Policy brief

Towards a Net Zero Aligned Paris Agreement Crediting Mechanism

Summary

- The Paris Agreement Crediting Mechanism (PACM) is a new global carbon trading system that is designed to help both countries and corporates raise their climate ambition by financing projects in return for carbon credits, which they can claim towards their own targets or as a contribution to climate mitigation.

- The PACM's rules were designed to avoid flaws from earlier international carbon trading mechanisms which were alleged to have financed 'hot air' as opposed to real climate mitigation. However, in some important ways, the PACM could set a weaker climate standard than its predecessor under the Kyoto Protocol.

- As a result, there is a risk that the mechanism could undermine the work needed to achieve global net zero, which requires us to remove all emissions we put into the atmosphere. Evidence from the first tranche of projects seeking to transition or be developed under the PACM confirms this risk.

- For the PACM to help rather than hinder the delivery of net zero we recommend that separate targets to reduce and remove greenhouse gases from the atmosphere be initially adopted before transitioning the mechanism to one that finances only greenhouse gas removals, and ultimately to one that finances only permanent removals. In tandem, we recommend the Paris Agreement's other financing levers be fully utilised to finance emission avoidance and reduction projects, as well as more temporary forms of carbon removal.

- Considering the voluntary nature of the mechanism, PACM actors could choose to undertake such a transition themselves. Beyond this, the official review of the mechanism in 2028 will present a further opportunity for more structural reform.

- Transitioning the PACM in the above way can encourage more effective use of all financing mechanisms under the Paris Agreement to deliver a net zero future. Placing constraints on the nature of credits traded via the PACM can also ramp up domestic mitigation efforts and help promote a rising tide of ambition across other carbon markets.

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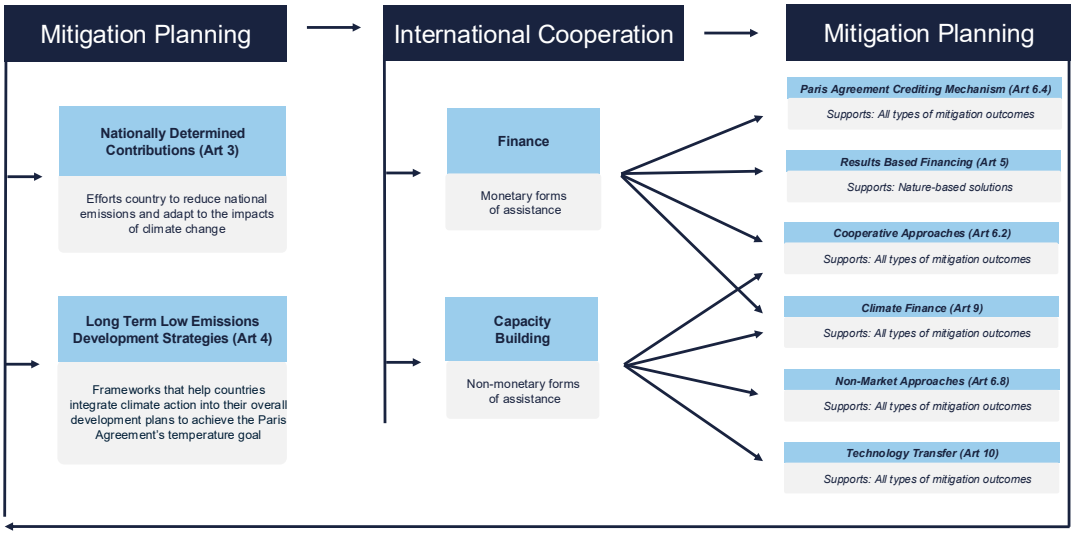
The PACM is one of the Paris Agreement's pathways to net zero

The Paris Agreement sets a goal to achieve a balance between the human-caused sources of greenhouse gas emissions and activities that remove them– otherwise known as a state of net zero.[1] It has many levers designed to achieve net zero. As Figure 1 illustrates, the Paris Agreement Crediting Mechanism (PACM) under Article 6.4 is one of them.

