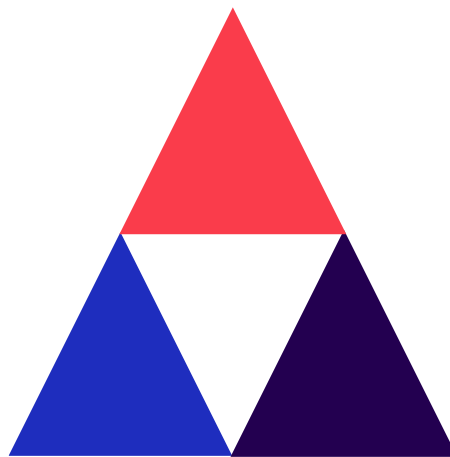




▶ The future of work in the oil and gas industry

Opportunities and challenges for a just transition to a future of work that contributes to sustainable development

Technical meeting on the future of work in the oil and gas industry
(Geneva, 28 November–2 December 2022)



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▶ Background

At its 341st Session (March 2021), the Governing Body of the ILO decided to convene a technical meeting on the future of work in the oil and gas industry.¹

At its 343rd Session (November 2021), the Governing Body in turn decided that the technical meeting should take place in Geneva from 28 November to 2 December 2022.²

In the context of the ILO Centenary Declaration for the Future of Work (2019),³ the meeting will discuss opportunities and challenges for a just transition to a future of work that contributes to sustainable development in its economic, social and environmental dimensions.

This report has been prepared by the International Labour Office as a basis for discussions at the meeting. Chapter 1 contains a brief overview of the oil and gas industry today in terms of its structure; reserves and production; consumption; international trade and contribution to gross domestic product (GDP); and employment. Chapter 2 sets out the megatrends and drivers of change that will transform the industry in the future, with a focus on climate change, technological advances, demographics and globalization. Chapter 3 describes the decent work opportunities and challenges that the industry faces within the framework of the four strategic objectives that are at the heart of the Decent Work Agenda,⁴ and with special attention to the nine key policy areas of the ILO *Guidelines for a just transition towards environmentally sustainable economies and societies for all*.⁵

¹ GB.341/POL/3(Rev.1).

² GB.343/POL/2(Rev.2).

³ ILO, [ILO Centenary Declaration for the Future of Work](#), International Labour Conference, 108th Session, 2019.

⁴ ILO, [ILO Declaration on Social Justice for a Fair Globalization \(2008\) as amended in 2022](#).

⁵ ILO, [Guidelines for a Just Transition Towards Environmentally Sustainable Economies and Societies for All](#), 2015.

▶ Chapter 1. The oil and gas industry

1. While the earliest known oil wells were drilled in China in the year 347, the first modern oil wells were created in the 1850s. Since then, the oil and gas industry has provided the energy to catapult the industrial revolution, it has transformed mobility, transport, electricity provision, heating, cooling, and cooking. In addition to powering our economies, oil and gas is the base ingredient in thousands of manufactured products that businesses and consumers use every day.
2. The oil and gas industry makes a significant contribution to the global economy and to its growth and development worldwide. The oil industry alone accounts for almost 3 per cent of global domestic product. The trade in crude oil reached US\$640 billion in 2020, making it one of the world's most traded commodities.⁶
3. The industry is highly capital-intensive. Investments in oil and gas supply reached more than US\$511 billion in 2020.⁷ According to the International Energy Agency's (IEA) recent report, *World Energy Employment*, oil and gas supply employed close to 11.9 million people in 2019.⁸
4. Being the world's most valuable commodities, oil and gas have greatly contributed to the wealth and power of governments and corporations that are endowed with these natural resources and that control their production and distribution. For this reason, the desire and ability to control oil and gas have played a significant role in geopolitics, wars and conflicts across the globe, and continue to do so today.
5. In recent decades, the industry has come under additional scrutiny because of concerns about the changing climate. According to the Intergovernmental Panel on Climate Change (IPCC), in 2019 approximately 34 per cent of total net anthropogenic greenhouse gas (GHG) emissions came from the energy supply sector.⁹ During a speech in March 2022, the Secretary-General of the United Nations (UN) warned that our "addiction to fossil fuels is mutually assured destruction".¹⁰
6. As highlighted by the International Petroleum Industry Environmental Conservation Association (IPIECA), the oil and gas industry will need to align its business strategies with the national strategies called for in the Paris Agreement to significantly reduce GHG emissions and to support the global energy transition. According to the IEA, no oil and gas company will be unaffected by the transition to clean energy, and every segment of the industry will need to consider the nature of their operations and business models.¹¹
7. Combined with concerns about working conditions and violations of fundamental principles and rights at work in oil and gas production in some countries, the industry is faced with increasing pressure to address the significant opportunities and challenges for a just transition to a future of work that contributes to sustainable development in its economic, social and environmental dimensions.

⁶ The Observatory of Economic Complexity (OEC), "[Crude Petroleum](#)".

⁷ Intergovernmental Panel on Climate Change (IPCC), *Climate Change 2022: Mitigation of Climate Change. Summary for Policymakers*, 2022.

⁸ IEA, *World Energy Employment*, 2022.

⁹ Anil Pandey, James Thomas and Aditya Harneja, "[How the Oil and Gas Industry can Turn Climate-change Ambition into Action](#)", *Strategy&*, 2021.

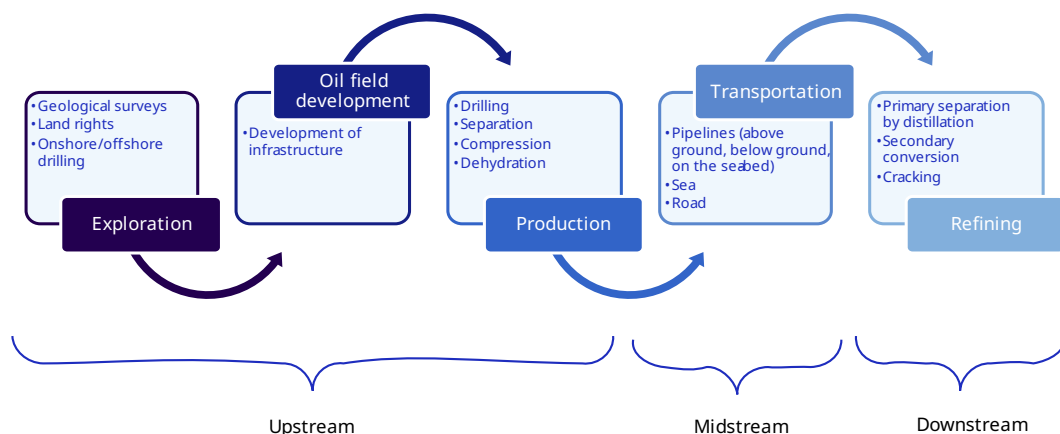
¹⁰ UN, "[Secretary-General's Remarks to Economist Sustainability Summit](#)", 21 March 2022.

¹¹ IEA, *The Oil and Gas Industry in Energy Transitions: Insights from IEA Analysis*, 2020.

1.1. Definition and structure

8. For the purposes of this report, the oil and gas industry is defined in accordance with the International Standard Industrial Classification of All Economic Activities (ISIC), Revision 4.¹²
9. The supply chains of the oil and gas industry span the globe and can be separated into three segments (figure 1):
 - The **upstream segment** of the oil and gas industry encompasses activities linked to exploration, including the search for hydrocarbons, identification of high-potential areas for oil and gas extraction, test drilling, the construction of wells, and initial extraction. Drilling for oil and gas are typically contracted to specialized drilling firms. Drilling facilities can either be onshore, frequently in the form of oil wells that are grouped together in a field, or offshore from single platforms that hold all the drilling equipment, storage areas and housing for crews. Another method used to extract oil and gas is hydraulic fracturing, which is used to extract hydrocarbons from inaccessible parts of existing wells or coalbed wells, tight sand formations and shale formations.¹³
 - The **midstream segment** of the industry refers to the transportation and storage of oil and gas. This includes the operation of pipelines and other modes of transportation to move oil and gas long distances, such as tank trucks, rail tank cars, barges and oil and liquefied natural gas (LNG) tankers. Another important midstream activity is the storage of oil and natural gas, largely for the purposes of softening supply and demand shocks.
 - Companies in the **downstream segment** refine crude oil and natural gas into thousands of finished products, including petrol, diesel, kerosene, jet fuels, heating oils and asphalt for building roads. Long-chain hydrocarbons are also found in products such as fertilizers, rubber, plastics, chemicals, pharmaceuticals, paints and fabrics. The downstream segment also covers the marketing and distribution of refined petroleum products to business, industry, government, and public consumers.

► Figure 1. The oil and gas supply chain



Source: Adapted from Library of Congress, "Oil and Gas Industry: A Research Guide".

¹² UN, *International Standard Industrial Classification of All Economic Activities (ISIC), Rev. 4*, 2008.

¹³ Library of Congress, "Oil and Gas Industry: A Research Guide".

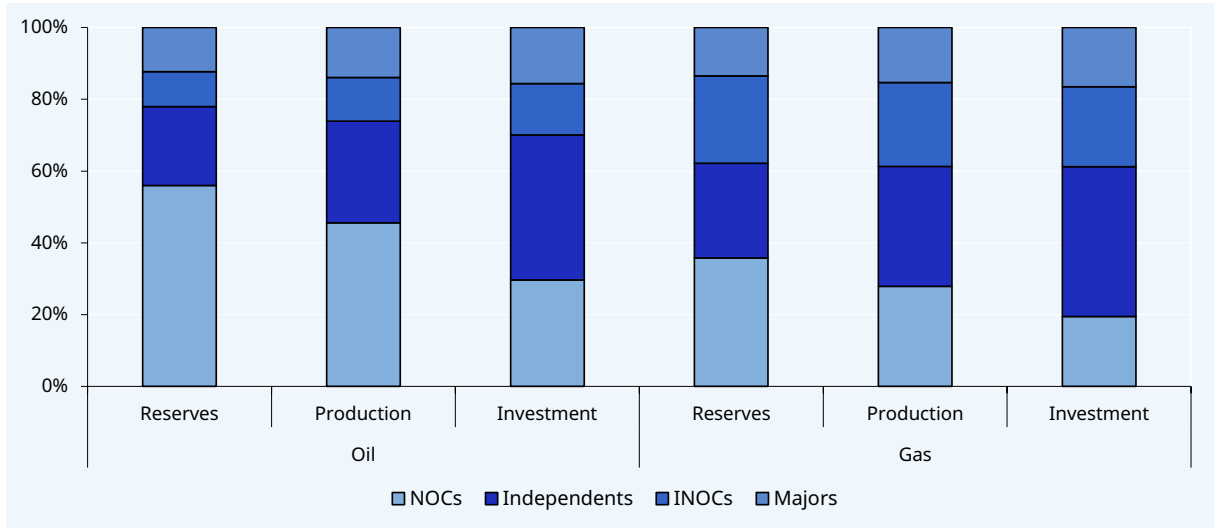
10. The oil and gas industry is dominated by a limited number of large multinational enterprises (MNEs), both private, public and state-owned. In 2019, petroleum and energy companies accounted for seven of the top ten Fortune Global companies, and in 2022 the trailing 12 month revenues (TTM) of the ten biggest oil companies ranged from US\$111.5 billion to US\$1.3 trillion.¹⁴ These MNEs coexist with prospectors, drillers, exploration juniors and small producers, and with numerous small and medium-sized enterprises (SMEs) in their supply chains, both globally and in local communities.
11. Oil and gas companies can be generally divided in two categories, international oil companies (IOCs) and national oil companies (NOCs):¹⁵
- **IOCs:** The seven “Majors” – that is, BP, Chevron, ExxonMobil, Shell, Total, ConocoPhillips and Eni – are examples of integrated IOCs that are involved in each segment of the oil and gas supply chain and have a market capitalization of US\$10 billion or more. IOCs also include the smaller group of “Independents”, who focus on frontier areas or assets of less interest to the Majors, and who operate across the supply chain or in a specific segment of it. Examples include Repsol, Marathon, Apache, Hess or Mitsubishi Corp. In addition to the fully or partially integrated IOCs, the oil and gas industry also includes companies that either specialize in a segment of the supply chain, such as pure downstream companies (for example, Marathon Petroleum and Phillips 66), service companies (for example, Schlumberger and Baker Hughes) and trading companies (for example, Glencore and Vitol).
 - **NOCs:** Since Mexico nationalized its oil production in 1938, countries have been creating private state-owned companies or purchasing significant shares in publicly traded oil companies. The rise of oil nationalization was not only a response to historical exploitation by IOCs, but also a political strategy to control access to national oil and gas reserves.¹⁶ Examples of NOCs include Saudi Aramco, National Iranian Oil Company, Basra Oil Company, Qatar Petroleum, Rosneft, Uzbekneftegaz, SOCAR, KazMunayGaz, Petrobras, PEMEX, Petróleos de Venezuela, SA (PDVSA), Nigeria National Petroleum Corporation (NNPC), Sonatrach, and Sonangol. International NOCs – also called INOCs – are NOCs that have large upstream investments, usually in partnership with large private companies or national oil companies of other countries. They include Equinor, the China National Petroleum Corporation (CNPC), Gazprom, Sinopec, the China National Offshore Oil Corporation (CNOOC), Petronas, India’s Oil and Natural Gas Corporation (ONGC) and Thailand’s PTTEP.
12. All of these types of company play a key role in oil and gas production, as shown in the breakdown of their ownership of reserves, production and investment in figure 2.

¹⁴ Nathan Reiff, “10 Biggest Oil Companies”, *Investopedia*, 5 August 2022.

¹⁵ IEA, *The Oil and Gas Industry in Energy Transitions*.

¹⁶ Gavin Bridge and Philippe Le Billon, *Oil*, 2nd ed., (Cambridge, UK: Polity Press, 2017), 47–49.

► **Figure 2. Ownership of oil and gas proven and probable reserves, production and upstream investment by company type, 2018 (percentage)**



Source: IEA, “Share of Oil Reserves, Oil Production and Oil Upstream Investment by Company Type”, 2018; “Shares of Gas Reserves, Gas Production and Gas Upstream Investment by Company Type”, 2018.

13. The creation of the Organization of the Petroleum Exporting Countries (OPEC) is closely linked to the nationalization of oil production. With a membership of 13 countries, OPEC aims to harmonize petroleum policies, stabilize oil markets for the benefit of consumers, producers and investors, and allow for countries to have sovereignty over their natural resources.¹⁷ Similar to OPEC, some countries have come together to form the Gas Exporting Countries Forum (GECF). However, unlike OPEC, which has been criticized for its monopolistic power, the GECF does not have mandate to control production or prices.¹⁸

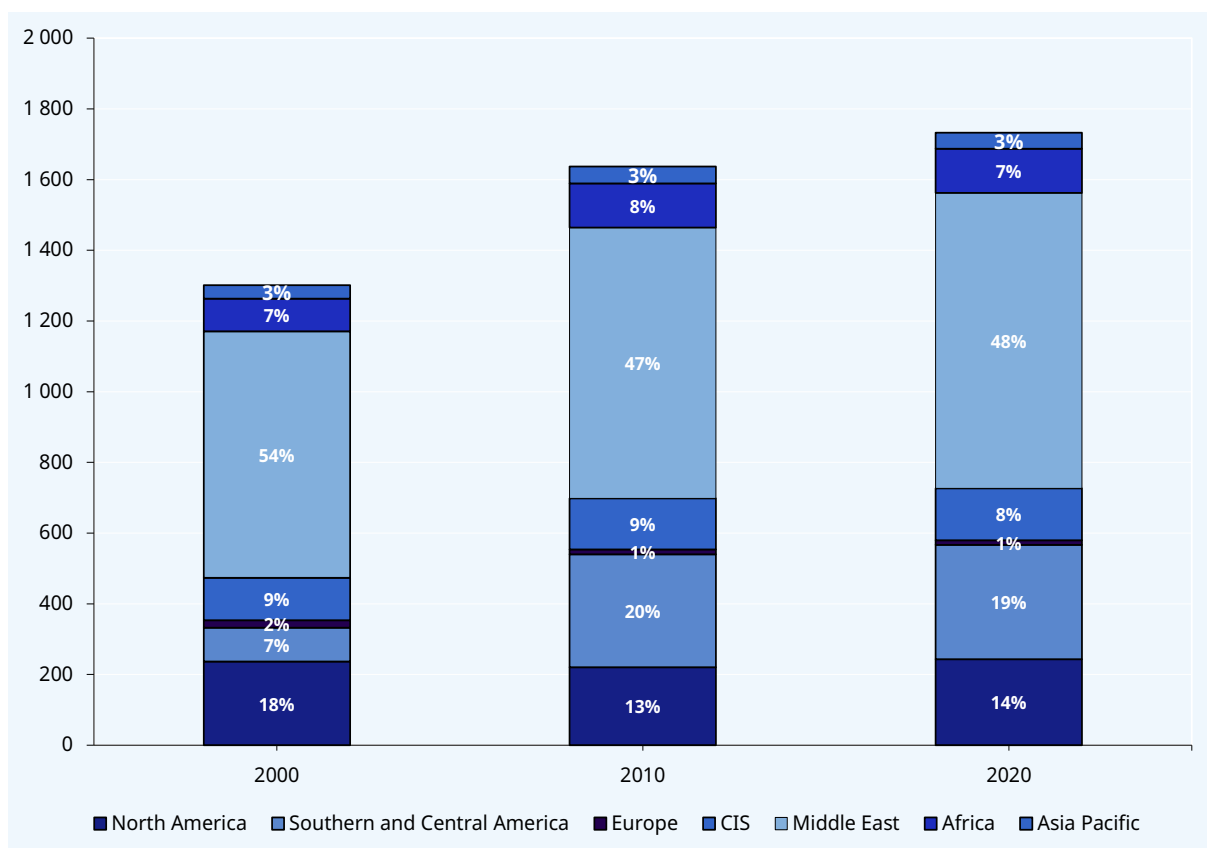
¹⁷ The 13 member countries are Algeria, Angola, Congo, Equatorial Guinea, Gabon, Islamic Republic of Iran, Iraq, Kuwait, Libya, Nigeria, Saudi Arabia, United Arab Emirates and the Bolivarian Republic of Venezuela.

¹⁸ Library of Congress, “Oil and Gas Industry: A Research Guide”.

1.2. Global oil and gas reserves

14. Oil and gas are finite resources. While the exact amount of oil or gas available for extraction from below the earth’s surface is unclear, data about proven reserves is available (figure 3).¹⁹

► **Figure 3. Total proven reserves of oil by region (in billions of barrels)**^{20 21}



Source: BP, *Statistical Review of World Energy 2021*, 70th ed., 2021.

15. Figure 3 shows that global proven reserves of oil have increased by 33 per cent from 2000 to 2020. This is largely driven by new exploration and drilling activities, which tend to pick up when oil prices rise, but also by changes in extraction regulations and technology, such as fracking.
16. The country with the largest increase in proven oil reserves was the Bolivarian Republic of Venezuela, from 76.8 billion barrels at the end of 2000 to 303.8 billion barrels at the end of 2020.

¹⁹ According to the Society of Petroleum Engineers (SPE), proven reserves can be defined as “those quantities of petroleum anticipated to be commercially recoverable by application of development projects to known accumulations from a given date forward under defined conditions”. A reserve is generally considered a “proven” reserve if its viability or probability of profitable extraction is equal to or over 90 per cent.

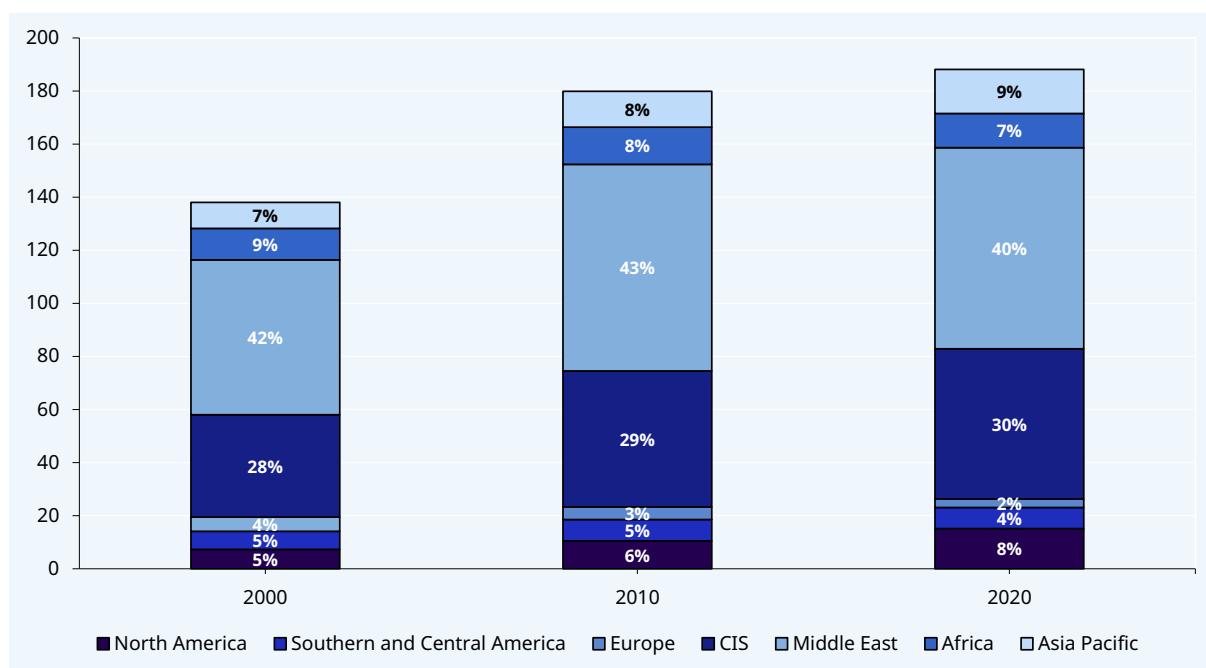
²⁰ In this figure as well as the following figures, the CIS region refers to the Commonwealth of Independent States and includes 12 countries: Armenia, Azerbaijan, Belarus, Georgia, Kazakhstan, Kyrgyzstan, Republic of Moldova, Russian Federation, Tajikistan, Turkmenistan, Ukraine and Uzbekistan.

²¹ According to the source this data includes crude oil, shale oil, oil sands, condensates (lease condensate or gas condensates that require further refining) and NGLs (natural gas liquids – ethane, liquefied petroleum gas (LPG) and naphtha separated from the production of natural gas). It excludes liquid fuels from other sources such as biofuels and synthetic derivatives of coal and natural gas. This also excludes liquid fuel adjustment factors such as refinery processing gain. It also excludes oil shales/kerogen extracted in solid form. This is applicable to all oil related data from this source in this chapter.

At the time, the region with the largest share of proven oil reserves was the Middle East, accounting for 48.3 per cent of the global share. Over 70 per cent of global proven reserves were in OPEC member countries.

- Similar to proven oil reserves, figure 4 shows that proven gas reserves have increased between 2000 and 2020, by approximately 36 per cent. At the end of 2020, the region with the largest share of proven gas reserves was the Middle East, accounting for 40.3 per cent of the global share.

▶ **Figure 4. Total proven reserves of gas by region (in trillions of cubic metres)**²²



Source: BP, *Statistical Review of World Energy 2021*.

- The IEA estimates that unabated combustion of the proven reserves of coal, oil and natural gas would result in three times more carbon dioxide (CO₂) emissions than the world’s remaining CO₂ budget.^{23 24} Even if unabated coal power is phased down, as the Parties to the Glasgow Climate Pact have agreed to do, large volumes of oil and gas would need to be kept in the ground to restrict global warming in line with the Paris Agreement. It has been calculated that there are currently US\$1.4 trillion in potentially stranded assets.²⁵ The Secretary-General of the UN has referred to such investments in fossil fuels infrastructure as “moral and economic madness”.²⁶

²² According to the source this data excludes natural gas converted to liquid fuels but includes derivatives of coal as well as natural gas consumed in gas-to-liquids transformation. This is applicable to all gas related data from this source in this chapter.

²³ A carbon budget is defined as “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, taking into account the effect of other anthropogenic climate forcers”.

²⁴ IEA, *The Oil and Gas Industry in Energy Transitions*.

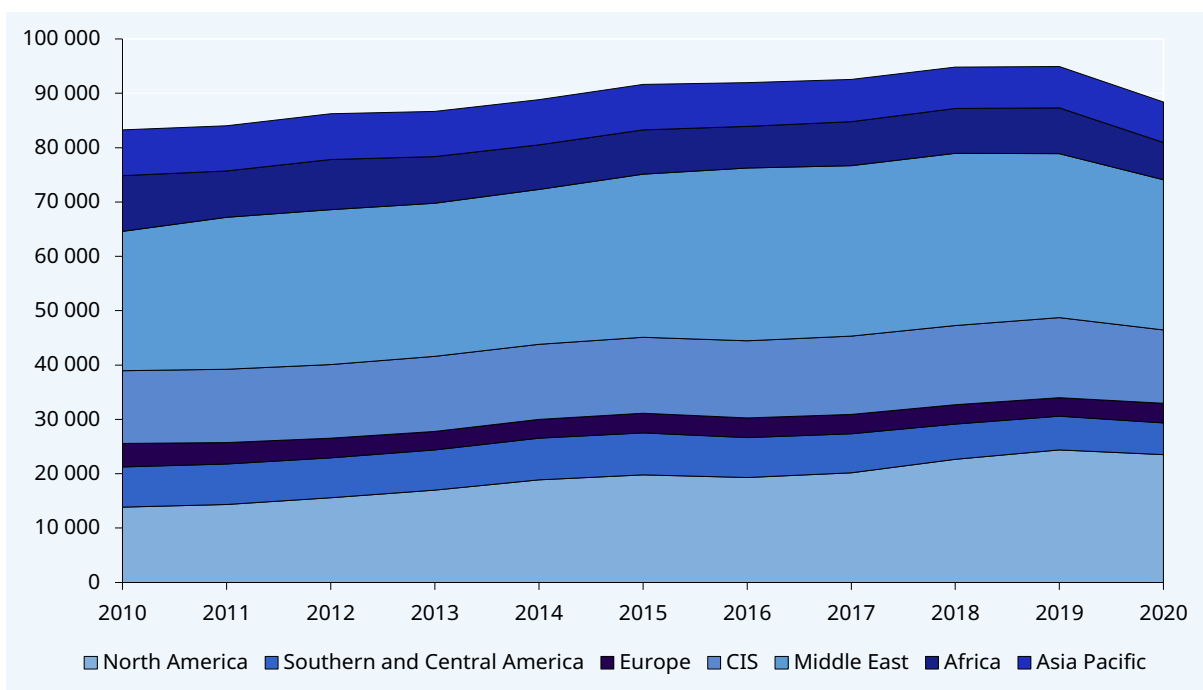
²⁵ Gregor Semieniuk et al., “Stranded Fossil-fuel Assets Translate to Major Losses for Investors in Advanced Economies”, *Nature Climate Change*, 12, (2022): 532–538.

²⁶ UN, “Secretary-General Warns of Climate Emergency, Calling Intergovernmental Panel’s Report ‘A File of Shame’, while Saying Leaders ‘Are Lying’, Fuelling Flames”, Press Release, 4 April 2022.

1.3. Global oil and gas production

- 19. Between 2009 and 2019, the annual global growth rate of oil production was 1.5 per cent. In terms of actual volumes, global production of oil increased from 83,293,000 barrels per day to a record high of 94,961,000 barrels per day in 2019 (figure 5).
- 20. The region with the highest average annual growth rate between 2009 and 2019 was North America with a 6.1 per cent growth per annum. The growth rate for OPEC production was 0.5 per cent per annum, whereas non-OPEC production grew at a rate of 2.2 per cent per annum. On the other hand, the European Union (EU) saw an average annual decline of 4.4 per cent in oil production.

