
SUSTAINCERT
CREDIBLE CLIMATE ACTION
SUSTAINCERT ACADEMY
INTRODUCTION TO CARBON MARKETS FOR PROJECT DEVELOPERS
LESSON 1: A BRIEF HISTORY OF CARBON MARKETS
October 2023

LESSON 1: A BRIEF HISTORY OF CARBON MARKETS

OBJECTIVE & KEY LEARNINGS

The main goal of this training is:

- Provide a summary of the evolution of carbon markets and their role mitigating for climate change.

At the end of the training, participants should be able to:

- Recall the reasons that carbon market exist as a solution to human induced climate change.
- List the key milestones and initiatives that led to the current state in carbon markets.
- Describe the lessons learned during the Kyoto Protocol that are being addressed through the implementation of the Paris Agreement.

DOCUMENT REFERENCE AND CHECKLIST

- Stern Review on the Economics of Climate Change. 2006.
- For detailed information on the Kyoto Protocol, please visit: https://unfccc.int/kyoto_protocol
- The World Bank. 2018. “Carbon Markets under the Kyoto Protocol: Lessons Learned for Building an International Carbon Market under the Paris Agreement,” World Bank Working Paper, Washington, DC.
- For detailed information on the Paris Agreement, please visit: https://unfccc.int/process-and-meetings/the-paris-agreement
- For more information on bilateral agreements, please examine this Gold Standard Foundation report: https://www.goldstandard.org/sites/default/files/implementing_article_6-an_overview_of_preparations_in_selected_countries.pdf

CLIMATE CHANGE A "MARKET FAILURE"

Climate change is a market failure because the costs and impacts of greenhouse gas emissions are not borne by those causing them (see the Stern Review on the Economics of Climate Change (2006)). It is widely acknowledged that those hardest hit by climate change are least responsible for it.

Key facts about the externalities of climate change include:

- **It is global in its causes and consequences**; The global climate system does not recognize political boundaries. It does not matter where in the world emissions come from as the incremental and accumulated impact will affect the whole system. The consequences include sea-level rise, extreme weather events with impacts on food systems and living conditions for all species.
- **The impacts of climate change are long-term and persistent;** The climate system is slow to respond to changes in atmospheric concentrations of GHGs. In addition, the long atmospheric life of certain GHGs makes it difficult to decrease their levels of concentration naturally in the short term. Therefore, climate change could take a long time before it reverts to pre-industrial conditions.
- **Uncertainties and risks in the economic impacts are pervasive:** "Climate change could see 4% of global annual economic output lost by 2050 and hit many poorer parts of the world disproportionately hard, a new study of 135 countries has estimated" (Reuters 27-04-2022).
- **There is a serious risk of major, irreversible change with non-marginal economic effects.** The costs of adapting to climate change in developing economies may be up to $300 billion by 2030. However, investing in resilience may cut post-disaster intervention costs by at least half.

To overcome these externalities, global stakeholders are engaging in carbon pricing and implementing market-based initiatives to expose the social and environmental costs of GHG emissions and provide financial incentives to address these costs. This is been done through regulations and instruments that also allow voluntary action as we will see next.

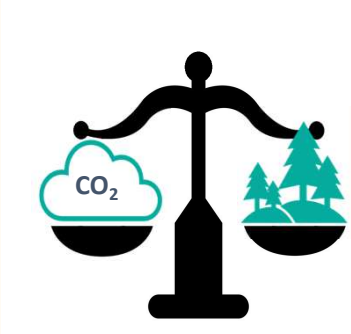
WHAT ARE THE CARBON MARKETS?

Carbon Markets

Carbon markets **are market-based environmental policy instruments** used to avoid, reduce, and/or remove greenhouse gas (GHG) emissions released into the atmosphere to mitigate the catastrophic effects of climate change.

These mechanisms are designed as **trading systems** that allow investors and different entities to buy and sell carbon credits simultaneously, while also creating new market opportunities.

To meet the worldwide net-zero target, emissions must be reduced tremendously, and very often, low carbon solutions are more expensive. Carbon markets address this need by creating a financial incentive to address emissions that cannot be eliminated in a cost-effective way, providing an **additional financial tool** to target the climate crisis.



Carbon Credits

Every carbon credit represents the certified reduction, avoidance, or sequestration of **one metric ton of carbon dioxide (CO_2) or other greenhouse gas (GHG) equivalent.** A carbon credit must be real, permanent, measurable, additional, unique, and independently verified.

Carbon credits are transferrable instruments, which are certified by independent recognized standards or by governments.

Purchasing carbon credits is one way for a company to address emissions it is unable to eliminate (i.e., residual or unabatable). Every carbon credit is traceable and finite; once used, they are retired forever, and cannot be sold again.

Carbon Offsets

Although both carbon credits and carbon offsets terms tend to be used interchangeably, they are not the same thing: **Carbon offsets** are carbon credits purchased for the purpose of offsetting an equivalent amount of carbon emissions created elsewhere and are usually used to make carbon neutral claims.

There are two different carbon markets: the **Compliance Carbon Market**, which is established and regulated by governments and operates on a mandatory basis, and the **Voluntary Carbon Market**, which functions voluntarily.

WHAT ARE THE CARBON MARKETS? COMPLIANCE & VOLUNTARY

Compliance Carbon Market

Compliance Carbon Markets (CCM), also known as 'mandatory carbon markets' are regulatory trading mechanisms operating at international, national, or regional levels. They are driven by regulatory requirements or policies to limit GHG emissions from specific sectors.

The implementation of these schemes is mandatory for the entities or businesses that emit GHG emissions which must adhere to specific regulations.

The CCM is crucial for governments to meet their GHG emissions reduction targets. The current initiatives are designed to target the most energy-intensive industries, such as power generators and oil refineries, as well as the metallurgical, cement, and paper industries, among others.