Figure 1: Levers to scale climate mitigation projects under the Paris Agreement



Source: Authors

This brief considers why and how the PACM can be a useful tool in reaching net zero, by contributing to the necessary scaling of removal activities stipulated under all Paris-aligned scenarios.[2] First, it unpacks the role of removals in reaching net zero. It then reviews the evolution of international carbon markets to date and how they have influenced the formation of the PACM. Next, it explores concerns over the PACM's ability to scale removals given its current design and projected practice under it. It then proposes a three-phased approach for PACM to be reformed in future. Finally, it explores specific implementation pathways for this future and what benefits it could bring, illustrating the critical role of policymakers and market participants in the PACM's success.

Permanent removals are critical to reaching durable net zero

The vast majority of the work to reach net zero– including under the Paris Agreement– should come from deep emissions cuts. However, there is a growing "carbon removal gap" that needs to be addressed in tandem. [3] Carbon removal refers to "human activity that captures CO2 from the atmosphere and stores it for decades to millennia".[4] Carbon removal encompasses a range of conventional and novel pathways. Conventional carbon removal includes activities that enhance an existing carbon sink, such as planting trees or restoring wetlands. Novel pathways include engineered approaches to capture and store carbon, such as direct air carbon capture and storage, bioenergy with carbon capture and storage, and biochar. Typically, novel carbon removal methods are more durable than conventional carbon removal methods due to a lower risk of reversal and are thus typically referred to as "permanent removals".[5] **Permanent removals play a critical role in reaching a durable state of net zero, as they are the only tool we have to effectively neutralise residual fossil-based emissions and clean up legacy carbon.**[6] About 2 billion tonnes of carbon removal already occurs annually around the globe, nearly all of it from planting trees.[7] Yet, we need an additional 5-7 billion tonnes of both conventional and permanent carbon removal by mid-century in order to limit warming to within the goal set by the Paris Agreement.[8] The gap between current levels of deployment and the amount needed by mid-century is known as the "carbon removal gap". This gap continues to grow the longer that we fail to swiftly cut emissions.[9] Therefore, action is needed to develop a broad portfolio of carbon removal pathways, particularly for permanent carbon removals.

The carbon market has been catalytic to financing permanent removals to date, a considerable feat considering that conventional carbon removal on average costs 3x more than traditional emission avoidance and reduction carbon credits and permanent carbon removals 100x more.[10] In order to scale up removal capacity, financing designed to unlock high ambition projects is needed. The PACM is best positioned to serve as a core international financing mechanism for permanent CDR due to Article 6's explicit aim of promoting "higher ambition".[11]

The PACM is also more regulated than the fully flexible voluntary carbon market (VCM) and provides a more robust methodological baseline than the Article 6.2 framework, under which trading terms remain subject to Parties' discretion. But to achieve this goal, the PACM needs to learn the lessons of the past, which we consider in the next section.

> *Some aspects of market-based mechanisms under the Paris Agreement might risk being less ambitious than those under the Kyoto Protocol*

The PACM was intended to build on the legacy of the Kyoto Protocol's Clean Development Mechanism (CDM) which issued carbon credits in the form of Certified Emissions Reductions (CERs) and temporary Certified Emissions Reductions (tCERs). Mirroring the structure of the CDM, the PACM is a centralised mechanism which issues carbon credits known as "A6.4 ERs" and is overseen by the Article 6.4 Supervisory Body. However, despite the CDM being overseen by an Executive Board, this was not enough to prevent it suffering from a range of integrity issues – from a lack of environmental integrity of the credits it issued to the social harms for impacted communities.[12] These issues indicated a need for an improved benchmark for international carbon credit trading under the Paris Agreement, leading to several years of intractable negotiations under Article 6 of the Paris Agreement, before the initial framework for the PACM was concluded at COP26 in 2021 and agreement on all key elements reached at COP29 in 2024.[13]

The PACM aims to set a higher bar than the CDM in terms of the rigour of the carbon crediting methodologies it accepts to generate A6.4 ERs.[14] **Importantly, the PACM was also the first international mechanism which recognised that the use of carbon credits should not be a zero sum game, but should instead contribute to overall mitigation in global emissions**. Under the PACM's rules, whenever A6.4ERs are internationally traded, 2% are automatically cancelled for overall global mitigation goals and a further 5% are used to generate a share of proceeds to the Adaptation Fund. However, a review of the key architecture of both mechanisms suggests that the CDM rules were– in some important ways– more aligned with an end state of net zero than the PACM, as the former differentiated between project types and durability levels in a clearer manner (see Table One).

