

# Architecture of the climate fight

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**Abstract.** Global warming is a serious challenge to the world's population. Scientists are still arguing about the causes, speed and possible threats of the climate change and ways to combat them. Meanwhile, the planetary climate is changing not for the better. Warming causes global environmental, economic, social and political problems and disasters. Further changes threaten the quality of life and the very lives of people on the planet Earth. Over the four decades a global mechanism of legal, policy and market instruments, was designed to revert climate change. The mechanism is to stabilize and reduce GHGs in the atmosphere by reducing their emissions and absorbing them in long-term sinks above and under the ground. The architecture and dynamics of this mechanism and the interaction of its individual parts and elements are the subject of this article.

## 1 Introduction

**1987: Montreal Protocol on Substances that Deplete the Ozone Layer (simply the Montreal Protocol).** The Protocol was adopted in 1987 and entered into force in 1989 [1]. To date, it is one of the most successful international treaties that has got general acknowledge and satisfaction. This was the first step in an international effort to protect stratospheric ozone and the planet's climate. Under the original plan, developed countries were to begin phasing out chlorofluorocarbons (CFCs) in 1993. During the first phase, by 1994, it was expected to achieve a 20% reduction compared to 1986 consumption level. At the second phase, by 1998, it was planned to achieve a 50% reduction. In addition, developed countries pledged to freeze production and consumption of halons compared to 1986 levels. However, in the following years, despite the adoption of the Montreal Protocol, scientists showed more serious damage to the ozone layer than expected.

The Protocol underwent nine revisions before the Kigali meeting in Rwanda in 2016. The meeting was encouraging. The ozone hole over the South Pole is gradually closing. It is expected to disappear completely by mid-century. Meanwhile, the global warming agenda has gradually begun to replace ozone issues and has quickly become the leading item on the global environmental agenda. The success of the Montreal Protocol made it, in every sense, a “role model” for the subsequent Kyoto Protocol on global warming. It showed a way for

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the construction of a global mechanism for regulating the planet's climate. The construction was dynamic and did not proceed according to a plan, but through trials and errors. Parts of the mechanism were constantly being built, rebuilt, or decommissioned over time. The current construction and reconstruction of the mechanism is ongoing and accelerating. The architecture and chronology of the current global climate regulation mechanism are outlined below.

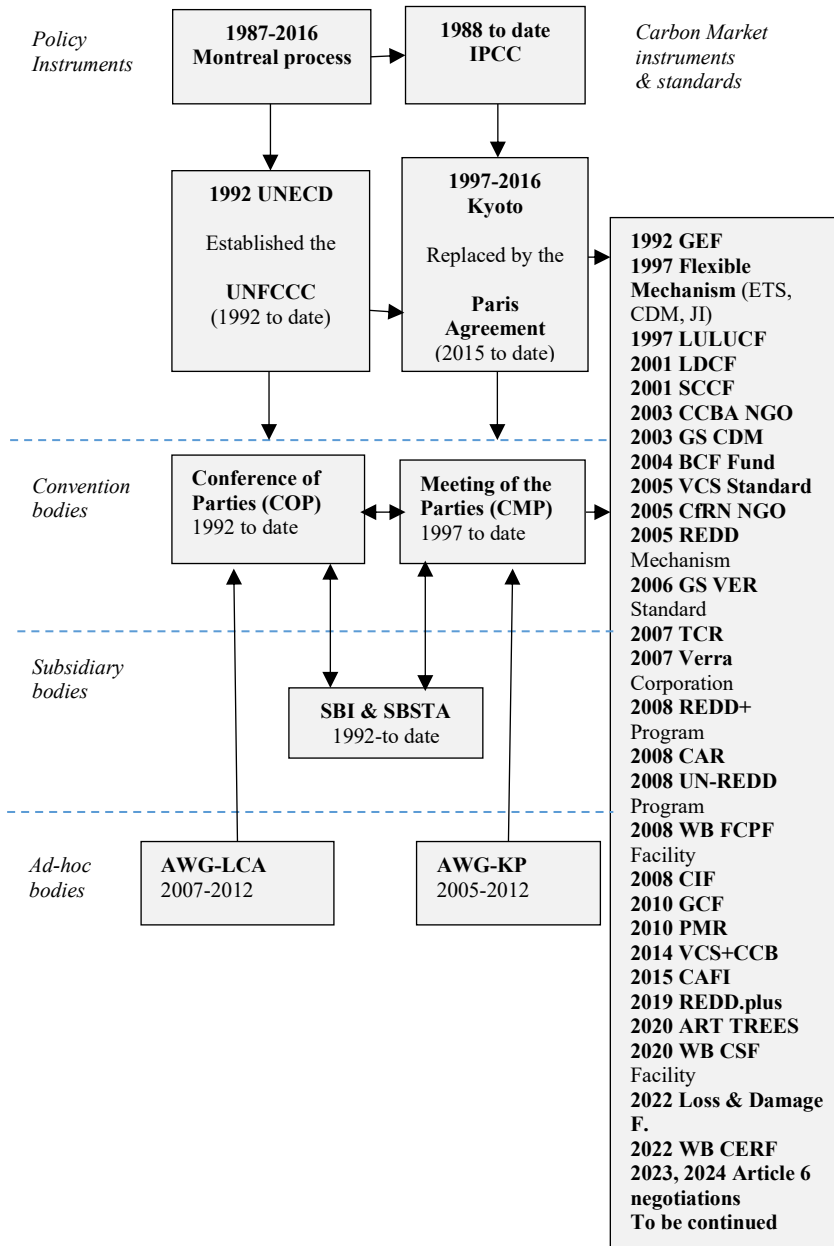
## **2 Architecture of GHG reduction over time**

