Evolutions and trends of carbon pricing mechanisms

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The transition we are embarking upon today necessitates a complete overhaul of our production methods to significantly curtail our CO_2 emissions to an absolute minimum. These emissions are partly culpable for climate change and for surpassing the other five planetary thresholds.

To accomplish this, the economic and financial tools employed for explicit or implicit carbon pricing convey clear messages about the societal advantages of emitting reduced carbon. However, while carbon pricing stands as one of the most potent mechanisms for channeling spending and investment away from polluting sources towards eco-friendly alternatives, numerous countries exhibit reluctance in harnessing this lever, apprehensive of jeopardizing international competitiveness.

In 2023, according to the World Bank, 73 Carbon Pricing initiatives are implemented. These initiatives would cover **11.66 $GtCO_2e$***, representing **23%** of global GHG emissions.

1. Policy tools

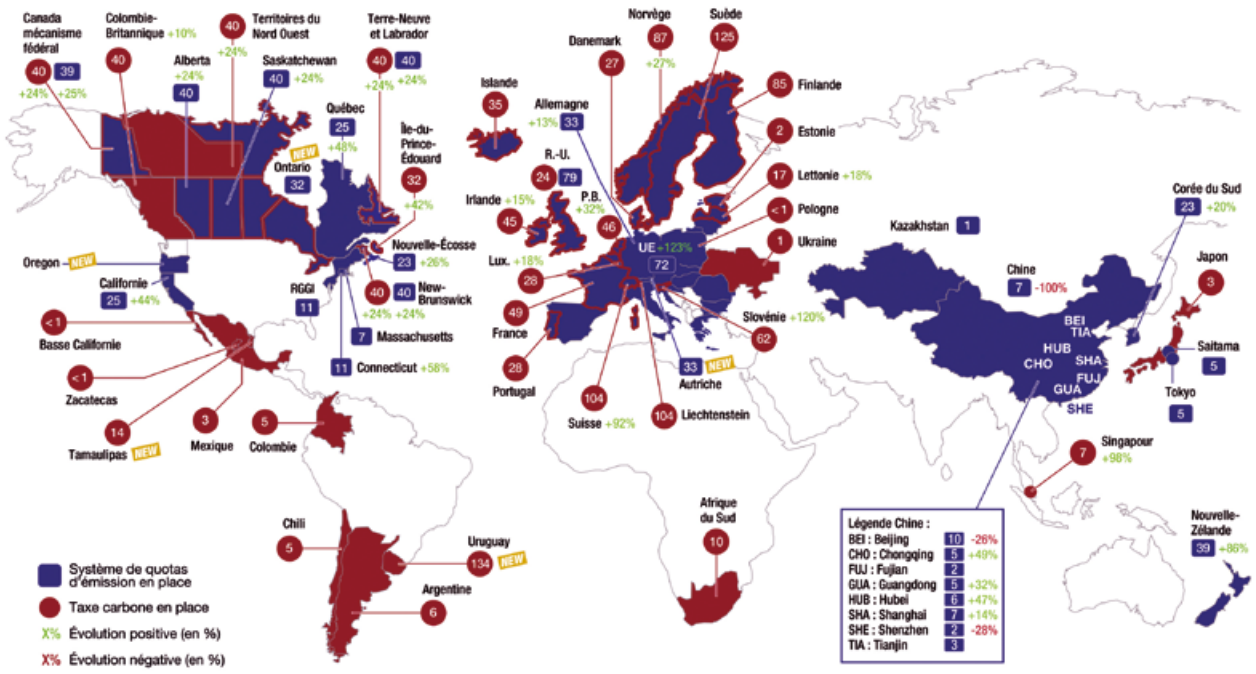
Regardless of their stage of development, the global landscape of carbon pricing mechanisms reveals that governments encounter significant technical, political, and legal challenges when striving to establish a credible and impactful price signal. The outcome manifests as a patchwork of carbon prices spanning the globe, offering valuable insights for both policymakers and businesses.

• Direct pricing OF CO_2

In theory, the simplest way to minimize the cost of the low-carbon transition is to apply the "polluter pays":

- via a **tax system**, the proceeds of which can be reused to reduce taxation elsewhere. France's carbon tax concerns fossil fuels. It began at € 7/ton of CO_2 in 2014. It has currently been frozen at € 44.60/ton of CO_2 since 2018. The aim is still to reach € 100/ton by 2030.

