

# Advancing high-quality carbon removal solutions

**Climeworks Direct Air Capture Summit 2023 Highlights**

4th Edition – June 2023, Zurich





## **Bill Gates,** Breakthrough Energy

Bill Gates delivered a prerecorded video address at the DAC Summit, highlighting the progress and importance of Direct Air Capture.

Watch it [here!](#)



# Pivotal years ahead for Direct Air Capture (DAC)



# 1

**The world won't reach net zero without permanent and scalable CDR solutions that can complement nature-based solutions.** As the most scalable CDR technology, DAC+S will play a substantial role in addressing the 6-10Gt of CO<sub>2</sub> that will need to be removed annually by 2050. DAC+S is a key component of the CDR industry, which could grow to a \$1tn potential market size.

# 2

**Actions taken this decade are crucial for DAC+S to reach industrial maturity, gigaton scale, and cost reduction in 2050.** DAC costs can decrease to a range of \$100-200 per ton, contingent upon solid collaboration, ecosystem build-up, and policy support. **Deploying DAC projects and confronting real-world challenges will generate a strong leverage effect on long-term costs.** Increasing the learning rate from 13% to just 15% could halve the required investment.

# 3

**Scaling requires efforts from the entire ecosystem. Policy makers have an essential role to play** through procurement, incentives such as the IRA or the DAC Hub program, compliance market, and setting third-party MRV standards. These are instrumental measures **to foster trust and enable credits, financing, infrastructure development.**

# 4

**The VCM has the power and responsibility** to act now— both to kick-start the market and to secure future CDR supply to deliver on net zero pledges. Most of 2030 CDR capacity will be already designed by 2025. **It is time-critical for companies to get started on their transition from conventional offsets to high-quality CDR.**

# 5

**Deploying DAC can benefit local communities and the Global South. Disproportionately impacted by climate change, it also holds an immense CDR potential.** Kenya alone has 10+ GW of renewable energy capacity untapped due to low demand, which can benefit engineered CDR. Global expansion will require true community engagement for environmental justice and an inclusive economy.

# 1 Why the world needs DAC+S



“Near-term urgency is to reduce emissions. That is 90% of the problem, but we need both CDR and emission reductions. We need to remove 4 to 10 Gigatons CO<sub>2</sub> by mid-century for net-zero and, looking at the IPCC scenario, we only get half of it from the natural carbon solution. You can mitigate this by having a broad portfolio. DAC and other technologies take a while to scale up so there is an urgency to develop them now.”

**Gregory Nemet, University of Wisconsin-Madison**



“We must drive emissions down and if we do that well, with the right kind of investment, that will be the growth story of this century. But it's crystal clear that we will also need CDR and within that, DAC is likely to play a major role.”

**Prof. Lord Nicholas Stern, Chair, Grantham Institute**



“There's a range of technologies for CDR, not only one solution. But to create this entirely new industry and bring the removals to the scale needed at an unprecedented speed, DAC is and should be a critical part of that journey. DAC offers some enormous benefits. It's scalable, it's verifiable, it's extremely high-quality, and can be located anywhere.”

**Rich Lesser, Global Chair of the Boston Consulting Group**



# 2 The leverage effect: now is the time to act



“I believe that the sooner we get into discussing specific carbon removal solutions and individual implementations, the more we can reach an understanding of where the true risks and trade-offs will be.”

**Dr. Marcius Extavour, Chief Climate Solutions Officer at TIMECO2**



“To get to net zero, we will need CDR to operate at a gigaton scale. As it takes time to develop and scale up, we need to work on CDR technologies now so they can contribute at scale by mid-century.”

**Howard Herzog, Senior Research Engineer, MIT Energy Initiative**



“We need to think about learning as an industry, not just as individual companies; the industry working together on all sorts of enabling technologies such as fans, pumps, and storage to drive cumulative learnings as fast as possible and maximize learning rates.

**Rich Lesser, Global Chair of the Boston Consulting Group**



“We're convinced that early demand and early capital need to come together to drive the growth of highly durable and additional carbon removal solutions. Microsoft is planning for a portfolio of roughly 5M metric tons per year of carbon removal in 2030 across nature-based and engineered solutions and we know that long-term contracts are needed to jumpstart the development of those projects. Most of the carbon removal capacity that will be available in 2030 will have been designed by 2025.”

