ABS

SUSTAINABILITY INSIGHTS:
OFFSHORE ENERGY SERIES

INDUSTRY AND MARKET TRENDS

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INTRODUCTION AND INDUSTRY TRENDS

As a route for international shipping and as a source for energy supplies, the ocean is fundamental to the world's economy. According to the United Nations (U.N.), three billion people depend on marine resources and coastal biodiversity for their livelihoods, driving the market value of the ocean to $1.5 to $3 trillion per year.[1]

An awareness of the health of our society and planet, through technology and communication, has raised expectations for people, governments, and industries to end harmful practices and support the development of sustainable methods of doing business. Energy demand and energy inequity[2] continue to grow as the energy transition looks to explore and develop renewable sources. Approximately one billion people do not have access to electricity and another 2.6 billion do not have access to clean fuels for cooking. Additionally, the population of earth is expected to grow by another two billion people by 2050. Almost one-third of the energy used on our planet is produced in the offshore environment. Oil and gas account for more than 99 percent of the offshore energy produced. Growth in oil, gas, wind, and subsea mining is projected to continue through 2040 in all scenarios of the energy transition. Renewable energy sources are projected to grow significantly during this time, but oil and gas will still represent 40 percent of the energy consumed[3].

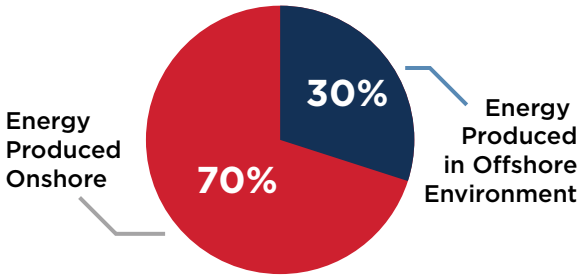


Figure 1: World energy production (all types).

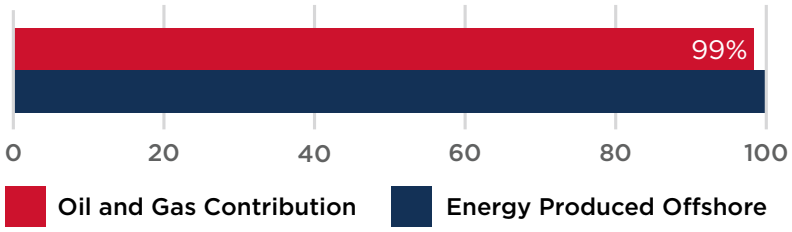


Figure 2: Oil and gas contribution to offshore energy production.

The leaders of oil and gas companies are keenly aware of the need to improve sustainability in their operations and are now addressing it[4]. Within these companies the view towards sustainability has changed from being good corporate citizens to being critical elements for future long-term business competitiveness. A survey by Systems Applications and Products (SAP) and Oxford Economics indicated that energy and utility executives made more sustainability-related changes in their operations than other industries. Of these executives, 79 percent indicated that sustainability was a major concern in all phases of their operations and 47 percent of the executives noted they were committing to a net-zero carbon goal.[4]

Significant advances in oil and gas sustainability efforts are often overlooked due to the greenhouse gas (GHG) emissions related to the industry. The oil and gas industry contributes the second highest amount of GHG emissions on our planet, emitting 13 million metric tons of methane per year, with a global warming potential of 28-32 times greater than carbon dioxide.[3] Expanding energy supplies, while increasing efficiency, developing decarbonizing operations, and lessening impacts from human activities, requires a comprehensive suite of solutions to understand, conserve, and sustainably use the marine environment.

1.0 CURRENT SUSTAINABILITY STATUS OF THE OFFSHORE INDUSTRY

The offshore oil and gas market is transitioning to more sustainable forms of energy. Beginning with the Paris Accords of 2015, ratification at the 21st session of the Conference of the Parties (COP21), this transition has gained momentum and has taken on a new visibility and scale in the aftermath of the COP26 climate summit.

The culmination of these efforts was the ratification of the Glasgow Climate Pact, an agreement of almost 200 nations to hold the global average temperature increase in 2050 to 1.5º C. Signers of the pact publicly committed to accelerate the transition to sustainable energy from renewable sources and to lower carbon emissions by reducing fossil fuel use.[5] However, since COP26 in Glasgow and the holding of COP27 in Sharm el-Sheikh, only 29 of 194 countries have publicly reported on tightened national plans for decarbonization.[6]

Sustainability is a significant global issue and all industries are impacted, especially the oil and gas sector since it is a hydrocarbon-based industry. External stakeholders, whether it is the financial community, or the general public, are growing increasingly more concerned and therefore more interested in how the oil and gas industry is addressing this issue.

The oil companies, whether they are international oil companies, national oil companies, or independents, face external pressure to perform their activities in a more sustainable way in order to avoid the risk of limited access to investment (which is usually is linked to sustainability performance) necessary to develop oil and gas fields. This pressure will formally and informally flow to their entire supply chain since any sustainability initiative will require a holistic approach and support.

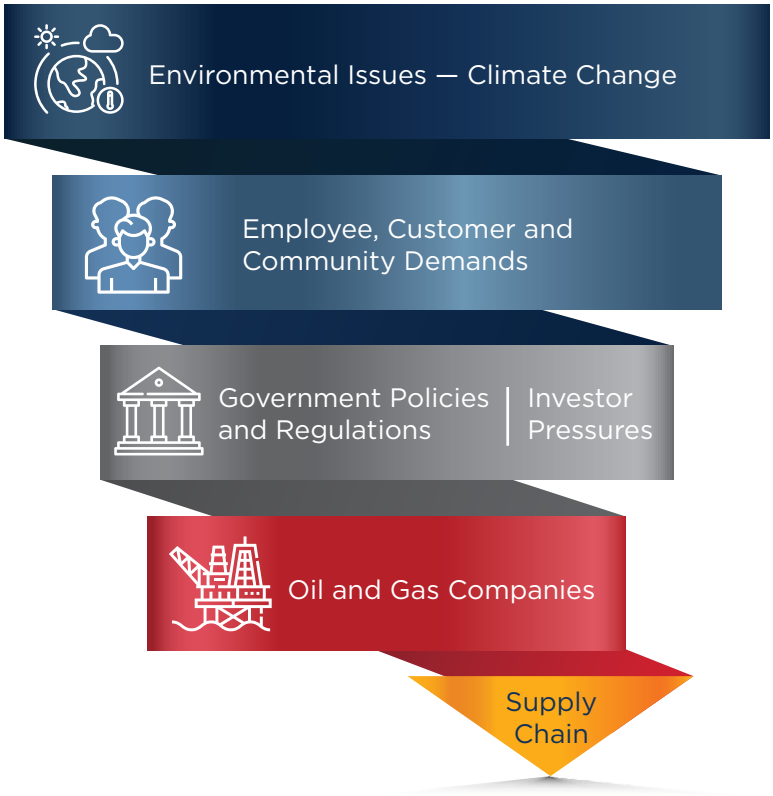


Figure 3: The flow of interest and pressure for sustainability in the oil and gas sector.

1.1 ESG TRENDS — OFFSHORE OIL AND GAS INDUSTRY

Environmental, social and corporate governance (ESG) factors are considered when investing in a company. ESG criteria are critical when analyzing and reporting on how a company serves all stakeholders, including workers, communities, customers, vendors, shareholders and the environment.

ESG is important for the oil and gas industry as momentum continues to build to promote renewable energy, sustainability and the energy transition, as investors, governments and individuals remain focused on issues such as climate change, labor standards, diversity and corporate governance.

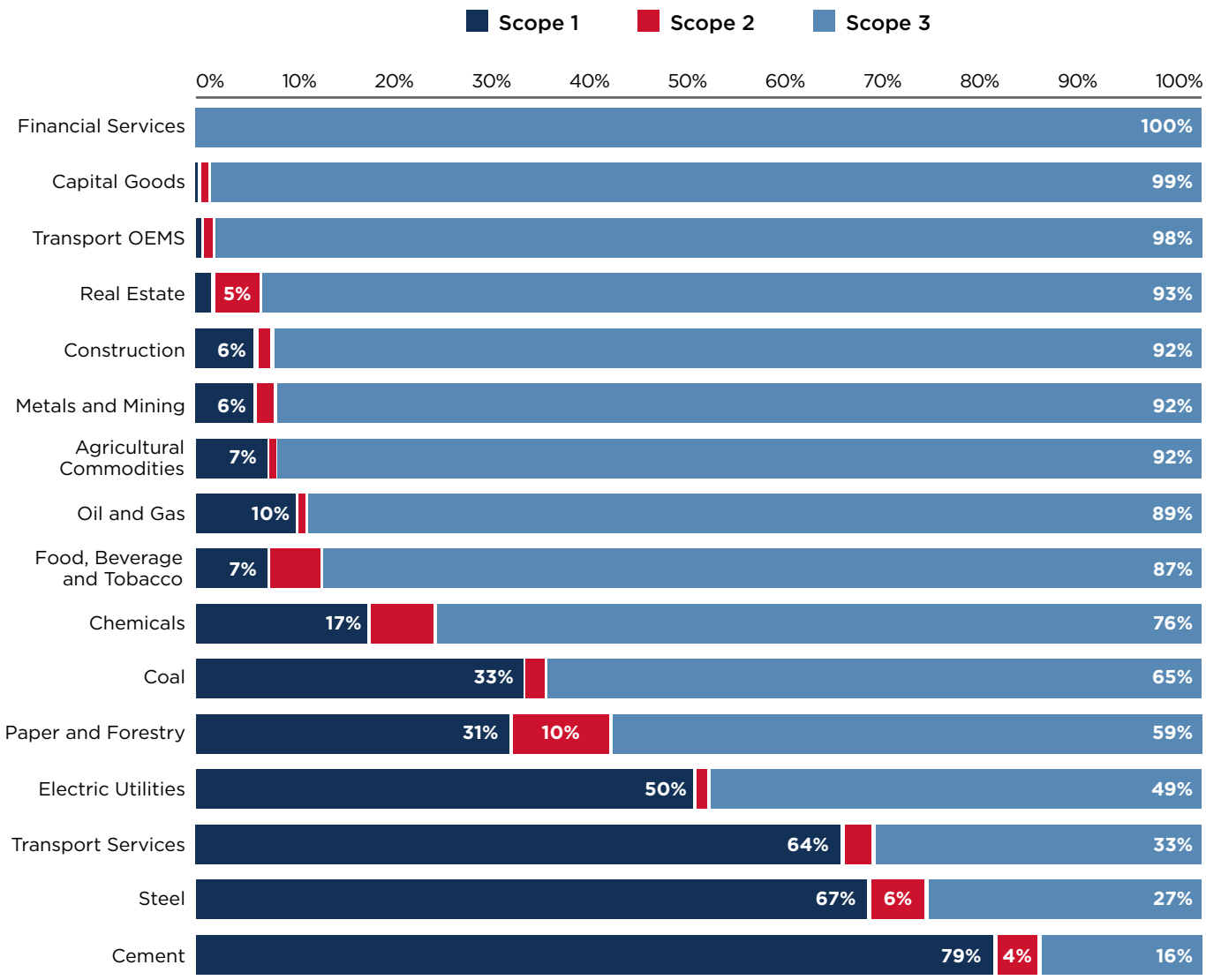
Most oil and gas companies have been implementing ESG strategies for years through initiatives to reduce emissions, responsible water use and disposal, and research and development into renewable energy programs. The current push to track and report ESG programs is seen as an opportunity for oil and gas companies to promote, validate and expand upon these efforts.

