

A UK Centre for Carbon Removal

February 2019

This paper explores the opportunity for a new, UK-based organisation with a mission to advance carbon removal in the emerging and shared worldwide pursuit of slowing, halting and reversing global warming on human-relevant timescales.

We briefly outline the current climate change landscape and need for carbon removal, identify specific barriers hindering the scaling up of carbon removal techniques, and outline the UK Centre for Carbon Removal (UKCCR) as a vehicle to lead the development and delivery of the capabilities required to overcome these barriers.

Carbon removal will be needed to address climate change

Despite our best efforts to reduce greenhouse gas emissions over the past few decades, current forecasts indicate that the world remains on track to warm well beyond tolerable thresholds.

Given current levels of policy action and investment in necessary mitigation activities – as well as the effects of inertia within financial, infrastructural, political and climate systems – it is increasingly clear that emissions reduction alone will not be sufficient. It is also clear that litigation and reparations will not be adequate to ameliorate long-term consequences.

It is therefore now apparent that ways of actively removing largely carbon-based greenhouse gases from the atmosphere will also be needed both in the short term and over many decades to come.

Specifically, more scenarios than not project that carbon removal techniques must be deployed at massive scale in the coming decades, *in addition* to significantly enhanced ambition and escalated action around emissions reduction, a statement echoed by the latest IPCC SR15 report:

“All pathways that limit global warming to 1.5°C with limited or no overshoot project the use of carbon dioxide removal (CDR) on the order of 100–1000 GtCO₂ over the 21st century.”¹

There are barriers to advancing carbon removal

The prominence of carbon removal in climate change discourse has increased over recent years. However, compared with discourse around mitigation and adaptation it remains, at best, largely unknown or, at worst, dismissed entirely by the communities that would need to engage with it.

In particular, there are three key barriers that must be overcome to facilitate large-scale deployment of carbon removal techniques:

¹ http://report.ipcc.ch/sr15/pdf/sr15_headline_statements.pdf

1. Communication and awareness

Carbon removal represents a subtle new component of an already complex climate change discourse and collection of narratives. In contrast with mitigation and adaptation, awareness and understanding of carbon removal in both scientific and mainstream communities are relatively low.

There are also political sensitivities that are unique to carbon removal. For example, the moral hazard argument – where deployment of, or even any serious exploration of carbon removal may reduce focus on mitigation or adaptation – is both a valid concern and a self-imposed, potentially self-fulfilling obstacle to the action required.

A second key sensitivity is the perceived injustice of carbon removal. In particular, where the discourse focuses on land-demanding approaches such as large scale Bio-Energy with Carbon Capture and Storage (BECCS), climate justice groups often reject the idea that, for example, the Global South be asked to clean up the carbon emitted by more developed nations.

Given the nascent position of carbon removal relative to mitigation and adaptation in both scientific and public discourse, communication around and dialogue on the topic is still relatively unsophisticated and disconnected. Much of the emerging discourse on the appropriate role of carbon removal is taking place in specialist technical domains such as the IPCC SR1.5 report referenced above. However, what is missing are forums and platforms for dialogue to take place to allow scientific and public discourse to evolve and necessary actions to be taken.

2. Technology innovation and diffusion

Carbon removal as a term is an umbrella for a highly diverse set of innovations, techniques and practices at various, mostly early, stages of development. As such the field suffers from dilution of attention and funding. This has limited the ability of any one participant to make significant progress to the degree that is necessary to scale.

Few designs or techniques within the carbon removal landscape have yet penetrated into the wider innovation landscape. Many of the industrial approaches with clear removal potential are currently at earlier stages of their innovation curves. Many of the ecological approaches with very mature stages of innovation have unclear removal potential.

Little attention has therefore yet been paid to enabling actions that are required to I) support necessary developments across the carbon removal innovation ecosystem, and II) ensure those developments have co-benefits rather than conflicts with other progress being made in

mitigation, adaptation and the broader themes of planetary stewardship² and sustainable development.

Examples of these enabling actions include, but are not limited to: policy adjustments to incentivise investment; robust supply chains; capacity for monitoring, reporting and verification and participatory dialogues and co-creation processes with a broad range of stakeholders.

3. Policy and commercial incentives

Currently, there are few meaningful policy incentives or price signals to drive the development of carbon removal techniques. In their absence, the limited ‘technology push’ activities currently being pursued are insufficient to progress carbon removal at the pace needed.

As promising techniques approach the demonstration phase of their development, they will be subject to the same valley of death challenges that all disruptive innovations face, where costs are high yet funding or the promise of future revenue are limited.

A diverse set of communities need to be engaged

The impact of these barriers is amplified by the number and diversity of the communities who need to pivot in different directions, and act in different ways, to bring carbon removal into their business-as-usual operations.

A visioning workshop held by the co-developers of the UKCCR model³ identified that there are at least fourteen communities, which is still likely an underestimate. In no particular order, these are:

- Large infrastructure businesses
- Start-ups
- Energy intensive businesses (e.g. cement)
- Financiers
- Non-governmental organisations
- Land owners
- Philanthropists
- Certification bodies
- Politicians
- Politicians and Policy makers
- The public
- Large technology businesses
- Journalists
- Businesses in industries that are hard to decarbonise (e.g. aviation)

Each community will be influenced by different needs that are most relevant to them and positive-sum-game actions will need to be identified and implemented to move forward. To illustrate this, consider the needs of two communities: policy makers and businesses whose activities are difficult to decarbonise.

