Carbon Pricing

Using Market-based Mechanisms to Mitigate Climate Change

Imprint

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Contents

Summary

Market-based policy instruments are a major component in the toolkit used to combat climate change. Carbon pricing can take many forms and is used in different ways. This brochure provides an overview of the various approaches, outlines the similarities and differences in the ways in which they work and describes their current development phase.

Market-based mechanisms are integral to the Paris Agreement. They are used by governments at national and sub-national level and also by businesses. The German Federal Government is actively involved in the technical design of these climate change mitigation tools and is also driving carbon pricing at policy level. Setting the mechanisms in a broad-based climate policy context, the *Introduction* to this brochure provides background on market-based approaches as instruments for use in mitigating climate change.

Carbon pricing can serve as a guide for industry and business, and there are a wide range of approaches available for putting a price on carbon. While emissions trading schemes put a ceiling or 'cap' on the quantity of greenhouse gas emissions allowed in the sectors they cover, carbon pricing prescribes a price per tonne of CO_2e (CO_2 equivalents) emitted. Crediting mechanisms, by way of contrast, provide a positive incentive for voluntary implementation of climate change mitigation measures in that they certify emission reductions achieved and make the certificates generated tradable. The section on *The Need for Carbon Pricing* shows the different carbon pricing approaches being used and looks at how they work.

For carbon pricing to work and be effective, international cooperation is essential. Article 6 of the Paris Agreement offers Parties three cooperation mechanisms: entering into direct, bilateral cooperation under Article 6.2, using the international climate change mitigation mechanism under Article 6.4 and using non-market-based mechanisms under Article 6.8. What remains unclear, however, is how these approaches are to work in practice. While most issues concerning implementation of the Paris Agreement were clarified back in 2018, the rules on the use of the cooperation mechanisms have yet to be approved. The aim is to agree at the climate change conference in Glasgow at the end of 2021 on an Article 6 rulebook which ensures the environmental integrity of the Paris Agreement while building on robust accounting rules and raised ambition. See the section on *International Cooperation Mechanisms for Raised Ambition* for more information on the cooperation mechanisms under Article 6.

Use of carbon pricing is advancing worldwide. The number of emissions trading schemes has increased from 17 in 2015 to 24 in 2021, meaning that 16 percent of global greenhouse gas emissions are now covered by such schemes. Use of carbon tax programmes is also on the rise. In recent years, the international community has gained valuable experience in implementing these instruments and has continuously improved their design. With the introduction of the Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA), market-based mechanisms were expanded to take in a sector not covered by the Paris Agreement. The progress made with CORSIA is addressed in the section on *Price-based Climate Change Mitigation Worldwide*.

Over the past few years, alongside the compliance market, a market for voluntary offsetting has also emerged. This newer market enables businesses and private individuals to use emission reduction certificates to voluntarily offset their carbon emissions. The voluntary carbon market is generating a significant volume of demand – especially among the vast numbers of companies that have set net zero or carbon neutrality targets and will rely, at least in part, on using emission reduction certificates in their strategies to achieve them. This is addressed further in the section on *The Voluntary Carbon Market*.

The negotiations on Article 6 of the Paris Agreement are to be concluded with the adoption of a rulebook at the climate change conference in Glasgow in November. With the help of a robust set of rules, use of the market-based approaches can play a role in ensuring that Parties raise their climate ambition and that the goals agreed in Paris are implemented. The section on *The Future of the Carbon Market* gives an overview of the upcoming negotiations and highlights the issues that still need to be addressed to enable the market mechanisms to be used.

Introduction

The climate crisis is one of the central challenges of our times. Once again, the recently published first part of the IPCC Sixth Assessment Report stresses that there is no doubt that climate change is due to human influence. The global average temperature has already reached 1.1° Celsius above pre-industrial levels.[1] The next decade will be decisive in combating the climate crisis, calling for united, decisive action from the international community. By putting a price on carbon, market-based approaches can play a key role in overcoming the climate crisis.

The adoption of the Paris Agreement in 2015 marked a key milestone in combating climate change and adapting to its unavoidable effects. This first global climate change agreement prescribes not only the direction that international and national climate policy should take from now on – it also makes numerous instruments available for use in coordinating, promoting and accelerating climate policy at the differing levels. The Paris Agreement entered into force in November 2016. Two years later, at the end of 2018, Parties at the Conference of the Parties to the United Nations Framework Convention on Climate Change (UNFCCC) held in Katowice, Poland, adopted the Paris Agreement rulebook, thereby enabling its implementation to begin in 2020.

1 IPCC (2021): Climate Change 2021 – The Physical Science Basis. Summary for Policymakers, URL: https://www.ipcc.ch/report/ar6/wg1/downloads/report/IPCC_AR6_WGI_SPM.pdf

However, clear rules and regulations are not yet in place for all areas governed by the Paris Agreement. Those still to be agreed concern the new international market-based mechanisms contained in the Agreement's Article 6. At the climate change conference in Katowice in 2018, Parties were unable to agree on rules for Article 6. And a year later, no consensus was reached in the negotiations in Madrid. As the 2020 climate change negotiations had to be postponed by a year because of the COVID-19 pandemic, efforts are now focused on agreeing the implementing rules in Glasgow in November. As soon as the rules for Article 6 implementation have been adopted, Parties will have access to a diverse range of options for bilateral cooperation. This will allow emission reductions to be transferred between Parties and used to achieve their nationally determined contributions (NDCs), thereby providing the basis for a new global carbon market.

Beyond the UNFCCC arena, efforts are also underway to use market-based tools to put a price on climate-damaging activities and thus develop affordable emission reduction potential. Use of carbon pricing instruments is gaining ground on a global scale: some 27 countries now have carbon tax programmes in place, while emissions trading schemes have been introduced in 38 national jurisdictions. Options to combine different instruments, such as using climate protection certificates in

carbon taxation programmes, are increasingly being used. Purchase of emission reduction certificates also plays an increasingly important role for businesses. Those that have set climate neutrality targets will, at least in the interim, rely on using emission reduction certificates. This can open up unprecedented revenue opportunities for the voluntary carbon market.

International aviation and shipping are also looking to use market-based mechanisms in implementing their climate change mitigation efforts. In 2013, the UN community of nations agreed the introduction of a global, market-based climate change mitigation mechanism for international aviation as of 2020. Introduced in 2016, the Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA) is currently in its pilot phase. Although the International Maritime Organisation (IMO) has been considering the introduction of a market-based mechanism for a number of years, a final decision has yet to be reached.

Germany is actively involved in the technical design of these international climate change mitigation instruments and is driving the dynamic development of price-based instruments at policy level. In the course of these activities, the Federal Government promotes a wide range of research and development projects which examine issues concerning the design and implementation of carbon pricing and develop respective solutions. Usability of the new approaches is assessed by supporting concrete projects in the partner countries. Participation in various international initiatives sees the Federal Government working closely with partner countries, the private sector and various other stakeholders. Carbon pricing also plays an increasingly important role at national level. For example, pricing of emissions has been extended beyond the sectors covered by the current EU Emissions Trading Scheme (EU ETS): since the beginning of 2021, a national emissions trading scheme has covered Germany's heating and transport sectors. The scheme is designed to aid achievement of Germany's carbon neutrality target.

This all makes carbon pricing a key instrument in implementing the Paris Agreement goals. This brochure gives an overview of the various carbon pricing approaches, explains how they work and outlines the progress made in their development so far.

The Need for Carbon Pricing

The impact of human-induced climate change is already being felt. The years 2016, 2019 and 2020 were the warmest since records began.[2] 2021 was characterised by heatwaves, forest fires, floods and other extreme weather events. In the future, the extreme weather events being seen today will increase in their frequency and intensity in countries around the world. The damage caused and the costs involved will likewise increase. To respond to these developments, different approaches have been developed to put a price on the emission of greenhouse gases.

Climate change is already seriously affecting societies around the world. To mitigate climate change and coordinate efforts to deal with its effects, the international community adopted a new climate change agreement in Paris in December 2015. With the ratification of the Paris Agreement, 191 Parties to the United Nations Framework Convention on Climate Change (UNFCCC) committed to limiting global warming to well below two degrees Celsius above pre-industrial levels and to pursue efforts to limit the temperature increase to 1.5 degrees Celsius.[3] Thanks to the quick ratification of the Paris Agreement by a large number of Parties, the Agreement went into effect on 4 November 2016. Its implementation is already underway.

2 NOAA National Centers for Environmental Information (2021). State of the Climate: Global Climate Report for Annual 2020. https://www.ncdc.noaa.gov/sotc/global/202013.