There is a correlation between the sustainable focus business practices and the successful financial performance of companies. A lack of an ESG strategy will ultimately affect a company's access to public, and increasingly private, capital.[7]

Mergers and acquisition (M&A) activity is below pre-pandemic levels even as oil prices have rebounded. This is not typical for a rebounding oil market. Increased capital discipline is the primary reason for the decrease in M&A activity but so is the lack of clarity in the carbon profile of sellers and their assets. Company growth strategies are now more often centered around the acquisition of low-carbon-intensity barrels and divesting of high-intensity ones, a strategy to support ESG goals.[8]

KEY MACROECONOMIC TRENDS[9]

1. **The Paris Agreement**
   This international treaty and subsequent required reductions in GHGs will cause governments to take measures to discourage emissions, harming the economic viability of the oil and gas industry.
2. **Carbon Pricing**
   Oil and gas companies will need to be cautious and strategic about their operations in nations with strict climate ambitions and associated carbon taxes.
3. **Renewable Energy Mandates**
   As the world continues to recover from the COVID-19 pandemic, nations are seeing higher percentages of energy demand met by renewables. The European Union (EU) has dedicated 30 percent of its recovery package to green and digital transitions. Many U.S. states are requiring utilities to purchase between 10 percent and 20 percent of their power from renewables.
4. **China and India**
   Both countries are primary contributors to the growth in global energy demand. Currently their power mixes are far more hydrocarbon-heavy than those of Western nations. Supplying demand while meeting reductions in GHG emissions will be challenging.
5. **Investor Pressure**
   In May 2021, ExxonMobil shareholders removed much of the company's board and installed new directors to aggressively pursue lower emissions. Chevron investors challenged executives by setting the company's first emission target. Shell was ordered by a Dutch court to reach a 45 percent reduction by 2030.
6. **Scope 3 Emissions**
   Emissions are categorized as either Scope 1, 2, or 3. Scopes 1 and 2 are emissions that are owned or controlled by an organization. Scope 3 emissions are a consequence of the activities of the company but occur from sources not owned or controlled by it. Especially from an investor's point of view, Scope 3 emissions are an important source of risk since these most often account for the largest share of all emissions (Scopes 1, 2, and 3) from an organization. There are arguments against[10], and for, reporting Scope 3 emissions but the momentum is swinging strongly "for reporting." The ability to understand climate related financial risks, reducing actual Scope 3 emissions, preventing companies from outsourcing carbon intensive activities (moving Scope 1 and 2 emissions to Scope 3), and preventing companies from being fully transparent to their shareholders is trending towards more complete reporting. Scope 3 emissions are simply too important to omit.[11]



Source: Data is from CDP. Research and analysis of the data was conducted by Concordia University.

Figure 4: Share of scope 3 emissions to total emissions by sector.

1.2 DECARBONIZATION

A clean energy future is underway, and the transition process will change most every aspect of energy companies' assets and operations. Leading drivers of decarbonization include:[2]

- Equipment, technology, and operational cost reductions
- Government policies and regulations
- Employee, customer, and community demands
- Investor pressures

For the world to reach climate change goals, the oil and gas industry will have to play a major role in reducing its own GHG emissions. Oil and gas industry operations account for nine percent of all human generated GHG emissions (Scopes 1 and 2). The fuels manufactured by the oil and gas industry create an additional 33 percent of global emissions (Scope 3). Therefore directly, and indirectly, the oil and gas industry contributes 42 percent of global emissions.[13]

Of all the drivers to decarbonize, investor pressure has been particularly direct and intense. UBS announced in March of 2020 that it would no longer fund offshore drilling in the Arctic. Other U.S. banks, including Wells Fargo and Goldman Sachs have also announced similar policy shifts.[14] In a world seeking to limit the increases in global temperatures, investors want to understand the long-term investment strategies of oil and gas companies as well as risks and possible opportunities.

Scope 1 and 2 emissions produced during oil and gas operations are generally under the control of the company. Companies seek to lower the carbon intensity of these operations by the following mitigation strategies.

- Reducing routine flaring
- Electrifying operations and incorporating renewable energy to fulfill power requirements
- Adopting the use of low or no emission fuels (hydrogen, biofuels, ammonia, e-fuels/ synthetic fuels)

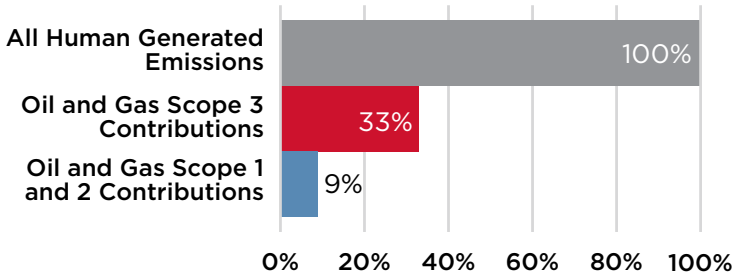


Figure 5: Oil and gas direct and indirect GHG emissions.

- Employing methane mitigation and capture (fugitive emissions, venting)
- Enhancing energy efficiency and reducing energy intensity through common standards and practices
- Optimizing production and reservoir management by using digital tools like the Internet of Things (IoT), sensors, digital twins, and virtual reality to track emissions and energy use, monitor operations, model scenarios, and proactively maintain equipment
- Calling upon the principles of a shared economy to improve logistics for more efficient fuel consumption (e.g., sharing trucks, marine vessels, and helicopters)
- Increasing carbon capture, utilization, and storage (CCUS)

The reality of decarbonization is that many companies are at different stages of preparing their GHG reduction plans. In planning a decarbonization strategy, a company could ask the following questions.[17]

1. What are our goals and targets for GHG reductions?
   a. Next three to five years?
   b. Five to 10 years?
   c. Out to 2050?
2. What is the most effective way, considering cost and performance improvements, to decarbonize our various sources of emissions?
3. How do we manage the process?
   a. The right organizational setup?
   b. Allocating funds for decarbonization across the entire enterprise?
   c. Measuring success?
4. How do we involve all stakeholders to support our decarbonization strategy?
   a. Investors?
   b. Employees?
   c. Customers?
   d. Governments?
5. How do we align our decarbonization goals with the larger energy transition?

2.0 PRESSURE ON THE INDUSTRY FOR EMISSION QUANTIFICATION AND DISCLOSURE

While the oil and gas industry is concerned with climate change and is taking steps to reduce its GHG emissions, the real pressure to adapt and disclose is coming from the investment industry. Investors struggle with the lack of uniform standards for measurement and disclosure of emissions from the oil and gas industry.[18]

The regulatory landscape is rapidly changing, and the result is that there is collective pressure being placed on asset managers, financial institutions and companies to calculate, manage and report their GHG emissions. Some of the pressures include the following:

- Carbon disclosure mandates
- Increased consumer awareness around climate issues
- Growing climate risks associated with investments
- Growing critical need to measure, manage, and report Scope 3 emissions due to the reality that, especially for the oil and gas industry, Scope 3 emissions make up the bulk of all emissions from these companies.

Asset managers will play a pivotal role in the energy transition process by mitigating and adapting to climate change by directing the flow of capital towards a decarbonized economy. Their goal will be to maximize economic opportunities in the transition process and mitigate risks in their portfolios from negative climate-related impacts.

2.1 ENVIRONMENTAL CONCERNS

The primary environmental concern related to GHG emissions is an increase in global temperatures. Carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O) and fluorinated gas emissions all impact the earth's atmosphere, along with the greenhouse effect that makes life possible on our planet. Human activities, specifically the burning of fossil fuels, have intensified the greenhouse effect causing global warming. Other effects of GHG emissions include ocean acidification, smog pollution, ozone depletion as well as changes to plant growth and nutrition levels.[20]

A research team from Princeton University performed a survey using laser-based instruments of facilities producing oil and natural gas in the North Sea and found that there was far more leakage of methane than was being estimated by the U.K. government, 0.13 percent of production by U.K. estimates. The survey identified an additional 0.19 percent occurring from normal operations (equivalent to 330,000 cars on the road).[21]

This disparity between estimated and measured emissions becomes critical when considering global emissions inventories and the mitigation of climate change. The researchers are raising concerns that policymakers might not be receiving accurate estimates for methane leakage and therefore cannot determine accurate policies for reducing emissions. Additionally, the researchers hope that the methods they used to measure leakage can be used by the offshore oil and gas industry to actively measure emissions to identify leaks, reduce emissions and improve company profits.

2.2 EMISSIONS PROFILE AND FUTURE PROJECTIONS

From a report issued by the Oil and Gas Authority (OGA) of the U.K. in October 2021, emissions coming from the U.K. Continental Shelf (UKCS) offshore production area have the following profile:

- 88 percent of all GHG emissions were CO_2 with three quarters originating from fuel combustion.
  - Out of 125 facilities on the UKCS, most were powered by field gas supplemented with diesel.
  - 70 percent of emissions were associated with on-site power generation.
    - Electrification of energy intensive equipment crucial for emission abatement
- Methane (CH_4) comprises around 10 percent of emissions on a CO_2 equivalent basis.
  - Roughly five percent of such emissions are associated with venting.
  - The remaining five percent coming from flaring due to combustion inefficiency or cold flaring.
- Nitrous oxide (N_2O) makes up two percent of emissions.
  - 90 percent of N_2O emissions are from fuel consumption with the remainder due to flaring.

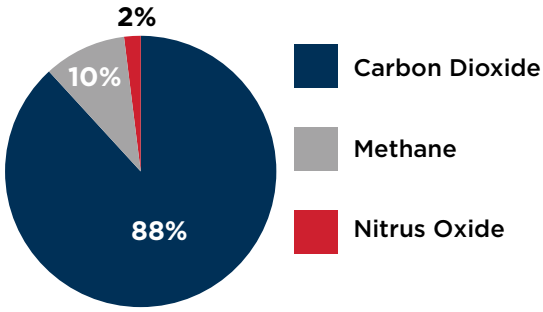


Figure 6: Emissions from the UKCS offshore production area.

As one could surmise, higher production levels coincide with higher emissions. To consider future emission projections, the U.K.'s overall emissions dropped 12 percent from 2019 to 2020 and an OGA report estimates a steady decline to 2024. From 2025 to 2040, emissions are expected to fall, after which they are projected to level out and remain steady at an annual value of one to two million metric tons of CO_2 equivalent.

GHG emissions from the U.K.'s oil and gas offshore production is widely consistent with the rest of the offshore oil and gas industry. Therefore, the emission profile identified in the U.K. report is expected to be very similar to other offshore drilling and production areas globally.

2.3 CARBON EMISSION ACCOUNTING SCHEMES AND METHODOLOGIES[23]

All stakeholders interested in understanding and quantifying carbon emissions generated by companies would prefer to have one method to measure and document carbon emissions. Having one method to document emissions would allow for easier comparisons between similar companies. However, the current situation for collecting carbon emission data includes many schemes used to accomplish this task. The following list details some of the most commonly used:

1. IPIECA, 2011, Petroleum Industry Guidelines for Reporting Greenhouse Gas Emissions
   a. GHG accounting and reporting should be based on the following principles:
      i. Relevance: Set boundaries that accurately reflect the GHG emissions and decision-making needs of the organization.
      ii. Completeness: Include all GHG emissions within the operational boundary.
      iii. Consistency: The methods and measurements should be standardized so that meaningful comparisons can be made over time.
      iv. Transparency: Be factual and clear with data collection and reporting. Indicate any assumptions made and include references to calculation methods used.
      v. Accuracy: Strive to neither over nor underestimate emissions based on actual emission levels. Ensure that the accuracy of data is such that users of the data can have confidence in the integrity of the information.
2. The Greenhouse Gas Protocol (GHGP), 1997
   a. Created following the Kyoto Protocol and guides organizations in developing inventories of their GHG emissions. Designed to simplify, improve consistency in carbon accounting, and provide organizations with a method to report and manage their emissions.
   b. In GHGP, all emissions fall into 1 of 3 Scopes. Scopes 1 and 2 are required to be measured, Scope 3 is optional.
      i. Scope 1: Direct emissions from an organization's operations.
      ii. Scope 2: Indirect emissions such as purchasing electricity, heating, and cooling.
      iii. Scope 3: All other indirect emissions from a company's value chain. The result of assets not owned or controlled by the reporting organization (e.g., suppliers, use of sold products).
3. ISO 14064, 2006
   a. An international standard for measuring and reporting GHG emissions.
   b. Part of the International Standardization Organization environmental management standards and broken down into three parts, each with a different technical approach:
      i. Part 1: Is guidance of quantifying a GHG inventory using a bottom-up data collection approach.
      ii. Part 2: Is the quantification and reporting of emissions from individual projects.
      iii. Part 3: Establishes a process to validate an organization's emissions.
   c. ISO 14064 is consistent with and derived from the GHGP.
4. The Task Force for Climate-Related Financial Disclosures (TCFD), 2015
   a. Developed to assess economic instability due to climate-related disruptions of organizations.
   b. Designed to apply to all organizations in any part of the world to give reliable, comparable, and forward-looking information to investors to base their investment decisions.
   c. Provides investors with relevant information they can use to understand opportunities and risks associated with climate risk in a market.
   d. The focus is on four main recommendations for disclosure.
      i. Governance: Disclose how a company is organized to respond to climate-related risks and/or opportunities.
      ii. Strategy: Disclose the actual and potential impacts of climate-related risks and opportunities on the organization's strategy and financial planning.
      iii. Risk Management: Disclose how the organization identifies, assesses, and manages climate-related risks.
      iv. Metrics and Targets: Disclose the metrics and targets used to assess and manage relevant climate-related risks and opportunities.
5. The Partnership for Carbon Accounting Financials (PCAF), 2015
   a. Created by Dutch banks to assist financial institutions with aligning their financed emissions with net-zero targets by 2050.
   b. Developed to be a disclosure standard for financed emissions.
   c. Provides guidance to measure and disclose the GHG emissions of eight asset classes (expected to grow)
      i. Listed equity
      ii. Corporate bonds
      iii. Business loans
      iv. Unlisted equity
      v. Project finance
      vi. Commercial real estate
      vii. Mortgages
      viii. Motor vehicle loans

3.0 CARBON PRICING[24]

Over the past few years, efforts have increased to tackle the climate crisis as the effects of climate change are getting severe and the issue is gradually moving to top of political agendas now. According to the latest Intergovernmental Panel on Climate Change (IPCC) sixth assessment report, global emissions would need to fall by 43 percent by 2030 to limit temperature rise to 1.5° C.[25] Over the past two years, many countries have made significant announcements and improvements to their Nationally Determined Contributions (NDCs). While these improvements are encouraging, analysis of NDCs, longer-term net zero targets and global initiatives show that a significant gap exists between current policy mechanisms and expected outcomes.[26]

While carbon prices over the past few years have reached record highs across emission trading systems (ETSs) and carbon tax, most prices are below what will be needed to achieve net zero by 2050. Increased ambitions in carbon pricing will play a key role in closing the policy gap. Carbon pricing is a cost-effective tool that governments can use in their broad climate strategy. Incorporation of climate change costs into economic decisions can help shift production, consumption, and investment patterns towards low-carbon growth.

