

The promise of carbon capture and storage technology

Maddyness is collaborating with environmental publication Ours to Save to bring readers fresh perspectives on sustainability. Here, we interrogate how you go about removing 1,000 gigatons of carbon dioxide from the atmosphere.

If there is one analogy that best describes the state of the world's atmosphere today it is that of a bathtub with the tap running at maximum capacity, a clogged drain, and water spilling all over the floor. Through carbon dioxide (CO₂) emissions of all kinds created by human activity – automobiles, power plants, manufacturing facilities, and so on – the tap is pumping out unprecedented levels of CO₂ into our atmosphere. Unchecked emissions are, in turn, triggering a rise in the planet's temperature.

The willingness of society to close the tap and open our drain to lessen the impact of those emissions is, at best, limited. The destruction of ecosystems naturally able to absorb CO₂ is rampant; there is a lack of viable national and international policy frameworks to encourage society-wide solutions (such as markets to trade carbon credits); and most consumers are unwilling or unable to change purchasing habits to achieve a less carbon-intensive lifestyle.

While there are glimmers of hope that society is rising to meet these challenges, the pace of transformation must occur at an accelerating rate

because – putting it mildly – our overflowing tub has created a mess. To be in with a chance of meeting the aggressive goal of limiting the Earth's temperature increase to 1.5°C by the end of this century, we must find a way to both turn off the tap (eliminating the use of fossil fuels that produce carbon dioxide) while unclogging the drain (achieving 'negative emissions' whereby carbon dioxide already in the atmosphere is removed).

Read also

[India's path to electric mobility](#)

The most effective solution is to turn off the tap. Unfortunately, we have put so much CO₂ in the atmosphere that simply stopping all emissions is not enough to arrest the rising temperature of the planet. If we are to limit the rise in the Earth's temperature we also must remove carbon dioxide already in the atmosphere – to the tune of 1,000 gigatons according to the United Nations' [Intergovernmental Panel on Climate Change](#). To put the magnitude of that amount in context – a single gigaton is equal to the weight of 200 million adult elephants, enough to stretch trunk to tail from Earth to the Moon.

Carbon capture and removal: the emerging solution

Mother Nature is the most effective tool at our disposal when it comes to removing carbon dioxide from the atmosphere. However, now that we've overwhelmed the Earth's natural capacity to remove carbon dioxide from the atmosphere, it's time to turn to technology as a supplement.

A technology quickly growing in prominence is known as 'carbon capture and removal'. Umair Irfan, a science and climate change reporter for Vox, provides a helpful distinction: carbon capture is the grabbing of carbon dioxide at its source – such as the smokestack of a power plant – before it goes into the atmosphere. Carbon removal is grabbing CO₂ already in the atmosphere. In both cases the CO₂ is diverted and stored underground.

Despite its promise, carbon capture and removal technology has a long way to go before it scales to the level needed to remove 1,000 gigatons of carbon dioxide from the atmosphere. Furthermore, prominent projects in Norway and the United States have been plagued by cost overruns and a failure to meet projected targets of CO₂ removal.

The network of actors scaling carbon capture and removal technology

In my work studying the formation of markets for sustainable goods and services, I found that such markets come together much more quickly when four sets of actors collaborate:

Public sector – policy makers at all levels of government, from city councils to national governments, to the United Nations

Private sector – corporations, both privately-held and publicly-traded

Cause sector – NGOs, academics, and foundations

Finance sector – banks, pension funds, asset managers, and institutions such as the World Bank

In markets such as wind power and battery electric vehicles we see these actors working together to establish the policy frameworks to allow companies and investors to enter the market with certainty – thus bringing in innovation and capital – and cause sector experts lending their expertise and

credibility.

The United States has quickly emerged as a 'hotspot' for the development of carbon capture and storage technology. This is significant for two reasons. First, the United States is the world's second largest emitter of CO₂ (behind China) and thus it must play an outsized role in reducing both CO₂ emissions and CO₂ already in the atmosphere. Second, the United States is home to arguably the world's most contentious debate around the causes of climate change and the importance of reducing CO₂ emissions to address it. Thus, it is a positive when parts of the conversation shift to being focused on solutions.

In studying the public conversation taking place across the news media over the last 12 months about carbon capture and storage technology, I found two important trends emerging. First, there is significant private sector engagement with the topic, with the corporations involved having significant size and reach – and thus able to play a significant role in creating and sustaining a market for the technology. Additionally, one of the most influential investment firms in the world – JPMorgan Chase – has committed to investing in carbon capture and removal technology.

Second, the primary institutions involved in the conversations cut across the public and cause sectors – and the conversations are oriented towards enabling the development of the technology, not inhibiting it.

Keep in mind that no technology has ever scaled to something transformative without successes and failures. Carbon capture and removal is no different.

Despite the setbacks and challenges, the technology has shown promise.

More important, the critical ingredient already is in place: a network of diverse actors committed to making it a reality, particularly in the United States. What

remains to be seen is if these actors can collaborate at the pace and intensity needed to create a truly global solution in order to remove 1,000 gigatons of CO2 in the coming years, not decades or centuries.

Robert Ludke has over 20 years of experience in using data and research to inform strategy for clients on issues ranging from sustainability and ESG to public affairs and crisis communications. His work has taken him from the US Senate and House of Representatives to Nairobi, Kenya to currently authoring Transformative Markets: Harnessing the Power of Markets for a More Sustainable Future.

Discover Ours to Save

Article by ROBERT LUDKE