

May 25, 2023

Supervisory Body, United Nations  
Framework Convention on Climate Change



**Re: Heirloom Carbon Technologies Inc  
("Heirloom") input to A6.4-SB005-AA-A09 Annotated Agenda and Related Annexes**

Dear Article 6.4 Supervisory Body,

As the Intergovernmental Panel on Climate Change revealed in its [Special Report on Global Warming of 1.5 Degrees Celsius](#), all pathways that limit global warming to 1.5°C project the extensive use of carbon dioxide removal (CDR). In the context of this urgent finding, we thank the Supervisory Body for progressing the development of international carbon markets, specifically on defining the role of carbon removals in realizing the ambition of the Paris Agreement.

Heirloom builds Direct Air Capture (DAC) that permanently removes CO<sub>2</sub> from the atmosphere, with a real path towards removing 1b tons of CO<sub>2</sub> by 2035. [Our technology rapidly accelerates](#) the natural processes that enable limestone to absorb CO<sub>2</sub> from the air from a timespan of years to days. Earlier this year, Heirloom and CarbonCure became the first to permanently store DAC-captured atmospheric CO<sub>2</sub> in concrete [in a world-first](#).

The inclusion of carbon removals in the Article 6.4 mechanism is welcome, and we appreciate the opportunity to comment on the Information Note at this foundational juncture for effective carbon management.

In summary, we have grave concerns that sections of the UNFCCC report present severe risks to catalyzing innovations and technologies required to address the urgent mandates laid out by your sister UN body (IPCC). We would draw your attention to the following:

1. The outdated dichotomy of engineered and land-based carbon removals is being upended by innovative carbon removal technologies. Technologies like Heirloom draw from the best elements of several approaches - such as Mineralization (traditionally considered a 'land-based' approach) and Direct Air Capture (traditionally considered an "engineered" solution).i
2. CDR solutions have shown promising economic and technological feasibility, with clear pathways to being able to scale to the challenges climate change presents
3. The transparency, effectiveness, and credibility of carbon markets hinges on the distinguishment of credits on the basis of quality, including permanence.
4. Responsibly deployed carbon removal can be an instrumental tool of climate equity.

### The urgency of carbon removal is now

Delays in delivering decisive climate action have compounded the urgency of the climate equation. [The IPCC's expert consensus](#) is now that carbon removal is “unavoidable” and 5-16 Gt of carbon dioxide will need to be removed annually by 2050 to keep to the 1.5 Degree C threshold. As stated by the UN Secretary-General Antonio Gueterres, “our world needs climate action on all fronts -- everything, everywhere, all at once.”

### Innovative carbon removals are rapidly scaling

Carbon removals, including those that harness and enhance removal processes through a blend of both engineered and natural solutions, have a proven track record of being effective, verifiable, affordable, and rapidly scalable. Heirloom is a nature-inspired technology that uses limestone, an earth abundant material, as the capture material in a highly scalable Direct Air Capture process with a minimal land footprint. The rate of scale will be determined, in part, by the transparency, credibility, and efficacy of an international carbon market.

### Effective carbon accounting

While most land-based removals are temporary and susceptible to climate-driven events such as wildfires, carbon removal technologies, including those that rely on natural processes, can store CO<sub>2</sub> permanently for hundreds to thousands of years.

Storage of CO<sub>2</sub> underground or in facilities like concrete is additional, verifiable, permanent, and durable. These benefits should be priced into carbon accounting systems so that the long term benefits of carbon removal credits can be distinguished from more temporary removal solutions.

### Supervisory Panel findings

We would therefore highly encourage a reconsideration, and multi stakeholder dialogue, about the the views expressed in Table 3 of the Information Note as outdated and unbalanced.

### 3.2. Eligibility of activity types under the Article 6.4 mechanism

39. Based on the public input from stakeholders and other sources consulted, table 3 summarizes the pros and cons of the eligibility of different types of activities under the A6.4 mechanism.

