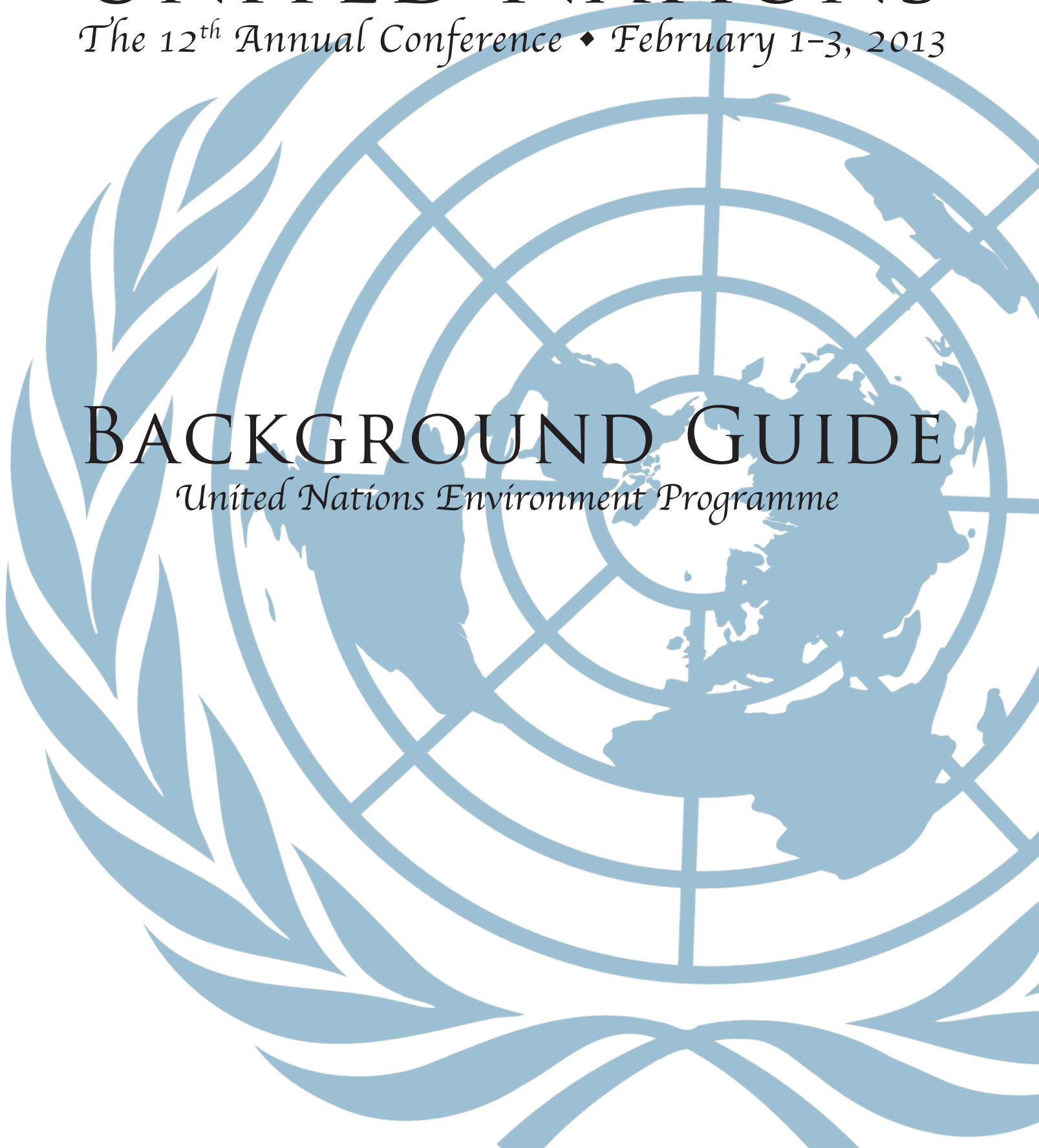


VANCOUVER MODEL UNITED NATIONS

The 12th Annual Conference • February 1-3, 2013

BACKGROUND GUIDE

United Nations Environment Programme





VANCOUVER MODEL UNITED NATIONS

The 12th Annual Conference ♦ February 1-3, 2013

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Dear Delegates,

My name is Bob Wang and I am the director of the United Nations Environment Programme for VMUN 2013. Instead of repeating my bio, which can be found on the committee website, I'd like to briefly talk about my understanding of Model United Nations. I consider Model UN conferences as opportunities for participants to be connected, not only to the world and its people, but also to oneself. You may surprisingly find out that public speaking appears to be more difficult than you previously thought, and you may be amazed by other people's amount of knowledge about international relations. In any case, the purpose of you attending a conference is fulfilled as long as you've acquired something new, whether it's a new friendship, or some new knowledge, or a new perspective.