"Put a price on carbon" is a phrase that is well known with momentum growing amongst countries and businesses to put a price on carbon pollution to create an incentive mechanism to not only drive emissions down, but also push them to invest into cleaner options. The concept of carbon pricing aims to externalize the costs of carbon emissions, i.e., the cost that external stakeholders (public/society at large) pay due to damage to crops, health care costs due to heat waves and damage to property due to sea level rise.[27]

The aim is to shift the costs back to the responsible party and act as an economic signal to help polluters decide how to reduce their burgeoning carbon emissions, and related costs. Carbon pricing also helps stimulate clean technology, since over the long term, the low-carbon alternative will be attractive as market behavior takes over and rewards low-carbon products and services. This will create a virtuous cycle of carbon pricing leading to development of low-carbon technology and consumer behavior shifting towards greater consumption of those products and services.[28]

Carbon pricing can be typically grouped into two categories:

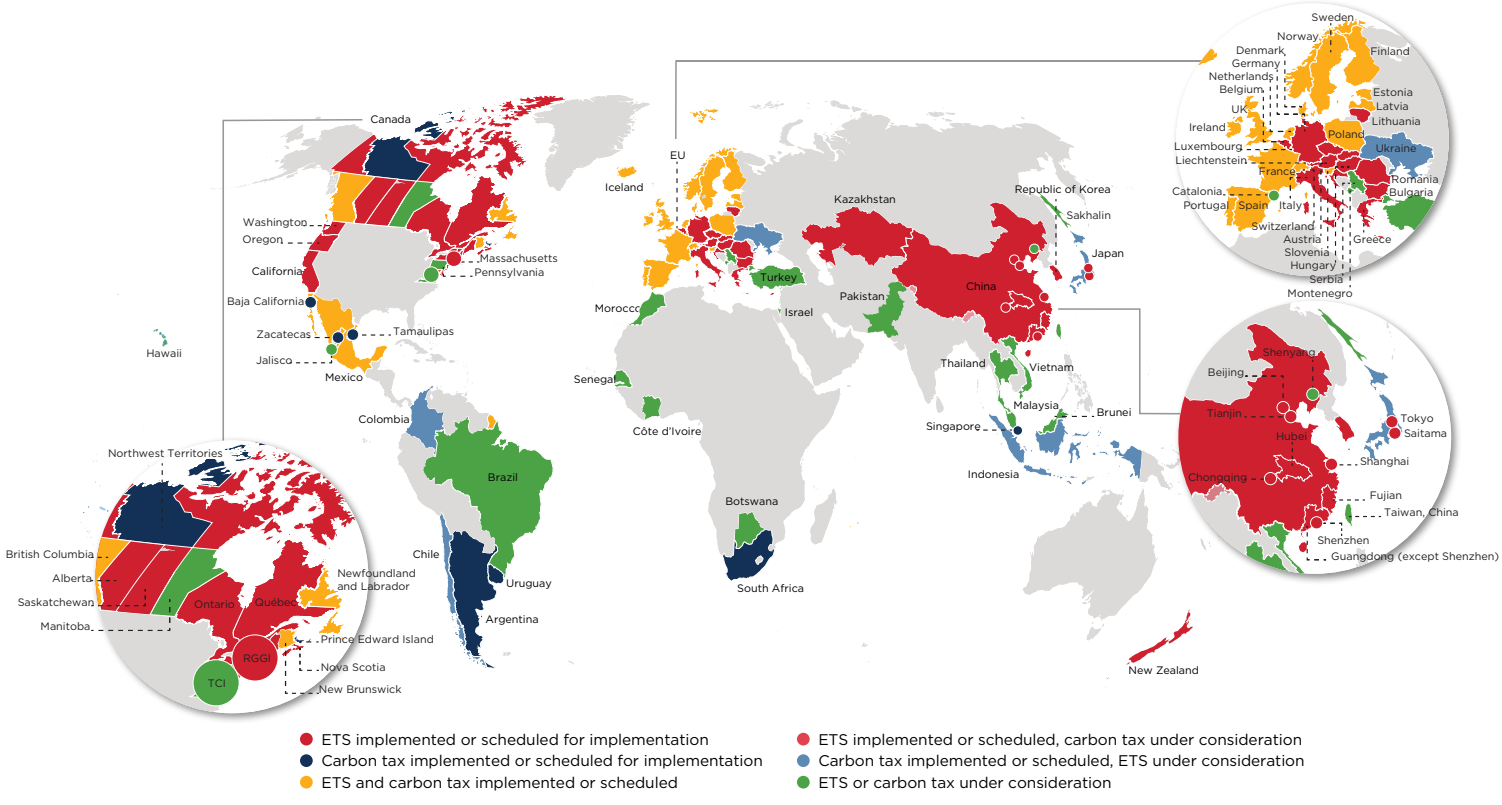
1. **Direct Carbon Pricing**
   a. Carbon pricing incentives that apply a direct price incentive proportional to GHG emissions generated by a given product, primarily through a carbon tax or an ETS.
      i. Carbon tax is a policy instrument which typically only a government (federal or state) can levy to provide a financial incentive to lower emissions. Under a carbon tax, the price is set by the government and the market mechanisms will work their way to determine the level of emission reduction possible.
      ii. An ETS involves creating an artificial limit or cap on the volume of GHG emissions in one or more sectors by the government. The government will then auction or trade these allowances and the total allowances will equal the cap or limit. Based on the level of economic activity, the value of these allowances will either go up or down, but the total emissions will stay constant over the time. Over multiple years, the cap will gradually reduce leading to an increase in allowance costs, forcing many sectors to decarbonize, since it will make more economic sense over the long-term. Additionally, it will incentivize low-carbon alternatives as they will have no carbon allowance costs.
      iii. ETS may also use a "baseline and credit" system, where a limit will not be created, but a baseline can be set and entities operating below the baseline, can earn credits which then can be traded between covered entities.
   b. Carbon crediting mechanisms are another mechanism and operate differently from regulatory credits or ETS as they are voluntary and offer subsidies for certain abatement activities. Instead of creating a cost signal for the entity, this mechanism will help create a revenue stream when emission reductions are demonstrated, and credits generated.
2. **Indirect Carbon Pricing** are instruments that can impact the price of products and directly impact the consumer, and thereby impact demand. Examples include fuel and commodity tax for high carbon products, i.e., if a flat tax was levied per liter of gasoline proportional to its carbon emissions, this creates a pricing signal and over a period of time negatively impacts consumption. On the other hand, subsidies may have the reverse impact and support consumption, leading to negative indirect carbon pricing.[23]

Agreements were reached in COP26 to sustainably phase down fossil fuel subsidies that are deemed inefficient and are considered a milestone step. Steps that support negative indirect carbon pricing are being discouraged on a global scale.

3.1 ADOPTION OF DIRECT CARBON PRICING

Globally, the adoption of carbon pricing continued but the overall coverage remains low. The volume of global emissions covered by direct carbon prices have not changed much over the past year, but many countries are considering new Carbon Pricing Instruments (CPIs). CPIs put a price on carbon, Carbon Tax, and Emission Trading Systems (ETS), which is another name for cap and trade.

As of April 2022, there were 68 CPIs operating with three more scheduled for implementation. This includes 37 carbon taxes and 34 ETSs including subnational jurisdictions in North America (Oregon), New Brunswick, and Ontario. The state of Washington, as well as Indonesia and Austria have CPIs scheduled for Implementation. Figure 7 shows the map of carbon taxes and ETS's. About 23 percent of global GHG emissions are covered by operating CPIs. Figure 8 shows the gradual rise of global GHG emissions covered by CPIs.



Carbon pricing initiatives are considered "scheduled for implementation" once they have been formally adopted through legislation and have an official, planned start date. Carbon pricing initiatives are considered "under consideration" if the government has announced its intention to work towards the implementation of a carbon pricing initiative and this has been formally confirmed by official government sources. TCI refers to Transportation and Climate Initiative. RGGI refers to the Regional Greenhouse Gas Initiative.

Figure 7: Map of carbon taxes and ETSs currently in force around the world.

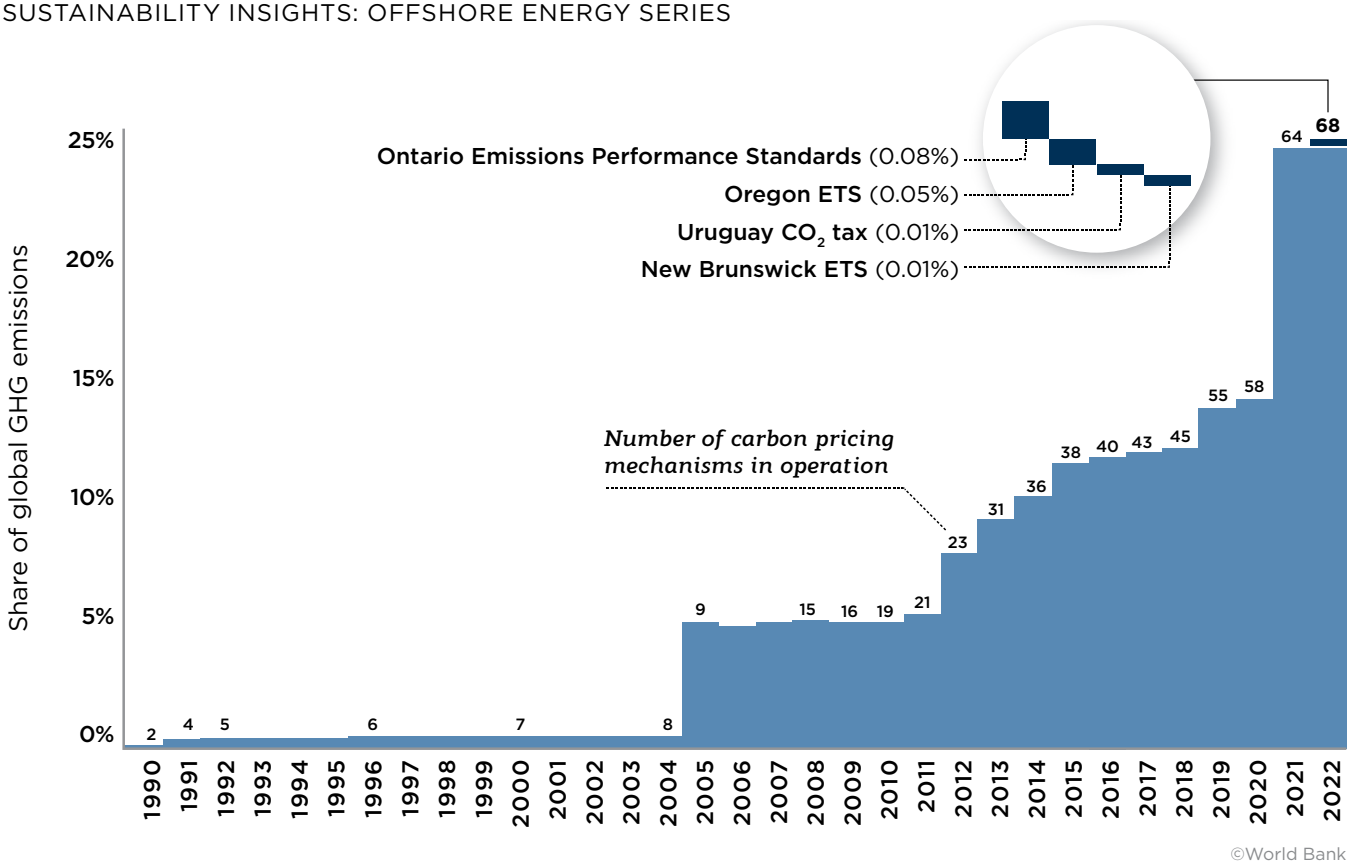


Figure 8: Share of global GHG emissions covered by carbon pricing instruments.