² [The Anthropocene: From Global Change to Planetary Stewardship](#)

³ Held in London on 20 September with 11 participants who work in fields related to the climate action space

Policy makers, e.g. in a UK government department, need to...

- Act in the national interest
- Set long term strategy
- Design evidence-based policies
- Adhere to wider policy ambitions
- Comply with legislation
- Show leadership in international forums
- Remain popular with voters
- Consult with advisors and communities
- Prioritise and allocate funding

Leaders in businesses that are hard to decarbonise, e.g. in an airline, need to...

- Act in the best interests of shareholders
- Respond to threats and opportunities
- Remain profitable over the long term
- Lobby for supportive policies
- Comply with regulations
- Maintain a good reputation
- Ensure customers keep using their service
- Complete with other businesses
- Invest in growth and innovation

As these needs will be always present in the minds of decision makers, the carbon removal ecosystem must be able to address or fit within these in order to successfully and sustainably scale-up. However, at present there are many barriers preventing it from doing so.

For example, it may not yet be clear to decision makers in local to national government that advancing carbon removal is a ready and viable part of the solution to restore a stable climate. In addition, taking action on carbon removal can be, or at least can appear to be, in tension with a key need such as fiscal or legislative restrictions that are not in broader alignment.

Nor may there yet be compelling cases for the benefits of demonstrating leadership, having a robust evidence base, or engaging voters' interests. Even as the evidence of the long term value of near term action in carbon removal emerges, navigating the landscape of potential options, politics and other systemic issues (e.g. economic, social) will require hard work and strong collective leadership.

Similarly, it may not yet be clear to business leaders that incorporating carbon removal techniques into their growth strategies could be in the best interest of shareholders, would defend their businesses against future threats, enhance long term profitability or encourage customers buy a service or product.

Coordinated support is required to address barriers

Given that there is a clear need for carbon removal to be developed and deployed at scale, and that there are many national, regional and local barriers currently preventing this from happening, it is clear that action must be taken.

We believe that decision makers within the relevant communities are willing to engage with carbon removal. As they embark on this journey, leaders will need support from trusted

advisors and third parties to help them to understand the landscape, identify opportunities to take action and identify and manage risks.

A new organisation will act as a trusted, independent advisor in carbon removal

There is a space for a new organisation in the UK with a mission to help advance carbon removal in addressing climate change across a range of audiences. Its activities would include:

- catalysing the transfer of evidence and capabilities around carbon removal techniques,
- facilitating their sustainable deployment, and
- encouraging governance and policy to co-evolve with innovation and technological development.

This UK Centre for Carbon Removal⁴ (UKCCR) will act as an objective and trusted advisor to a multitude of diverse stakeholders. It will raise awareness of carbon removal and facilitate constructive discourse. Moreover, as an agent of positive change, it will bring people together to co-create compelling and evolving narratives that incorporate reversing climate change alongside mitigating and adapting to it.

The UKCCR also has the potential to democratise and drive forward developments on many aspects of a wider healthy innovation ecosystem, including⁵:

- co-developing stretch goals to keep innovation robust
- developing and promoting standards, especially in measurement
- encouraging pre-competitive collaboration
- enabling low-risk field scale trials
- establishing new norms for intelligent business operations in emerging critical sectors of the 21st century and beyond.
- facilitating cross-sectoral dialogues and working groups to identify and address barriers
- pooling patents and finding innovative modes of collaboration,

Services will be developed to target the specific needs of its stakeholders

As an independent third party, the UKCCR will respond to stakeholder needs with targeted, timely and useful services. These propositions may include:

1. Synthesising and communicating high quality data and evidence

With the diversity of carbon removal techniques in terms of science, technology, process, geography, industry and stage of maturity, the carbon removal ecosystem requires time, expertise, and hard work to understand. We believe the UKCCR could act as a 'one stop shop' that collects, aggregates and communicates existing evidence to reduce the burden on

⁴ Working title

⁵ Not exhaustive

those new to the space. It could also collaborate with and multiply the impact of leading institutions with different deep expertise on aspects of carbon removal. In such a role, the UKCCR could also examine the quality of the available evidence, responsibly arbitrate areas of disagreement and polarisation, and clearly highlight potential areas and opportunities to move forward.

2. Informing positive stories to raise awareness and catalyse change

Carbon removal has proven, so far, to be a highly complex and politically charged topic often framed, as adaptation before it, as a 'dangerous distraction' from other activities that address climate change.

Given the as yet unfulfilled potential of mitigation, the persisting powerful actors in the denial and disinformation landscape, and the lack of ownership of the problems and leadership of solutions from the vast majority of powerful vested interests, the roots of the moral hazard argument against carbon removal are deep and have grown over many years.

