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**Rethinking voluntary carbon credit markets and the EU  
ETS:  
A critical review**

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## **Abstract**

Climate change is a global challenge, with estimated mitigation costs ranging from \$1.6 to \$3.8 trillion per year. As a pioneer in climate action, the European Union has the most extensive emissions trading system worldwide (90% of the global value of \$759 billion in 2021). In this paper, we review the European Union's climate strategy, emphasizing the EU Emissions Trading System (EU ETS) development, and the role of tropical forest carbon credits for offsetting. We argue that the European Union continues to leave a significant potential of tropical forests as natural carbon sinks unattended. In contrast, we reveal that the regulators can learn from the experiences made in the past and the finalization of the rulebook for Article 6 of the Paris Agreement. We present a proposal on changes to the EU ETS regulation by converting the European Commission's proposal to increase the linear reduction factor from 2.2% to 4.2% to the eligibility of forest carbon credits, resulting in additional funding potential for forestry projects to increase necessary carbon sinks. Simultaneously, allowing flexibility of investing to a limited extent in neutralization projects mitigates the risk of overstressing regulated companies to reach the emission reduction targets.

Keywords:

Climate change, European climate strategy, forest carbon credits, offsetting, Paris Agreement, Voluntary Carbon Market.

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## List of Abbreviations

A/R	Afforestation/Reforestation
CCS	Carbon Capture and Storage
CDM	Clean Development Mechanism
CER	Certified Emission Reduction
CMA	Conference of Parties serving as the meeting of the Parties to the Paris Agreement
COP	Conference of Parties
DAC	Direct Air Capture
DG CLIMA	Directorate-General for Climate Action
ECCP	European Climate Change Program
EDG	European Green Deal
EESC	European Economic and Social Committee
ERU	Emission Reduction Units
ESR	Effort Sharing Regulation
ETS	Emissions Trading System
EU	European Union
EUA	EU-Allowances
EU ETS	EU Emissions Trading System
GHGs	Greenhouse Gases
IFM	Improved Forest Management
IPCC	Intergovernmental Panel on Climate Change
ITMO	Internationally Transferred Mitigation Outcomes
JI	Joint Implementation
LEAF	Lowering Emissions by Accelerating Forest finance
LRF	Linear Reduction Factor
LULCC	Land-Use and Land-Cover Changes

LULUCF .....Land Use, Land-Use Change, and Forestry

NBS .....Nature-Based Solutions

NCS .....Natural Climate Solutions

NDCs .....National Determined Contributions

NGOs .....Non-Governmental Organizations

NMM .....New Market Mechanism

REDD.....Reduced Emissions from Deforestation and Forest Degradation

REDD+.....Reducing Emissions from Deforestation and Forest Degradation  
and the role of conservation, sustainable management of forests  
and enhancement of forest carbon stocks in developing countries

SDGs .....Sustainable Development Goals

SEA.....Single European Act

SDM .....Sustainable Development Mechanism

UN.....United Nations

UNEP.....United Nations Environment Programme

UNFCCC .....United Nations Framework Convention on Climate Change

VERs.....Verified Emission Reductions

## 1 Introduction

Effective climate action is needed to combat the widely acknowledged climate change caused by emitting greenhouse gases (GHGs). The European Union (EU) is operating one of the most important mechanisms to combat climate change, the EU ETS. The EU ETS is the largest cap-and-trade system worldwide and accounted for 90% of global value in 2021 (\$759 billion (Refnitiv, 2022)). However, it appears to be necessary to complement this compliance market mechanism with carbon credits stemming from ecologically effective and economically efficient projects as so far compliance markets alone cannot effectively absorb all negative aspects of climate change. We argue that (voluntary) tropical forest carbon credits, part of Nature-Based Solutions (NBS), are a promising way to make a significant contribution to combat climate change.

One major drawback in considering voluntary carbon credits generated by tropical rainforest projects is that neither the EU ETS nor other major compliance markets such as the California Cap-and-Trade System allow their inclusion in the compliance system. Voluntary carbon credits have been excluded from trading in the European compliance market ever since the establishment of compliance carbon markets in the early 2000's. In voluntary carbon markets, forest carbon projects account for the largest share of all project types. The aim of this study is to critically review the EU's current strategy to combat climate change and to provide a new policy perspective about the future of tropical forest carbon credits and their potential eligibility under the EU ETS.

Positive momentum for such an assessment is generated by the pledge given at COP 26 in Glasgow in November 2021 to not only halt forest loss and land degradation but also reverse deforestation until 2030. The second positive momentum of COP 26, which affirms the intention to rethink the compliance market, is the breakthrough of the negotiations on Article 6 of the Paris Agreement, which facilitates cooperation between the Parties and offers a New Market Mechanism (NMM) for carbon trading. By enabling global collaboration, up to 60% of international costs are lowered by 2030 compared to unilateral actions by the Parties of the Paris Agreement from 2016, presenting an enormous potential to be considered (Thube et al., 2022).