3.1.1 U.S.A.

The U.S. currently does not have a carbon tax, but there have been numerous proposals at the federal level, ranging from $20 to $160 (2020 $/ton). (Columbia | SIPA Center on Global Energy Policy, 2022). While the U.S. does have a cap-and-trade program in a few of the sub-national jurisdictions (California, Massachusetts, Virginia, Oregon, and Washington), there is no federal cap-and-trade program, nor is there a federal mechanism for carbon taxes.

Carbon pricing is a market-based mechanism which creates financial incentives to reduce GHG emissions. Nearly twelve states are home to over a quarter of the U.S. population and account for 33 percent of the U.S. gross domestic product (GDP) and have active carbon pricing programs. The Regional Greenhouse Gas Initiative (RGGI) includes 11 northeastern states and Pennsylvania joined in April 2022. RGGI is the first mandatory cap-and-trade program in the U.S. to limit CO_2 emissions from the power sector. California's program was the first multi-sector cap-and-trade program in North America. Massachusetts also has implemented regulations to setup an additional cap-and-trade program for its power sector in parallel with RGGI and extends out to 2050.

In 2021, the state of Washington passed the Climate Commitment Act (CCA), which established a comprehensive, market-based program to reduce carbon emissions. The program started in January 2023 and the first allowance auction occurred on February 28th, 2023. Four auctions will be held each year, and each consists of a single round of bidding by the auction participants. The first auction offers 6,185,222 allowances of the 2023 vintage and future vintages will be offered in future auctions. The annual auction floor price was set at $22.20 for the 2023 vintage. The cap and invest program set a limit on overall carbon emissions in the state and requires businesses to buy allowances equal to their covered GHG emissions, which will be sold in quarterly auctions and can be bought or sold on a secondary market. Roughly 75 percent of the statewide emissions will be covered under this program, covered businesses include fuel suppliers, natural gas and electric utilities, waste to energy utilities and railroads.[26]

In 2021, ETS permit prices covered about 6.4 percent of GHG emissions. About 34.2 percent of GHG emissions in the U.S. are subject to a positive net effective carbon rate, up from 31.6 percent in 2018. The share of emissions covered by an explicit carbon price has increased by 0.8 percentage point since 2018. Fuel excise taxes are an implicit form of carbon pricing which covers nearly 28.4 percent of emissions.

3.1.1.1 SOCIAL COST OF CARBON

The Resources For Future (RFF) and University of California, Berkeley (UC Berkeley) have released an updated social cost of carbon estimate that aims to reflect the latest methodologies and other scientific advancements. The study finds that each additional ton of carbon dioxide costs society about $185 per ton which is 3.6 times the current estimate of $51 per ton. The concept aims to highlight the costs of a high carbon economy.

Social Cost of Carbon (SCC) is a critical metric that aims to quantify economic damage caused by every incremental ton of CO_2. The SCC is an estimate and aims to put the effects of climate change in economic terms to push policy makers and other decision makers to understand the economic impact of high emissions. The SCC is used by local, state, and federal governments to inform major investment decisions.

SCC is a powerful tool in policy analysis and can be used in policy design for cost-benefit analysis and has been a part of regulatory analysis at the federal level since 1981. Figure 9 shows how SCC can be used to calculate costs and benefits of changing emissions.

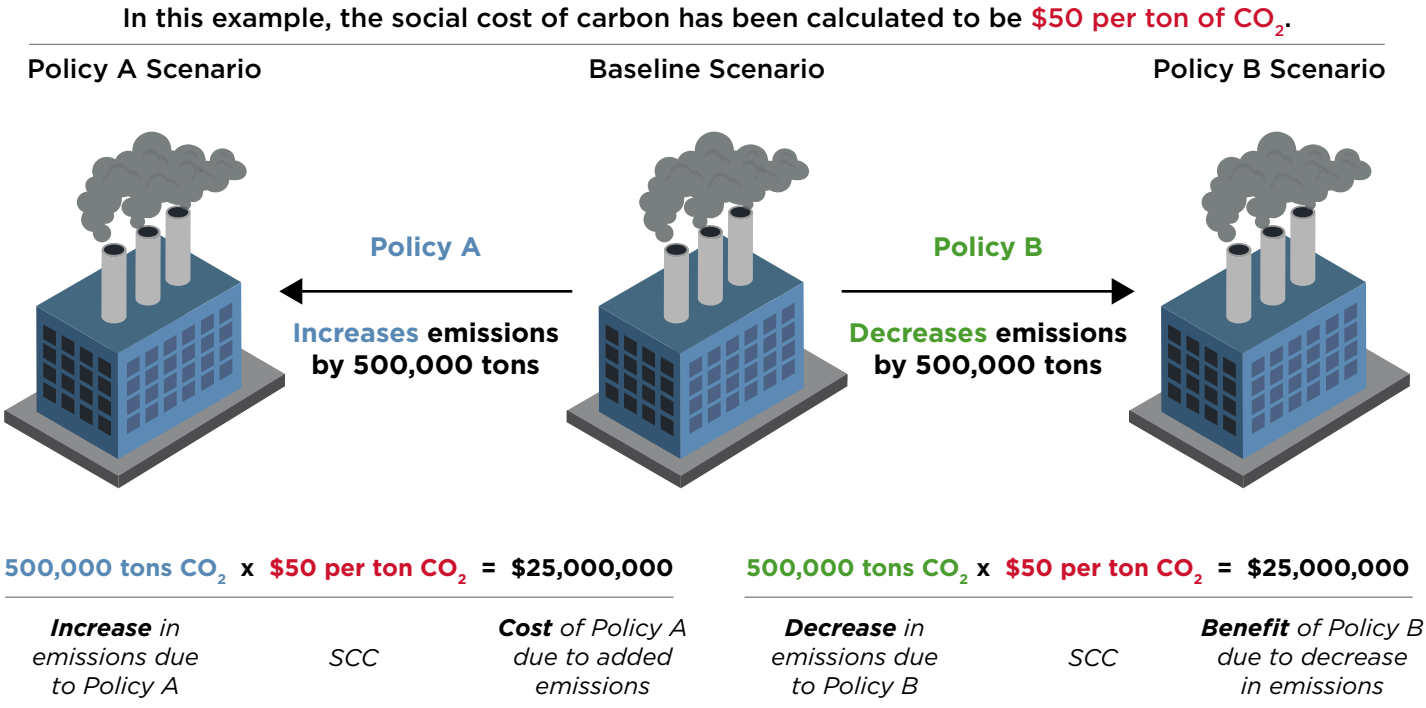


Figure 9: Social cost of carbon's impact on policy decisions.

At a high level, the following steps (see Figure 10) are completed to estimate the SCC and are completed using computerized models.

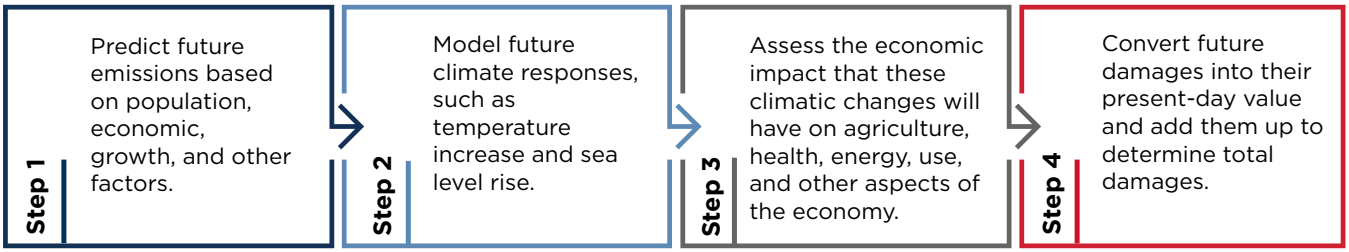


Figure 10: SCC estimation steps.

Overall, SCC is a very important tool used by the government to decide where investments will flow, as the present U.S. administration reinstated the Obama administration's central case value of $51 per ton of CO_2.

3.1.1.2 IRA AND CARBON PRICING

The U.S. Inflation Reduction Act (IRA) signed into law in 2022 offers substantial subsidies for investment in renewable sources of clean energy. It commits nearly $369 billion to those investments and is expected to reduce roughly 40 percent of GHG emissions by 2030, comparing against a baseline level from 2005. The IRA does not explicitly price carbon at the point of its use but surely acts as an industrial policy accelerator for low-carbon investments.

The IRA does increase tax credits for capturing and sequestering CO_2 at industrial facilities and power plants. The increase is from $50 per ton to $85 per ton for carbon stored by industry and from $35 to $60 if used for Enhanced Oil Recovery (EOR) and in the case of Direct Air Capture (DAC), the increase is from $50 to $180 per ton.

Additionally, the IRA creates a shadow carbon price since it incentivizes low carbon options and pushes them ahead of high carbon sources of products and services. While the IRA does not create a stable carbon pricing environment and can cause some distortions, it is something that cannot be ignored by incumbent industries that are addressing the challenge of a low carbon energy transition and can be an opportunity for a soft-landing.

3.1.2 CHINA

China has the world's largest carbon market by emissions and 2021 was the first full compliance cycle. The program reported a compliance rate of 99.5 percent with over 2,100 liable power stations participating during this cycle, covering over 4.5 billion metric tons of CO_2 equivalent per year, which represents over 30 percent of China's total GHG emissions. The closing price for the year for the allowances was 54.2 yuan ($8.5) per metric ton but indicates a 13 percent increase from the start of trading. A record 179 million tons of allowances were traded in 2021, representing a turnover close to 7.7 billion yuan ($1.2 Billion), and while small, it is not insignificant.[35,36,37]

3.1.3 EU ETS

Launched in 2005, the EU ETS is the world's first transnational ETS, which includes 27 EU member States and three states from the European Economic Area-European Free Trade Association (EEA-EFTA): Iceland, Liechtenstein, and Norway.

While refineries are explicitly mentioned as a source covered under the program, emissions from upstream production and exploration, which includes gas flaring, are covered under the category of combustion installations. Additionally, emission from transportation of the crude oil, natural gas and fuels are covered, for example, emissions from fuel use at pumping and compression facilities, and gas processing facilities.

From 2024, amendments have been proposed to cover marine specific emissions from offshore installations, including movements and work done by offshore support vessels (OSVs). This is expected to cover vessels of 400 gross tons (gt) and above from January 1, 2024, and for vessels above 400 gt and below 5000 gt, "*shall only be required to report the information which is relevant for the inclusion of such ships within the scope of the EU ETS from 1 January 2027*", purportedly to ensure there is a proportionate administrative burden for these vessels.

The largest carbon market by traded value is the EU ETS and saw record trading activity and prices in both spot and futures market and over 15 billion allowances were traded in the intercontinental exchange. The EU climate law came into force in 2021, which set the binding new EU-wide climate target of 55 percent reduction by 2030 in comparison to a baseline of 1990 (Fit for 55).[1] The Fit for 55 program also includes the addition of a new, separate ETS which will cover transport and buildings. The requirements are expected to be gradually phased in during the 2023 to 2027 time frame. ETS market stability reserve will be amended to enable a smoother intake of allowances to the reserve and hence, from 2023, allowances above the level of auction volume of the previous year will be invalidated and the Market Stability Reserve (MSR) will be limited to 400 million tons.

Additionally, a separate self-standing ETS for fuel distribution for road transport and buildings will be established starting 2025. The regulated entities will be expected to report the amount of fuels placed on the market starting 2024 and from 2026, they would have to surrender a corresponding amount of allowances.

The EU ETS is one of the EU's key policies for reducing carbon emissions. It has already completed three phases from 2005 to 2020; the fourth phase started in January 2021. The history is briefly recapped in Figure 11.