Voluntary Carbon Market

The Voluntary Carbon Market (VCM) is based on voluntary and private initiatives. Therefore, its participation is not mandated by government regulations. Organizations can engage proactively in the VCM to meet sustainability goals and take responsibility for their emissions. Entities that engage with the VCM typically include businesses, government departments, NGOs and individuals.

Besides providing a source of funding sustainable development projects, the VCM contributes too to generating price signals for carbon credits which stimulate innovation, and investment in low-carbon technologies.

Additionally, the VCM offers organizations the opportunity to take voluntary action against climate change and demonstrate their commitment to protecting the environment.

UNDERSTANDING THE BIGGER PICTURE: A BRIEF HISTORY OF CARBON MARKETS

Exploring the history of carbon markets is necessary to gain a deeper understanding of where the VCM is today and where it is headed. We propose to take a historical perspective on the evolution of carbon markets: looking at their beginnings and origins, examining the development of various domestic and international markets, and exploring today's **landscape of voluntary and compliance markets.**

Over the past decade, there has been a significant increase in global awareness about the risks arising from climate change. Governments, businesses, and individuals are more and more aware of the need to shift from prioritizing profit to safeguarding nature, resulting in unprecedented collective efforts toward achieving net-zero emissions. This led to the rise of carbon markets as one solution to accelerate climate action.

The role and perception of the voluntary carbon market has evolved during this time. Initially used by climate action pioneers, it has gained momentum and is now also playing a role in compliance markets.

TIMELINE

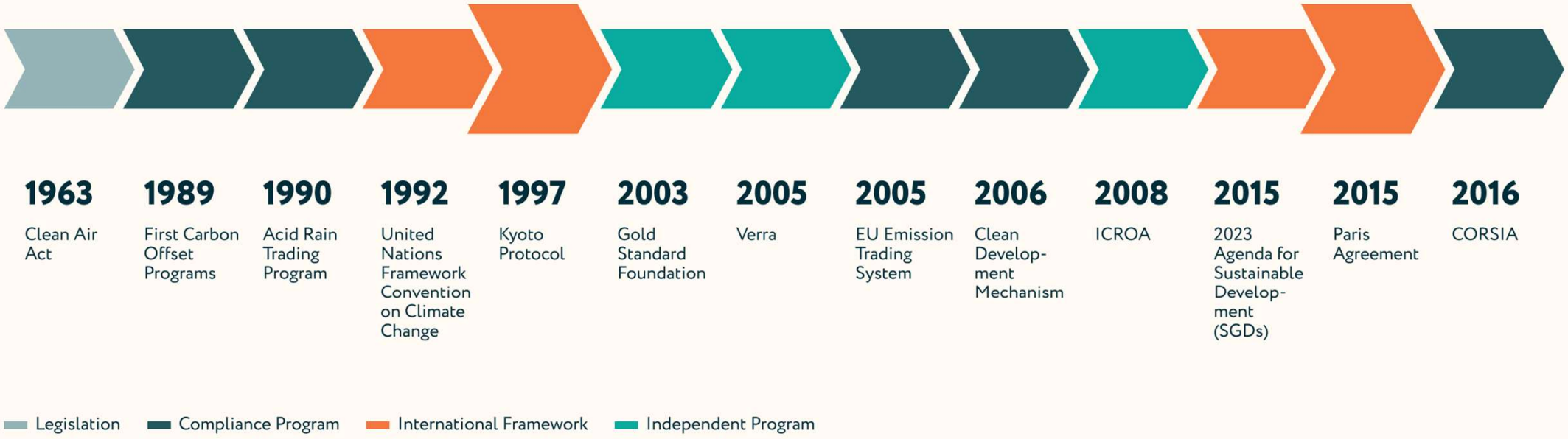


Figure 1.1. Historical overview of the evolution of carbon markets

EVOLUTION OF CARBON MARKETS

The United States pioneered the first market-based mechanisms to put a price on air pollution and created economic incentives to reduce emissions. The success of these programs paved the way forward in the development of carbon markets.

The Clean Air Act (CCA) 1963

Initially enacted as the United States' primary federal air quality law in 1963, its main goal was to reduce and control air pollution nationwide. In 1977 it started one of the first tradable emission offset mechanisms, which allowed certain organizations to raise their emissions by paying another company to reduce them by a greater amount.

First carbon offsets program 1989

The U.S. energy company Applied Energy Services, approved to finance a project the emissions generated by the activities of their new coal-fired plant in Connecticut. The carbon offsetting project was an agri-forest located in Guatemala.

The Acid Rain Program (ARP) 1995

The Acid Rain Program was established after the Clean Air Act (CCA) in 1990, which pioneered an emissions trading program designed to reduce the acid rain produced by the sulphur dioxide SO_2 emissions from power plants across the country. Through this market-based approach the concept of a cap-and-trade system was introduced, where pollutant limits would decrease over time. **It succeeded in reducing SO_2 emissions by 94% below 1990 levels while proving the effectiveness of emissions trading markets.**

EVOLUTION OF CARBON MARKETS

United Nations Framework Convention on Climate Change 1992

The UNFCCC was established in 1992 as an international environmental treaty. Originally signed by 154 countries during the Earth Summit in Rio de Janeiro in 1992, it includes 198 parties. It was the first international work plan to address climate change. Aimed to prevent harmful interference with the climate system and promote sustainable development. It encourages emission reduction efforts, technology transfer, financial support, adaptation, and mitigation. It paved the way for subsequent agreements like the Kyoto Protocol and the Paris Agreement, fostering international collaboration for a sustainable future.

Kyoto Protocol 1997

The Kyoto Protocol was adopted in 1997. It is an international treaty focused on addressing climate change by setting binding emission reduction targets for developed countries. It operationalizes the United Nations Framework Convention on Climate Change (UNFCCC) and aims to mitigate greenhouse gas emissions responsible for global warming. **The protocol introduced the concept of "carbon credits" and "carbon trading," allowing countries to trade emission allowances to meet their targets**.