The discussions of forest protection made up a considerable part of COP 26. Forests act as carbon sinks by removing carbon dioxide from the atmosphere for a certain time-period. But it is also important to note that forests can be a carbon source because they may emit more carbon dioxide to the atmosphere in a given time interval than they capture (Alexandrov, 2008). Forests cover about one-third of the global land area and half of the global forests are in just five countries: Brazil, Canada, China, the Russian Federation, and the United States of

America (FAO and UNEP, 2020). The imagery from Global Forest Watch shows that tropical deforestation led to a CO<sub>2</sub> equivalent emission of 5.3 gigatons between 2001 and 2019, which makes it the third biggest source of GHG emissions worldwide if it were considered a single country (Armstrong, 2021). Thus, it seems unlikely that without reducing emissions from the rapidly ongoing deforestation of tropical rainforest the Paris goals cannot be met.

This study focuses on tropical forests, which are ecologically effective when they act as carbon sinks. The current path is alarming as we are approaching the tipping point where tropical forests can accelerate global warming. Furthermore, protecting tropical forests is also economically efficient as a study from Griscom et al. (2017) concluded that Natural Climate Solutions (NCS) can contribute to 37% of cost-effective CO<sub>2</sub> mitigation activities until 2030.

To provide a new perspective about the role of tropical forests under the compliance system of the European Union, we first conduct an analysis and critical discussion of the European climate strategy. This reveals that the efforts of the EU are increasingly ambitious, albeit lacking a global focus. Instead, we see a European Union-centric policy and regulatory development where the EU is not efficiently addressing the global challenge of climate change. We further analyze the role of tropical forests under the EU ETS based on the regulatory perspective (Section 2). This section points out that the risks associated with forestry projects – additionality, non-permanence, leakage, accounting, and monitoring uncertainties as well as socio-economic and environmental impacts – led to the exclusion of such projects right at the beginning of the establishment of compliance markets in 2005. In Section 3, we shed light on the growing voluntary carbon markets, where forestry projects play a major role. Besides growing transaction volumes, an increase in price levels of carbon credits generated from such projects can be observed. This is a necessary step to foster high project quality and the flow of sufficient funds into voluntary carbon markets. While it seems somewhat difficult to achieve from today's point of view, there is a need to ramp up financing of such projects by factor one hundred to meet 2030 targets. In Section 4, we discuss the evolution of voluntary carbon markets and the outlook for the development of these markets until 2030. We elaborate further on the EU's climate strategy path, which leads to more fragmentation of the market (Section 5). We show the importance of addressing flaws from the past as well as the role of voluntary carbon markets to improve the quality of carbon credits. In addition, we conclude with the finalization of the rulebook of the Paris Agreement (particularly Article 6). There is an excellent chance to build an international voluntary carbon market supported by standardized rules, procedures and methodologies, and governmental justification. Based on the results, we propose allowing tropical forest carbon credits under the EU ETS to significantly increase required financing by supporting cost-effective projects (Section 6). Under the premises of the existence of (political) will, all conditions exist to include tropical forest carbon credits under the



compliance scheme of the EU. Building upon the increasing ambition of the EU (Fit For 2030), we provide an estimation of forest carbon credit-related financial flows if applying a growing linear reduction factor (LRF) increase from currently 2.2% to 4.2% annually.

This study contributes to the existing literature that highlights the growing importance of NBS to combat climate change by acknowledging the current situation of a lack of funding. We also contribute to the literature that critically assesses carbon credits under compliance schemes and proposes methodologies to address the above-identified risk criteria. Finally, we are adding a new perspective to be considered by policymakers and governments to make use of the complete toolbox of available instruments by considering tropical forest carbon credits.

## **2 The European Union's climate strategy**

We look into the European Union's climate strategy to understand the main instruments the EU is using to fight climate change and to assess the main focus of the EU. In December 2020, the EU heads of the governments had committed to several changes to increase the GHGs emissions reductions from initially 40% to 55% by 2030, compared to 1990s emission levels. It has also been recognized to enhance the carbon sinks in the EU by setting higher ambitions on the Land Use, Land-Use Change, and Forestry (LULUCF) regulation (European Commission, 2021b). The LULUCF regulation is not considering international forests, such as tropical forests, but focuses solely on EU forests. However, we will provide an overview of this regulation as it reveals that the EU is well aware of the importance of carbon sinks. A complete framework has been established that comprises accounting and reporting methodologies.

The EU focuses on three key instruments, which are presented in the following and comprise the Emission Trading System (EU ETS), the Effort Sharing Regulation (ESR), and the LULUCF regulation (BMU, 2021). The EU ETS, a cap-and-trade mechanism, has its regulatory foundation in the Directive 2003/87/EC of the European Parliament and the Council from 2003. The legal basis for the EU ETS even reaches further back to the Single European Act (SEA) from 1986 as the revision of the Treaty of Rome from 1957 when it added momentum to the European integration and the inclusion of environmental issues under the control of the European Parliament, the European Commission, and the European Council (European Commission, 2015). The EU ETS covers roughly 40% of the GHGs emissions within the EU by including the sectors Power, Industry, and Aviation. Overall, about 11,000 utilities and a few hundred aircraft operators must comply with the EU ETS (BMU, 2020). It is currently operating in the fourth trading phase which will span from 2021 to 2030. Cap-and-trade systems play a significant role in the EU and globally; ETS systems cover about 16% of the global GHGs emissions. By the end of January 2022, 25 ETS existed worldwide (ICAP, 2022). The EU ETS is regarded as

the leading climate policy instrument to fight climate change and to cost-effectively reduce greenhouse gas emissions (Wallner et al., 2014; European Commission, 2015; BMU, 2021; European Commission, 2021a).