**Brandon Middaugh, Senior Director, Climate Innovation Fund at Microsoft Sustainability**



# 3 The essential role of MRV and policy frameworks



“Not all carbon removal is good carbon removal. We have this exciting opportunity to define what is high-quality CDR and what we want the future of CDR to look like.”

**Giana Amador, Executive Director at Carbon Removal Alliance**



“To enable financing in any industry, the base level of what you need is transparent data that is auditable and that has third-party verification.”

**Natalia Dorfman, CEO, Kita**



“The VCM will keep having a role, and while helpful, will not be sufficient for this task. Compliance markets are the main event for scaling removals.”

**Eve Tamme, Founder and Director Climate Principles**



“Strong standards and the beginning of big infrastructure investments would be crucial in the year to come.”

**Erin Burns, CEO, Carbon180**



“About a tenth of carbon projects we have reviewed fail to meet one or more of our qualifying criteria because of insufficient transparency and poor disclosure. It is critical to get robust MRV, then ratings and insurance can come into play and help scale this market.”

**Ted Christie-Miller, Head of Carbon Removal, BeZero Carbon**



# 4

## Corporate responsibility in the race to net zero



“We have a responsibility, every one of us in every firm, to accelerate on that journey. Early investments can change the curve and will benefit companies and benefit everyone. I see a lot of emphasis on reductions, and I don't think enough companies are embracing where removals fit in that journey.”

**Rich Lesser, Global Chair of the Boston Consulting Group**



“The VCM is still a very disaggregated one, young and immature. But it can help deploy proven technologies at scale and encourage innovation through the scale and volume of trading. And at the end of the day, we are the VCM. The scientists and the technologists, the engineers and the buyers and the project developers, we are the ones developing this market.”

**Brian DiMarino, Managing Director, Head of Operational Sustainability, JPMorgan Chase & Co**



“Shopify has been buying carbon removal since 2020, and we've realized that it doesn't need to be complex or time-consuming. It's not just for companies with large sustainability teams and budgets. And it's not just for certain sectors of the economy. Anyone and everyone can and should get involved and start building for the future today.”

**Stacy Kauk,  
Head of Sustainability, Shopify**



“Mammot does both things simultaneously: on one side, a full focus on reduction, and then on the other side, investing in carbon removal. Investing now in high-quality CDR will ensure a better ROI than investing tomorrow. Please hear us and join us in this movement.”

**Michael Rammelsberger,  
Chief Supply Chain Officer,  
Mammot Sports Group**



# 5

## A huge opportunity for globalization & environmental justice



“Africa is much more than just a climate change victim. Its combination of super-abundant renewable energy potential, limited existing emissions, large endowments of land and natural resources, massive projected infrastructure needs and a young dynamic workforce, give it huge potential for deploying hybrid and engineered CDR at a massive scale.”

**James Mwangi, CEO, Africa Climate Ventures**



“CDR is now a global industry, deploying projects across borders. Doing community engagement from the outset helps you understand their needs and experiences and what local communities are bringing to the table.”