The two topics chosen are closely relevant to UNEP's mandate and represent some of today's most pressing environmental issues. The first topic, the disposal of waste concerns the continuing unregulated trans-boundary movement of hazardous wastes, while the second topic, geo-engineering, offers an alternative to combat climate change. The impacts of these global environmental issues have long term effects on people and societies and are either difficult or impossible to reverse over the period of one generation. To adequately address the problems, concerted responses on the part of the international community are required.

With that said, I look forward to meeting all of you at the conference and wish you the best of luck with everything. Make sure you enjoy yourselves and I truly hope that you can acquire something new from your experience at UNEP of VMUN 2013. If you have any questions or concerns, please do not hesitate to contact me.

Sincerely,

Bob Wang

Director, United Nations Environment Programme

Position Paper Policy

What is a Position Paper?

A *position paper* is a brief overview of a country's stance on the topics being discussed by a particular committee. Though there is no specific format the position paper must follow, it should include a description of the positions your country holds on the issues on the agenda, relevant actions that your country has taken, and potential solutions that your country would support.

At Vancouver Model United Nations, delegates should write a position paper for each of the committee's topics. Each position paper should not exceed one page, and should all be combined into a single document per delegate.

For the United Nations Environment Programme, position papers are *optional*.

Formatting

Position papers should:

- Include the name of the delegate, his/her country, and the committee
- Be in a standard font (e.g. Times New Roman) with a 12-point font size and 1-inch document margins
- Not include illustrations, diagrams, decorations, national symbols, watermarks, or page borders
- Include citations and a bibliography, in any format, giving due credit to the sources used in research (not included in the 1-page limit)

Due Dates and Submission Procedure

All position papers must be submitted by midnight on Friday, January 18, 2013, two weeks prior to the conference.

Once your position paper is complete, please save the file as your last name, your first name and send it as an attachment in an email, to your committee's email address, with the subject heading as your last name, your first name — Position Paper. Please do not add any other attachments to the email or write anything else in the body.

Both your position papers should be combined into a single PDF or Word document file; position papers submitted in another format will not be accepted.

Each position paper will be manually reviewed and considered for the Best Position Paper award.

The email address for this committee is unep@vmun.com.

Topic A: Hazardous Waste

Overview

The amount of solid and hazardous waste has been increasing rapidly worldwide, a consequence of technological advances. Among the many different types of wastes, the primary focus of this committee will be hazardous wastes. Though the definition of the term may vary by country,¹ hazardous wastes in this backgrounder will refer to the definition developed by United Nations:

Hazardous waste is waste that, owing to its toxic, infectious, radioactive or flammable properties, poses an actual or potential hazard to the health of humans, other living organisms, or the environment.²

Efforts to manage these wastes vary by nation and have changed dramatically over the past few decades as our understanding of the issue has grown. This year, the United Nations Environment Programme is called upon to address the threatening environmental impacts of the improper disposal of hazardous waste, with a specific focus on the three areas listed below:

1. International cooperation to remediate contaminated sites
2. Regulation of the trade of hazardous waste
3. Disposal of waste from the 2011 Tohoku earthquake & Fukushima Daiichi nuclear disaster

Timeline

1978	The situation in Love Canal, New York, is declared to be a public environmental emergency, sparking legislation in the US concerning the disposal of hazardous waste.
1988	Italy is caught illegally transporting 8,000 barrels of hazardous wastes to the small town of Koko, Nigeria. This incident greatly alarmed the world and resulted in the convening of the Basel Convention.
1989	The Basel Convention is opened for signature in Switzerland.
1991	The Bamako Convention is signed, prohibiting the import of hazardous wastes by its members.
March 22, 1992	The Basel Convention comes into force.
1995	The Basel Ban Amendment is adopted, prohibiting the export of hazardous wastes from a list of developed countries, mostly members of the Organization for Economic Cooperation and Development (OECD), to developing countries.
1998	The Bamako Convention comes into force.

