Christopher J. Kirkpatrick
Secretary of the Commission
Commodity Futures Trading Commission
Three Lafayette Centre
1155 21st Street, NW
Washington, DC 20581

RE: Request for Information on Climate-Related Financial Risk

Dear Mr. Kirkpatrick,

The Center for Negative Carbon Emissions (CNCE) appreciates the opportunity to provide comments on the Commodity Futures Trading Commission's efforts around commodity markets and risk disclosure relevant to tackling climate change. The CNCE is a research center at Arizona State University focusing on advancing carbon management science, technology, and policy to manage climate change.

The IPCC's most recent report makes clear that to limit global warming to the commitments made under the Paris Agreement, world emissions must stay within a finite allowance (i.e., a remaining carbon budget). Operating within this finite allowance means emissions must either halt completely (go to zero) or emissions must be matched by neutralization (a balancing). Purchasing credits that represent emission reduction or avoidance does not neutralize (balance) an emission. The math makes that clear: an emission (1 ton) minus an emission avoided (0 ton) does not equal zero, it equals 1 extra ton. Since tackling the climate change problem requires staying within a finite budget, this extra ton debits from the account. Buyers of such avoidance or reduction credits that then claim to have scrubbed their emission ledger are in fact continuing to contribute to climate change, and thus increasing their (and everyone else's) climate risk. The disclosure of the type of credit purchased would thus be a necessary step to meeting the public and climate-risk disclosure targets explored by the CFTC.

Understanding the implications of finite allowance leads one towards designing a system to enable economy-wide carbon accounting. Here, rather than spending futile efforts in tracing carbon through the supply chains, it would be much more effective to demand that the easily quantifiable extraction of fossil carbon from the ground[1] must be matched immediately by an equal amount of quantifiable sequestration[2]. If for every ton of carbon coming out of the ground another ton is stored safely and permanently, the extracted carbon is rendered harmless. This system would allow for all types of carbon removal to be treated as a commodity under one price. The cost of removal will motivate the elimination of emissions.

However, as currently devised, credits of carbon removal are not commodities, they are differentiated products because of their widely ranging definitions of "permanent" storage. CO_2 that is captured from the environment and released (even 1,000 years later) has little benefit for climate

[1] Lackner, K., Wilson, R., 2008. The importance of controlling carbon not emissions or mpg. Toxicology and Industrial Health 24, 573–580. https://doi.org/10.1177/0748233708098123
[2] Lackner, K.S., Wilson, R., Ziock, H.-J., 2000. Free-Market Approaches to Controlling Carbon Dioxide Emissions to the Atmosphere. Global Warming and Energy Policy 31–46. https://doi.org/10.1007/978-1-4615-1323-0_3

mitigation since CO_2 once re-emitted will resume causing damages for many thousands of years[3]. CO_2 that is temporarily sequestered has a benefit for the generations of humans and other species that live during the sequestration, but it intentionally pushes the climate change problem onto future generations who are voiceless[4]. Carbon removal that does not store carbon on timescales of tens of thousands of years cannot claim to have solved the climate change problem. Credits of carbon removal that do not store carbon on such scales that are purchased for the purpose of making claims of balancing emissions are deficient, even illusory. By allowing the trade of such deficient credits, the CFTC would expose the purchasers to further risk and liability since the purchaser, through their purchase of carbon credits, acknowledged their responsibility.

Furthermore, credits of carbon removal represent the sequestration of a colorless and odorless gas that was moved into a reservoir that purchasers will not see, as it is geographically distant, underground, or underwater. As a result, verification is critical to trust the system at the point of sequestration and at the point of claim. Verification at the point of sequestration is most transparent if is compares a measurement made by a reservoir manager against an independently measured value made by a third party. Verification at the point of claim is most transparent if it compares a measurement made by a third party against the number of credits awarded. That is a transparent, fully verifiable system. It means that measurements are necessary, not models, probabilities, declarations, or scenarios. For certain sequestration activities this will be challenging, but measurement-based, reproducible solutions can be found in most instances. Credits that are not based on measurements, as is the case for almost all credits available today, are unverifiable. Verification adds to the cost of sequestration. If a sequestration technology is difficult to verify, its cost is high, even if the unverified process has little or no cost.

In many cases, current methodologies rely on counterfactual scenarios and Life Cycle Analysis to account for carbon removal. Counterfactual scenarios are representations of an alternative world where something does not happen. Because it does not happen, it cannot be verified, although it can be shown to be plausible, using external information, and it can be easily manipulated to exaggerate the amount of removal achieved. This alternative scenario is then compared to a Life Cycle Analysis (LCA) that estimates net removals within the boundaries of an activity. The problem here is the subjectivity, incompleteness, and inaccuracy of the LCA. LCAs are not comparable across different types of activities, their boundaries are difficult to standardize, rely on large amounts of data that frequently is unknown or modeled, and make the attribution of emissions a challenge. LCAs are important for project design but are inadequate for carbon accounting. Future change in LCA methodologies would expose storage operators to major risks.

A safer approach for investors starts from only allowing the trade of credits that guarantee a pathway to permanent storage and only those that can replicate measurements of carbon storage. The ability to measure the carbon content of temporary storage, makes it possible to hold the storage operator responsible for replacing carbon lost from storage. The responsibility to remediate for lost

[3] Archer, D., Eby, M., Brovkin, V., Ridgwell, A., Cao, L., Mikolajewicz, U., Caldeira, K., Matsumoto, K., Munhoven, G., Montenegro, A., Tokos, K., 2009. Atmospheric lifetime of fossil-fuel carbon dioxide. Annual Reviews of Earth and Planetary Sciences 37.

[4] Arcusa, S., Lackner, K., 2022. Intergenerational equity and responsibility: a call to internalize impermanence into certifying carbon sequestration. OSF Preprint. https://doi.org/10.31219/osf.io/b3wkr

storage should not be placed on the purchaser (who cannot be held accountable in 100 years' time) nor the standard developer (who does not have access to the reservoir), but the storage operator who will be maintaining the reservoir. It also means that by only allowing the trade of credits produced with measurements (not those that use counterfactuals, declarations, probabilities, and models), the CFTC would protect purchasers from significant risk of liability and accusations of greenwashing from credits that cannot be trusted because they cannot be verified.

We are grateful for the leadership of Mr. Kirkpatrick and the Commission on this issue and appreciate the opportunity to contribute. Our hope is that, by regulating the trade of carbon removal credits, the CFTC will move carbon management one step closer to being a successful strategy to mitigate climate change. We urge the CFTC to end the cycle of delaying tackling climate change by setting the rules today that support the scientific understanding of climate change.

Respectfully,

Dr. Stephanie Arcusa, Dr. Klaus Lackner, Dr. Michael Hanemann, Robert Page, Dr. Matthew Green