3 Paris Agreement, Article 2.

Carbon pricing as a market signal for industry

However, the emission reduction targets – known as nationally determined contributions (NDCs) – submitted by Parties so far are not enough to meet these goals. Around the world, greenhouse gas emissions are still far too high. One of the reasons is that emitters, those who cause the emissions, are not required to cover the costs of climate change. The damage caused to the climate equates to external costs that are not included in the price of a tonne of coal, a barrel of oil or a cubic metre of gas. For example, the price of an airline ticket does not reflect the true costs involved. Putting a price on carbon can change all of that.[4]

If an appropriate price were to be charged for every tonne of CO_2e emitted, it would send a signal to businesses and consumers, helping them to give greater consideration to climate change in their production, investment and purchasing decisions. Less emission-intensive production processes and consumer goods would have a natural advantage because they involve lower costs. Carbon pricing also makes it easier to implement climate change mitigation measures because the price signal it sends helps to ensure that emissions are reduced in areas where cost-savings can be achieved.

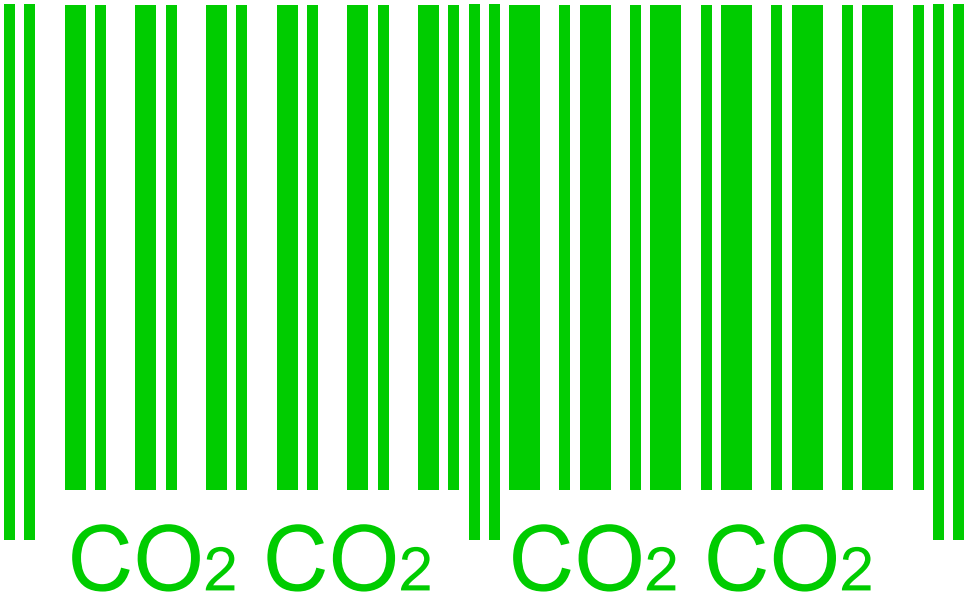
Price-based mitigation mechanisms – not just an idea, but reality.

Price-based climate change mitigation mechanisms are not just an idea, but reality. Around the world, they are being used at various levels and in different forms. The EU Emissions Trading Scheme (EU ETS) is perhaps the best-known example. Alongside emissions trading schemes, many different instruments are now in place, including various forms of greenhouse gas (carbon) taxes and crediting mechanisms which are used to certify emission reductions and make them tradable.

Emissions trading schemes

In emissions trading schemes, a ceiling or cap is set for greenhouse gas emissions in the industry sectors covered. Within the sectors covered by the scheme, only a limited quantity of emission permits (allowances) are issued, namely just enough to allow the reduction target to be met. Each business covered by the emissions trading scheme must possess an allowance for each tonne of CO_2e they emit. These companies are either issued a portion of the necessary allowances free of charge or they can purchase them by auction from the state. These allowances can also be freely traded. This allows the companies involved to buy additional allowances or, if they have succeeded in reducing their own emissions, to sell excess allowances they no longer need. This gives rise to a uniform carbon price, which in turn serves as an important market

4 Where the following refers to a carbon market or carbon price, this also includes other greenhouse gases. In addition to CO_2, these include methane (CH_4), nitrous oxide (N2O) and various industrial gases (hydrofluorocarbons [HFCs], perfluorocarbons [PFCs] and sulphur hexafluoride [SF_6]). The climate impact of these far more potent greenhouse gases is converted into what are known as CO_2 equivalents (CO_2e), so that in total they correspond to the CO_2 emissions of over a period of 100 years.



signal. The companies covered by the emissions trading scheme can then consider that carbon price, both in their short-term management decisions and in long-term investment planning. The price depends largely on the level of ambition applied when setting the upper ceiling of the respective emissions trading scheme and on the costs incurred by the companies in implementing their emission reduction measures.

Emissions trading schemes 'cap' the quantity of greenhouse gas emissions allowed, while carbon taxation levies a price per tonne emitted.

Carbon taxation

Greenhouse gas or carbon taxation levies a predetermined tax rate for each tonne of CO_2 emitted. Taxation of this kind also puts a price on emissions, sending a signal to companies covered by the taxation scheme to reduce emissions in the shorter term and make their long-term investments climate friendly. In contrast to emissions trading schemes, there is no trading involved and very little flexibility is afforded to businesses as a result. While an emissions trading scheme determines the absolute quantity of emissions, carbon taxation defines the price of the emissions. But although a taxation system ensures a stable carbon price, it cannot guarantee that the emission reduction targets set for the sectors involved will actually be met. The incentive is largely dependent on the taxation rate charged: if it is high, it provides an incentive to keep emissions low.

Crediting mechanisms

Crediting mechanisms exist outside the regulated world of emissions trading and carbon taxation. A crediting mechanism can either be based on individual climate change mitigation projects or be designed to cover entire industries or industry sectors. With this type of mechanism, tradable certificates are issued for actual emission reductions achieved. Certificates are issued when actual emissions are reduced below a predetermined project-specific or sector-specific ceiling. Participation in a crediting mechanism is voluntary and demand for generated certificates must thus be created elsewhere. This can be done, for example, by allowing the certificates generated under the crediting mechanism to be traded in an emissions trading scheme or under a carbon taxation programme. Use of certificates for voluntary offsetting of emissions can also provide an important source of demand.

Crediting mechanisms incentivise voluntary climate action

The Clean Development Mechanism: Successful business model and source of insight and experience

The first valuable experience to be gained with price-based climate action mechanisms at international level came in the form of the Clean Development Mechanism (CDM) – a crediting mechanism operated under the Kyoto Protocol. Under the CDM, climate change mitigation projects and programmes can be registered in developing countries according to international standards, with the emission reductions achieved being identified and certified using internationally accepted methodologies. These certified emission reductions (CERs) can, for example, be used by companies covered by the EU Emissions Trading Scheme (ETS) to meet their emission reduction targets. The reductions achieved thus help to reduce the costs involved in implementing the emission reduction targets agreed under the Kyoto Protocol.

The CDM has shown that price-based climate change mitigation mechanisms can be extremely productive. Since 2004, some 7,850 emission reduction projects and 350 programmes have been registered, with savings in the amount of two billion tonnes CO2e achieved. This represents about three times the amount of greenhouse gas emitted in Germany in 2020. The experience gained with the CDM also revealed a number of weaknesses in the approach, making ongoing readjustment essential. The CDM has also proven to be an extremely flexible and adaptable mechanism. Over the years, CDM guidelines and methodologies have been repeatedly adapted and enhanced. Valuable experience was also gained and capacity built which could play an important role in designing and implementing the new mechanisms: at UN level, robust procedures and methodologies have been introduced and institutions established to enable effective monitoring and control of climate change mitigation efforts. Parties have also introduced national-level processes to enable them to benefit from using the CDM.

In the private sector, considerable expertise has been developed, with auditing companies like Germany's Technical Inspection Association (TÜV) gaining global experience in validating emission reduction activities and building local capacities. A range of consulting firms and project developers have also become specialised, both in identifying climate change mitigation potential and in developing suitable methodologies to help leverage that potential. This CDM-related experience must be taken into account and made usable when designing and implementing the cooperation mechanisms to be used under the Paris Agreement. But be that as it may, the future of the CDM remains uncertain: should CERs also be used

under the Paris Agreement? Under what conditions is re-registration of existing CDM projects possible under the new Article 6.4 mechanism? And how can CDM methodologies be adapted and aligned to the new provisions of the Paris Agreement? Despite the significant progress made at the climate change conferences thus far, these issues are currently the subject of heated debate in negotiations on Article 6. Uniform rules and regulations concerning CDM transition are to be adopted at COP26 in Glasgow in November.

International Cooperation Mechanisms for Raised Ambition

At the climate change conference in Paris in December 2015, a pioneering international climate change agreement was reached. The Paris Agreement sets out the legal conditions for international climate change mitigation efforts in the period beyond 2020. With its innovative architecture, the Agreement is designed to incentivise Parties to raise their climate ambition. This is where market-based climate change mitigation mechanisms can play a vital role.

