



Walking the Walk: A CDR developer's guide to corporate citizenship

Whitepaper



ZeroEx

February 21st, 2025

Introduction

Carbon removal developers require two things: locations to build projects and buyers to purchase credits. Currently, the CDR industry is trapped between the dual forces of public mistrust of geoengineering and waning buyer appetite for expensive removal credits. Developers can address this by taking a few concrete steps when designing and executing projects, such as transparently explaining a project's net removal, about the strengths and limitations of a given CDR method, and working in good faith to minimize impacts on communities. Lessons can be learned from the experience of the wind energy sector, which has struggled with both unpredictable finances and public opposition. Credibility cannot be built using language alone, but requires sustained, genuine actions which have the potential to generate multiple benefits for developers while increasing public and buyer support.

Industry at a crossroads

In the beginning of 2025, the CDR industry now finds itself squeezed in two directions: on one side, CDR buyers have become more price sensitive and less prone to seek out more expensive methods¹, while on the other, opinion studies show that the public remains skeptical towards CDR development, particularly in their own communities^{2,3,4,5}. High-profile instances of deceptive carbon accounting have generated negative publicity for carbon removal over the past five years⁶. The public doesn't trust CDR: environmentalists don't trust that it genuinely reduces CO2 concentrations without adversely impacting the environment, while the broader public is skeptical of geoengineering as a safe and scalable solution to the climate crisis.

Beyond affecting specific companies or removal types, poor-quality carbon removal credits can cast doubt on the entire concept of carbon offsetting⁷. Governments and nonprofits focused on climate impacts increasingly have their hands full with climate adaptation work, reducing the institutional bandwidth for mitigation strategies like removal. Countries are on track to miss their climate mitigation targets, both in terms of emission reductions and supporting carbon removal.

The burden is on CDR developers to prove to the general public that their projects are safe, sustainable, and truly carbon-negative. CDR as an idea has been viewed in terms of scientific experimentation, with media headlines often including words like "potential" and "promising". Billions of dollars have been spent developing technologies ranging from the well-proven to the barely tested. It makes sense for the public to be suspicious of such a nascent idea. Now, however, the CDR industry as a whole is mature enough to begin gaining the public's trust in earnest, and that starts with five fundamental conditions that every new developer must meet:

1. Be transparent and accountable with respect to additionality

Commercial-scale CDR developers must be able to document their projects' net carbon capture using tools like life cycle assessments (LCAs). Following protocols set out by private certifiers like Isometric or puro.earth is a positive step to show that a project adheres to industry best practices. The arrival of government regulations on carbon credits like the European Union's Carbon Removal and Carbon Farming (CRCF) framework⁸ will bring an additional level of standardization.

Hopefully these forms of documentation can give carbon removal projects the level of credibility that they require to be accepted by the broader public.

LCAs can raise problems for CDR developers from a corporate perspective. However, as the level of detail required for a rigorous LCA can require disclosure of confidential information like proprietary technology, companies are left with the option to significantly redact in any public documents or forgo a LCA process entirely⁹. As the CDR industry grows while public opinion stays the same, new strategies may be required to prove the benefits of specific projects. In addition to a detailed LCA prepared for certification bodies with sensitive information, CDR projects may eventually benefit from providing the public with more easy-to-read materials proving a project's net-negativity.

2. Minimize the environmental impacts of CDR technologies and individual projects

In addition to being carbon negative, it is critical that CDR companies not contribute in any other ways to the climate crisis. For instance, carbon removal technologies like direct air capture (DAC) depend on clean electricity in order to be net-negative¹⁰.

However, the energy transition depends on a rapid increase in the use of renewable electricity for heating, cooking, and transportation¹¹. CDR developers must explicitly show that their projects do not pull resources away from other forms of climate change mitigation.

CDR companies have a special duty to minimize harm to the natural world, not for public relations or legal compliance reasons but as an aspect of their basic business model. The burden is on developers to show that projects do not adversely impact the environment. Large construction projects, such as those involved in building DAC or BECCS installations, have an inherent impact on their surroundings. Methods that involve adding foreign material to a natural or manmade environment, such as enhanced rock weathering, biochar, or ocean fertilization, require intense planning and testing to effectively anticipate and minimize any potential negative effects.

3. Minimize the impact of CDR projects on communities

CDR projects of all types can face criticism from political and community leaders for valid reasons such as the disturbance caused by the new development or skepticism that the project is genuine.