**1988: International Panel on Climate Change (IPCC).** IPCC has been jointly developed by the World Meteorological Organization (WMO) and the United Nations Environment Program (UNEP). It was approved by the UN General Assembly in 1988. The UN created IPCC as an international intergovernmental body to provide the global community and the UN with periodic scientific assessments of climate change. The Panel includes 195 parties and is headquartered in Geneva. The very first IPCC report was issued in 1990. It laid a solid foundation for the UN Convention on Climate Change (UNFCCC), which was established two years later in 1992 (Figure 1).

**1992: The United Nations Conference on Environment and Development (UNCED).** The UNCED (also called Earth Summit or Rio Summit) held in 1992 and got together 8,000 delegates from over 170 countries. It was the largest environmental gathering of the last decade of the 20th century. The motto of the conference was “Our last chance to save the planet.” It well reflected the mood of global community at the end of the century and after the end of the Cold War. The decisions taken at the Summit determined the environmental policy of the UN and its members for many decades to come [2]. They laid solid basis for the future architecture of the climate building. It started to be actively constructed and reconstructed immediately after the summit to include several stories: (1) policy instruments, (2) convention bodies, (3) subsidiary bodies, (4) ad-hock groups, (5) carbon market instruments and standards.

**1992: United Nations Framework Convention on Climate Change (UNFCCC).** The 1992 Rio summit adopted three prominent legally binding agreements: (1) Convention on Biological Diversity (CBD), (2) United Nations Framework Convention on Climate Change (UNFCCC) and (3) United Nations Convention to Combat Desertification (UNCCD). UNFCCC was the key treaty to strictly address the climate change. It established annual Conferences of the Parties (COP) – members, that signed the UNFCCC treaty. The regular COPs were launched as a policy instrument to materialize the UNFCCC mission.

**1992: Subsidiary Body for Implementation (SBI) and Subsidiary Body for Scientific and Technical Advice (SBSTA).** To support the COPs Rio Summit has also created two permanent subsidiary bodies to the conferences: (1) the Subsidiary Body for Scientific and Technical Advice (SBSTA) and (2) the Subsidiary Body for Implementation (SBI). SBSTA advises COP on methodology, technology and science. It is facilitating technology transfer, national staff training, monitoring, reporting and verification (MRV) of GHG emissions. SBSTA links scientific experts, policy and decision makers. SBSTA and SBI cooperate on cross-cutting problems, including Kyoto Protocol mechanisms and climate vulnerability of the developing nations. The SBSTA and SBI traditionally meet at least twice a year. These advisory bodies to the COP are opened for participation of all Parties. Any government may assign their country experts to participate in the work of the two bodies.