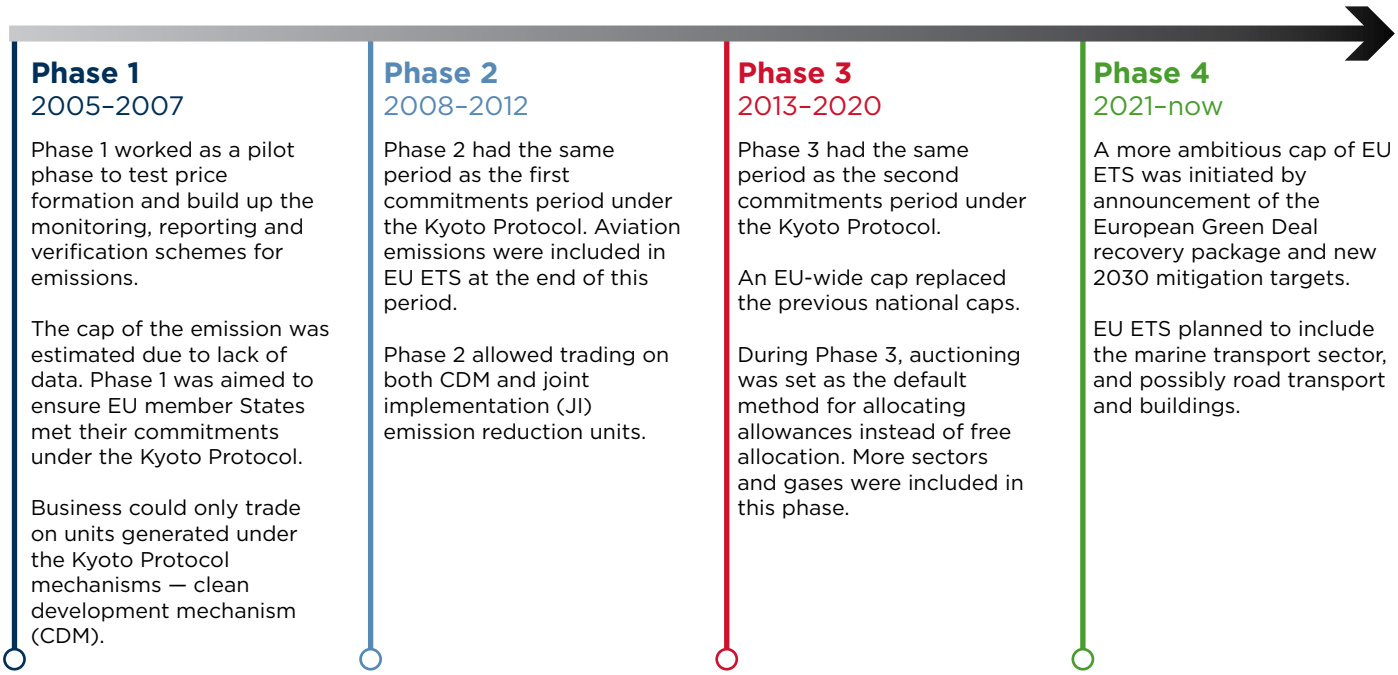


Figure 11: EU ETS Phases.

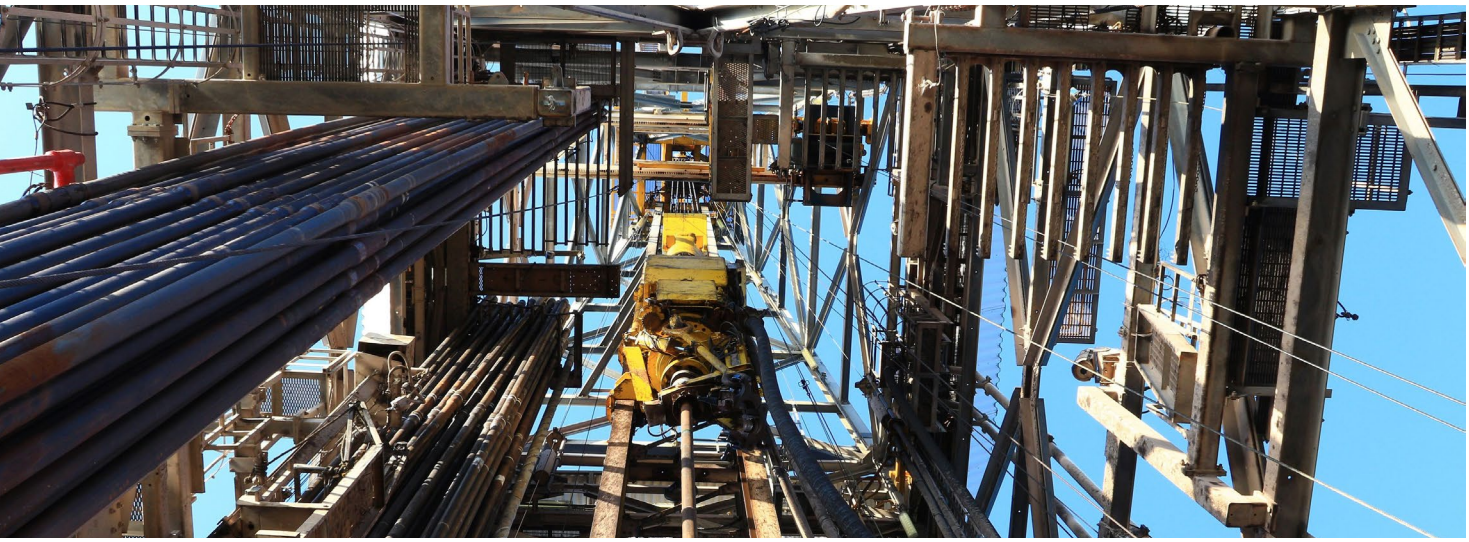
It is a typical cap-and-trade system, covering CO_2 emissions from industry, power and aviation sectors, nitrous oxide (N_2O) from certain chemical sectors and perfluorocarbons from aluminum production.

Like other cap-and-trade systems, the legislation for the EU ETS sets the annual cap, which in turn determines the number of allowances in this market; the cap is also designed to be reduced each year to gradually cut the emissions.

These allowances are allocated to participants for free or sold through auctions. The free allocations are given to the sectors (such as industry and aviation) based on benchmarking and historical data. Then, the EU ETS allows participants to trade their allowances on the market to ensure their compliance with the regulation. Fines and penalties are applied to participants who failed to comply with their allowance limit at the end of the year.

3.2 CARBON PRICING TRENDS

The figure below shows the absolute emission coverage, share of emissions covered and prices for CPIs across jurisdictions. It is clear that the China National ETS program and the EUETS program have been the most successful in terms of volume of GHG emissions. The EU ETS program seems to be operating like an efficient market as one would expect and the cost of allowances is high enough to cause market behavioral shifts.



The carbon prices are rising, but in general across jurisdictions except EU, are very low. Record prices were seen in ETS, particularly in advanced economies, where the market responds to price signals and high compliance programs. High prices were seen in the EU and Swiss ETS markets, the linked California and Quebec markets, the RGGI and the New Zealand ETS. In February 2022, the republic of Korea ETS was edging back towards the record high witnessed in early 2020. Carbon taxes increased during 2021 and 2022, but less than ETS prices and have increased on an average by $6 per metric ton of CO_2 equivalent in 2021 and by an additional $5 per metric ton of CO_2 equivalent as of April 2022.[43,44,45,46]

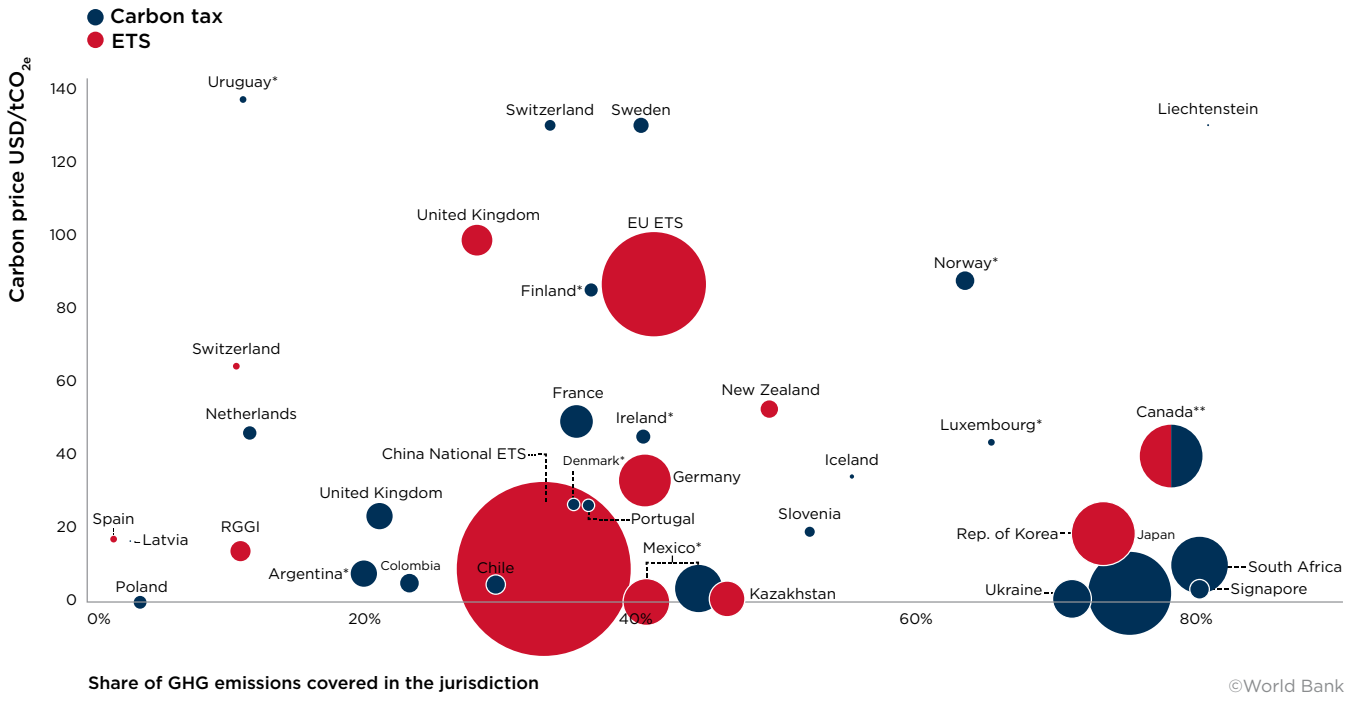
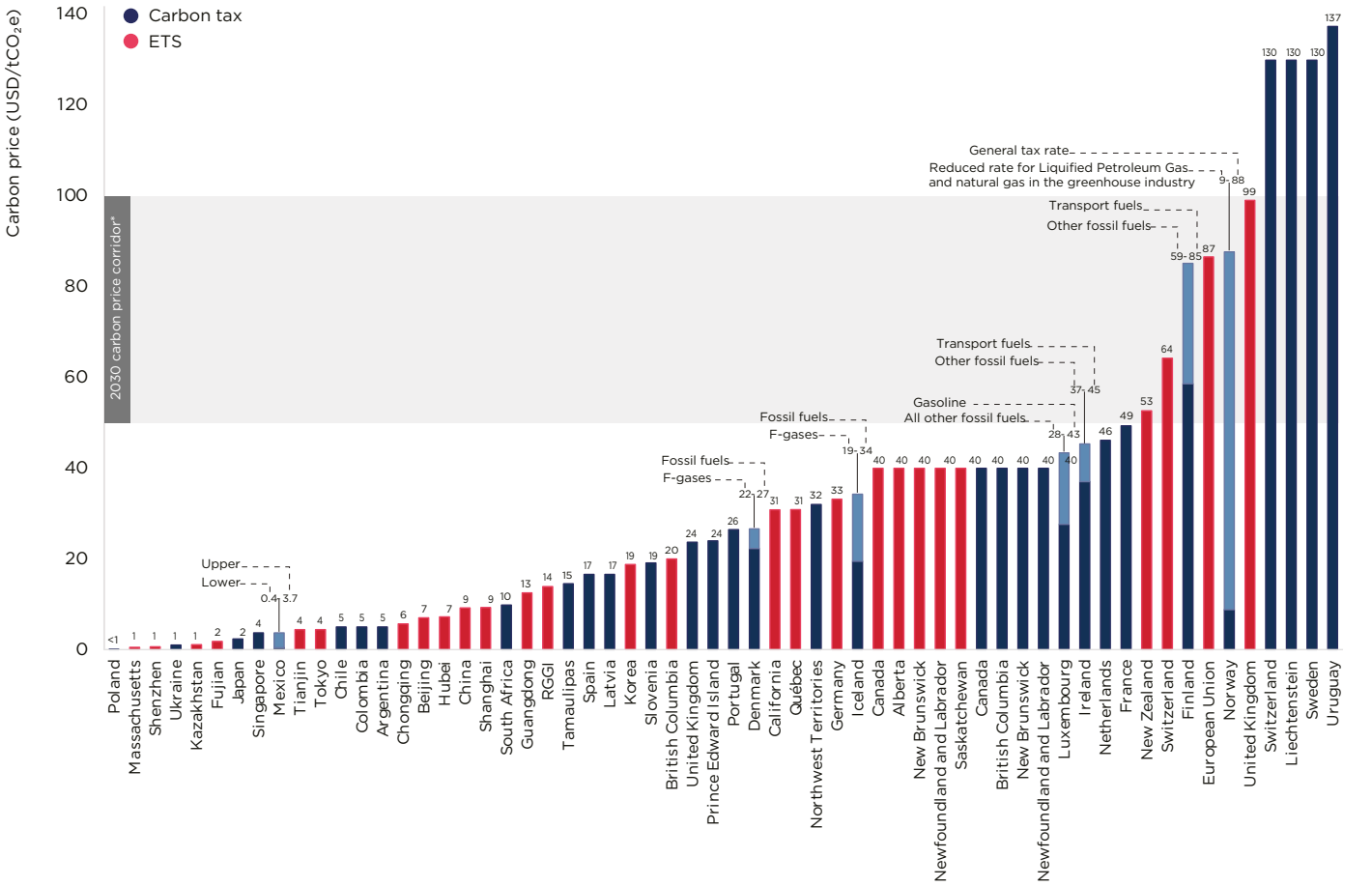


Figure 12: Emission Coverage and Prices Across Jurisdiction.

