ESG Research

Carbon Pricing, In Various Forms, Is Likely To Spread In The Move To Net Zero

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Government policies seeking to transition economies to net-zero emissions are likely to increase globally. These include carbon pricing regulations, one policy lever to achieve emissions abatement targets.

This research paper draws on the research and insights of S&P Global Ratings, S&P Global Commodity Insights, and S&P Global Sustainable 1. It does not comment on current credit ratings nor does it constitute a methodology used for credit ratings. This report does not constitute a rating action.

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Key Takeaways

- Government policies seeking to transition economies to net-zero emissions are likely to increase globally, amid the urgency of mitigating climate change impacts. These are likely to include some form of carbon pricing regulations, one of the policy levers that we have observed being used by some governments as they aim to achieve emissions abatement targets. Many economists argue that carbon pricing policies are one of the most efficient policy levers to encourage reductions of GHG emissions. From an economic perspective, they provide direct incentives for households and firms to account for the environmental cost of carbon emissions.
- Relatively few carbon pricing regulations are currently in place, covering less than a quarter of global GHG emissions. The largest carbon markets by emissions coverage are found in the EU and China, and others are in place in the U.K., Canada, select U.S. states, and Asia, among others.
- The EU's carbon price is about €80/tCO2e today, supported by its Fit for 55 environmental package and impetus from the Russia-Ukraine conflict and related energy crisis. We expect the EU's carbon allowance prices to exceed €100/tCO2e from 2025 onward, as the EU steps up its transition to net zero.
- Political and economic considerations, like affordability, are more conducive to gradual, localized applications of carbon pricing policies, rather than a drive toward a single global carbon price.
- Sectors such as utilities, materials, energy, and transportation are among the most carbon intensive on a direct emissions basis. Companies better prepared to deal with higher carbon prices may enjoy greater optionality to adjust their businesses and a stronger competitive position.
- For the rest of 2022, further developments in the Russia-Ukraine conflict are likely to impact emissions from the EU power sector, as member states seek to extend more polluting coal-fired generation and LNG imports capacity to meet short-term demand, in response to potential restrictions of Russian oil and gas imports. For EU countries in particular, ambitious decarbonization objectives will continue to be managed against other priorities such as energy security and affordability.

Over time, we think a greater number of countries will likely adopt some form of carbon pricing policies as part of broader policy mixes to reduce greenhouse gas emissions to mitigate global warming. Here, we survey the existing policies in place, which today cover less than a quarter of global GHG emissions. Those policies are varied in scope and geography, and we do not expect to see a single global carbon system or price in the near future.

We take a look at the EU's emissions trading system or ETS, one of the world's most established. Discussions are proceeding among member states to increase its scope and institute a carbon tax at the border to tighten the regime and reduce regulatory arbitrage. We expect the EU's carbon allowance prices to increase and exceed €100/tCO2e (tons of CO2 equivalent) from 2025 onward, as the EU steps up its transition to net zero.

Looking ahead, this paper also briefly looks at sectors with higher direct emissions, which is only one indicator. Others include the ability to substitute or compete with less carbon-intensive products or to pass on the cost to their end clients. Assuming a future with an increased number of carbon pricing policies, it seems clear that companies with a greater ability to adjust their business models and operations will be less exposed—and perhaps better able to compete. Over time, investor demand for climate-related disclosures from companies is likely to increase. In 2017, the Task Force on Climate-related Financial Disclosures (TCFD) published recommendations in this area.

The State Of The World's Carbon Pricing Policies

Governments and policymakers have a wide range of instruments at their disposal to mitigate global warming and have taken steps to use them (see "Green Spending Or Carbon Taxes (Or Both): How To Reach Climate Targets, And Grow Too, By 2030?" published by S&P Global Ratings on Nov. 4. 2021). For example, green spending has increased—even during the COVID-19 pandemic. Plus, several central banks have adopted a supervisory approach to raise awareness and monitor climate-related risks in the financial sector (see "Central Banks And Climate Change," June 16, 2022). And then there's carbon pricing, which many economists argue is one of the most efficient policy levers to encourage reductions of GHG emissions. They argue that because carbon emissions are a negative externality linked to consumption or production patterns, not well accounted for by economic agents, they don't carry any direct cost unless taxed or priced by a market mechanism. So far, the use of carbon pricing policies remains relatively modest across the globe.