**Fig. 1.** Evolution and status of the mechanism to reverse global warming

**1992: Global Environmental Facility (GEF).** The GEF was established in 1991 as a pilot program of the World Bank. In March 1994, the 73 participating countries decided to restructure the program. GEF is a financial basis for implementing the UN Convention on Biological Diversity (CBD), the UN Framework Convention on Climate Change (UNFCCC), the Stockholm Convention on Persistent Organic Pollutants (POPs), and the UN Convention to Combat Desertification (UNCCD). GEF also supports projects to eliminate ozone-depleting substances. The Facility consists of several funds: Global Environment Facility Trust Fund (GEF TF), Global Biodiversity Framework Fund (GBFF), Least Developed

Countries Fund (LDCF), Special Climate Change Fund (SCCF), Nagoya Protocol Implementation Fund (NPIF), and Capacity-building Initiative for Transparency Trust Fund (CBIT). GEF targets developing nations for meeting their obligations on international climate pledges. GEF renders support to governmental bodies, civil society agencies, private sector, academia, and other bodies implementing the conservation, protection and renewal environmental projects.

**1997: Kyoto Protocol (KP).** The KP was agreed on December 11, 1997 in Kyoto, Japan. It is a global agreement on the issues of sustainable development and environmental protection. KP goes far beyond the treaty predecessors. It was intended to reduce GHGs emissions in several Annex I (developed) countries. The Protocol deals with the seven major pollutants, such as carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>), nitrous oxide (N<sub>2</sub>O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), sulfur hexafluoride (SF<sub>6</sub>), nitrogen trifluoride (NF<sub>3</sub>). Flexible Mechanism was designated to achieve the KP climatic goals and included three parts: (1) Joint Implementation (JI), (2) Clean Development Mechanism (CDM), (3) International Emission Trading (IET). The first two mechanisms are project-based. This means that greenhouse gas reduction is addressed by individual climatic projects. They are aimed at reducing emissions in the most cost-effective way. JI crediting period started in January 2008. The third Kyoto mechanism (IET) does not provide for a real reduction but allows nations to fulfill their commitment to reduce GHG emissions by purchasing emission quotas from other states. The three market mechanisms of the KP created global voluntary and compliance carbon market. The innovative market allows reducing GHG emissions in the most cost-effective way in the countries with the lowest specific costs per unit of emission reduction. The amount of GHGs in the planetary atmosphere should be reduced to prevent climate warming. It does not matter where and how emissions are reduced. GHG markets stimulate employment and environmentally friendly technologies in developing countries instead of outdated technologies. After the Copenhagen's failure, the negotiations immediately resumed on bottom-up approach and led to Paris Agreement in 2015.

**1997: Land Use, Land Use Change and Forestry (LULUCF).** LULUCF represents various forms of land use and ecosystem management, including forestry. Agriculture is considered a separate sector within AFOLU (agriculture, forestry and other land uses). The Kyoto Protocol allowed Annex I Parties to use LULUCF activities to meet their commitments. In other words, greater carbon sequestration allows bigger use of hydrocarbons. Trees are best sinks to remove carbon dioxide from the atmosphere. LULUCF projects can be represented by the following types: avoided deforestation (protecting existing forests), reforestation (restoring forests), afforestation (creating forests), soil management projects (preserving or increasing soil carbon). LULUCF project activities produce Removal Units (RMUs).

**2003: Climate, Community & Biodiversity Alliance (CCBA).** CCBA was launched in 2003 by the partnership of several bodies, including Conservation International (CI), CARE (Cooperative for Assistance and Relief Everywhere), formerly Cooperative for American Remittances to Europe, The Nature Conservancy (TNC), Rainforest Alliance, and the Wildlife Conservation Society. CCBA primary purpose was to boost private investments in agroforestry, forest protection and restoration. For this purpose, CCBA NGO members drafted the first CCB Standard in 2004. The second edition of the standard was released in 2008 and the third in 2013. The third edition of the CCB standard is periodically updated to strengthen and expand the scope of the CCB Program.