► **Figure 5. Global oil production by region, 2010–20** (in thousands of barrels per day)

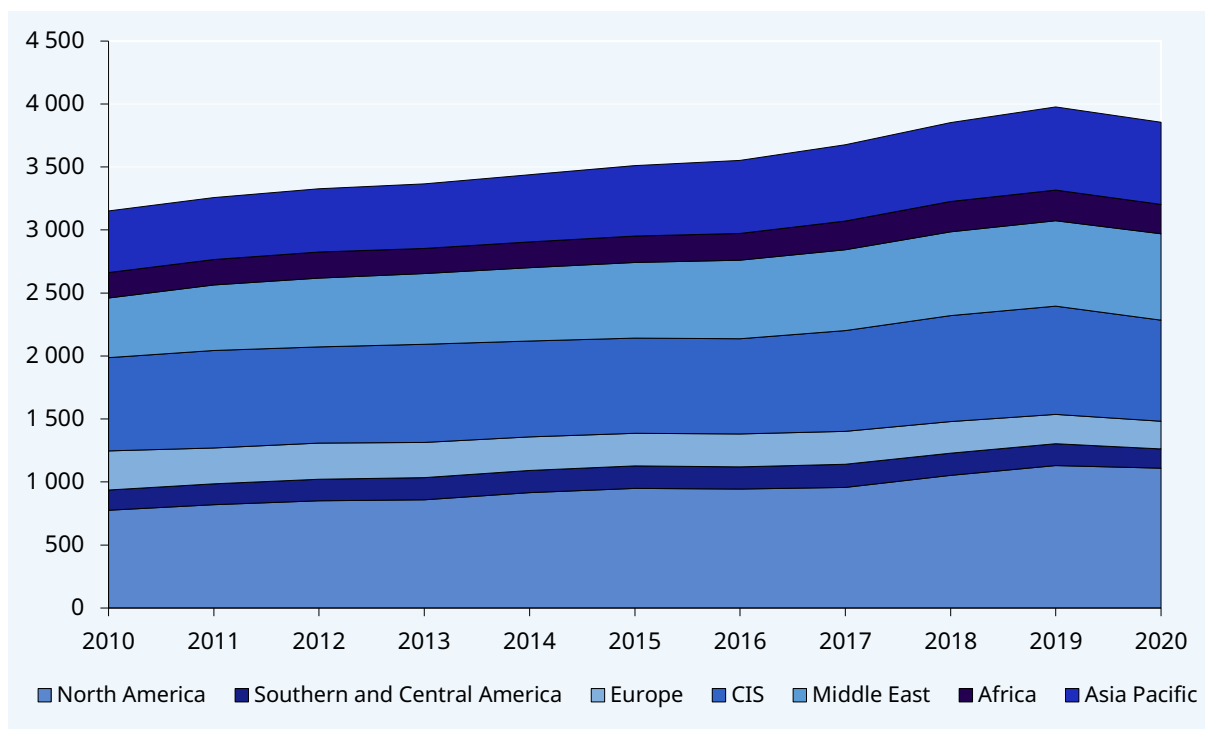


Source: BP, *Statistical Review of World Energy 2021*.

- 21. Due to the COVID-19 crisis, global oil production decreased by 6.9 per cent in 2020 down to 88,391,000 barrels per day. However, production has since rebounded, and the IEA expects global oil supply to average 100.1 million barrels per day in 2022 before hitting an annual record of 101.1 million barrels per day in 2023.²⁷
- 22. The production of natural gas increased at an average annual rate of 3.1 per cent between 2009 and 2019, from 3,150.8 to 3,976.2 billion cubic metres (figure 6).
- 23. The region with the highest average annual growth rate between 2009 and 2019 was the Middle East with a 5.1 per cent growth per annum. On the other hand, the EU saw an average annual decline of 2.5 per cent in natural gas production.

²⁷ IEA, "Oil Market Report – July 2022", July 2022.

▶ **Figure 6. Global gas production by region, 2010–20** (in billions of cubic metres)



Source: BP, *Statistical Review of World Energy 2021*.

- 24. Similar to oil production, global production of gas decreased from 2019 to 2020 by 3.3 per cent down to 3.854 trillion cubic metres. However, production has since rebounded: global natural gas demand grew by 5.3 per cent in 2021 and reached more than 4 trillion cubic metres for the first time.²⁸
- 25. Based on the proven oil reserves and the current production patterns, the global reserve to production ratio was 53.5. This means that the currently known proven reserves would last another 53.5 years should oil production continue at the same rate. Similarly for gas, the reserve to production ratio at the end of 2020 was 48.8.²⁹

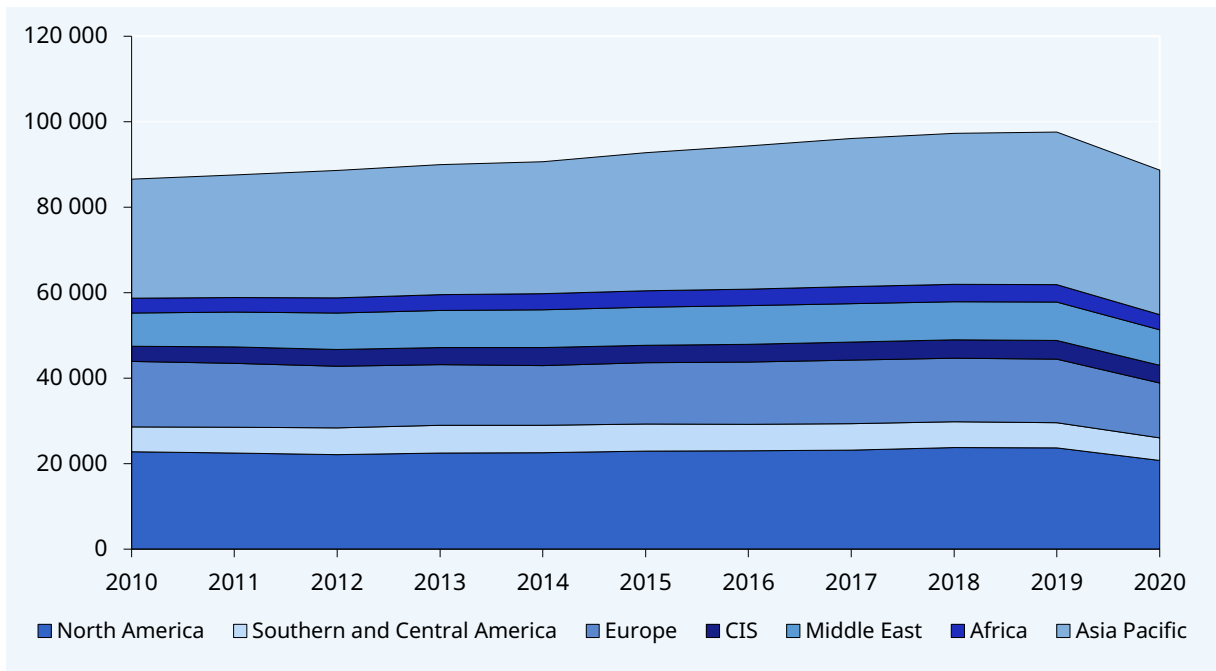
1.4. Oil and gas consumption

- 26. The United States of America and China are the two largest consumers of oil in the world. China and the Islamic Republic of Iran consume the most natural gas. Oil is primarily used as fuel for transportation and industrial production, while gas is mostly used to generate electricity and for industrial production.
- 27. Between 2009 and 2019, the consumption of oil worldwide increased at an annual average rate of 1.6 per cent. The Asia and the Pacific region had the highest annual growth rate of 3.2 per cent during this period, followed by Africa which had a growth rate of 2.2 per cent each year (figure 7).

²⁸ BP, *Statistical Review of World Energy, 2022*, 71st ed., 2022.

²⁹ BP, *Statistical Review of World Energy 2021*.

▶ **Figure 7. Consumption of oil, by region, 2010–20** (in thousands of barrels per day)

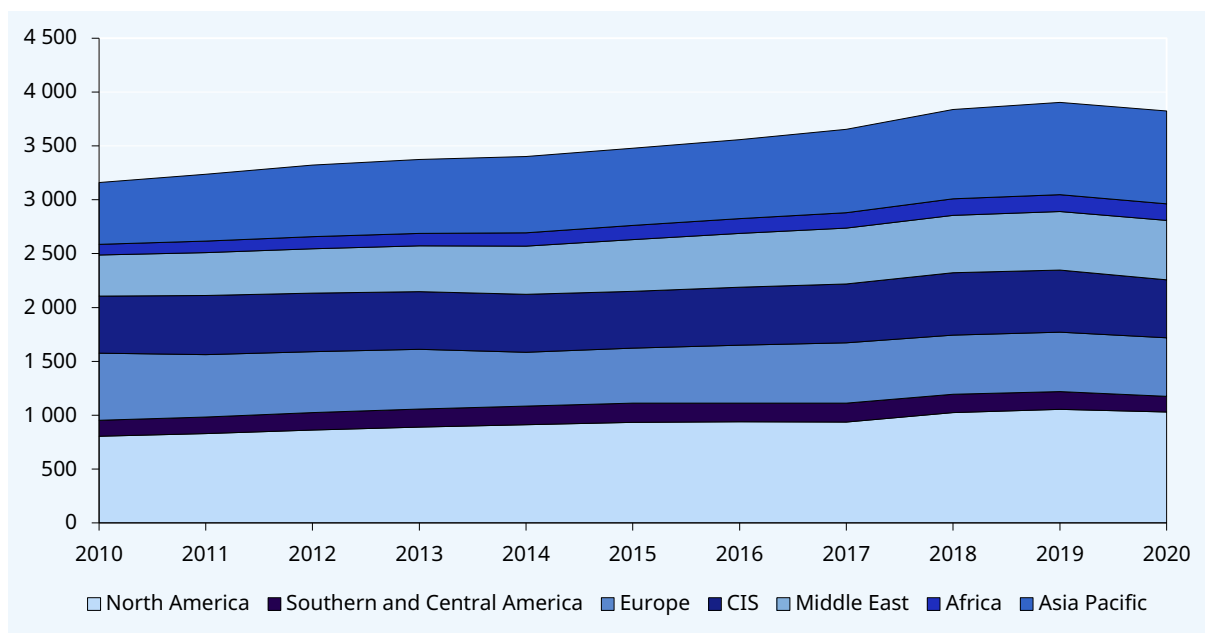


Source: BP, *Statistical Review of World Energy 2021*.

- 28. As with production, the consumption of oil dropped by 9.1 per cent from 2019 to 2020, mostly due to the pandemic. The region that saw the largest decline in the consumption of oil from 2019 to 2020 was Europe with a decline of 13.8 per cent. However, oil consumption rebounded in 2021 and has been forecasted to average 99.4 million barrels a day for all of 2022.³⁰
- 29. Between 2009 and 2019, the consumption of natural gas worldwide increased at an annual average rate of 2.9 per cent. Asia and the Pacific had the highest annual growth rate of 5.2 per cent during this period, followed by Africa with a growth rate of 5.1 per cent each year (figure 8).

³⁰ Energy Information Administration (EIA), “Short-term Energy Outlook”, 2022.

▶ **Figure 8. Consumption of natural gas, by region, 2010–20** (in billions of cubic metres)



Source: BP, *Statistical Review of World Energy*, 2021.

- 30.** As with production, the consumption of natural gas dropped by 2.3 per cent from 2019 to 2020. The region that saw the largest decline in the consumption of natural gas from 2019 to 2020 was Southern and Central America with a decline of 11.1 per cent. Global gas consumption has since increased in 2021 but is expected to contract slightly in 2022 and grow slowly over the following three years as the Russian Federation’s aggression against Ukraine pushes up prices and fuels fears of further supply disruptions.³¹

1.5. Contribution to GDP and world trade

- 31.** The oil and gas industry is a major driver of the global economy. The oil industry alone accounts for 3 per cent of global gross domestic product (GDP).³²
- 32.** For a large number of oil-rich countries, the revenue of oil minus its production cost accounts for much greater shares of their GDP, more than 40 per cent in the case of Libya, Congo and Kuwait (table 1).

³¹ IEA, “Global Natural Gas Demand Set for Slow Growth in Coming Years as Turmoil Strains an already Tight Market”, Press Release, 5 July 2022.

³² The Global Economy, “Oil Revenue – Country Rankings”, 2019.

▶ **Table 1. Share of oil revenues minus production costs as percentage of GDP, top 10 countries, 2019**

Country	Oil revenue minus costs as share of GDP
Libya	43.89
Congo	43.45
Kuwait	42.14
Iraq	39.62
Angola	25.09
Oman	24.88
Saudi Arabia	24.24
Equatorial Guinea	22.26
Azerbaijan	21.86
Gabon	18.80

Source: The Global Economy, "Oil Revenue – Country Rankings", 2019.

- 33.** Prices of oil and gas play an important role in the global economy. They are affected by a number of factors, such as global demand and supply, geopolitical tensions, market speculations and the decisions of OPEC.³³ While oil and gas prices are extremely volatile, and while global trade rankings differ, oil and gas are together one of the most actively traded commodities in the world.
- 34.** Because of economies of scale, transporting oil and oil products is extremely easy and cheap. This goes a long way to explaining why oil is an internationally traded commodity with a unified market, while gas remains traded in regional markets.³⁴
- 35.** The total value of global trade of crude petroleum³⁵ in 2020 was US\$640 billion and this accounted for 3.82 per cent of total world trade (figure 9). The largest exporter of crude petroleum in 2020 was Saudi Arabia (US\$95.7 billion). Other top exporters were the Russian Federation, the United States of America, Iraq and Canada. The largest importer was China (US\$150 billion). Other large importers included the United States, India, the Republic of Korea and Japan.³⁶

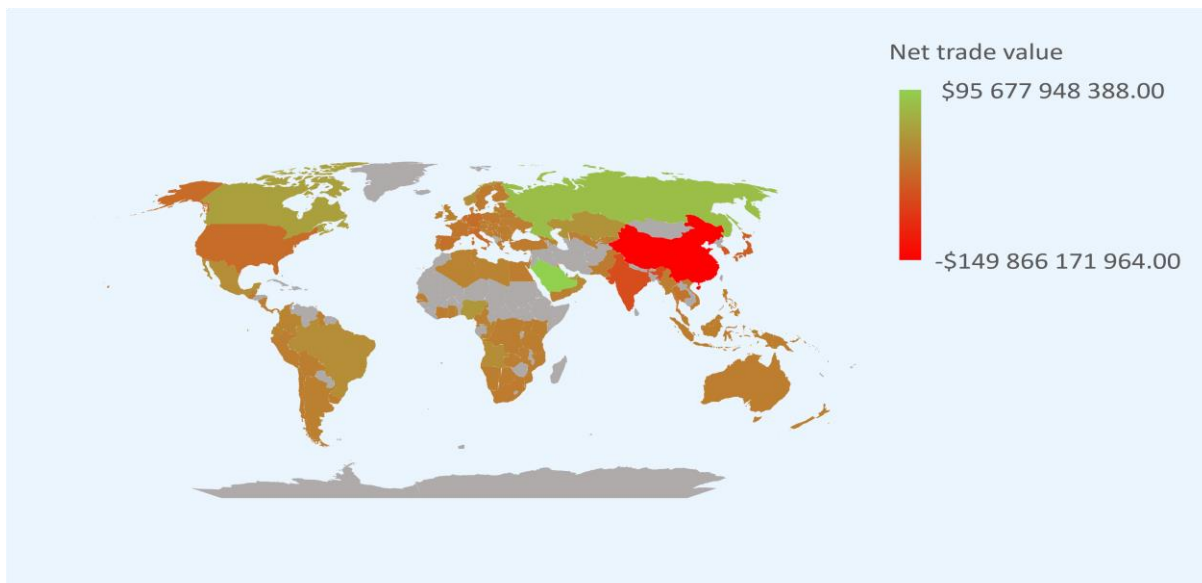
³³ Lutz Kilian, "Oil Price Volatility: Origins and Effects", World Trade Organization (WTO), Research and Analysis: Working Paper, December 2009.

³⁴ Paul Stevens, "The Role of Oil and Gas in the Development of the Global Economy", United Nations University, UNU-Wider, Working Paper, December 2016.

³⁵ This includes petroleum oils, oils from bituminous minerals, and crude

³⁶ OEC, "Crude Petroleum".

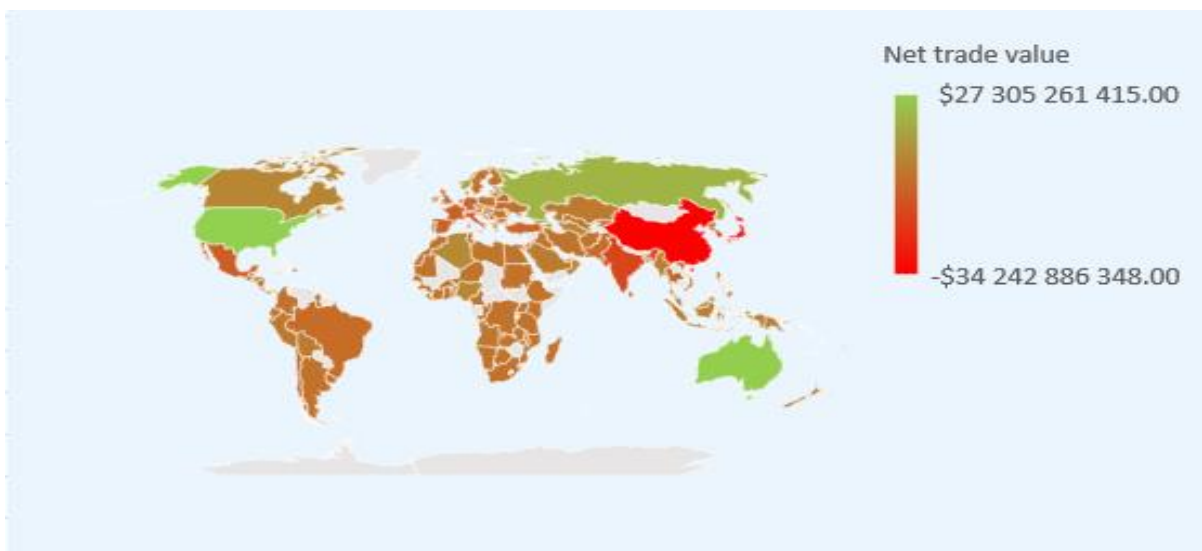
► **Figure 9. Net trade flow of crude petroleum in US\$ by country, 2020**



Source: OEC, "Crude Petroleum".

36. The total value of global trade of petroleum gas ³⁷ in 2020 was US\$217 billion and this accounted for 1.3 per cent of total world trade (figure 10). The largest exporter of petroleum gas in 2020 was the United States (US\$34.7 billion). Other top exporters were Australia, Qatar, the Russian Federation and Norway. The largest importer was China (US\$36.6 billion). Other large importers included Japan, the Republic of Korea, India and Italy. ³⁸

► **Figure 10. Net trade flow of petroleum gas in US\$ by country, 2020**



Source: OEC, "Petroleum Gas".

³⁷ This includes mineral fuels; mineral oils and products of their distillation; bituminous substances; and mineral waxes They include natural gas in gaseous state; natural gas, liquefied; propane, liquefied; butanes, liquefied; petroleum gases and gaseous hydrocarbons nes, liquefied; ethylene, propylene, butylene, butadiene, liquefied; and petroleum gases and gaseous hydrocarbons nes, as gas.

³⁸ OEC, "Petroleum Gas".

1.6. Global employment

37. Detailed and consistent global modelled employment data for oil and gas extraction and production are not easily accessible and even national employment data are difficult to obtain. This is not only because of the high volatility of employment in the industry as it frequently undergoes cycles of boom and bust, but also because of infrequent reporting and a lack of reliable data about employment in leading oil- and gas-producing countries.
38. Nevertheless, the IEA has estimated that, in 2019, 8 million workers were employed in the oil supply industry and 3.9 million workers were employed in the gas supply industry. These global statistics include employment in oil and gas extraction, production, transportation, and refining. They also account for employment generated by the construction of new oil and gas infrastructure as well as the operation of existing infrastructure.³⁹ Because oil and gas production is highly capital-intensive and automated, productivity is high and the share of oil and gas employment of total employment is generally low compared to other industries. However, oil companies regularly outsource many routine and one-off tasks, from highly technical services, such as construction, well logging, exploration drilling, shaft sinking and laboratory analysis, to maintenance, catering, transport and security services. This provides opportunities for SMEs in the supply chain and for contract workers. These workers were the subject of an ILO report published in 2010 but are hardly ever captured in national oil and gas employment statistics.⁴⁰
39. The lack of reliable gender disaggregated data is particularly concerning. According to available ILO data, the share of women workers in the industry is generally low, typically ranging from 8 per cent in the Islamic Republic of Iran to 25 per cent in Viet Nam. Notable exceptions were Spain and Mongolia where women workers accounted for 63 per cent and 54 per cent of all oil and gas workers, respectively, if these figures can be relied on.
40. There is an urgent need to improve the collection and analysis of data and statistics concerning all occupations and categories of workers in the oil and gas industry in order to provide policymakers and employers' and workers' organizations with the evidence base and knowledge they need to enable a just transition to a future of work in the oil and gas industry that contributes to sustainable development.

³⁹ IEA, *World Energy Employment*, 2022.

⁴⁰ Ian Graham, "Working Conditions of Contract Workers in the Oil and Gas Industries", ILO Working Paper No. 276, 2010.

▶ Chapter 2. Megatrends and drivers of change

41. Technological advances, globalization, demographics and other drivers of change have transformed the oil and gas industry throughout its turbulent history. In the past ten years alone, the industry first endured a steep downturn in the aftermath of the global economic and financial crisis, followed by a collapse in demand during the COVID-19 pandemic, and hence historically high supply volatility and prices following the Russian Federation's aggression against Ukraine. The urgent need to mitigate and adapt to climate change is now an almost existential crisis for the industry and for the workers.
42. This chapter reviews how climate change, technological advances, demographics and a new era of globalization are likely to continue to transform the industry and its supply chains. These opportunities and challenges will need to be addressed by governments and employers' and workers' organizations in order to advance decent and sustainable work and ensure a just transition to a future of work that contributes to sustainable development in its economic, social and environmental dimensions.

2.1. Climate change

43. In July 2022, the General Assembly of the UN declared that access to a clean, healthy and sustainable environment is a universal human right.⁴¹ In this regard, the UN Environment Programme 2021 *Emissions Gap Report* shows that despite all efforts, there is a 66 per cent chance of the world hitting a global temperature rise of 2.7°C by the end of the century.⁴² This is almost double the 1.5°C limit that signatories of the Paris Agreement have committed to pursue and it will result in irreversible and catastrophic social, environmental, and economic consequences.
44. In a recent report, the IPCC describes both observed and projected impacts and risks of climate change. It concludes that the changing climate is becoming increasingly complex and difficult to manage and will have profound and prolonged effects on all ecosystems and human systems. Climate change will negatively affect water scarcity, crop production, animal and livestock health and productivity, and fisheries yield and aquaculture production. It will also have a negative impact on human health and well-being, including in terms of infectious diseases, heat stress, malnutrition and mental health, and will lead to increased inland flooding, storm damages to coastal areas, and damages to infrastructure and key economic sectors.⁴³
45. Climate change will thus change how humankind consumes, produces, lives, and works. Working conditions will be negatively affected by climate change, including as a result of the increased exposure of workers to heat stress and air pollution.⁴⁴ An ILO study has estimated that the projected increase in global temperatures will render 2 per cent of all work hours too hot to work in by 2030.⁴⁵
46. While climate change will affect all industries and sectors, the oil and gas industry is particularly vulnerable to its impacts. It has large, high-cost fixed assets with long lifetimes, and it often operates in extreme conditions that are more at risk to record heat, rising sea levels, flooding,

⁴¹ UN, "UN General Assembly Declares Access to Clean and Healthy Environment a Universal Human Right", *UN News*, 28 July 2022.

⁴² UN Environment Programme (UNEP), *Emissions Gap Report 2021*, 2021.

⁴³ IPCC, *Climate Change 2022: Impacts, Adaptation and Vulnerability: Summary for Policymakers*, 2022

⁴⁴ ILO, *Safety and Health at the Heart of the Future of Work: Building on 100 Years of Experience*, 2019.

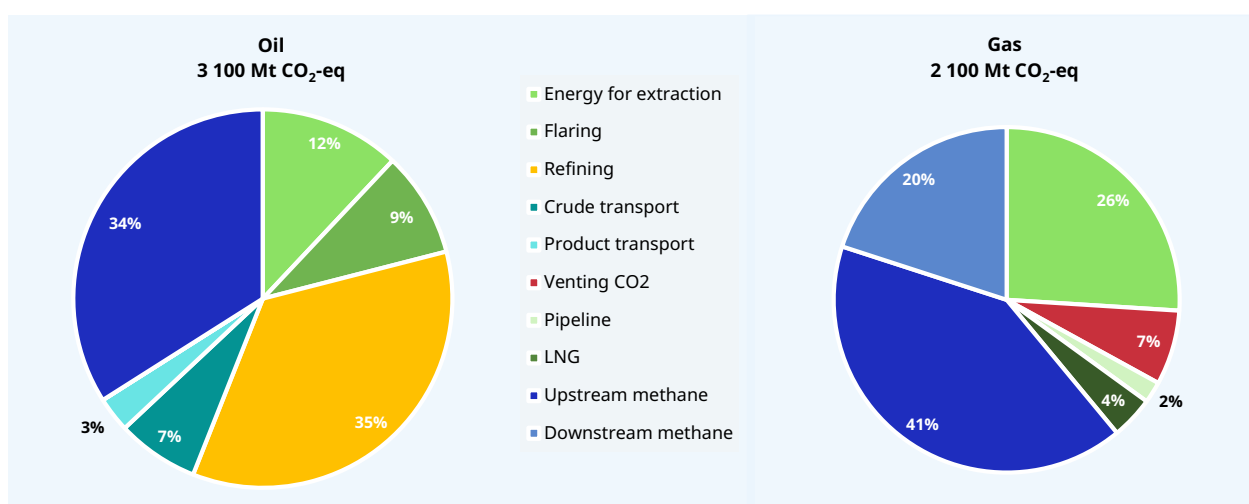
⁴⁵ ILO, *World Employment and Social Outlook 2018: Greening with Jobs*, 2018.

hurricanes and other unprecedented extreme weather events. This makes it costlier and more complex for oil and gas companies to operate and more hazardous for oil and gas workers.⁴⁶

2.1.1. The contribution of the industry to climate change

- 47. The energy sector is the source of around three quarters of GHG emissions today.⁴⁷
- 48. Extraction, processing and transportation of oil and gas account for nearly 15 per cent of the global energy sector’s GHG emissions.⁴⁸ Figure 11 below shows the breakdown of the global GHG emissions by element for oil and gas.

► **Figure 11. Breakdown of GHG emissions by element for oil and gas, 2017**



Source: IEA, *World Energy Outlook, 2018*.
 Note: 2018e = estimated values for 2017.

- 49. In 2017, most of the emissions were related to methane, 34 per cent for oil and 41 per cent for gas. There are ample, cost-effective opportunities to bring down the emissions intensity of delivered oil and gas by minimizing flaring of associated gas and venting of CO₂, tackling methane emissions, and by integrating renewables and low-carbon electricity into operations (see section 2.2.3).
- 50. The IEA divides emissions associated with oil and gas production into three different scopes:
 - Scope 1: emissions come directly from the oil and gas industry itself. This includes, for example, emissions from powering the engines of drilling rigs, or from leaks of methane in the upstream or midstream, or emissions from ships used to transport oil or gas overseas.
 - Scope 2: emissions arise from the generation of energy that is purchased by the oil and gas industry. This includes, for example, the generation of electricity taken from a centralized grid to power auxiliary services, or from the production of hydrogen purchased from an external supplier to be used in a refinery. The sum of scope 1 and 2 emissions is often referred to as the “well-to-tank” or “well-to-metre” emissions.

