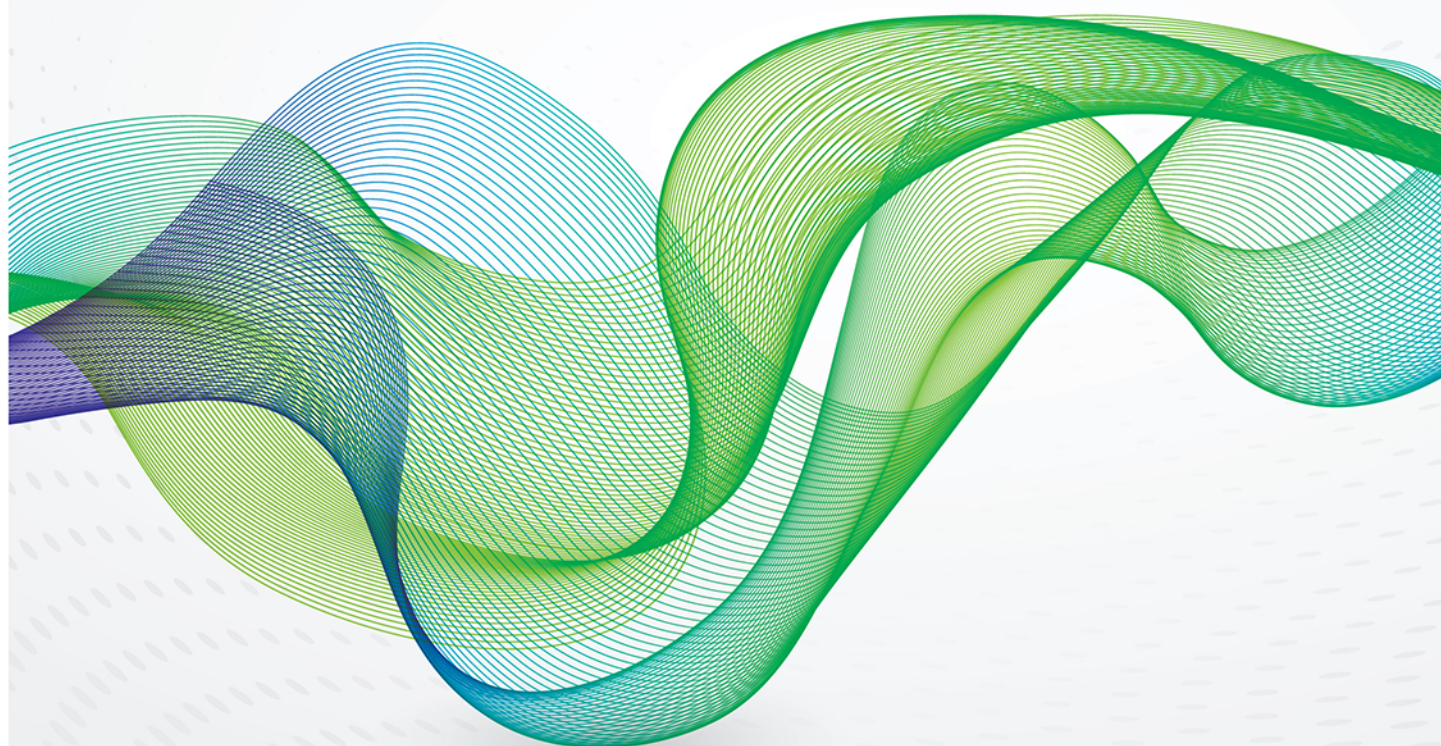
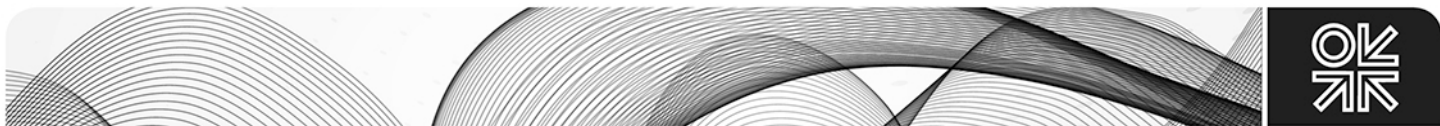