Gold Standard Foundation 2003

The Gold Standard Foundation was established in 2003 by WWF and other international NGOs to ensure projects that reduced carbon emissions featured the highest levels of environmental integrity and also contributed to sustainable development. The foundation launched it's "Gold Standard for the Global Goals, or GS4GG" as a best practice standard for climate and sustainable interventions to maximize impact, creating value for people around the world and the planet we share.

EVOLUTION OF CARBON MARKETS

VERRA 2005

Verra is a non-profit organization that develops and manages standards for various sustainability initiatives, including carbon offset projects and environmental conservation efforts. Formerly known as the Verified Carbon Standard (VCS), Verra ensures the credibility and quality of projects by setting rigorous criteria for emissions reductions, sustainable development, and stakeholder engagement. Through its certification and verification processes, Verra enables projects to earn carbon credits, contributing to climate change mitigation while promoting sustainable practices.

EU Emission Trading System 2005

The EU Emission Trading System (EU ETS), launched in 2005, is a significant policy initiative by the European Union to combat climate change and reduce greenhouse gas emissions. It operates as a cap-and-trade system where a cap is set on the total emissions allowed from industries and power sectors. Tradable emission allowances are distributed among participants, enabling them to either reduce emissions or purchase allowances from those with surplus. The system incentivizes emission reductions through market forces and economic efficiency.

Clean Development Mechanism 2006

The Clean Development Mechanism (CDM), established in 2006 under the 1997 Kyoto Protocol, is a market-based mechanism aimed at promoting sustainable development and reducing GHG emissions in developing countries. It allows industrialized nations to invest in emission reduction projects in these countries to meet their compliance obligations. Projects that qualify for the CDM generate Certified Emission Reductions (CERs), which can be traded and used to meet emission reduction targets.

EVOLUTION OF CARBON MARKETS

ICROA 2008

The International Carbon Reduction and Offset Alliance (ICROA), is a non-profit organization comprising leading carbon offset providers that aim to uphold high standards and credibility in the carbon offset industry. ICROA members commit to transparency, integrity, and effectiveness in carbon offset projects. They work to educate businesses and individuals about carbon offsetting, ensuring that offset projects are of high quality, verified, and contribute to genuine emissions reductions. ICROA plays a crucial role in promoting trustworthy and impactful carbon offset initiatives as part of global efforts to address climate change.

Sustainable Development Goals 2015

The Sustainable Development Goals (SDGs), adopted in 2015 by the United Nations, are a set of 17 interconnected global goals designed to address a wide range of social, economic, and environmental challenges. These goals aim to achieve a more equitable, prosperous, and sustainable world by 2030. The SDGs cover areas such as poverty eradication, quality education, gender equality, clean water and sanitation, affordable and clean energy, climate action, and more. They provide a comprehensive framework for governments, organizations, and individuals to work collaboratively towards creating a better future for all, while considering the interplay between human well-being, economic growth, and environmental protection.

Paris Agreement 2015

The Paris Agreement, established in 2015 under the UNFCCC, is a landmark international accord aimed at combating global climate change. Its primary objective is to limit global warming to well below 2 degrees Celsius above pre-industrial levels, with efforts to limit the increase to 1.5 degrees Celsius. Countries that are Parties to the agreement submit individual nationally determined contributions (NDCs) outlining their climate action plans, which include emission reduction targets and adaptation measures. The agreement emphasizes transparency, accountability, and financial support for developing countries in their climate efforts. It encourages international cooperation, technology transfer, and capacity building to achieve its goals.

KEY MILESTONE: KYOTO PROTOCOL 1997

OPERATIONALIZING THE COMPLIANCE MARKET

The Kyoto Protocol established mandatory greenhouse gas emission limits per industrialized country, which were derived from the overall target of reducing greenhouse gas emissions by 5% relative to 1990 (the 'base year'). The aim was to achieve this reduction during the 'commitment period', from 2008-2012. It introduced UN market-based mechanisms (also called 'Flexibility Mechanisms'); such as the **International Emissions Trading (ET),** the **Clean Development Mechanism (CDM) and Joint Implementation (JI)** to achieve cost-effective greenhouse gas abatement.

The Protocol had two phases:

1. **2008-2012**
2. **2013-2020 (Doha Amendment).**

The Protocol includes in Annex-I a list of industrialized countries, economies in transition, and the European Union that commit to meet the binding emission reduction targets set in Annex B.

As such, the Protocol acknowledges the large responsibility of current high levels of GHG emissions in the atmosphere to the countries listed. However, this created a point of contention during the ratification process as China and India were some of the largest emitters at the time and were not mandated to commit to an emission target.

The Protocol also ensured strict oversight through registry systems, consistent reporting, and compliance measures. Moreover, it supports climate adaptation via the "Adaptation Fund," initially funded by CDM proceeds; subsequently, the Doha Amendment extended its scope to include contributions from JI and ET, offering a 2% share for this purpose.

KYOTO PROTOCOL 1997
OPERATIONALIZING THE COMPLIANCE MARKET

WHAT IS A FLEXIBILITY MECHANISM?

A Flexibility Mechanism is a market-based approach designed to facilitate the reduction of greenhouse gas emissions and promote sustainable development. It provides flexibility for countries to achieve their emission reduction targets by trading emissions allowances or credits, thus allowing them to cost-effectively meet their commitments. These mechanisms create a market where emissions allowances can be bought and sold, enabling countries that can reduce emissions at a lower cost to do so, while those with higher costs can purchase allowances from others.

These mechanisms aim to provide cost-effective ways to achieve emission reduction targets while fostering collaboration, technology transfer, and financial support between nations. They are essential tools in the global effort to mitigate climate change and promote a transition to a low-carbon economy.