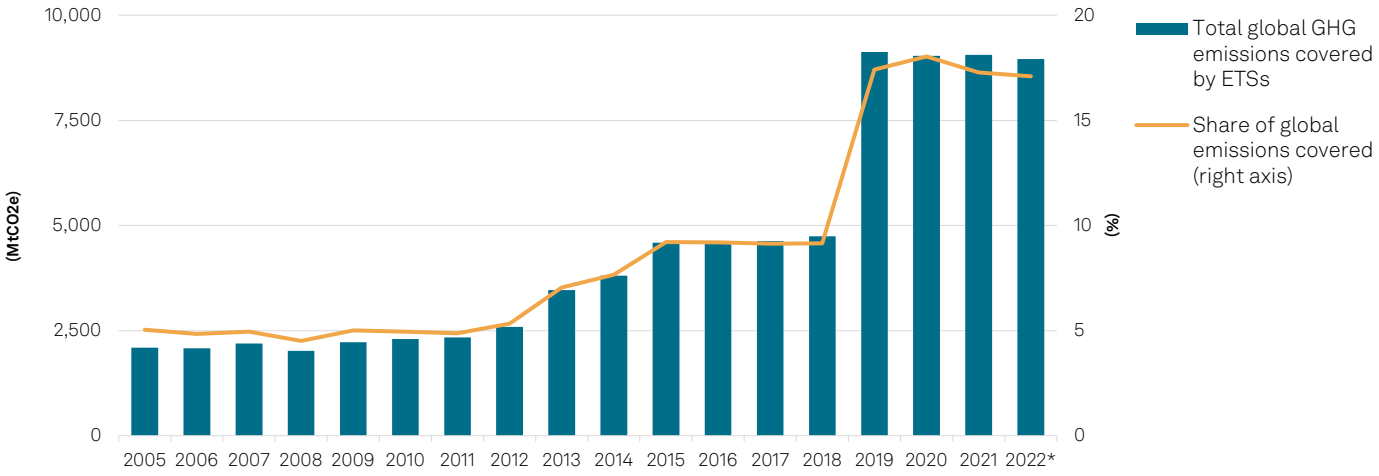
For the purpose of this research, we define carbon pricing policies to mean either the implementation of a carbon taxation regime or establishment of a compliance-based carbon market (such as an emissions trading system or ETS). These are examples of direct carbon pricing. Indirect carbon pricing includes, for example, taxes with implied carbon costs—such as fuel taxation or outright bans on polluting products, like bans on fossil fuel-powered cars.

In an ETS, the governing body sets a total quota of emissions permitted for the year for all participating sectors. Participating companies are required to acquire and surrender emission "allowances" (emissions permits) to cover their annual emissions to the regulating authority or face a penalty for every allowance not surrendered. Allowances can be auctioned to the highest bidder as well as traded on secondary markets, creating a carbon market with a price set by the market itself. Companies whose emission abatement efforts are financially more costly than others purchase these allowances from the ETS market, while companies that can reduce their emissions may sell surplus allowances to other participants. Policymakers may adjust the quota of emission allowances in a market system or the sectors included in the ETS to indirectly control the allowance price.

Around 17% of global GHG emissions were covered by ETSs as of 2021, up from about 5% when the EU ETS system was established in 2005, according to the International Carbon Action Partnership (ICAP). ETS and carbon taxation policies combined covered around 23% of global emissions as of April 2022, according to the World Bank's report, "State and Trends of Carbon Pricing 2022, World Bank," May 24, 2022.

Chart 1

Global Expansion Of GHG Emissions Covered By Emission Trading Systems



*As of March 2022. Note: The sharp increase in 2019 reflects the start date of the Chinese National ETS in 2021, while also indicating the retroactive coverage of the system in 2019 and 2020. For further details on ICAP's methodology see "Emissions Trading Worldwide: 2022 ICAP Status Report," March 2022.
MtCO2e--Metric tons of carbon dioxide equivalent.
Source: International Carbon Action Partnership (2022).