CARBON PRICING TOOLS
Global Panorama of Carbon Prices as off August 2022 (US $/t CO_2 éq)



** World Bank - Carbon Pricing Dashboard: https://carbonpricingdashboard.worldbank.org*
https://www.i4ce.org/wp-content/uploads/2022/09/220915-18h13-i4ce3632-ComptesMondiaux2022-VA-10p.pdf

As of May 1, 2020, 31 carbon taxes were in operation worldwide. They brought in $ 26 billion, 65% of which from EU member countries. As of March 31, 2023, the number of carbon taxes in operation had increased to 37.

Some examples of prices in US $/ton of carbon worldwide nowadays:

- Sweden: 123
- Norway: 58
- Canada: 23
- South Africa: 8
- Mexico: 3

- via an **emission allowance market**, a 'cap' is generally set, representing the maximum allowable emissions to adhere to the Paris Agreement and prevent missing the target. Carbon 'credits' are then allocated to relevant companies through various methods (such as national auctions or free allocations for the most vulnerable). Subsequently, facilities that exceed their allocated CO_2 emission allowances are obligated to purchase allowances on the market, leading to financial penalties for their excess emissions. Conversely, facilities that reduce their emissions can sell their unused allowances on the market and generate income.

  This system enables the achievement of decarbonization goals by directly aligning with decarbonization technologies and the associated emissions reduction costs of various sectors or companies. Companies must strike a balance between the required quantity of allowances and the potential investment needed to lower their emissions, based on their cost functions.

  Carbon markets are being established in an increasing number of regions and are expanding in terms of the volume of emissions they cover. Presently, there are 36 'compliance' carbon markets operating globally. Collectively, these markets encompass nearly a fifth of the world's greenhouse gas emissions.

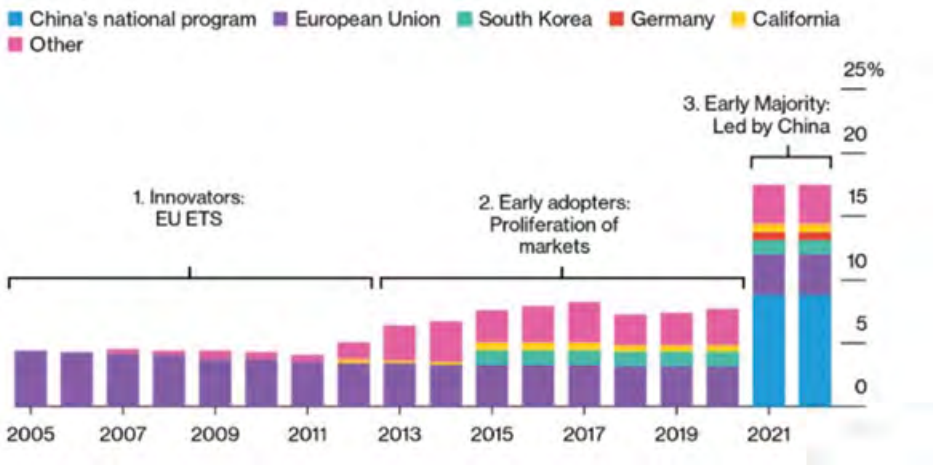
In Europe, the EU-ETS (European Union Emissions Trading System) was established in 2005. In practical terms, the European carbon market comprises over 10,000 entities responsible for 40% of the total EU emissions, including power generation, district heating, the steel industry, and commercial aviation, among others.

The EU-ETS has long been criticized for its inefficiency, largely due to the allocation of free quotas to heavy industries to mitigate the risk of relocation and carbon leakage to countries with less stringent regulations. This strategy has resulted in a decline in the price of carbon credits and a reduced incentive effect on companies. The EU altered its free allocation policy in subsequent phases (post-2014), leading to a significant increase in allowance prices.

What factors influence the price of allowances? Numerous studies have delved into the subject (Alkathery and Chaudhuri 2021; Boersen and Scholtens 2014; Carnero et al. 2018), concluding that energy-related factors serve as long-term influencers, while macroeconomic factors act as short-term influencers.