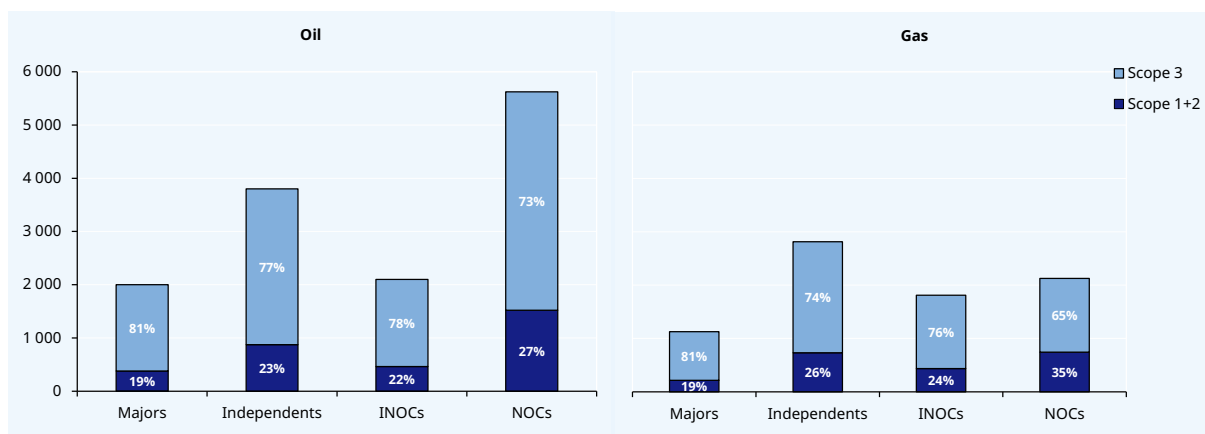
⁴⁶ John Firth, *Oil and Gas: Understanding the Investment Implications of Adapting to Climate Change* (Acclimatise, 2009).

⁴⁷ IEA, *Net Zero by 2050: A Roadmap for the Global Energy Sector*, 2021.

⁴⁸ IEA, *World Energy Outlook 2018*, 2018.

- Scope 3: emissions occur during combustion of the fuel by end users. These emissions are around three times bigger than scope 1 and 2 emissions, but the shares vary between different companies and company types (figure 12).

► **Figure 12. Estimated annual scope 1, 2 and 3 GHG emissions from the full oil and gas supply chain according to company type, 2018**



Source: IEA, *The Oil and Gas Industry in Energy Transitions: Insights from IEA Analysis*, 2020.
 Note: Emissions are apportioned on an equity ownership basis.

51. Beyond GHG emissions, the operations of the oil and gas industry use large amounts of water and lead to air, noise, soil and water pollution. Waste and spills from oil and gas contain hydrocarbons, heavy metals, radioactive material, salts and toxic chemicals, all of which have the potential to damage soils and vegetation directly, and eventually groundwater (box 1). Fires and air pollution due to spills can further damage vegetation and agricultural resources, disrupt wildlife habitats, lead to their extinction, affect biodiversity, contaminate water, displace communities and affect their livelihoods.

► **Box 1. Oil spills**

Although oil spills have decreased since the 1970s, they are still a prominent issue in the oil industry. For instance, it was discovered in 2018 that between 300 and 700 barrels of oil per day has been spilling into the Gulf of Mexico since 2004, when an oil production platform sank in a mudslide triggered by Hurricane Ivan.

The oil drilling rig Deepwater Horizon, also in the Gulf of Mexico, exploded and sank in 2010, leading to 11 deaths and 4 million barrels of oil spilt into the ocean. At the time, the United States Government negotiated a record-setting settlement with the company in the amount of US\$5.5 billion in penalty and US\$8.8 billion in natural resource damages.

During the January 2020–21 period, around 408 oil spills were confirmed in Nigeria and surrounding waters, according to the National Oil Spill Detection and Response Agency. Over 75 per cent of spills in Nigeria since 2016 can be attributed to theft and sabotage by criminals that target the pipeline network.

Source: Darryl Fears, "A 14-Year-Long Oil Spill in the Gulf of Mexico Verges on Becoming one of the Worst in US History," *Washington Post*, 21 October 2018; U.S. Environmental Protection Agency (USEPA), "Deepwater Horizon – BP Gulf of Mexico Oil Spill".

2.1.2. The energy transition

52. More and more ILO Member States are embracing the energy transition – that is the transition from a fossil-based to zero-carbon energy sector – as well as a greater reliance on renewable energy sources as part of their national strategies to reduce CO₂ emissions, limit global warming

and create green jobs. Backed by governments, employers, workers, investors and consumers alike, these energy transition policies are beginning to transform the broader energy sector as well as the oil and gas industry.

53. At the 2021 United Nations Climate Change Conference (COP26), the Parties adopted the Glasgow Climate Pact. They specifically committed to: “accelerate the development, deployment and dissemination of technologies, and the adoption of policies, to transition towards low-emission energy systems, including by rapidly scaling up the deployment of clean power generation and energy efficiency measures, including accelerating efforts towards the phasedown of unabated coal power and phase-out of inefficient fossil fuel subsidies, while providing targeted support to the poorest and most vulnerable in line with national circumstances and recognizing the need for support towards a just transition” (paragraph 36).
54. The energy transition is also part of countries’ efforts to mitigate and adapt to the effects of climate change through nationally determined contributions (NDCs) in the context of the Paris Agreement. More than a hundred countries have updated their first NDCs, new NDCs have been adopted, and an increasing number have developed specific net-zero pledges, long-term strategies, and laws.
55. In the run-up to COP26, some of the world’s largest CO₂ emitters per capita announced their commitment to reach net-zero emissions. Saudi Arabia, for example, stated that it would aim to reach net-zero emissions by 2060 by investing more than US\$186 billion into a green economy over time. Bahrain made a similar pledge with a target by 2050 and investments estimated at US\$163 billion in renewable energy.⁴⁹ Costa Rica, Denmark, France, Greenland, Ireland, Sweden, Wales, the Canadian province of Quebec and other core members of the new [Beyond Oil and Gas Alliance](#) specifically pledged to end oil and gas production within their borders by 2030.⁵⁰ Following COP26, in May 2022, the UN-Energy Plan of Action⁵¹ and the Energy Compact Action Network⁵² were launched to assist UN Member States in transforming these commitments into action and delivering on the outcomes of the UN’s High-level Dialogue on Energy.
56. As part of the net-zero emissions target, tackling methane emissions has become a priority for the oil and gas industry. Although methane has a much shorter atmospheric lifetime than CO₂ – around 12 years, compared with centuries for CO₂ – it absorbs much more energy while in the atmosphere. The new [Global Methane Pledge](#) was launched at COP26. Led by the United States and the EU, it has a total of 121 participant countries. It calls for at least a 30 per cent reduction in global methane emissions from human activity by 2030.⁵³ Going beyond these voluntary initiatives, in 2021, the European Commission published the hydrogen and gas market decarbonization package, which include a proposal for a regulation on methane emissions reduction in the energy sector.⁵⁴ As part of the Inflation Reduction Act (2022), the biggest climate bill in US history, the United States Government imposes a fee of US\$900 per metric ton of methane emissions starting in 2024, rising to US\$1,500 by 2026.⁵⁵

⁴⁹ Maya Gebeily, “Analysis: Gulf Energy Giants Pledge Net Zero – But Plan to Stick with Oil”, *Reuters*, 28 October 2021, accessed on 19 April 2022.

⁵⁰ Adam Vaughan, “COP26: New Alliance Commits to Ending Oil and Gas Extraction”, *New Scientist*, 11 November 2021.

⁵¹ UN Energy, “UN-Energy Plan of Action Towards 2025”.

⁵² UN Energy, “Energy Compact Action Network”, May 2022.

⁵³ Climate & Clean Air Coalition, “Global Methane Pledge”, accessed on 1 August 2022.

⁵⁴ European Commission, *Proposal for a Regulation of the European Parliament and of the Council on Methane Emissions Reduction in the Energy Sector and Amending Regulation (EU) 2019/942*, 2021.

⁵⁵ Sarah Gibbens, “Methane Supercharges Climate Change. The U.S. has a New Plan to Slash It”, *National Geographic*, 19 August 2022.

- 57.** Using various strategies, NOCs and IOCs also aim to reduce their GHG emissions. Leading European companies, for instance, have set ambitious goals to become net-zero companies by 2050 or sooner.⁵⁶ A large Chinese company is establishing a “low-carbon energy ecosystem” to achieve “near-zero” emissions around 2050, thus contributing to China’s goal of carbon neutrality by 2060.⁵⁷ And a large Norwegian company is working to electrify oil and gas production platforms using offshore wind power and other renewables.⁵⁸
- 58.** These efforts are supported by existing and new associations and initiatives, including but not limited to:
- In collaboration with the World Business Council for Sustainable Development (WBCSD), the IPIECA launched a road map providing guidance for oil and gas companies on achieving low emissions and aligning with the 2030 Agenda for Sustainable Development.⁵⁹
 - The Oil and Gas Climate Initiative (OGCI) has developed a set of guiding principles to help its member companies contribute to a low-carbon future by, among other things, supporting the Paris Agreement, reducing methane and CO₂ emissions, assessing climate change risks and opportunities in business planning and supporting government policies that consider a value for carbon, explicitly or implicitly.
- 59.** It should be noted that oil and gas companies’ pledges and strategies towards-net-zero vary considerably in scope and depth. Research published in 2022 by Carbon Tracker compared emissions targets of major IOCs and found that some report on emissions of all oil and gas products, others report on the end use of all energy products, and some on the emissions intensity of their oil and gas operations only. The coverage of operations is uneven and only a few have set specific reduction targets for 2030.⁶⁰
- 60.** In this regard, the World Benchmarking Alliance, with ILO support, has created indicators for a just transition in the oil and gas industry. It used these indicators to assess 100 keystone listed and state-owned oil and gas companies’ targets and performance against their 1.5°C pathways to see if they are on track to meet the Paris Agreement goal. There were five main findings: oil and gas must be kept in the ground to stay within the 1.5°C limit; companies’ climate change strategies need to be more effective and held up to accountability; scope 3 emissions, as the greatest contributors to climate change, need to be recognized in companies’ targets and planning; there is urgent need for more expenditure on low-carbon technologies; and state-owned companies need to speed up their transitions.⁶¹
- 61.** The Climate Action 100+ initiative, hosted by the French Government and comprising of 700 investors with over US\$68 trillion in assets under management, has furthermore created a Net-Zero Company Benchmark to assess the progress of the world’s largest corporate GHG emitters in taking necessary action on climate change. Thirty-nine of the 166 focus companies are oil and gas companies. While there are improvements in terms of cutting GHG emissions, climate governance, and strengthening climate-related financial disclosures, it is a concern that the vast

⁵⁶ Shell, “Shell Accelerates Drive for Net-zero Emissions with Customer-first Strategy”, Press Release, 11 February 2021.

⁵⁷ PetroChina, *Environmental, Social and Governance Report*, 2020.

⁵⁸ Angeli Mehta, “Oil & Gas Industry Emissions Reduction Pledges Under Scrutiny”, *Chemistry World*, 10 November 2021.

⁵⁹ Yoana Cholteeva, “Oil and Gas Majors Agree on a Roadmap for Sustainable Development”, *Offshore Technology*, 20 April 2021, updated 14 February 2022.

⁶⁰ Carbon Tracker, Analyst Notes “Absolute Impact: Why Oil and Gas Companies Need Credible Plans to Meet Climate Targets”, 12 May 2022.

⁶¹ World Benchmarking Alliance, “2021 Oil and Gas Benchmark”.

majority of companies have not set medium-term emissions targets that are aligned with the IEA’s 1.5°C scenario (box 2).⁶²

► **Box 2. Findings of Climate Action 100+ assessments, 2022**

Only 17 per cent of focus companies have set medium-term targets which are aligned with the IEA 1.5°C scenario.

Just 42 per cent of focus companies have comprehensive net zero by 2050 commitments that cover all material GHG emissions, including material scope 3 emissions.

Only 5 per cent of focus companies explicitly commit to align their capex plans with their long-term GHG reduction targets.

Only 17 per cent of focus companies have robust quantified decarbonization strategies in place to reduce their GHG emissions.

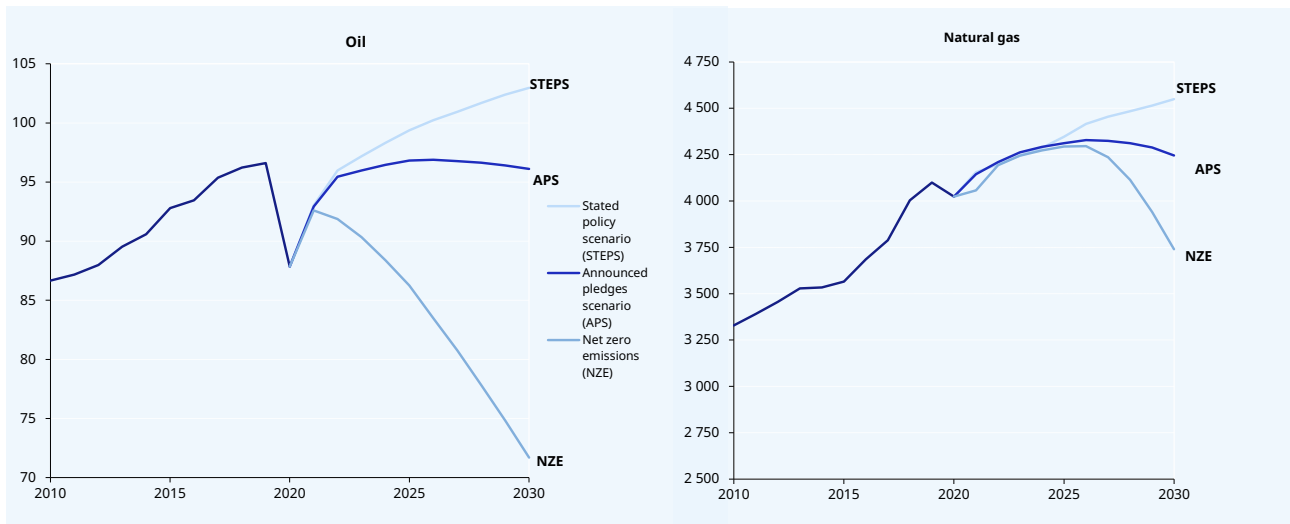
All companies fail to integrate climate risk into accounting and audit practices.

Source: “Climate Action 100+ Net-zero Company Benchmark Shows an Increase in Company Net-zero Commitments, but Much More Urgent Action is Needed to Align with a 1.5°C Future”, 30 March 2022.

2.1.3. The production gap persists

62. Despite these and other efforts to reduce the negative impacts of the production and consumption of oil and gas, global demand for and supply of oil and gas is not falling fast enough to reach the goals of the Paris Agreement and Glasgow Climate Pact.

► **Figure 13. The demand for oil and natural gas by scenario, 2010–30**



Source: IEA, *World Energy Outlook 2021*, 2021.

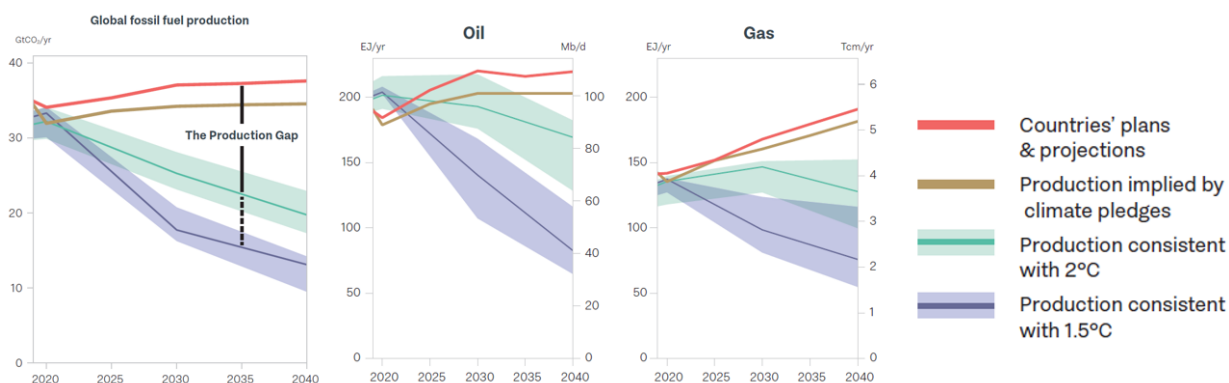
63. According to the UN Environment Programme (UNEP), the “production gap”, which is the difference between countries’ plans and projections and production consistent with limiting global warming to 1.5°C, is expected to become wider with time unless action is taken now (figure 14).⁶³ If countries continue with their current oil and gas production plans, by 2030, they

⁶² Climate Action 100+, “Net Zero Company Benchmark”, 2021.

⁶³ UNEP, Stockholm Environment Institute (SEI), International Institute for Sustainable Development (IISD), Overseas Development Institute (ODI) and E3G, *The Production Gap*, 2021.

will produce 57 per cent more oil and 71 per cent more gas than would be consistent with limiting global warming to 1.5°C.

► **Figure 14. Global fossil fuel production and focus on oil and gas production, 2020–40**



Source: UNEP, SEI, IISD, ODI and E3G, *The Production Gap*.

2.1.4. Rebalancing energy investments for a just transition

64. Energy investments are key to getting the world on a net-zero pathway, to spur economic recovery, to relieve the pressure of high energy costs on consumers, to combat inflation, to create jobs and to reduce energy dependence. The IEA notes that governments, companies and investors currently face a complex situation as they decide which energy projects to back, with urgent short-term needs not automatically aligned with long-term goals, and in light of the looming problem of stranded oil and gas asset liabilities.⁶⁴
65. The IEA estimates that world energy investment is set to rise over 8 per cent in 2022 to reach a total of US\$2.4 trillion, which is well above pre-COVID levels. After remaining flat for several years, annual clean energy investments are expected to exceed US\$1.4 trillion in 2022. Since investments in renewable energy generally generate more jobs than investments in fossil fuels, this has the potential to generate much needed green jobs, provided the right policies and protections are in place. However, it should be noted that the rise in clean energy investments has been concentrated in advanced economies and China, and is leaving developing economies behind.⁶⁵
66. According to the IEA, global investment in fossil fuels is also set to rise in 2022 but remains below pre-pandemic levels. It is not yet clear whether the current environment of high energy prices will attract new investments in capital-intensive oil and gas projects with long lead times. It is noteworthy, however, that G20 countries have allocated more than US\$300 billion in new fossil fuel investments since the beginning of the COVID-19 pandemic, which is more than they have toward clean energy.⁶⁶ In early 2022, an investigation identified 195 large oil and gas projects that are generating or will generate at least a billion tonnes of CO₂ emissions each during their lifetime.⁶⁷
67. What is clear is that a secure, just and affordable energy transition relies on a massive scale-up of investment in clean energy infrastructure and production, including from countries and

⁶⁴ IEA, *World Energy Investment 2022*, 2022.

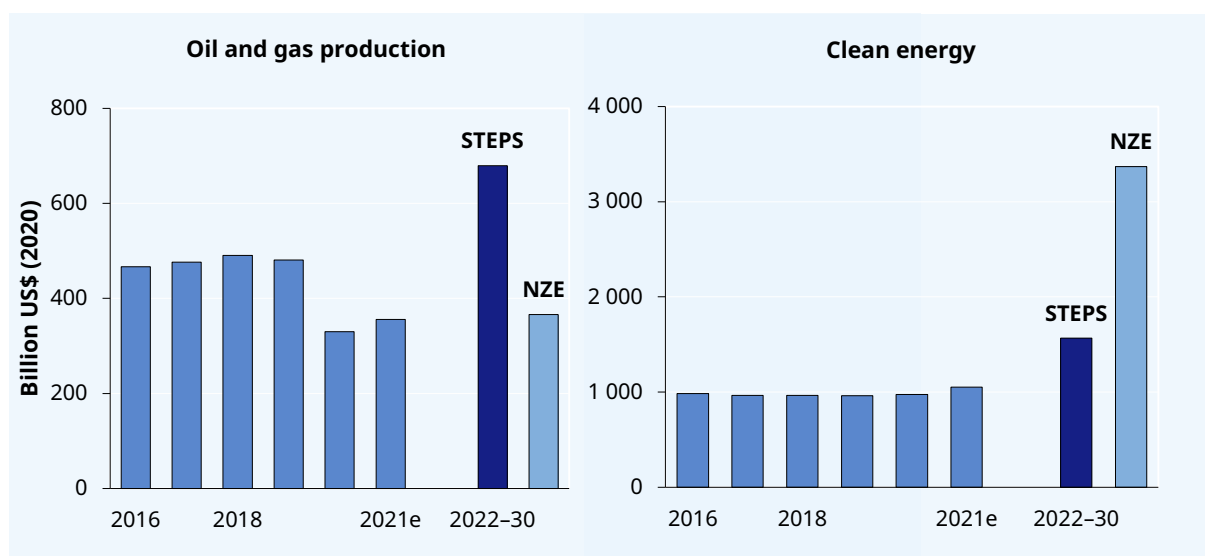
⁶⁵ IEA, *World Energy Investment 2022*.

⁶⁶ UNEP, SEI, IISD, ODI and E3G, *The Production Gap*.

⁶⁷ Matthew Taylor, "Environmentalists Join Forces to Fight 'Carbon Bomb' Fossil Fuel Projects", *The Guardian*, 6 June 2022.

companies that are currently producing oil and gas. Global investment in clean energy in 2021 was well below the levels needed by 2030 to reach the goals of the IEA’s Net Zero Emissions (NZE) by 2050 scenario, which sets out a road map to a 1.5°C stabilization in rising global temperatures and the achievement of other energy-related Sustainable Development Goals. Global investment in clean energy is also lower than the Stated Policy Scenario (STEPS), which captures the measures that governments have already put in place or that are under development to combat climate change (figure 15).

► **Figure 15. Investment in oil and gas production and clean energy in the Stated Policies scenario (STEPS) and Net Zero Emissions by 2050 scenario (NZE)**



Source: IEA, *World Energy Outlook, 2021*.

68. There are many parts of society that need to work together to deliver a new global energy economy that is safer and more sustainable than the one we have today, but governments have the unique ability to act and to guide the actions of others, including the oil and gas industry. This includes green fiscal stimulus packages to counterbalance the current high-level financial support to fossil fuel projects, innovative financing solutions that aim to stimulate the economy with environmental objectives in mind, and the implementation of coherent policy frameworks that enable business mitigation towards sustainable oil and gas production.
69. In this regard, the financial sector can play an important role in ensuring alignment with the objectives of the Paris Agreement, including through sustainable lending with environmental, social and governance (ESG) performance standards.⁶⁸ ESG investing is rapidly becoming one of the most visible and durable megatrends in the oil and gas industry as momentum builds behind efforts to promote renewables, sustainability and the energy transition, at least in some markets.⁶⁹ Several organizations, including IPIECA and the American Petroleum Institute, support their members in implementing ESG initiatives and sustainability reporting.
70. At the same time, and mirroring many countries’ sustained investments in fossil fuels, recently published data revealed that the world’s 60 largest banks continue to invest in fossil fuel

⁶⁸ Lexology, “The Future of Lending to the Oil and Gas Sector”, 22 July 2021.

⁶⁹ Opportune, “Q&A: Why ESG Investing Will Impact Oil & Gas Landscape in 2021”.

companies, in the amount of US\$742 billion in 2021.⁷⁰ North American brands dominate in that sphere, while European banks provided around US\$33 billion in loans and other financing mechanisms to 50 companies with significant oil and gas expansion plans.⁷¹

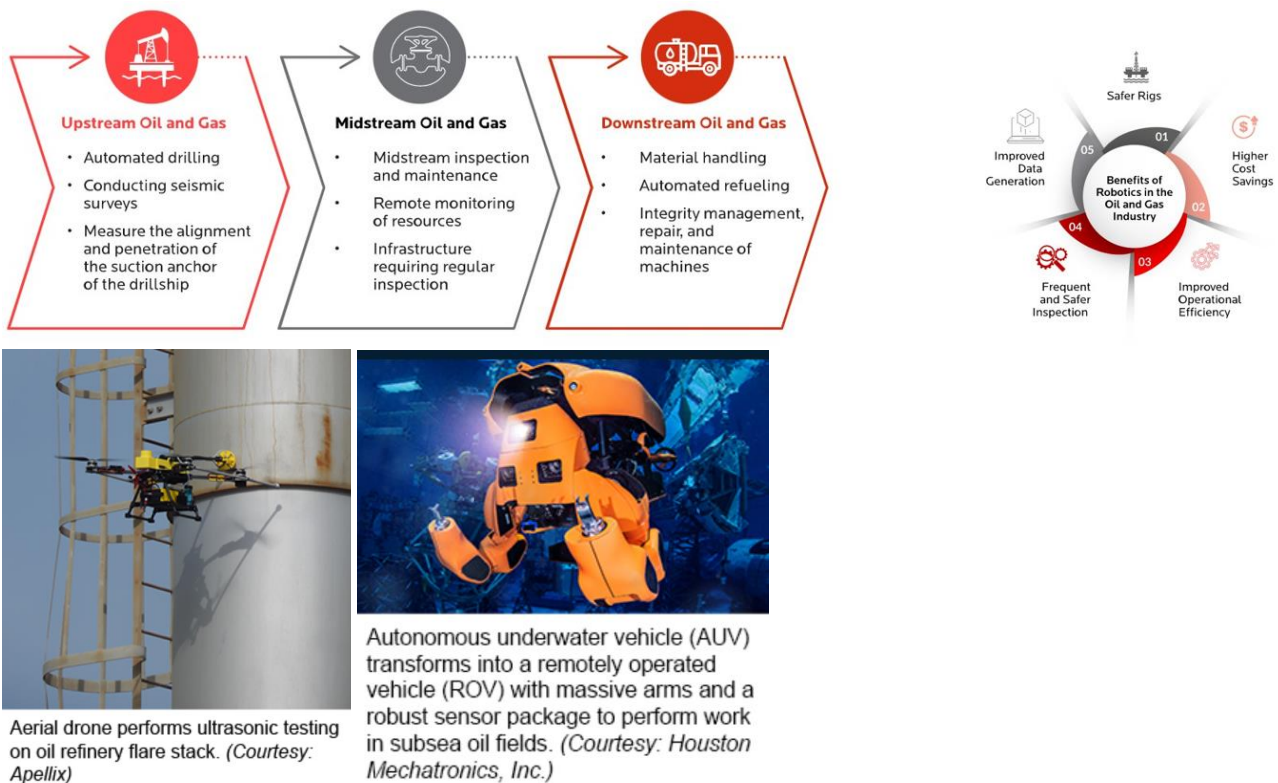
2.2. Technological advances

71. The oil and gas industry has been at the forefront of technological advances for the past century. It is capital-intensive, applies state-of-the-art technology and is highly automated. Still, the industry continues to invest in automation, robotics, digital connectivity and supply chain management to optimize operations and maintenance and drive down production costs. Investments in research and development (R&D) and innovation are also driven by the need to reduce GHG emissions and increase resource efficiency across the supply chain.

2.2.1. Robotics and automation

72. Robots are increasingly used all along the industry supply chain and across all segments of oil and gas production (figure 16). Applying robotics and automation leads to increased productivity, safety, operational efficiency and cost savings, but can also lead to job losses.

► **Figure 16 Application and illustration of robotics in the offshore oil and gas industry**



Source: Birlasoft, “The Essential Guide: How to Transform Oil & Gas Industry with Robotics”.