Carbon markets take different forms globally, with state and provincial schemes most prevalent

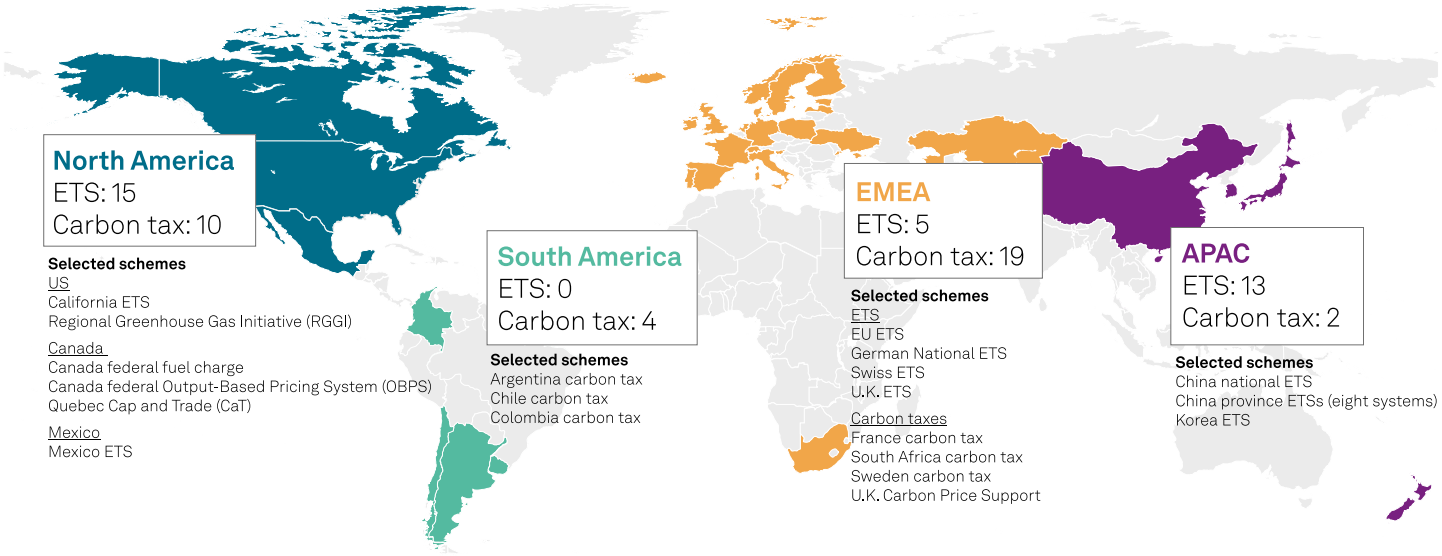
In its May 2022 publication, the World Bank reported 34 different ETSs implemented around the world. The majority of these schemes are operating at the subnational level in the North American and APAC regions. One spans a multinational area—the EU ETS. In the U.S., a number of state-level cap-and-trade systems have been established since 2013, with the largest being California's, which is currently linked to the Canadian province of Quebec. A federal approach to carbon pricing regulations in the U.S. does not exist, and we do not foresee the establishment of one in the near term given the political and macroeconomic environment.

China launched its national ETS in 2021, which initially applied to emissions from the power sector and was backdated to cover emissions from 2019 and 2020 in its first compliance phase. Unlike other ETSs, China's sets an intensity target-based cap, rather than an absolute cap on annual emissions. China plans to gradually roll out its ETS to additional sectors over the next few years and has expressed a strong commitment to reducing its carbon emissions.

The EU ETS is the longest running of such systems in the world, first launched in 2005. The EU ETS applies to emissions from the power sector, heavy industry (including but not limited to steel, cement, and chemicals production) and intra-EEA aviation. The scheme is currently in its fourth phase, which runs from 2021 through 2030.