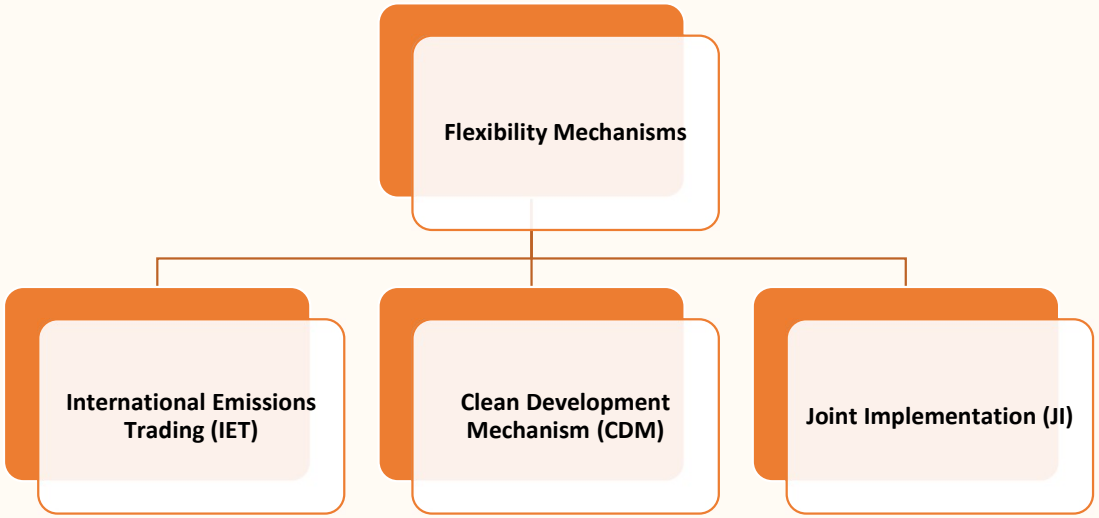


Figure 1.2. Flexibility mechanisms

KYOTO PROTOCOL 1997 – FLEXIBILITY MECHANISMS

Flexibility Mechanisms

International Emissions Trading (IET)

The Kyoto Protocol introduced the International Emissions Trading (IET) system, allowing countries with surplus emission allowances to sell them to those exceeding their limits. This market-based approach encourages cost-effective emission reduction and international collaboration. Article 17 of the protocol sets emission reduction targets from 1990 levels, using "assigned amount units" (AAUs) for trading unused units, including removal units (RMUs), emission reduction units (ERUs), and certified emission reductions (CERs) from various activities, thereby creating a market for emissions reductions.

Clean Development Mechanism (CDM)

The Clean Development Mechanism (CDM), established under the Kyoto Protocol's Article 12 in 2006, allowed developed nations to carry out emission-reduction projects in developing countries. These projects generated Certified Emission Reduction (CER) credits that contributed to Kyoto targets. The CDM promoted sustainability through green technology, clean energy investment, and capacity-building in host nations, covering areas like renewables and energy efficiency. Projects underwent rigorous validation to ensure real emissions reductions, adhering to carbon market principles. As of 2020, new CDM registrations ceased in line with the Kyoto Protocol's conclusion, but existing projects can transition to other frameworks under the Paris Agreement.

Joint Implementation (JI)

Article 6 of the Kyoto Protocol introduced Joint Implementation (JI), enabling developed nations to partner on emission reduction projects, earning Emission Reduction Units (ERUs). Similar to the Clean Development Mechanism (CDM), JI and CDM provided flexibility and cost-effectiveness for meeting Kyoto commitments, while encouraging foreign investment and technology transfer. JI involved developed countries cooperating with counterparts having similar targets, resulting in ERUs. Projects encompassed areas like renewable energy and energy efficiency and were rigorously verified for genuine emission reductions. JI concluded in 2020, but its cooperative model influenced mechanisms in subsequent agreements like the Paris Agreement, with 597 projects registered in Annex I countries during its operation.

KYOTO PROTOCOL 1997 – LESSONS LEARNED

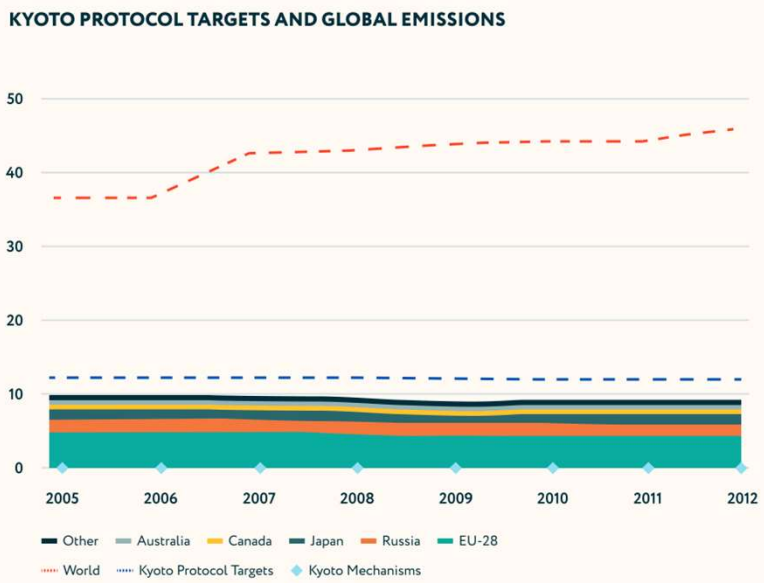


Figure 1.3. Kyoto Protocol targets and global emissions (Shishlov et al. 2016)

LESSONS LEARNED

1. Low demand due to lackluster political will
2. Information and procedural complexity and opacity
3. Low Least Developed Countries (LDC) participation
4. Other incentive issues

