MCSC | MIT Climate & Sustainability Consortium

Establishing CO2 as an Asset Class in Voluntary Carbon Markets

MCSC Topic Brief

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Study Group Overview

In Fall 2022, the MIT Climate and Sustainability Consortium (MCSC) hosted a study group focused on carbon markets, in the form of a panel discussion. Experts answered questions and engaged with audience members on how to improve the present state of carbon credit and offset markets. The primary goal of the session was to consider how carbon markets need to evolve, what can be done to accelerate the necessary transition, and the role of co-benefits in the marketplace. This Topic Brief is a summary of content discussed, with selected references for further reading. Quotes from panelists are provided below the relevant aspects of the discussion.

State of Carbon Markets

Carbon markets have grown rapidly over the last few years, after a period of dormancy that followed the European Union's Trading Scheme price collapse (Lovell and MacKenzie 2011; MacKenzie 2009). These markets emerge across a range of contexts, from cap and trade government programs to voluntary carbon offsets that meet net zero corporate and government commitments (Knox-Hayes 2016). This growth has escalated over the last year, particularly in response to corporate net zero commitments coming out of COP26 in Glasgow in November 2021.

Lots of Activity, but Questionable Performance

Markets fail when nobody believes in them. So, while growth is a positive sign of corporate and government readiness to act on climate change, any rapid shift into developing markets should be diligently assessed to ensure that credibility in the financial products and their climate impacts remain. Market failure can occur from things like price instability, as was the case in the European Union's Trading Emissions Scheme (Allen et al. 2020; Gerlagh, Heijmans, and Rosendahl 2022).

The actual impact of the dramatic growth of carbon markets has already been contested by material assessments of physical carbon growth. For example, a recent piece in *The Conversation* cites a peer-reviewed scientific assessment of the additional (or lack thereof) carbon sequestering benefits of California's forest carbon offsets (Coffield et al. 2022). Using satellite data, this assessment found that California forests connected to carbon offsets showed no additional carbon storage compared to similarly logged forests.

> We are already starting to see pricing signals that point to discrepancies in quality. Credits with longer vintages or that are avoidance-based are trading cheaper than those with shorter vintages or that are removal-based.
>
> *Beatriz Roa Tejero, BBVA*

Countries are responsible for establishing adjustment systems; adjusted credits will have a higher price than non-adjusted credits. Article 6 is replacing the clean development mechanism (UNFCCC 2015); credits will have a higher price.

Janelle Knox-Hayes, MIT

Prices for credits are currently too low and not converging at the rate we want them to, we are trying to control too much of the system rather than taking an asset-perspective and letting the financial market do what it's good at, which is assessing risk.

Roberto Rigobon, MIT

Incentives for Misbehavior in Carbon Markets

Given the strong demand pull that corporate net zero statements have put on carbon markets, the market is incentivized to meet demand without proper oversight. The market then behaves poorly because strong demand does not encourage due diligence on the supply-side. Organizations like Oxford University suggest offsetting principles to correct some of the misbehavior stemming from the demand-side.

Current market incentives for short-term solutions have not been addressed fully by the international system. Consumption reductions should have a significant impact on the accounting. -***JKH***

The system around the regulated market is very different from a traditional financial market. These are cap-and-trade systems. The stronger the voluntary market becomes, the more rapidly we expect to see convergence. Engineered solutions will be a big part of this since credits from those projects have high durability. -***BRT***

Another issue driving misbehavior is the poor accounting of co-benefits for a given carbon removal strategy. For example, mono-cropping for supposed high-density carbon removal strategies can backfire. Native plant varieties and biodiversity are necessary for long-term ecosystem functioning, which ultimately affect carbon removal performance. Even in "high-quality" credit projects issued today, co-benefits are poorly understood and commonly undervalued (Microsoft acknowledged this in their recent Carbon Removal Report). This phenomenon is connected to a broader effect seen in financial markets connected to climate change, studied in the MIT Aggregate Confusion Project.