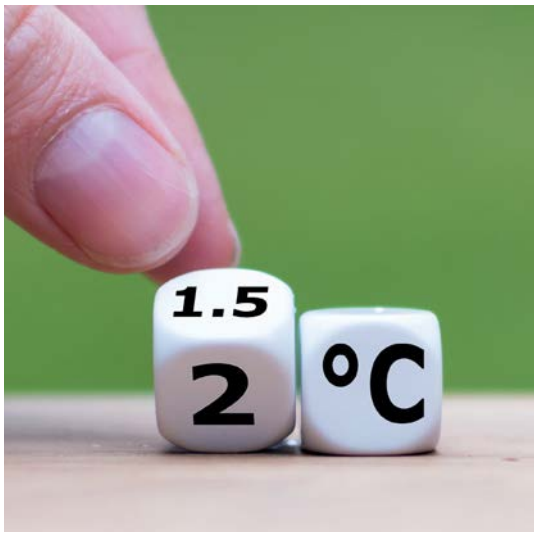
The Paris Agreement sets out the goal of the international climate change regime as a legally binding target: global warming is to be limited to well below two degrees Celsius above pre-industrial levels and Parties are to pursue efforts to limit the temperature increase to 1.5 degrees Celsius above pre-industrial levels. The Parties have also committed to "achieve a balance between anthropogenic emissions by sources and removals by sinks of greenhouse gases in the second half of this century. This rather awkward wording – which translates into greenhouse gas neutrality – goes even further than the goal of decarbonising the global economy, as called for by the G7 leaders

at their meeting in Elmau, Germany, in summer 2015, because it takes in not just carbon but also other greenhouse gases and specifically covers land use. The Paris Agreement thus sends out a clear signal that the age of coal, oil and gas is coming to an end.

Paris Agreement opens up the door to decarbonisation

Nationally determined contributions

But how do Parties intend to achieve this long-term global goal? How can the huge challenge faced by the entire international community be transferred to individual states? Under the Paris Agreement, Parties have agreed that all countries must comply with the provisions of international law and contribute to global climate change mitigation efforts: this means not just the traditional industrialised countries, but also the emerging economies and developing countries. All countries are required to draw up national emission reduction targets – called nationally determined contributions (NDCs) – which they must regularly submit to the UNFCCC. It was also agreed that each new NDC must be more ambitious and exceed its predecessor. The actual targets and the associated levels of ambition are, however, left to the countries to decide and achievement of the targets they set is not binding under international law. Parties do, however, have a legal obligation to develop their NDCs and implement measures to achieve them. This gives rise to a high level of political commitment for countries to actually meet the targets they set.



Transparency mechanism

The binding nature of NDCs is to be achieved through the use of a global transparency mechanism, with countries' climate change mitigation efforts being subjected to binding international review. This transparency and monitoring mechanism also allows for comparison of climate change mitigation activities because, for the first time ever, countries are now subjected to the same reporting rules. This review process poses a significant risk to Parties' reputations if they fail to deliver what they pledge in their NDCs. Also, a global stocktake is conducted every five years to verify whether the international community is on the right path to achieving the goal of limiting global warming to well below two degrees Celsius. The first global stocktake will be conducted in 2023. Thus, by repeatedly shining the spotlight on the climate change mitigation effort, the mechanism can contribute significantly to ensuring that steps are taken to actually implement NDCs.

Raised ambition vital

In the meantime, all countries have submitted national emission reduction targets, known as nationally determined contributions (NDCs), and just under 50 percent of Parties have subsequently submitted an updated or new NDC (as of June 2021).

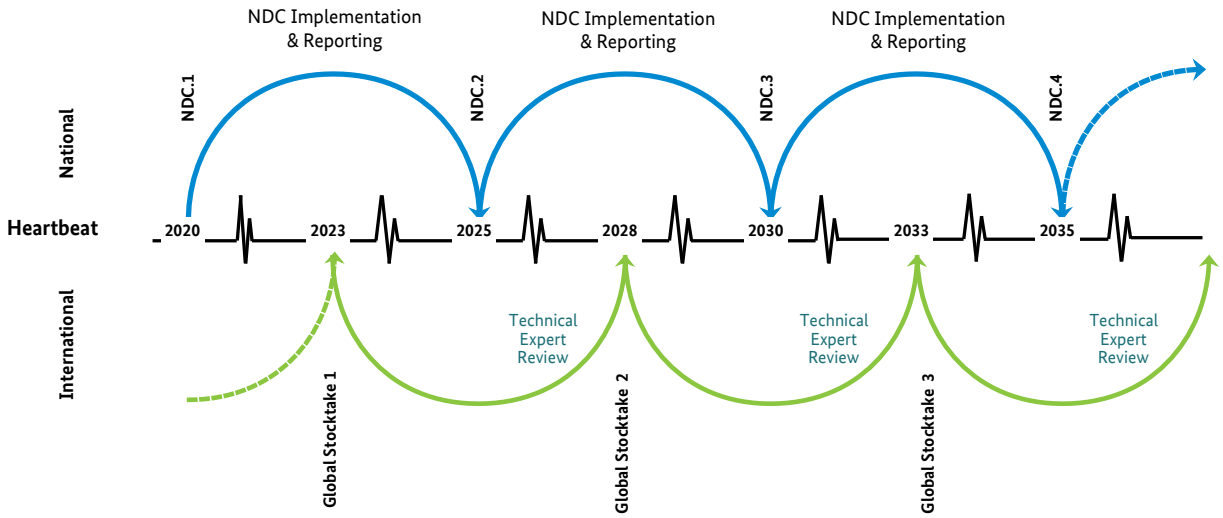
However, analyses show that even if they are fully met, these targets will not go far enough to enable a development pathway which ensures that global warming can be limited to well below 2° C.

The question thus remains as to how ambition can be raised to the level needed. When implementing their current NDCs, one option would be for countries to show that climate change mitigation does not put a burden on economic development, but can provide new impetus for growth. If this is achieved, the countries can exceed their NDCs and take a more ambitious approach in their future emission reduction efforts. To ensure this does not remain some pious wish, among others, cooperation mechanisms have been enshrined in Article 6 of the Paris Agreement to assist Parties' ambition-raising efforts. Such cooperation mechanisms form the legal framework to allow use of market-based climate change mitigation mechanisms under the Paris Agreement.

International cooperation mechanisms

The Paris Agreement contains a range of principles which apply when Parties intend to use cooperation mechanisms to achieve their NDCs:

- Participation in the cooperation mechanisms is voluntary and must be approved by the national government.
- Use of the cooperation mechanisms is designed to allow for raising climate action ambition, thus increasing the effort in terms of climate change mitigation or adaptation.



The graphic above shows how the NDC cycle works as a climate policy pacemaker. Its core component comprises Parties' nationally determined contributions, NDCs, which must be updated every five years. As part of the transparency provisions contained in the Paris Agreement, Parties must regularly report on NDC implementation. The reports submitted are subjected to a Technical Expert Review which can result in recommendations for improvement. Based on that review and taking account of other sources of information, an assessment is made during the regular Global Stocktake (every 5 years) as to where the global community stands in implementing the Paris Agreement. Parties must then consider the outcome of the Global Stocktake when updating and adjusting their NDC.
Source: Wuppertal Institute

- The cooperation mechanisms are to promote sustainable development. While the main focus is on reducing greenhouse gas emissions, other sustainability aspects shall also be addressed.

- The cooperation mechanisms shall ensure environmental integrity. This means that the mechanisms may not be used to circumvent ambitious climate change mitigation effort in the participating countries.

The Paris Agreement offers three approaches in the use of international cooperation mechanisms.

Cooperative approaches (Article 6.2)

First, Parties can cooperate directly with one another (Article 6.2). This makes it possible for emission reduction measures to be implemented in one country and the resulting emission reductions to be transferred to another and counted towards its NDC. It requires transparent processes and accurate accounting of the emission reductions achieved to avoid emission reductions being counted more than once – for instance, in the emissions inventory of the country in which the reduction activities are conducted and also in the country to which the resulting emission reductions are transferred. This would enable diverse forms of cooperation. Apart from direct trading of achieved emission reductions between two governments, one country could also promote implementation of a climate change policy in another and then count a portion of the emission reductions achieved towards its own NDC. In addition, national and regional instruments such as the EU Emissions Trading Scheme can also be linked to similar schemes as one of the cooperative approaches provided for under Article 6.2. Whether all of these cooperation forms will actually be possible and under what conditions is currently the subject of negotiations between Parties to the UN Framework Convention on Climate Change. Guidance on using

Three approaches for international cooperation

these cooperative approaches will be decided at the end of 2021, at the next Conference of the Parties (COP) in Glasgow.