Instances of CDR developers misleading communities as to the repercussions or funding sources of projects have cast a pall over the entire industry^{12,13}. Developers building projects in historically marginalized communities using carbon capture technologies with histories of adverse health impacts have raised issues of environmental justice and generated backlash from concerned communities^{14,15}. Developers must approach communities which might be affected by projects from a position of humility and respect, prepared to adjust or even reverse course based on feedback. CDR sites must be determined more carefully than normal construction commercial or industrial projects. This includes minimizing exposure to potential air, water, noise, light, and sound pollution. Any transport of potentially hazardous materials such as rock powder must be handled responsibly and proactively. In short, CDR developers must think of all the issues that could cause conflict with communities, and—most importantly—ask communities for any other issues they may not have considered.

Additionally, the CDR industry must also be able to show that projects do not take land or resources away from critical uses such as food and housing. Current national CDR commitments in the Paris Agreement will require an estimated 1 billion hectares of land, primarily for reforestation¹⁶.

That extreme degree of land use change has the potential to bring climate finance projects into conflict with vulnerable populations whose resources may already be threatened by the impacts of climate change. CDR developers must commit to being good neighbors to nearby communities and making certain that they do not hurt more than they help.

4. Be upfront about the strengths and limitations of a CDR technology

Companies in the CDR space must be clear as to both the strengths and weaknesses of removals in order to build credibility and manage short-term expectations on the part of important stakeholders. The use of removal credits has itself consistently generated skepticism: in order to truly mitigate global climate change, CDR should be for offsetting only unavoidable emissions, like those either inherent to a business's core operations or those caused by upstream or downstream companies (Scope 3). CDR developers themselves do not have the power to tell buyers how much to reduce their own emissions in addition to buying removal credits, they can contribute to efforts to promote separate emissions and reductions goals at both the private and regulatory level, as opposed to setting a combined net emissions goals¹⁷.

At the moment, large removal credit buyers are not prioritizing high-additionality, high-permanence credits¹⁸, leaving it up to high-quality developers to maintain standards until the market recognizes their value. This will require significant self-advocacy from developers, as well as incentives and guidance from governments and NGOs like the Science Based Targets initiative (SBTi)¹⁹.

Additionally, following industry-standard protocols, developers must clearly explain the potential losses and reversibility of a particular project. Recent studies using reduced- and intermediate-complexity climate models have found that short-durability CDR would have a limited impact on rising temperatures depending on overall global emissions reductions. Removals with a short durability (~100s of years) can have an impact on short-term warming, but it is important to state their limitations in terms of reversing human emissions permanently^{20,21,22}. Doing so may work to build up trust with buyers, regulators, and the public, once the important roles of different types of CDR is made clear.

5. Take a proactive approach to educating the public

The industry must be on the offensive in terms of supporting basic education about climate change and geoengineering. Evidence shows that a person's attitude towards different CDR technologies is highly sensitive to how familiar they are with any of its scientific or logistical components⁴. Developers of all types of CDR technologies have a vested interest in the public being well-informed, both in terms of political decision making and corporate sustainability planning. Afforestation approaches are popular in part because they are the most easily understood by non-experts²³. This leaves open an opportunity for CDR developers to substantially increase public support simply by increasing public awareness. Explaining the science and logistics of a given project can help make it approachable and ultimately more attractive when viewed by a community as an economic opportunity.

Looking for lessons: the renewable energy industry

Developers of renewable energy projects like wind and solar farms face similar risks to CDR projects in terms of minimizing effects on communities and the environment, gaining and maintaining public trust, and proving their worth to governments and investors. The CDR industry may take some lessons from the issues that have faced renewable energy projects, both financially and in terms of corporate citizenship.

Offshore wind power in the US in particular may be viewed as an example of an industry which found itself overly dependent on government support, leaving it vulnerable to capital costs and electricity companies demanding impossibly low prices²⁴. Companies planned large developed counting on a combination of federal and local financial incentives and low-interest loans, leaving them vulnerable when the government aid failed to make up for the losses from rising inflation. This only adds to a narrative that the industry is slowing globally which has the potential to further alienate investors²⁵.

A 2024 incident at the Vineyard Wind development in which a turbine blade broke off and scattered debris in the Atlantic Ocean only added to this negative mood, coming at a time when wind power had already been

under attack both publicly and privately from organizations funded by the fossil fuel industry²⁶. The operators of the project took almost two weeks to publish a full explanation of the project, leaving the media space open for attacks and misinformation. Even political leaders who had been strong supporters of the projects found themselves in a difficult position, struggling to uncouple themselves from a development they had endorsed as safe and reliable²⁷.