Map 1

Implemented Carbon Taxes And ETSs Around The World



Source: The World Bank. 2022. "State and Trends of Carbon Pricing 2022" (May), World Bank, Washington, DC.
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The economic and redistributive impacts of carbon pricing policies are a hurdle to implementation

Where they exist, we observe that carbon markets have to date not resulted in carbon prices that are high enough to incentivize a reduction in emissions in line with climate ambitions pledged by the countries with carbon pricing regulations. The OECD uses €120 per ton of CO2 as an estimate of the price needed in 2030 to decarbonize by midcentury and finds that in 2018 only 12% of emissions in its member countries were priced at that level. That's despite many of these countries targeting net zero by 2050. Some jurisdictions have also protected carbon-intensive industries from potential losses in cost competitiveness because of carbon pricing through the issuance of free emission allowances (for example, in the EU ETS). This reduces the implied cost of carbon for those emitters, making those schemes arguably less effective at achieving emissions reductions.

Hurdles to implementation include concerns regarding potential weakening of consumer purchasing power and business competitiveness, as well as concerns about social equity. Depending on how carbon pricing regulations are designed, they can have immediate visible repercussions for the end-consumer. Because companies generally pass on the costs, consumers tend to pay the price. Companies selling their products in international markets might also suffer from lower cost competitiveness than nonregulated peers, although the evidence on this phenomenon is somewhat mixed. For governments, developments in the energy market, such as gas supply shortages and higher fuel and power prices currently driven higher by the Russia-Ukraine conflict, are creating tough choices about how to balance immediate energy security needs and affordability with longer-term energy transition plans.

To illustrate the different macroeconomic implications of carbon pricing, we ran a carbon tax scenario assuming a gradual increase in the carbon price for all sectors of the economy to $100 by 2030 in the U.S., China, and the EU. (Note that carbon prices achieved through an ETS do not cover the whole economy as they do not apply to all sectors.) Our results, originally published in November 2021, highlight that given China's larger reliance on carbon-intensive energy sources,

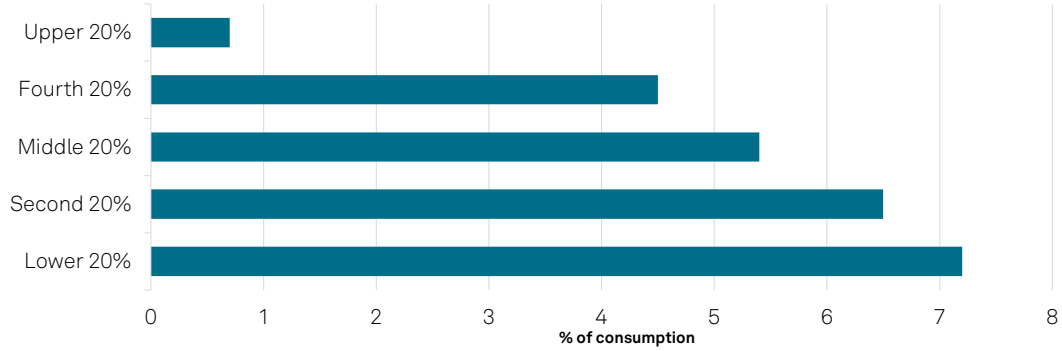
the economic impact could be much larger than in the U.S. or the EU, all things being equal. Our scenario points to an 8% GDP loss by 2030 for China, compared with much less for the U.S. at 3% of GDP and the EU at 2% of GDP (see chart 2). For the EU, the impact is relatively muted given it has already embarked on the green transition and the existing carbon price is higher there than in the other jurisdictions (see "Green Spending Or Carbon Taxes (Or Both): How To Reach Climate Targets, And Grow Too, By 2030?" Nov. 4. 2021).

Our research also highlights that lower-income households (see chart 2) and smaller firms tend to lose relatively more from these types of mechanisms as they spend a larger share of their revenues on energy and have less capital to invest in energy efficiency. These distributional consequences suggest that carbon pricing is unlikely to be implemented as a single measure to encourage emissions abatement.

To offset some of these redistributive consequences and potential economic losses, one option could be to reuse any carbon tax or program proceeds for household income support or to finance investments, as chart 3 shows. For example, the European Green Deal and Fit for 55 package actively seek to address these effects with redistributive funds, such as the Just Transition Fund, the Social Climate Fund, and targets for energy efficiency and renewable energy that will require investment.

