Research Report

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Forum: *Environmental Commission*
Issue: *Exploring the possibilities of geo-engineering for counteracting climate change*

Position: *President*

Disclaimer: this research report has not been checked by the LEMUN staff

Introduction

In recent years, geo-engineering (also known as climate engineering) has been suggested more and more as a method to mitigate climate change. Generally speaking, geo-engineering aims to tackle climate change directly by decreasing the amount of sunlight which reaches earth and by removing carbon dioxide from the air. Many concepts to achieve this have already been developed, like artificial trees which remove CO2 from the atmosphere and introducing aerosols into the stratosphere which the intention of reflecting sunlight back into space. Still, many critics of such schemes warn of the potential side effects, technical issues and the high operating costs. Thus, it would be wise to explore these schemes to find out if they can effectively serve to combat climate change.

Definition of Key Terms

Geo-engineering: Direct intervention in our planet's climate with the intention of reducing or combating climate change by means such as blocking sunlight, absorbing CO2, etc.
Ocean acidification:
The decrease of the ocean's pH, largely due to the increased amount of CO2 in the atmosphere.
Aerosols:
Substances which are released in the form of a fine spray after being contained under pressure.

General Overview

Scientists have been working on ways to mitigate climate change for decades, and many important discoveries have already been made. Most of these discoveries are related to ways to reduce greenhouse gas emissions or energy conservation. Many of these inventions show great potential to reduce our energy consumption and greenhouse gas emissions. Furthermore, more and more ways of generating energy sustainably are being developed, and energy generation by renewable means seems to be becoming increasingly common. While these developments all seem like great ways to help humanity battle climate change, some argue that it is not enough; These critics believe that we should not only strive to decrease greenhouse gas emissions and lower our energy consumption, but that we should combat climate change directly by means such as reflecting a portion of the sun's energy or capturing excess carbon dioxide in the atmosphere. In recent years, scientist have developed many techniques to achieve such goals. Sadly, it is not always clear whether these schemes are feasible. Doubts about the cost and effectiveness of the various contraptions and inventions still prevent the implementation of geo-engineering.

One of the most commonly suggested methods of geo-engineering is solar radiation management: Partially reflecting the sunlight which would otherwise reach earth. This can be achieved by applying pale-colored materials to roofs, brightening clouds, introducing reflective aerosols into the upper atmosphere, or even by deploying space-mirrors. While these methods would reduce the adverse effects of climate change by cancelling out the effects of greenhouse gases in the atmosphere, it does not help to tackle the actual amount of greenhouse gases, meaning that it can't help other negative effects of these gases, such as ocean acidification. Thus, some might prefer to invest in other solutions. Still, many experts prize solar radiation management due to its relatively low cost and the speed with which such methods can be carried out.

Another method is carbon dioxide removal. The aim of this method is to remove excess CO2 from the atmosphere so as to combat the greenhouse effect and ocean acidification. This could be achieved by reforestation, forest restoration or carbon air capture. This would appear to be more effective than solar radiation management, since it also tackles ocean acidification, but large scale methods have the potential to be significantly more costly.

Climate engineering is obviously not limited to these two methods. Many others, such as grassland modification and ocean hydrosols, could also help mitigate climate change. These methods should all be considered but would

require a significant amount of research and development before any definite judgement regarding their feasibility can be made. So far, however, geo-engineering has been disregarded by most governments and to some extent even the UN. It would appear that it has not yet been considered as a serious option to help save the environment. Perhaps now the time has come to start taking the matter seriously, and to look into ways to determine whether geo-engineering can be used effectively. Exploring the various methods and techniques of climate engineering could hold the key to save our planet and the life it supports.

Major Parties Involved

Intergovernmental Panel on Climate Change:

The Intergovernmental Panel on Climate Change is an intergovernmental body which is part of the UN's efforts to mitigate climate change. Since its goal is to create an objective and scientific view of the effects of climate change, it could play a major role in bringing together various nations to discuss the possibility of using geo-engineering to counter climate change.

Russia:

Russia has previously pleaded for climate engineering to be considered as a means to combat climate change in the UN, and it is likely that they will do so again. Russian researchers have also experimented with stratospheric aerosols in the past.

UK, US, Germany:

These three nations have released government-commissioned assessment reports regarding climate engineering, showing that these nations seem to be taking the practice as a possibility when it comes to combating climate change. They haven't supported it as actively as Russia, though.

Timeline of Events

1950s-1960s	US and the USSR start seeing weather climate modification and weather control as priorities and as a major subject for research.
1965	Publication of report on climate change, "Restoring the quality of Our Environment", suggesting as a solution the employment of "a suit of geo-engineering options"

1983	Report published by the National Academy of Sciences, where geo-engineering is for the first time seriously discussed.
1997	The Kyoto Protocol on Climate Change
2007	IPCC report on geo-engineering where it is suggested the geo-engineering technologies are unstable, and thus should be treated carefully
2009	First real experiment of releasing sulphur aerosol in the atmosphere in Russia, conducted by Yuri Izrael
2011	UN Climate Change conference establishes a treaty to serve as the continuation of the Kyoto Protocol

Previous Attempts to solve the issue

Geo-engineering has been thought of as a solution to climate change since the 1950s, yet, little action has been taken. Although many small-scale projects had taken place prior it, the first major step towards further exploring geo engineering was the Kyoto Protocol, singed in 1997. In the recent years, both developed and developing countries have experimented with small-scale projects. For instance the US, UK, Japan, Russia, and also India and China, have all shown interest in experimenting and exploring geo engineering possibilities. A few countries have also developed national regulations, which unfortunately are quiet vague and thus not effective. Currently there is no international agreement on the topic either.

Due to lack of research, and fears over the possible side-effects, in 2008 the UN Convention on Biological Diversity imposed a e facto moratorium on ocean fertilization, which was extended to all geo engineering procedures in 2010, at the Conference of Parties in Japan.

Unfortunately, the above actions haven't had much of an effect and it is predicted that it is unlikely they will be effective in the future.

Possible Solutions

A first step towards facing the issue would certainly be the conduction of more in depth research. Also, an international treaty could be created, which will supervise any geo-engineering projects and objectively examine geo-engineering.
Since right now there isn't any international legislation, the establishment of regulations on geo-engineering is definitely urgent.