As seen in the figure above, several jurisdictions have established more ambitious price trajectories. For instance, Singapore proposed to progressively increase the carbon tax rate from SGD 5 to SGD 25 ($18) in 2024 and 2025. It will be increased to SGD 45 ($33) per metric ton of CO_2 equivalent in 2026 and 2027 with a view to reaching SGD 50 to 80 ($37 to $59) per metric ton of CO_2 equivalent by 2030. South Africa has also announced a proposal to increase the carbon tax rate from current levels of $10 per metric ton CO_2 equivalent to $30 per metric ton of CO_2 equivalent by 2030 and $120 per metric ton of CO_2 equivalent beyond 2050. Canada announced that minimum carbon prices will be increased by CAD 15 ($12) per metric ton of CO_2 equivalent and it will increase the prices to CAD 170 ($136) per metric ton of CO_2 equivalent by 2030. In April 2022, Indonesia announced the delay of introduction of carbon taxes due to economic impact of high energy prices caused by the Ukraine conflict.[47,48,49]

Some of the trends that were seen over the past year include:[50,51,52,53]

1. Spikes in ETS prices were driven by more ambitious targets and tightened ETS rules, which is an expected response to target-setting, which made CO_2 allowances more expensive.
2. COVID-19 did not have a major impact on prices and most governments did not allow the pandemic to shift their stance on the importance of carbon pricing.
3. Speculations from participants have also led to ETS price increases.
4. The opening of the ETS market to non-liable entities i.e., those entities that do not directly require allowances but purely act as speculators can influence the dynamics.
5. As prices have increased in the EU market, speculators are coming under closer scrutiny as concerns of a "Carbon Bubble" grow. Additionally, few other jurisdictions want to open carbon trading to financial players to add liquidity to the market for example., the Republic of Korea opened trading to a limited number of financial entities.
6. Rising energy costs also pushed up ETS prices as the need for carbon allowances increased. This is most notable in Europe where increase in natural gas prices exist amid tight supplies from Russia.
7. The carbon price corridor (50 - 100 per metric ton of CO_2 equivalent) is the price needed by 2030 to keep global heating at 2° C, but less than four percent of global emissions are covered by a direct carbon price at or above the range required.
8. Carbon pricing, in tandem with other governmental support policies for research, development and demonstration, capital and operational subsidies, will need to be implemented to help support the net zero journeys.



Nominal prices on April 1, 2022 are shown for illustrative purposes only. Prices are not necessarily comparable between CPIs because of (for example) difference in the sectors covered and allocation methods applied, specific exemptions and compensation methods.

*The 2030 carbon price corridor is based on the recommendation in the report of the High-Level Commission on Carbon Prices.

**Seveal jurisdictions apply different carbon tax rates to different sectors or fuels. In these cases, we have indicated the range of tax applied, with the dark blue shading showing the lower rate and the combined dark blue and light blue shading representing the higher rate.

Figure 13: Global carbon prices, as of April 2022.

3.3 RISING ENERGY PRICES – CHALLENGES AND OPPORTUNITIES FOR CARBON PRICING

Oil prices have increased sharply over the past year, fueled by a slingshot rebound of demand post- COVID-19, and supply challenges due to conflicts in Europe. As the EU commitment to reduce reliance on Russian oil and gas progresses, it will put an inflationary pressure on the prices. The price increase will force governments to shield their consumers by regulating or capping energy prices and subsidizing costs. Over the short term, as the need for energy increases with supply reducing and energy prices being subsidized, the incentive for emission reduction may be delayed at least over the short-term.[54]

The geopolitical context presents several challenges and opportunities for carbon pricing. In economies that depend on imported oil and gas such as the EU, carbon prices push up the cost of energy and may reduce demand, but investors in low carbon projects will require a stable carbon price to make long-term decisions on investments. High carbon prices can be used by governments to help domestic low-carbon energy producers' subsidies, which will help reduce reliance on foreign energy and provide protection against shocks.[55]

Carbon prices will be a useful tool in achieving a "Just transition" i.e., creating reliable work and quality jobs and ensuring at-risk regions, industries, communities, workers, and consumers share in the low-carbon economy transition. In the EU's Fit for 55 packages, a few measures have been introduced to help with a transition such as utilizing the social climate fund to help alleviate financial pain to vulnerable households, micro-enterprises, and transport users.[56]

3.4 VOLUNTARY CARBON CREDIT MARKETS AND CREDITING MECHANISMS

The global carbon credit market has a wide range of sources of supply and demand, and multiple trading frameworks. Each of the crediting mechanisms has specific purposes and covers different jurisdictions. The table below summarizes the crediting mechanisms:

SUPPLY CREDITING MECHANISM	JURISDICTIONS
Kyoto Protocol's Clean Development Mechanism (CDM), Paris Agreement	International crediting mechanism established under international treaties
California Compliance Offset Program and Australia Emission Reduction Fund	Domestic crediting mechanisms established by regional, national, sub-national governments
Verra and Gold Standards	Independent crediting mechanisms which include standards and crediting mechanisms managed by independent, non-governmental entities.

Demand for credits come from a range of different buyers and can be divided into four major broad segments. The table below summarizes the demand segments.

DEMAND SOURCE	BUYERS
International Compliance Market	These are markets that primarily respond to commitments made under international agreements. They primarily consist of countries voluntarily purchasing/utilizing credits or mitigation outcomes and recognized under international treaties to meet their reduction goals.
Domestic Compliance Markets	Companies purchasing credits that are required to meet their obligations under domestic law, usually an ETS or a carbon tax.
Voluntary Carbon Markets	Mostly private entities purchasing carbon credits for complying with voluntary mitigation commitments. Largely consist of credits under independent crediting standards.
Results-Based Finance	Governments or international organizations for incentivizing climate change mitigation or meeting national targets. They could also be payments in return for achieving emission reductions, without any transfer of credits or other ownerships.

Carbon credit markets have grown over the past year with issuances, transactions, and prices rising sharply. Carbon credit markets grew by 48 percent in 2021, and the total number of credits issued from international, domestic, and independent credit mechanisms increased from 327 million to 478 million which is one of the biggest year over year increase since 2012. The total number of credits issued since 2007 is around 4.7 billion metric tons of CO_2 equivalent.[57]

3.4.1 SUMMARY

Carbon pricing as a concept will impact all carbon intensive sectors of the global economy as many major economies outside the U.S. have made rapid progress in executing some of these concepts (cap-and-trade and carbon taxes). It is likely that, in the U.S., the driving factor will be sub-national regulatory action, but not at the federal level. As of the end of 2022, listed below are important data points indicating the general direction in which the carbon pricing markets are moving.

- Most new issuances were from projects registered under independent credit mechanisms. Issuances from international and domestic crediting mechanisms increased at a slower pace.
  - 74 percent of credits were from independent standards which total 352 million credits.
  - CDM represented 11 percent and grew by 25 percent with no new registered projects in 2021 due to uncertainty over the mechanisms future. This was clarified at COP26 with a new agreement (Article 6) which allows countries voluntarily cooperate with each other to achieve reduction targets.
  - Issuances from domestic mechanisms represented 15 percent of total issuances, led by the California compliance offset program and Australia's emissions reduction fund.
- The total value of voluntary carbon market exceeded more than $1 billion in November 2021 and grew to over $1.4 billion as of April 2022.
- Demand from domestic compliance markets such as carbon taxes and ETS remains small but could change with agreement on article 6 rules.
- Demand from international compliance markets has not changed much over the past year, but is expected to grow once travel rebounds post COVID-19.
- In 2021, countries agreed at COP26 on rules for international carbon trading under Article 6 of the Paris Agreement. These agreements provide greater certainty.
- Voluntary markets are the main driver of growth due to growing corporate net-zero commitments.
  - Large purchases of credits come from energy companies, mainly large oil and gas companies, food/beverage and tourism companies have also purchased credits. Additionally, the financial sectors also increased their carbon credit purchase to meet their climate targets.[58,59,60,61,62,63,64]

4.0 MARKET TRENDS ON OFFSHORE ASSETS

The offshore oil and gas industry had been in a deep slump from the price collapse in 2014 through the pandemic in 2020. During this time, there was a high degree of volatility and heavy pressure on the margins that could be made (low profits). In 2021 the tide turned with a powerful surge in demand with corresponding increases in the price per barrel. In the first half of 2022, oil prices averaged $110 per barrel. The strong energy environment during that time was boosted by the Russia-Ukraine war, Organization of the Petroleum Exporting Countries' (OPEC+) unwillingness to alter its timeline for easing quotas, and difficulties many OPEC countries had meeting the quotas that were in place.[66]

Looking at the first part of 2023, oil prices have moderated in the $75 to $85 per barrel range, which is still a price point where oil and gas companies can expand their operations and work on projects (e.g., sustainability initiatives). Risks still exist including possible inflation-induced recession impacting demand. Other risks include potential COVID-19 outbreaks reducing demand and eased sanctions on Iran and Venezuela, which could add to the global supply and weaken prices. For now, the overall market for oil and gas production is good and should provide opportunities for all industry participants.

4.1 SERVICE (SUPPORT)

Beginning in 2021, the support sector started on an improved trajectory and during the first half of 2022, the improved trajectory continued. Global support vessel utilization went from 57 percent at the start of 2021 to 68 percent at the start of 2022. Solid demand and utilization have increased the day rate and value of the vessels in this sector. Additional progress is expected through the remainder of 2023 and the outlook is optimistic.[18]

The support sector is well on its way to reducing the emissions generated from their operations. This sector continues to increase its use of natural gas and battery power to fuel their fleets. In addition to servicing the oil and gas industry, opportunities to gain business in offshore wind turbine installation and service, and supporting subsea construction of carbon injection wells have high potential.

2022 SUPPORT VESSEL NEW BUILDS

Type	Quantity
Anchor Handling Tug Supply (AHT/AHTS)	
Offshore Service Vessel (OSV)	1
Platform Supply Vessel (PSV)	
PSV-Crewboat	6
Column Stabilized Unit/Self Elevating Unit (CSU/SEU)	7
Barge/Heavy Lift	1
Single Point Mooring (SPM)	
Underwater Systems	
Other	4
Total	19

4.2 PRODUCTION

Offshore production vessels/units have little opportunity to diversify into other offshore businesses (e.g., wind, carbon injection installations). With one of the highest GHG emissions in the offshore sector, production operations will likely need to focus on their existing carbon emissions to reduce their carbon footprint through equipment and operational improvements. Approximately 65 percent of the production sector's emissions come from power generation and looking for alternative fuel sources could yield significant emission reductions.