Chart 2

Less Affluent Households Are More Vulnerable To Energy Taxes

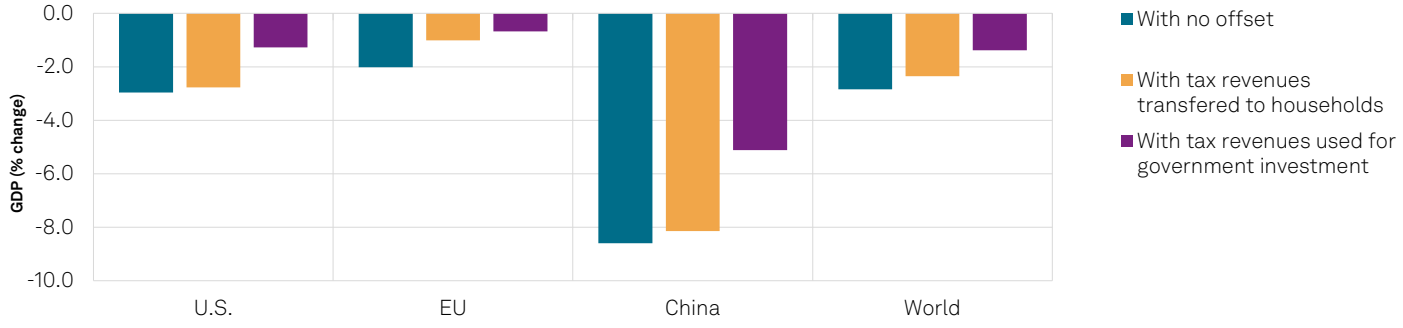


Sources: Eurostat, S&P Global Ratings.

Chart 3

Raising The Price Of Carbon To $100 By 2030 Is Likely To Weigh On GDP In Most Countries

GDP impact of a $100 a ton carbon tax by 2030 (difference to business as usual baseline)



Note: We note that these are rough estimates because such a big macro model is unlikely to fully capture some of the complex environmental dynamics, in particular for China, where the data is less rich than for the U.S. and EU.
Sources: Author's calculations using Oxford Economics Global Economic Model, S&P Global Ratings.

Carbon Pricing Regulations Are Likely To Spread As More Countries Move To Mitigate Climate Change

Despite implementation challenges, we think more carbon pricing policies are likely to be included as part of broader policy mixes as many countries continue to strengthen their climate commitments. The recent IPCC report, "Climate Change 2022: Mitigation of Climate Change," alerted the world that "limiting warming to around 1.5 degrees Celsius requires global GHG emissions to peak before 2025 at the latest," while last year's Glasgow COP26 conference explicitly stipulated the need for annual follow-up and revisions to the targets. Although it is difficult to anticipate what kinds of policies jurisdictions might adopt to reduce their carbon emissions, we believe the number of carbon pricing policies is likely to increase and think they will be included as part of larger policy packages to green the economy. If implemented effectively in otherwise functioning markets, many economists argue that direct or indirect carbon pricing can help firms and households incorporate the cost of pollution in their choices, which is otherwise an externality that they don't see (as any Pigouvian tax that seeks to price a negative externality generated by market transactions), and incentivize a reduction in emissions.

The EU, one of the few jurisdictions that has explicitly announced its objectives for greening its economy, provides a detailed roadmap for emissions abatement and transition policies. The EU Commission released plans in July 2021 to reform the EU ETS and a carbon tax at the border (the Carbon Border Adjustment Mechanism (CBAM), which could trigger more carbon pricing across the world.

The CBAM intends to avoid regulatory arbitrage known as "carbon leakage" and put an end to free allowances under the EU ETS, which were issued to alleviate competitiveness concerns, but have undermined the effectiveness of the ETS to date. The European Parliament's recent vote on the Fit for 55 package favors a phasing out of free allowances between 2027 and 2032 and starting the gradual implementation of the CBAM, but the European Council has not yet approved parliament's recommendations. Some jurisdictions affected by the CBAM may consider domestic carbon pricing policies to avoid a disruption in trade and keep carbon tax revenues at home, especially those countries with strong trade links to jurisdictions that introduce carbon pricing at the border.