73. Drilling is a major expense in oil and gas production, representing between 20 and 30 per cent of total production costs. Automated drilling technologies not only have the potential to increase

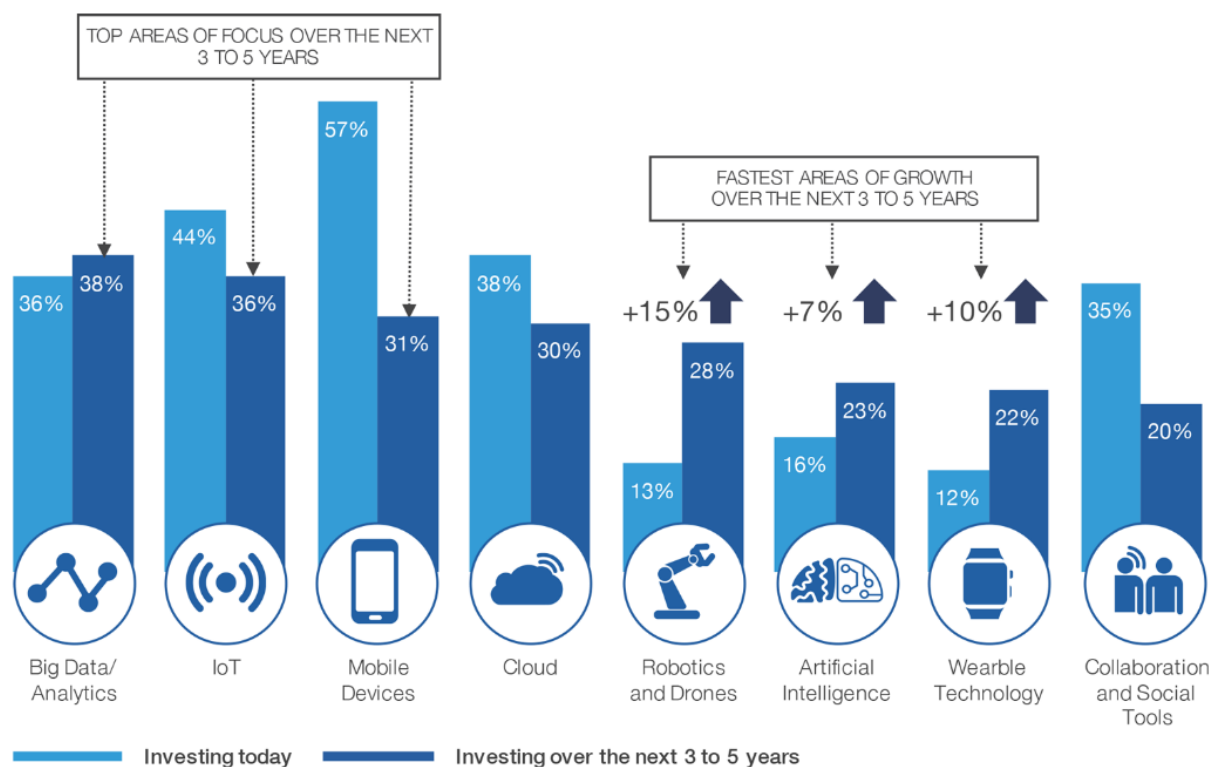
⁷⁰ Simon Jessop, “World’s Top Banks Pumped \$742 bln into Fossil Fuels in 2021 – Report”, *Reuters*, March 2022; Reclaim Finance, “New Report: World’s Biggest Banks Continued to Pour Billions into Fossil Fuel Expansion in 2021”, Press Release, March 2022.

⁷¹ Jasper Jolly, “Europe’s Biggest Banks Provide £24bn to Oil and Gas Firms despite Net Zero Pledges”, *The Guardian*, February 2022.

drilling speed and reduce the time a drilling rig is idle but can also reduce human error while lifting drill pipes, assembling the drill string, and moving tools on the rig floor.⁷²

- 74. Unmanned aerial vehicles (UAVs), commonly known as drones, are increasingly used to inspect assets, improve the safety of operations and detect methane leaks. UAVs with high-resolution sensors and cameras collect visual data on the condition of rigs, platforms, tanks, columns, elevated structures, and other assets, which is key to more intelligent and cost-efficient maintenance. Meanwhile, aquanautic subsea robots are increasingly deployed to assess the condition of oil and gas assets underwater.⁷³ According to the World Economic Forum (WEF), the fastest areas of investment growth over the next 3–5 years in the oil and gas industry will be robots and drones (figure 17).

► **Figure 17. Investments in digital technologies in the oil and gas industry, 2021**



Source: WEF, “Robots and Drones: Automation on the Rise”, 2018; Association for Advancing Automation, “Deep Dive: Robotics in Oil & Gas, Improve Safety and Productivity”, 19 October 2020, accessed on 5 May 2022.

2.2.2. Digitalization

- 75. The oil and gas industry has been an early adopter of digital technologies since the 1970s, notably in upstream activities. Today, the industry is an integral part of a new and emerging era of digitalized energy production, which have the potential to make energy systems around the world more connected, intelligent, efficient, reliable and sustainable.⁷⁴

⁷² Ferry Grijpink et al., “How Tapping Connectivity in Oil and Gas can Fuel Higher Performance”, *McKinsey & Company*, 6 November 2020.

⁷³ Association for Advancing Automation, “Deep Dive: Robotics in Oil & Gas, Improve Safety and Productivity”.

⁷⁴ IEA, *Digitalization and Energy*, November 2017.

- 76.** In the oil and gas industry, digital technologies facilitate faster decision-making processes, more efficient operations and predictable performance. The industry has, for instance, harnessed a host of different sensors, the Internet of Things (IoT), big data and artificial intelligence (AI) to manage massive amounts of data and information. AI is also used to handle large levels of data, predict trends, manage stock levels, and improve operations while increasing productivity and cost-efficiency. The use of digital technologies is estimated to boost technically recoverable oil and gas resources by about 5 per cent globally while decreasing the industry's production costs by 10–20 per cent.⁷⁵
- 77.** The new frontiers for deploying digital technologies in the industry are digital connectivity and so-called smart oil and gas fields. McKinsey & Company estimates that digitally enabled drilling optimization and automation, production automation, enhanced field operations, digitally enabled logistics, and smart maintenance could contribute up to US\$250 billion in incremental value to global GDP by 2030.⁷⁶ Many oil and gas companies invest heavily to stay at the forefront of this digital transformation. A large Chinese company, for instance, has set up plans to facilitate industrial transformation and upgrading by focusing on building smart oil and gas fields.
- 78.** The digitalization of the industry offers new opportunities for technology companies that can offer new products and services. Occupations throughout the industry will be shaped by these new technologies and the increasingly rapid growth of data. This is increasing the demand for highly skilled workers with science, technology, engineering and mathematics (STEM) backgrounds, who are trained in information and communications technology (ICT) and who can respond to new opportunities and the volatility of technological disruption (see section 3.1.4).
- 79.** However, the new digital technologies are not evenly distributed across the oil and gas industry or its supply chains. The high demand for digital solutions has resulted in global supply shortages, forcing key industry stakeholders to increase their collaboration with third-party suppliers. Cybersecurity and data privacy are furthermore emerging as key issues that the industry and oil and gas workers will address in the future.⁷⁷

2.2.3. Technologies to reduce industry emissions

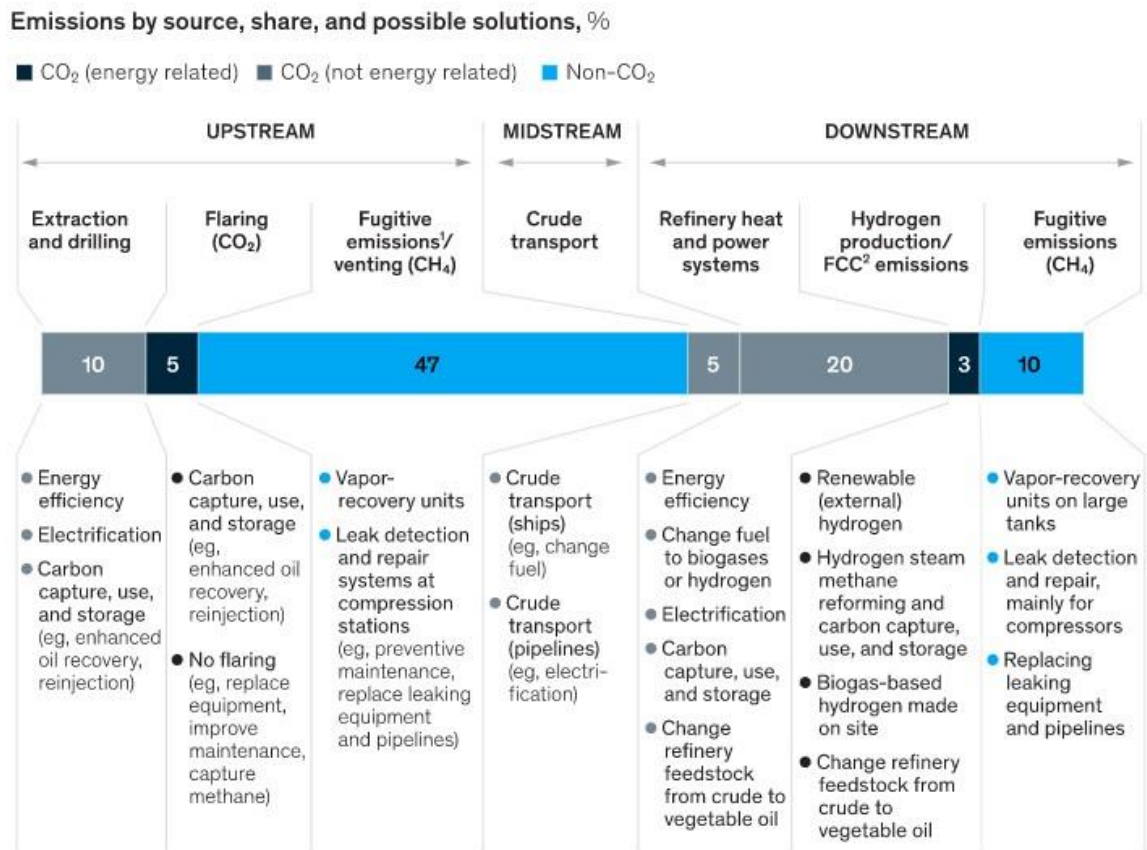
- 80.** The need to reduce GHG emissions and increase resource efficiency has driven industry-wide innovation in clean energy and resource-efficient technologies and a search for greener products. The most common technological solutions that the industry is pursuing to reduce emissions are captured in figure 18.

⁷⁵ IEA, *Digitalization and Energy*.

⁷⁶ Grijpink et al., "How Tapping Connectivity in Oil and Gas can Fuel Higher Performance".

⁷⁷ WEF, *Advancing Supply Chain Security in Oil and Gas: An Industry Analysis*, August 2021.

► Figure 18. Oil and gas emissions by source, share and possible solutions, 2018



¹Fugitive emissions from midstream are included in upstream (~20% of total oil and gas emissions, mainly methane) to be consistent with IEA *World energy outlook 2018* classification.

²Fluid catalytic converter.

Source: World 2018 CO₂ and SF₆ emissions from fuel combustion, Organisation for Economic Co-operation and Development (OECD) and IEA; world 2018 emissions of CO₂, CH₄, N₂O, hydrofluorocarbons, and perfluorinated compounds, OECD and IEA; Global Greenhouse Gases Emissions EDGAR v4.3.2, European Commission Joint Research Centre, July 2017, edgar.jrc.ec.europa.eu; *World energy outlook 2018*, IEA, November 2018, iea.org

Source: Chantal Beck et al., “The Future is Now: How Oil and Gas Companies Can Decarbonize”, *McKinsey & Company*, 7 January 2020.

81. In the upstream segment, the industry is pursuing the electrification of offshore platforms. The [Oil and Gas Authority](#) of the United Kingdom of Great Britain and Northern Ireland estimates electrification could cut platform emissions by 2–3 million tonnes by 2030, the equivalent of 20 per cent of today’s production emissions. ⁷⁸
82. Significant reductions could also be generated by cutting fugitive methane emissions and venting and by reducing flaring. The World Bank has estimated that flaring produced 400 million tonnes of GHG emissions in 2019 and has set up an initiative to end routine flaring by 2030. ⁷⁹ Many European companies have already committed to eliminating it by 2025. ⁸⁰
83. In the upstream segment, countries and companies are also exploring carbon capture, use and storage (CCUS) solutions, whereby CO₂ is captured at the power point or manufacturing facility, stored into geological formations, and then converted into products such as concrete, plastics and alcohol through chemical and manufacturing processes. The IEA has estimated that a wave

⁷⁸ Mehta, “Oil & Gas Industry Emissions Reduction Pledges under Scrutiny”.

⁷⁹ The World Bank, “Zero Routine Flaring by 2030 (ZRF)”.

⁸⁰ Mehta, “Oil & Gas Industry Emissions Reduction Pledges under Scrutiny”.

of new CCUS project announcements could push annual investment in CCUS up to US\$40 billion by 2024 (box 3).⁸¹

▶ Box 3. Carbon capture, use and storage (CCUS)

Carbon capture, use and storage can play a significant role in mitigating carbon emissions in the future and is a key technology for the decarbonization of the energy sector in the long-term. A large project in China will capture up to 1 Mt CO₂ per year from refineries. In the United States, nearly 50 new carbon capture projects in the industry and fuel transformation sectors were announced between January 2020 and August 2021. In the North Sea, a partnership between leading European oil and gas companies is developing offshore CO₂ storage to support Norway's plans for a fully integrated industrial project. These are part of 120 new industrial CCUS projects in recent years.

CCUS has been discussed at least since the United Nations Framework Convention on Climate Change (UNFCCC) was negotiated and eventually adopted by the Earth Summit in Rio de Janeiro in 1992. Because it relates to the future of oil and gas, however, and the key role the industry plays in several countries, CCUS remains a divisive issue today. Opponents claim that CCUS could legitimize the continued use of fossil fuels and undermine existing commitments to reduce emissions. Greenpeace argues that CCUS will keep the world dependent on fossil fuels.

Furthermore, there are concerns about potential carbon leakage from storage sites or transmission pipelines. The large amount of energy needed to capture and store carbon, the so-called energy penalty, is also a concern, particularly if that energy comes from fossil fuels. A study by the Institute for Energy Economics and Financial Analysis of 13 CCUS projects found that seven underperformed, two failed and one was stopped.

Finally, Sir David Attenborough reminds us that nature itself is a CCUS system, which has been developed over hundreds of millions of years, and which can and should be boosted by ending deforestation, rewilding nature and restoring biodiversity.

Source: UNFCCC, "Carbon Capture, Use and Storage"; IEA, "Carbon Capture, Utilisation and Storage"; The Oxford Institute for Energy Studies, "Carbon Capture and Storage: The Perspective of Oil and Gas Producing Countries", September 2021; David Attenborough, "A Life on our Planet".

84. In the downstream segment, GHG emissions can be reduced by changing the fuel and energy used to transport oil and gas to biofuels and renewable energy sources. Energy efficiency measures and clean energy solutions at refineries would also help reduce oil and gas production emissions significantly.
85. The majority of these initiatives concern scope 1 and 2 emissions in the oil and gas supply chains, and not scope 3 emissions that are more than 3 times larger. While some oil and gas companies argue that estimating GHG emissions beyond a company's direct operations involves an increased level of complexity, assumptions, and uncertainty, there is a global push for this data to be collected and shared. Financial institutions have begun pushing for enhanced disclosures and some countries, such as France and the United Kingdom, have passed emission reporting laws.⁸²

2.2.4. The search for new sources of products and energy

86. Experts and environmentalists are promoting the use of alternatives to oil and gas to create climate-neutral or climate-friendly products and energy.
87. Such products include plastics that are made from renewable, biodegradable sources, such as corn starch and cassava starch that can be used to make containers and biodegradable bags.

⁸¹ IEA, *World Energy Investment 2022*.

⁸² Matt Farmer, "COP26: What are Scope 3 Emissions and Why does Oil Hate Them?", *Offshore Technology*, 30 September 2021.

Oil-based paints can now be substituted by water-based acrylic alkyd paints made from recycled polyethylene terephthalate (PET), acrylics and soybean oil.⁸³

88. The main alternatives to oil and gas energy include biodiesel, bioalcohol (such as ethanol) and hydrogen (box 4), as well as nuclear, solar and wind power. Many oil and gas companies actively explore and invest in these alternative energy sources, and some have already converted themselves into energy companies in the process of doing so.

▶ Box 4. Hydrogen

Hydrogen (H₂) is an alternative fuel than can be produced from diverse domestic resources, such as water, hydrocarbons, and other organic matter. It is light, storable and energy-intensive, and does not produce direct carbon emissions nor GHGs.

Interest in hydrogen has increased sharply in recent years, particularly to diversify energy and transportation options, and also to help deliver deep emissions reductions across a wide range of hard-to-abate sectors. Low-carbon hydrogen is costly to produce, however, an investment in hydrogen comes with significant risk in the absence of assured supply and demand.

Oil and gas-producing countries have extensive experience in producing and handling hydrogen. However, only a fraction of this is low-carbon or green hydrogen (made by using clean electricity from surplus renewable energy sources to electrolyse water). The main ones are grey (created from natural gas or methane using steam methane reformation) or blue (produced from natural gas using steam reforming).

Source: IEA, *The Oil and Gas Industry in Energy Transitions*; Natalie Marchant, "Grey, Blue, Green – Why are There So Many Colours of Hydrogen?", *Agenda Weekly*, WEF, 27 July 2021.

2.3. Demographics

89. Demographic shifts are already influencing oil and gas demand and consumption patterns, which provide new opportunities and challenges for the industry and its workers.
90. The UN forecasts that the world's population will reach 8.5 billion in 2030 and exceed 9.7 billion by 2050. More than half of that population growth will be attributed to just nine countries, eight of them developing or emerging economies.⁸⁴ Sub-Saharan Africa is projected to have the highest growth rate, with the population of the region doubling by 2050.⁸⁵
91. Coupled with growing middle classes in many countries, these population increases will lead to an increased demand for energy in different parts of the world. According to the initial findings of the *International Energy Outlook 2021*, it is predicted that global energy use will increase by 50 per cent by 2050 compared to 2020 levels, primarily because of economic and population growth in non-OECD countries.⁸⁶ Unless these countries invest in clean energy sources now, the demand for oil and gas is likely to increase in the coming decades. This will deepen the world's dependency on oil and gas and put additional pressure on global markets for these commodities.
92. Future demand for oil and gas, however, also depends on changing consumer preferences and technological advances in other industries, including automotive and electronics. The

⁸³ American Chemical Society (ACS), "Green Chemistry Examples".

⁸⁴ In descending order of expected population increase, those nine countries are: India, Nigeria, Pakistan, the Democratic Republic of the Congo, Ethiopia, the United Republic of Tanzania, Indonesia, Egypt and the United States.

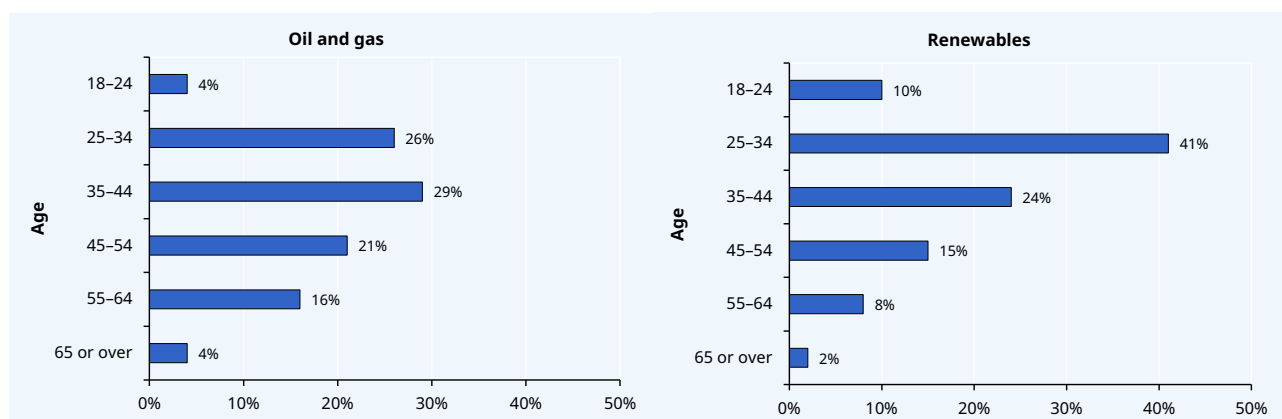
⁸⁵ UN Department of Economic and Social Affairs, *World Population Prospects 2019: Highlights*, 2019.

⁸⁶ EIA, *International Energy Outlook 2021*.

development of new batteries, for instance, and the increased use of electric vehicles, are expected to reduce the demand for diesel and petrol in the coming decades.

93. While youth bulges and demographic dividends will drive economic growth in many countries, others are ageing. The share of the working-age population (15–64 years) of the total population in Canada, Europe, the Russian Federation, the United Kingdom, the United States and other oil and gas-producing countries is increasing. This is the case in the oil and gas industry as well: the average age of oil and gas workers is already high, particularly when compared with renewables (figure 19).

► **Figure 19. Age demographics of oil and gas and renewable workers, 2022**



Source: Airswift, *The Sixth Annual Global Energy Talent Index*, GETI 2022.

94. The implications for the oil and gas industry are twofold: Firstly, a large share of the industries’ workers will be eligible for retirement in the near future. Secondly, the industry is already facing the challenge of attracting women workers (see section 3.5.3) as well as young workers who do not consider the oil and gas industry attractive due to its social and environmental impacts or who consider the perspective of promotion more important than high-entry wages in an industry that might eventually decline.⁸⁷

2.4. Globalization

95. Oil, gas and their derivative products are strongly influenced by the global economic outlook and oil and gas production and prices have a huge impact on the global economy in turn. The oil and gas industry is at the heart of the global production system, it is a key driver of economic growth, and therefore also a part of global debates about the direction and shape the global economy should take, and how to bring about sustainable development and a fair globalization.
96. In the oil and gas sector, global markets, international finance and highly globalized production, transportation and refinery networks coexist with resource nationalism, measures to develop domestic oil and gas industries, and policies to ensure energy independence. The number of international arbitrations in the extractives sector, which concern disputes between host governments and companies over the terms of their agreements, and which can be seen as a proxy for resource nationalism, tend to rise during commodity super cycles.⁸⁸

⁸⁷ Kevin Keane, “Oil and Gas Sector ‘Facing Skills Crisis’”, *BBC News*, 22 January 2019.

⁸⁸ Stevens, “The Role of Oil and Gas in the Development of the Global Economy”.

97. Geopolitics and oil and gas are inextricably linked. Wars, conflicts, trade wars and other threats to energy supply tend to drive oil and gas prices up, which was the case following the Russian Federation's aggression in Ukraine. Such geopolitical events can in the worst case lead to energy rationing and shutdowns across industries and regions, which have a negative impact on affected economies and the global economy as a whole. Security of supply concerns in turn tend to drive deep changes in the energy policies of oil and gas-importing countries, which is currently the case across Europe. The European Commission, for instance, has recently presented its REPowerEU Plan, which aims to end the EU's dependence on the Russian Federation's fossil fuels and to tackle the climate crisis.⁸⁹
98. As a result of the COVID-19 crisis and the Russian Federation's aggression in Ukraine, the past three years have been unpredictable and extremely volatile, even for the oil and gas industry, which has managed external shocks throughout its history. This is reflected in the price of crude oil which plummeted to an average of US\$39.68 in 2020 and rebounded to US\$100.28 in 2022.⁹⁰
99. As the world enters a new era of globalization, characterized by the return of geopolitics, trade turbulence and the impacts of a changing climate, the oil and gas industry will continue to be greatly affected. While these commodities will remain of key importance for our economies and societies and for how we live, produce and consume, it is becoming harder for the industry and for oil and gas workers to navigate an increasingly uncertain future.

⁸⁹ European Commission, "REPowerEU: A Plan to Rapidly Reduce Dependence on Russian Fossil Fuels and Fast Forward the Green Transition", Press Release, 18 May 2022.

⁹⁰ Macrotrends, "WTI Crude Oil Prices - 10 Year Daily Chart".

▶ Chapter 3. Challenges and opportunities for decent and sustainable work

100. This chapter examines the decent work challenges and opportunities that governments, employers and workers in the oil and gas industry are facing now and will be facing in their attempts to ensure a just transition to a future of work that contributes to sustainable development in its economic, social, and environmental dimensions.

3.1. Employment

3.1.1. Macroeconomic and growth policies

- 101.** While some countries with large oil and gas resources have benefited substantially from them, the economic performance of many oil exporters has been lower than expected. This has prompted some observers to ask whether oil and gas are a blessing or a curse.⁹¹
- 102.** The volatility of oil and gas prices can lead to several challenges, particularly for resource-rich countries, when formulating and implementing macroeconomic policies to ensure economic stability and growth. Volatile commodity prices can directly affect the economy by changes in the trade balance and exchange rates or by affecting government revenues related to oil and gas. This can in turn affect a country's ability to implement fiscal policies as well as its ability to finance and implement social programmes.⁹² In addition to price volatility, abundance of a particular resource could lead to a lack of economic diversification and might therefore impede a country's economic growth.
- 103.** As an example of how the price of oil and gas is redistributing wealth between oil and gas exporting and importing countries, the rapid growth in oil and gas prices since the Russian Federation's aggression in Ukraine began in February 2022 has doubled the export earnings of Norway and increased the import bill of India by some 50 per cent. Such rapidly growing oil and gas prices also generate spillover effects across other sectors of the economy, and has drastically increased the cost of transportation, manufacturing and heating, which in turn drives up inflation.
- 104.** The complexity of these challenges depends on the extent of oil and gas dependence of each country, for example through fiscal revenues and exports, and on the stage of development of the oil and gas industry. Ethiopia, Mauritania, Mozambique, Senegal, the United Republic of Tanzania and Uganda are examples of relatively new producers where the oil and gas sector is being developed, and where oil and gas revenues are expected to grow in the future, whereas Yemen's oil resources will be depleted in the coming years. It also depends on the financial position and public debts of governments, which vary considerably, as well as on the ownership of the oil and gas sector.⁹³ To better manage the exhaustibility of oil resources and the unpredictability of oil prices, some countries have established oil revenue funds to stabilize the economy and provide inter-generational redistribution of oil wealth (box 5).

⁹¹ J.M. Davis, R. Ossowski and A. Fedelino, eds, *Fiscal Policy Formulation and Implementation in Oil-Producing Countries* (Washington, DC: IMF, 2003).

⁹² Elva Bova, Paulo Medas, and Tigran Poghosyan, "Macroeconomic Stability in Resource-rich Countries: The Role of Fiscal Policy", IMF Working Paper WP/16/36, February 2016.

⁹³ Davis, Ossowski and Fedelino, *Fiscal Policy Formulation and Implementation in Oil-Producing Countries*.

▶ **Box 5. Oil revenue funds**

The best known oil revenue fund is perhaps the Norwegian Government Pension Fund Global, also known as the Oil Fund, which was established in 1990 to invest the surplus revenues of the Norwegian petroleum sector. It has over US\$1.19 trillion in assets and holds 1.5 per cent of all shares of the world's listed companies, making it the world's largest sovereign wealth fund.

Source: Norges Bank Investment Management, "[About the Fund](#)".