To avoid conflating terms, we need to specify what we mean with co-benefits and use the context and information about the kinds of credits that are available. It is important to have the requisite context, for example understanding what kinds of crops are being planted (monocropping to replace a forest vs planting native varieties). The better the ecological fit, the higher potential there is for 'co-benefits'. I would think about the co-benefits of a carbon offset stream. -***JKH***

Even with verification, there can be significant differences in estimated carbon emissions. Companies don't just need targets, they need improved standards. We are working with Clarity AI. We need reporting, targets, and verifications because firms are underreporting. We need firms to accept the liability of having inaccurate emissions disclosures. -***RR***

Key Concepts for Evaluating a Carbon Credit or Offset

With many competing incentives complicating carbon markets, it is important for buyers to adhere to some foundational concepts, like those proposed by Oxford University, to avoid pitfalls. Though these will not prevent all errors, they serve as a good foundation.

Additionality
Proof that the project would not have "happened anyway" (i.e. the project has been possible because of the payments received for the offset credits).

The best way to achieve the required transformation is to have an asset approach. It is important to think of symmetric additionality; these are assets. You get the credit for planting the tree, but if the tree burns you accept the liability and pay for the emissions. The person who backs up the credit needs to be responsible for the cost if the credit is no longer valid. In finance, the company is responsible for the earnings but also the losses. -***RR***

We need to consider both environmental additionality and financial additionality. Some projects would not be viable without the support of credits. In practice, if the only thing that was blocking a project was the financial additionality, then the project still would not have happened. Article 6.4 refers to limiting double counting; in order to be material it can't be ancillary (e.g. an auto manufacturer can't just buy trees because that's not actually in their supply chain). - ***JKH***

Leakage
When a project's emissions reductions results in additional greenhouse gas emissions elsewhere (i.e. project reduces supply of a specific product but market demand encourages others to provide that product instead).

It is perhaps better to focus on removal than avoidance, and check that CO2 is actually being removed. The market is evolving rapidly so quality metrics may change over time, and we need to evolve with the changing market. It is crucial to have data that backs up what you're buying. -***BRT***

Durability
Time that the specified tons of CO2 will remain removed from the atmosphere. Natural solutions have a hidden cost of replacement when the associated tons revert to the atmosphere, sooner than engineered solutions.

The Inflation Reduction Act has incentives for engineered solutions. Durability is incredibly important, and this is where both energy and agriculture spaces need to be aiming to excel in the long term. Currently leakage assessments are mostly mitigation focused, but we need to be cognizant of the adaptation-focused leakages as well. -***JKH***

Vintage
Year in which the carbon credit occurred. A vintage of 5 years means that the carbon credit purchased is within 5 years of the emission year.

We are already to see pricing signals that point to discrepancies in quality. Credits with longer vintages or that are avoidance-based are trading more cheaper than those with shorter vintages or that are removal-based. The longer the time between the occurrence of the credit and its commercialization, the less traceable the credit becomes. Shorter vintages trade at higher prices than longer vintages. This could be solved through due diligence but currently traders do not have access to this information. - ***BRT***

Concluding Thoughts

Carbon markets are an evolving, complicated space. However, by focusing on key points of clarification that can support robust carbon markets, we can highlight what parts of carbon markets require more careful consideration. We conclude with these key points and emerging ideas from our study group that will be followed up on in 2023.

Putting a price on emissions is critical; this is not a mature market, not very big, but these efforts are fundamental. We need to push for scale and transparency. -***BRT***

We should absolutely want higher quality. There are some primary vendors that sell credits, but the price of credits can vary a lot and that complicates things. Also we need to bring co-benefits into this conversation. -***JKH***

Owning a CO2 credit means being responsible for that asset. If the credit removes more carbon than planned, the owner reaps the benefit. If the credit underperforms, the owner is responsible for the loss. Treating emissions as assets can help with many issues in carbon markets today. -***RR***

Establishing price legitimacy (that prices for carbon credits/offsets reflect true marginal costs), carbon project quality, and market transparency are key points that can help guide carbon markets in the right direction. In the new year, MCSC's Climate Change and Finance crosscutting theme will hold another carbon markets Study Group.

MIT Carbon Markets Sources

Carbon Confusion Project

MIT Climate Portal on Carbon Offsets

MIT TILClimate, Carbon Offsets podcast

Alex Prather, MIT Research Assistant, Carbon Markets blog series

References

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