Mechanism to contribute to the mitigation of greenhouse gases and support sustainable development (Article 6.4)

A second option involves the use of the newly created mechanism to contribute to the mitigation of greenhouse gases and support sustainable development (Article 6.4). This mechanism will be supervised by a body designated by the Conference of the Parties. In addition, the Conference of the Parties will adopt rules, modalities and procedures which must be observed when implementing activities under Article 6.4. The aim is to ensure that standardised procedures are followed in the design and implementation of emission reduction activities and when verifying the results achieved. Another unique aspect of the mechanism is its goal of mobilising the private sector to participate in climate change mitigation by providing suitable incentives. The Paris Agreement will thus offer private-sector actors an opportunity to directly use the mechanism established under Article 6.4. As with the bilateral cooperation approaches provided for under Article 6.2, the emission reductions achieved using this mechanism can be transferred from the country in which they were generated to another country and counted towards its NDC. These transfers must also result in raised ambition. And under Article 6.4 of the Paris Agreement, use of the mechanism must also lead – as a net global outcome – to an absolute reduction in global greenhouse gas emissions.

Non-market-based approaches (Article 6.8)

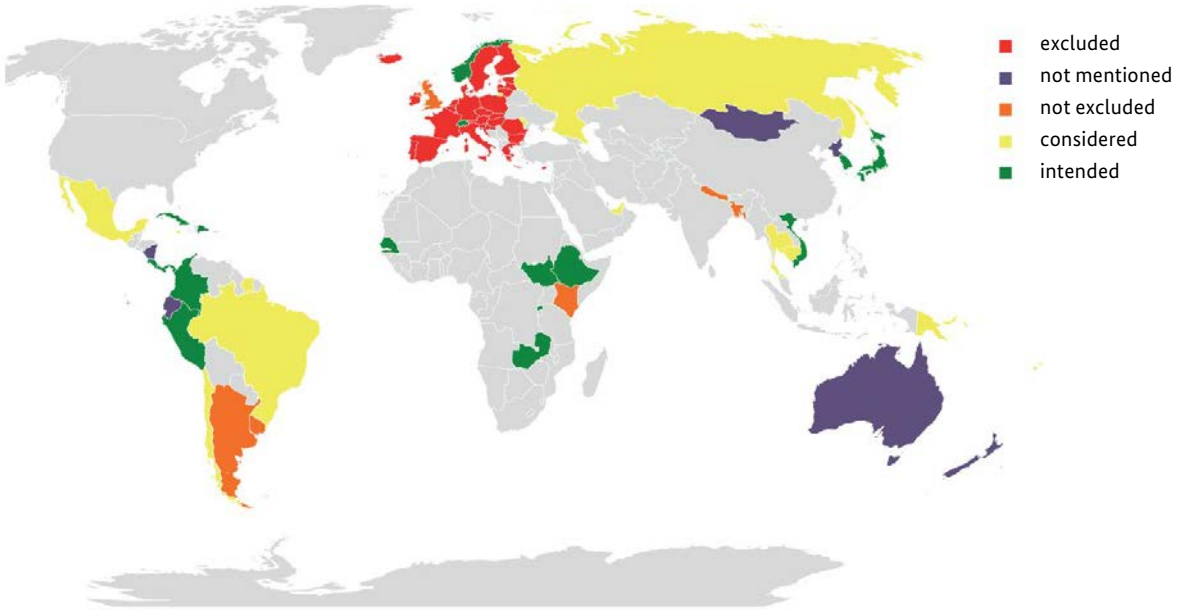
As a third option, use of non-market-based approaches is provided for under Article 6.8. As the name suggests, market-based climate change mechanisms play no role at all. Just how these non-market-based approaches are to work will be determined in the coming years with the development of a “framework for non-market-based approaches”.

Challenges in using the cooperation mechanisms under the Paris Agreement

While the Paris Agreement is a done deal and its implementation is already underway, a number of issues still need to be addressed. Although most issues concerning implementation – the details contained in the small print of the Agreement – were dealt with at the climate change conference in Katowice, Poland, in 2018, the rules on using the cooperation mechanisms have not yet been agreed. For this to happen, there are still a large number of implementation-related issues that need to be resolved. This is the case, for example, concerning how use of the cooperation mechanisms can be kept separate from NDCs. What

The role of market mechanisms in NDCs

Five years on from the adoption of the Paris Climate Change Agreement in 2015, Parties are required to develop new or updated NDCs and to submit them to the UNFCCC secretariat by 2020 at the latest. In their updated NDCs, a large number of countries have announced their intention to use the international market mechanisms. While the new cooperation approaches have attracted greater attention in recent years, only few countries intend to buy certificates for emission reductions achieved in another country and then use them to meet their own emission reduction targets. And conversely, many countries plan to finance their planned climate change mitigation activities from the sale of the emission reductions those activities achieve. The figure below gives an overview of country positions on market mechanisms in latest nationally determined contributions.



Source: Wuppertal Institute (map supported by Bing - © GeoNames, Microsoft, Navinfo, OpenStreetMap, Tom Tom, Wikipedia).

portion of its emission reductions can be defined as a host country's national contribution and what portion can be transferred to another country? How will use of the mechanisms in a given NDC period affect the targets defined for the subsequent period several years on? The cooperation mechanisms must thus be designed in a way that they provide no incentive whatsoever for host countries to delay their own climate change mitigation activities because, rather than taking efforts to reduce their own emissions, they would prefer to sell their CERs.

Also, the industrialised countries have committed to supporting developing countries' climate action efforts by providing both finance and technology. If emission reductions are transferred between countries it usually means that money is involved. How can this flow of funding be separated from the climate finance amounts agreed? This is where clear rules are needed.

There is also the issue of how to ensure robust accounting of emission reductions achieved. Not all countries have set out their NDCs as absolute emissions ceilings over a period of several years. Some have set

themselves the goal of reducing the carbon intensity of their economies, meaning the greenhouse gases emitted for each dollar or euro generated. Others, by way of contrast, have chosen not to reduce emissions in absolute terms, but in relation to a hypothetical business-as-usual scenario. There are even countries which, when defining their NDCs, not only consider greenhouse gas emissions as an indicator but also factors such as increased renewable energy use and improved energy efficiency. This wide range of very different types of commitment poses a huge challenge when it comes to defining common rules and requirements to govern the international transfer of CERs .

Great inroads made thus far

While up to now, a purely project-based approach has been used under the CDM, the cooperation mechanisms contained in the Paris Agreement take a different, more open approach. They are designed to allow consideration of entire sectors, develop large-scale programmes and co-finance implementation of targeted policies such as renewable energy feed-in tariffs (based on Germany's Renewable Energy Sources Act [the EEG]). This could give the mechanisms a new and considerably wider reach. Another significant success is that the Paris Agreement brings raised ambition firmly to the forefront. The provisions of Article 6 require that participating countries increase their own contributions and that use of the new mechanism created under Article 6.4 must result in an overall net reduction in global emissions of greenhouse gas. Last but not least, it is important that the mechanisms do not focus solely on reducing emissions of greenhouse gas. They must also promote other sustainability aspects, such as human health and local biodiversity conservation, in a targeted way.

With regard to implementation of the necessary framework, the negotiations held in Madrid at the end of 2019 have driven the process a good way forward. Although there remain some differences of opinion, there are signs that a mutual understanding will be reached as to how the mechanisms under Article 6 can be integrated into the Paris Agreement's structure and contribute to achieving its goals. It has also been possible to prevent the adoption of rules and regulations that could have compromised the environmental integrity of the Paris Agreement. Under the leadership of Costa Rica and Switzerland, a number of leading countries, including Germany, have agreed a set of clear principles regarding raised ambition and the integrity of the global carbon market. Building on what are known as the San José Principles, at the end of 2020 a coalition of 36 countries was formed with the aim of breathing new life into the Article 6 negotiations. The idea is – at the climate change conference in Glasgow at the end of 2021 – to adopt a set of rules and regulations for Article 6 which ensure the environmental integrity of the Paris Agreement, while building on robust accounting rules and raised ambition.

Policy coordination for fragmented carbon markets

Largely independent of developments at UN level, a range of market-based mechanisms have been developed at national and sub-national level in various regions in recent years. This expansion reflects the attractiveness of market-based mechanisms and presents an important opportunity for climate change mitigation worldwide. The diversity in the mechanisms' design could, however, prove difficult for subsequent linking of the various schemes. Important climate change potential would thus go unused, as would the opportunity to improve efficiency and secure the environmental integrity of the activities involved. There is thus an urgent need to coordinate these policies in the course of international cooperation. For this purpose, two high-level initiatives – the Carbon Market Platform and the Carbon Pricing Leadership Coalition (CPLC) – were called into being in which the Federal Government plays a major role.