- 105.** Macroeconomic and growth policies that promote full, productive and freely chosen employment and decent work are key to addressing these challenges. These policies are not only critical to harnessing the potential of the oil and gas industry in support of national development but also to ensuring a just transition towards environmentally sustainable economies and societies for all. Such policies should be developed by governments in consultation with employers' and workers' organizations, they should encourage a self-reinforcing cycle of productivity-enhancing investment, stable and sustained economic growth, sustainable enterprises and quality jobs, and they should align with social and environmental objectives set out in national development plans and nationally determined contributions (NDCs).⁹⁴
- 106.** The successful implementation of macroeconomic and growth policies that promote full, productive and freely chosen employment and decent work depends to a large extent on the capacity and integrity of key labour market institutions. While strong democratic institutions can support more efficient management of natural resources, there are signs that "even consolidated democracies may not be immune to at least some aspects of the resource curse".⁹⁵
- 107.** To reduce the social and environmental footprint of oil and gas production, there is a need for a new generation of macroeconomic and growth policies that to a greater extent align economic growth with social objectives and with the goals of the Paris Agreement and NDCs. To promote decent work and a just transition, these policies should be aligned with international labour standards and complemented by the types of policies, regulations, instruments and incentives that are set out in the ILO *Guidelines for a just transition*, and be formulated and implemented in consultation with the social partners.

3.1.2. Industrial and sectoral policies

- 108.** Many oil- and gas-producing countries have developed policies and strategies to develop the oil and gas sector and to maximize its contribution to economic growth and social objectives. This includes but is not limited to policies to attract foreign direct investment and to local content policies to encourage the participation of domestic enterprises and workers.
- 109.** In Nigeria, for example, the Government has formulated a National Petroleum Policy (NPP) that aims to transform oil production into national economic growth and not just a source of income. One of the pillars of this policy is the establishment of a fiscal framework that aims to "attract investment, facilitate the determination of petroleum products based on market rules, and ensure cost efficiency and sustainability in the long run".⁹⁶

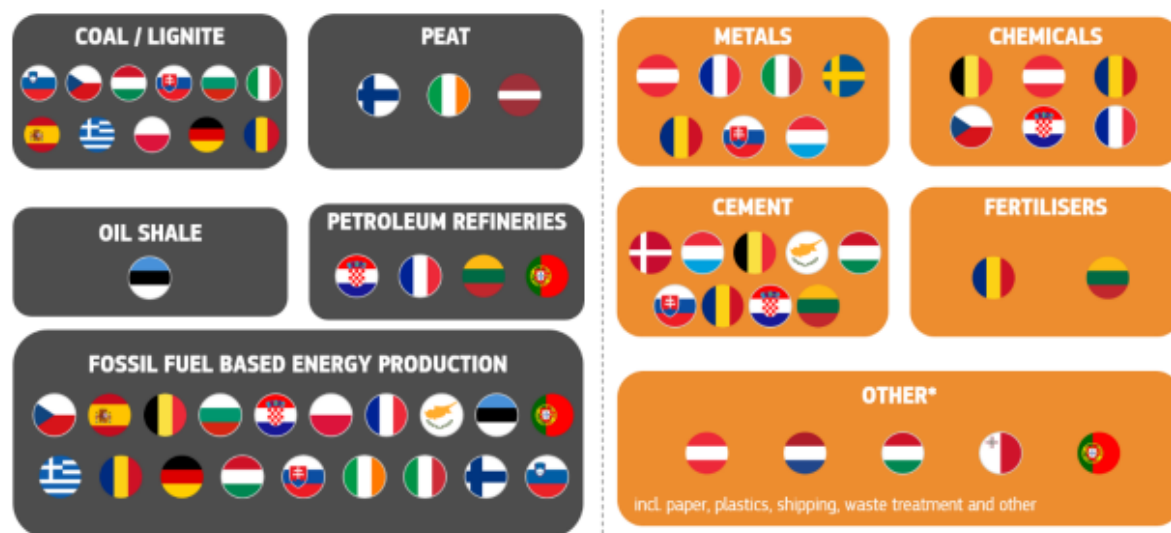
⁹⁴ ILO, "Rethinking Macroeconomic Policies for Full Employment and Inclusive Growth: Some Elements", ILO Working Paper No. 238, 2017.

⁹⁵ Anar K. Ahmadov and Farid Guliyev, *Tackling the Resource Curse: The Role of Democracy in Achieving Sustainable Development in Resource-Rich Countries* (International IDEA, March 2016).

⁹⁶ KPMG, "The National Petroleum Policy (NPP)", August 2017.

- 110. Elsewhere, in Brazil, the exploration and production of oil and gas has been the object of policies since the 1950s that have ensured the sector’s centre-stage role in national development. From the late 1990s the Government put in place a Value Chain Development Policy of the Oil and Natural Gas Industry that included a robust local content policy to promote the expansion and diversification of the national industrial park⁹⁷ and investments in research, development and innovation to access pre-salt oil reserves.⁹⁸
- 111. The oil and gas policies that were reviewed for this report did refer to some elements of the Decent Work Agenda, notably the generation of jobs and opportunities for domestic enterprises, but were silent on other aspects, including working conditions, gender equality and rights at work. More research is needed to understand whether and how representatives of workers and employers have contributed to the formulation and implementation of these policies.
- 112. These more traditional industrial policies for the oil and gas sector are progressively being replaced by policies and strategies for the broader energy sector with the aim of increasing the production of renewable energy and reducing the reliance on fossil fuels. As part of the European Green Deal, for example, the EU has set up the Just Transition Mechanism (JTM) with a fund that will invest €17.5 billion between 2021 and 2027 in the territories most affected by the transition.⁹⁹ Each individual Member State is preparing its own territorial just transition plan. Declining sectors that need to be supported by effective policies in the EU have already been identified (figure 20), including the oil shale industry where it is estimated that 6,000 people are employed besides the numerous indirect jobs created by the industry. The ILO *Guidelines for a just transition* contain important principles and guidance that can be applied to the development and implementation of industrial policies for the oil and gas sector as well as for the broader energy sector.

► **Figure 20. Declining (in grey) and transforming sectors (in orange) identified in the Annexes D of the European Semester country reports of February 2020**



Source: European Commission, “Commission Staff Working Document on the Territorial Just Transition Plan”, 2021.

⁹⁷ Ricardo José dos Santos and Ana Paula Macedo de Avellar, “Policies to Support the Oil and Gas Industry in Brazil: A Study of Public Actions to Develop the Value Chain”, *Economia e Sociedade* 26, No. 3 (2017): 721–750.

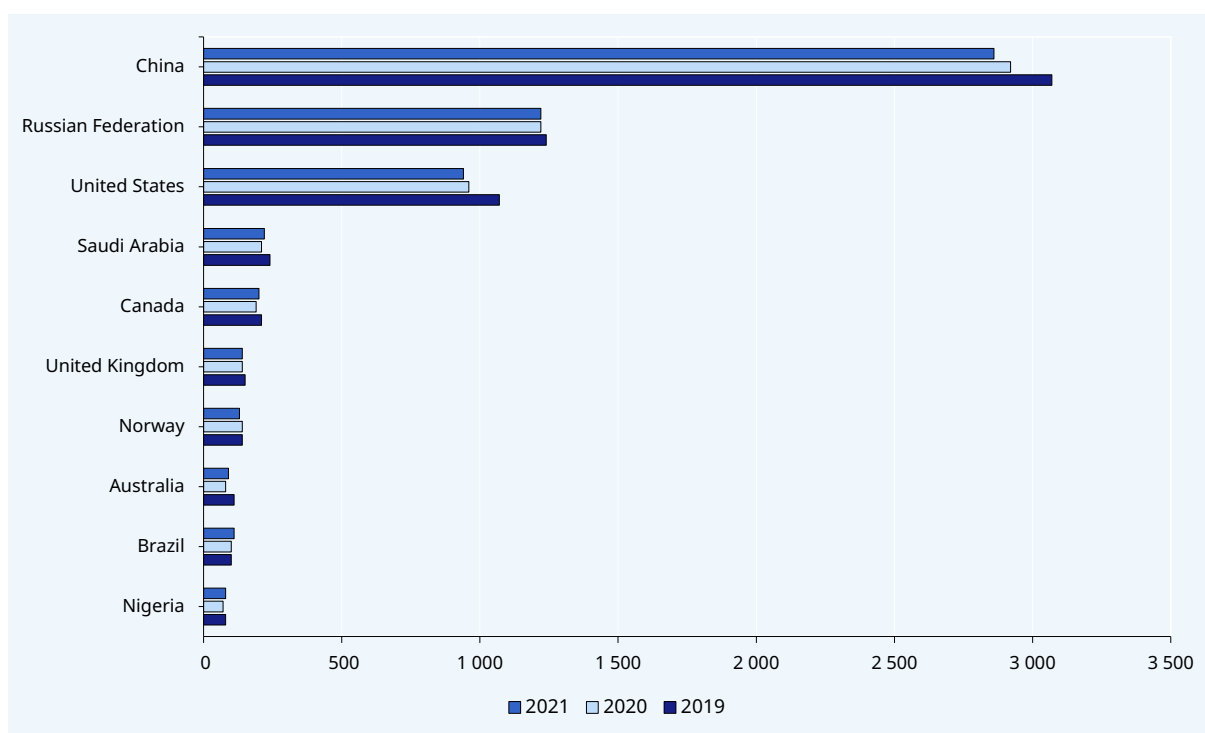
⁹⁸ Rosélia Périssé da Silva Piquet and Marlúcia Junger Lumbreras, “Changes in the Path of Brazilian Oil Policy”, *Revista Política e Planejamento Regional* 7, No. 3 (2020): 246–266.

⁹⁹ European Commission, “The Territorial Just Transition Plans”, 23 September 2021.

3.1.3. Job creation, transformation and losses

- 113. While the oil and gas industry is a key contributor to many countries’ economic growth, it is highly capital-intensive and automated, and therefore not a large direct employer.
- 114. Employment in the sector is furthermore highly cyclical. Large numbers of workers are recruited during booms in oil and gas exploration and extraction, particularly during the construction of new oil and gas infrastructure, but then laid off during the inevitable “bust” periods that follow.¹⁰⁰
- 115. These bust periods have in recent times been compounded by external shocks. When the COVID-19 crisis drastically reduced oil and gas demand, for instance, hundreds of thousands of oil and gas jobs were lost in China, the Russian Federation and the United States (figure 21). These job losses are challenging for many countries and companies to manage, particularly countries without inclusive, robust and sustainable social protection systems and active labour market policies in place.

► **Figure 21. Estimated number of oil and gas industry employees worldwide from 2019 to 2021, by country (in thousands)**



Source: Statista, “Estimated number of oil and gas industry employees worldwide from 2019 to 2021, by country 2021”.

- 116. Such job losses, however, are small relative to the jobs that will be lost or transformed as the world shifts from fossil fuels to renewable sources of energy. ILO research estimates that the transition to sustainable energy sources will lead to a strong decline in demand for workers in the oil and gas sector by 2030, particularly in petroleum refinery (-1.6 million jobs) and in extraction of crude petroleum and service related to crude oil extraction (-1.4 million jobs) (table 2).¹⁰¹

¹⁰⁰ S. Landsberger, “Addressing Cyclical Unemployment in the Oil Industry”, *IC² University of Texas Blog*, 25 January 2021.

¹⁰¹ ILO, *World Employment and Social Outlook 2018*.

► **Table 2. Sector most affected by the transition to sustainability in the energy sector**
(in millions of jobs)

Industries set to experience the highest job demand growth (absolute)		Industries set to experience the strongest job demand decline (absolute)	
Sector	Jobs (millions)	Sector	Jobs (millions)
Construction	6.5	Petroleum refinery	-1.6
Manufacture of electrical machinery and apparatus	2.5	Extraction of crude petroleum and services related to crude oil extraction, excluding surveying	-1.4
Mining of copper ores and concentrates	1.2	Production of electricity by coal	-0.8
Production of electricity by hydropower	0.8	Mining of coal and lignite, peat extraction	-0.7
Cultivation of vegetables, fruit, nuts	0.8	Private households with employed persons	-0.5
Production of electricity by solar photovoltaics	0.8	Manufacture of gas, distribution of gaseous fuels through mains	-0.3
Retail trade, except of motor vehicles and motorcycles; repair of personal and household goods	0.7	Extraction of natural gas and services related to natural gas extraction, excluding surveying	-0.2
Industries set to experience the highest job demand growth (%)		Industries set to experience the strongest job demand decline (%)	
Sector	Jobs (%)	Sector	Jobs (%)
Production of electricity by solar thermal energy	3.0	Production of electricity by coal	-0.19
Production of electricity by geothermal energy	0.4	Extraction of crude petroleum and services related to crude oil extraction, excluding surveying	-0.11
Production of electricity by wind	0.4	Extraction, liquefaction, and regasification of other petroleum and gaseous materials	-0.11
Production of electricity by nuclear energy	0.3	Petroleum refinery	-0.08
Production of electricity by biomass and waste	0.3	Manufacture of gas, distribution of gaseous fuels through mains	-0.05
Production of electricity by solar photovoltaics	0.3	Mining of coal and lignite, peat extraction	-0.03
Production of electricity by hydropower	0.2	Extraction of natural gas and services related to natural gas extraction, excluding surveying	-0.03

Source: ILO, *World Employment and Social Outlook 2018*.

117. The research also shows that new jobs will be created in the broader sustainable energy sector. At the regional level, there will be net job creation in the Americas, Asia and the Pacific and Europe, representing some 3 million, 14 million and 2 million jobs respectively, resulting from measures taken in the production and use of energy. In contrast, there could be net job losses in the Middle East (-0.48 per cent) and Africa (-0.04 per cent) if current trends continue, due to the dependence of

these regions on fossil fuel and mining, respectively. These shifts will not be automatic, however, and require concerted efforts by governments and employers’ and workers’ organizations to manage in order to ensure that no one is left behind (box 6).

► **Box 6. Oil and gas workers in transition**

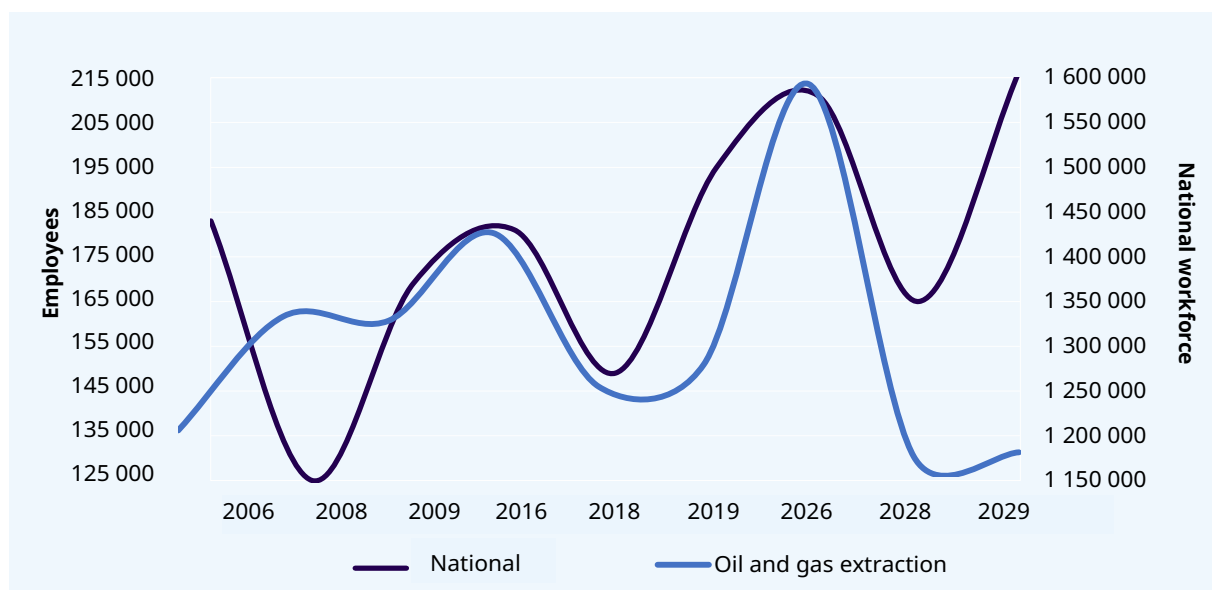
In Scotland, oil and gas workers have been vocal about needing support to find green jobs. It is estimated that 120,000 people in the United Kingdom work for offshore oil and gas producers but announcements of companies pulling out of new oil fields in the region have generated uncertainties about job security in the industry. Despite government promises of investments in just transition solutions, there is little concrete action to help workers move to other jobs in renewables.

Workers in Canada are similarly looking to transfer to different sectors. Since 2019, upskilling projects in the province of Alberta have been training oil and gas sector professionals for IT jobs available in fields such as data science, software development and cybersecurity.

Source: Madeleine Cuff, “*Cambo Oil Field: Oil and Gas Workers Need More Help to Find Green Jobs, Experts Warn*”, *iNews*, 4 December 2021; and Julius Melnitzer, “*Energy Workers Switch to Other Professions in Drove as Work Dries Up in Once Booming Sector*”, *Financial Post*, 4 January 2022.

118. While such global estimates are based on assumptions that can be disputed, the trend towards lower oil and gas employment is backed up by historical data from the EU and employment projections for the United States. In the EU, the depletion of oil and gas resources and policies to phase out fossil fuels have resulted in a decline of direct employment in oil and gas extraction between 2008 and 2017, from 98,000 jobs in 2008 to 60,500 jobs in 2018.¹⁰² In the United States, an outlook study based on data from the United States Bureau of Labor Statistics shows that over a 10-year period jobs in the sector are estimated to fall by 13.6 per cent while national jobs growth is expected to reach 7.66 per cent (see figure 22).¹⁰³

► **Figure 22. Projected 10-year job growth in the number of jobs for oil and gas extraction in the United States**



Source: DATA USA, “Data USA: Oil and Gas Extraction”, 2014.

¹⁰² Eurostat, “Employment by sex, age and detailed economic activity (from 2008 onwards, NACE Rev. 2 two digit level) – 1 000”.

¹⁰³ DATA USA, “Data USA: Oil and Gas Extraction”, 2014.

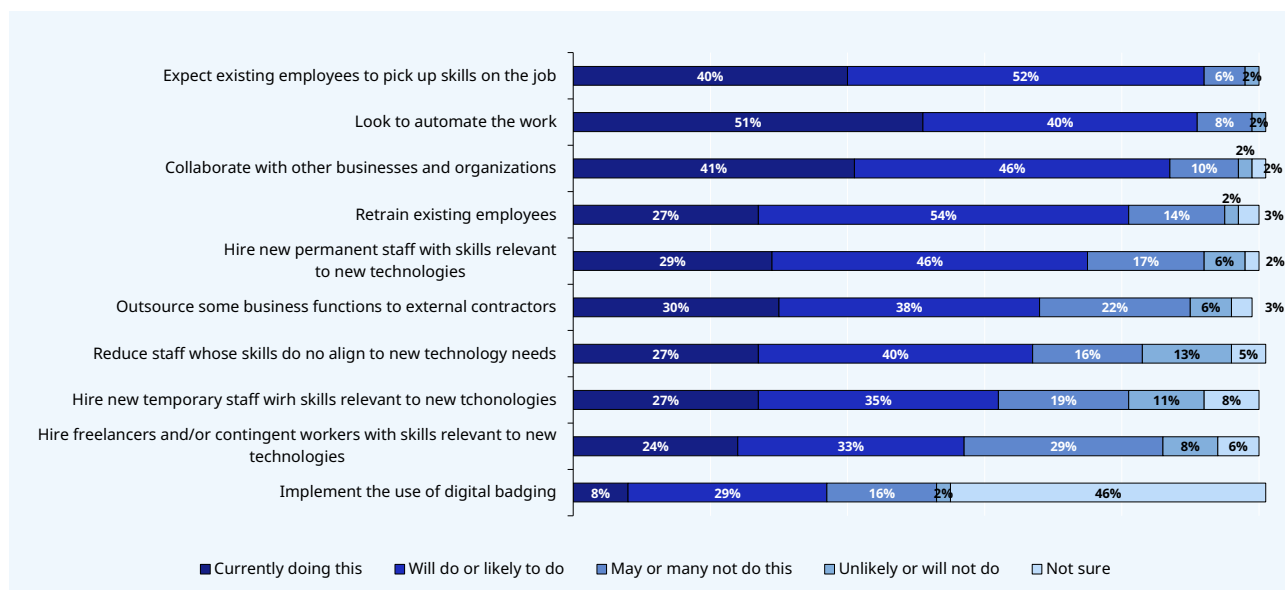
119. These projected global job losses in the oil and gas industry might partly be offset by an increase in employment in countries that are actively developing and expanding their oil and gas industry, particularly in the construction phase, and less so in the production phase where digital and automated technologies will continue to reduce the dependence on manual labour. However, the global employment trend in the oil and gas industry will likely be further downwards in the medium to long-term. This calls for the implementation of policies and measures set out in the ILO *Guidelines for a just transition* to ensure displaced oil and gas workers can transition to employment opportunities in renewable energy and other more labour-intensive green growth sectors of the economy.

3.1.4. Skills needs, mismatches now and in the future

120. The oil and gas industry has been at the forefront of technological developments and has for decades relied heavily on high-skilled workers. The industry is accustomed to addressing skills mismatches in highly specialized occupations, to closing the skills gaps by competing for global talent, and to investing in the re- and upskilling of workers.

121. Oil and gas companies are currently pursuing a variety of different strategies to address changing skills needs in the industry (figure 23).

► **Figure 23. Strategies used by companies to address changing skills needs**



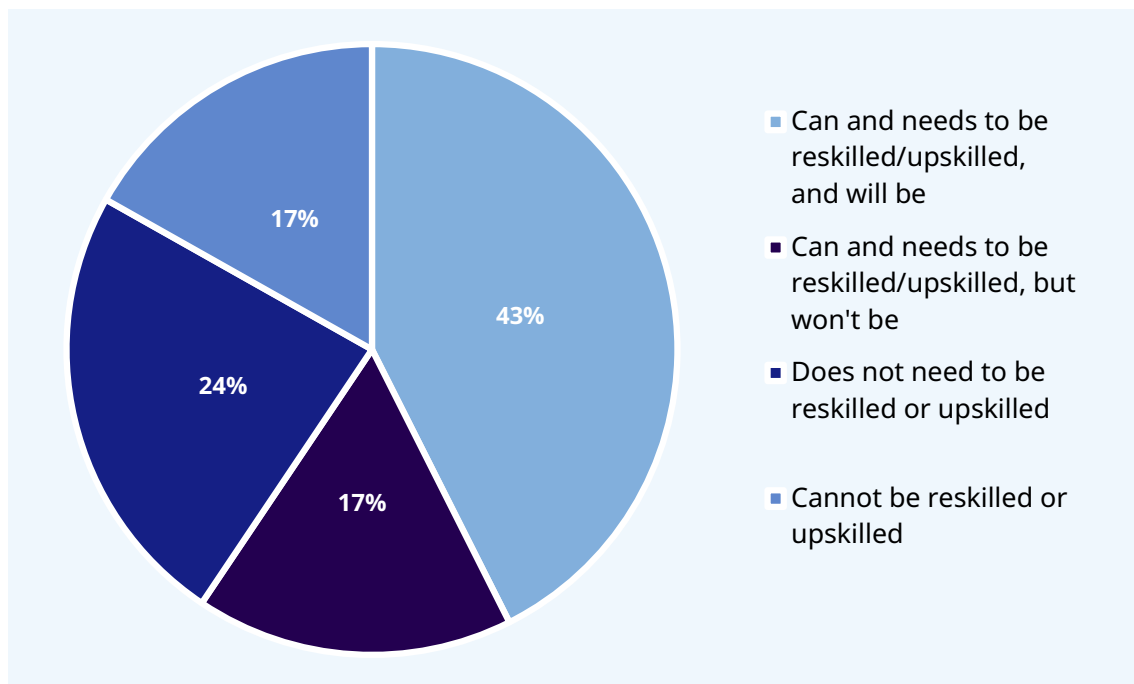
Source: Ernst & Young (E&Y), *How do you Reshape when Today's Future may not be Tomorrow's Reality? Oil and Gas Digital Transformation and the Workforce Survey 2020*, 2020

122. However, the industry's challenges in the area of skills development are becoming increasingly complex to manage. This is mainly due to increasingly complex regulatory compliance mandates, an ageing workforce that will take critical skills and experience with them when workers retire, difficulty in attracting young talent, competition for talent within the broader energy sector and other growth sectors, and the need to improve production rates while reducing environmental impacts and safety accidents. According to PricewaterhouseCoopers (PwC), the skills pipeline is a major concern for more than 60 per cent of energy CEOs. Opito, the industry training body, and

the Engineering Construction Industry Training Board report that over half of firms in the oil and gas sector see the skills shortage as their number one challenge.¹⁰⁴

- 123.** According to an analysis by E&Y, oil and gas companies estimate that at least 43 per cent of workers will need to be reskilled (figure 24) and that it might take up to ten months to reskill or upskill the average worker. The analysis also highlights that up to 17 per cent of workers cannot be reskilled or upskilled. This requires urgent pre-emptive action to facilitate transitions for these workers and ensure that no one is left behind.

► **Figure 24. Workforce in need of reskilling or upskilling**

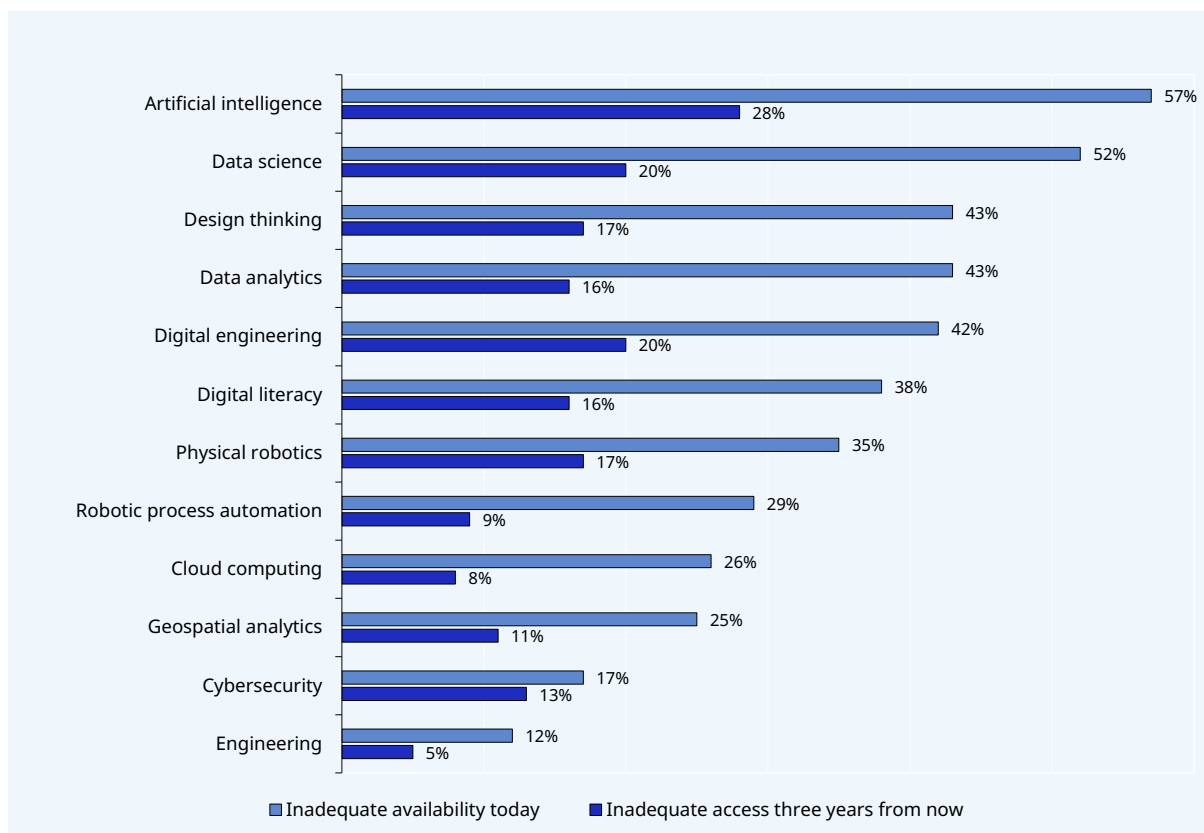


Source: E&Y, *How do you Reshape when Today's Future may not be Tomorrow's Reality?*

- 124.** The competition for high-skilled workers is becoming even more accentuated as the energy sector continues to evolve and share skill sets with other industries. The technical skills held by geoscientists, electrical or chemical engineers, and engineering managers, for instance, are ever more in demand by other sectors. If these high-skilled workers decide to move to other industries, there would be further shortages in the oil and gas industry in the future.
- 125.** The digital transformation of the oil and gas industry has further accelerated the shortage of high-skilled workers. The industry is today competing with other industries for workers with STEM degrees and ITC skills that can operate the digital technologies of the future, such as AI, blockchain, IoT, big data and analytics, and more. Research by E&Y shows that the industry considers AI as one of the most important digital technologies but one where availability of skills is inadequate today and three years from now (figure 25).