**2003: The Gold Standard (GS).** GS was launched in 2003 after a two-year period of consultation with stakeholders, governments, non-governmental organizations, and private sector specialists from over forty countries. The GS for voluntary offset projects (GS VER) was launched in 2006. The GS project registry, containing all projects implemented through

the standard, was launched in 2018. For projects to be accepted by GS they must conduct additional assessment of the project's communal impact and ensure that neighboring populations are benefiting.

**2004: BioCarbon Fund (BCF).** The BCF was created by the World Bank as a public-private initiative. The fund supports projects that combine financial returns from the sale of carbon credits with the multiple benefits of sustainable land management. The first tranches of the BCF began in 2004. In 2013, the BCF launched the Sustainable Forest Landscapes Initiative (ISFL) to support forest landscapes. The initiative tests jurisdictional approaches in developing countries. It is to green supply chains by integrating reduced deforestation, degradation, and sustainable forest management with climate-smart agricultural practices. ISFL finances large-scale programs that enable developing countries and their private sectors to enact change.

**2005: The Verified Carbon Standard (VCS).** The VCS (formerly the Voluntary Carbon Standard) was launched in 2005 as a quality standard for meeting the CDM requirements established by the Kyoto Protocol in 1997. The VCS program is currently administered by Verra, a non-profit corporation created in 2007.[6] Verra administers several other global voluntary carbon market programs, including the Jurisdictional and Nested REDD+ (JNR) Framework, the Verra California Offset Project Registry (OPR), the Climate, Community, and Biodiversity (CCB) Standard, the Verified Sustainability Impact Standard (SD VISA), and the Plastic Waste Reduction Program. Verra is the largest greenhouse gas program, accounting for nearly 75% of the voluntary carbon market. The VCS program issues unique Verified Carbon Units (VCUs). Each VCU represents the reduction or removal of one ton of carbon dioxide equivalent (CO<sub>2</sub>e) produced by a project. VCUs are ultimately purchased and retired by the end user to offset their emissions. All VCU issuance and retirement records are publicly available in the Verra own registry.

**2005: Coalition for Rainforest Nations (CfRN).** The CfRN was launched on May 10, 2005 with Secretariate at Colombia University in New York City. The CfRN coalition acts as a focal point in international negotiations on behalf of over 50 rainforest member states [7].

**2005: Ad-Hock Working Group under the Kyoto Protocol (AWG-KP).** In 2005, COP11 in Montreal served as the first meeting of the parties (CMP1) to the Kyoto Protocol. The joint COP11/CMP1 meeting established the Ad Hoc Working Group on the Kyoto Protocol (AWG-KP). The group was called upon to discuss the commitments of industrialized countries under the Kyoto Protocol. CMP8 in 2012 decided that the group had fulfilled its mandate and closed it.

**2005: Reduced Emissions from Deforestation and Forest Degradation (REDD).** In 2005 COP11/CMP firstly negotiated REDD program to prevent deforestation in natural forests. In 2008 REDD was replaced by REDD+. Plus signified extra activities including conservation, sustainable management of forests and enhancement of forest carbon stocks.

**2007: Ad-Hock Working Group on Long-Term Cooperative Action under the UNFCCC (AWG-LCA).** In 2007, COP13/CMP3 held in Bali, Indonesia. The meeting adopted Bali Action Plan and established AWG-LCA to enable sustained implementation of the UNCCC convention. After the COP18/CMP8 meeting in Doha (2012) the AWG-LCA Group ceased to exist. COP13 adopted substantial decision on REDD+

**2007: The Climate Registry (TCR).** TCR is a non-for-profit, U.S.A.- and Canadian-based registry formed in 2007. It is the direct successor to the California Climate Action Registry (CCAR). TCR operates in voluntary and compliance carbon markets worldwide. TCR assists national, private, and government entities in measuring, verifying, and reporting GHG emission reductions. There is a fee for membership in the Registry. Fees vary for governments, academic and educational organizations, and the private commercial sector.