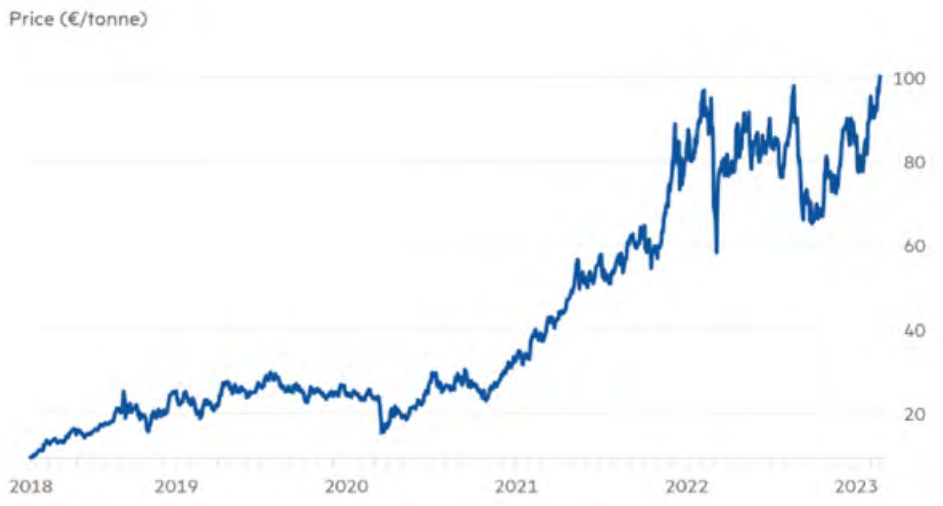
Given that the power sector accounts for nearly 39% of European CO_2 emissions and is a major sector under the EU ETS, energy prices play a pivotal role in determining allowance prices (which themselves are heavily influenced by supply and demand). Key factors encompass oil prices, stock market indices, the switching price between gas and coal (the CO_2

EXPANDED REACH
Almost a fifth ogf global emissions are now covered by a carbon market



Source: World Bank, BloombergNEF
Note: 'EU ETS' refers to the EU Emissions Trading System

EUROPEAN CARBON REACHES € 100 A TONNE



Source: Refinitiv, © FT

price at which it becomes attractive in the short term for a power producer to switch from coal to gas, or vice versa), and electricity prices (mainly over the recent period).

Regarding macroeconomic factors, exchange rates and stock market fluctuations significantly impact the oil market during periods of high volatility. It's also noteworthy that uncertainty in the system's early phases (up to 2010), regarding precise rules governing permit market operations up to 2020, led to an under-determination of the carbon price, which should be avoided today.

Concerning the evolution of the EU-ETS, in June 2022, European Parliament approved the following (439 votes to 157):

- The expansion of the carbon market to maritime transport.
- Citizens will remain excluded from the carbon market until 2029.
- The establishment of a separate market, EU-ETS II, for buildings, road transport (heavy goods vehicles), fuels, and space heating from 2027.
- A more rapid reduction in the cap, achieved through releasing a smaller quantity of allowances into the market (-4.3% per year for the 2024-2027 period and -4.4% per year for 2028-2030, corresponding to the reduction of 117 million allowances over two years).
- The gradual phasing out of free quotas allocated to certain sectors, such as the air industry. The reduction will commence from 2027, eventually culminating in their complete removal by 2032.

Finally, concerning this tool, it is expected that carbon prices across various emissions trading systems worldwide will increase between 2026 and 2030, compared to the period between 2022 and 2026. The average EU ETS carbon price is projected to be around 85.45 € per metric ton of CO_2 during the 2022-2025 period but is anticipated to rise to nearly 100 euros per metric ton of CO_2 from 2026 to 2030, based on a survey of International Emissions Trading Association members.

• Subsidizing avoided CO2 emissions

Other instruments include those that reward avoided emissions through subsidies for low-carbon investments. These subsidies take the form of support mechanisms for renewable energies and tax credits to promote energy efficiency. For instance, the US launched the 45Q tax credit in 2008, which incentivizes carbon capture by providing a credit for CO_2 storage. The 2022 changes to 45Q offer up to USD 85 per tonne of CO_2 permanently stored and USD 60 per tonne of CO_2 used for enhanced oil recovery (EOR) or other industrial uses of CO_2, contingent on clear demonstrations of emissions reductions. The credit amounts rise for direct air capture projects, reaching USD 180 per tonne of CO_2 permanently stored and USD 130 per tonne for used CO_2.

• Regulating carbon price evolution

In sectors where there is no explicit price, such as agriculture, transport, or waste, setting a price significantly exceeding € 100/ton would be challenging to accept as an incentive for behavior change or to encourage significant fuel consumption reductions by car manufacturers. Hence, regulation becomes valuable to expedite the process and foster technological breakthroughs.