KYOTO PROTOCOL 1997 - LESSONS LEARNED

LOW DEMAND DUE TO LACKLUSTER POLITICAL WILL

Low demand, stemming from insufficient political will, was the primary factor hindering the effectiveness of Kyoto's market mechanisms. These mechanisms rely on incentives, with carbon revenues making projects viable and trading allowing cost-efficient solutions. However, without credible carbon prices, there's no motivation for projects or trading. The US's non-ratification of the Kyoto Protocol limited demand, with other nations accounting for just 21% of emissions, and uncertainty about commitments reduced the incentive. Non-binding emission caps and economic factors further weakened commitment. The reliance on the EU ETS, coupled with the financial crisis, led to a collapse in carbon prices and demand. Attempts to adapt the mechanisms couldn't overcome low political will. **Effective carbon markets need strong, consistent demand reflected in meaningful asset prices.**

KYOTO PROTOCOL 1997 - THE LESSONS LEARNED

INFORMATION AND PROCEDURAL COMPLEXITY AND OPACITY

The complexity of the Clean Development Mechanism (CDM) have been criticized. While efforts were made to standardize additionality tests and methodologies for environmental integrity, concerns arose about their subjectivity, unpredictability, and exploitation potential. The tradeoff between integrity and complexity emerged, as complex tests ensured additionality but were expensive to administer. Financial additionality tests required carbon revenue's decisive influence on project viability. However, banks, the primary financiers, didn't recognized projected carbon revenue due to market complexity, low demand, and policy uncertainty. Consequently, the development of CDM projects favored those that would occur regardless of carbon revenues.

Joint Implementation (JI) and International Emissions Trading (IET) also faced opacity issues. In JI, AAUs were converted to ERUs and traded through intermediaries, raising transparency concerns. IET displayed AAU trades but lacked transaction details and account holders, making independent monitoring challenging.

KYOTO PROTOCOL 1997 - LESSONS LEARNED

LOW PARTICIPATION FROM LEAST DEVELOPED COUNTRIES (LDC)

A challenge specific to the Clean Development Mechanism (CDM) was the limited involvement of Least Developed Countries (LDCs). While China and India generated 67% of CERs, Africa, home to most low-income countries, contributed only 5%. This disparity was influenced by high transaction costs and complexity, deterring project developers and host countries. The upfront costs of creating a CDM project were significant, making small-scale projects in LDCs less appealing. Compliance with monitoring, reporting, and verification (MRV), GHG accounting, and institutional standards was demanding for host countries. The emergence of Programmatic CDM (PoA) and the EU's exclusion of non-LDC CERs from its ETS after 2013 encouraged LDC participation, but the absence of a second Kyoto commitment period impacted the growth of LDC CERs.

KYOTO PROTOCOL 1997 - LESSONS LEARNED

OTHER INCENTIVE ISSUES

Apart from low demand and political will affecting carbon asset prices, other fixable issues impacted incentives.

Despite potential access to emissions from non-mitigating countries, gaps remained in Kyoto mechanisms. In sectors like forestry, carbon sequestration incentives were lacking, with up to 88% unstimulated. Emissions reductions in transportation, carbon capture, nuclear energy, and sustainable development were also insufficiently incentivized due to political decisions, risk perception, and pricing.

Though sustainable development was an official goal, few projects received price premiums for higher sustainable development benefits. The mechanisms lacked incentives for broader emissions coverage or enhanced sustainable development.

Moreover, some provided incentives were counterproductive. Governments selling excess allowances (AAUs) or converting them to project-based credits (ERUs) risked undermining system integrity and fostering collusion. Intermediaries arbitraging between market and government allowance prices created incentives for obtaining allowances well below market rates.

OPERATING CARBON MARKETS: TRADING SYSTEM & INDEPENDENT GOVERNANCE

EUROPEAN UNION EMISSION TRADING SYSTEM

In 2005, the European Union Emissions Trading System (EU ETS) was launched, becoming the first and largest international carbon scheme in force.

The EU ETS covers approximately 40% of EU GHG emissions and includes more than 11,000 installations in the energy, domestic aviation and industrial sectors. It aims to reduce EU net GHG emissions by at least 55% by 2030 and reach climate neutrality by 2050.

The system works by setting a cap on emissions for each installation and allowing companies to trade allowances to emit a certain amount of GHGs. This has incentivized companies to reduce their emissions and invest in low-carbon technologies. Carbon credits from CDM and JI were allowed during several phases of the scheme.

INTERNATIONAL CARBON REDUCTION AND OFFSET ALLIANCE (ICROA)

The development and growth of carbon markets have also led to the establishment of international independent standards to ensure that carbon offsets contribute to the reduction of GHG emissions, while bringing transparency and credibility to the process.

In 2008, the International Carbon Reduction and Offset Alliance (ICROA), was established to set a framework for carbon offset projects in the Voluntary Carbon Markets.

ICROA is a non-profit membership organization, that promotes high-quality carbon credits with its Code of Best Practice, which its members sign up and report against.

There are currently 4 endorsed United Nations and government standards, and 9 independent standards.

VOLUNTARY CARBON MARKETS - INDEPENDENT CREDITING MECHANISMS

The term 'voluntary carbon market' ('VCM') historically referred to carbon markets operating outside the scope of a regulatory framework and governed by independent standards also referred to as 'crediting mechanisms' or 'registries.

Standards play the role of market regulators, enabling the certification and issuance of carbon credits, and safeguarding the credibility of the market. Standards have become extremely complex with extended sets of rules, requirements, and methodologies. All credible VCM standards require independent 3rd party verification before carbon credits can be issued.

In recent years, the divide between voluntary and compliance markets has become less relevant as independent standards are increasingly being used in compliance markets and as governments engage in establishing domestic voluntary markets. Carbon markets are better defined by the nature of their supply, independent standards such as Verra (VCS) or Gold Standard (GS), versus government-led standards, and the nature of demand (i.e., voluntary demand vs compliance demand) that characterize them.

The most well-known independent standards are:

- American Carbon Registry (ACR) was founded in 1996 and was the first private voluntary GHG registry in the World.
- Climate Action Reserve (CAR) began as the California Climate Action Registry in 2001.
- Gold Standard was established in 2003 by the WWF and other international NGOs.
- Verra and the Verified Carbon Standard program was founded in 2005 by environmental and business leaders.

