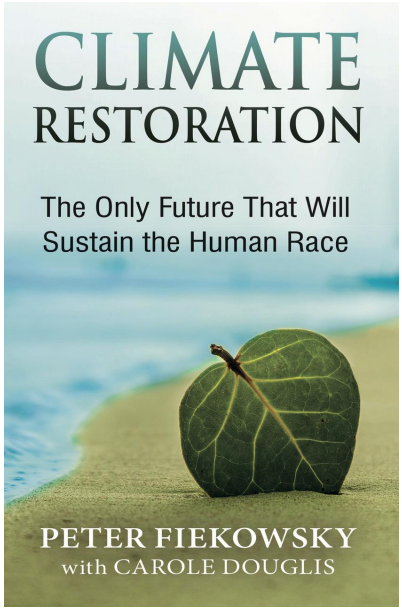
# Climate Restoration: A Pre-Industrial Climate by 2050

Everyone wants to restore a safe climate – one that humans have actually survived long-term.

In this "pre-industrial" climate, which allowed us to develop agriculture and thriving civilizations, atmospheric $CO_2$ never rose above 300 parts per million (ppm).




$CO_2$ levels are now 420 ppm, 40% higher and climbing. The widely accepted climate goal of net zero by 2050 would leave 50% more $CO_2$ in the atmosphere than humans have ever survived long-term. This is an unacceptable, risky proposition.

Fortunately, we now understand how to restore pre-industrial $CO_2$ levels by 2050. The know-how, technologies and even finance already exist. Putting that knowledge to use is our obligation to future generations.

Wholehearted implementation will take place when the moral imperative lands. When organizations and leaders take a stand and make an explicit commitment to climate restoration, policymakers can feel secure promoting climate restoration approaches, and investors will confidently make it happen.

Climate restoration requires investment of about $2 billion per year–less than 1% of the transition to clean energy. We can and will do both.

**The only climate justice is climate restoration. Since the poor are the first and most affected, climate restoration should be our common goal.**

---

## Good news: We *can* restore our safe climate

We can achieve our goal of bringing $CO_2$ back down below 300 ppm by 2050. This will require pulling a trillion tons of legacy carbon from the atmosphere. We can do this by replicating processes that nature has used for millions of years, and pay for it through investment from the private sector, without large government outlays.

## How will we do it?

By copying nature. Nature pulls massive amounts of $CO_2$ from the atmosphere by two main pathways: 1) Boosting photosynthesis in the ocean; and 2) Forming limestone on the seafloor (from the fallen shells of sea animals). Limestone is nearly half $CO_2$ by weight and stores 99% of the carbon on the planet.

5. 

## The “Big Four” Climate Restoration Methods

1. Ocean Iron Fertilization. Restoring healthy photosynthesis in selected parts of the ocean also restores fisheries. Island nations and coastal communities are exploring public-private partnerships to revive fisheries while contributing to climate restoration.
2. Synthetic limestone. This high-quality construction material can store $CO_2$ in our roads and buildings. It is already in use at the San Francisco International Airport.
3. Seaweed. Fast-growing kelp and sargassum consume massive amounts of $CO_2$ in their photosynthesis. In mariculture farms, half the seaweed can be processed and sold as food, chemicals and other products (including vegan leather). The rest can sink and store its biocarbon in the deep.
4. Methane oxidation. Accelerating nature’s way of removing atmospheric methane promises to turn back global warming to the level last seen in 2002. It can also protect humanity from a catastrophic methane “burst” from melting permafrost.

---

## Are DAC and carbontech the same as climate restoration?

We hear a lot about Direct Air Capture (DAC) and other carbontech these days. DAC filters $CO_2$ from the air and concentrates it, with large machines and chemistry. Today, after billions of dollars in government funding, DAC is most often used to push more oil out of oil fields, although some startups produce consumer goods from small amounts of $CO_2$. DAC can contribute to a host of industrial processes, replacing fossil fuel as a source of $CO_2$.

But DAC costs around $500 to capture one ton of $CO_2$. Even if the cost drops by 80%, removing the trillion tons of legacy $CO_2$ through DAC and other carbontech would cost a hundred trillion dollars– more than world GDP.

Climate restoration solutions are over 100 times more cost-efficient than DAC. They replicate natural processes. They work at a massive scale and produce commodities with large, existing markets–i.e,. fish and building materials. Therefore they can finance themselves. Ocean iron fertilization and synthesized limestone, alone or in combination, have the potential to remove 50-60 gigatons of atmospheric $CO_2$ a year, thus restoring pre-industrial $CO_2$ levels by 2050 while restoring fisheries and/or substituting for natural rock.

Info: Peter Fiekowsky, pfieko@gmail.com; Carole Douglis, cdouglis@gmail.com