The CDR industry now finds itself facing some of the same problems now. In the face of a tightening carbon credit market, the industry must maintain a narrative of growth and dependability. The problem of public trust is not intractable, however. According to the public relations firm Wilkinson Butler, developers must ensure consistent messaging across their corporate, government, and public messaging²⁸. Building community engagement is not just a matter of communication, however, and requires developers to make substantive commitments like job training or informational outreach programs. Just like renewable energy, most people do not think about carbon removal on a daily basis, so it is a developer's job to make it relatable.

Looking forward: opportunities for growth

There are a number of ways CDR developers can be better corporate citizens through specific actions, including:

- Initiatives aimed at generating economic co-benefits can help build up logistical capacity to ease further development. For instance, local hiring and training generates a skilled workforce able to scale up CDR deployments with lower activation energy.
- Preemptive self-policing can make sure that credits are trustworthy in the eye of the public and buyers, and allows for easier adaptation to stricter standards in the future. Developers can go above and beyond the requirements of certification protocols and clearly explain their methodologies to local stakeholders and the broader public.
- If the CDR industry succeeds in winning over public opinion, it has the potential to benefit from increases in government support, interest from other corporations, and even individual credit buyers.



Key Lessons

- CDR developers must be proactive about earning public trust in order to ensure future growth, both in terms of demand and protection approval.
- Commitments made regarding community engagement and environmental project must be achievable and measurable.
- The industry as a whole must continue to prioritize transparency, accountability, and additionality when proposing and executing CDR projects.

ZeroEx
Pioneered in Germany.
Trusted by the world.

References

1. Keep Calm and Remove On—CDR.fyi 2024 Year in Review. (n.d.). Retrieved February 18, 2025, from <https://www.cdr.fyi/blog/2024-year-in-review> Waller, L., Cox, E., & Bellamy, R. (2024). Carbon removal demonstrations and problems of public perception. *WIREs Climate Change*, 15(1), e857. <https://doi.org/10.1002/wcc.857>
2. Raimi, K. T., Wolske, K. S., Hart, P. S., & Choi, S. (2024). Exploring public perceptions of carbon capture and utilization in the U.S. *Sustainable Production and Consumption*, 50, 314–326. <https://doi.org/10.1016/j.spc.2024.08.003>
3. Low, S., Fritz, L., Baum, C. M., & Sovacool, B. K. (2024). Public perceptions on carbon removal from focus groups in 22 countries. *Nature Communications*, 15(1), 3453. <https://doi.org/10.1038/s41467-02447853-w>
4. Cox, E., Bellamy, R., & Waller, L. (2024). Public attitudes and emotions toward novel carbon removal methods in alternative sociotechnical scenarios. *Environmental Research Letters*, 19(8), 084026. <https://doi.org/10.1088/1748-9326/ad5dd0>
5. Blake, H. (2023, October 16). The Great Cash-for-Carbon Hustle. *The New Yorker*. <https://www.newyorker.com/magazine/2023/10/23/the-great-cash-for-carbon-hustle>
6. White, N. (2023, March 21). Bogus Carbon Credits a “Pervasive” Problem, Scientists Warn. *TIME*. <https://time.com/6264772/study-most-carbon-credits-are-bogus/>
7. European Commission. (n.d.). Carbon Removals and Carbon Farming. Retrieved February 3, 2025, from https://climate.ec.europa.eu/eu-action/carbon-removals-and-carbon-farming_en
8. Terlouw, T., Bauer, C., Rosa, L., & Mazzotti, M. (2021). Life cycle assessment of carbon dioxide removal technologies: A critical review. *Energy & Environmental Science*, 14(4), 1701–1721. <https://doi.org/10.1039/D0EE03757E>