However, the risks of moral hazard from introducing carbon removal techniques is complicated. There are also risks that blanket moral hazard debates create a self-fulfilling prophecy, in which reduction and removal persist in a false 'zero-sum' framing (as opposed to non-zero sum). This strategic position naively risks benefitting negative aspects of the status quo, and unintentionally increases the likelihood of a future scenario in which high emissions and accelerated warming lead to a more aggressive and thus riskier deployment of solar radiation management technologies.

As the latest IPCC report on 1.5 degrees emphasised we are no longer in the realms of 'either/or'. All options need pursuing, and all need to be pursued symbiotically, with the wider systemic picture clearly in mind.

Some have argued that there must be a truth and reconciliation process to allow all stakeholders to move on with unalloyed support. If we are to revolutionise our collective relationship with the carbon cycle, it must be with full and candid appraisal of the situation we face, how we got there, and what can be done about it.

To support this, UKCCR could bring together, for example, technical experts, policy makers and business leaders with storytellers and designers, framing carbon removal as a powerful tool alongside others while respecting the nuances and subtleties inherent within it.

3. Facilitating access to diverse networks and subject matter experts

As an independent third party, the aim of the UKCCR is to cultivate and inform a powerful, decentralised and independent network of stakeholders relevant to carbon removal discourse, both within the existing arena of practitioners and also connecting wider communities with an interest in learning more about carbon removal.

Within such a network, the UKCCR would also be in a position to direct queries from new entrants to the landscape to the most appropriate subject matter leaders and so facilitate new and productive relationships.

4. Convening events and thematic workshops

In support of its activities around communication and relationship building, the UKCCR will be an ideal convenor of events in order to bring people together and raise awareness around its mission.

These events would connect a range of diverse communities to raise awareness generally or be targeted at addressing specific customer needs, for example communicating technological readiness for investor technical due diligence or policy implications for civil service teams.

5. Educating and empowering decision makers

The UKCCR could create a series of guidance and tools to support the development of forward thinking decision makers and leaders within its customers. While these may take the form of events, as already described, this could be flexible and adaptive based on customer needs. For example, bespoke analysis and educational material supplemented by events may be used to enhance the capabilities of new stakeholders beginning to explore the carbon removal space.

6. Summarising and contextualising news

As an interdisciplinary organisation with a broad remit, the UKCCR would be in a position to take a high level and holistic view of carbon removal within a wide range of adjacent developments and emerging industries.

By reviewing and highlighting relevance and points of connection with customers' activities, the UKCCR could inspire new ideas and catalyse new activities that may otherwise have gone unnoticed.

Team members and advisors to the UKCCR also have direct experience in communications and media from the traditional mainstream platforms to newer more disruptive outlets.

This list of potential services is not exhaustive, but it does represent the depth and diversity of the opportunity available and serves as an effective starting point for initial development of the UKCCR concept.

The capabilities to deliver these services exist but are not coordinated

The UKCCR is inspired by the US-based *Carbon 180*, formerly the 'Center for Carbon Removal', which has played a valuable role in catalysing action and awareness of carbon removal within the United States.

While there are many actors within the sustainability and environment space in the UK, and many engaged individuals outside those sectors, there is no single entity with the mission to advance the understanding and development of carbon removal in an impartial and objective way.

The UKCCR would bring together existing communities of engaged and experienced professionals, identify where new capabilities are required and then build them to deliver against its mission.

The growth and evolution of the UKCCR will be stakeholder-led

While there are many potential priorities, capabilities and services that the UKCCR could develop, it will be important to focus the efforts of the UKCCR on identifying and engaging with its first customers and shaping its offer around addressing their needs in line with its mission.

A 'lean startup' model of rapid prototyping around iterative development of minimum viable products (build -> measure -> learn) will allow the UKCCR to move quickly, shortening timescales if opportunities emerge, and respond to new learning in an agile and efficient way.

This need-led approach will also ensure that the UKCCR contributes value quickly, and help to avoid exploration of avenues that may drain resources for little benefit.

Timeline for next steps

Q4, 2018

- Release this paper among trusted communities as a living document to encourage co-creation and deepening of quality and ambition.
- Reach out and connect with related initiatives and individuals who may be able to contribute a valuable perspective.

Q1, 2019

- Publish a website to act as a focal point for news, publications and community building
- Host a networking event to bring the existing community together and encourage participation in discussing and enhancing the UKCCR concept.

Q2-3, 2019

- Identify and interview potential stakeholders, refining the understanding of the appetite for such an initiative and beginning to scope the initial offerings. This will be supported by the recruiting of student research resource and holding a number of workshops
- Host a second networking event to maintain and build on momentum created thus far

Q3-4, 2019

- Publish a second iteration of this white paper based that has been refined through meaningful and repeated efforts at co-creation with the wider community;
- Define the governance and business model of the UKCCR, identify initial staff or volunteers who can help grow it and raise funding.

Contributors

This paper was authored by Michael Ashcroft and Mark Workman with the support of David Addison, Piers Cooper, Ed Dowding, Lizzie German, Guy Lomax, Richard Roberts, Patricia Silva, Richard Taylor and others.

Contact

If you would like to get in touch with us, please email hello@carbonremovalnetwork.org