¹⁰⁴ Andrew Speers, "Oil and Gas Industry Suffers Brain Drain", *Energy*, 17 May 2020.

► **Figure 25. Skill availability in 2020 and access to skills in the future**



Source: E&Y, *How do you Reshape when Today's Future may not be Tomorrow's Reality?*

- 126.** The oil and gas industry's demand for workers with STEM background should in principle offer more opportunities for women to find employment in the sector. However, while more women and girls are pursuing STEM degrees than ever before, they still only account for 35 per cent of all students enrolled in STEM-related fields of study in higher education. Concerted efforts will be needed to attract more women and girls to STEM degrees if the oil and gas sector is to achieve a more meaningful balance of women and men. Governments and employers' and workers' organizations will also have to address the "leaky pipeline" problem, namely that "Women leave STEM disciplines in disproportionate numbers during their studies, during transition to the world of work and even during their career cycle".¹⁰⁵
- 127.** In this regard, the ESG performance of the oil and gas industry is increasingly becoming an important factor in the industry's ability to attract and retain talent. According to the sixth annual Global Energy Talent Index (GETI) report, which is based on a survey of 10,000 energy professionals of 144 different nationalities and spread across 161 countries, 85 per cent of respondents say ESG is a factor in whether they will stay or leave an organization. Moreover, 55 per cent of those open to switching sectors would be interested in switching to renewables, and 38 per cent of respondents would leave energy for technology.¹⁰⁶

¹⁰⁵ UNESCO Digital Library, *Cracking the Code: Girls' and Women's Education in Science, Technology, Engineering and Mathematics (STEM)*, 2017.

¹⁰⁶ Airswift, *The Sixth Annual Global Energy Talent Index*.

128. These complex skills development challenges call for a comprehensive approach to skills development and lifelong learning in the oil and gas industry as well as in the broader energy sector, in line with the principles and guidance set out in the ILO *Guidelines for a just transition*, the Conclusions of the general discussion of skills and lifelong learning at the 109th Session of the International Labour Conference in December 2021, and the [Points of Consensus](#) adopted by the [Global Dialogue Forum on Future Needs for Skills and Training in the Oil and Gas Industry](#) (12–13 December 2012).

3.1.5. Other active labour market policies

129. To ensure the energy transition becomes a well-managed and just transition, it is critical to combine skills development and lifelong learning policies with other active labour market policies.

130. As set out in the ILO *Guidelines for a just transition*, this includes efficient and effective delivery of employment services that respond to the needs of enterprises and workers affected by the transition. Such services should provide information, guidance, matching services and training to jobseekers in the job-search process. Active labour market policies can also include wage subsidies as well as support to micro-entrepreneurs or independent workers. These should be carefully targeted to areas and to employers and workers most affected by the transition.

131. Such active labour market policies have been instrumental in facilitating a just energy transition in Denmark. The country is currently the only one with a large oil and gas sector that has decided to phase out oil and gas completely, with broad support from employers and workers and society at large. Denmark’s climate neutrality law of 2020 contains a clear commitment and specific measures to ensure that the transition to wind and other renewable energies by 2050 becomes a just transition for an estimated 26,000 people directly or indirectly employed in oil and gas extraction.

132. This includes investment in former oil and gas communities in renewable energy and new economic activities that require similar skills and expertise as in the oil and gas sector. The Government has managed to create an effective regulatory framework to help attract investment into renewable energy, which has the potential to create twice as many jobs as the country’s fossil fuel industry did. The municipally owned port authority, Port Esbjerg, in cooperation with the United Federation of Workers in Denmark is furthermore introducing an “Offshore Academy” to support education and training of both skilled and unskilled workers in renewable energy and related industries. Danish labour market laws and collective agreements make it easy to hire and fire workers while safeguarding their financial security by providing a robust system of social and employment supports. Careful coordination among key government ministries and close connections with industry and unions have been at the forefront of this approach.¹⁰⁷

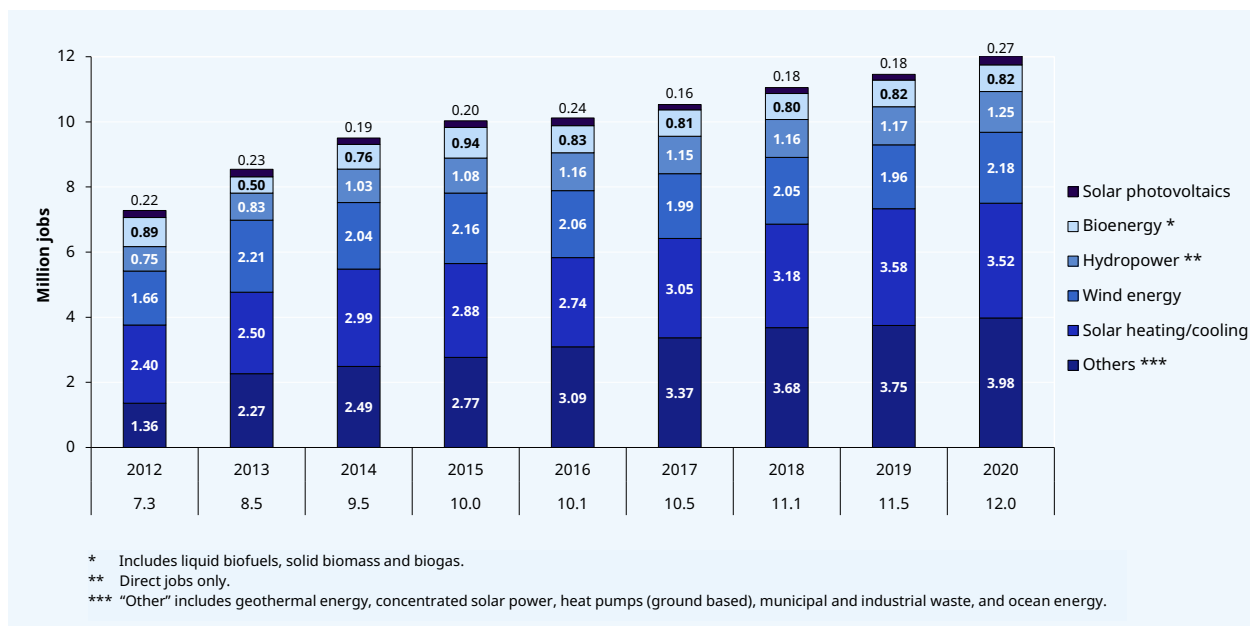
133. The challenges of managing a just energy transition will be larger for countries with a bigger oil and gas sector and less diversified economy than Denmark. But the renewable energy sector is growing in all regions of the world, which means that there is a large untapped potential for job creation in hydrogen, solar and wind power in all countries, and this potential can be explored while oil and gas is phased out or scaled down.

134. The International Renewable Energy Agency (IRENA) estimates that about 12 million were employed directly or indirectly in the renewable energy sector in 2020 (figure 26), and that the renewable energy sector could account for 38 million jobs by 2030 and 43 million by 2050 if all countries follow an energy transition pathway that is aligned with the 1.5°C climate ambition

¹⁰⁷ Tamara Krawchenko, “[Managing a Just Transition in Denmark](#)” (Canadian Climate Institute, 18 July 2022).

(figure 26). IRENA recommends that countries map the existing skills and knowledge required to support jobs in renewables and design policies for education and training based on the results. Additionally, countries should consider the development of other active labour market policies such as public employment guarantee schemes, job-creating public works programmes for the unemployed, income maintenance and job placement services.¹⁰⁸

► **Figure 26: Renewable energy employment in selected countries**



Source: IRENA and the ILO, *Renewable Energy and Jobs: Annual Review 2021*, 2021.

3.2. Enterprises

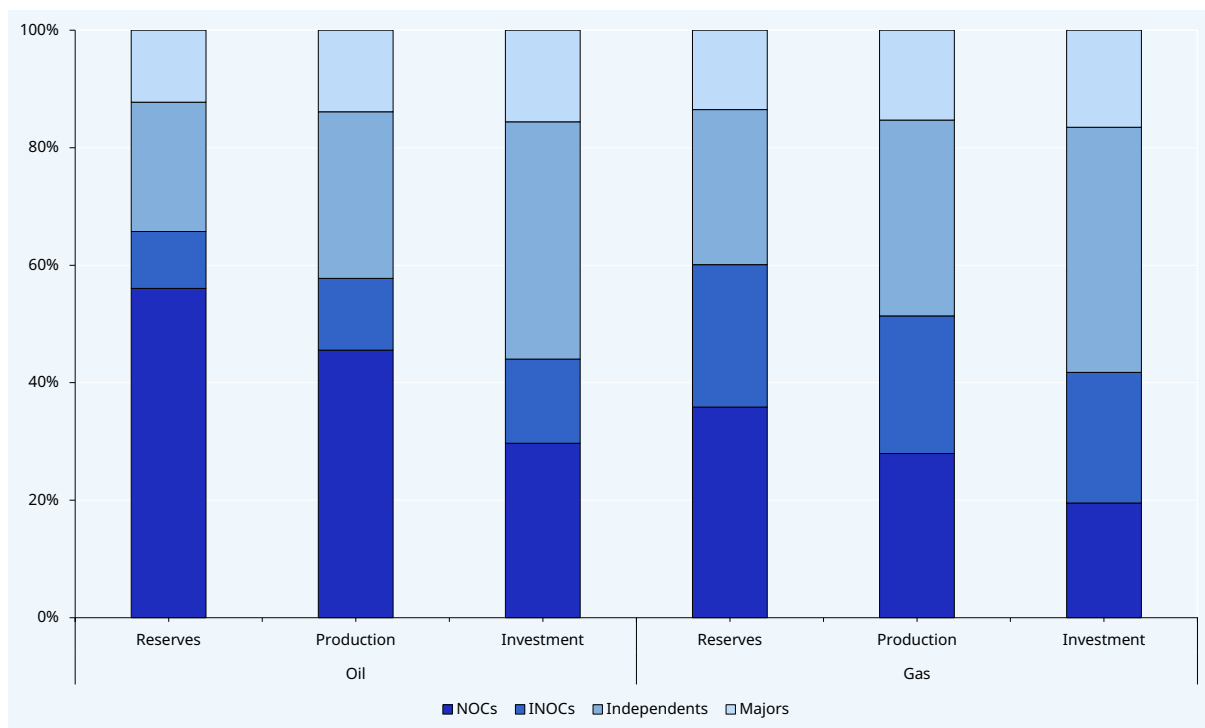
135. While multinational enterprises dominate the industry and are among the world’s largest companies, small and medium-sized enterprises are strategically important in the oil and gas industry as well as the broader energy sector, both now and in the future (section 1.1).

3.2.1. Multinational enterprises

136. Big Oil, the term used to collectively describe a group of leading companies, dominated the petroleum market in the mid-twentieth century, and are among the most influential publicly traded oil and natural gas producers today. However, NOCs and INOCs in some of the world’s most oil and gas-rich countries, such as the Islamic Republic of Iran, Mexico, Saudi Arabia, and the Bolivarian Republic of Venezuela, have over time become responsible for the production of the majority of the world’s oil and gas (see figure 27).

¹⁰⁸ Anabella Rosemberg, “Building a Just Transition: The Linkages between Climate Change and Employment”, *International Journal of Labour Research* 2, No. 2 (2010): 125–161.

► **Figure 27. Ownership of oil and gas reserves, production and upstream investment by company type, 2018**



Source: IEA, *The Oil and Gas Industry in Energy Transitions*.

- 137.** NOCs and INOCs control at least US\$3 trillion in assets and have become important investors and actors in emerging oil and gas-producing countries.¹⁰⁹ It is expected that these companies will supply 65 per cent of the world’s oil by 2050.¹¹⁰
- 138.** The ILO [Tripartite Declaration of Principles concerning Multinational Enterprises and Social Policy](#) apply to all enterprises, and are particularly relevant to large oil and gas companies, as it encourage them to maximize their positive contribution to decent work in the countries in which they operate. In this regard, both state-owned and private oil Majors make large contributions to government revenue, and many have local content policies in place to strengthen linkages with local enterprises. In addition to investments in infrastructure, it has become ever more common for oil and gas companies to invest in social programmes. These are implemented to establish and maintain good relationships with local, regional and national stakeholders, to secure a social licence to operate, and to enhance the company’s social impact on its host society.¹¹¹
- 139.** The contribution of state-owned and private oil Majors to local economies and society varies from one country to another. In general terms, however, publicly listed NOCs prioritize commercial efficiency and the value this creates for shareholders, host governments and communities, whereas unlisted NOCs frequently supplement the State by performing a wide range of public functions, such as providing fuel subsidies, creating jobs and providing social services. Such NOCs are also capable of taking on large amounts of debt to finance new investments or meet political

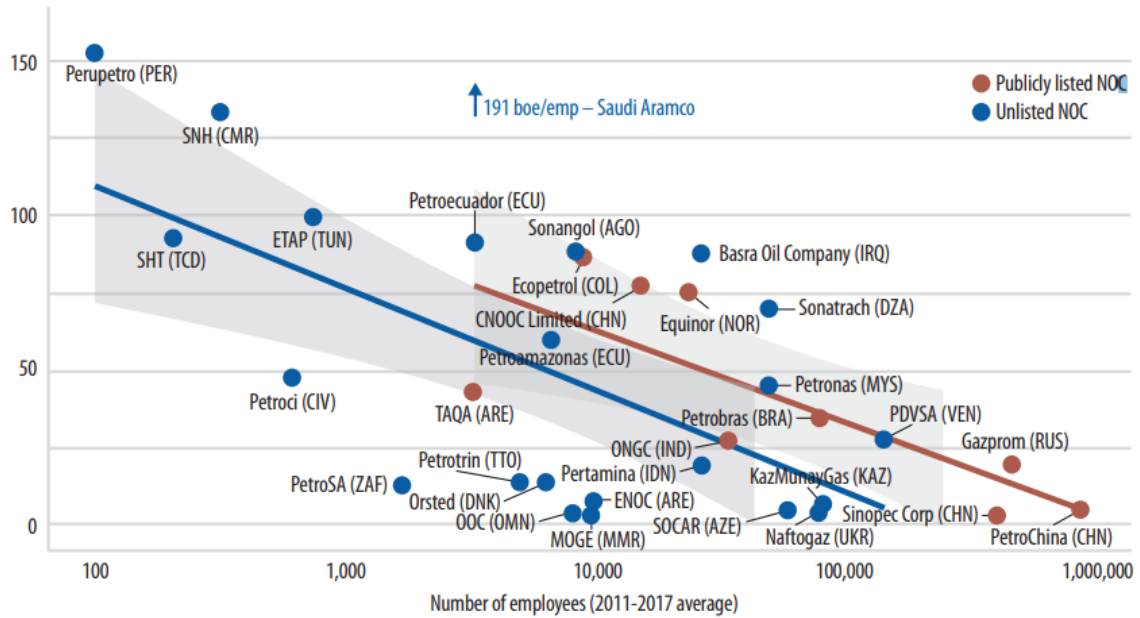
¹⁰⁹ David Manley, David Mihalyi and Patrick R.P. Heller, “Hidden Giants”, *Finance & Development* 56, No. 4 (December 2019): 56–59.

¹¹⁰ D. Saha et al., *Just Transitions in the Oil and Gas Sector: Considerations for Addressing Impacts on Workers and Communities in Low- and Middle-income Developing Countries*, forthcoming.

¹¹¹ IPIECA, *Creating Successful, Sustainable Social Investment: Guidance Document of the Oil and Gas Industry*, 2nd ed., May 2017.

agendas. The different roles and expectations of unlisted and publicly listed NOCs is reflected in their labour productivity as measured by production by employee (figure 28).

► **Figure 28. Oil and gas production per employee, 2011–17 average**



Source: Manley, Mihalyi and Heller, “Hidden Giants”.

140. Investors, civil society and consumers are increasingly demanding that oil and gas companies respect human rights and reduce their environmental and social footprint. Many oil and gas companies, particularly among the oil Majors, have in turn adopted explicit human and labour rights policy statements that refer, inter alia, to the Universal Declaration of Human Rights, the ILO Declaration on Fundamental Principles and Rights at Work and the UN Guiding Principles on Business and Human Rights. Many of these companies have furthermore included human and labour rights criteria in guidelines and codes of conduct for suppliers, which in turn may be required to introduce such guidelines for their own suppliers. Such voluntary initiatives are increasingly supported by industry bodies, including IPIECA, and numerous multistakeholder initiatives.
141. In recent years, however, many governments have followed in the footsteps of France and developed legislative initiatives that will make human and labour rights due diligence mandatory (box 7).

▶ **Box 7. The move to mandatory human and labour rights due diligence**

On 23 February 2022, the European Commission adopted a proposal for a Directive on corporate sustainability due diligence. The aim of this Directive is to foster sustainable and responsible corporate behaviour and to anchor human and labour rights and environmental considerations in companies' operations and corporate governance.

Outside the EU, the Norwegian Transparency Act came into force on 1 July 2022, the Government of Japan published a draft due diligence guidance in August 2022, and the German Supply Chain Act will come into force on 1 January 2023.

Within the next few years, it is highly likely that more than 40–50,000 of the world's largest multinational enterprises, including the world's largest oil and gas companies, will be required by law to reinforce or put new mechanisms in place to ensure that they and their suppliers will respect human rights, international labour standards and environmental standards in their operations.

Source: European Commission, "[Just And Sustainable Economy: Commission Lays Down Rules For Companies To Respect Human Rights and Environment in Global Value Chains](#)", Press Release, 23 February 2022; Norway, Lovdata, [Act relating to enterprises' transparency and work on fundamental human rights and decent working conditions \(Transparency Act\)](#); Germany, Federal Ministry of Labour and Social Affairs, "[Act on Corporate Due Diligence in Supply Chains](#)", 18 August 2021; Japan, Ministry of Economy, Trade and Industry, "[Guidelines on Respect for Human Rights in Responsible Supply Chains \(Draft\)](#)", August 2022; Assent, "[The SCDDA Handbook: Business Impacts of the German Supply Chain Act](#)", e-book.

- 142.** In this regard, the ILO [resolution concerning decent work in global supply chains](#) recognizes that governments, business and social partners have complementary but different responsibilities in promoting decent work in global supply chains: businesses have a responsibility to respect human and labour rights in their supply chains, consistent with the UN Guiding Principles, and to comply with national laws wherever they operate. Governments have the duty to implement and enforce national laws, including by strengthening labour administration and labour inspection systems in order to ensure compliance, and to provide access to appropriate and effective remedy and complaints mechanisms.
- 143.** In recent years, large oil and gas companies have come under pressure to reduce their impact on the environment. Milieudefensie, the Dutch wing of Friends of the Earth, won a landmark court case in 2021 against a major oil company over the amount of CO₂ emissions from its operations. The court imposed a mandate on the company to cut its carbon emissions by 45 per cent by 2030. The industry is concerned that this may constitute a precedent for new cases and will lead to unfair competition and a disruption of the level playing field in the oil and gas market. This trend could also affect other sectors, such as finance, who are called upon to limit and reduce their funding to upstream oil and gas projects.
- 144.** While multinational oil and gas companies have a large social and environmental footprint, they have a key role to play in investing in new energy sources and facilitating a just and well-managed transition (box 8). In late 2020, a UK-based multinational company with over 100 years of business experience in the oil and gas sector, announced that it was moving from being an IOC to becoming an international energy company (IEC). This means, in practice, that the company intends to scale-up its low-carbon energy business while reducing its oil, gas and refining portfolio. The new strategy should increase the company's investment in low-carbon energy from US\$500 million to US\$5 billion by 2030 and raise its renewable generating capacity from 2.5 GW to 50 GW.¹¹² Similarly, another major oil company based in the Netherlands has launched a strategy to achieve its target to be a net-zero emissions energy business by 2050. It includes a new set of targets to reduce net-carbon intensity: 6–8 per cent by 2023, 20 per cent by 2030, 45 per

¹¹² BP, "[From International Oil Company to Integrated Energy Company: BP Sets Out Strategy for Decade of Delivery Towards Net Zero Ambition](#)", Press Release, 4 August 2020.

cent by 2035, and 100 per cent by 2050, using a baseline of 2016; and an additional 25 million tons per year of carbon, capture and storage (CCS) capacity by 2035.¹¹³

▶ Box 8. Ørsted's renewable energy transformation

Ørsted is an example of an energy company that has transformed its main business from oil and gas to renewables. In 2009, the company made 92 per cent of its revenues from fossil fuels and was responsible for one third of Denmark's CO₂ emissions. It then announced a strategic shift to its business model and set a target to generate 85 per cent of heat and power from renewable sources by 2040, and has since become the world's leading offshore wind power producer.

To reach its goal, Ørsted had to review its supply chain, its competencies, and its financing models. The company recognized that to achieve its objectives it must drive a "just, local and enabling transition". Among their many concerns, workers' health and well-being as well as the guarantee of human rights throughout their supply chain were central. The company has engaged actively with trade unions in the process, and has recently signed a comprehensive agreement with North America's Building Trades Unions to build an equitable offshore workforce, and is thus seeking to create fair and equitable green jobs and listen to local communities.

Source: Ørsted, "Driving a Just, Local, and Enabling Transition".

- 145.** There are notable differences among the IOCs when it comes to the transition to renewable energy sources. According to Carbon Tracker, "US companies are lagging way behind their European rivals in adapting their businesses and minimizing their stranded asset risk".^{114 115} This can be explained by the diverging views of the future that each company takes and how this shapes their responses to the need to transition to a net-zero carbon world.
- 146.** Differently from IOCs, NOCs do not face shareholder and investor pressure to reduce emissions and diversify their portfolios to include more clean energy. They are more likely to expand production and grow their market share by investing in new oil and gas projects. However, there are significant differences among state-owned enterprises as well: while some analysts expect that some of these will likely continue to produce at the same levels as long as possible in order to enable a transition of the country's economy into a more diversified model, China's top state oil and gas producers are developing a number of green initiatives that will likely support China's pledge to become carbon neutral before 2060.¹¹⁶

3.2.2. Small and medium-sized enterprises

- 147.** While the share of large-scale, highly automated and capital-intensive oil and gas jobs in national employment is generally low, the industry has significant multiplier effects on the local and national economy through the creation of indirect and induced employment and business opportunities for SMEs in local communities and value chains. This is particularly the case during construction of oil and gas installations and infrastructure, but opportunities are also created for SMEs and workers to service oil and gas production and manufacture inputs and through satellite economic activities such as transport, hotels, restaurants and shops. The deeper the linkages

¹¹³ Shell, "Shell Accelerates Drive for Net-zero Emissions with Customer-first Strategy", 11 February 2021.

¹¹⁴ Carbon Tracker, "Fault Lines: How Diverging Oil and Gas Company Strategies Link to Stranded Asset Risk", October 2020.

¹¹⁵ Andrew Lee, "European Oil Giants in 'League of their Own' as Shell Tops BNEF Energy Transition Rankings", *Recharge*, 18 April 2022.

¹¹⁶ Eric Koenig, "How Industry Leaders like BP are Moving from International Oil Company to International Energy Company", (blog) 8 October 2020.

between large-scale oil and gas companies and SMEs in the community and at the national level, the greater the impact on indirect and induced jobs.

- 148.** Governments are increasingly using local content policies to harness the oil and gas industry's potential for development, creating business opportunities for local businesses and potentially generating more indirect jobs along the supply chain. To encourage more oil and gas companies to use local procurement, governments are contemplating both demand- and supply-side policies, such as a mandated percentage of local sourcing of goods and services from domestic businesses or technology transfer requirements, as well as incentives like financial support and tax rebates.
- 149.** According to a World Bank study, the aim of local content policies “has evolved from creating backward links (that is, supplying input to the local economy through transfer of technology, the generation of value added in domestic supply sectors, the creation of local employment opportunities, and increasing local ownership and control) to creating forward links (that is, processing the sector’s output prior to export through, for example, the establishment of refineries, petrochemical industry, and the production of fertilizers)”.¹¹⁷ The World Bank argues that the technological complexity of the petroleum sector as well as the need for specialized inputs can potentially limit the effectiveness of local content policies and the development of links to the local economy, which is unable to provide services in a timely manner, especially if local content targets are too ambitious, creating bottlenecks from high demand.¹¹⁸
- 150.** In countries such as Nigeria, where the oil and gas sector took off in the early 1970s with the country’s membership of OPEC, SMEs faced significant challenges that stunted their growth, such as “deplorable infrastructural facilities; funding and financing challenges; inadequate managerial and entrepreneurial skills; limited capacity for research and development as well as innovations; limited demand for their products and services; burden of multiple taxes; and overbearing actions of government functionaries and agents”.¹¹⁹ Perhaps more importantly there was a low level of local content due to issues of technical expertise, production capacity and capability to compete favourably. In 2010, the Nigerian Content Development Act was adopted to ensure that “substantial proportion of activities, material engineering parts and human capital in the Nigerian oil and gas industry are domiciled within the country” adding value to local production and promoting technology transfer. However, difficulties in navigating the complex legislation has still not enhanced higher participation of local SMEs in the oil and gas sector.¹²⁰
- 151.** Conversely, the case of Norway proves the value of focusing on local content. Petroleum is one of Norway’s most significant industries. It is the largest in terms of value added, government revenues, investments and export value. Since production started in the early 1970s, “petroleum activities have contributed to over [Norwegian kroner] NOK 18,000 billion¹²¹ in current NOK to Norway’s GDP” and represented 21 per cent of the country’s GDP in 2021.¹²² Norway ensured that technical advisers and technology transfers were available to national companies and also encouraged recruitment of local staff and the use of local service companies. Over time, with the support of strong academic programmes and the insertion of local content initiatives within

¹¹⁷ Silvana Tordo et al., *Local Content Policies in the Oil and Gas Sector*, World Bank, 2013.

¹¹⁸ World Bank, “Local Content in Oil, Gas, and Mining”, 27 January 2016.

¹¹⁹ Joseph E. Aigbodua and Michael D. Oisamoje, “Promoting Small and Medium Enterprises in the Nigerian Oil and Gas Industry”, *European Scientific Journal* 9, No. 1 (2013): 244–261.

¹²⁰ Aigbodua and Oisamoje, “Promoting Small and Medium Enterprises in the Nigerian Oil and Gas Industry”.

¹²¹ Approximately US\$1.9 billion at UN Operational exchange rates in April 2022.

¹²² Norway, Norwegian Ministry of Petroleum and Energy, “The Government’s Revenues”.

operation contracts that expanded the existing knowledge and skills base, Norway developed a highly skilled and internationally competitive oil and gas services sector that helped many SMEs to thrive.

- 152.** These examples highlight how important well-designed SME policies that are compatible with national circumstances are to ensure that SMEs increasingly become job creation engines and providers of decent and sustainable work in the oil and gas industry. They also highlight how critical it is to strengthen the capacity of governments and employers' and workers' organizations to implement such policies. As per the ILO resolution concerning small and medium-sized enterprises and decent and productive employment creation, these SME policies should furthermore "align with sound macroeconomic policies, strategies aimed at improving enforcement and compliance, education and skills policies and promotion of social dialogue, freedom of association, collective bargaining and social protection".¹²³
- 153.** Governments can take a number of actions to help build an enabling environment for SMEs in the oil and gas industry, including simplifying overly complex regulations for SMEs; improving SMEs' access to finance through appropriate measures, such as loan guarantees and start-up grants; clustering, networking, linking into technology platforms, and value chain and local economic development to address the lack of scale and scope of SMEs; addressing structural barriers to sustainable enterprise development, productivity growth, and decent work challenges in the industry; and public investment in physical and digital infrastructure, education, training and technology.

