



## What is geoengineering (GE)?

- Interesting etymology: originally “coined in the 1970s to describe the injection of power-plant CO<sub>2</sub> into the deep ocean.” (Keith 2001, p. 420)
- The evolution of GE has taken us ...
  - From pollution control towards atmospheric modification
  - From fantasy to reality: interest is growing in GE
    - CBC has recently run a feature on it
    - The 2007 IPCC report included 1 page on GE; the upcoming report is alleged to have much more extensive coverage

## Some Contemporary Definitions

- “the deliberate large-scale manipulation of the planetary environment to counteract anthropogenic climate change” (Royal Society, p. 1)
- “planetary-scale environmental engineering, particularly engineering aimed at counteracting the undesired side effects of other human activities” (Keith 2001, p. 420)
- The intentional use of technology on a planetary scale with the goal of influencing the climate

## Two categories of GE

Two strategies:

1. Allow more radiant energy to escape the atmosphere or
  2. Allow less radiant energy to enter the atmosphere
- Carbon Dioxide Removal (CDR): “techniques which remove CO<sub>2</sub> from the atmosphere”
    - CD removed could be sequestered in the ground or in the ocean
  - Solar Radiation Management (SRM): “techniques that reflect a small percentage of the sun’s light and heat back into space”
    - Reflective material could be installed in space, in the atmosphere, or on the Earth’s surface
    - “cheap, fast, and imperfect” (Keith in Scott, p. 152)

## Some notable aspects of GE as a technique to mitigate CC/GW

- End-of-pipe rather than start-of-pipe
- Compensatory (in many cases) rather than remedial
- Planetary-scale rather than local-scale
- Essentially technological

## Some distinct but related questions about GE

1. Essential and inessential properties: What is GE? Does proposal x even count as GE? Is GE something unique?
2. Epistemic policy questions: Should we research GE? Who should be in charge of any GE research? Should research be private or public? Who should control GE research agendas and results?
3. Practical policy questions: Should we implement GE? How should we do so? Is GE a “good enough” strategy to mitigate CC/GW?
4. Meta questions: What are the metrics upon which we should assess GE for the purposes of answering 2 & 3?

## Epistemic policy questions an argument for GE research

### Insurance policy argument

1. There is a non-trivial chance we will not be able to ...
    1. adapt to CC/GW OR
    2. Successfully implement mitigative strategies like reducing GHG emissions

to prevent climate catastrophe
  2. In cases of non-trivial chance of catastrophic loss, it is prudent to take out an insurance policy if possible
  3. Researching GE is like doing this for the climate
- So we should research GE

## Some philosophical criticisms of the insurance argument

- **The open question response (Scott 2012):** GE research is not like an insurance policy
  - It is an open question whether GE research will lead to climate insurance, to something worse than the catastrophe it's supposed to insure, or to nothing at all.
- **The inertia response (Hourdequin 2012):** GE research is not like an insurance policy
  - Careers and life-projects will be established around GE, giving it an inertia insurance policies don't have.
- **The moral hazard response (Hale 2009, 2012):** GE research is like an insurance policy, but its one that carries with it certain bads or hazards.
  - Single action bias

## An argument for implementation

### The lesser of two evils argument

1. To (have a chance to) prevent climate catastrophe we will need to either
    - A. Reduce GHG emissions and/or
    - B. Pursue GE
  2. But A doesn't look very plausible for a variety of reasons (Gardiner, 2006)
  3. So if we rely on A we will likely end in climate catastrophe
  4. B is at least marginally better than climate catastrophe
- So we ought to pursue GE

## Responses – page 1/2

- **Meta question response (see Gardiner 2011):** what are the values on which the various outcomes are judged?
  - There's a divide in assessment here:
    - engineers and scientists tend to focus on efficiency (bang for buck), whereas
    - others tend to have other values (like natural values (Sarkar 2012), equality, solidarity, and virtue, in mind).

## Responses – page 2/2

- **The false dichotomy response (Whyte 2012):** catastrophic collapse has been used before to justify environmentally dubious policies
  - In particular, this style of argument has been used in the colonial past of North America
- **The future generations response (Hourdequin 2012, Smith 2012):** GE threatens our moral relationship with our kids
  - It constitutes intergenerational buck passing (failing to deal with the root cause for which we and our forebears are responsible)
  - Dead-hands the future into continuing to deploy GE measures

## The constructionist approach to GE – Introduction

- Early modern philosophers (Descartes, Bacon, others) argued mechanistic accounts of nature – only human minds were valuable
- Contemporary philosophers push back by positing value in more than just human minds.
  - Singer, Regan, and others argue that animals are alike enough to humans to be valuable
  - Leopold, Callicott, Rolston III, and others argue that nature itself is valuable, albeit for different reasons than people are valuable

### The constructionist approach – con't

- Bases the error of the early moderns not (only) in their failure to ...
    - realize other things in nature are like us in relevant respects, or
    - realize other kinds of value besides the value inherent in human minds
- ... but (also) in their failure to take seriously the morally significant relations between the uncontroversially morally valuable and the rest of the world.

### The constructionist view

- Organisms are always and everywhere define their environments and literally construct them
- Environments, in turn, always and everywhere interact with organisms' genetics to literally construct organisms

### Critical application of the constructionist view

or How not to object to GE

Two kinds of arguments against GE and objections to arguments in favour of GE:

1. Consequence-based: geoengineering will have, or is likely to have, bad effects which are greater than its good effects
2. Intrinsic: geoengineering is a kind of act that is wrong to some extent or other regardless of its consequences.

### How not to object: con't

"If initiated, climate engineering would take anthropogenic influence on the earth to a whole new level.

It would mean **intentionally assuming responsibility for the very skies under which all life on earth lives ...** " (Preston 2012, p. 1)