The second instrument is the ESR which covers the sectors not included in the EU ETS. It comprises Transport, Building, Agriculture, and non-ETS industry and waste, accounting for about 60% of the EU's GHGs emissions. It does not contain LULUCF. The legal basis of the ESR is the EU regulation 2018/842 from 2018, as the successor of the Effort Sharing Decision from 2009, and it reflects the different capacities of the Member States to take climate action by taking into consideration an above average gross domestic product per capita. This measurement shall generate fairness by allocating more prosperous Member States higher reduction targets. The targets vary between the involved sectors and will increase due to the European Green Deal (EGD) from 29% to 40% by 2030 compared to the base year 2005 (European Commission, 2021c). Within the ESR regulation, flexibility mechanisms can be used. In this paper, we concentrate on the mechanism to compensate a shortage with removal units generated under the LULUCF regulation or to move a surplus to the LULUCF regulated area (Peeters and Athanasiadou, 2020). These flexible mechanisms under the ESR are a clear distinction from the regulation in the EU ETS. As the CO<sub>2</sub> emissions covered under the ESR regulation make up the larger share within the EU, it also offers a higher degree of flexibility than the EU ETS when achieving the targets allocated towards each Member State.

Finally, the third reviewed instrument within the European Union for this paper addresses the Land Use, Land-Use Change, and Forestry sector within the EU by the LULUCF regulation. It is determined by the EU regulation 2018/841 from 2018 and ensures that the emissions from this sector do not exceed the removals within the period 2021 – 2030, which is also referred to as no net-debit obligation. Within the EU since the year 2000, the LULUCF sector has been a net carbon sink with an average of 320 Mt CO<sub>2</sub>e per year with a decreasing slope. Like the ESR regulation, the LULUCF regulation also allows the above-described mechanism to use surplus removals from LULUCF for compensation in the ESR sectors or surpluses from the ESR sectors for compensation in LULUCF (European Commission, 2021d; Böttcher et al., 2019). Tropical forests are not in the scope of the LULUCF regulation, which we consider a shortcoming because of the global importance of tropical forests as a climate sink and the size of tropical forests. As part of the EGD the above-mentioned mechanisms are under revision whereas no significant change in the handling of tropical forests is to be expected.

### **3 The role of forests under the EU Emissions Trading System**

In this section, we emphasize the EU ETS's main tool, the flexibility mechanisms under the Kyoto Protocol from 1997, and the specific role of forest carbon credits under these mechanisms. The EU directive 2003/87/EC from 2003 is serving as the core regulation for emissions trading within the European Union. The Directive has been subject to ten amendments from 2003 to 2020 resulting in the latest version from May 2020 based on a Commission Delegated Decision (Official Journal of the European Union, 2020). The version of the Directive from 2003 did not foresee the reflection of the two additional market-related mechanisms stemming from the Kyoto Protocol for offsetting purposes – the Clean Development Mechanism (CDM) and Joint Implementation (JI). To integrate these compensation mechanisms, the so-called Linking Directive (directive 2004/101/EC) was established in 2004 and obliged the Member States to comply with it from November 2005 onwards (Article 2). The directive encompassed lower overall costs, boosting liquidity in the market, and stimulating the development and transfer of technology to support developing countries (Official Journal of the European Union, 2004).

The Directive 2004/101/EC Article 11a 1. accepted the use of Certified Emissions Reductions (CERs) and Emission Reduction Units (ERUs) stemming from CDM and JI projects. Member States had to define a quantitative limit for the usage of CERs, which were allowed from the pilot period 2005 onwards. The Directive also contained exemptions from being eligible for offsetting under the ETS. These are governed in Article 11a 3. and comprised a) CERs and ERUs from nuclear power plants, projects involving the destruction of industrial gases, and b) CERs and ERUs from land use, land-use change, and forestry activities (Official Journal of the European Union, 2004). With the focus on forestry projects, the few words in the directive led to the exclusion of a comprehensive set of removal activities.

Forest-related carbon credits can be understood as a carbon credit based on CO<sub>2</sub> binding action, which encompasses all kinds of forests. Forest carbon credits comprise projects with the target of afforestation, reforestation (A/R), and revegetation, as well as improved forest management (IFM) or reduced emissions from deforestation and degradation (REDD) (Elyse et al., 2018). The investigation of the justification for removing all LULUCF activities from the scheme was conducted by reviewing all relevant documents that accompanied the legal procedure of Directive 2004/101/EC.

In the foreword of the directive, the necessity to ensure environmental integrity through guidelines, modalities, and rules were laid out. It needed to be answered how the risks of non-permanence, additionality, leakage, uncertainties, and socioeconomic and environmental impacts are addressed. Because of the temporary nature of LULUCF projects, a review of the

directive was proposed for 2006 (Official Journal of the European Union, 2004). At COP 7 in Marrakesh, it was decided that A/R projects were allowed under the CDM with a quantitative limit. This was affirmed by the decisions of COP 9 in Milan in 2009 (UNFCCC, 2002; 2003).