Carbon Market Platform

The Carbon Market Platform was called into being under the German G7 Presidency in 2015, the aim being to strengthen international cooperation in market-based climate change mitigation efforts. The Platform's main forum is the annually-held strategic dialogue involving high-ranking policymakers and which is supplemented by ongoing technical-level work. Open dialogue on market-based mechanisms fosters a better understanding of the differing national and regional approaches involved. It also encourages exchange on related drivers, obstacles and experience gained. The policy dialogues address a wide range of topics, such as how market-based instruments can be designed so as to raise ambition in climate change mitigation effort. In addition to the strategic dialogue to foster policy-level exchange, the Platform also promotes technology-related initiatives and partnerships. Through cooperation with key technical partner organisations like the World Bank, the Organisation for Economic Cooperation and Development (OECD) and the International Carbon Action Partnership (ICAP), the Carbon Market Platform consolidates technical expertise and provides access to political discourse. By promoting this kind of exchange between interested countries, the Carbon Market Platform serves in driving new forms of cooperation and also in developing common carbon market strategies.

Carbon Pricing Leadership Coalition

Germany is also a member of the Carbon Pricing Leadership Coalition (CPLC), which has set itself the goal of advancing the carbon pricing agenda worldwide. The Coalition, which was called into being by the World Bank, was announced during the climate change conference in Paris in November 2015. It brings

together leaders from national and sub-national governments, the private sector and civil society to support the implementation of existing carbon pricing policies and drive the introduction of new policy measures. The CPLC serves as a platform for dialogue, enabling participants to share experience with policies on carbon pricing. Companies' use of internal carbon pricing also plays a role. The CPLC is to develop guidelines for effective carbon pricing. Experience gained in designing and implementing carbon pricing policies will be collated by the CPLC.

The work of the CPLC is supported by the Carbon Pricing Panel comprising the heads of seven national governments along with high-ranking representatives from the World Bank, the IMF and the OECD. Since it was founded, the CPLC has held numerous dialogue events at global and regional level and has helped to improve the state of knowledge on carbon pricing by issuing a wide range of publications. The *Report of the High-Level Commission on Carbon Prices* published in 2017 described the differing carbon pricing corridors, while the *Guide to Communicating Carbon Pricing* aided the design and implementation of effective communication strategies. In 2019, the *Report of the High Level Commission on Carbon Prices and Competitiveness* addressed the fears expressed by industry and policymakers that the introduction of carbon pricing could have negative effects on competitiveness. And in the run up to the climate change conference in Glasgow, the *Report of the Task Force on Net Zero Goals and Carbon Pricing* was designed to improve understanding of what climate neutrality actually means and illustrate how carbon pricing can serve in implementing net-zero targets and goals.

Price-based Climate Action Worldwide

Around the world, more and more price-based climate change mitigation mechanisms are being introduced at national and subnational level. They covered 21.5% of global greenhouse gas emissions in 2021. Given the lack of an Article 6 rulebook, their implementation at international level is only gradually gaining momentum. It appears that carbon pricing is also becoming an increasingly attractive climate change mitigation tool outside the framework of the international regime.

In countries around the world, more and more emissions trading schemes are being introduced to achieve cost-effective emission reduction and promote investment in low-carbon technology. The number of emissions trading schemes has risen from 17 in 2015 to 24 in 2021 and further schemes are planned. Some 16 percent of global emissions are now covered by emissions trading schemes.[5] Launched in 2005, the EU Emissions Trading Scheme (EU ETS) has to date been regarded as the biggest in the world. However, when China launched its national emissions trading scheme at the beginning of 2021, it also launched the world's biggest carbon market. Seven other national -level emissions trading schemes are currently in operation – in Germany, Kazakhstan, Korea, Mexico, New Zealand, Switzerland and the UK. Having

5 ICAP (2021). Emissions Trading Worldwide: Status Report 2021.

left the EU and thus the EU ETS, the UK introduced its own emissions trading scheme in 2021. Germany also introduced a national emissions trading scheme in 2021 to supplement the existing EU ETS. It covers almost all carbon missions not covered by the EU ETS.

Apart from these national approaches, some countries have also introduced emissions trading at sub-national level. There are currently two emissions trading schemes in place in the US: the Regional Greenhouse Gas Initiative in the north-west, and the emissions trading scheme in California. In Canada, a framework was adopted at national level requiring all jurisdictions to introduce carbon pricing instruments by 2018. In Japan, sub-national emissions trading schemes have also been introduced in the metropolitan regions of Tokyo and Saitama. In various other countries and regions, the introduction of similar systems and schemes is either being discussed or is planned.

24 emission trading schemes now regulate 16% of global emissions

Building on years of experience, the emissions trading schemes have been constantly improved. When in the EU ETS an imbalance arose between supply and demand due to a surplus of allowances, a market stability reserve was introduced. The reserve uses an indicator to reduce the number of allowances in circulation. However, if in the future, supply of allowances is poor and prices are extremely high, allowances are fed back into the market from the reserve in compliance with specific rules. With market-stabilising measures now being widely used, in 2020 the various schemes proved to be largely resilient to economic impacts during the COVID-19 pandemic. Although the pandemic initially led to a price drop, prices were still well above pre-pandemic levels on average up to the end of 2020.[6] In summer 2021, prices in the EU ETS were the highest they had been, at almost €60 per tonne.

CO_2 taxes worldwide

Carbon taxation programmes are also increasingly used. As one of the first countries to do so, Finland introduced its carbon tax in 1990. Since then, numerous other countries have followed suit, including EU member states, Switzerland, Japan, South Africa, Argentina, Chile, Colombia and Mexico. The carbon tax rates used vary significantly. In April 2021, at €166 per tonne, Sweden levied the highest carbon tax rate, followed by Switzerland and Lichtenstein (€85).[7]

In addition to emissions trading schemes and carbon taxation, other carbon pricing instruments have also been introduced. As a supplement to its existing carbon tax, the Canadian province of British Columbia launched a baseline and credit scheme in 2016. And in 2017, Washington State in the US introduced a similar scheme covering two-thirds of its emissions. To achieve their emission reduction targets, the facilities covered by these schemes can conduct climate change mitigation activities or trade their emission reductions with others in their respective schemes.

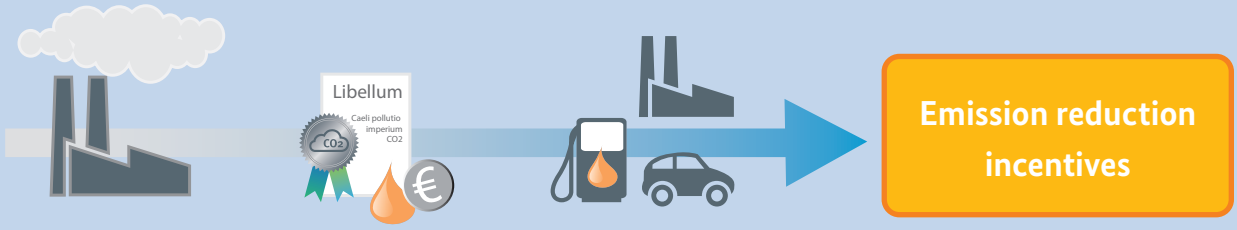
6 ICAP (2021). Emissions Trading Worldwide: Status Report 2021.
7 World Bank (2021). State and Trends of Carbon Pricing 2021. http://hdl.handle.net/10986/35620

The German nETS

Since January 2021, Germany has put a price on emissions from the heating and transport sectors. The national emissions trading scheme (nETS) supplements the EU ETS and is part of the package of measures designed to achieve Germany's emission reduction targets. The nETS takes in all fuels whose combustion results in climate-damaging carbon emissions, primarily petrol, diesel, heating oil and natural gas. Companies such as gas suppliers are now required to purchase and surrender allowances for the quantities of fuel-related emissions they cause. Companies already covered by the EU ETS are not included in the nETS.

The allowances are initially sold at a fixed price. While a tonne of carbon costs €25 in 2021, the price rises to €55 in the period up to 2025. After this interim phase, meaning from 2026 on, the allowances will no longer be sold but will be auctioned instead. The price will thus be determined on the basis of market supply and demand. As in the EU ETS, the quantity of allowances declines each year. This ensures that the emissions caused from burning fossil fuels are also reduced over time. In contrast to the EU ETS, allowances are not issued to market players free of charge. Instead, businesses covered by the nETS receive financial compensation if carbon pricing leads to a disadvantage in cross-border competition. A large portion of that compensation must subsequently be invested in climate change mitigation.