¹LaGrega, 2

²United Nations Statistics Division

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2002	Newly-conducted research reveals that the export of electronic waste from developed nations to African and Asian countries is still rampant.
2011	The Tohoku earthquake triggers the Fukushima Daiichi nuclear disaster. In the aftermath of the crisis, the Japanese government dumps radioactive water into the Pacific Ocean.
2012	Large amounts of tsunami debris are found along the west coast of North America and the east coast of Asia.

Historical Analysis

The advent of the Industrial Revolution spurred significant progress in the Western world in the fields of science and technology. With rapid industrialization came a dramatic rise in human population, which in turn caused an increase in personal consumption. One of the negative consequences of industrial growth and rising consumerism, however, was the generation of hazardous waste, which was not fully understood until recently. Up until two decades ago, the world remained largely ignorant of the risks of improperly handling wastes; indeed, the chief philosophy that guided government policies was “take it out and dump it.”³

These attitudes resulted in several unfortunate accidents. One such tragedy occurred in Love Canal, a neighbourhood in Niagara Falls, New York. In the early 1900s, William Love sought to establish a model city between the Upper and Lower Niagara Rivers but his plan did not pan out, and the region was turned into an industrial chemical dump. In the 1950s, despite being warned of its dangerous nature, the City of New York purchased the site from the Hooker Chemical Company and proceeded to establish a neighbourhood there, building on it two schools and several homes. However, within a decade, it became apparent that something was wrong, as puddles of chemicals began to surface in residents’ yards and basements; medical investigations revealed abnormally high rates of miscarriages and birth defects, as well as chromosome damage and early signs of leukemia.⁴ Finally, in 1978, all citizens were evacuated, as it became clear that the toxic waste underneath Love Canal made the area far too dangerous to be inhabitant.

Only after such notorious crises did it become evident that our environment and health are threatened by hazardous waste. Contaminated areas, such as Love Canal, can be found in all countries, but the number is generally proportional to the country’s level of industrialization; as an example, studies in the 1970s indicated that United States alone had over 50,000 sites made unsafe by waste.⁵

With more and more contaminated sites being created in the 1970s, industrialized nations started to tighten their environmental laws. However, similar programs did not emerge in most least developed countries (LDCs) until the 1990s. This, combined with the fact that disposal costs rose dramatically in countries where regulations of hazardous wastes were strengthened, made the transboundary movement of hazardous wastes easier and more attractive than before. Deals were made between LDCs and more developed countries (MDCs), but it soon became clear that recipi-

³LaGrega, 3

⁴Beck

⁵Blackman, 3

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ent countries were being shipped a noxious substance they did not have the resources to properly handle; hazardous waste began to accumulate in hundreds of African and Asian ports.

In 1988, a group of Nigerian students reported and helped to publicize the shipment of over 8,000 barrels of hazardous wastes from Italy to the small town of Koko, Nigeria, resulting in widespread environmental contamination.⁶ This incident, known as the Koko case, sparked public furor over the trade of wastes, leading to the enactment of the Basel Convention on the Control of Trans-boundary Movements of Hazardous Wastes and Their Disposal, or simply the Basel Convention, which is “the most comprehensive global environmental treaty on hazardous and other wastes.”⁷ The Basel Convention permits export of waste to occur only if the exporting country lacks adequate facilities for proper disposal, or the wastes are to be used as raw materials in a recycling or recovery operation.

However, a few years after the adoption of the Basel Convention, several LDCs voiced their concern over the still-rampant trade of hazardous waste and the apparent inefficacy of the convention. Exporters were exploiting a loophole in the agreement, classifying all exports as intending to be recycled, regardless of whether that was actually the case. In response, in 1995, the Basel Ban Amendment was introduced, prohibiting the export of hazardous waste from certain developed countries to developing countries for any reason.⁸ However, the legal status of the Basel Ban Amendment was called into question at a UN environmental conference in Cartagena, Colombia, in 2011. Today, many developed countries, such as United States, strongly oppose the global ban of hazardous waste trade and argue that less radical solutions can solve the issue just as well and that a total ban is excessive.⁹

The Fukushima Daiichi Nuclear Disaster

On March 11, 2011, a magnitude 9.0 undersea earthquake took place on the Oshika Peninsula of Tohoku, Japan, triggering a powerful tsunami that engulfed the entire region. One effect of the natural disaster was a series of nuclear meltdowns at the Fukushima Daiichi nuclear power plant, which led to the release of two major types of waste: radioactive materials and solid debris.