While the United Nations Framework Convention on Climate Change (UNFCCC) allowed certain types of forestry projects, the EU rejected them without further notice in the linking directive. By moving forward and reviewing the proposal of the Commission, the final recommendation was to not convert credits from LULUCF into allowances because of missing permanence, uncertainties, and that A/R projects would not support new and cleaner technologies and improvements. Uncertainties refer to doubts about accounting and monitoring treatment on a project or country level (COM, (2003) 403 2003). In the Commission Staff Working Paper from 2003, the arguments were confirmed and concerns about the short eligibility period of the CDM projects were raised. These projects expired by the end of 2012, which created doubts about the continuity of the removal activities (SEC, (2003) 785 2003). Lastly, the EESC opinion, as the voice of the EU citizens, was reviewed. In contrast to the above, it did not systematically exclude LULUCF projects but encouraged the Commission to be ready for later implementation. The main argument was that it should be strived for a worldwide agreement on forests as an enabler for future integration (EESC, (NAT/205) 2003).

Based on this assessment, we conclude that LULUCF projects did not play any role in the EU ETS for offsetting purposes. Table 1 provides an overview of the above-identified risks and provides a short definition of each one of them.

Criteria	Description
Non-permanence/ reversibility	Non-permanence refers to a situation where the emission reductions or removals generated by the mitigation activity are later reversed so that they only have a temporary benefit for the atmosphere. The risk of non-permanence manifests for different reason, such as unintended natural effects, e.g. wildfires, extreme weather events or vermin infestation. It can also be caused by intended actions such as mismanagement by harvesting before the end of the project period.
Additionality	Greenhouse gas reductions are viewed as being additional if they would not have occurred without a market for offset credits. If the emission reduction occurs in any case without any prospect of a project owner to sell carbon credits, they do not count as additional. This criteria is of utmost importance for the acceptance of projects under the CDM.
Leakage	Leakage describes a situation when the level of carbon dioxide increases outside the project boundaries of the mitigation action at a given period and location. Leakage can happen due to indirect emission changes upstream or downstream the mitigation activity

	or due to rebound effects. Leakage risks also occur on a transnational scale.
Socio-economic	Socioeconomic impacts of LULUCF reflects the possible impacts of projects for local communities affected. The risk of not considering land use rights, human rights or ignoring the interests of locals can be subsumed under this category.
Environmental impacts	The ecological impacts also on biodiversity and natural ecosystems are inherent to LULUCF projects. Due to interventions in nature negative effects can occur, for instance through monoculture plantations which have a higher risk and do not positively contribute to species diversity or biodiversity in general.
Uncertainty - Accounting	Uncertainties of LULUCF projects are primarily referred to accounting and monitoring risks. Accounting refers to the rules for comparing emissions and removals as reported with commitments. A major task of accounting is to address the risks of double-counting [see separate explanations in the following].
Uncertainty - Monitoring	Monitoring generates evidence on an intervention's activity and the impacts over a period of time in a structured way. Monitoring risks apply if the data availability and data accuracy is not sufficient, data are inconsistent or different definitions lead to a lack in compatibility of data.
Double counting	Double counting can have different characteristics and facets such as through double issuance, double use, and double claiming [see separate explanations in the following]. Double counting is a situation in which a single GHGs reduction or removal is counted more than once towards achieving mitigation targets.
Double claiming	Double claiming occurs when the same emission reduction or removal is claimed by two different parties towards achieving mitigation targets. A typical situation is when the country where the emission reduction or removal projects is executed reports lower emissions and the using entity of the carbon credit.
Double use	Double use occurs if the same carbon credit is counted twice towards achieving mitigation goal. This can be understood if the buyer of a credit uses the carbon credit for cancellation under two different schemes.
Double issuance	Double issuance is a situation in which more than one carbon credit is issued for the same emission reduction or removal. It leads to double counting if more than one of these carbon credits is counted towards achieving mitigation targets.

Table 1: Risk factors of LULUCF projects<sup>1</sup>

<sup>1</sup> Own illustration. Sources: Schneider et al., 2020; Broekhoff et al., 2019; Hartmann et al., 2011; IPCC, ND; Böttcher et al., 2019)

## 4 Voluntary carbon credits

Carbon credit markets exist basically in two different forms, the compliance markets and the voluntary markets. We now shift our focus to the development of voluntary carbon markets. Offsets that are intended to be used within the compliance market need to fulfill the criteria under the United Nations Framework Convention on Climate Change (UNFCCC), the Kyoto Protocol mechanisms, or any other regional, national or subnational program or ETS (Schmidt et al., 2015). The voluntary carbon credit market, in comparison, is by far less regulated and is characterized by many suppliers of Verified Emission Reductions (VERs). However, these are generally not eligible for being used as offsets in the compliance markets (Elyse et al., 2018).<sup>2</sup>

The market is characterized by a high degree of fragmentation of available standards, with well-known standard setters and managing players such as CDM, Gold Standard or the Verified Carbon Standard by Verra. A prerequisite for a functioning voluntary market is mutual trust that real emission reductions or removals have been achieved (Dufrasne, 2020a). By comparing compliance and voluntary carbon markets, a high degree of dependence was observable in the past when CDM projects were allowed under the EU ETS by watching the development of volumes and prices (IFF, 2021). The overall voluntary market development and the accessible projects for reducing and removing carbon dioxide emissions are positive and increased over the last years. In 2019 the market size of traded values for VERs was \$296 million, in 2020 \$473 million, and for 2021 it exceeded \$1 billion (Forest Trends' Ecosystem Marketplace, 2021a). Within the different product categories such as forestry and land use, renewable energy, energy efficiency, and fuel switches, agriculture or waste disposal, forestry and land-use projects have a market share of around 60% of total offset transaction in the year 2020, followed by renewable energy projects with around 20%. An increasing price development also backs up the higher transaction volume for many types of credits due to a tightening supply. Based on forestry and land-use credits, the average price per 1tCO<sub>2</sub>e increased from \$3,85 in 2017 to \$4,33 in 2019 and \$4,73 in 2021 (Forest Trends' Ecosystem Marketplace, 2021a).