November 2023

How Carbon Trading Can Unlock Carbon Dioxide Removals





Introduction

Carbon trading has long been identified as a key policy tool as part of a broader policy framework to help achieve the goals of the Paris Agreement. With COP28 scheduled to take place in UAE later this year, there is much interest in carbon markets and the role of carbon removals. Multiple Article 6 memoranda of understanding (MOUs)¹, which are the first step to allow international carbon trade, have been signed and many more are anticipated in the future.

However, universal acceptance of carbon trading² as a key tool for raising climate ambitions remains a challenge. In this Energy Comment, the importance of carbon trading and the challenges it faces are presented including how carbon trading can help countries achieve net zero. In particular, based on a combined academic and industry review, this article focuses on the importance of carbon dioxide removal (CDR) activities³ and examines the role that carbon trading can play in unlocking their potential and highlighting, as a top priority, the need for carbon removal projects to be internationally recognized and supported particularly within Article 6 of the Paris Agreement. The article concludes with key policy recommendations including:

- a) recognizing that trading of CDRs should be identified as one of the key levers to achieve decarbonization
- b) technology has an integral role to play towards improving the deployment of CDRs through carbon markets, and
- c) capacity building across stakeholders is key for further deployment.

Carbon trading and challenges

Carbon trading is not a new or novel mechanism to mobilize decarbonization efforts. Carbon trades took place under the Kyoto Protocol in the 1990s. Based on past experiences with Kyoto's Clean Development Mechanism (CDM), international carbon trading now also features as an important part of the Paris Agreement, specifically within Article 6. Under Article 6, countries can pursue collaborative approaches as part of their nationally-determined contributions (NDCs). Although the Paris Agreement was adopted in 2015, it was not until COP26 in Glasgow (2021) that significant progress was made where countries agreed to rules to operationalize Article 6 (also known as The Rulebook).

Since then, there has been a considerable amount of interest from countries in trading carbon, materializing in numerous bilateral agreements and memoranda of understanding (MoUs) between host and purchasing countries. This showcases their commitment towards operationalizing the first step to allow for large-scale international carbon trade. Figure 1 provides an overview of such current agreements. In parallel, more countries are today adopting carbon pricing as a tool to assist decarbonization efforts. For instance, in the early 1990s, no more than 1% of emissions were priced whilst today approximately 25% of global emissions are priced through government-based mechanisms⁴, be it a carbon tax or under an emissions trading system (ETS) (Figure 2).

¹ Article 6 has two clauses. Article 6.2 helps facilitate government to government trade and Article 6.4 aims to develop a new international mitigation mechanism to help countries reduce emissions and promote sustainable development. The MOUs referenced in this paper are with regards to Article 6.2.

² Carbon trading can refer to trading of emission allowances – or 'permits' – within emission trading systems (ETSs) (compliance markets) or the trading of emissions reduction, emission avoidance or carbon removal credits on the voluntary market or through Article 6.

³ A carbon dioxide removal activity is defined as an activity or project type which absorbs more carbon dioxide from the atmosphere than it releases, leading to a net negative impact on emissions balance.