In **Lesson 2**, we will go deeper into **independent crediting mechanisms** and other types of carbon pricing instruments**.**

VOLUNTARY CARBON MARKETS - INDEPENDENT CREDITING MECHANISMS

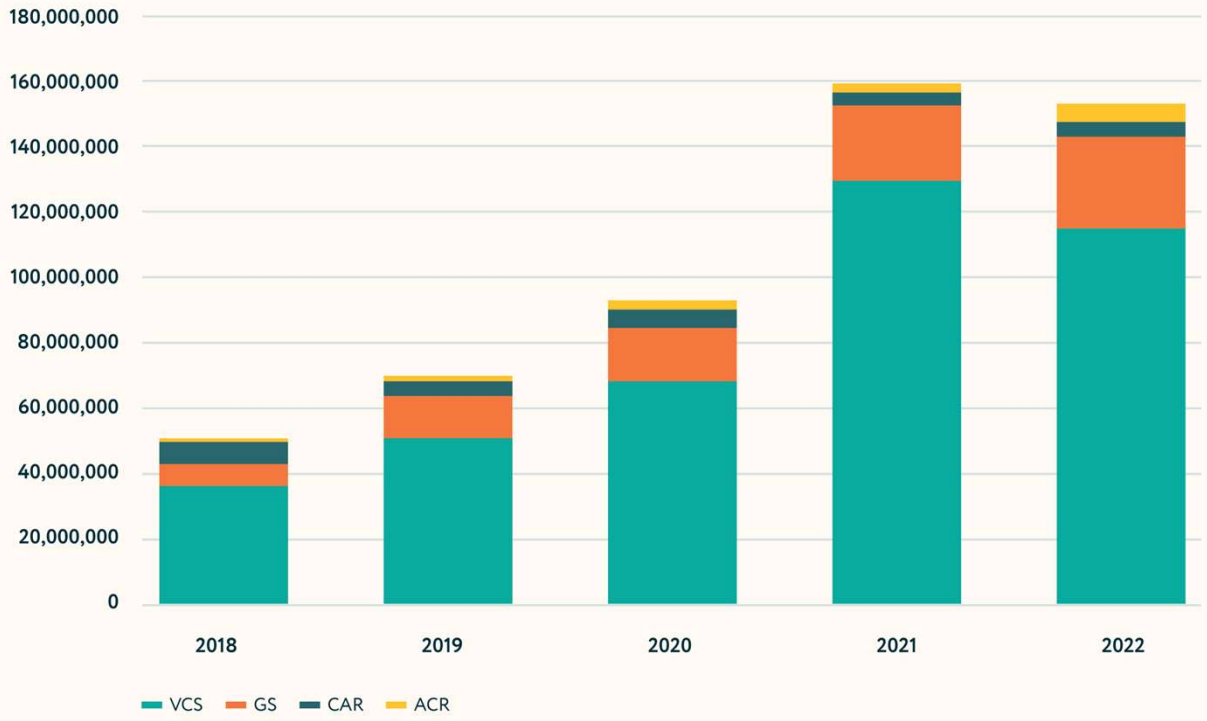


Figure 1.4. Total retired credits (tCO2) per standard 2018-2022 (including REDD+ projects). Data extracted from SustainCERT Market Share Yearly Analysis 2022

KEY MILESTONE: THE PARIS AGREEMENT 2015

The Paris Agreement encompasses the following key elements:

1. **Long-term temperature goal (Art.2):** The Agreement sets the goal of limiting global temperature increase to well below 2 degrees Celsius and pursuing efforts to limit the increase to 1.5 degrees Celsius. This acknowledges the urgent need for reaching the global peaking of GHG emissions as soon as possible, to later achieve balance and climate neutrality (Art.4)

2. **Nationally Determined Contributions (NDCs):** Each participating country is required to submit its own voluntary climate action plan called the Nationally Determined Contribution (NDC). These plans outline the country's targets, strategies, and measures to reduce GHG emissions and adapt to climate change. NDCs are updated every 5 years, with a focus on increasing ambition over time and providing transparency (Art.4)

3. **Transparency (Art.13), implementation, and compliance (Art. 15):** The Paris Agreement emphasizes the importance of transparency and accountability. Participating countries are required to regularly report on their emissions and implementation efforts, enabling tracking of progress and ensuring transparency in climate actions.

4. **Voluntary cooperation / Market-and non-market-based-approaches (Art.6):** The voluntary cooperation among the Parties is recognized to allow higher ambition for the international transferal of mitigation outcomes, including environmental integrity, transparency, and credible accounting.

5. **Adaptation (Art.7) and loss and damage (Art.8):** The Paris Agreement recognizes the importance of adaptation to the impacts of climate change and establishes the Adaptation Committee to promote and support adaptation actions. It also acknowledges the need to address loss and damage associated with climate change impacts in vulnerable countries

6. **Climate finance, technology transfer, and capacity building (Art. 9, 10, and 11):** Developed countries are committed to providing financial resources to support developing countries in their climate mitigation with a goal of $100 billion annually by 2020. The also promotes the transfer of green technologies in developing countries and the importance of capacity building to effectively address climate change in developing countries.

PARIS AGREEMENT 2015 – ARTICLE 6

Article 6 of the Paris Agreement is vital, outlining mechanisms for global climate collaboration. It supports developing nations in achieving NDC targets through suitable financial methods. Given limited public funds, private sector financing is crucial. Notably, paragraphs 6.2 and 6.4 allow the transfer of authorized emission reductions to achieve countries' goals while ensuring "overall mitigation of global emissions". Additionally, paragraph 6.8 promotes non-market approaches for cooperation in mitigation and adaptation. Essentially, Article 6 forms the bedrock of future carbon markets, addressing issues like double counting and strengthening market reliability.