• A carbon reference value

To guide its infrastructure investment decisions, the French government integrates a "carbon reference

value" or price corridor into the socio-economic analysis of projects. In France, this value was estimated at € 30 in 2018 and is projected to be € 100 in 2030. It represents the estimated carbon price required to achieve the national objective of reducing GHG emissions by fourfold by 2050.

• The EU border tax (MACF)

The EU has reached an agreement on a European border carbon adjustment mechanism set to take effect from October 1, 2023, marking a global first for climate policy. This mechanism will extend the regulations of the European carbon market to imports of polluting products, necessitating European manufacturers to procure carbon dioxide (CO_2) emission allowances. The scope encompasses iron and steel, cement, aluminium, fertilizers, electricity, hydrogen, and specific end products like screws and bolts.

The intention is not to establish a market for certificates for imported goods. Instead, it's a system dedicated to materials imported from the value chain of goods produced within the EU. The number of certificates isn't limited, nor is it intended to diminish over time. These certificates will be sold to declarants by competent national authorities without any quantitative limitation. Their price will align with the average closing price of ETS allowances on the common auction platform for each calendar week.

Declarants will also have the option to obtain a reduction in the number of MACF certificates to be surrendered by demonstrating that their goods originating countries have been subjected to carbon pricing.

This mechanism is designed to curb the relocation of EU manufacturing production to countries with less stringent standards. However, it doesn't entirely eliminate the potential for increased offshoring".

2. Private sector instruments

Carbon pricing is no longer a taboo subject for companies, and many of them are prepared to embrace a carbon price.

• An internal carbon price

Some companies are already incorporating a carbon price into their business models, foregoing the wait for it to be imposed by public authorities. This price can be determined based on carbon market prices, the state's reference value of carbon, or the company's own criteria.

Carbon emissions are thus considered as costs, creating an advantage for projects with relatively lower emissions. This allows climate risk to be factored into decisions by translating the risk into the future carbon cost of the activity, enabling anticipation of regulatory changes that could impact the future profitability of unprepared companies.

• Divestment from the fossil fuel sector

The financial sector is also growing more cognizant of the risks that climate change might pose to its stability. The increasing movement towards divestment from coal and the broader fossil fuel sectors demonstrates the recognition that their long-term profitability is under threat.

• Voluntary offset markets

Certain companies are taking a proactive approach by implementing a form of internal taxation on their carbon-related activities. The revenue generated from this internal tax is then reinvested into internal energy efficiency projects or directed towards carbon offset projects within voluntary carbon markets.

• Carbon offsetting system:

These systems don't directly dictate the price of carbon. Carbon offsetting operates within a voluntary, non-mandatory market accessible to any entity desiring to diminish its environmental footprint (distinct from carbon emission quota systems), and thus avoid emissions costs. Presently, this market is valued at approximately 2 billion dollars, with forecasts indicating growth. Carbon offset prices currently average between $ 3 and $ 10 per metric tonne of CO_2, indicating a well-supplied market. However, prices are starting to rise within regulated and voluntary carbon markets due to the influence of other demand drivers, including commitments under the Paris Agreement and market mechanisms. There's a notable surge in demand for credits from the private sector as companies strive for carbon neutrality and ESG objectives, necessitating the acquisition of offset credits.

3. Current carbon pricing globally

Today, there exists a mosaic of instruments explicitly or implicitly pricing carbon at national, regional, or sectoral scales. To date, none of these instruments have been applied on a global scale, as carbon taxes primarily function as national or sub-national measures.

• A universal carbon price?

A survey conducted by the World Business Organisation revealed growing concern among businesses about the increasing fragmentation of these systems. They emphasize the necessity for greater international policy harmonization to attract the private investments required to achieve zero net emissions by 2050. The organization urged COP26 to yield tangible outcomes in promoting the harmonization of existing carbon pricing mechanisms, including robust regulations for emissions trading and offsets under Article 6 of the Paris Agreement; however, no concrete progress was made concerning global carbon pricing.

More than 100 countries have expressed interest in employing carbon pricing to meet their Nationally Determined Contributions (NDCs) under the Paris Agreement.