The production sector should continue to generate solid growth in the short to medium term. Twenty-five percent margins can be expected as oil and gas companies increasingly favor floating platforms over stationary facilities for their offshore projects.[67]

2022 PRODUCTION NEW BUILDS

Type	Quantity
Floating Production Storage Offloading (FPSO) — New/Conversions	7
Floating Storage Offloading (FSO)	
Floating Liquid Natural Gas (FLNG)	
CSU/SEU	
Single Point Anchor Reservoir/Tension Leg Platforms (Spar/TLP)	
Fixed Platform	
Other	1
Total	8

4.3 EXPLORATION

The exploration (drilling) sector has fewer opportunities for diversification than the support sector but more than the production sector. There may be opportunities to apply its experience, assets, and technologies for carbon capture and storage (CCS) or to access geothermal resources (GR).

While additional opportunities may exist, the exploration sector must still focus on emission reduction initiatives. These initiatives could come from operational efficiency improvements and seeking less carbon intensive forms of extraction. The offshore exploration sector has struggled with lowering revenues and margins since the 2014 crash left an oversupply of rigs. This oversupply has impacted new build orders. However, increasing utilization and day-rates have started to recover with help from the 2021 oil price rally. The need for drilling rigs is expected soon in the North Sea, Gulf of Mexico, Latin America, West Africa, Mediterranean, India, and Australia. Demand should continue to increase until peaking in 2025 before the next predicted decline. Despite the forecasted decline in 2025, consolidations, asset retirements, and financial restructurings should have this sector on solid financial footing.[68]

2022 EXPLORATION NEW BUILDS

Type	Quantity
Self Elevating Drilling Units (SEDU)	
Column Stabilized Drilling Unit (CSDU)	
Drill Ship	
Drill Barge	
Total	0

5.0 SUSTAINABLE FINANCING

The oil and gas industry, onshore and offshore, is having more difficulty in securing financing for projects because the industry is perceived as being a large emitter of GHGs. Lenders are being pressured by investors to reduce the amount of high-carbon intensity companies in their portfolios, including oil and gas companies. One source for lending that is becoming more prevalent is from sustainable finance instruments that come in the form of bonds or loans. The use of these instruments often provides oil and gas companies with greater, and easier, access to funds.

A bond is a type of debt instrument where a government or company (the issuer) raises money, selling in effect IOUs. Bonds typically have lower interest rates than loans. A loan is a debt instrument provided by a lender (e.g., bank, credit union) and typically has higher interest rates.

5.1 TYPES OF SUSTAINABLE FINANCE INSTRUMENTS

Sustainable finance refers to the process of taking ESG considerations into account when making investment decisions in the financial sector, leading to more long-term investments in sustainable economic activities and projects. The following list describes the primary types of sustainable instruments that are available.

1. Green/climate bonds and loans
   a. Proceeds must go to projects that improve carbon emissions or make other environmental improvements (e.g., emission control equipment, reduction in waste discharged).
2. Sustainability bonds and loans
   a. Proceeds go towards a combination of green and social projects (e.g., green energy projects, investing in companies that make a positive contribution in relation to people, the environment, and society).
3. Sustainably linked bonds and loans
   a. These bonds and loans are linked to a borrower's ability to meet sustainability targets. Meeting the agreed upon targets often improves the interest rate charged.
4. Social bonds and loans
   a. Proceeds for projects that address or mitigate a specific social issue or to achieve positive social outcomes (e.g., improving access to essential services such as health, education, affordable housing).

A nuance to green lending is Climate Transition Financing (CTF). Typically, CTF is used for "high-carbon" industries to help in their transition towards net-zero emissions. Usually, these industries need to undertake complex transformations to reduce their carbon emissions. CTF bridges the gap between traditional and sustainable financing.

5.2 GENERAL REQUIREMENTS OF SUSTAINABLE FINANCE

Just like with ESG reporting, sustainable financing has organizations that have developed frameworks to follow when applying for funding. Most have one form or another of the following requirements.

1. Use of Proceeds
   a. The fundamental determinant of obtaining a sustainable financial instrument (SFI) is the ultimate utilization of the proceeds. It must be for projects that are green or improve social outcomes.
2. Process for Project Evaluation and Selection
   a. The borrower should clearly communicate the following to lenders:
      i. Sustainable objectives.
      ii. The process used to determine the eligibility of the project.
      iii. The eligibility and exclusion criteria used.
3. Management of Proceeds
   a. The proceeds received should be credited to a dedicated account and tracked by the borrower so that transparency and integrity are maintained.
4. Reporting
   a. Borrowers should make and keep available current information on the projects for which the funds are used. It's a good idea to report this information to the lender annually until the funds are fully drawn.

Internationally, banks have done their part by pledging to expand sustainable finance solutions. This has been realized through the establishment of green loans and green bonds, both of which can be utilized to move a low-carbon project into economic feasibility. The magnitude of pledges has continued to balloon over the last few years. For example, JPMorgan Chase plans to facilitate more than $2.5 trillion to address climate change[68] and Citi Bank has a $100 billion sustainable finance goal.[69] Green loans and bonds should make up the bulk of sustainable financing for the offshore oil and gas industry.

5.3 GREEN LOANS

A green loan is a form of sustainable financing that requires the borrower to use the funds towards projects that have a direct environmental objective. The overall process for obtaining the loan will be established by the issuing entity, who may have its own requirements or may lean on a green loan framework. The European Investment Bank (EIB), the lending arm of the EU is an example of an entity with its own framework while the Green Loan Principles is a framework established by the Loan Market Association (LMA).

Although how the project is evaluated varies, the general process is similar. The process typically includes a screening in which the potential borrower submits project details such as the environmental benefit of the project, how the project fits into the applicable framework/requirements, and the proposed success criteria. It also includes periodic reviews of the project against proposed success criteria. This is a critical component of the overall process, which empowers banks to continually manage the sustainability performance of their portfolio. It can also be a step that is mutually beneficial, in which proposed criteria could be tied to financial incentives (and conversely to financial consequences).

In addition to the overall green loan process, there are multiple ways in which the green loan can be structured by the issuing entity. The entity could use a fixed term loan in which there is a flat or adjustable interest rate. Alternatively, there could be a revolving credit facility whose interest rate is adjustable. An adjustable interest rate (as it relates to sustainable financing) can also be called a "sustainability-linked market ratchet," which means that the interest rate can go up or down depending on the level of success the borrower has had against the proposed success criteria. SBM Offshore is one such example, where it re-financed its revolving credit facility with a new facility including a margin ratchet.[70] The margin ratchet was a success metric that linked the company's sustainability performance to the interest rate.

Therefore, it is critical that the potential borrower conducts due diligence and establishes a robust governance structure to guarantee project success. Establishing these processes and policies will mitigate financial risk associated with not meeting success criteria and material environmental risks. The governance structure should consider the following elements:

1. Internal project creation and screening process
2. Internal accounting policies to track green loan spending
3. Process for monitoring and validating success criteria
4. Policy for implementing remedial action as necessary to meet success criteria

A further example is detailed in Table 1.

Framework	Green Loan Principles
Borrower	Exploration and Production Company
Sector	Oil and Gas
Project	Energy Efficiency retrofits
Project Description	The borrower is seeking $100M to retrofit its existing assets with energy efficient devices. These may include, but are not limited to, energy efficient lighting, an advanced control unit for the power generation system, an advanced flare monitoring system, and an upgraded energy efficient flare.
Success Criteria	Reduce annual emission intensity by eight percent across the fleet.
Interest Rate	The bank proposed a 4.25 percent adjustable interest rate. For the life of the loan there would be an annual third-party review to determine if the success criteria are being met. If so, the rate would go down by 0.05 percent. If not, the rate would go up by 0.05 percent.
Governance Structure	The borrower has previously established a workstream to conduct a cost-benefit analysis, which concluded that the energy efficient devices listed should achieve an eight percent reduction in emission intensity at a price of $95M. The borrower requested an additional $5M to cover variances in cost and to allow for minor additions as necessary to achieve reduction. The borrower then requested a consultant review, who provided a second party opinion on the approach.
Accounting Structure	The borrower prepared an accounting process to handle and track the funds from the green loan, ensuring that the funds were not accidently misused.
Reporting	The borrower established a sustainability team to manage the project and its success. The team tracked fuel consumption and flaring volumes onboard to track emissions. The team lead had the authority to consider additional alternatives as the budget allowed to meet the success criteria.

Table 1: Green loan example.

5.4 GREEN BONDS

Green bonds are the other instrument by which sustainable financing is secured. Green bonds, a form of debt securities, are issued by borrowers to raise money from investors. This money is then paid back after a certain amount of time. Like green loans, there are multiple frameworks for green bonds. One example is the Green Bond Principles by LMA and another is the Green Bond Framework by the International Finance Corporation (IFC). Under the Green Bond Principles there are a handful of different bond types, these include:

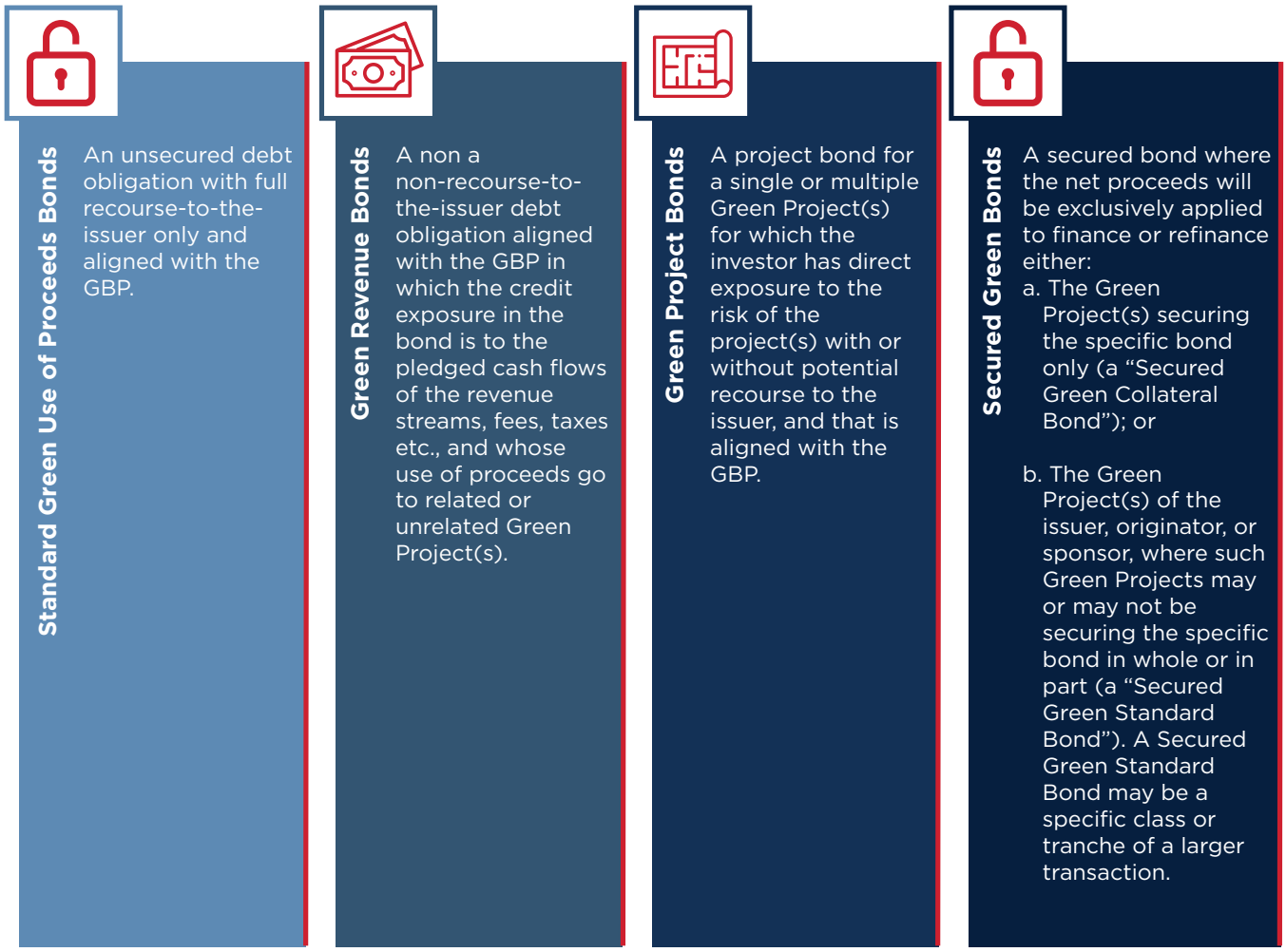


Figure 14: Bond types under the Green Bond Principles.