**2007: Verra Corporation (Verra).** Verra was founded in 2007 as a non-profit corporation under US jurisdiction. The corporation has its roots in the Voluntary Carbon Standards (VCS), developed in 2005 by consulting firm Climate Wedge in partnership with Cheyene Capital. VCS is a quality standard for non-Kyoto Protocol carbon credit transactions. These credits met the Clean Development Mechanism (CDM) standards of the Kyoto Protocol (KP) but were still not eligible due to the geographic and time constraints of the KP. Verra is currently the largest carbon registry in the world, serving some 75% of the global voluntary carbon market. In addition to VCS, Verra administers other standards such as the Climate, Community, and Biodiversity (CCB) Standard and the Plastic Waste Reduction (PWR) Standard. Verra issues carbon credits called Verified Carbon Units (VCU). Each VCU represents one metric ton of CO<sub>2</sub> reduced or removed. Project owners then sell their VCUs to interested buyers through the Verra Registry. However, in 2021, The Guardian criticized Verra for misrepresenting its carbon credits. In January 2023, The Guardian confirmed that 94% of Verra's carbon credits were worthless. Verra's CEO resigned following the criticism. Verra continues to deny the blames but is taking extraordinary steps to ensure stricter certification of its own climate programs.

**2008: REDD+.** In 2008, SBSTA 29 at COP14 in Poznan, Poland, significantly modified and expanded the previous concept of the REDD program by incorporating new elements in the concept. Before that, the former REDD stood for "Reducing Emissions from Deforestation and Forest Degradation". Indeed, deforestation and forest degradation are responsible for over 20% of the world's annual carbon dioxide emissions into the atmosphere. However, REDD essentially underestimated the efforts to manage forests sustainably. Thus, REDD+ went far beyond just deforestation and forest degradation. The PLUS added up also forest sustainable management, conservation, and carbon sinks in developing nations. REDD+ incentivized the developing states to conduct sustainable forest management, not just refrain from forest cutting down [8].

**2008: The United Nations Programme on Reducing Emissions from Deforestation and Forest Degradation (UN-REDD Programme).** The program was initiated by three UN branches: the Food and Agriculture Organization of the United Nations (FAO), the United Nations Development Programme (UNDP) and the United Nations Environment Programme (UNEP). The main mission of the program was to support the Bali Action Plan. UN-REDD should not be confused with the REDD+ program. These two programs are similar in name but different in nature. The REDD+ is an element of the Paris Agreement that encourages developing countries to conserve and protect their forests. The UN-REDD program has a limited number of partner countries (65 Parties) and provides them with access to REDD+ project financing [9].

**2008: The Forest Carbon Partnership Facility (FCPF).** The FCPF was established by the World Bank in 2008 as a global partnership of national governments and the private sector, indigenous peoples and civil society. FCPF implements the REDD+ program in developing nations for sustainable forest management, preventing forest degradation and deforestation, reducing GHG emissions and increasing forest carbon stocks. The FCPF is financed through two funds: (1) the FCPF Readiness Fund for financing the development of national climate strategies, GHG methodologies and benchmarks, management, monitoring, reporting, verification (MRV) and insurance of REDD+ projects. The FCPF Readiness Fund exceeds US\$400 million. (2) the FCPF Carbon Fund makes result-based payments for the GHG emission reductions in forest sectors. The FCPF Carbon Fund amounts to US\$900 million. The FCPF works with about fifty countries in Asia, Africa, Latin America and the Caribbean. Total FCPF commitments to date exceed \$1.3 billion.