References

10. Direct air capture technology: Innovations in CO₂ removal. (n.d.). Climeworks. Retrieved February 3, 2025, from <https://climeworks.com/direct-air-capture>
11. Electrification—Energy System. (n.d.). IEA. Retrieved February 3, 2025, from <https://www.iea.org/energy-system/electricity/electrification>
12. Magazine, H. (n.d.). The Social Cost of Carbon Credits. Hakai Magazine. Retrieved February 3, 2025, from <https://hakaimagazine.com/features/the-social-cost-of-carbon-credits/>
13. Gannon, K. E., & Hulme, M. (2018). Geoengineering at the “Edge of the World”: Exploring perceptions of ocean fertilisation through the Haida Salmon Restoration Corporation. *Geo: Geography and Environment*, 5(1), e00054. <https://doi.org/10.1002/geo2.54>
14. Public outcry against carbon capture in Louisiana growing. (2024, January 2). WWNO. <https://www.wwno.org/coastal-desk/2024-01-02/public-outcry-against-carbon-capture-in-louisianagrowing>
15. RIVER PARISH SEQUESTRATION COMMENT TEMPLATE. (n.d.). Rise St. James. Retrieved February 19, 2025, from <https://risestjames.org/river-parish-sequestration>
16. Dooley, K., Christiansen, K. L., Lund, J. F., Carton, W., & Self, A. (2024). Over-reliance on land for carbon dioxide removal in net-zero climate pledges. *Nature Communications*, 15(1), 9118. <https://doi.org/10.1038/s41467-024-53466-0>
17. Dooley, K., Christiansen, K. L., Lund, J. F., Carton, W., & Self, A. (2024). Over-reliance on land for carbon dioxide removal in net-zero climate pledges. *Nature Communications*, 15(1), 9118. <https://doi.org/10.1038/s41467-024-53466-0>
18. Trencher, G., Nick, S., Carlson, J., & Johnson, M. (2024). Demand for low-quality offsets by major companies undermines climate integrity of the voluntary carbon market. *Nature Communications*, 15(1), 6863. <https://doi.org/10.1038/s41467-024-51151-w>

References

19. Trencher, G., Nick, S., Carlson, J., & Johnson, M. (2024). Demand for low-quality offsets by major companies undermines climate integrity of the voluntary carbon market. *Nature Communications*, 15(1), 6863. <https://doi.org/10.1038/s41467-024-51151-w>
20. Matthews, H. D., Zickfeld, K., Dickau, M., Maclsaac, A. J., Mathesius, S., Nzotungicimpaye, C.-M., & Luers, A. (2022). Temporary nature-based carbon removal can lower peak warming in a well-below 2 °C scenario. *Communications Earth & Environment*, 3(1), 1–8. <https://doi.org/10.1038/s43247-022-00391-z>
21. Brunner, C., Hausfather, Z., & Knutti, R. (2024). Durability of carbon dioxide removal is critical for Paris climate goals. *Communications Earth & Environment*, 5(1), 1–6. <https://doi.org/10.1038/s43247-02401808-7>
22. Brunner, C., Hausfather, Z., & Knutti, R. (2024). Author Correction: Durability of carbon dioxide removal is critical for Paris climate goals. *Communications Earth & Environment*, 5(1), 1–1. <https://doi.org/10.1038/s43247-024-01899-2>
23. Brunner, C., Hausfather, Z., & Knutti, R. (2024). Author Correction: Durability of carbon dioxide removal is critical for Paris climate goals. *Communications Earth & Environment*, 5(1), 1–1. <https://doi.org/10.1038/s43247-024-01899-2>
24. Aronoff, K. (2023, November 7). Offshore Wind's Bizarre Global Problem. *The New Republic*. <https://newrepublic.com/article/176690/offshore-winds-bizarre-global-problem>
25. 5 challenges facing wind—Timera Energy. (2023, November 20). <https://timera-energy.com/blog/5challenges-facing-wind/>, <https://timera-energy.com/blog/5-challenges-facing-wind/>
26. Slevin, I., Kattrup, W., Marcil, C., & Roberts, J. T. (2025). Beyond dark money: Information subsidies and complex networks of opposition to offshore wind on the U.S. East Coast. *Energy Research & Social Science*, 119, 103829. <https://doi.org/10.1016/j.erss.2024.103829>

References

27. Lavin, N. (2024, September 5). The biggest problem facing offshore wind energy isn't broken blades. It's public opinion. Maine Morning Star. <https://mainemorningstar.com/2024/09/05/the-biggest-problemfacing-offshore-wind-energy-isnt-broken-blades-its-public-opinion/>
28. Albrow, N. (n.d.). Navigating the PR and Communications Landscape in the Renewables Industry – A Guide for Clean Energy Companies. Retrieved February 4, 2025, from <https://www.wilkinsonbutler.com/insights/navigating-the-pr-and-communications-landscape-in-therenewables-industry-a-guide-for-clean-energy-companies>