The radioactive waste spread largely through the air and radioactive particles originating from the Fukushima Daiichi disaster were detected in the atmosphere in California and along the coastline of China. Several scientific reports have since corroborated that the radioactive plume from Fukushima was indeed blown across the Pacific Ocean and is still being cycled around the world by oceanic currents and winds.

Exacerbating the effects of the initial meltdown of the nuclear plants was the Japanese government’s decision to dump 10,000 tons of “slightly radioactive water” into the ocean to “make room to pump highly contaminated water” out of other reactors,¹⁰ in violation of the London Convention, which prohibits the dumping of radioactive waste into the ocean.

⁶American University

⁷UNEP

⁸Basel Convention, 52

⁹Morrison

¹⁰Grier

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The Tohoku earthquake and tsunami created an estimated 24–25 million tons of possibly radioactive rubble and debris in Japan.¹¹ Some of this debris entered the Pacific Ocean and has been found along the west coast of North America and the east coast of Asia, posing a threat to marine ecosystems. Thus far, efforts to deal with the problem have been underwhelming: disposal of marine waste is extremely expensive, yet the United States has proposed a budget just \$700,000, an unrealistically small amount that will almost certainly prove inadequate, especially waste continues to accumulate into 2013.¹²

Current Situation

The number of contaminated sites worldwide is believed to be between 5 to 10 million,¹³ yet there is no coherent approach worldwide to dealing with hazardous waste. In light of issues with more visible effects such as the economic depression, the hazards of contaminated sites may seem tolerable; this, however, is a dangerous mentality, as hazardous wastes clearly pose serious risks to people and the environment and can have long-term damage. While some countries such as Netherlands are fully committed to remediating waste-bearing land, many, especially developing countries, still view the expenditures associated with remediation as superfluous and a hindrance to development.

This is an unfortunate situation, considering that the effects of improper hazardous waste management are magnified in LDCs, due to a lack of education and general awareness of the environmental risks, inadequate access to medical care, and unique sub-populations at special risk (e.g. scavengers who scourge contaminated sites).¹⁴

Though developed nations typically have more stringent legislation and the resources to remediate contaminated land, they are also guilty of exporting wastes to less-developed countries, exacerbating the issue. Most exporters claim that the recipient countries have facilities specialized in treating, disposing, and recycling waste,¹⁵ but in fact, many of the importing countries have no capability to adequately dispose of these wastes and are unable or unwilling to stop the traffic because of various regulatory loopholes.

An example of such a loophole concerns electronic waste (also called E-waste), or discarded electrical devices, the most common type of hazardous waste that is exported. A report by Basel Action Network and Silicon Valley Toxics Coalition revealed that “most of the material [E-waste] was clearly of North American origin, with Japanese, South Korean and European waste witnessed to a lesser degree.”¹⁶ Since most E-waste is still functioning at the time of export, proponents of E-waste exports have argued successfully that they should be classified as for the purpose of reuse and not as waste, thus evading international regulations.

In this hazardous waste trade anarchy, we find that the current trends are not leading away from export but indicate that exporters are instead finding new destinations and justifications for per-

¹¹Kurokawa, 20

¹²Coleman

¹³Site Remediation

¹⁴LaGrega, 73

¹⁵Blackman, 29

¹⁶Dutta, 16

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petuating the waste trade, which is still very much active despite the total ban of the exportation of hazardous wastes by the Basel Ban Amendment (see the UN Involvement section). Asia and Africa are two most popular destinations for exports of hazardous wastes because labour costs are very low and environmental and occupational regulations are lax. The improper disposal of hazardous wastes in recipient countries causes a myriad of problems such as groundwater contamination, atmospheric pollution, and health issues. For example, in Guiyu, a Chinese town situated on the South China Sea and a popular destination for E-waste, “seven out of ten children in the villages have too much lead in their bodies.”¹⁷

Case Study: Electronic Waste in Lagos, Nigeria

Nigeria has “a very large, highly educated and well-trained but low-wage informal sector.”¹⁸ An example of this are the many so-called waste brokers and recyclers, who transport huge quantities of E-waste to Lagos, the country’s most populous city, in spite of the fact that Nigeria is one of the 24 countries that has ratified the Bamako Convention, which bans the trans-boundary movements of hazardous wastes. While some of the imported E-waste is repairable and marketable, as much as three-quarters is junk.