**2008: Climate Action Reserve (CAR).** CAR was founded in 2008 as an independent program operating in the United States. CAR projects are developed and implemented exclusively in North America. The California Climate Action Registry (California Registry)

was the predecessor to CAR. California Registry was a voluntary greenhouse gas registry for companies and other organizations created in 2001. It was meant to implement actions to account for, manage, and reduce greenhouse gases in California. CAR develops quality standards for measuring and verifying greenhouse gas emission reduction projects. CAR oversees the verifiers, issues, tracks and retires carbon credits called climate reserve tons (CRT). CAR develops methodologies (protocols) for climate projects and generally follows a result-based approach to performance. CAR employs participatory mechanisms that include consultation with staff experts and stakeholders approved by the board.

**2008: Climate Investment Funds (CIF).** CIF was founded in 2008 with a value of US\$8.5 billion. It is one of the most ambitious attempts to invite climate investments. The fund targets developing and middle-income countries. Financing prioritizes clean technologies, energy access, increasing resilience to climate change and sustainable forest management. Long-term, large-scale and relatively cheap investments reduce the cost and risks of climate finance. CIF tests new carbon markets, different approaches and business models to increase confidence and attract investors. CIF manages a portfolio of over 300 projects in over 70 developing countries with low and middle level of population income. CIF uses for its mandate two multi-donor trust funds: the Clean Technology Fund (CTF) and the Strategic Climate Fund (SCF) [10].

**2009: Copenhagen Accord.** In 2009, COP15/CMP5 in Copenhagen adopted the Copenhagen Accord and established the Copenhagen Green Climate Fund. COP16 in Cancun formally adopted the fund in 2010. COP17 in Durban endorsed the final governing document in 2011.

**2010: Cancun Agreement.** COP16/CMP6 in Cancun, Mexico adopted a package of documents known as the "Cancun Agreements" [11]. Almost all countries agreed to set long-term goals to keep anthropogenic temperature increase under 2°C by 2050. These Cancun modified the Copenhagen Conference (2009) pledges by provisioning possible downsizing of the benchmark to 1.5°C, if needed. In 2010 the developed countries were responsible for over 50% of the global GHG emissions. They did confirm their intentions to reduce their GHG emissions by 25–40% by 2020 compared to 1990, although without legal obligations. That was because developing countries refused from any legal reductions. New special funds and institutions have been agreed upon to help developing countries. The Green Climate Fund (GCF) of the World Bank, was officially established with intended volume of up to US\$100 billion by 2020. However, only the EU has confirmed its contribution to the GCF (€7.2 billion). So far, the GCF is the world's biggest multilateral climate fund helping the developing nations to reduce their GHG emissions and increase their resilience to global warming [12].

**2010: The Partnership for Market Readiness (PMR).** PMR was established by the UN World Bank in 2010 as a global partnership for promoting global carbon market. PMR employs market approach to combat climate change in developing countries with the low and medium income of citizens. PMR acts as a forum for dialogue on technical exchange and also as a trust fund to develop, pilot and introduce new market instruments and incentives. As of the end of 2020, the partnership's financial portfolio has grown to US\$130 million. Donor contributions are counted as Official Development Assistance (ODA) [13].

**2012: Adaptation for Smallholder Agriculture Programme (ASAP).** COP15/CMP5 in Montreal, Canada, in December 2012. ASAP got adopted the ASAP program as a flagship of the International Fund for Agricultural Development's (IFAD). ASAP is the largest program of IFAD on environment and climatic financing of the small farmers. Since 2012, ASAP provides financing via two separated programs: ASAP1 and ASAP2. Total cost has reached US\$300 million investments, that helped 8 million small farms in 43 countries to resist climate changes and establish resilient livelihoods. The following step of the IFAD -

Enhanced Adaptation Programme for Smallholder Agriculture (ASAP+) - is already underway.

**2013: Reduced Emissions from Deforestation and Forest Degradation (REDD+).** Another COP19/CMP9 took place in Warsaw, Poland, in November 2013. The conference adopted additional seven decisions on REDD+. They clarified several important REDD+ problems and made significant breakthrough in the climate negotiations. On the top, during COP 19, the World Bank announced a new US\$280 million initiative under the BioCarbon Fund. Also the Government of Norway made a US\$40 million pledge to the UN Collaborative Programme on Reducing Emissions from Deforestation (UN-REDD). Despite these new pledges, the demand for new and additional financing from a variety of sources was acknowledged by participants.