We can see the growing importance of forestry in the voluntary market, forming the most significant part of NBS. Research conducted by McKinsey & Company (2021) concluded that in line with the 1.5°C goal, the demand for Nature Climate Solution (NCS) based credits would need to increase to 7 Gt CO<sub>2</sub> by 2030. Assuming a \$20 per ton pricing level would translate to a market size of up to \$100 billion per year in 2030, or a 100-fold increase relative to the current market size in less than ten years.

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<sup>2</sup> The most important exception is the California Cap-and-Trade system that allows the use of carbon credits resulting from forest projects up to a certain percentage. However, only domestic projects are considered.

## **5 Results and discussion**

### **5.1 Results from the current position of the European Union**

One of the striking insights from reviewing the EU's climate strategy in Section 2 regards how the EU is structuring the fight against climate change: it refrains from a global policy approach and focuses on the EU itself. This assessment is derived from the decision to exclude LULUCF right from the beginning from the EU's main instrument, the ETS. Instead, a European Union-centric regulation for forestry, land use, and land-use change was adopted. However, the EU's decision to phase out the acceptance of any international credits for compensation purposes within the EU ETS for the trading period 2021–2030 contradicts the aim to enact with international partners in close cooperation by making use of all available instruments (European Commission, 2021f).

Adding a different perspective of the EU's decision to refrain from international carbon credits, it is important to look at it from a corporate level. The increased efforts to reduce emissions within the EU sectors (Power, Industry, and Aviation) through the European Green Deal forces the regulated companies to make substantial investments in new technologies with the risk of overstressing their capabilities and capacities. Allowing compensations, for instance by underwriting voluntary carbon credits, would allow the regulated companies some flexibility in making investment decisions instead of rushing them into action. Other sectors that fall under the ESR and LULUCF regulation have more flexibility due to the mutual but limited recognition of credits, increasing the inequalities between the systems.

Regarding the development of the EU ETS, the EU's action leads to a more fragmented environment. The European Commission will extend emissions trading to the Building and Road transport sector according to current plans. Instead of the integration and coverage extension of the existing EU ETS, it is foreseen to build a new separate ETS around these sectors (European Commission, 2021e).

### **5.2 Results from the development of Voluntary Carbon Markets**

In this section, we will present three arguments based on a literature review about the developments in the voluntary carbon market to rebut the concerns of the EU of using forest carbon credits in a future design of the ETS. Identifying risks associated with carbon credits is straightforward, but the implementation of mitigation and reduction measures is not. The reason is that there are technical, for instance, in the quantification of emission reductions or removals, but also behavioral obstacles that stem from information asymmetries between project de-

velopers and the buyers of voluntary carbon credits (Trexler, 2019). High-quality carbon credits are a prerequisite to scale up the volume in the voluntary market as it is aimed for by the private sector-led initiative from 2020 called the Taskforce on scaling up voluntary carbon markets (also referred to as Taskforce) (IFF, 2021).

The first argument is that unregulated procedures, standards, and methodologies, as they prevail in the voluntary market, can serve as a testing field to gain experience for a later development and integration of voluntary markets into compliance schemes. Benefits can be the high amount of flexibility and innovation, which are both not limited by strict rulesets. The development potential is further supported by regularly lower project implementation costs and lower administration costs, which enable the creation of lower-scale projects. The associated risks, such as insufficient controls, which can lead to overestimated emission reductions or removals, need to be addressed for voluntary carbon markets usage (Kollmuss et al., 2008). One manifestation of this higher risk is the lower revenue from selling carbon credits on the voluntary market compared to the compliance market. On the other hand, the higher prices on the compliance market can be used to monitor, report, and verify the prices for voluntary carbon credits.<sup>3</sup>

The second argument is that even though forest carbon credits have not been allowed in the compliance market of the European Union, the experiences from the voluntary market and the until 2020 allowed CDM projects can be used to improve the quality dimensions for a future inclusion of forestry projects under the EU ETS. In 2016 the Öko-Institut e.V. performed a study on behalf of the DG CLIMA (European Commission) on CDM projects and concluded that about 85% of the approved projects failed to meet the additionality criteria and overestimated the emissions reductions.

It is also recommended to avoid double-counting based on robust accounting rules and a time-limited role of carbon credits as a climate instrument (Cames et al., 2016). For forest and land-use projects, the risk of non-permanence, which means that GHGs emissions are returned to the atmosphere, is especially imminent. Scientifically any reduction or removal that is not guaranteed for an indefinite future is considered not permanent (Broekhoff et al., 2019). Despite the definite time horizon, a temporary storage function does provide a benefit. Nature-Based Solutions play a vital role in the climate as they provide a sink function besides other co-benefits. Preserving and enhancing these natural sinks is imperative; even if they are not forever, they allow for researching other permanent actions such as Direct Air Capture (DAC) or Carbon Capture and Storage (CCS) solutions.