**Table 3. Pros and cons of the different activity types being made eligible under the mechanism**

Activity type	Pros and cons
Engineering-based activities	<p><b>Pros</b></p> <ul style="list-style-type: none"><li>– Engineering-based removal activities result in permanent net removal of carbon dioxide from the atmosphere.</li></ul> <p><b>Cons</b></p> <ul style="list-style-type: none"><li>– Engineering-based removal activities are technologically and economically unproven, especially at scale, and pose unknown environmental and social risks (P-12, R-83:a, R-84:a, R-50:c,d). Currently these activities account for removals equivalent to 0.01 MtCO<sub>2</sub> per year (P-15:a) compared to 2,000 MtCO<sub>2</sub> per year removed by land-based activities.</li><li>– These activities do not contribute to sustainable development, are not suitable for implementation in the developing countries and do not contribute to reducing the global mitigation costs, and therefore do not serve any of the objectives of the Article 6.4 mechanism.</li></ul>

## **Technological and economic readiness**

To answer the science-backed imperative of the IPCC's guidance, many engineered carbon removal technologies have demonstrated technological efficacy at various scales. Heirloom has established the first Direct Air Capture facility in North America which permanently stores CO<sub>2</sub>, with plans for additional facilities set for 2023-24. New carbon removal facilities by companies such as [Global Thermostat](#) and [Carbon Engineering](#) have also come online.

The economic rationale for carbon removal, or negative emissions, lies not in evading the costs associated with emissions reductions, but in addressing historical emissions and residual emissions from sectors that are hard to decarbonize. Negative emissions credits produced by carbon removal technologies have been sold to sophisticated voluntary buyers such as [JPMorgan Chase](#), [Frontier](#), and [Microsoft](#) in deals valued as highly as 200 million USD - who understand the importance of reversing their companies decades-long impact on the planet.

Legislative actions in the United Kingdom, European Union, Canada, and the United States, including the State of California, have provided an early-stage enabling environment for Direct Air Capture and other carbon removal technologies. India has emerged as a prominent player in the Global South in pioneering carbon markets through the [development of a carbon credit trading scheme](#). However, to scale at the pace the climate math requires, additional policies and incentives must rapidly be introduced across all levels of governance. Most importantly - these markets must fairly consider the merits of carbon removals - by accurately pricing in important variables like the permanence and additionality of a removal.

## **CDR as a driver of sustainable development**

CDR technologies present a compelling opportunity to bring the sustainable development goals within reach. The advantages are threefold:

Firstly, these technologies can be rapidly and effectively scaled across the globe, leveraging our planet's vast geological reserves to store CO<sub>2</sub> without encroaching on arable lands. This approach safeguards food supply and preserves biodiversity.

Secondly, in developed countries, the transition from fossil fuels to greener technologies is crucial. By repurposing existing oil and gas infrastructure for CO<sub>2</sub> storage, we can smoothly transition fossil fuel workers into the emerging green tech industry, mitigating unemployment risks and fostering a sustainable workforce.

Thirdly, the Global South, which is disproportionately impacted by climate change, stands to gain outsized benefits from responsibly-deployed CDR due, in part, to a [widespread availability of geological storage](#). Technologies like Heirloom's can also lower the carbon footprint of building materials, like concrete, that are essential to climate-resilient infrastructure. By fostering green jobs and stimulating investment, we can create significant economic ripple effects that strengthen local economies.

Overlooking the immense potential of responsible CDR in international carbon markets risks neglecting significant opportunities for sustainable development and strengthening climate resilience.

### **Moving at the speed of the climate crisis**

Recent literature suggests that CDR technologies are required to reach mass industrialization [two to four times faster than earlier green technologies](#), like solar power, if we are to achieve carbon neutrality by mid-century. As one of the most important mechanisms for harnessing the ingenuity and capital of the private sector, Article 6.4 must provide countries with a framework that fairly considers the merits of every solution in our climate toolkit. This is increasingly occurring at the local and national level, and we urge the UNFCCC to lead on shaping carbon markets that set the world economy on the fastest possible path to net-zero emissions.

*For further reading on Heirloom, [read our white paper](#)*

We know the UNFCCC takes its diligence and development of positions extremely seriously, so we very much appreciate your willingness to gather stakeholder feedback and ensure that policy frameworks catalyze both the growth of critical technological innovations and measurably meet the urgency of climate change. We believe verifiable, high quality carbon removals generated by Direct Air Capture (and other CDR technologies) firmly get us there, and we welcome a conversation as you refine your vision for the road ahead.

We appreciate the opportunity to engage in this request for information, and look forward to partnering in the fine-tuning of UNFCCC policy to advance shared climate goals. Please contact Vikrum Aiyer and Christian Theuer at Heirloom at [vikrum@heirloomcarbon.com](mailto:vikrum@heirloomcarbon.com) or [christian@heirloomcarbon.com](mailto:christian@heirloomcarbon.com) if you have any questions.

Sincerely,

**Shashank Samala**  
Chief Executive Officer

**Vikrum Aiyer**  
Head of Global Public Policy, Heirloom