Nigeria does not have any kind of electronic waste management collection or recycling program, and it therefore simply does not have the infrastructure to properly store or dispose of all the E-waste from developed nations. This means that the large amounts of garbage imported are inevitably bound for dump sites, typically located close to residential areas, a result of the dearth of official landfill sites. When these makeshift landfills become full, the waste is simply incinerated, sometimes by residents without any protective measures. A report by the Basel Action Network notes the problems with this situation:

Apart from the severe hazardous emissions expected from the burning of the electronic waste, the dumps are observed to be extremely hazardous with toxic ash, broken CRT glass, dead animals, medical wastes, used chemical containers, food scraps, etc., all mingled together. And yet, on the dumps, both informal and formal, children, scavengers and livestock, such as goats and chickens, routinely pick over or play on the sites, creating dangerous probabilities for contamination and infection.¹⁹

According to studies by the Basel Action Network, the E-waste found in Lagos comes from Belgium, South Korea, Finland, the Netherlands, Germany, Norway, Israel, Singapore, Italy, UK, Japan and USA. All of these countries are therefore guilty of exporting E-waste in defiance of regional and international agreements:

Not only is the Basel Convention being ignored...but a 1988 decree in Nigeria prohibiting all imports of hazardous wastes without special government authorization, and the Waste Shipment Regulation in the European Union banning export of hazardous electronic waste to developing countries, are not being properly implemented and enforced.²⁰

¹⁷Levin

¹⁸Basel Action Network

¹⁹Puckett, 23

²⁰Puckett, 6

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In Nigeria, virtually all imports of used electronics are illegal and the situation there is the result of lax enforcement of international law. It is not alone, however, in facing this problem: other Asian and African countries, such as China, India, Malaysia, Indonesia, Vietnam and the Ivory Coast, are all victims of the hazardous waste trade.

UN Involvement

The United Nations Environmental Programme is a leading force for international activities relating to the sound management of hazardous wastes. In conjunction with other organizations, UNEP has hosted numerous conventions, sponsors and publishes reports on issues related to the disposal of waste, and manages the International Register of Potentially Toxic Chemicals, a database specific to international hazardous waste management.

The most important convention that regulates the disposal of waste is the Basel Convention, held in 1989 in Basel, Switzerland. The three main principles of the Basel Convention, as stated in Article 4, are to:

Ensure that the generation of hazardous wastes and other wastes within it is reduced to a minimum, taking into account social, technological and economic aspects;

Ensure the availability of adequate disposal facilities, for the environmentally sound management of hazardous wastes and other wastes, that shall be located, to the extent possible, within it, whatever the place of their disposal;

...

Ensure that the transboundary movement of hazardous wastes and other wastes is reduced to the minimum consistent with the environmentally sound and efficient management of such wastes, and is conducted in a manner which will protect human health and the environment against the adverse effects which may result from such movement;

Another treaty, the Bamako Convention, was signed in 1991 by members of the African Union and came into effect in 1998. Galvanized by the failure of the Basel Convention, the Bamako Convention is much more explicit, prohibiting the importation of all hazardous wastes — including radioactive waste, a category omitted by the Basel Convention — by African states.

Though the United Nations has never officially engaged in attempts to promote international cooperation to remediate contaminated sites, many other international forums and meetings have been held on the matter, including the recent International Forum on Contaminated Sites Remediation.

Possible Solutions and Controversies

While all countries have contaminated sites and agree in principle that remediation of these sites is needed, translating verbal commitments into concrete action has been impeded by a combination of a lack of political will and financial and technological resources. Even open discussion on the matter is difficult, as most governments are averse to being forthcoming about the situation of contaminated lands in their country for fear of negative publicity.

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One solution to the issue of a physical lack of resources to deal with waste is an international exchange of technology and funding — that is, countries with advanced disposal strategies provide the rest of the world with the requisite technology and help partially fund the implementation of such programs. This scheme has failed to become popular, in part due to the fact that it is difficult to monitor remediation and ensure that the technology and money are being properly used. This problem can be resolved with the deployment of technicians in the recipient country, allowing the donor to closely monitor and advise the recipient. However, such a solution requires the donor to offer resources with no tangible return, something many countries are unwilling to do.

With regards to the international trade of hazardous waste, this committee needs to address the controversies over the implementation of the Basel Convention and the Basel Ban Amendment. Opponents of the Basel Ban Amendment, led by developed nations including the US, Canada, and Australia, argue that a total ban on exporting hazardous waste is unrealistic and impossible to achieve; they propose imposing more regulations, where there must be consent from both sides prior to the shipment of waste. However, proponents of the Basel Ban Amendment believe that this plan does not go far enough and does not address the loophole where exporters can simply label themselves as “recyclers” and their wastes as “exports”, thereby circumventing the new restrictions; in the status quo, many items that are labelled as able to be reused or recycled are in fact useless and are thrown away, without any accountability. Another possible solution is the implementation of an international monitoring system; such a scheme might, for example, require both export nations and import nations to inspect the cargo of ships in their ports for hazardous wastes.