⁴ Source: World Bank Carbon Pricing Dashboard

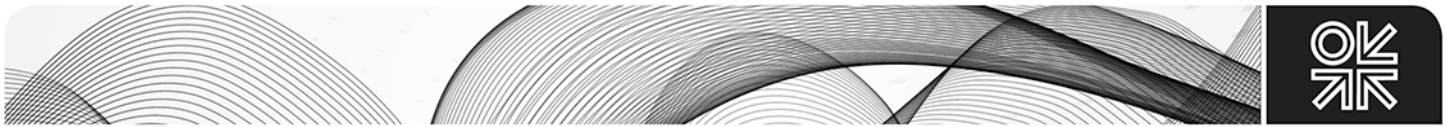
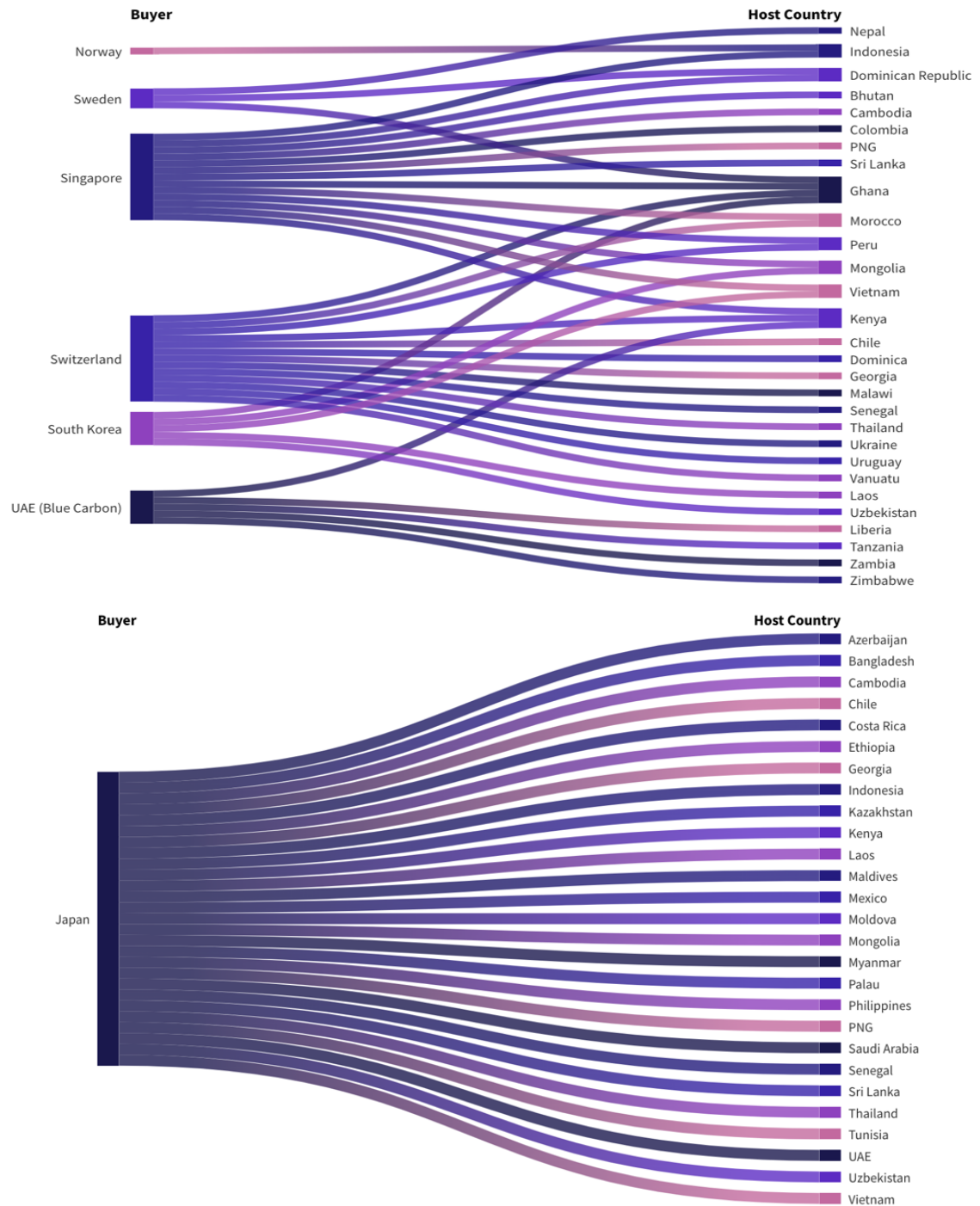


Figure 1: Overview of international bilateral agreements as part of Article 6.



