majority of oil and gas producers anticipate increasing their production between 2021 and 2030, and some until 2050.

The war in Ukraine, the ensuing pressures on global energy supply, and record high prices for internationally traded gas have further spurred plans for and investment in liquefied natural gas infrastructure by exporters and importers alike. Many countries are promoting gas as a “bridge” or “transition” fuel, but with no apparent plans to transition away from it. Eight countries profiled in Chapter 3 project relatively flat or increasing gas production from 2021 until 2035–2050. However, gas could hinder or delay the transition to renewable energy systems by locking in fossil-fuel-based systems and institutions. Moreover, despite some local air pollution benefits when substituting for coal, advances in the quantification of methane leakage along the gas supply chain have substantially reduced the expected climate benefits of replacing coal with gas (see Chapter 3).

In recent years, many governments have launched initiatives to reduce emissions from fossil fuel production activities. As shown in Table ES.1, 14 of the 20 countries profiled in Chapter 3 have signed onto the Global Methane Pledge to collectively reduce global methane emissions from all sources by 30% by 2030 compared to 2020 levels. Six major oil- and gas-producing countries, all of which are among the 20 profiled in Chapter 3, have also launched the Net Zero Producers Forum aimed at reducing emissions from the sector. Such efforts, while important, are also deeply insufficient. In the pathways consistent with limiting warming to 1.5°C explored in this report, global methane emissions from the energy sector decline by more than 60% between 2020 and 2030. Furthermore, and perhaps most importantly, these initiatives fail to recognize that reducing fossil fuel production itself is also needed to limit warming to 1.5°C.

Table ES.1

A large majority of countries profiled in this report have made net-zero pledges and signed onto the Global Methane Pledge and the Glasgow Statement on international finance. Most are also planning to increase oil and gas production, and some are planning to increase coal production, until 2030. (See details in Chapter 3 and Tables 3.2–3.3.)

Country	Status of national net-zero commitment; net-zero target year	Signatory of Global Methane Pledge	Signatory of Glasgow Statement	Planned change in annual fossil fuel production for 2030 relative to 2021 (EJ)		
				Coal	Oil	Gas
Australia	In law 2050	✓		▲ 0.2	■ 0 ^b	▲ 0.7
Brazil	NDC objective 2050	✓		No data	▲ 5.2	▲ 1.0 ^d
Canada	In law 2050	✓	✓	No data	▲ 3.0	▲ 0.6
China	NDC objective 2060			▼ 5.3	■ 0	▲ 2.6
Colombia	In law 2050	✓		▲ 1.7	▼ 0.1	■ 0
Germany	In law 2045	✓	✓	▼ 0.5	■ 0	▼ 0.1
India	NDC objective 2070			▲ 10.7	No data	No data
Indonesia	In strategy document 2060	✓		▲ 2.5	▼ 0.2	▲ 1.1
Kazakhstan	In strategy document 2060			▼ 0.2	▲ 0.4	▲ 0.1 ^d
Kuwait	Political pledge 2050 (oil & gas sector) 2060 (rest of economy)	✓		No production	▲ 2.1	▲ 0.1
Mexico	No commitment	✓		No data	▲ 1.4	▲ 0.6
Nigeria	In law 2060	✓		No data	▲ 1.3	▲ 2.6 ^d
Norway	No commitment ^a	✓		No data	▼ 0.5	▼ 0.3
Qatar	No commitment			No production	No data	▲ 3.9 ^e
Russian Federation	In strategy document 2060			▲ 3.2	▲ 2.9	▲ 3.3
Saudi Arabia	Political pledge 2060	✓		No production	▲ 5.5	▲ 1.3
South Africa	In strategy document 2050			No data	No data	No data
UAE	NDC objective 2050	✓		No production	▲ 1.8 ^c	▲ 0.4 ^b
UK	In law 2050	✓	✓	No data	▼ 0.7	▼ 0.6
US	In policy document 2050	✓	✓	▼ 5.1	▲ 5.2	▲ 2.5

^a Norway has committed to a "low-emission society" by 2050 in its 2018 Climate Change Act, with 90–95% emission reduction targets.

^b Planned change for 2028, furthest year for which data is available.

^c Planned change for 2027, furthest year for which data is available.

^d Excluding gas that is re-injected, consumed by producers, and/or flared.

Sources: Net Zero Tracker (2023) and own analyses (see Chapter 3).

Governments should be more transparent in their plans, projections, and support for fossil fuel production and how they align with national and international climate goals.

Governments play a central role in setting the direction of future fossil fuel production. State-owned entities control half of global production for oil and gas and over half for coal. Governments' existing targets, policies, and support for fossil fuel production help to influence, legitimize, and enable continued investments in domestic and international fossil fuel projects, which are undermining the transition to renewable energy and global climate mitigation efforts. At the same time, many fossil fuel projects planned and under development are now at risk of becoming stranded assets as the world decarbonizes and global demand for coal, oil, and gas are expected to peak and decline within this decade, even without additional policies.

Nevertheless, there are some encouraging signs of movement. Thirty-four countries, including four profiled in Chapter 3 (Table ES.1), have signed onto the Glasgow Statement on International Public Support for the Clean Energy Transition to end international public financing for “unabated” fossil fuel projects by the end of 2022 and to redirect investments into clean energy. It is important to note though that while the term “unabated” (see Box 2.1) is being increasingly used in policy commitments related

to fossil fuel reductions, it is often highly contested, poorly defined, and open to interpretation regarding the required rate of carbon capture for abatement.