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<sup>3</sup> Behr et al. (2021) analyze how important policy events affect prices on compliance and voluntary carbon markets.



And the last argument under this section is the constant further development of standards and procedures by standard setters. Providing advice and information by Non-Governmental Organizations (NGOs) that aim to ensure that high-quality carbon credits have been generated that address the main concerns and reflect other concerns like Sustainable Development Goals (SDGs). Furthermore, companies' increasing public interest and ESR pledges contribute to more pressure on related parties such as standard-setters, project developers, countries, companies, and buyers to deliver real, measurable, and verifiable voluntary carbon credits. Besides the work of the Taskforce, the World Wildlife Fund, together with the Environmental Defense Fund and Öko-Institut, is developing guidance on how to assess high-quality voluntary carbon credits. It focuses on several quality objectives: robust determination of GHG emissions, avoiding double-counting, or addressing non-permanence. In addition, it provides guidance on how to perform the transition to net-zero, solid institutional arrangements, environmental and social impacts, and host country ambitions (Schneider et al., 2021). Information and data are also vital in providing transparency and supporting future development. The non-for-profit organization Ecosystem Marketplace, as an initiative from Forest Trends located in Washington DC, collects and shares reliable data of the carbon markets, both on compliance and voluntary markets, to assist buyers of carbon credits, but also project developers, brokers, policymakers, and regulators with the information needed to develop other market-related mechanisms (Forest Trends' Ecosystem Marketplace, 2021b). These voluntary initiatives do not automatically contribute to integrating carbon credits in compliance systems but increase the likelihood of real, measurable, and verifiable offsets, which the European Union should consider for a robust compensation mechanism.

### **5.3 Results from COP 26 in 2021 and Article 6 of the Paris Agreement from 2016**

In this section, we will add on the governmental discussion of the future of international carbon markets during COP 26, which ended in mid-November 2021. Massive public interest and high expectations existed before the conference on a diverse set of topics such as the phasing out of the coal industry, finance commitments by developed countries of \$100 billion annually, the need for more ambitious NDCs, and finalizing the rulebook of the Paris Agreement.

The UN adopted a rulebook that covers various areas such as rules on transparency, finance, mitigation activities, and flexibility to reach the climate targets. It is also known as the Katowice Climate Package, released at COP 24 in 2018. No commitment on Article 6 could be reached in Katowice and the subsequent COP 25 in Madrid in 2019 did also not achieve a breakthrough. Hence, expectations were high about COP 26 in Glasgow. Article 6 of the Paris

Agreement contains three pathways with the right for voluntary cooperation of Parties to allow increased ambitions and promote sustainable development and environmental integrity (Article 6.1) (United Nations, 2015). Environmental integrity is not defined within the Paris Agreement but according to Schneider and La Hoz Theuer (2019) needs to address the issues of accounting for transfers, ensuring unit quality, the ambition and scope of the NDCs targets from a transferring countries perspective as well as (dis)incentives for future mitigation actions. Article 6.2 recognizes countries using Internationally Transferred Mitigation Outcomes (ITMO). Article 6.4 intends to create a centralized crediting mechanism that supports sustainable development (SDM)<sup>4</sup>. The ITMO character of Article 6.2 allows setting up a carbon market where countries can sell surplus emission reductions to other countries by means of bilateral agreements. Due to the decentralized nature of this mechanism, it bears the risk of not meeting environmental integrity and quality as it is not regulated under the authority of the COP. Transferable mitigation outcomes in the sense of Article 6.2 can comprise EU-Allowances (EUAs), Reduction of Emissions from Deforestation and Forest Degradation and the role of conservation, sustainable management and enhancement of forest (REDD+) projects, and the linking of ETS.

In contrast to this, the Article 6.4 mechanism is under the authority and guidance of the Conference of Parties serving as the meeting of the Parties to the Paris Agreement (CMA). As such, it is comparable to the Kyoto Protocol mechanism CDM, where the procedures and rules are unified for all Parties. The additional ambition of emissions reductions is associated with this mechanism with achieving an absolute reduction of GHGs emissions on a global balance (Marcu, 2016; 2017; Dufasne, 2020b; Comstock et al., ND; Roth et al., 2019).

The very positive result from COP 26 is that a consensus could be achieved on Article 6 after more than six years of negotiations. This was announced by the UN on November 13th, 2021 (UNFCCC, 2021a). It is to be noted that Article 6 and Article 13 of the Paris Agreement on an enhanced transparency framework are interlinked as they form the critical basis for the reporting requirements and trust-building action. The Parties must report under Article 13 on the essential issues of avoiding double-counting, ensuring environmental integrity, and promoting the SDGs (UNFCCC, 2021c).

In the advance unedited version 12a, 12b, 12c from 13th and 14th November 2021, the decisions made by the CMA on Articles 6.2, 6.4, and 6.8 got published. For ITMO's as well as for the NMM and the SDM, corresponding adjustments were decided. Corresponding adjustments mean that if one party transfers a mitigation outcome to another party, that this transferred reduction or removal is not counted towards the host parties' targets or NDCs. This is a

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<sup>4</sup> Article 6.8 foresees a non-market-related provision, but this is not discussed in detail in this paper.

critical achievement, as countries like Brazil fought against this principle, to reduce the risk of having more difficulties achieving their NDC targets.