3.3. Conditions of work

- 154.** Wages, working conditions and social benefits in the oil and gas industry are generally better than those in other industries. However, there are some areas for improvement in relation to occupational safety and health and to gender equality and diversity.

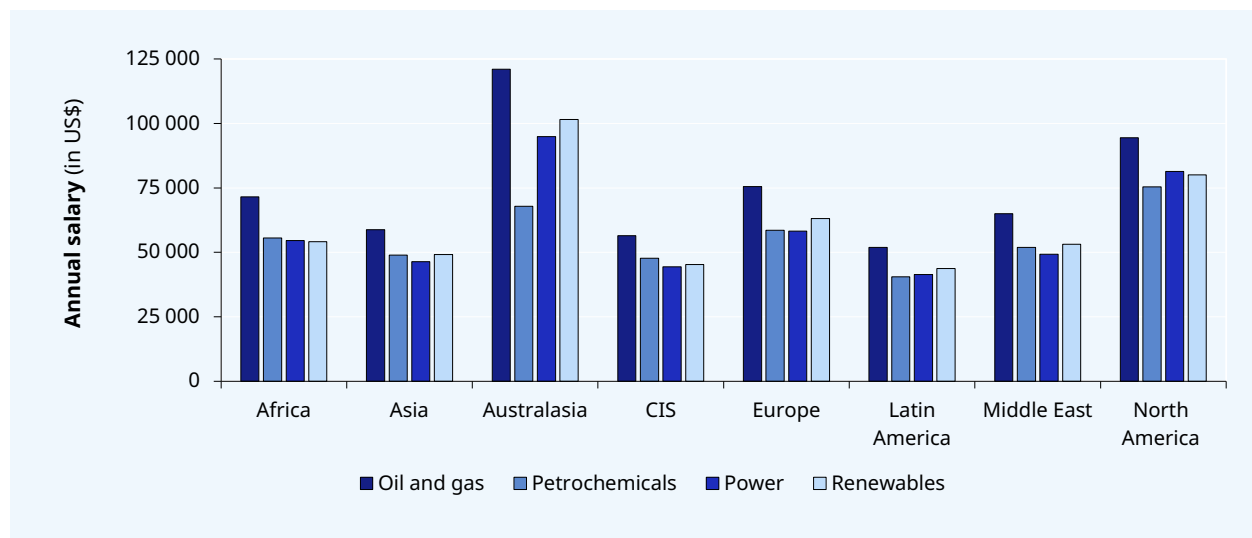
3.3.1. Wages

- 155.** Jobs in oil and gas extraction and production are generally relatively well paid compared with other economic sectors, and oil and gas workers enjoy some of the highest wages in the energy sector (figure 29). In Canada, for instance, wages in oil and gas extraction were 92 per cent higher than in the automotive sector, 79 per cent higher than in aerospace, and 166 per cent higher than the all-industry average.¹²⁴ This reflects the industries' reliance on high-skilled workers as well as the remote and often harsh environments in which oil and gas workers live and work for extended periods of time.

¹²³ ILO, [Resolution concerning small and medium-sized enterprises and decent and productive employment creation](#), International Labour Conference, 104th Session, 2015.

¹²⁴ Lennie Kaplan and Mark Milke, "[Fueling Canada's Economy: Comparing the Oil and Gas Extraction Sector to the Automotive and Aerospace Sectors](#)", *Canadian Energy Centre*, 17 May 2021.

► **Figure 29. Average annual salaries of long-term contracted employees in the energy industry worldwide as of 2020, by sector and region (in US dollars)**



Source: Statista, 2022.

156. According to the GETI, permanent workers in Australasia were the highest paid, receiving on average around US\$121,000 annually, while workers in Latin America were the lowest paid with an average annual salary of almost US\$52,000. Among the different occupations we find drilling supervisors taking home the highest wages across the board (table 3).

► **Table 3. Permanent worker annual salary, US\$ (global average based on past 6 years)**

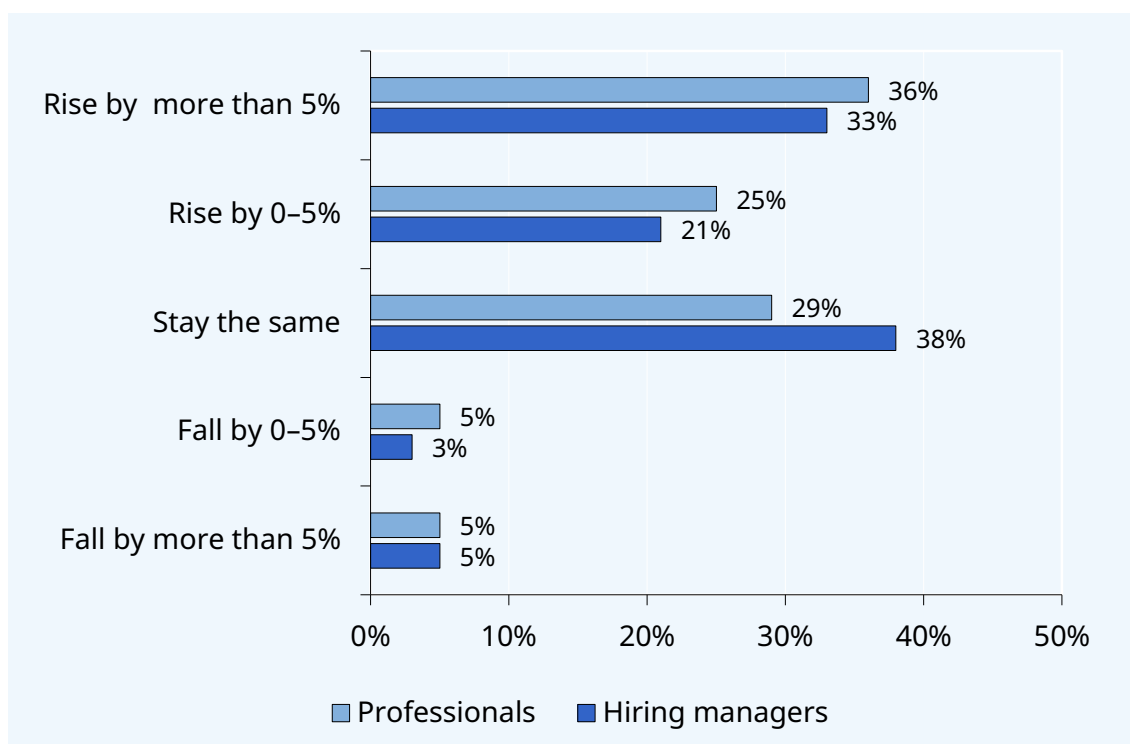
	Africa *	Asia	Australasia	CIS	Europe	Latin America	Middle East	North America
Averages	71 491	58 762	120 988	56 464	75 539	51 900	65 010	94 426
Accountant	42 921	35 662	84 000	34 209	50 711	30 500	40 065	56 207
Administrator	20 958	18 908	59 500	16 013	23 851	17 400	19 694	27 845
Chemical engineer	75 810	50 696	115 500	50 718	63 504	35 100	45 484	74 416
Civil engineer	50 776	44 482	108 500	40 385	60 660	43 200	48 587	63 985
Commissioning engineer	82 826	69 612	112 000	66 043	90 609	25 000	75 323	102 698
Construction engineer	74 443	62 352	112 000	79 668	69 871	46 800	59 281	102 398
Construction manager	84 265	75 518	126 000	61 587	85 397	59 700	76 805	107 140
Contracts manager	54 559	42 518	126 000	56 640	67 783	46 900	56 048	71 336
Drilling engineer	74 636	68 589	175 000	61 698	84 459	70 000	83 140	107 061
Drilling supervisor	124 927	103 897	210 000	95 342	131 899	105 800	110 562	172 344
Electrical engineer	70 026	57 011	112 000	52 859	78 069	54 600	63 128	98 775
Finance manager	71 678	59 250	126 000	63 530	73 936	58 100	75 015	98 604
Geophysicist	78 999	63 043	135 100	57 023	83 273	60 400	76 000	94 867
HSE manager	71 192	60 291	131 600	56 640	80 582	45 100	61 909	92 501
Inspection engineer	75 779	68 839	112 000	57 930	65 426	63 300	67 411	107 637
Instrumentation engineer	80 769	53 244	112 000	71 788	85 563	58 500	69 928	111 028
Maintenance engineer	71 537	56 753	108 500	50 953	72 889	52 000	70 933	95 524

	Africa *	Asia	Australasia	CIS	Europe	Latin America	Middle East	North America
Mechanical engineer	63 478	49 415	112 000	49 588	70 168	52 900	60 922	87 135
Process engineer	80 899	66 198	119 000	57 681	84 875	58 000	71 978	112 897
Production engineer	68 703	52 498	140 000	46 462	73 439	57 700	61 967	97 531
Project engineer	76 811	65 053	108 500	59 883	81 473	50 900	70 673	102 956
Project manager	77 769	66 800	122 500	77 880	90 450	56 400	74 233	100 675
QA/QC inspector	63 652	56 282	112 000	43 898	63 106	46 759	49 997	88 349
Reservoir engineer	88 075	81 663	140 000	68 414	86 197	62 800	102 435	115 337
Welding engineer	61 786	40 477	105 000	34 769	70 297	39 650	33 744	71 404

Source: GETI, 2022.

157. Wages in the oil and gas industry are influenced by the boom-and-bust cycle of the sector and by skills gaps and global competition for high-skilled workers. During the COVID-19 crisis, a third of oil and gas workers faced pay cuts in 2020. However, both workers and hiring managers are reporting an uptick in wages in 2022 and expect they will continue to rise over the next 12 months as demand for oil and gas has regained strength and as inflation and the cost of living is increasing globally (figure 30).

Figure 30. Pay expectations for the next 12 months



Source: Airswift, *The Sixth Annual Global Energy Talent Index*.

158. Notwithstanding the widespread recognition of the principles of equal treatment in recruitment, promotion and training, and of equal pay for work of equal value, there is still a pay gap between women and men in the oil and gas industry. According to a recent analysis from Offshore Technology, 93.6 per cent of companies in the offshore oil and gas industry in the United Kingdom pay their male workers more than their female workers. Across the sector, men’s median hourly

pay was 20 per cent higher than that of women. This puts the offshore oil and gas industry above the national average of 11.6 per cent. On average, women also received 24.4 per cent less in bonuses compared to their male co-workers.¹²⁵

3.3.2. Organization and hours of work

- 159.** The nature of oil and gas extraction means that workers are deployed to remote installations or offshore platforms that operate around the clock.
- 160.** The oil and gas industry has adopted rotation work arrangements, which are characterized by travelling long distances to work in isolated areas, where workers typically rotate consecutive days working and living on-site with periods at home.¹²⁶ The industry's most common schedule consists of 14 consecutive day shifts or 14 consecutive night shifts. In the United Kingdom, for example, it is common practice to work two weeks offshore followed by two weeks at home. In Norway, however, offshore workers can spend two weeks on platforms at sea followed by four weeks off.
- 161.** Shift work is exceptionally prevalent in the offshore petroleum industry, which operates with a number of different work schedules, variations in duration of work and onshore leave periods.¹²⁷
- 162.** In most oil and gas-producing countries, working time and shift work is highly regulated. In Denmark, for instance, the total working time per week, including overtime, calculated as an average over 12 months, cannot exceed 48 hours, and the length of offshore work must not exceed 28 consecutive days. Working time must be organized so as to allow a rest period of at least 11 consecutive hours within every period of 24 hours. Following a period of offshore work and the subsequent rest period, the worker must be allowed at least 3 days off, consecutive as far as possible, for each 14 days of offshore work.¹²⁸
- 163.** ILO statistics show that weekly hours worked vary considerably from country to country, from 39.9 hours in Norway to 49.6 in the Islamic Republic of Iran. Women tend to work fewer hours than men. The gender gap in working hours is related to working time regulation and policies and how they are implemented. It is also related to income, the gender wage gap, opportunities and advancement at work, the nature and organization of work, occupational segregation and the ability of workers to bargain collectively as well as housework and childcare responsibilities, which in many countries is seen as the sole responsibility of women.

3.4. Social protection

- 164.** Social protection¹²⁹ policies aim to address life risks, including those associated with work, such as employment injury, sickness, maternity, unemployment, disability and old age. In so doing,

¹²⁵ Offshore Technology, "How Big is the Gender Pay Gap in the Offshore Industry in Britain and Who are the Worst Offenders?", *Offshore Technology*, 6 April 2022.

¹²⁶ Bernard Yeboah-Asiamah Asare et al., "Health and Well-being of Rotation Workers in the Mining, Offshore Oil and Gas, and Construction Industry: A Systematic Review", *BMJ Global Health* 6, No. 7 (2021).

¹²⁷ Ingrid Nesdal Fossum et al., "Effects of Shift and Night Work in the Offshore Petroleum Industry: A Systematic Review", *Industrial Health* 51, No. 5 (2013): 530–544.

¹²⁸ Denmark, Danish Working Environment Authority, "Working Time Regulations in Connection with Offshore Oil and Gas Operations", June 2016.

¹²⁹ In this report, the term social protection, or social security, is used with reference to the human right and defined as the set of policies and programmes designed to reduce and prevent poverty, vulnerability and social exclusion throughout the life cycle. Social protection is mainly provided in relation to nine areas: child and family benefits, maternity protection, unemployment

social protection is an important tool in reducing poverty and inequality, as highlighted in targets 1.3 and 3.8 of the Sustainable Development Goals.¹³⁰

- 165.** This is of particular relevance to the future of work in the oil and gas industry given the increased likelihood of lay-offs and increasing unemployment over time as more and more countries seek to reduce their dependence on fossil fuels. As mentioned above (section 3.1.4), it will not be possible to re- or upskill all workers in the industry, and many of these will rely on unemployment benefits for longer or shorter periods of time until they find employment in other sectors of the economy. Given the high average age of oil and gas workers in many countries, many of these might take early retirement and will rely on their pensions.
- 166.** These challenges are pronounced in countries without robust, resilient and sustainable social protection systems. The ILO estimates that some 4 billion people, about 50 per cent of the global population, have no social protection and that only 45 per cent of the global population are effectively covered by at least one social protection benefit.¹³¹
- 167.** To ensure that the energy transition becomes a socially just transition, social protection systems need to be reinforced. This can be achieved through maintenance and strengthening of social protection systems that facilitate and adapt to structural changes in the economy; reinforcing key social protection schemes and programmes, such as unemployment protection, social assistance including housing and energy benefits, and health protection; and strengthening links with skills development and active labour market policies.¹³²
- 168.** Certain policy areas must be strengthened to help constituents adjust to these changes. For instance, unemployment protection schemes and cash transfer programmes play a critical role in supporting workers facing job losses and can facilitate the transition to new jobs, especially when combined with skills development and job placement or relocation measures. Other options are early retirement for workers of advanced age at risk of losing their jobs due to phase-outs.¹³³
- 169.** Finally, social protection is key to addressing the critical challenges of skills shortages and attracting young workers. Oil Majors are, for instance, offering 16-week paid maternity leave for all women workers irrespective of the country in which they are working as part of improved benefit packages.¹³⁴ Additionally, companies are looking to extend parental leave to men as well.¹³⁵ In a competitive job market, these new policies can contribute to attracting and retaining the talent the oil and gas industry needs now and in the future.

support, employment injury benefits, sickness benefits, health protection (medical care), old-age benefits, invalidity/disability benefits, and survivors' benefits. Social protection systems address all these policy areas through a mix of contributory schemes (social insurance) and non-contributory, tax-financed benefits (including social assistance).

¹³⁰ SDG target 1.3 is to "Implement nationally appropriate social protection systems and measures for all, including floors, and by 2030 achieve substantial coverage of the poor and the vulnerable." SDG target 3.8 is to "Achieve universal health coverage, including financial risk protection, access to quality essential healthcare services and access to safe, effective, quality and affordable essential medicines and vaccines for all."

¹³¹ ILO, *World Social Protection Report 2017–19: Universal Social Protection to Achieve the Sustainable Development Goals*, 2017.

¹³² ILO and OECD, *How to Ensure a Socially Just Transition? The Role of Social Protection*, 2022.

¹³³ ILO, *Social Protection for a Just Transition: A Global Strategy for Increasing Ambition in Climate Action*, 2019.

¹³⁴ Shell, "Shell to Roll Out Global Minimum Standard for Paid Maternity Leave".

¹³⁵ Olivia Pulsinelli, "Energy Giants Increase Benefits, including Parental Leave and Gender Reassignment Surgery", *Houston Business Journal*, 25 May 2017.

3.5. Fundamental Principles and Rights at Work and other international labour standards

- 170.** The ILO Declaration on Fundamental Principles and Rights at Work was adopted in 1998 and amended in 2022. It sets out the obligation of ILO Member States to respect, promote and realize in good faith the principles concerning the fundamental principles and rights at work, which are the subject of some specific ILO Conventions, even if they have not ratified the corresponding fundamental Conventions. Member States, therefore, have the duty to adopt, implement and effectively enforce national laws and regulations and to ensure that the fundamental principles and rights at work as well as ratified international labour Conventions cover and are applied to all workers.
- 171.** There are five categories of principles and rights at work: freedom of association and the right to collective bargaining; the elimination of forced or compulsory labour; the abolition of child labour; the elimination of discrimination in respect of employment and occupation; and the right to a safe and healthy working environment.¹³⁶ These principles and rights at work have been expressed and developed in ten ILO Conventions and one Protocol that have been recognized by the ILO Governing Body as fundamental instruments (table 4).

▶ **Table 4. Fundamental ILO Instruments**

Number	Convention
29	Forced Labour Convention, 1930, and the Protocol of 2014
87	Freedom of Association and Protection of the Right to Organise Convention, 1948
98	Right to Organise and Collective Bargaining Convention, 1949
100	Equal Remuneration Convention, 1951
105	Abolition of Forced Labour Convention, 1957
111	Discrimination (Employment and Occupation) Convention, 1958
138	Minimum Age Convention, 1973
155	Occupational Safety and Health Convention, 1981
182	Worst Forms of Child Labour Convention, 1999
187	Promotional Framework for Occupational Safety and Health Convention, 2006

3.5.1. Freedom of association and the right to collective bargaining

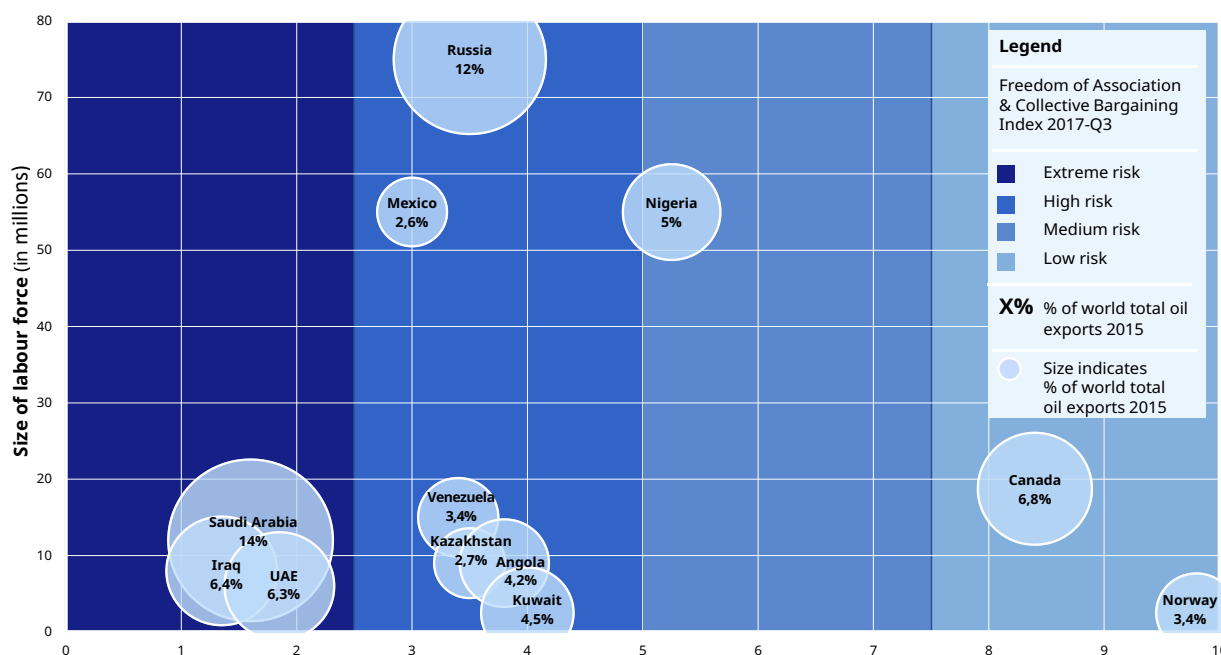
- 172.** Freedom of association ensures that workers and employers in the oil and gas industry can organize to efficiently negotiate work relations. Governments have an obligation to create a stable political and civil climate, as well as the legal and institutional frameworks that enable autonomous employers' and workers' organizations to operate freely, without fear of reprisal.
- 173.** Combined with effective freedom of association practices, sound collective bargaining practices ensure that employers and workers have a voice in negotiations and that the outcome will be fair

¹³⁶ At its 110th Session in June 2022, the International Labour Conference decided to amend para. 2 of the ILO Declaration on Fundamental Principles and Rights at Work (1998) to include "a safe and healthy working environment" as a fundamental principle and right at work.

and equitable. Collective bargaining allows both sides to negotiate fair wages and working conditions and can help prevent costly labour disputes.

- 174. Freedom of association and collective bargaining are both enabling rights that are fundamental to the attainment of all ILO strategic objectives. These enabling rights have allowed strong and independent workers’ and employers’ organizations to contribute to the growth and development of the oil and gas industry (see section 3.6 on social dialogue).
- 175. Collective bargaining has been used by oil and gas employers and workers to negotiate and agree on wages, working time, and other working conditions. The ILO *Report for discussion at the Tripartite Meeting on Promoting Social Dialogue and Good Industrial Relations from Oil and Gas Exploration and Production to Oil and Gas Distribution* (2009) contains examples of how employers and workers in Mexico, Spain and the United Kingdom have entered into collective agreements.
- 176. According to a World Bank analysis of freedom of association and collective bargaining, workers in some oil exporting countries face extreme or high risk when trying to form and join unions or engage in collective bargaining (see figure 31). Some oil and gas-producing countries are hostile to workers’ organizations and, in some instances, to employers’ associations. In other countries, while not explicitly prohibited, trade unions do not exist in practice.¹³⁷

► **Figure 31. Freedom of association and collective bargaining in top oil exporting countries**



Source: Michelle Carpenter, “Restrictions on Freedom of Association Potential Powder Keg for Oil Companies” (Verisk Maplecroft, 2017).

- 177. As Member States of the ILO, these and other oil and gas producing countries must fulfil their obligation to promote, realize and respect, in good faith, the fundamental principles and rights at work, including freedom of association and the right to collective bargaining. These enabling rights are the foundation for addressing and improving working conditions in the industry today and in the future and to ensuring a socially just energy transition.

¹³⁷ ILO, *Regulatory Framework Governing Migrant Workers*, 2019.

3.5.2. The elimination of forced or compulsory labour and the abolition of child labour

- 178.** Considering the capital-intensive and complex nature of oil and gas operations and the predominance of skilled and high-skilled workers, it is uncommon to encounter forced and child labour in oil and gas extraction, refinery and transportation.
- 179.** Nonetheless, there have been reports in the media of child and forced labour violations in the operations of suppliers and contractors. The industry body IPIECA points out that oil and gas companies often need to work with SMEs and less-mature companies to meet local content requirements. In countries where forced and child labour is widespread, and where capacity to enforce laws and take action to address such violations is limited, oil and gas companies need to verify that their contractors and suppliers have processes in place to ensure that they are meeting their expectations in terms of respecting human rights and fundamental labour rights.
- 180.** Because of the large footprint of the industry, oil and gas operations can furthermore have a negative indirect impact on children, their families, and communities, especially in developing countries and fragile states. Conflict between countries to access oil and gas reserves can create heightened insecurity for children in affected areas, through outbreaks of armed conflict or the presence of private security companies or armed forces. Another issue is the loss of land acquired by oil and gas companies, which means families are dislocated and access to schools, hospitals, and other essential services disrupted. The large influx of people during the construction of new oil and gas facilities can also affect access to public services, raise prices of goods and services, and increase the risk of sexual exploitation of women and children. Finally, the environmental hazards caused by extraction activity can also affect children's physical and mental development negatively.¹³⁸

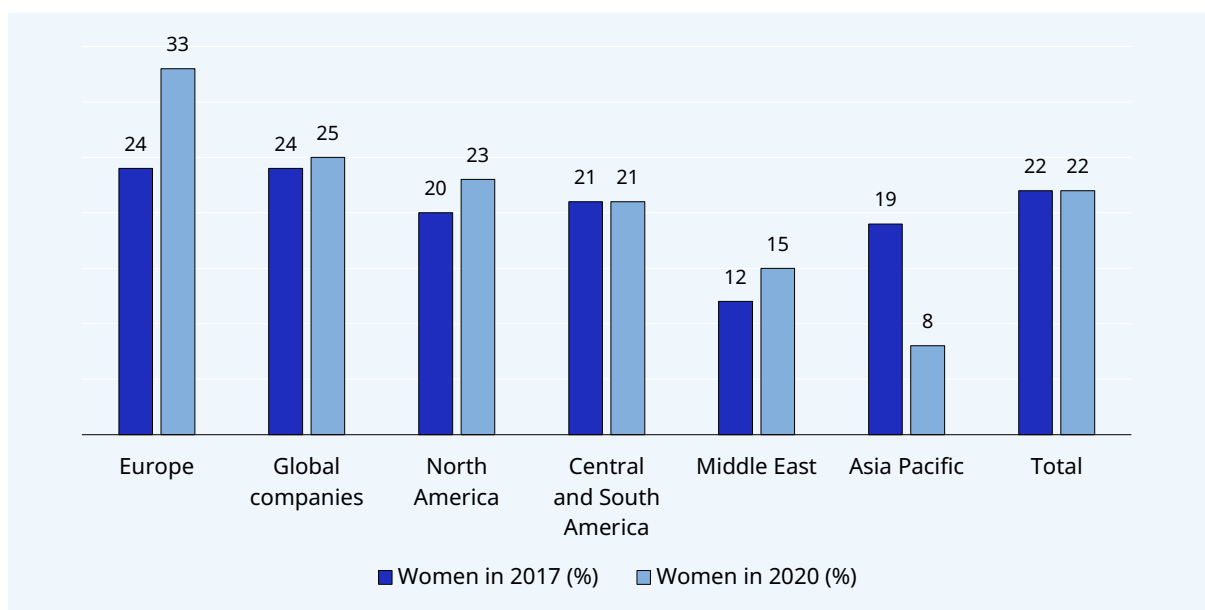
3.5.3. The elimination of discrimination in respect of employment and occupation

- 181.** Discrimination stifles opportunities, wastes human talent and accentuates social tensions and inequalities. Measures to prevent and eliminate all forms of discrimination are therefore critical to investing in people's capabilities and advancing decent and sustainable work in the oil and gas industry.
- 182.** Together with the UN Convention on the Elimination of All Forms of Discrimination against Women and the International Covenant on Economic, Social and Cultural Rights, the ILO Equal Remuneration Convention, 1951 (No. 100), and the ILO Discrimination (Employment and Occupation) Convention, 1958 (No. 111), recall the principles of equality and non-discrimination, affirm a woman's right to work, and call on governments to adopt and implement rules and regulations that establish a comprehensive set of obligations to ensure that women can enjoy equal labour rights in law and practice. Convention No. 111 calls on governments to abolish laws, regulations, and cultural practices that restrict the types of work in which women can engage, that limit women's freedom of movement, or that permit gender-based work-related discrimination, violence or harassment. In other words, governments are obliged to ensure that women can exercise their right to work on a basis equal to that of men.
- 183.** Along with the mining and construction sectors, the oil and gas industry has one of the lowest rates of diversity in its workforce. This is an issue across all oil and gas producing countries and companies, both IOCs and NOCs.