Table 1: Comparison between the CDM and the PACM from the Perspective of Net Zero Alignment

Clean Development Mechanism (Kyoto Protocol)	Paris Agreement Crediting Mechanism (Paris Agreement)
Distinguishes on a unit level basis between permanent and temporary outcomes in the form of CERs and tCERs.	**Does not distinguish on a unit level basis between different types of projects or their durability:** Subject to a methodology being approved by the Article 6.4 Supervisory Body, all types of avoidance, reduction and removal projects could be eligible to produce A6.4ERs without reference to their durability characteristics.
Excluded nature based avoidance projects from crediting due to concerns over rigour. Instead recognising these programmes (known commonly referred to as REDD+) as adaptation rather than mitigation.[15]	**Introduces options to address the risk of reversal of A6.4ERs** whether they are carbon which applies to all types of removals, with no differentiation on their level of durability.
Clear steps to address the reversal risk of temporary removals by requiring tCERs to be replaced upon their expiration to reflect the temporary nature of conventional forms of carbon removal.	

Source: Authors

Practice thus far underscores concerns over the PACM's ability to deliver on net zero targets

While many actors consider the PACM to be a new age of integrity in international carbon trading, there have been concerns regarding its design and application in practice. Such concerns stem primarily from the significant degree of carryover of legacy CERs from the CDM into the new system as well as from the lack of incentives to develop a transitional portfolio of carbon removals over time.[16]

- **Legacy Credits from the CDM**: Up to 940 million tCO2e of legacy carbon projects have applied for transition from the CDM, with household energy efficiency, wind and hydropower projects making up the majority.[17] A recent peer reviewed study has found that the vast majority of credits in these project types did not deliver their promised emission reductions.[18] While not all of these projects will ultimately be transitioned to the PACM–depending on the stringency of methodologies that the Article 6.4 Supervisory Body sets–it is still of concern that an additionality

review of these projects was rejected by negotiators at COP29[19] and **the first approved programme of activities transferred into the PACM is estimated to deliver only one real emission reduction for every 26 units issued**.[20]

- **New PACM Credits**: Even if the above were taken out of the equation, there still remains a significant carbon removal gap within PACM, which current trajectories do not demonstrate sufficient ambition to close. As of May 2025, **out of the 1,018 projects that have registered prior notification to raise financing via the PACM, only 64 of them are carbon removals and out of these only 5 are permanent carbon removal**.[21] Therefore, similar to the CDM, new credits under PACM are still disproportionately skewed towards reduction and lower durability carbon removal.

As a result, both the project composition and design of the current PACM signifies a clear risk of stimulating a race to the bottom instead of one to the top–undermining rather than raising climate ambition globally.

Recommendations for the PACM to transition towards net zero alignment

Despite the potential shortcomings outlined in the section above, there is potential for reform to help the PACM gradually align with global net zero. Such reform would entail a structural shift in project composition under the PACM, until it is fully made up of permanent removals. A PACM composed only of permanent removals could address integrity issues on both the supply and demand (claims) sides of the carbon credit supply chain. Permanent removals are typically additional and have the capacity to store carbon for geologically meaningful timescales, satisfying the conditions for net zero aligned offsetting of fossil-based emissions.[22] Increasing supply of these types of credits can spur on early investments in removals, and reduce the risk of mitigation deterrence in the long term. Transitioning the PACM in this way would also help to scale the various carbon removal pathways that exist, lowering costs over time as the market shifts from ex-ante to ex-post issuance of such credits.[23]

The multilateral nature of the PACM also makes it well placed to ensure equity in a permanent removals-only market, passing on the costs for carbon removal development in line with the polluter pays principle. Modelling on equitable allocation of CDR suggests that countries that do not have the necessary domestics capacities for carbon removal storage to meet obligations and future liabilities, suggesting "an imperative demand for the international trading of carbon dioxide removal".[24] Likewise, high-emitting companies, with more residual hard-to-abate emissions should drive demand for permanent carbon removal to reach their organisational net zero targets, in line with guidance on net zero aligned offsetting approaches.[25]

The transition towards a permanent removal only future of the PACM can be gradual rather than immediate, grandfathering current methods. We propose a three-phased transition (Figure Two).