Source: IETA

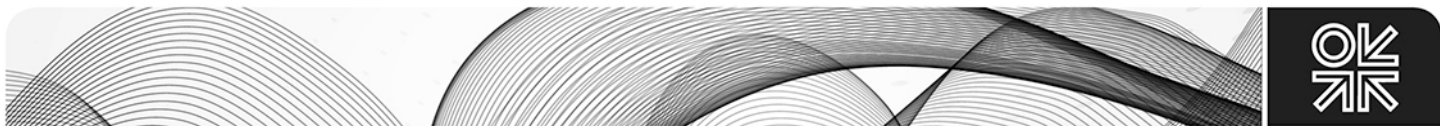
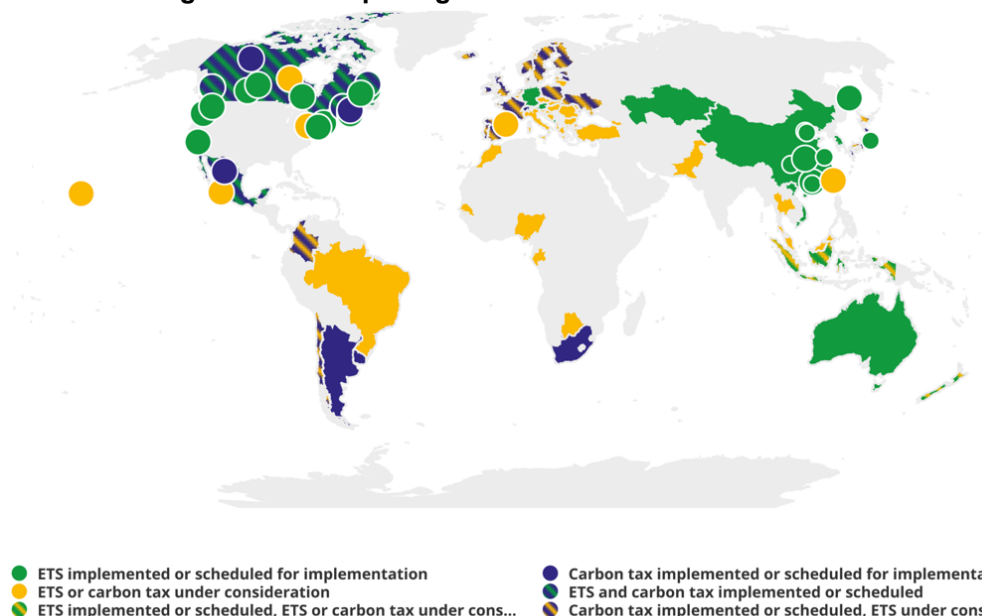


Figure 2: Overview of global carbon pricing mechanisms.



Source: World Bank's Carbon Pricing Dashboard

However, many challenges remain. Various aspects of Article 6 still need to be resolved which is creating much uncertainty. Questions that persist in the latest negotiations revolve around matters of authorization, whether emissions avoidance activities should be included within the scope of Article 6, interaction between Article 6 and independent carbon credit registries and with the voluntary carbon market, revocations and insurance, developing and adopting appropriate methodologies, amongst others. The scope of this Energy Comment is not to address these issues – but to recognize they exist.

Additionally, carbon trading can be technically challenging and difficult to administer. How can countries ensure that they are buying credits at the right price or not underselling the value of their credits over time? Developing a national strategy to decarbonize and subsequently establish how/where credits are most relevant/appropriate over a ~25-year horizon is a strategic and a technical challenge.

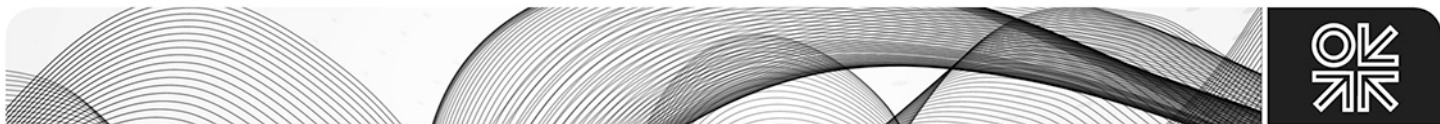
Another key issue which remains and which was indeed one of the key takeaways from COP27 discussions is how carbon removal activities should be treated under Article 6. Carbon removal is one of the tools required as part of an overall decarbonization strategy that carbon trading can help unlock. The following section explores its significance.