¹³⁸ UNICEF, *Oil and Gas Scoping Study*, 2015.

- 184. In an assessment of gender diversity and inclusion in the oil and gas industry in 2021, which is based on a survey of 2,800 employees working across 60 countries, the World Petroleum Council and Boston Consulting Group found that the percentage of women oil and gas workers remains unchanged at 22 per cent, the same level reported in 2017.¹³⁹
- 185. There are important regional differences in terms of the share of women in the oil and gas workforce. In Europe, women’s representation has risen from 24 per cent to 33 per cent due to proactive policies put in place by national governments, such as Germany and the Netherlands, whereas in Asia and the Pacific, the opposite happened: the share of women employment declined from 19 per cent to 8 per cent between 2017 and 2020 (figure 32).

► **Figure 32. Women as a percentage of the total oil and gas workforce, by region**



Source: Ulrike von Lonski, et al, *Untapped Reserves 2.0: Driving Gender Balance in Oil and Gas*.

- 186. National statistics furthermore highlights the intersectionality of discrimination in the oil and gas industry. In the United States, for instance, Bureau of Labor Statistics data shows that only 20.2 per cent of “oil and gas extraction” workers are women, compared with 46.8 per cent in the overall workforce, and that African American workers represent only 6.2 per cent in the same category, compared with 11.9 per cent overall.¹⁴⁰
- 187. Additional challenges include the under-representation of women in entry-level jobs, the lack of women in technical and operations roles and expatriate positions, the low uptake of existing diversity and inclusion policies, the persistent unconscious biases around gender-related challenges, and the low female representation in senior roles. Although the number of women on boards of oil and gas companies doubled between 2009 and 2019, reaching 14 per cent, there is fewer than one female board member out of every five.¹⁴¹

¹³⁹ Ulrike von Lonski, et al., *Untapped Reserves 2.0: Driving Gender Balance in Oil and Gas*, World Petroleum Council and Boston Consulting Group, 7 December 2021.

¹⁴⁰ Jeff Brady, “Big Oil has a Diversity Problem”, *NPR*, 5 November 2017.

¹⁴¹ Jodi Shafto, “Oil, Gas Sector Struggling To Attract, Elevate Women Amid Gender Diversity Gap”, *S&P Global Market Intelligence* (blog), 23 September 2019.

- 188.** Violence and harassment against women is also reported to be an issue in the industry, and includes but is not limited to catcalling, crude language, groping and rape. This is exacerbated by lax management, poor handling of harassment claims, and a lack of support from upper management and human resources departments. It has been reported that many women have even been fired when filing a complaint.¹⁴² Additionally, the sector has had to deal with numerous complaints of racism and struggles to become a more diverse workplace.
- 189.** There are, nonetheless, signs of progress. The analysis by the World Petroleum Council and Boston Consulting Group shows that more companies are implementing diversity and inclusion policies and offering maternity leave. More than 95 per cent of them are supporting equal pay, offering paternity leave, and have sexual harassment policies in place. These policies are slowly evolving to include childcare support and making diversity a key component of leadership remuneration.¹⁴³
- 190.** To address the challenges and opportunities, oil and gas-producing countries can, as a first and tangible step to advance gender equality and address discrimination, repeal and revise any laws, policies and regulations that discriminate against women and other groups in the sector. Governments should furthermore enact laws and policies that embody the principle of equality of men and women, and support women in the economic, social and civil life of society.

3.5.4. Occupational safety and health

- 191.** The nature of the work in the oil and gas sector exposes workers to increased risks of accidents and diseases such as explosions, drowning, electrical shock, helicopter crashes, falling and moving objects, hazardous substances, noise and vibration, and biological agents, as well as to psychosocial risks and stress that can lead to alcohol or drug abuse, or violence or harassment.
- 192.** Combined with fly-in fly-out (FIFO) operations, time zone changes, and 24/7 operations, the extended working hours and the concentrated work patterns described above can cause sleep loss, fatigue and psychological disruption leading to reduced alertness and performance, loss of production and increased accidents.¹⁴⁴ The two main types of risks associated with fatigue are operational risk resulting from human error (for example, risk of explosion, fire, structural failure, shut-down, reduced productivity), and risk to the physical and psychological well-being of individuals (for example, injury, illness, sleep disturbance, anxiety).¹⁴⁵
- 193.** The remote locations of oil and gas operations which are exposed to adverse weather conditions pose specific occupational safety and health risks to oil and gas workers. In addition to exposure to extreme heat and cold, the remoteness of oil and gas installations may also compromise access to health and emergency facilities. Oil and gas workers in remote areas are furthermore at risk from insurgent attacks targeting energy infrastructure to achieve political and economic aims, gang and criminal activity, actions by domestic extremist groups and international terrorism.
- 194.** These and other occupational safety and health challenges were the subject of ILO reports and ILO tripartite meetings, namely the [Tripartite Sectoral Meeting on Occupational Safety and Health and Skills in the Oil and Gas Industry Operating in Polar and Subarctic Climate Zones of the](#)

¹⁴² Arya Sundaram, "The Oil and Gas Industry Hasn't Reckoned with #METOO", *Texas Observer*, 14 December 2020.

¹⁴³ Von Lonski et al., *Untapped Reserves 2.0: Driving Gender Balance in Oil and Gas*.

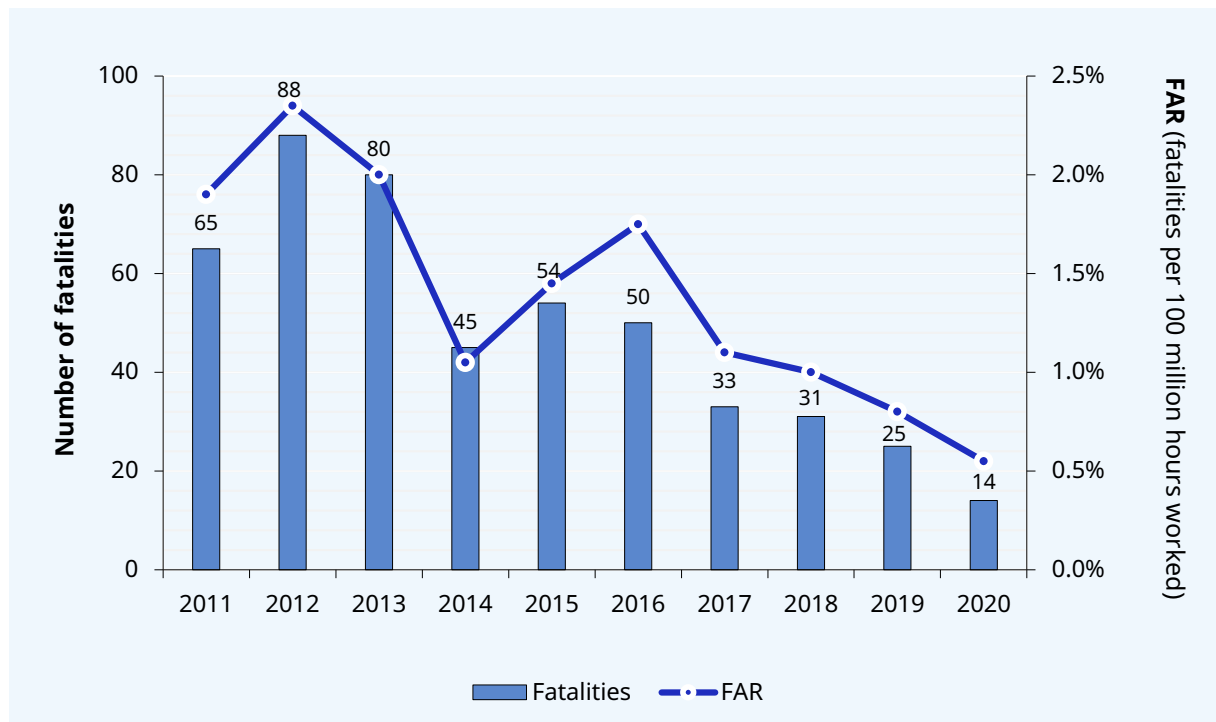
¹⁴⁴ IPIECA-IOGP, *Managing Fatigue in the Workplace: A Guide for the Oil and Gas Industry*, IOGP Report 626, 2019.

¹⁴⁵ Katherine Parkes, *Working Hours in the Offshore Petroleum Industry, Current Knowledge and Research Needs Regarding Extended Work Periods and Shift Work Offshore*, presented to a conference on "Work Time Arrangements in the Petroleum Industry". Petroleum Safety Authority, Norway, 15 March 2007.

Northern Hemisphere (26–29 January 2016) and the Sub-Saharan African Tripartite Workshop on Occupational Safety and Health in the Oil and Gas Industry (17–18 May 2017). The Conclusions and Points of Consensus from these meetings contain recommendations or future action by governments, employers and workers to prevent occupational fatalities, injuries and illness and to continuously improve occupational safety and health in the sector.

- 195. The oil and gas industry has for years developed and implemented occupational safety and health management systems, not only for oil and gas extraction and production, but also for the construction of oil and gas installations and infrastructure. These management systems are increasingly implemented as part of environmental management systems and often include fatigue risk managements systems.
- 196. According to the annual safety performance indicators that the International Association of Oil & Gas Producers (IOGP) published in 2021, the safety and health performance of 48 of its members has improved significantly over a period of ten years: from 65 oilfield fatalities in 2011 to 14 in 2020. During the same period, the rate of fatalities per 100 million hours worked fell from 1.6 to 0.5 (figure 33).

► **Figure 33. Number of fatalities and fatal accident rate (FAR) (2011–20)**

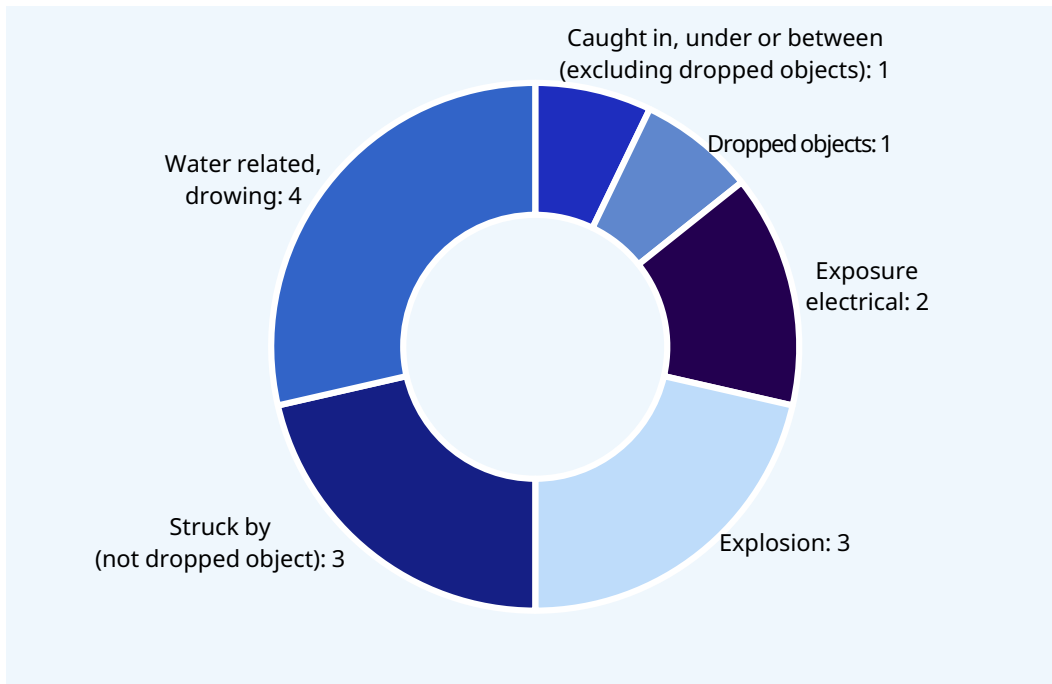


Source: International Association of Oil & Gas Producers (IOGP), 2021

- 197. As shown in figure 34 below, 29 per cent of the fatalities reported in 2020 were the result of incidents categorized as “water related, drowning” (4 fatalities in 3 separate incidents). Fatalities categorized as “explosion” accounted for 21 per cent of the fatalities (3 fatalities in 2 separate incidents). Another 3 fatalities (in 3 separate incidents) were categorized as “struck by (not dropped object)”, and 2 fatalities (in 2 separate incidents) were categorized as “exposure electrical”.¹⁴⁶

¹⁴⁶ IOGP, *Safety Performance Indicators: 2020 Data*, May 2021.

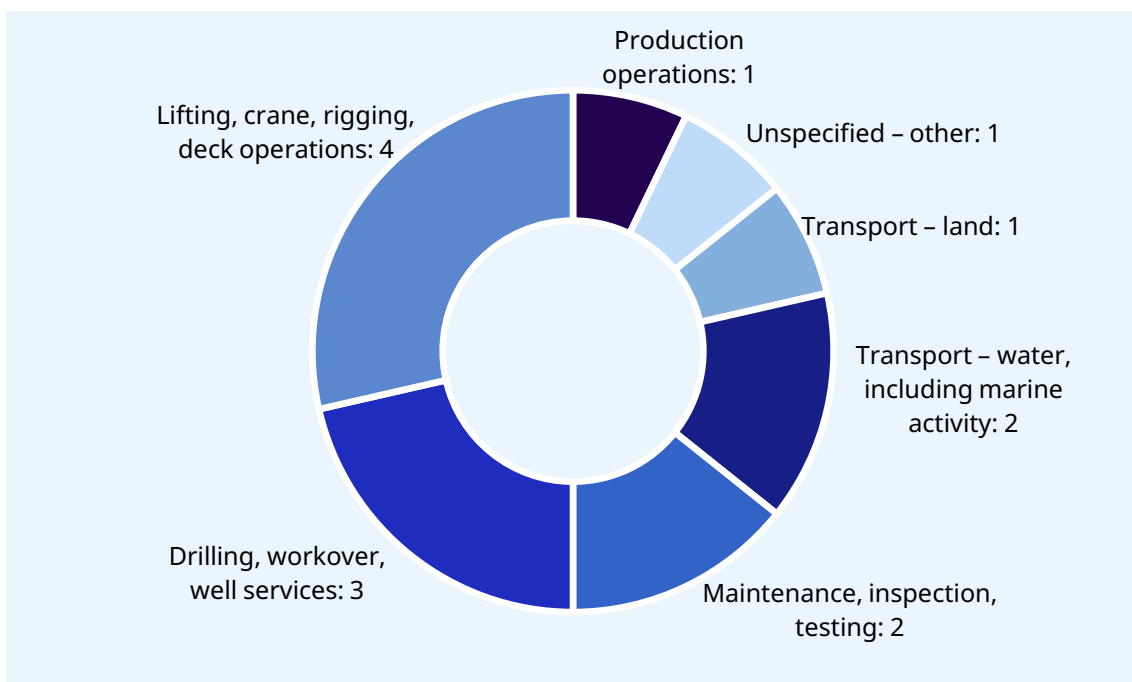
▶ **Figure 34. Number of fatalities by incident cause, 2020**



Source: IOGP, Safety Performance Indicators: 2020 data, 2021

198. The activity associated with the highest number of fatalities was “lifting, crane, rigging, deck operations” (29 per cent) with 4 fatalities as a result of 4 separate incidents. There were 3 fatalities (21 per cent) reported in 2 separate incidents in the “drilling, workover, well services” activity, and 2 fatalities in 2 separate incidents were reported in the “maintenance, inspection, testing” activity (figure 35).

▶ **Figure 35. Number of fatalities by activity, 2020**



Source: IOGP, Safety Performance Indicators: 2020 data, 2021

- 199.** Occupational safety and health risks in the oil and gas sector are constantly evolving as a result of climate change, including but not limited to extreme heat and weather events, the introduction of new technologies, and as oil and gas extraction and production moves to new geographies. Occupational safety and health risks are furthermore higher in countries with an emerging oil and gas industry and limited experience in the management of these risks. The construction of new oil and gas installations and infrastructure is complex with tight deadlines and can be particularly hazardous.
- 200.** The same applies to the dismantling of oil rigs and other specialist offshore infrastructure at the end of the life cycle. Many governments and companies have made significant investments in infrastructure and facilities to dismantle oil rigs safely. However, there are reports of such oil and gas infrastructure being dismantled and broken on beaches of Bangladesh, India and Pakistan by low-paid and unskilled workers operating in extremely poor conditions and without adequate personal protective equipment.¹⁴⁷
- 201.** While consistent data is lacking, safety and health performance tends to be poorer in countries without robust safety and health legislation and policies in place and the capacity of labour inspectors to enforce these. Participants in the ILO Sub-Saharan African Tripartite Workshop on Occupational Safety and Health in the Oil and Gas Industry (17–18 May 2017) furthermore noted that workers in non-standard forms of employment sometimes lack protection in law and practice, and that their fatal accident rates are generally higher than the ones of regular oil and gas workers.

3.5.5. Other international labour standards

- 202.** International labour standards offer a robust framework for addressing the issues faced by the oil and gas industry today and in the future, including those associated with the greening of the economy and the energy transition. Several ILO instruments, in addition to the fundamental Conventions mentioned above, and relating to social dialogue, tripartite consultation, minimum wage, labour administration and inspection, employment policy, human resource development, as well as social security are important in this regard. Annex 1 of the ILO *Guidelines for a just transition* set out some international labour standards and ILO resolutions that may be relevant to a just transition framework.
- 203.** In addition to these Conventions, the Indigenous and Tribal Peoples Convention, 1989 (No. 169), is of particular relevance to the future of work in the oil and gas sector given the industry's historical impact on indigenous and tribal peoples and the complex issues that oil and gas companies need to consider when operating in areas with indigenous and tribal peoples. The ILO Convention has been crucial in shaping national laws and policies regarding indigenous and tribal peoples as it covers a wide range of issues, including land rights, access to natural resources, health, education, vocational training and conditions of employment. The fundamental principle of the Convention is that indigenous and tribal peoples should be consulted and participate fully at all levels of decision-making processes that concern them.
- 204.** The Canadian oil and gas industry has publicly committed to working together with indigenous and tribal peoples and to ensure their participation in decisions that impact them, their rights and communities. Through a process based on the concept of free, prior, and informed consent (FPIC), companies strive to ensure consistent corporate guidelines, early engagement of communities, transparent consultation processes, incorporation of traditional knowledge, and long-term dialogue.

¹⁴⁷ FE Online, "In Gujarat's Alang, More Oil Rigs Are Arriving at Ship Graveyard than Ever; Here's Why", *The Financial Express*, 8 May 2018.

205. In this regard, Canada has seen an increase of indigenous workers in the sector between 2009 and 2019. Data from Statistics Canada reflects that indigenous workers represented over 6 per cent of the upstream oil and natural gas sector workforce in 2019, almost double their representation in the country’s total workforce (see table 5).¹⁴⁸

▶ **Table 5. Indigenous employment and wages in Canada**

Indigenous employment and wages	2009	2019
Share of jobs in upstream industry	5.1%	6.3%
Senior management roles in energy sector	1.3%	1.7%
Indigenous male employees vs other male employees, energy sector (wage gap)	14%	10%

Source: CAPP, “Indigenous Engagement and ESG Report” 2021.

206. Notably, the oil and gas and mining sectors represent the highest paying occupations for Indigenous workers in Canada with Indigenous women earning three to four times more in wages from occupations in oil and gas than from median wages across all industries (see table 6). Additionally, it is the only sector where Indigenous women had a higher median weekly wage than non-Indigenous women.¹⁴⁹

▶ **Table 6. Top and bottom 10 NAICS sectors by employment income for Aboriginal women in Canada (2015)**

Industry – North American Industry Classification System (NAICS) 2012	An employment income in 2015 (\$) for Aboriginal women in Canada
Top 10 sectors	
4862 Pipeline transportation of natural gas	114 208
486 Pipeline transportation	105 468
211 Oil and gas extraction	84 710
4861 Pipeline transportation of crude oil	83 925
3253 Pesticide, fertilizer and other agricultural chemical manufacturing	74 262
2212 Natural gas distribution	71 447
2121 Coal mining	68 166
3314 Non-ferrous metal (except aluminum) production and processing	66 371
2211 Electric power generation, transmission and distribution (includes fossil-fuel electric power generation)	64 068
482 Rail transportation	62 896
Average (all industries)	26 207

¹⁴⁸ Canada’s Oil & Natural Gas Producers (CAPP), “Indigenous Engagement and ESG Report”, October 2021.

¹⁴⁹ Heather Exner-Pirot, *Pathways to Indigenous Economic Self-Determination* (Macdonald-Laurier Institute, May 2021).

Industry – North American Industry Classification System (NAICS) 2012		An employment income in 2015 (\$) for Aboriginal women in Canada
Bottom 10 sectors		
711	Performing arts, spectator sports and related industries	10 321
487	Scenic and sightseeing transportation	9 801
7113	Promoters (presenters) of performing arts, sports and similar events	9 077
814	Private households	8 998
4872	Scenic and sightseeing transportation, water	8 791
7115	Independent artists, writers and performers	8 602
7112	Spectator sports	6 336
3271	Clay product and refractory manufacturing	6 207
1142	Hunting and trapping	4 490
7131	Amusement parks and arcades	4 267

Source: Exner-Pirot, *Pathways to Indigenous Economic Self-Determination*.

3.6. Social dialogue and labour market institutions

- 207. Sound employment relations and effective social dialogue contribute to good governance in the workplace, decent work, inclusive economic growth and democracy. Social dialogue, in all its forms and including cross-border social dialogue, remains vital to meeting the challenges and opportunities faced by the oil and gas industry, both today and in the future. From job losses to skills training, and from addressing discrimination to changing requirements in occupational safety and health, social dialogue can help governments, employers and workers find solutions and facilitate the promotion of decent and sustainable work.
- 208. Social dialogue is particularly critical in ensuring that employers and workers in the oil and gas sector are involved in the formulation of policies and actions to ensure a just energy transition. It has a fundamental role in promoting frameworks, legislation and policies that bring together both social, economic and environmental concerns, including sustainable industrial policies and plans for a just transition.

3.6.1. Employer and business membership organizations

- 209. National oil and gas associations are the most common form of employer and business membership organization in the oil and gas industry. They promote the interests of their members, negotiate agreements with trade unions and support the development of the oil and gas sector. In most countries, these associations and their members are affiliated with, and represent their members’ interests within, national employer and business membership organizations (EMBOs), for which the [International Organisation of Employers](#) is the apex body, as well as other national policymaking and advocacy forums.
- 210. EMBOs help to create the conditions for enterprise success by influencing the environment in which they do business and by providing services that improve their individual performance, including for businesses in the oil and gas industry and its supply chains. They also play a critical role in supporting the energy transition. The Confederation of Danish Employers, for instance, represents its members in the Danish Offshore Safety Council, and is actively promoting the developments of skills and lifelong learning that is critical to a successful energy transition.

- 211.** At the global level, the [IOGP](#) is the voice of the global upstream oil and gas industry. Its membership consists of most of the world's foremost publicly traded, private and state-owned oil and gas companies as well as industry associations and upstream service companies. IOGP members operate around the globe and produce 40 per cent of the world's oil and gas.¹⁵⁰
- 212.** The [IPIECA](#) is a global oil and gas association dedicated to advancing environmental and social performance across the energy transition. It brings together members and stakeholders to lead in integrating sustainability by advancing climate action, environmental responsibility and social performance across oil, gas and renewables activities. It was founded at the request of the UN Environment Programme in 1974. Through its non-lobby and collaborative approach, IPIECA remains the industry's principal channel of engagement with the UN.
- 213.** Finally, there are a number of voluntary oil and gas initiatives that have gained traction. These include but are not limited to the Oil & Gas Climate Initiative ([OGCI](#)), the Global Methane Initiative ([GMI](#)), the Climate & Clean Air Coalition ([CCAC](#)) and the Oil & Gas Methane Partnership 2.0 ([OGMP 2.0](#)).

3.6.2. Workers' organizations

- 214.** Beginning in the nineteenth century, and continuing through the twentieth, workers have formed oil and gas unions in many countries. While their power and membership vary considerably, many have been successful in bargaining collectively for better working conditions and protection for their members.
- 215.** Many national oil and gas unions are affiliated to [IndustriALL Global Union](#) and the International Trade Union Confederation ([ITUC](#)), which work to build trade union power and strengthen trade unions in the oil and gas sector through global support networks, and by campaigning and organizing. IndustriALL Global Union has launched several campaigns to advance decent work in the oil and gas industry and it manages five regional oil and gas networks (that is, Middle East and North Africa Oil and Gas Union Network; Asia-Pacific Oil and Gas Union Network; Latin American – Caribe Oil and Gas Union Network; CIS Oil and Gas Union Network; and sub-Saharan Africa Oil and Gas Union Network). It has entered into global framework agreements with nine multinational energy companies (that is, EDF, ENEL, ENGIE, Equinor, Siemens Gamesa, Eni, Lukoil, Total and Petrobras) and has created trade union networks in three companies (that is, the Shell Global Union Network; Enel Latin America Network; and Repsol Latin America Network).
- 216.** ITUC and IndustriALL Global Union are, together with other global union federations, calling for action to address climate change and to ensure a just transition globally and in the sectors they represent, including in oil and gas. ITUC demands for a just transition includes “respect the contribution that workers in fossil-fuel industries have made to today's prosperity and provide them with income support, retraining and redeployment opportunities, as well as secure pensions for older workers”. A just transition should furthermore be backed up by essential social protection and a just transition fund in every nation, and be based on social dialogue with all relevant parties, collective bargaining with workers and their unions and the monitoring of agreements which are public and legally enforceable.
- 217.** ITUC and IndustriALL, jointly with the Norwegian Confederation of Trade Unions (LO) Norway, have recently launched a new [initiative for a just transition in the energy sectors](#), which brings together unions and experts to share information on jobs, skills, markets, investments, and emissions for technologies such as hydrogen, CCS, offshore wind and other renewables,

¹⁵⁰ IOGP, “[About IOGP](#)”.

alternative fuels, and energy services. They are organizing thematic and country workshops looking for answers like how the transition will affect existing jobs, how many jobs the transition will create, whether they will be good jobs, when do the jobs appear, what skills do workers need or what policies and investments do we need to secure good jobs during this change, among others.

3.6.3. Labour administration and inspection

- 218.** Governments also play a critical role in supporting the effective implementation of international labour standards and national labour laws through their labour inspectorates. Labour inspectors support the creation of better working conditions for women and men by verifying how national labour standards are applied in the workplace, and can advise employers and workers and their organizations in the oil and gas sector how to make improvements in areas such as working time, wages, occupational safety and health, and child labour.
- 219.** However, the critical role and independence of labour inspectorates to enforce legislation is in many countries undermined by weak capacity, poor governance, including corruption, and a lack of equipment, specialized training and of human and financial resources. This limits their numbers and effectiveness and means that inspections of remote oil and gas installations in some countries rarely takes place. There is great potential to make labour inspection more effective by promoting awareness of the purposes and benefits of inspection, strengthening the role of current labour inspection systems, revising outdated legislation relating to labour inspection, promoting proper planning of regulatory activities, and providing workers and their representatives with proper competence to be involved in matters related to safety and health, among others.¹⁵¹

¹⁵¹ ILO, *Labour Inspection in the Petroleum Producing Industry*, Part 3, 1994.