For jurisdictions currently without a carbon pricing policy in place, wide differences in political preferences and wealth globally suggest they are likely to take a variety of approaches to reducing carbon emissions. The hurdles highlighted above suggest we are more likely to see an increase of a variety of different carbon pricing policies, that is, predominantly localized initiatives to price some carbon emissions, rather than a global carbon price covering all sectors. In addition, we think carbon pricing, which is one of several instruments at policymakers' disposal, where adopted is likely to be combined with other measures to green economies. For example, investment in cleaner production processes—like improving the energy efficiency of buildings—or encouraging consumers toward more sustainable lifestyles through behavioral policies—by raising awareness about climate change and the environmental impact of their purchases—can also contribute to reducing carbon emissions.

Central EU Carbon Price Forecasts And Drivers, From S&P Global Commodities Insights

Here, S&P Global Commodities Insights provides its price forecast for the EU ETS, the world's most established carbon market framework, launched in 2005.

We expect the EU carbon price to increase to, then exceed on a sustainable basis €100/tCO2e by 2025, up from around €80/tCO2e today

The EU ETS carbon allowance price (EUA) has recovered following a period of high volatility after the outbreak of the Russia-Ukraine conflict to trade around €80/tCO2e. This is in line with our monthly average EUA price expectations. The recovery and stabilization of the EUA price have been supported by demand for allowances from compliance entities at auctions and continued hedging interest amid ongoing negotiations about reforming the EU ETS, due for implementation next year.

For the rest of 2022, we expect the Russia-Ukraine conflict will have significant impact on emissions from the EU power sector, as member states seek to extend more polluting coal-fired generation and LNG imports capacity to meet demand in response to potential sanctions imposed over Russian oil and gas imports. As a result, we forecast the region's annual power emissions to increase by 3% in 2022. While this may have bullish implications for EUA prices, rising power sector emissions may be offset by diminishing demand from industrial participants, in response to the ongoing impact of high energy prices. On July 26, 2022, EU member states agreed to a voluntary 15% gas demand reduction between August 2022 and March 2023.

Our EUA price forecast currently does not fully account for a bearish risk of significant demand destruction from EU industrial installations in 2022. The probability of a global recession has risen, but this is not currently our baseline.

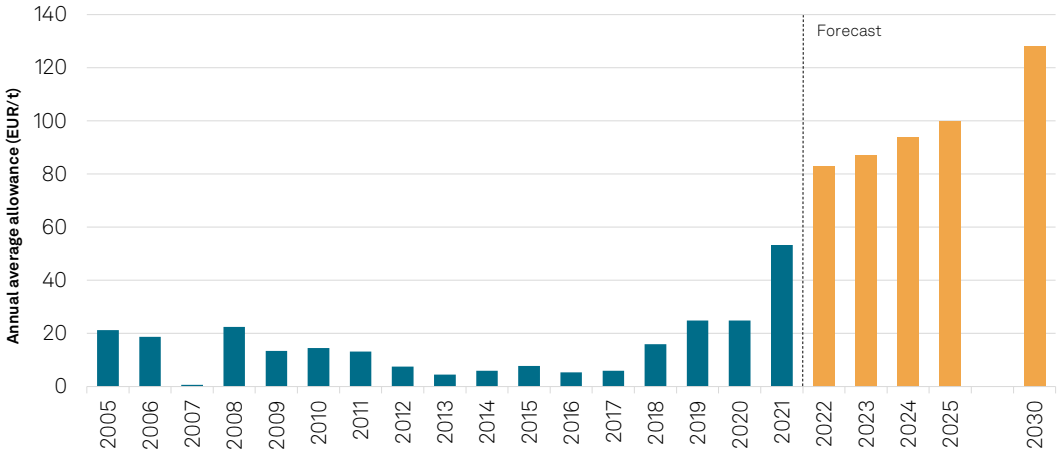
Following the implementation of policy reforms currently being negotiated by EU legislators as part of the Fit for 55 package, our view is for nominal EUA prices to increase and exceed €100/tCO2e annually by 2025. We forecast tighter balances of allowances in the system as a result of policy reforms, which initially will support greater investor interest in trading EUAs during the current phase until 2030. Higher investor demand, coupled with demand for allowances by sectors with current or future compliance obligations, will support higher EUA prices beyond fuel-switching prices through the mid-2020s. While this is a significant increase in the price of carbon for EU economies, we note this will not apply to all sectors, so the price of carbon for the aggregate economy is likely to remain below the €120 mark used by the OECD, unless other measures are taken to price carbon for other sectors not covered by the ETS.