The process of issuing these bonds is like that of loans, where the objective is defined within the framework scope. As investors become more focused towards sustainability, its objectives, and potential greenwashing scenarios, issuers will be required to mature as well. This maturity process will involve considering perceived social risks and lingering environmental impacts. It will also involve effectively conveying the necessity for project execution considering any environmental impacts, with justification that industry leading mitigation techniques have been implemented. Simply put, the offshore industry needs to take the steps it can to reduce energy intensity while conveying the need to meet the energy demands of the world as it transitions to net-zero. Incorporating this into a submission will increase the probability an investor will consider the bond, especially as some issuers begin straying away from the oil industry. The EIB is one example of this, where it is tightening its financing by no longer considering new financing for unabated fossil fuel energy projects.[71]

The governance for green bonds is equivalent to that for green loans. The issuer should ensure they have a rugged accounting system in place to manage and report funds transparently to investors. They also need to have processes in place to monitor success. This may be realized through emission monitoring software, emission calculations, waste consumption monitoring, or by another means. One real life example of a green bond is for Eni SpA. In 2021, it was the first oil and gas company to issue a sustainability linked bond. The success metrics for the bond are to increase

renewable energy installed capacity to at least 5 GW by the end of 2025 and lower net GHG emissions of upstream activities to at least 7.4 million tons by the end of 2024. In the case Eni SpA does not reach the success metrics, then the interest will increase by 0.25 percent on the bond.[72]

5.5 EXTERNAL REVIEW

External review is a key component of managing the issuer/borrower relationship, where success criteria are objectively verified by a third party. Issuers and/or borrowers may also use external services during the loan evaluation process. The borrower may use a consultant to determine the most effective projects and success criteria. The issuer may require the borrower to have the project rated by a rating company, have the project certified against a green loan framework, or have the submission verified by an auditor.

6.0 FUTURE CONCERNS AND PROJECTIONS

The world is moving towards renewable and/or lower carbon energy sources and the pressures on oil and gas companies to reduce GHG emissions and other environmental releases are ramping up quickly. These pressures are coming from consumers, investors, employees and governments. Because of this, oil and gas companies realize the need to advance their sustainability efforts, and are working hard to digitize operations, develop new technologies to decarbonize and encourage their supply chain partners to do the same.

As discussed in section 2.0 (pressures on the oil and gas industry), the regulatory landscape is rapidly changing with Europe leading in the pace of changes. Governmental interventions such as European Commission's Green Deal as well as the U.N. Paris Agreement have caused oil and gas companies to look for emission reduction opportunities to meet sustainability targets.

As one can see, many factors must be considered as oil and gas companies transition towards more sustainable operations. These companies are trying to become more sustainable with help from governments, internal governance and strong senior leadership.[73]

7.0 PREVIEW OF NEXT RELEASE

In this paper, we addressed the sustainability and market trends of the offshore oil and gas industry. What we found were pressures on the industry to improve its carbon footprint were coming from all directions, with the investment community being the loudest voice for change. In our next installment of this paper series, we will examine the technologies and operational improvements that can make real impacts towards emission reductions in the industry. Additionally, alternative power sources will be explored, including renewables.[74]

REFERENCES

1. Ecomagazine May 2021 – Toward Sustainable Development of the Offshore Energy Industry
2. Refers to the individual access to energy, part of basic human needs including food, water, and shelter.
3. Ecomagazine May 2021 – Toward Sustainable Development of the Offshore Energy Industry
4. Precognize - Nov 2021 – Where is Sustainability on the Oil and Gas Agenda?
5. Alix Partners 2022 Annual Offshore Oil and Gas Report
6. COP27, Sharm el-Sheikh – Focus on Delivering the Promises of Paris
7. Gunnar Friede, Timo Busch and Alexander Bassen, "ESG and financial performance: Aggregated evidence from more than 2000 empiricalstudies," Journal of Sustainable Finance & Investment, 5:4 (2015), 210-233, https://www.tandfonline.com/doi/pdf/10.1080/20430795.20 15.1118917.
8. Deloitte 2022 Oil and Gas Industry Outlook
9. Offshore Technology, Nov 2021 - ESG in Oil and Gas: Macroeconomic Trends
10. Many companies, especially American O&G companies (producers), believe reporting Scope 3 emissions would be misplacing the responsibility for carbon emissions on the producers instead of the carbon users. Additionally, the potential for double counting these emissions is high given that what is a Scope 3 emission for the producer can also be a Scope 1 or 2 for a company using a fossil fuel in their operations.
11. WRI, June 2022 – Trends Show Companies Are Ready for Scope 3 Reporting with US Climate Disclosure Rule (SEC)
12. Deloitte 2020 – The 2030 Decarbonization Challenge, The Path to the Future of Energy
13. McKinsey Jan 2020 – The Future is now: How Oil and Gas Companies Can Decarbonize
14. APnews.com March 2020: https://apnews.com/article/06a46fe1aee6ff70a283ec2e90a9d050
15. The Internet of things (IoT) describes physical objects (or groups of such objects) with sensors, processing ability, software and other technologies that connect and exchange data with other devices and systems over the Internet or other communications networks.
16. A digital twin is an environment of linked data and models that reproduce an accurate, virtual representation of real-world entities and processes.
17. McKinsey Jan 2020 – The Future is now: How Oil and Gas Companies Can Decarbonize
18. S&P Market Intelligence, Dec 2022 – Path to net-zero: Lack of emission-reporting standard clouds oil, gas investment.
19. ESG Investor, Dec 2021 – Pressure to Accurately Disclose Carbon Emissions is Building.
20. What's Your Impact.org – Effect of increased greenhouse gas emissions.
21. Princeton University, Aug 2019 – Offshore oil and gas rigs leak more greenhouse gas than expected.
22. Oil and Gas Authority, Oct 2021 – Emissions Monitoring Report.
23. Persefoni.com, Dec 2022 – Carbon Accounting Standards.

24. The World Bank. 2022. “State and Trends of Carbon Pricing 2022” (May), World Bank, Washington, DC.

25. M. Pathak, R. Slade, P.R. Shukla, J. Skea, R. Pichs-Madruga, D. Ürge- Vorsatz, “Technical Summary,” in Climate Change 2022: Mitigation of Climate Change. Contribution of Working Group III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change, edited by P.R. Shukla, J. Skea, R. Slade, A. Al Khourdajie, R. van Diemen, D. McCollum, M. Pathak, S. Som e, P. Vyas, R. Fradera, M. Belkacemi, A. Hasija, G. Lisboa, S. Luz, J. Malley. (Cambridge, UK and New York, NY, USA: Cambridge University Press, 2022).

26. International Energy Agency, “COP26 Climate Pledges could Help Limit Global Warming to 1.8°C, but Implementing Them Will Be the Key,” November 4, 2021.

27. https://www.worldbank.org/en/programs/pricing-carbon

28. I. Parry, C. Veung, and D. Heine, “How Much Carbon Pricing Is in Countries’ Own Interests? The Critical Role of Co-Benefits,” Climate Change Economics 6, no. 4 (2015): 1–26.

29. https://www.energypolicy.columbia.edu/what-you-need-know-about-federal-carbon-tax-united-states.

30. https://www.c2es.org/document/us-state-carbon-pricing-policies/

31. https://ecology.wa.gov/Air-Climate/Climate-Commitment-Act/Cap-and-invest/Auctions-and-trading.

32. https://www.oecd.org/tax/tax-policy/pricing-greenhouse-gas-emissions-turning-climate-targets-into-climate-action.htm.

33. https://www.rff.org/news/press-releases/social-cost-of-carbon-more-than-triple-the-current-federal-estimate-new-study-finds/.

34. https://www.rff.org/publications/explainers/social-cost-carbon-101/.

35. Chinese Ministry of Ecology and Environment, “The First Compliance Cycle of the National Carbon Market Ended Successfully,” January 1, 2022.

36. T. Luyue, “The First Year of China’s National Carbon Market, Reviewed,” China Dialogue, February 17, 2022

37. M. Xu and D. Stanway, “China Slams Firms for Falsifying Carbon Data,” Reuters, March 15, 2022.

38. https://www.nera.com/content/dam/nera/publications/archive1/PUB_EUETS_PetEcon.pdf.

39. https://www.hfw.com/EU-Emissions-Trading-System-Current-status-and-key-issues-July-2022.

40. European Commission, Proposal for a Directive of the European Parliament and of the Council amending Directive 2003/87/EC establishing a system for greenhouse gas emission allowance trading within the Union, Decision (EU) 2015/1814 concerning the establishment and operation of a market stability reserve for the Union greenhouse gas emission trading scheme and Regulation (EU) 2015/757, September 14, 2021.

41. Council of the European Union, “Presidency Report for the Environmental Council Meeting of 17 March 2022,” March 8, 2022.

42. https://www.europarl.europa.eu/legislative-train/package-fit-for-55/file-revision-of-the-eu-emission-trading-system-(ets).

43. O. Wannan, “Soaring Demand to Pollute Blows Government’s First Limit on Carbon Units,” Stuff, September 2, 2021.

44. O. Wannan, “Everyone Wants to Buy Carbon—So Why Does No One Want to Sell?,” Stuff, March 18, 2022.

45. Government of the United Kingdom, "UK ETS Authority Statement: Cost Containment Mechanism Decision—December 2021," January 18, 2022.

46. Government of the United Kingdom, "UK ETS Authority Statement."

47. L. Yulismanm, "Indonesia Delays Carbon Tax till July to Help Economic Recovery," The Straits Times, March 30, 2022.

48. Milenio, "Hacienda elimina impuesto a gasolina Magna y diésel ante alza de precios por conflicto en Ucrania," March 4, 2022.

49. I. Gerretsen, "South Korea Proposes Cutting Emissions 40% by 2030," Climate Home News, June 16, 2021.

50. D. Nachtigall, J. Ellis, and S. Errendal, "Carbon Pricing and COVID-19: Policy Changes, Challenges and Design Options in OECD and G20 Countries," OECD, March 2022.

51. ANZ Research, "Carbon Markets 101: Pricing Climate Change Solutions," July 29, 2021.

52. S. Reklev, "SK Market: KAUs Climb to 19-mth High as Financials Enter Market," Carbon Pulse, December 20, 2021.

53. Legislative Analyst's Office, "Cap-and-Trade Auction Update and GGRF Projections," December 6, 2021

54. E. Rauhala, R. Noack, and V. Guinan-Bank, "Europe's Plan to Wean Off Russian Energy Could Lead to Price Shocks and Political Blowback," Washington Post, March 9, 2022.

55. W. Van Gaal, "Poland Threatens to Veto the EU's Fit for 55," EUObserver, December 21, 2021.

56. United Nations, Paris Agreement to the United Nations Framework Convention on Climate Change, December 12, 2015; European Bank for Reconstruction and Development, 'What Is a Just Transition?" 2022.

57. The EM Insights Team, "Voluntary Carbon Markets Top USD1 Billion in 2021 with Newly Reported Trades, a Special Ecosystem Marketplace COP26 Bulletin," Ecosystem Marketplace, November 10, 2021.

58. The EM Insights Team, "Voluntary Carbon Markets Top USD1 Billion."

59. ICAP, Emissions Trading Worldwide: Status Report 2021, International Carbon Action Partnership, 2021.

60. IATA, "Passenger Demand Recovery Continued in 2021 but Omicron Having Impact," January 25, 2022.

61. M. Lithgow, "ICAO Moves forward CORSIA Emissions Recovery Forecast, Drops Offset Cost Estimates," Carbon Pulse, July 6, 2021

62. The EM Insights Team, "CORSIA Carbon Market Data from Ecosystem Marketplace. ICAO Environment CORSIA Newsletter," Ecosystem Marketplace, December 1, 2021.

63. M. Lithgow, "ICAO Moves forward."

64. ICAO, "CORSIA Eligible Emissions Units," November 2021.

65. AlixPartners, Feb 2022 – 2022 Offshore Oil & Gas Report.

66. The Clarksons Research, Sept 2022 – Offshore Review & Outlook.

67. AlixPartners, Feb 2022 – 2022 Offshore Oil & Gas Report.

68. https://www.jpmorganchase.com/impact/sustainability.

69. https://www.citigroup.com/citi/sustainability/lowcarbon.htm

70. https://www.nortonrosefulbright.com/en-nl/knowledge/publications/0e4486ae/sustainable-green-financing-in-the-shipping-and-offshore-sectors.

71. https://www.eib.org/en/press/all/2019-313-eu-bank-launches-ambitious-new-climate-strategy-and-energy-lending-policy.

72. https://www.ca-cib.com/pressroom/news/eni-issues-worlds-first-sustainability-linked-bond-oil-gas-sector.

73. Precognize – Nov 2021 – Where is Sustainability on the Oil and Gas Agenda?.

74. https://insights.grcglobalgroup.com/sustainable-future-for-the-oil-and-gas-industry/.

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