The importance of carbon dioxide removals

The latest IPCC Synthesis Report states:

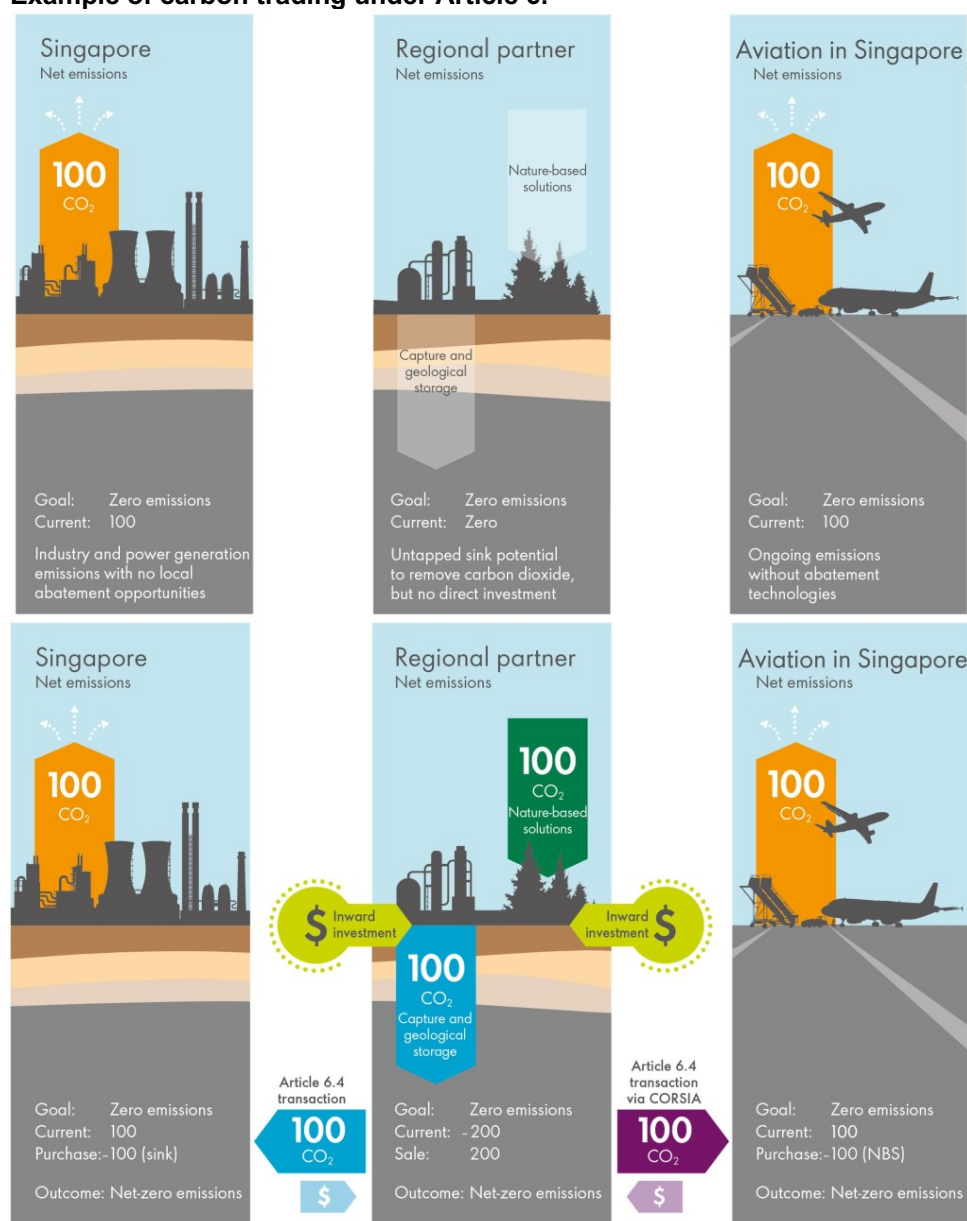
Global modelled mitigation pathways reaching net zero CO₂ and GHG emissions include transitioning from fossil fuels without carbon capture and storage (CCS) to very low- or zero-carbon energy sources, such as renewables or fossil fuels with CCS, demand-side measures and improving efficiency, reducing non-CO₂ GHG emissions, and CDR. In most global modelled pathways, land-use change and forestry (via reforestation and reduced deforestation) and the energy supply sector reach net zero CO₂ emissions earlier than the buildings, industry and transport sectors.