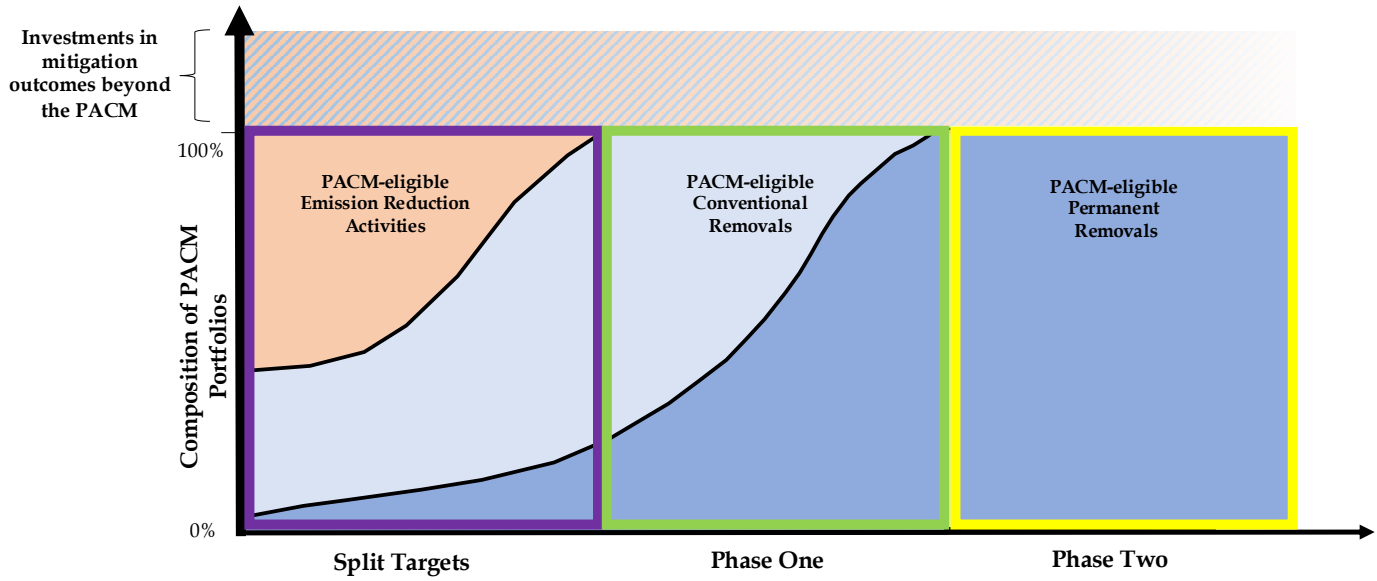
1. During the **Initial Phase**, the issuance of credits under the existing PACM could be initially allowed with the PACM composition adopting a split target between reductions and removals, in which A6.4ERs are clearly separated from a new class of general Article 6.4 Removals (A6.4Rs), with issuances of the former expiring within a pre-determined timeframe prior to Phase One.[26]
2. Under **Phase One**, A6.4Rs are further separated based on level of durability. Issuances of A6.4Rs representing temporary conventional carbon removal projects (A6.4TRs) could be initially allowed but must expire and ultimately phased out in favour of A6.4 Permanent Removals (A6.4PRs).
3. This transition will bring the PACM to a **Phase Two**, where only A6.4PRs are allowed to be authorised and transacted, enabling actors to utilise the PACM for net zero aligned offsetting.[27]

Each of the three phases recommended for this transition suggest that carbon markets can only truly be an effective financing stopgap for climate mitigation activities if they are tied to the type and quality of the mitigation outcomes they are funding–reinforcing calls for Parties to establish and implement separate reduction and removal targets in their NDCs.[28]

Figure Two: Progression of ambition for Net Zero Aligned PACM reform. Interim split targets (Purple): Ensuring that emission reduction and removals are clearly tracked and measured under the PACM. Phase 1 (Green): The PACM as a "removals only" mechanism (conventional and permanent CDR) and Phase 2 (Yellow): The PACM as a "permanent removals only" mechanism.

transition to a "permanent removals only" future in line with Figure Two.