The additional cost attached to fossil fuels as a result of the emissions trading scheme provides an incentive for consumers to reduce the amount of heating and fuel they use. It also makes switching to low-carbon technologies or implementing energy-efficiency measures, such as improved building insulation, more cost-effective. Revenue from carbon pricing subsequently flows 100% into climate change mitigation effort and the provision of social compensation.



Emitters

Acquire emissions allowances which they can then sell

Use of fossil fuels in industry and private households becomes less attractive

Use of fossil fuels declines, use of climate-friendly alternatives increases, CO_2 emissions reduce as a result

Source: Wuppertal Institute, adapted from German Emissions Trading Authority (2021).

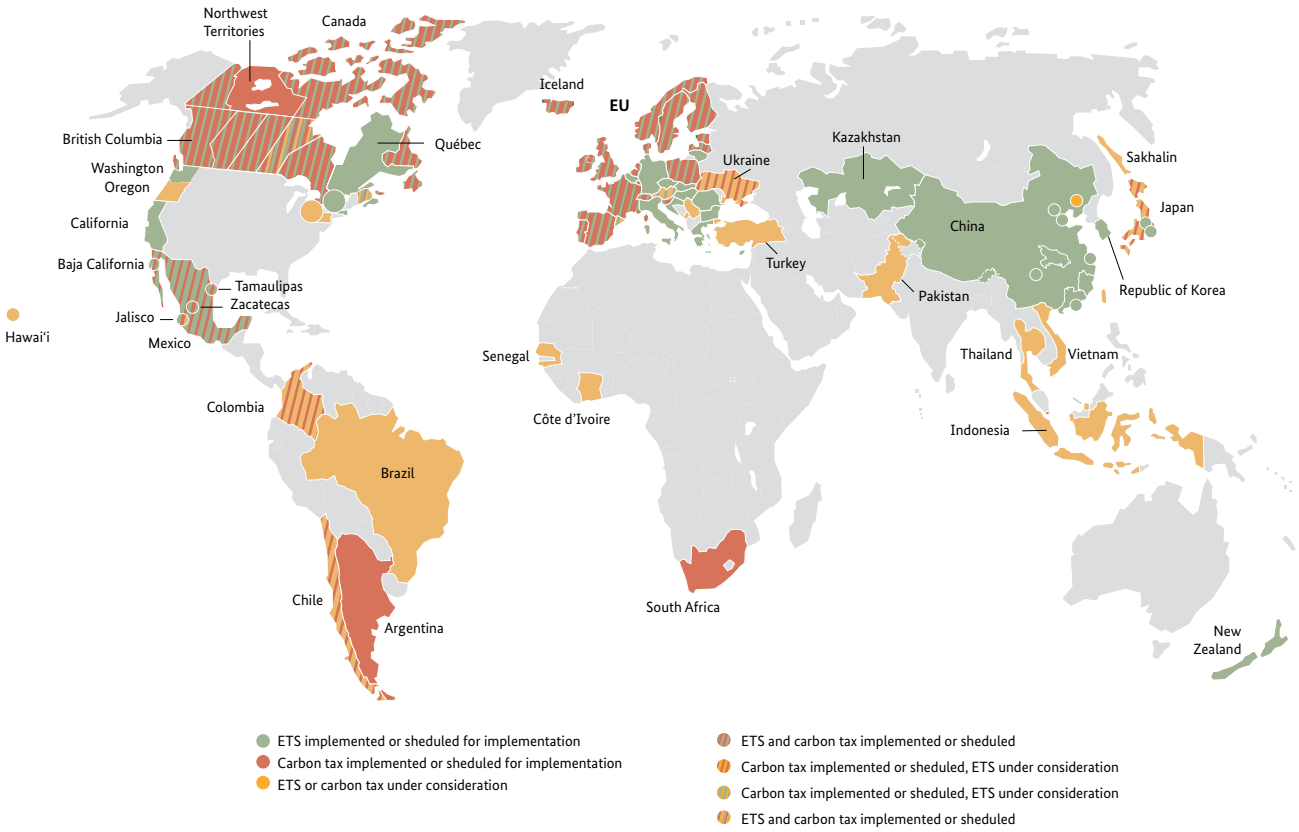
Numerous countries operate carbon taxation schemes – but pricing levels are often low

In Australia, the Safeguard Mechanism operated since July 2016 works somewhat differently: in this baseline-and-offset approach, baselines are defined for the companies participating in the scheme. If the baselines are exceeded, participants can buy offsets to meet their reduction targets. In contrast to baseline-and-credit schemes, emitters in the baseline-and-offset schemes do not automatically receive credits if their emissions fall below their respective baselines.

One relatively new development is the introduction of carbon taxes that have been expanded to include an offsetting component. This offsetting option allows companies subject to greenhouse gas taxation to pay a portion of that tax by submitting emission reduction certificates generated from mitigation activities. By investing in emission reduction activities at an early stage, companies can gain an economic advantage rather than simply paying the tax. From a climate policy standpoint, this hybrid model has the advantage that investment in an emission reduction activity secures a climate protection effect. By way of contrast, with the simple levying of a carbon tax, use of that revenue for climate change mitigation is not necessarily guaranteed. Mexico is one of the pioneers in applying this hybrid approach, having introduced a tax on fossil fuels in 2014 which since December 2017 allows the companies involved to submit certificates from Mexican CDM activities to reduce their tax burden. Certificates are, however, accounted for on the basis of their actual market value. A surrendered certificate thus only reduces the tax burden by the amount of its monetary value and not by the quantity of emission reductions against which it was issued.

Emissions trading schemes and carbon taxation programmes are increasingly supplemented by innovative approaches and hybrid schemes

This situation differs with the fossil fuel tax introduced in Colombia in 2016. It enables generous use of offset certificates because businesses



Source: World Bank (2021).

that can prove their carbon neutrality are exempt from paying the tax. The carbon taxation programme in South Africa also has an offset option. The introduction of the tax in 2019 led to a revival of the then ailing domestic market for offsets because businesses were allowed to use emission allowances to offset between five and ten percent of their taxable emissions. And in Chile, expanding the already adopted carbon tax to include an offset option is currently being discussed. The Chilean government is in the throes of preparing a respective regulation. The figure above gives an overview of the proliferation of carbon pricing instruments worldwide.

The importance of the price level of the climate change mitigation instruments

The various price-based climate change mitigation instruments which are currently in planning or already in place have resulted in an ever-greater share of global greenhouse gas emissions being covered by carbon pricing in recent years. According to a study by the World Bank, as of 2021 some 21.5 percent of global greenhouse gas emissions are covered by a price-based climate change mitigation mechanism.[8] This positive trend is, however, countered by the fact that the carbon prices set with many of the mechanisms are often too low and that many countries are still paying out exorbitant, climate-damaging subsidies. According to the World Bank report, most carbon prices are still significantly below the level that would be needed to implement the Paris Agreement goals. Most prices are far below the USD 40/tCO_2e – USD 80/t CO_2e range that would have been needed in 2020 to limit global warming to two degrees Celsius. In the course of the coming decade, much higher prices will be needed if the 1.5 degree Celsius goal is to be achieved.[9] When it comes to climate-damaging subsidisation, a steady decline has recently been seen, with subsidies dropping from just under USD 500 billion in 2014 to USD 181 billion in 2020.[10] This trend is not, however, entirely the result of policy reforms. It is also being driven by low market prices for fossil fuels and a drop in energy demand.[11] International policy initiatives to withdraw subsidies altogether thus remain crucial. Withdrawal of subsidies makes both economic and climate policy sense, but it will nonetheless be difficult to implement in policy terms due to the distribution effects involved. However, if global warming is to be limited to well below two degrees Celsius, it remains vital that subsidies on fossil fuels be withdrawn.

Climate change mitigation and global aviation

Although all Parties to the Paris Agreement have agreed to operate ambitious climate change policies, emissions from international aviation – which are not covered by the Agreement – continue to rise.

8 World Bank (2021). State and Trends of Carbon Pricing 2021. http://hdl.handle.net/10986/35620
9 World Bank (2021). State and Trends of Carbon Pricing 2021. http://hdl.handle.net/10986/35620
10 IEA (June 2021). Fossil fuel subsidies database. https://www.iea.org/data-and-statistics/data-product/fossil-fuel-subsidies-database
11 IEA (2021). Energy subsidies. https://www.iea.org/topics/energy-subsidies#our-work

Fit for 55 – EU ETS aligned to new climate change goal

By 2050, Europe is to become the world's first climate neutral continent. To achieve this ambitious goal, the EU has tightened its 2030 goal, aiming to reduce net greenhouse gas emissions by at least 55 percent compared with levels in 1990. In addition to other policy measures, the EU Emissions Trading Scheme (EU ETS) is to be reformed and expanded. Up to now, the ETS – which forms the core of EU climate policy – has been used to regulate energy-intensive industry sectors, electricity and heat generation, and aviation involving flights within the European Economic Area. The EU ETS has resulted in a 42.8 percent reduction in emissions in these sectors in the past 16 years.