Since the 2021 Production Gap Report, two more countries (Canada and China) — in addition to Germany and Indonesia — have begun to develop scenarios for domestic fossil fuel production that are consistent with national or global net-zero or carbon-neutrality targets. Meanwhile, discourses on just transitions for fossil-fuel-dependent workers and economies are advancing in many countries, though these are still mostly limited to coal-fired power generation. Among the 20 countries profiled, Colombia recently signed on to an international initiative targeted at phasing out fossil fuel production (see Table 3.2).

There is a need for governments to adopt both near- and long-term reduction targets for fossil fuel production and use to complement other climate mitigation benchmarks and reduce the risks of stranded assets. Countries with greater transition capacity should aim for faster reductions than the global average.

The current misalignment of climate ambitions and fossil fuel production plans undermines efforts to reduce fossil fuel use and emissions by sending mixed signals about countries' intentions and priorities and by locking in new fossil fuel production infrastructure that will make the



energy transition more costly, difficult, and disruptive. The almost-exclusive focus of climate policy on the demand for fossil fuels and on the territorial emissions associated with their combustion over the past decades has proven to be insufficient. Ultimately, the global energy landscape is shaped by both demand and supply. A well-managed energy transition will thus require plans and actions to reduce both fossil fuel production and consumption in a coordinated fashion.

Combining targets and policies to actively phase out fossil fuel production with other important climate mitigation and just transition measures — such as reducing fossil fuel consumption, expanding renewable energy, reducing methane emissions from all sources, and targeting investments and social protection for affected communities — can reduce the costs of decarbonization, promote policy coherence, and ensure that renewables replace, rather than add to, fossil fuel energy.

The long-term, cost-optimized mitigation scenarios selected and analysed in this report from the IPCC AR6 database suggest that, to limit warming to 1.5°C, global coal, oil, and gas production should decline rapidly and substantially between now and mid-century, in parallel with other key mitigation strategies.

The selected scenarios differ substantially with respect to their reliance on carbon capture and storage (CCS) and carbon dioxide removal (CDR). The median 1.5°C-consistent global fossil fuel production pathways shown in Figures ES.1–ES.2 assume that, by mid-century, 2.1 billion tonnes of CO₂ per year (GtCO₂/yr) of fossil-fuel-combustion emissions will be captured and stored, 2.2 GtCO₂/yr of atmospheric CO₂ will be sequestered by conventional land-based CDR methods (afforestation, reforestation, and management of existing forests), and over 3 GtCO₂/yr will be sequestered by novel CDR methods (CCS coupled to bioenergy or direct air capture), on average.

However, there are large uncertainties in the technical, economic, and institutional feasibility of developing and deploying novel CDR and fossil-CCS technologies at the extensive scale envisioned in these scenarios. Around 80% of pilot CCS projects over the last 30 years have failed, with annual capacity from operational projects resulting in dedicated CO₂ storage currently amounting to less than 0.01 GtCO₂/yr (see Section 2.4). There are also widespread concerns around the potential negative impacts arising from extensive land-use for conventional or novel CDR, which could affect biodiversity, food security, and the rights of Indigenous peoples and traditional land users.

Given risks and uncertainties of CCS and CDR, countries should aim for a near total phase-out of coal production and use by 2040 and a combined reduction in oil and gas production and use by three-quarters by 2050 from 2020 levels, at a minimum. The potential failure of these measures to become sufficiently viable at scale, the non-climatic near-term harms of fossil fuels, and other lines of evidence, call for an even more rapid global phase-out of all fossil fuels.

While the above reduction targets are derived from 1.5°C-consistent scenarios that align with taking a precautionary approach to limiting reliance on CCS and CDR, they still assume that these measures will become available at scale to some degree (see Section 2.4). Ultimately, the pace and extent of the required reductions in global coal, oil, and gas production will also depend on many normative and values-based choices. For example, one mitigation scenario that relies only on conventional CDR and no CCS coupled to fossil fuels, bioenergy, or direct air capture sees reductions in global oil and gas production of 90% and 85%, respectively, between 2020 and 2050.

There are additional compelling reasons to strive for an even faster global phase-out of all fossil fuels. Research has found that the committed emissions of CO₂ expected to occur over the lifetime of existing fossil-fuel-producing infrastructure already exceed the remaining carbon budget for a 50% chance of limiting warming to 1.5°C by 2100. This implies that no new coal mines and oil and gas fields can be developed unless existing infrastructure is retired early, a task that is hard to achieve in practice.

Moreover, fossil fuel extraction and burning are associated with many near-term and localized non-climatic social, economic, and environmental harms that are rarely accounted for in climate mitigation scenarios, including the ones analysed in this report (see Section 2.4).

Continued production and use of coal, oil, and gas are not compatible with a safe and livable future. Achieving net-zero CO₂ emissions by 2050 requires governments to commit to, plan for, and implement global reductions in the production of all fossil fuels alongside other climate mitigation actions, beginning now.

A digital copy of this report along with supporting appendices is available at <https://productiongap.org/2023report>