Moreover, the extent of the corresponding adjustments was intensely discussed, and it was decided that it would be complied with for international transfers outside the host country's NDCs. Moreover, the principle is extended to carbon credits sold under voluntary carbon market schemes to private or public parties located in a different country. For Article 6.4, a mandatory share of proceeds was negotiated, where 5% of the revenues from issued credits are paid into an Adaption Fund. To achieve more overall global emission reductions, it was decided that a further mandatory 2% of the issued credits are directly canceled. Such regulation was not achieved under Article 6.2; participating parties are only encouraged to contribute to the Adaption Fund voluntarily (UNFCCC, 2021b; 2021d). There is criticism about the results of Article 6 of the Paris Agreement that the rules do not avoid double-counting entirely or that environmental integrity is ensured. Already issued carbon credits under the CDM (after 2013) can be used to offset future pollution, which is critical. Compromises belong to international agreements and cannot be fully avoided. Nevertheless, it is remarkable that after this long period, an agreement was achieved and further improvements by the Subsidiary Body for Scientific and Technological Advice, the newly initiated Supervisory Body, and the introduction of a grievance process will help to ensure the robustness of the mechanism of Article 6.4 (UNFCCC, 2021d). The results from COP 26 are of high relevance as they present a common ground for the international community for robust and standardized rules. From the perspective of the EU, this provides a higher certainty to meet emission reduction targets.

## **6 Conclusion and policy implications**

Climate change is a global threat to the economy and the civil society and, as such, requires global cooperation, including large-scale fund flows into developing countries. This paper outlines that carbon credits from tropical forest projects form an ecologically effective and economically efficient market-related instrument to achieve this objective. We have shown the increasing significance of the voluntary carbon market and the efforts by private-led institutions like the Taskforce to scale up the volume of voluntary carbon credits. Strong policy is mandatory to impede the risk of being stuck between credibility and feasibility risks of the voluntary market due to the new Paris Agreement era (Kreibich and Hermwille, 2021). Further scaling of the voluntary markets along with the potential of current regulatory decisions can lead to the integration in the compliance markets system of the EU. Only real, measurable, and verifiable offsets shall be eligible for compensation purposes which need to be safeguarded by rigorous rules, processes, and procedures.

We see the conditions for a successful reflection of tropical forest credits in compliance emission markets, both at the level of the European Union and worldwide<sup>5</sup>, as available but not utilized. Despite there being no perfect solution for avoiding all offset related risks to a full extent, significant improvements have been made to foster collaboration. This enables to take timely action.

We provide a critical perspective of the role of tropical forest carbon credits in the EU and rethink the future path of the EU by learning from the voluntary carbon market and COP 26 decisions. Forests act as a natural sink, removing the largest source of GHGs emissions out of the atmosphere and further providing a variety of co-benefits. The latest IPCC report from August 2021 proved humans' contribution to global warming and sent out an alarming signal that meeting the Paris Agreements 2 °C, respectively 1,5 °C, is not achievable with the current nationally determined contributions. The EDG sets a higher ambition in the reduction of GHGs emissions and presents a path to net-zero by 2050. At the same time, we showed that the strategy is EU-centric, as the three main instruments – the EU ETS, the LULUCF, and the ESR – focus solely on the territory of the EU.

We depicted how the EU ETS's primary instrument evolved regarding the eligibility of offsetting using forestry projects. These never played a role in the compliance scheme. In parallel to the compliance scheme, voluntary carbon markets evoked as decentralized and unregulated markets and increased with a significant upward slope over the recent years. Forestry projects are the largest project type in voluntary carbon markets. We also laid out that achieving the 1,5 °C target would require a 100-fold increase in NBS related offsets by 2030.

We further argued that the EU's climate strategy is increasingly fragmenting the market by planning new ETS without any international credits for usage. This will be an enormous burden for regulated corporations and cause inequality amongst sectors, which are not regulated under the ETS. We also outlined that the risks associated with forestry projects can be addressed, especially on voluntary carbon market initiatives striving for high-quality carbon credits. Even if they occur in the voluntary markets, they can provide essential insights for compliance purposes. Finally, we discussed the results from COP 26 on the fundamental Article 6, which came to a fairly positive end after six years of negotiations. While the guidance and procedures need to be tailored and improved further, a breakthrough was reached by agreeing on applying the

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<sup>5</sup> The Korea Emissions Trading System is the only ETS allowing international offset credits being used under the ETS for compliance. Up to 5% of the compliance obligation can be met by either using domestic or international offsets (trading phase 2021–2025). International carbon credits under the CDM need to meet additional qualitative criteria, that encompass an active role of Korean companies or national/ regional government in the offset projects (ICAP, 2021).

corresponding adjustment principles to foster environmental integrity by fighting double counting.