Now, the European Commission has, among other things, proposed that shipping emissions be included in the EU ETS for the first time.

If the proposal is adopted unchanged, shipping companies will also have to buy emission allowances for the carbon emissions emitted by their biggest ships. Integrating shipping into the EU ETS was first proposed back in 2020, albeit with a number of differences compared with the EU Parliament's recent proposal. EU measures must dovetail effectively, not least when it comes to emissions trading and the FuelEU Maritime proposal for use of renewable and low-carbon fuels. In addition, decisions and developments concerning greenhouse gas reduction at International Maritime Organisation (IMO) level must be taken into account if effective greenhouse gas reduction and sectoral transformation towards sustainable alternative fuels are to be achieved.

Apart from expanding the EU ETS to take in shipping, the European Commission has also proposed developing a second emissions trading scheme which puts a price on emissions from the buildings and road transport sector. Power and fuel suppliers will then have to purchase emission allowances commensurate with the carbon intensity of the products they place on the market. The new emissions trading scheme should also promote member states' national-level climate action measures in buildings and transport. Because the additional form of carbon pricing could significantly disadvantage certain societal groups, the EU Commission proposes establishing a Climate Social Fund which would be fed from revenues accrued under the new scheme. This will assist member states in implementing social compensation measures.

To avoid the risk of an imbalance between supply and demand, the Commission also proposes establishing a market stability reserve for the new emissions trading scheme. The market stability reserve is a regulatory instrument which was introduced under the EU ETS when an imbalance in supply and demand led to a surplus of emission allowances. Its aim is to reduce any allowance surplus and prevent a further surplus from occurring. The Commission's proposal also contains measures to improve the existing market stability reserve used under the EU ETS.

To ensure that the tighter emissions reduction target does not result in carbon-intensive industries being relocated to other countries with less stringent environmental regulations, the EU Commission has proposed a completely new policy instrument. The underlying idea of the long-discussed and not uncontroversial carbon border adjustment mechanism is that for certain products which are imported into the EU, a levy should be paid for the greenhouse gas emissions generated in the production of the imported goods. The amount of the levy is to be

determined by the price of allowances traded under the EU ETS.

It remains to be seen what measures the Commission, Parliament and Council will agree on in the course of the legislative process for the EU ETS and other proposals under the Fit for 55 package. With the Commission having proposed a range of measures on reforming and aligning EU regulations in July 2021, it is now up to the Council and Parliament to respond. An agreement is not expected before the end of 2022.

The International Civil Aviation Authority (ICAO) has set itself the goal of stabilising net emissions from the aviation sector from 2020 onwards. To enable carbon-neutral growth in the aviation sector as of 2020, a range of measures will be used: increased efficiency in ground operations, optimised flight routes, use of biofuels and improved efficiency in global aircraft fleets.

Thus, in autumn 2016, the ICAO General Assembly adopted a global market-based mechanism – the Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA). The mechanism will be used to offset emissions from aviation with certified climate change mitigation projects on the ground. CORSIA's phased introduction involves voluntary participation from 2021, with all countries – except the poorest developing countries – being required to participate from 2027. Up to now, more than 100 countries, including Germany, have declared their willingness to participate voluntary in the CORSIA scheme.[12]

The rules needed to implement the international offsetting mechanism were adopted by the ICAO Council in 2018. Those Standards and Recommended Practices have been in force since 2019 and set out, among other things, administrative requirements and the rules for measuring, reporting and verifying emissions and calculating offset obligations. Since the start of 2019, airlines operating international flights have been required under CORSIA to monitor and report their carbon emissions to the ICAO.

A global offsetting scheme offsets the rise in emissions from international aviation

CORSIA's voluntary pilot phase began at the start of 2021. Carbon emissions from international aviation which exceed the level in 2019 are to be offset by the airlines. The reference value for offsetting emissions was originally to reflect the average emissions from the years 2019 and 2020. Because of the COVID-19 pandemic and the associated decline in air traffic, it was decided to use only the emissions from 2019 as the reference value. To offset their increased emissions compared with 2019, airlines buy CORSIA emission

12 ICAO (2021). Over 100 States now participate in ICAO's Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA). www.icao.int/Newsroom/Pages/Over-100-States-now-participate-in-ICAOs-Carbon-Offsetting-and-Reduction-Scheme-for-International-Aviation-CORSIA.aspx

allowances, meaning certificates from programmes and projects which verifiably prevent greenhouse gas emissions elsewhere or remove such gases from the air. The airlines may only purchase emission allowances from sellers whose certification standard meets specific criteria and has been approved by the ICAO Council.[13]

The CORSIA offsetting scheme will be developed further as part of an ongoing process. From 2022, it will be audited once every three years to assess its contribution to sustainable development in international aviation and for its impact and effect. A parallel review of the base year is also foreseen. In 2032, a separate audit will decide whether the scheme is to expire after the second, binding phase in 2035 or be continued with system improvements.

13 As of 2021, the ICAO Council has approved eight standards: the Clean Development Mechanism (CDM), American Carbon Registry (ACR), Architecture for REDD+ Transactions (ART), Climate Action Reserve (CAR), Global Carbon Council (GCC), Verified Carbon Standard (VCS), The Gold Standard (GS), China GHG Voluntary Emission Reduction Program. Other standards are currently being assessed.

Federal Government supports capacity-building in the development of innovative climate change mitigation tools

More and more countries are planning or considering the use of carbon pricing policies and programmes to meet their national emission reduction targets (nationally determined contributions or NDCs). Many of them require support in the development, testing and implementation of those instruments and tools. By participating in a wide range of initiatives, the Federal Government supports the necessary capacity building measures.

Partnership for Market Implementation

The World Bank's Partnership for Market Implementation (PMI) aims to provide support to partner countries in implementing market-based mechanisms. The PMI was called into being at the climate change conference in Madrid as a successor programme to the Partnership for Market Readiness (PMR) which had assisted 23 countries in developing innovative instruments for use in carbon pricing. The PMI began its work in early 2021 to build on the successes achieved under the PMR.

The activities in the new ten-year programme with a finance target of USD 250 million primarily focus on implementing carbon pricing instruments in the partner countries by providing technical assistance and capacity-building support. The programme promotes national and international cooperation and feeds both the national and global political debates by sharing lessons learned and by creating a platform for collaborative innovation on carbon pricing tools.

Collaborative Instruments for Ambitious Climate Action Initiative

The Collaborative Instruments for Ambitious Climate Action (CiACA) Initiative is yet another approach designed to help build the national capacities needed in developing carbon pricing tools for use in implementing NDCs.

Launched at the climate change conference in Marrakech in 2016, the CiACA Initiative is supported by voluntary contributions from a number of national governments, including the German Federal Government through the Federal Ministry for the Environment (BMU). CiACA is headed by the UNFCCC and implemented by its Regional Collaboration Centres (RCCs).

During the project's initial years of operation, CiACA worked with a total of 18 jurisdictions to promote carbon pricing. For example, studies were prepared for Senegal and Uganda to explore the potential for introducing various carbon pricing options. Currently, partner countries already receiving CiACA support are being further assisted in introducing and implementing specific policy instruments. New partner countries receive support in developing their national climate change mitigation instruments, including instruments for use in monitoring, reporting and verification (MRV) of greenhouse gas emissions.

The voluntary carbon market

Alongside the compliance market, the market whose demand is eventually fed by the binding emission reduction targets of the nation states, a market for voluntary offsetting of greenhouse gas emissions has developed in recent years. The voluntary market enables businesses and private individuals to offset or reduce their carbon footprint voluntarily.

More and more businesses, organisations and also private individuals want to offset part of their emissions by purchasing emission certificates. Buyers need not necessarily use certificates that meet the international rules laid down by the UNFCCC. A number of private initiatives have responded by developing their own certification mechanisms. Pioneers in this field include the Verified Carbon Standard (VCS) and the Gold Standard Foundation. These standards each have their own requirements regarding the design and implementation of emission reduction activities. Projects can take the form of activities to reduce emissions (e.g. promoting renewable energy use in developing countries) or removing carbon from the air (such as by means of afforestation). Some certification standards thus focus purely on the climate impact of the certified projects, while others take a broader approach which takes in their social and environmental impacts.

Combinations of different standards are also possible and are frequently used. Certificates generated by projects with especially high social and environmental additionality are particularly attractive to voluntary market buyers. By way of example, village communities in developing countries can be equipped with more efficient cooking stoves. Here, the environmental benefit lies in more efficient, low-carbon burning of wood and the resulting decline in deforestation. Social contributions are achieved in the form of health benefits from reduced toxic smoke and time saved in collecting firewood. Integrated projects of this kind serve businesses especially well in communicating their climate change mitigation efforts and activities.

