

The ultimate climate change FAQ



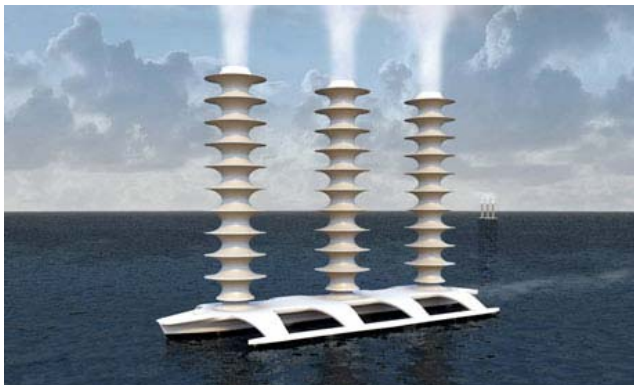
What is geo-engineering?

Geo-engineering aims to tackle climate change by removing CO₂ from the air or limiting the sunlight reaching the planet

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Engineer Stephen Salter's design for an unmanned ship designed to generate clouds and reflect sunlight away from the earth.

Geo-engineering schemes are projects designed to tackle the effects of climate change directly, usually by removing CO₂ from the air or limiting the amount of sunlight reaching the planet's surface. Although large-scale geo-engineering is still at the concept stage, advocates claim that it may eventually become essential if the world wants to avoid the worst effects of climate change. Critics, by contrast, claim that geo-engineering isn't realistic – and may be a distraction from reducing emissions.

The first category of scheme – those designed to remove CO₂ from the air – include machines (sometimes called "artificial trees") that pull the gas from the atmosphere using plastic polymers. Other proposals seek to increase the amount of CO₂ absorbed by the oceans – for example by adding large quantities of lime to the water.

Other related schemes – sometimes but not always described as geo-engineering – involve harnessing the capacity of trees and plants to absorb CO₂ from the air. These include burning large quantities of wood in power plants with carbon-capture technology; making and burying large amounts of charcoal to lock carbon into the soils; and grazing cattle in a way designed to turn grasslands into giant carbon sinks.

In the second category – schemes designed to reduce the amount of sunlight reaching Earth – proposals include firing sulphate aerosols into the stratosphere to reflect sunlight back to space; using [unmanned ships to increase above-ocean cloud cover by spraying sea water into the air](#); [painting the world's roofs white](#) to increase reflectivity; and even floating thousands of tiny mirrors in space between Earth and the sun.

Some geo-engineering schemes, such as adding aerosols to the stratosphere, have [attracted heavy criticism for their possible side effects](#). Even if these side-effects weren't severe, schemes that "mask" the temperature rise rather than removing the CO₂ come with some serious disadvantages, such as the fact that they don't deal with CO₂'s other major impact: ocean acidification. Administering any such scheme would also raise obvious issues of geopolitics and global governance.

Other schemes, such as the machines designed to suck CO₂ directly out of the air, are far less controversial, since all they aim to do is remove a pollutant that humans are adding to the air. The main challenges in this case are reducing manufacturing and running costs to make the devices commercially viable, and finding reliable and inexpensive ways to store the captured gas.

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