The main takeaway is that CDR solutions – whether engineered, such as direct air carbon capture and storage (DACCS), or natural, such as reforestation or reduced deforestation – are required to meet net zero goals.



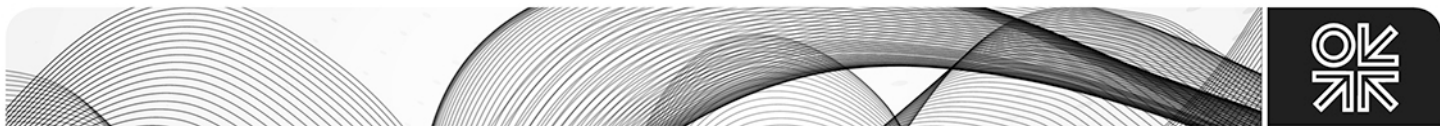
However, what the above does not recognize is that not all countries will have the same access to or capacity to develop these CDRs. This is where trade becomes relevant. As an example, Singapore is a nation that has announced a mid-century net-zero target – but has limited CDR capacity (engineered or natural). In such instance, and in order to achieve net-zero, carbon trading with partners in other host countries will be required. Specifically, while Singapore invests in a trade partner's CDR (e.g. engineered or natural), the trade partner, through the investment, is able to create jobs and support their local economy, while contributing towards Singapore's NDC (where credits are correspondingly adjusted and double counting is avoided). On a higher level, this allows countries to explore and invest in projects with the lowest costs of abatement, while creating opportunities for both parties. This win-win scenario is illustrated in Figure 3.

Figure 3: Example of carbon trading under Article 6.



Source: Shell⁵

⁵ <https://blogs.shell.com/2023/05/30/without-article-6-there-may-be-no-1-5c-or-even-2c/>



The positive is that a market for removals, whether tech- or nature-based, has finally picked up and that DAC, a climate solution once thought too expensive to pursue, is seeing a surge in demand. In part, this is due to its high permanence of removal but also to its potential effectiveness in addressing legacy emissions, which has made it a necessary inclusion in the IPCC's 1.5°C climate scenario. The emergence of different marketplaces is also a clear signal that a market for removal- based credits exists.

The challenge is that at least half of the pre-purchase orders (involving DAC and concrete mineralization) will take four to five years to fulfil and so they will not contribute to immediate climate action. What's more, of the 4.8Mt of total CDR purchases, only 2.4% have been delivered as of October 2023.⁶ The market is still limited to a very select number of suppliers and large corporate buyers with voluntary climate targets, such as Shopify, Microsoft, Swiss Re, Stripe, and JPMorgan Chase. The development of different standards and removal methodologies also risks creating fragmentation and confusion in the market if they are not properly aligned across different verification bodies and the Paris Agreement.