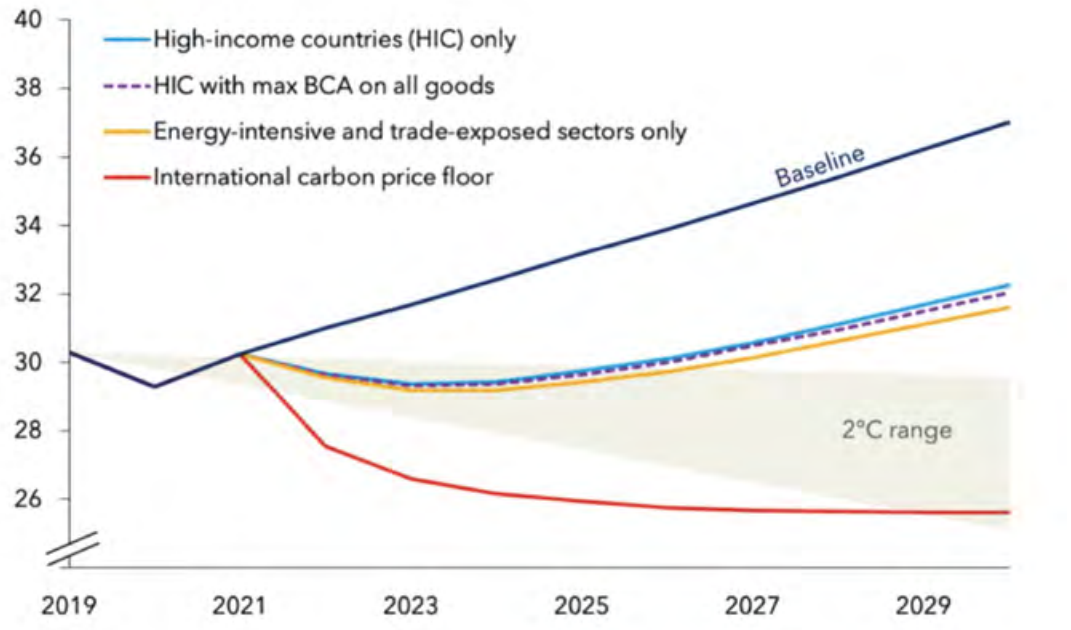
Within the private sector, a group of investors managing assets exceeding € 5 trillion, under the United Nations' oversight, has called for coordinated global carbon pricing. The global variation in prices and tools distorts competition and obstructs the realization of desired objectives at the lowest attainable cost. However, an international consensus on a uniform global carbon tax remains unlikely, primarily due to the principle of common but differentiated responsibilities (CBDR) enshrined in international environmental law conventions. This principle requires developed countries to contribute more substantially to climate efforts than less developed nations. Indeed, a flat carbon price would be inequitable since it would not equally affect economically diverse countries. A carbon price of $ 50, for example, might be unviable in India, given that cement costs twice as much in a rapidly urbanizing nation, whereas the social impact of the same price would be comparatively smaller in France.

While discussions about an international carbon price floor continue, the challenge lies in achieving consensus among nations with varying degrees of economic development, diverse emission profiles, and distinct policy priorities. Establishing an international carbon price floor would necessitate significant political will and cooperation among nations.

Addressing the issue of competitiveness loss due to unilateral carbon pricing could be tackled through an agreement that sets an international floor price for carbon. This solution was proposed by IMF staff in a paper published last year, suggesting that the world's major emitters pay a floor price per ton of carbon ranging from $ 25 to $ 75 based on their level

THE ONLY OPTION

An international carbon price floor is the only viable scenario which limits CO_2 emissions sufficiently to prevent global temperatures from increasing above 2 degrees Celsius
(emissions, gigatons of carbon dioxide equivalent)



Sources: IMF-ENV model; UNEP (2020)
Note: "High-income countries only" is a scenario in which only HICs implement an international carbon price floor (ICPF); "HIC with max BCA on all goods" is a scenario in which high-income countries implement an ICPF and impose a border carbon adjustment on other nonacting countries; Energy-intensive and trade-exposed sectors is a scenario of an ICPF for those sectors only (albeit HICs apply the ICPF to all sectors). The 2°C range refers to the likely range of emissions that the global temperature increase to the kept to 2°C

of economic development. The proposal acknowledges that some countries might implement measures other than carbon pricing – such as regulations – which should yield emissions reductions equivalent to those of the carbon price floor. The study indicates that simultaneously introducing an international carbon price floor in all countries would offer significant advantages.

Firstly, it would sufficiently reduce emissions to meet the 2-degree target. Secondly, it would have only a moderate impact on global economic growth (provided countries also invest in low-carbon energy). According to their estimates, the international price floor would decrease global GDP by 1.5% by 2030 compared to a scenario without the price floor, with the poorest countries experiencing a more modest slowdown (only 0.6%). This cost is the price we must pay to avoid the much higher costs associated with failing to curtail carbon emissions, as the IPCC explains.