**2014: VCS acquired CCB (VCS+CCB).** Since November 2014, the CCB program (founded in 2003) has been acquired by Verra, a non-profit corporation (the owner of the VCS standard), founded in 2007. More than 70% of forest carbon offsets developed under the VCS have also been certified using the CCB co-benefits standard. Corporate buyers of carbon offsets highlight the growing importance and significance of non-carbon benefits such as employment, protection of endangered species, and the well-being of indigenous communities. Verra optimizes the application of the VCS+CCB standards by synchronizing the validation and verification of climate projects. Managing both standards by a single Verra team reduces overall costs and shortens project timelines. As an example, VCS+CCB projects use one auditor instead of two. This saves cost of monitoring and verification [14].

**2015: Central African Forest Initiative (CAFI).** CAFI was launched in 2015 on the sidelines of the UN General Assembly as a partnership initiative. It brings together a coalition of donors and recipients. Donors are the governments of Belgium, the European Union, France, Germany, the Netherlands, Norway, Sweden, the Republic of Korea, the United Kingdom and the United States. The six CAFI recipient countries are the Central African Republic, the Democratic Republic of the Congo (DRC), the Republic of Cameroon, the Republic of Congo, the Republic of Equatorial Guinea and the Republic of Gabon. CAFI mechanism also employs several implementing organizations and South-South partners. The partnership aims at supporting governments in Central Africa. The primary objective are reforms and investments to stop tropical deforestation. The partnership focuses primarily on Central African countries with a high proportion of forest cover. The international initiative aims to conserve African forests and maintain their carbon stocks (REDD+).

**2015: Paris Agreement (PA).** The Paris Agreement was to replace the Kyoto Protocol. It was adopted during the Climate Conference in Paris (COP21/CMP11) by consensus on December 12, 2015, and signed on April 22, 2016 [15]. The Agreement is a hybrid document consisting of a legally binding protocol to the UNFCCC and a series of decisions of the UNFCCC conference. Unlike the Kyoto Protocol, the new document assumes responsibility for reducing GHG emissions by all states, not just by the most developed nations. PA addresses measures to reduce CO<sub>2</sub> in the global air since 2020. The agreement is intended to keep the global average temperature increment below 2 C. PA even called for nations to limit the temperature increase to 1.5 C. The peak of carbon dioxide emissions must be reached as soon as possible. The participating countries must determine their contributions to achieving the common goal individually and review them every five years. The Agreement does not provide for a coercion mechanism in relation to national goals and obligation to achieve them. The parties were to begin practical cooperation under Article 6 of the agreement starting in 2020. However, the issues of free carbon market raised by the Article 6 have proven difficult to resolve despite the extensive following negotiations.

**2019: REDD.plus platform.** In 2019, the Coalition for Rainforests (CfRN), founded in 2005, launched the REDD.Plus platform for carbon trading. CfRN is a non-profit, tax-exempt charity that pioneered the development of global REDD and REDD+ initiatives. REDD.plus

is positioning itself as a quality marketplace for quality trading of REDD+ Result Units (RRUs) [16].

**2020: The World Bank launched a family of three Trust Funds, including Climate Support Facility (CSF), Partnership for Market Implementation Facility (PMIF) and Climate Emissions Reduction Facility (CERF).** In 2020, the World Bank complemented its climate action plan (2021-2025) with three umbrella trust funds: (1) CSF to support country strategy development and enable environment for its implementation. (2) PMIF to promote fair carbon pricing and development of next-generation carbon markets. (3) CERF to provide results-based climate finance [17].

**2021: Article 6 of Paris Agreement** got approved. COP26/CMP16, held in Glasgow, Scotland, at the end of 2021, marked a turning point for global greenhouse gas markets. Six years after the Paris Agreement, Parties were finally able to agree on the principles of the international offset market and endorsed Article 6 of the Agreement. It allowed countries, companies and others to cooperate with each other to provide nationally determined contributions (NDCs). For instance, a country was enabled transferring produced carbon credits to the other countries for reducing domestic GHG emissions. Meantime, to avoid double counting, the seller or buyer country cannot count these credits twice.