Beyond this, we expect the EU will prepare and publish further plans for policy revisions of the EU ETS in anticipation of the fifth phase of the scheme that starts in 2031. Deeper emissions reductions are required from 2030 from the harder-to-abate industrial and transportation sectors, as low-cost fuel switching in the power sector is mostly exhausted. As such, we expect higher industrial abatement costs to decarbonize the industrial and transportation sectors and set the EUA price in the long term.

Chart 4

S&P Global Commodity Insights Current Forecasts For EUA Prices

We forecast continued strength in EUA prices with alignment to EU Fit for 55 targets



Source: S&P Commodity Insights' published forecasts for EUA prices.

We expect the EU ETS will evolve, expand, and tighten as early as 2024

As we mentioned above, the EU ETS is being reformed as part of its wider Fit for 55 package. The European Commission plans to significantly strengthen the climate ambition of the EU ETS, to ensure its climate trajectory is consistent with the EU's legislated 55% emissions reduction target below 1990 levels by 2030. Reform proposals are currently under review by member states and the European Parliament. We expect the review will end in early 2023, followed by implementation of legislation by the end of 2023.

Policy proposals, including plans to expand the scope of the EU ETS to maritime emissions and reduce the cap on emissions, started to raise EUA prices in July 2021. We expect further price uplift later this year as final policy designs are agreed, likely to come from existing and new sectors to EU ETS looking to build their allowance balances in advance of legislative changes to the EU ETS taking effect, to manage effects on long-term cash flow.

Our longer-term EUA price forecast is subject to future policy revisions by the EU and any further policy responses to the Russia-Ukraine conflict. The EU released its REPowerEU plan on March 8, seeking to accelerate development of renewable energy production and accelerate the roll-out of domestic heat pumps to improve energy efficiency. REPowerEU could provide short-term uplift to EUA prices through to 2030 via increased energy demand, but dampen annual increases from 2030 as demand lessens from power sector participants.

What Sectors Have The Highest Emissions?

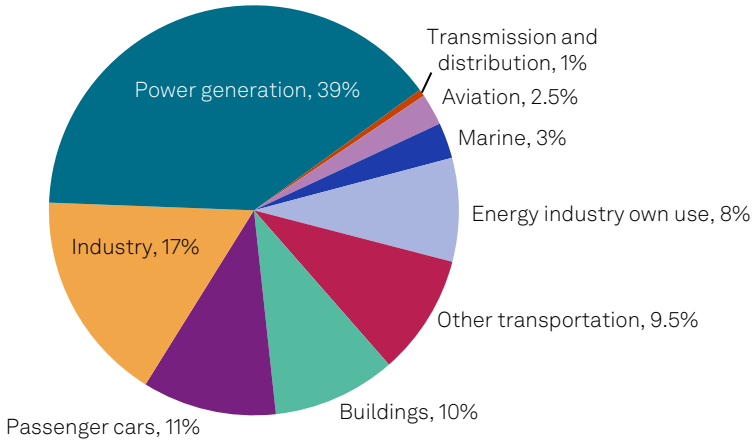
The heaviest-emitting sectors are most likely to be subject to carbon pricing and, in turn, bigger increases in costs linked to their carbon emissions. Platts Global Integrated Energy Model from S&P Global Commodity Insights forecasts that power generation will remain the biggest source of global CO2 emissions for 2022, followed by emissions from industry and transport sectors (see chart 5). The majority of existing ETSs already covers emissions from at least the power sector or heavy industrial sectors, but few cover transport, with international aviation emissions covered only within the EU, U.K., and Swiss ETSs. Historically, in some schemes, power and heavy industry have been offered a degree of protection from full exposure

to a carbon price. The main reasons are to reduce the risk of carbon leakage—that is, companies moving production to jurisdictions with no carbon pricing—preserve cost competitiveness, and manage the transition toward a low-carbon economy.