The policy landscape, whether compliance, voluntary, or Article 6, is also evolving. At the CDR project level, this is where quality assessment standards such as the ICVCM's Core Carbon Principles (CCPs) come in. The CCPs - published earlier in 2023 - set new threshold requirements for what is considered 'high-integrity' carbon credits based on several quality criteria. At the policy level, the EU made the first attempt in 2023 at creating a framework around carbon removals with similar quality considerations, with the Carbon Removal Certification Framework (CRFC) Bill having been passed in the European Parliament's cross-party environment committee in October 2023. The CRFC will allow participants to apply for harmonised and reliable certification to secure public and private funding and use voluntary carbon markets to raise financing for high-quality carbon removals; however, certified carbon removals cannot be used for compliance with the EU ETS. The announcement is considered very timely and should set the scene for increasing momentum and scale up of CDR developments at COP28. In parallel, the Supervisory Body of the Article 6.4 mechanism is developing rules, modalities and procedures for activities involving carbon removals. The recommendations should provide guidance on monitoring, reporting, accounting for removals and crediting periods, addressing reversals, avoidance of leakage, and avoidance of other negative environmental and social impacts.

Policy Recommendations

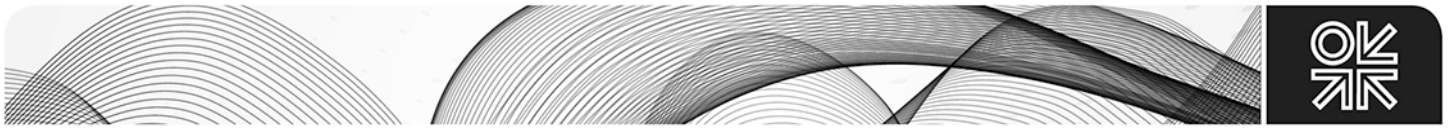
Based on CDR market's status quo, we make a number of policy recommendations.

The first is to recognize that not all CDRs will be distributed equally. Areas where nature-based and engineered solutions exist will depend on geology, climate, and land area. Trading of CDRs will help alleviate consequences of this uneven distribution and should as such be identified as one of the key levers to achieve decarbonization. This includes for the IPCC to recognize that country-to-country carbon trading is required to meet the goals of the Paris Agreement, including emphasizing the role of Article 6, which at present it does not.⁷

Second, for CDRs to be deployed at scale, technological advances in digital infrastructure and trading platforms, has an integral role to play to improve their integration within carbon markets. One of the reasons that carbon markets may not have seen the uptake that is needed is because it is tool that can be complex to administer and technically challenging to implement. Technology has the potential to

⁶ Source: www.cdr.fyi

⁷ The IPCC report does state the below – but does not make reference to carbon trading between countries: *Regulatory and economic instruments could support deep emissions reductions if scaled up and applied more widely (high confidence). Scaling up and enhancing the use of regulatory instruments can improve mitigation outcomes in sectoral applications, consistent with national circumstances (high confidence). Where implemented, carbon pricing instruments have incentivized low-cost emissions reduction measures but have been less effective, on their own and at prevailing prices during the assessment period, to promote higher-cost measures necessary for further reductions (medium confidence). Equity and distributional impacts of such carbon pricing instruments, e.g., carbon taxes and emissions trading, can be addressed by using revenue to support low-income households, among other approaches.*



leapfrog these obstacles by identifying which CDR technologies can be used for which sectors, identifying where carbon trading is relevant, and establishing bilateral agreements that benefit both nations. Examples such as the Climate Action Data Trust which offers a minimized, blockchain-powered digital infrastructure to connect registries and provide public access to information can help harmonize markets, increase transparency of carbon credits, minimize risks of double counting, and enhance overall integrity in the voluntary carbon market. Announcements that the UAE has made to develop a national system for carbon credits using blockchain technology is one such example of technology's role in mobilizing this market.⁸

The final note concerns the significance of integrated capacity building – across government, private sector, NGOs, and relevant stakeholders. The ongoing energy transition differentiates itself from previous transitions in that it will be actively managed – and greater understanding and integration across sectors and participants will be required. This entails for governments to establish frameworks with input from all the relevant sectors, including the private sector, academia, and customers, to ensuring that carbon trading platforms are operating in a framework that helps achieve the goals of the Paris Agreement in the most effective manner.

⁸ Gulf Business (2023). UAE to develop national system for carbon credits using blockchain.