Art 6.2

Article 6.2 of international climate agreements promotes voluntary cooperation between countries through emissions trading. It allows nations to trade their emission reductions and removals via bilateral agreements using Internationally Transferred Mitigation Outcomes (ITMOs). This system aims to boost global emission reduction efforts by enabling countries with greater mitigation potential to assist those in greater need. While the concept is in place, the specific rules and procedures for Article 6.2 are still being negotiated. Nonetheless, some countries have already begun forming their bilateral treaties.

Art 6.4

The Paris Agreement aims to establish a global carbon trading system overseen by a United Nations body called the "Article 6.4 Supervisory Body" (6.4SB). This mechanism resembles the Clean Development Mechanism from the Kyoto Protocol. Projects require approval from this body and the host country to issue UN-recognized credits known as A6.4ERs, which can be purchased by countries, organizations, and individuals. The specifics of implementing Article 6.4, including requirements and procedures, are still under negotiation, like Article 6.2, with the first credits expected to become available in the coming years.

Since the adoption of the Paris Agreement, negotiations have taken place at various UN climate conferences to finalize the guidelines for implementing Article 6.2 and 6.4 and setting up their operational rules while ensuring environmental integrity, transparency, and equitable outcomes.
Parties are seeking to address these challenges and create a robust framework for international cooperation under Article 6.2 and 6.4. While the countries work towards the implementation of these mechanisms, clear guidelines and strong governance structures are required to ensure effective and equitable collaboration in meeting climate goals.

PARIS AGREEMENT 2015 – ARTICLE 6

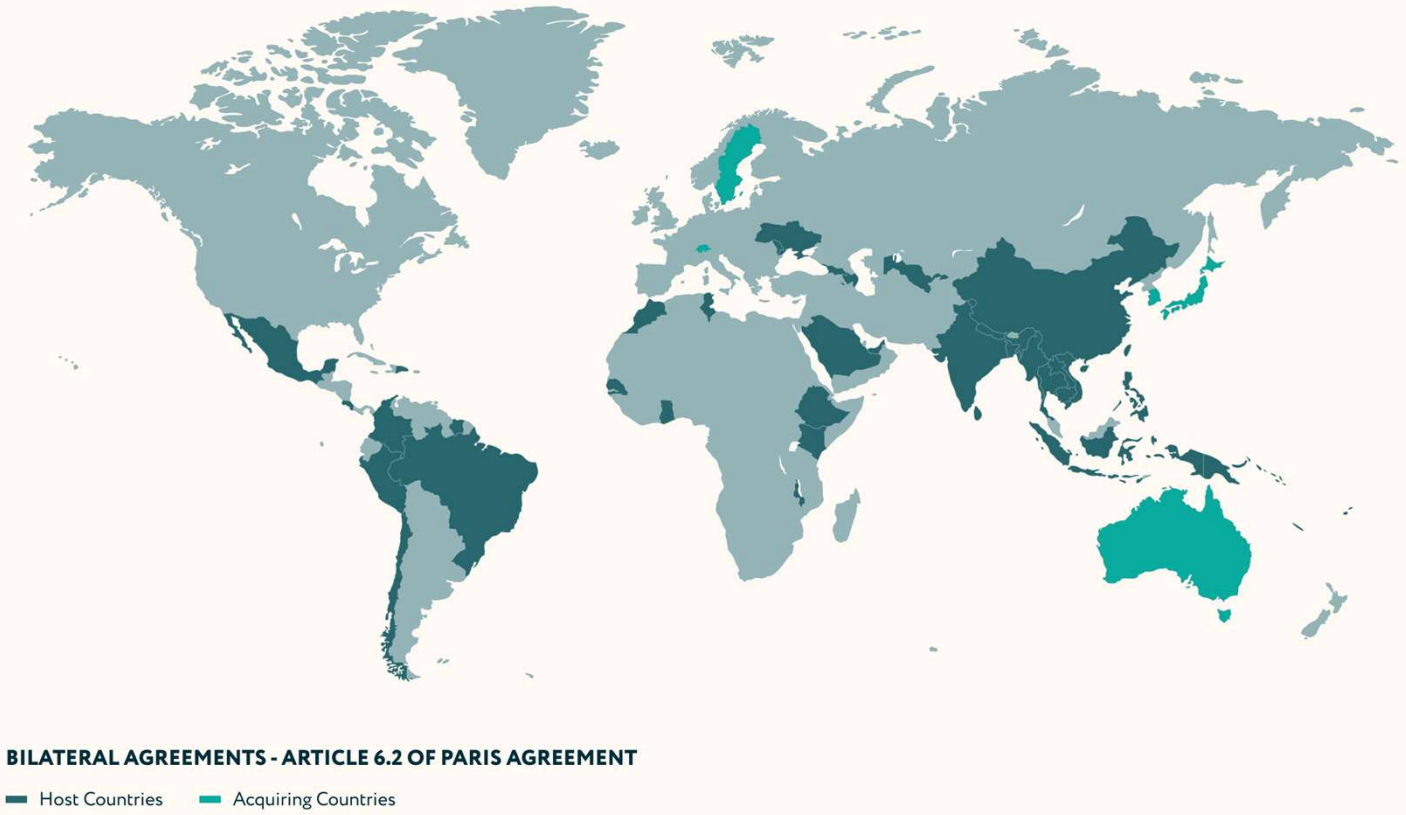


Figure 1.5. Countries participating in bilateral agreements under Article 6.2 of Paris Agreement

PARIS AGREEMENT 2015 – ARTICLE 6 VS KYOTO PROTOCOL

While both the Kyoto Protocol and the Article 6 are the results of significant global political alignment and purpose, they also have important differences in their approach:

- **GHG coverage:**
  - Kyoto Protocol covered 21% of global emissions during its first commitment period with 36 mitigating countries.
  - Article 6 covers approximately 98% of global emissions with 194 signatories.
- **Operating logic:**
  - Kyoto Protocol is a fixed legally binding agreement with overt penalties for non-compliance
  - Article 6 adopts a 'pledge and review' system

National emissions caps and possible linkages under the Paris Agreement are more ambiguously defined than under Kyoto Protocol.