**Nikki Batchelor, XPRIZE Carbon Removal**



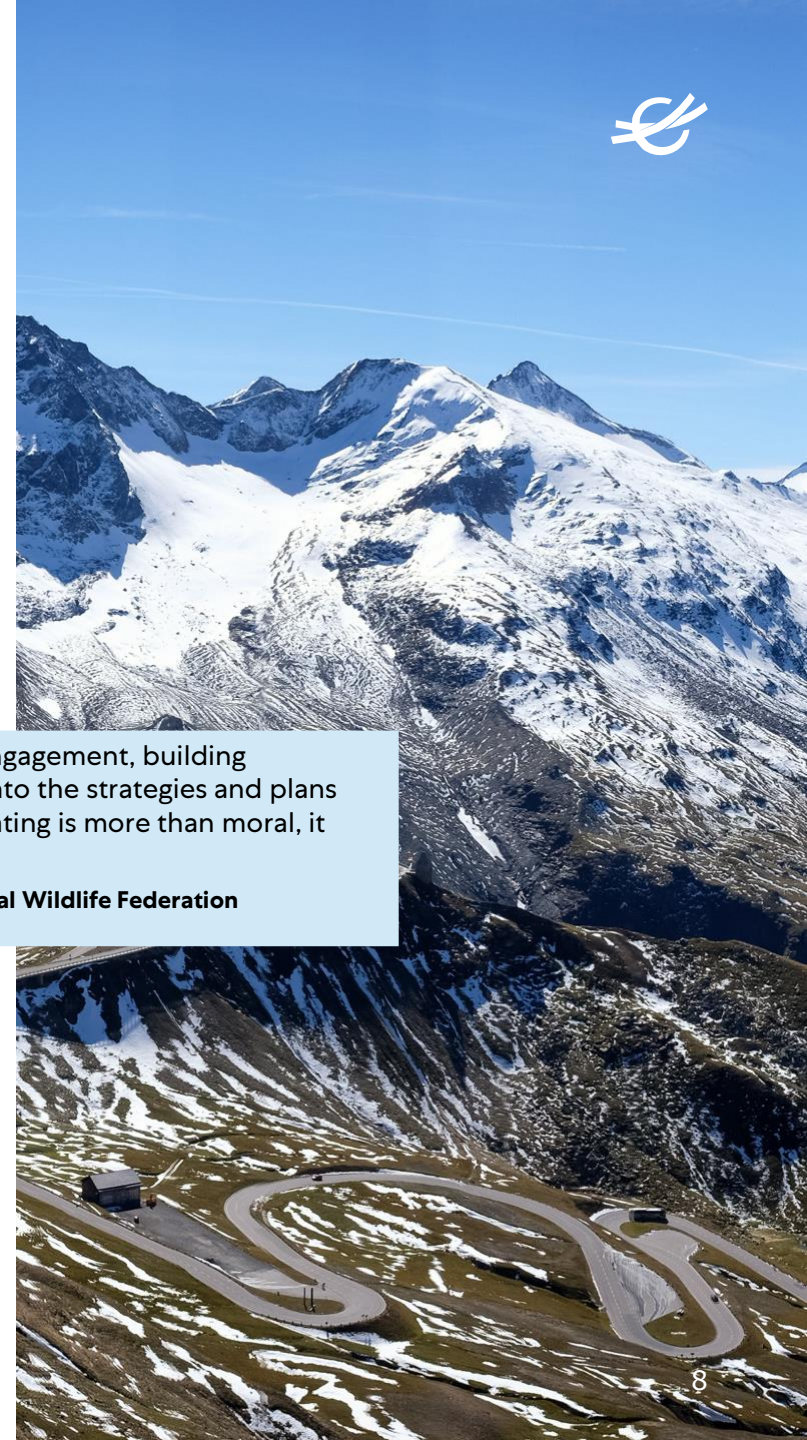
“Building community engagement, building environmental justice into the strategies and plans that companies are creating is more than moral, it is responsible.”

**Simone H. Stewart, National Wildlife Federation**



“We need actual projects at that scale to show the world what they look like. We need to make sure that they don't just work from a technical or a business model standpoint but engage communities and provide robust environmental protection so that people want CDR in their community.”

**Noah Deich, Office of Fossil Energy and Carbon Management (FECM), US Department of Energy**





# Inspiring closing words from our guests



**Katharine Hayhoe**  
Chief Scientist,  
The Nature Conservancy



“Take the information that you have heard here, the inspirational stories and the challenges, and share them. Share them with people that you work with. Share them with people who are looking at investing in climate solutions. Share them with researchers who are lending a hand. Share them with business people, engineers, teachers, and your kids. We need every person's hand on the giant boulder of climate action, pushing it down the hill as fast as we can--because I'm convinced that, together, we truly can build a better future.”



**Brian DiMarino**  
Managing Director,  
Head of Operational Sustainability  
JPMorgan Chase & Co.



“I have one ask of you: beat us, do a bigger contract, push the bar. We moved the bar up, move it higher. Somebody is out there who is in the audience today and will be talking at the summit next year. You guys can do it. Challenge us, challenge yourself.”

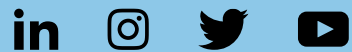


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**Bill Gates,**  
Breakthrough Energy

“We need massive decarbonization, but for the hardest to decarbonize areas, we also need a huge amount of Carbon Dioxide Removal (CDR). We need this CDR to be monitored, reported, and verifiable. And Direct Air Capture is the gold standard for CDR.”