**2022: Loss and Damage Fund (LDF).** On November 20, COP27 in Sharm el-Sheikh, Egypt, concluded with a historic decision to establish a Loss and Damage Fund. The agreed text acknowledged the need to financially support the new insurance fund from a variety of sources. However, no decisions were made on who and how should contribute, where the money would come from, or which countries would benefit. This became one of the most contentious issues at the negotiating table.

**2022: Scaling Climate Action by Lowering Emissions (SCALE).** SCALE is a new initiative announced by the World Bank during the COP27 summit in Sharm el-Sheikh, Egypt, in 2022. The fund is designed to bring together the global financing (including donor countries, the private sector and foundations) to reduce GHG emissions. The fund will provide grants for verifiable emission reductions. SCALE offers the world an unfragmented path to combat climate change. It will apply results-based climate finance. Under this financing, countries will receive grant payments for achieving pre-agreed, verifiable results, building on the World Bank's two decades of experience in this area. SCALE will support countries in building a track record of reducing emissions through agreed programs and policies. SCALE will also generate extra credits that can be traded on external carbon markets. Social dimension is also built into the design of all SCALE programs. The SCALE Associated Fund (called Enabling Access to Benefits while Lowering Emissions - EnABLE) encourages the inclusion of marginalized communities and indigenous peoples in partnership programs through specially designed benefit-sharing agreements.

### **3 Article 6 key market instrument**

Article 6 of the Paris Agreement has been the subject of particularly heated debate during international negotiations. It provides for both market (Articles 6.2 and 6.4) and non-market (Article 6.8) solutions to achieving the main objectives of the agreement. Article 6.2 invites countries to achieve their climate targets (Nationally Determined Contributions, NDCs) through open bilateral or multilateral market agreements. This article allows for direct flexible trading of carbon credits between countries through so-called Internationally Transferred Mitigation Outcomes (ITMOs). Article 6.4 requires the establishment of an international body and system of oversight to ensure that any private or public carbon credits (Article 6, paragraph 4, emission reduction - A6.4ER) comply with strict limits. Only A6.4ER credits must be traded or used to meet the NDCs. The Article 6.4 mechanism is more structured and regulated compared to the free market approaches of Article 6.2. Article 6.8

encourages non-market-based approaches (NMAs), including mitigation, adaptation and technology transfer. However, reaching consensus among the Parties on most of the key issues in Article 6 has proven elusive. Particularly difficult negotiations are going on around market-based approaches to achieving NDC under Articles 6.2 and 6.4. There is intense debate over whether market systems should be centralized or decentralized. The discussions on the NMA are also gaining momentum, promising progress soon.

## 4 Conclusion

The race against global climate warming approaches the point of no return. Humanity will either win or ultimately lose the climatic race. The latter threatens with global ecological, economic and socio-political calamities of unprecedented scales. The fight against global warming began with the Montreal Protocol in 1987 and created a global mechanism for concerted climate actions including huge carbon market. The mechanism consists of several elements at different layers, including policy instruments, convention bodies, subsidiary bodies, ad-hoc bodies, market instruments and standards. In 2023, the world carbon market reached US\$950 billion [5], surpassing oil and gas goods. Carbon became the most traded global commodity and far exceeded oil, gas, grain and other goods. But carbon market shares and prices are drastically different around the globe. Some 99.6% of this market belongs to the EU (87.4%), UK (4.1%), US (8.1%), and others (0.4%). Carbon market prices in the leading countries often ten and more times exceed the those in the rest of the world. A few developed countries control the greatest market shares and resist to the free market and fair carbon trade idea. With no fair market, global carbon market efficiency remains weak. Current market instruments barely capture 20% of the annual GHG pollution. Meeting the 1.5°C and net zero emission target by mid-century [6] would require much better market efficiency. Fair and free carbon market trade should be promoted to revert global warming as there is no other way to do so. This requires proper consent on the Article 6 to free carbon market from excessive limitations.

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