CONCLUDING REMARKS

Summarizing the main differences between the Kyoto Protocol and the Paris Agreement

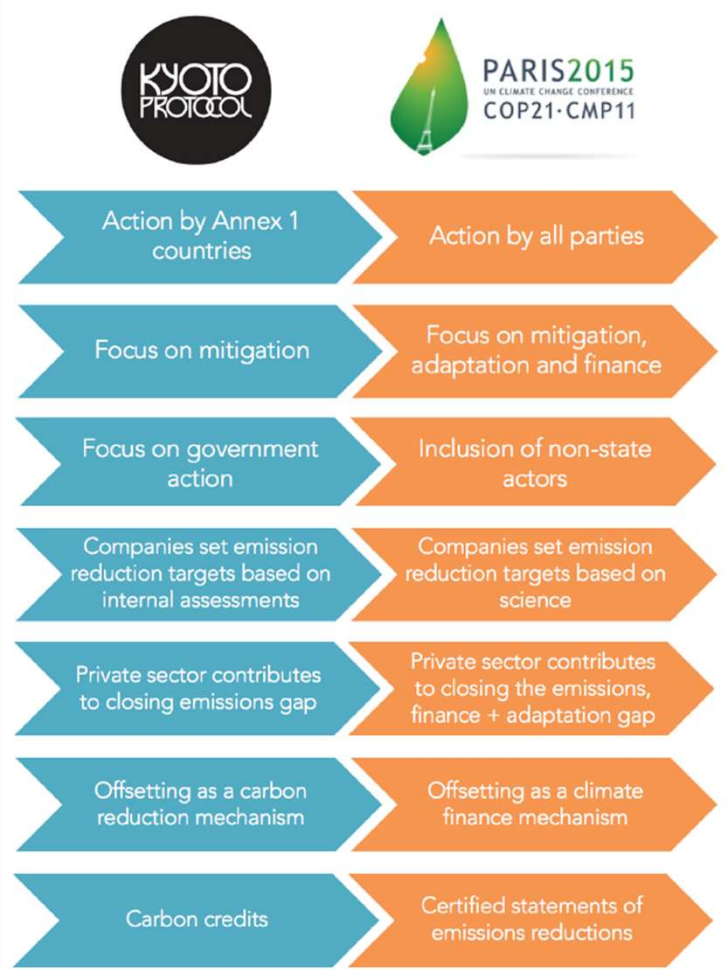


Figure 1.6. Comparison between KP and PA (GSF 2017 A new paradigm for Voluntary Climate Action)

CORSIA 2016

As part of its strategy to achieve carbon neutrality, the International Civil Aviation Organization (ICAO) adopted in 2016 the **Carbon Offsetting and Reduction Scheme for International Aviation**, known as **CORSIA**.

CORSIA is the first global compliance scheme adopted by a specific sector. Covering international aviation only (domestic flights are excluded), it requires, since 2019, airlines to report their annual GHG emissions each year. The air industry sector committed to reaching net zero emissions by 2050, and to reach this ambitious goal the implementation of CORSIA started in 2021.

The implementation of CORSIA will be done in three phases:

1. Pilot phase (2021-2023)
2. First phase (2024-2026)
3. Second phase (2027-2035), where participation will be mandatory.

From January 2023, 115 countries are participating in CORSIA, and more have announced their intention to join in 2024.

In addition to CORSIA's three-phase plan, the aviation sector is also making simultaneous efforts to reduce greenhouse gas emissions through the implementation of new technologies designed to enhance the utilization of more efficient and sustainable fuels.

CORSIA will significantly drive the demand for carbon credits as it is known that aviation is a sector hard to abate. Therefore, airlines will need to buy carbon credits from CORSIA approved standards to meet their targets. This is a good example of how independent crediting mechanisms operating under the VCM can be a source of supply for a compliance market.

CONCLUDING REMARKS

In their pursuit of reducing greenhouse gas (GHG) emissions, nations have expanded their utilization of carbon pricing methods, such as taxes or emissions trading systems. According to a recent report from the Organisation for Economic Co-operation and Development (OECD) titled 'Pricing Greenhouse Gas Emissions: Turning Climate Targets into Climate Action,' this expansion in coverage was observed across various countries and sectors in 2021. The report reveals that over 40% of GHG emissions fell under the umbrella of carbon pricing mechanisms in 2021, a notable increase from the 32% recorded in 2018. This shift was accompanied by higher average carbon prices in 47/71 countries examined. Specifically, average explicit carbon prices, stemming from **carbon taxes** and **emissions trading**, more than doubled during this period, reaching EUR 4 per tonne of CO2 equivalent.

In countries with already high carbon prices, there were significant increases, highlighting varying reliance on carbon pricing as a climate solution. Governments adapt emission-cutting strategies to their unique situations. Carbon pricing encourages cleaner energy use and generates revenue, but nations also employ additional tools like regulations, tax incentives, and clean tech subsidies for net-zero goals.

The reported carbon prices include emissions trading, carbon taxes, fuel excise taxes, and fossil fuel subsidies. These represent only a partial view of government climate policies.

Some nations cut energy taxes in response to supply issues, impacting effective carbon rates. 'Pricing Greenhouse Gas Emissions' evaluates 71 countries, revealing:

- In 47 countries, net Effective Carbon Rates rose, driven by new systems or strengthening existing ones.
- In 2021, 25% of emissions in these countries were subject to ETS, carbon tax, or both.
- Fuel excise taxes, a form of carbon pricing in road transport, remained at 24%.
- Fossil fuel subsidies, countering carbon pricing, affected 22% of emissions.
- 39 countries had explicit carbon pricing mechanisms, like ETS or carbon tax.
- Carbon prices rose for all fuels; road transport fuels had significantly higher rates, e.g., diesel and gasoline at EUR 72 and EUR 88 per tCO2e vs. coal at EUR 6 per tCO2e.