Chart 5

Expected Breakdown Of Global CO2 Emissions By Direct Combustion For 2022 (%)

Our Global Integrated Energy Model Forecasts majority of global emissions to come from power generation sector

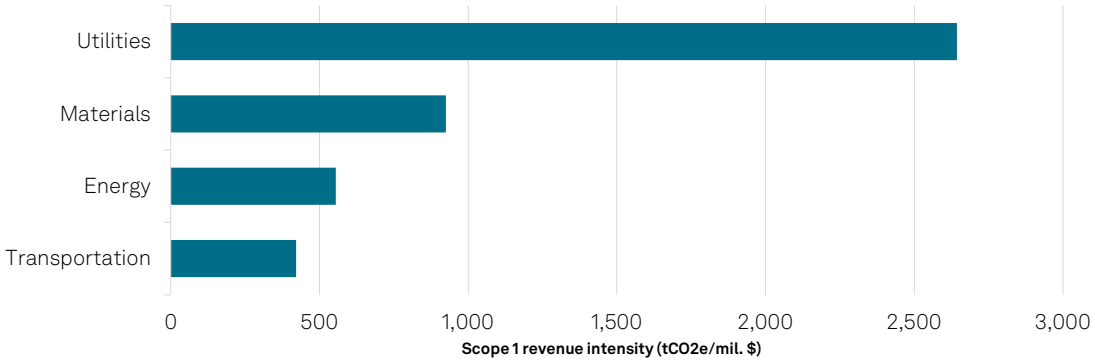


Source: Platts Global Integrated Energy Model by S&P Global Commodity Insights.

Relative to revenue generation, we find that utilities, materials, energy, and transportation are among the most carbon-intensive sectors on a direct emission basis. This suggests their businesses are more exposed to increases in carbon pricing than other sectors (see chart 6). We note that this does not necessarily provide the full picture for energy transition risks for all sectors, since this data and our report only address direct or Scope 1 emissions, given that this has been the primary focus for most jurisdictions. When considering an organization's overall exposure to energy transition risks, Scope 2 and Scope 3 emissions can also provide useful information.

Chart 6

Top 4 Sectors: Scope 1 Emissions Revenue Intensity Per Ton



Note: Scope 1 revenue intensity is calculated as tons of Scope 1 emissions per $1 million of revenue. Calculation is based on 2019 and 2020 averages using GICS Industry Group data. The analysis is based on companies covered by S&P Global Trucost (a part of S&P Global Sustainable1) in its Trucost Environmental dataset.
Source: S&P Global Sustainable 1.

What Emissions Intensity Could Mean For Competitiveness

We note that high direct emissions intensity cannot be taken as the sole indicator of the future potential financial materiality of carbon pricing for a sector or its future competitiveness. For example, it is likely that companies in industries where there are no or limited substitutes or competing products might be able to pass a meaningful portion of the cost of carbon pricing to their end customers.

As the scope of regulation expands and carbon emissions-related costs potentially become financially more material, we believe this could translate into a competitive advantage for companies that have successfully lowered their emissions. Even if one cannot predict the actual future cost of carbon as policies evolve, companies with a greater degree of preparedness should be able to have greater optionality to adjust their business models and operating processes and be less exposed to potential carbon pricing or penalties than the less prepared ones. Although the magnitude of financial impact might differ from one sector to another, which does not just depend on emissions exposure but as much on prevailing regulations and pass-through of carbon costs to consumers, we would expect some companies will need to engage in substantial and long-term capital expenditure projects to reduce emissions intensity.

Meanwhile, we don't believe every company will enjoy the same starting level of access to capital markets and technology. Businesses in wealthier countries generally enjoy stronger access to capital markets, which should help them proactively modify their energy mix and products as well as finance the sizable capital expenditure associated with investing in new technologies or emission-abatement projects, as long as a sound strategic plan is in place. However, some businesses in developing markets might not have the same access to capital markets or technology.

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- State and Trends of Carbon Pricing 2022, World Bank, May 24, 2022
- Emissions Trading Worldwide: Status Report 2022, International Carbon Action Partnership, March 2022