More and more companies are setting climate neutral targets – signalling significant potential demand for emission certificates

Since the voluntary carbon market was launched, more than one billion tonnes of CO_2e have been transferred with a market value of some USD 5.5 billion. In 2019, voluntary demand for certificates rose to 104 mega tonnes/CO_2e, the highest seen since 2010.[14] Businesses acquire the largest share of certificates. In many cases, their engagement is driven by the desire to meet their corporate social responsibility (CSR) and position their company as an environmentally conscious enterprise.

Corporate climate neutrality and the role of the voluntary market

One particular development responsible for the significant upswing recently seen in the voluntary carbon market and one which will likely further drive demand for certificates is seen in businesses announcing climate neutrality targets. More and more companies have set themselves the goal of reducing all or part of their emissions to zero in the course of the coming years. Initiatives like the Science-Based Targets Initiative support businesses in developing Paris Agreement-compatible reduction paths for their own emissions. A standard is currently being developed to define neutrality targets and specify the role emission reduction certificates are to play in implementing such targets. Businesses will be reliant to varying degrees on using emission reduction certificates from the voluntary carbon market.

For some businesses, it will no doubt be relatively easy to avoid greenhouse gas emissions, for example by procuring electricity from renewable energy sources and making greater use of e-mobility. This applies, for example, to the information and communication technology (IT) sector, for manufacturers of technological devices and for the finance industry. Neutrality targets have also been set by businesses whose business models have a far more direct link with the emission of greenhouse gases. These include companies in the oil and gas sectors and the steel and cement industries. For most of these businesses, the purchase of emission reduction certificates is, at least in the medium-term, the only

14 Forest Trends' Ecosystem Marketplace (2020). Voluntary Carbon and the Post-Pandemic Recovery. State of Voluntary Carbon Markets Report. A Special Climate Week NYC 2020 Installment.

option open to them if they are to achieve their neutrality targets. This harbours significant potential demand for certificates in the voluntary carbon market.

Use of the voluntary market has enabled private businesses to gain experience with market-based mechanisms which could well give them a competitive advantage should binding schemes be introduced at a later date. But in addition to private businesses, national governments also benefit indirectly from the voluntary market. In the US state of California and in Australia, experience gained with voluntary offsetting has been used in designing emission reduction schemes which are partly based on the methodologies used in the voluntary market. In some areas, the voluntary market has thus been able to function as a ground breaker for subsequent binding schemes.

New challenges brought about by the Paris Agreement

The voluntary carbon market has also faced a change in conditions since the Paris Agreement entered into force. All countries must now set national emission reduction targets and implement measures to meet them. If a climate change mitigation activity is conducted in a given

country, it reduces the greenhouse gas emissions of that country and thereby contributes to achieving its nationally determined contribution (NDC). If at the same time, a business wants to use emission reduction certificates to achieve its climate neutrality target, the emission reduction would be claimed twice. This raises some fundamental questions.

Can the climate change mitigation effect achieved with the activity be claimed by the country in question and also by the business? Or should double counting be prohibited by the use of a robust accounting system to be applied when dealing with transfers? As regards trading of emission reduction certificates between countries, the Paris Agreement already excludes this kind of double counting and appropriate technical solutions are currently being developed. No such solution has been agreed for the voluntary carbon market. While some actors see no problem with double counting of emission reductions by countries and companies, others want to prohibit any and all forms of double counting. The key players in the voluntary carbon market – among them The Gold Standard – are currently working on proposals on ways in which the voluntary market can be integrated into this altered playing field.

A solution is needed to deal with double counting between countries and companies

As things stand, the most promising solution is to develop the voluntary carbon market by making it into a market with two different products: offset certificates (offsets) which are accounted for against the host country's emissions balance and that can be used to offset unavoidable emissions. Businesses could use these offset certificates to count in full towards their net zero targets.

In addition to offset certificates, a new product is also being considered in the form of emission reduction certificates which are used to certify a contribution to achieving the host country's NDC. These units would not be eligible for use to offset emissions, nor would they be suited to meeting neutrality targets. Purchasers would instead make a contribution to climate financing in the host country in which the climate change mitigation activity took place. Certificates of this kind would effectively prevent all forms of double counting, while at the same time opening up new opportunities to aid climate change mitigation.

Whether a product of this kind can become established in the market and how it might be implemented remains to be seen. This will largely depend on whether or not double counting will be allowed in the voluntary carbon market in the future. This is a subject of heated debate – both between key market players and in the climate change negotiations, where the role of the voluntary carbon market is seen as a major issue in connection with Article 6. A decision on the direction to be taken is expected after the negotiations in Glasgow.

The Future of the Global Carbon Market

Market-based mechanisms are an integral component of the Paris Agreement. However, five years on from the signing of the Agreement, numerous issues remain unresolved in terms of how the cooperative approaches are to be used. To ensure these can not only be used, but also contribute to achieving the goals agreed in Paris, a robust set of rules is needed.

The Paris Agreement is a milestone in international climate change policy. It sets out a new legal framework for climate change mitigation. Article 6 of the Agreement enables the Parties to use cooperation mechanisms. These in turn allow emission reductions to be transferred between countries. This means that emission reduction activities can be implemented in one country, but a portion of the resulting emission reductions can be counted towards the emission reduction target of another. The Paris Agreement thus lays the foundation for the use of market-based climate change mitigation mechanisms beyond national borders. Many issues of central importance in their implementation remain open, however. These must be addressed and clarified at the climate change conference in Glasgow in November 2021.

Pilot project: Putting Article 6 into practice

Although the international climate change negotiations have yet to produce binding implementation rules, piloting of Article 6 mechanisms is advancing apace. As the number and diversity of the pilot projects grows, more and more new players are entering the piloting field. While most pilot projects are still in the preparation phase, implementation is already underway for a few. The Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU) supports various Article 6 pilots. The projects are primarily designed to operationalise Article 6 and build local capacities in the partner countries. In the future, emission reductions are to be generated which can be used for voluntary offsets.

The BMU-funded projects include a programme to reduce technology-related losses in electricity grids in countries in Africa and which builds on an earlier BMU activity in the region. The aim of the programme is to tap the vast emission reduction potential harboured in the significant technology-related energy losses in local transmission and distribution grids. These losses can be reduced by installing power factor correction devices. To promote their installation, the programme builds on an innovative financing tool which combines Article 6 financing with other types of funding. The emission reductions achieved are to be divided between the partner country and Germany by means of a specially designed algorithm: emissions which would not be financially viable without programme support will be assigned to Germany, while those which would have been viable without external support will remain with the partner country.

The idea is to maximise incentives to achieve energy savings which result in corresponding emission reductions. The programme is not only scalable, but can also be adapted for transfer to other regions and technologies. For more information on this and other pilot projects, see the publication *Article 6 Piloting: State of Play and Stakeholder Experiences* published with BMU support as part of the Climate Finance Innovators Project.

The cooperation mechanisms must be designed in such a way that emission reductions can be accurately recorded and accounted for against the national climate balance of the countries concerned. This is the only way to prevent double counting of the emission reductions achieved, first by the host country and then again by the country to which the reductions are transferred. Also, clarification is needed regarding the relationship between finance provided in relation to the cooperation mechanisms and general climate finance. Here, it is also necessary to prevent double counting – in this case of the funding provided – because the cooperation mechanisms were created explicitly to raise climate change ambition and not to provide an escape hole for countries wanting to duck out of serious climate change mitigation effort.

Finally, the issue of how, in relation to a country's existing emission reduction target, use of the cooperation mechanisms will impact the design and ambition of its future NDCs. The implementation requirements for the cooperation mechanisms and the associated guidelines must ensure that the mechanisms provide no incentive whatsoever for host countries to minimise their own contributions to mitigating climate change and push climate change mitigation ambition off onto others because they prefer to sell their emission reduction potential on the carbon market.

One central challenge in all of this will involve developing the climate change mechanisms at differing levels without approaching each of them in isolation. More and more price-based mechanisms are being planned, developed and introduced – both at national and at sub-national level. The global framework set out by the Paris Agreement must thus be designed in a way which, rather than detracting from them, supports and harmonises those initiatives.

The Federal Government is thus committed to finding a solution to all of the challenges outlined above, the ultimate aim being to ensure that the international cooperation mechanisms contained in the Paris Agreement will secure the environmental integrity of the climate change regime, contribute to greater reduction of emissions and drive sustainable development in countries that implement action to mitigate climate change.

Germany supports further development of the cooperation mechanisms

www.carbon-mechanisms.de/en