Thirdly, it would ensure that transition costs are distributed in accordance with the respective responsibilities of countries at varying income levels, achieved through differentiated floor prices. The proposal suggests a floor price of $ 25 per ton of carbon for low-income countries, $ 50 for middle-income countries, and $ 75 for high-income countries. This approach would be fairer than a uniform global price and would decrease the need for additional transfers between countries, which have proven to be politically challenging.

The ultimate advantage of an international carbon price floor is that high-income countries would not experience significant competitiveness loss, even with differentiated price floors. Products from middle-income and low-income countries generally possess higher carbon contents, balancing the lower carbon price and higher carbon intensity. Consequently, a given product would entail similar carbon payments across all income groups.

This proposed floor price remains in its conceptual stage. In actuality, the Paris Agreement currently stands as the most advanced framework for international cooperation concerning carbon pricing. Article 6 of the agreement provides a foundation for facilitating international acknowledgment of collaborative approaches to carbon pricing, introducing novel concepts that could potentially pave the way for further cooperation.

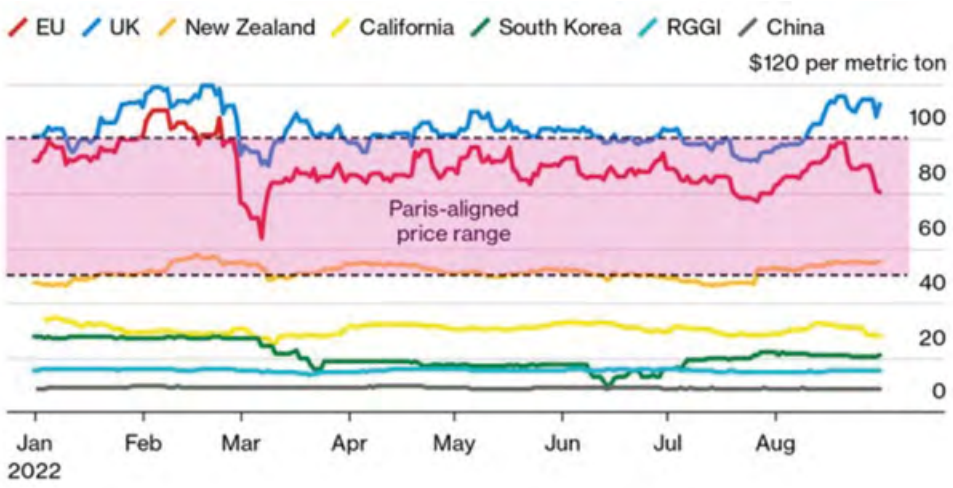
Paragraph 136 of the initial COP 21 decision acknowledges the pivotal role of incentives for activities aimed at reducing emissions, encompassing tools like national policies and carbon pricing. Numerous plans submitted to the UNFCCC also highlight the significance of carbon pricing, with approximately 100 countries incorporating or contemplating carbon pricing mechanisms in their Nationally Determined Contributions (NDCs).

Although discussions within international organizations about minimum carbon prices or policy alignment persist, tangible progress in this direction has yet to materialize.

TO FIND OUT MORE :

https://about.bnef.com/blog/the-untapped-power-of-carbon-markets-in-five-charts/#:~:text=There%20are%20now%2030%20%27compliance,for%20the%20emissions%20they%20produce.

FALLING SHORT
Only carbon prices in Europe and New Zealand are currently high enough to meet the goals of the Paris Agreement



Sources: World Bank, BloombergNEF
Note: 'RGGI' refers to the US Regional Greenhouse Gas Initiative

Uncertainty acts as a catalyst for caution, making it prudent to potentially guarantee the future trajectory of the carbon price within the ETS emissions permit market in the European Union and other international markets. Such a guarantee of long-term visibility would instill confidence in transition stakeholders and mitigate a significant portion of the downside risks associated with their green investments. It's important to acknowledge that this proposal comes with an economic cost, as elucidated earlier. Indeed, should a substantial and cost-effective decarbonization technology emerge in the decades to come, maintaining a high carbon price might inadvertently cause us to surpass our climate targets.

In conclusion, while carbon pricing plays an indispensable role, it alone may not entirely resolve the challenge of climate change; complementary and ambitious policies are indispensable. The financial services sector holds a pivotal responsibility in managing tail risks. To fulfill this role effectively, enhanced information and more comprehensive disclosure practices are imperative for all market participants, empowering investors to make well-informed decisions.