Learning from the experiences and flaws of the CDM in the past, the work and experiences on the voluntary market or from other compliance carbon markets around the globe, own improvements made to the system, e.g., by the introduction of the Market Stability Reserve and the rulebook of Article 6 and 13 of the Paris Agreement, form a robust basis for changing current legislation and allowing forest carbon credits for offsetting. Global costs to address climate change is estimated to be in the range of \$1.6 to \$3.8 trillion per year (Ecosystem Marketplace, 2019). The value of compliance carbon markets in 2021 was \$759 billion, much larger than voluntary carbon markets in 2021 (around \$1 billion). It immediately becomes evident that emissions trading does make a big difference, but it is not enough. Furthermore, the EU alone cannot solve the problem of global warming. Nevertheless, it plays a crucial role and by reconsidering tropical forest carbon credits for the use in the compliance market, it can send out a positive signal to other countries' ETS. Developing countries, such as Brazil and Columbia, would emerge as large sellers of credits from land-use and land-cover changes (LULCC), mobilize billions of dollars and finance excellent change options to protect tropical forests. The public-private Lowering Emissions by Accelerating Forest finance (LEAF) Coalition collected \$1 billion for tropical forest protection in an unregulated voluntary carbon market, which is an outstanding effort. However, compliance markets are and will remain much bigger in the foreseeable future (Levy, 2021).

In July 2021, the European Commission proposed amending the emissions trading system and suggested increasing the LRF of the allowance cap from 2.2% annually (minus 48 million allowances annually) to 4.2% annually as part of the Fit For 2030 package. This would impact the allowances available and increase efforts to reduce emissions for all regulated companies. In the trading period 2013–2020, the LRF was 1.74% annually (minus 38 million allowances annually), which means this proposal foresees a second adjustment in the current running phase. The objective of the European Commission with this proposal is an overall reduction target of 61% (by 2030) compared to 2005 (COM, (2021), 551 final 2021). A recent study from Zaklan et. al (2021) conducted that a significant adjustment of the LRF of at least 4% from 2021 onwards is required in order to meet the 1.5°C path. If the proposal enters into force and after applying a one-off downward adjustment of the cap, balancing the delayed start of the LRF increase after the year 2021, the emission cap will be zero in 2040.<sup>6</sup> This means that regulated companies need to decarbonize all their emissions until then. It is hardly imaginable

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<sup>6</sup> This is assuming no further adjustments to the LRF following the Commission's proposal from July 2021 and a linear reduction of the cap. Remaining certificates per end of the year 2020: 1,816,452,134, annual cap reduction: 92,361,973 certificates.

for sectors such as the cement industry to reach this ambitious goal without compensation by carbon credits. We suggest making the additional 44 million annual allowances<sup>7</sup> from the increasing ambition eligible for high-quality carbon credits for offsetting purposes.

Integrating forest carbon credits into compliance regimes requires pre-defined quality criteria through an internationally confirmed standard. The decisions of Article 6 encourage parties to participate in developing the methodologies, which are subject to the next COP in Egypt at the end of 2022. However, the Annex of Article 6 limits the crediting period depending on an emissions reduction or removal. According to it, forest carbon credits shall be limited to a crediting period of issuing Article 6.4 emission reduction (A6.4ER) ERs of 15 years with a maximum of two renewal periods (UNFCCC, 2021b). A similar concept was applied to certain types of projects of CERs issued under the CDM mechanism. Temporary CERs (tCERs) or long-term CERs (ICERs) have been issued for forestry projects. Temporary CERs expired at the end of the commitment period following their issuance. To further increase the quality of a carbon credit by mitigating the non-permanence risk, the EU can consider supplementing the offsets by a post-purchase obligation and a post-liability agreement. The post-purchase responsibility makes the certificate buyer liable for buying a new carbon credit after the initially bought credit expires. The company needs to buy EUAs or reduce the additionally adjusted tons of carbon dioxide from the resurrected offset. In order to guarantee that voluntary carbon credits result in real and measurable emission reductions or removals, the seller, e.g., a local project developer, of carbon credits should deliver a post-liability agreement in exchange to get access to higher prices on the compliance market. Building a mandatory reserve can also function as a safeguard in the case of a threatening bankruptcy. We recommend that the EU mandates the ECCP for a detailed assessment of all Article 6 provisions for application to tropical forest offsets. Additional needed safeguards should be shared with the supervisory body of Article 6 for reflection in the harmonized standard. In case of dissent at the CMA level, the EU can utilize the adjustment for own compliance purposes.

Finally, we agree with Broekhoff et al. (2019) that "there is no single silver bullet approach to solving climate change [...] coordination between voluntary actors and governments will be essential for ensuring a strong collective response to climate change. Carbon credits should be seen as one element of this collective response, not a solution by themselves".

The EU as the pioneer of the cap-and-trade system should take the opportunity provided by the results of COP 26 in Glasgow and reconsider the utilization of carbon credits, primarily

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<sup>7</sup> Current annual cap reduction: 48,380,081 certificates (equal to LRF of 2.20%) (Umweltbundesamt, 2021) Underlying basis for reduction: 2,199,094,598 certificates. Anticipated new annual cap reduction: 92,361,973 certificates (4.20% of 2,199,094,598). Annual difference between current and anticipated cap reduction: 43,981,892 certificates.

from international forests, for being eligible in a limited quantity in the compliance system. The Directive 2003/87/EC has been amended ten times up to 2021; the 11th adjustment could be a win-win-win situation for global forests, regulated companies, and the civil society in fighting climate change.

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