These two pathways of implementing the transition of PACM towards an increasingly net-zero aligned future are complementary, with user choices shaping PACM design in the short-term, sending a strong signal for potential structural reform of the mechanism from 2028 onwards.



Source: Authors

A net zero aligned PACM can be implemented through user choices as well as official reform processes

User Choice: Considering that use of the PACM is voluntary, it is significantly shaped by the decisions of its users, both countries and corporates. Users have the power as to whether or not to utilise the PACM with integrity and ambition and therefore, shape it into a tool that can bring us closer to or further away from a state of net zero. If users engage with PACM in a way that aligns with best practice guidance on net zero aligned offsetting,[29] they can send a clear demand signal by establishing split targets for procurement via the PACM, catalysing a natural shift in the PACM's project composition in line with the 'three-phased' transition proposed above.

PACM Reform: At the Subsidiary Body for Scientific and Technological Advice (SBSTA) 68 in 2028, Parties to the Paris Agreement have resolved to review the PACM.[30] This presents a key opportunity to implement an interim split target between reductions and removals with a longer-term view towards a full

Gradually transitioning the PACM to a mechanism that only finances permanent removals can bring us closer to a state of net zero.

The approach that we present to ensure that PACM is aligned with and supportive of a state of net zero, offers five key benefits. It:

- **Incentivises domestic climate mitigation efforts:** It is imperative that international carbon trading frameworks are only utilised ambitiously, complementing rather than displacing actors' capacities to reduce emissions and maximise carbon removal capacities within their own jurisdictions or organisations. A transitional pathway to a permanent removals-only market mechanism ensures that the PACM is used to raise ambition instead of obscuring urgently needed domestic emission reduction efforts by heavy emitters.
- **Helps avoid a race to the bottom**: Signalling a sustained future demand for permanent CDR can lower the price of these projects as the market scales. This can help course correct the perverse incentives to invest in cheaper forms of mitigation outcomes which put "downward pressure on overall market-based price of carbon" irrespective of the quantities or qualities of that project.[31]
- **Facilitates a growing carbon removal export industry:** The financial flows implied by a centralised, standardised PACM comprised

increasingly of carbon removals could foster scaling of finance for and technology transfers in relation to such pathways, creating new industrial opportunities–including in the Global South.[32]

- **Incentivises utilisation of the full Paris Agreement package:** A net zero aligned PACM can help unblock underutilised channels of the Paris Agreement that provide more appropriate forms of financing for other types of projects, for instance, Article 5 related results based financing for nature-based projects (see Figure One).
- **Promotes a rising tide of ambition across other market mechanism:** The goal of a permanent carbon removal only PACM, could incentivise a similar shift towards "high-hanging" climate mitigation investments in other international carbon markets that continue to face their own integrity challenges, including the Carbon Offsetting and Reduction Scheme in International Aviation (CORSIA) and the VCM.

Summary

The PACM serves as a new carbon market instrument under the Paris Agreement to assist countries and companies in their mitigation efforts. At present, the PACM looks set to feature substantial carryover from the Kyoto Protocol's CDM and furthermore lack substantial integration of new conventional and permanent carbon removal projects. To avoid the PACM undermining global climate action, we recommend that it evolve into a mechanism that supports only permanent carbon removals in future whilst using the other levers of the Paris Agreement to finance emission reductions and conventional carbon removals over time. Such reform would help close the growing carbon removal gap and create a fairer and more equitable international climate response framework under the Paris Agreement and beyond.

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Endnotes

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