Specifically concerning the proper disposal of marine debris from the Japanese disaster, solutions must factor in the huge quantity of waste, which will make remediation difficult and costly. Therefore, Japan’s role in resolving the problems associated with the radioactive debris needs to be defined. Though the Japanese government should not have to bear the entire burden of paying for cleanup efforts — the release of waste was, after all, ultimately the consequence of an unavoidable natural disaster — countries on the Pacific Rim will undoubtedly have concerns about, and may require assistance with, the radioactive waste in their waters.

Bloc Positions

Historically, in developed nations, greater public awareness and heightened public concern forced governments to legislate the treatment of hazardous waste. Since then, hazardous waste management strategies have emerged in even the most underdeveloped of countries, but are usually low on the political agendas of most developing nations. Hundreds of thousands of contaminated sites are still waiting to be cleaned up and the outsourcing of hazardous wastes remains a common practice.

In the early stages of the evolution of hazardous waste management, western European nations were perceived to be several steps ahead of the United States. Incineration was the major disposal technique and remains so to this day, but landfills — the disposal of waste via burial — were practiced in varying degrees, especially in Denmark, France, Holland, UK, and the former state of West Germany. The Warsaw Pact countries had less sophisticated waste management systems though, and the dissolution of the Soviet Union left thousands of military bases located mainly in central

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and eastern Europe, contaminated by abandoned military equipment. The former occupants took no financial responsibility to remediate those sites, causing tons of hazardous wastes to be improperly disposed of. The same situation happened in the Baltic countries.²¹

In Central and South America, waste management efforts was hindered by lax enforcement. Unlike most of the industrialized countries in the 1980s and 1990s, those developing nations were yet to fully realize the dangers posed by hazardous wastes. Countries of the Pacific Rims likewise fell behind, with Japan as an exception: Japanese laws, regulations, and enforcement mechanisms were said to be comparable to those found in other industrialized countries.

n.b. The following blocs are based on UNEP's geographical group divisions, found at <http://www.unep.org/gc/Secretariat/GCmember2012-2015.pdf>.

United States, Canada, Israel, Australia

These four countries have relatively advanced technology to support domestic remediation of contaminated sites and are all open to international cooperation. This bloc, led by United States, publicly oppose certain terms of the Basel Convention, especially the total ban on waste trade. Most of the countries in this group are very concerned with the debris from the Japanese tsunami, but are reluctant to either invest money or ask for Japan's help to deal with the situation.

Western European Nations

Western European nations are generally ahead of US in terms of domestic regulations over hazardous wastes. Programs to remediate contaminated sites exist within the European Union, a regional alliance of European states. All of these countries openly support the Basel Ban Amendment, but several continue to export hazardous wastes. Though not directly affected by the debris from the Japanese tsunami, many countries have expressed their concerns on the spread of the radioactive debris.

Eastern European Nations

This bloc as a whole has less stringent regulations compared to western European countries in terms of hazardous waste management, though some states in this group are members of the European Union and participate in the alliance's land remediation programs. All countries in this group except for Russia and Georgia are in support of a total ban on hazardous wastes trade, but some export or import wastes in spite of their support for the Basel Ban Amendment.

Asia-Pacific Group

In this bloc, only China, Indonesia and Malaysia have been open in their support for the Basel Ban Amendment. Other countries, such as Japan and South Korea, are either in favour of being able to export wastes or silent on the issue because they import and export hazardous wastes. All of these countries, with the exception of Japan, are also falling behind with technological developments in terms of hazardous waste management, and thus have large numbers of contaminated sites. The coastal states in this bloc are quite concerned about Japan's radioactive debris.

²¹Blackman, 29

African Group

This bloc is heavily in favour of a total ban on the transboundary movement of hazardous waste. Although some of the countries have ratified the Bamako Convention instead of the Basel Ban Amendment and some are not popular destinations for hazardous wastes, as developed nations begin to seek new countries in which they can export their waste, countries in this group have been increasingly active in rallying against the hazardous waste trade. Countries that import significant amounts of E-waste have called for an international monitoring system, for example. With regards to the Japanese tsunami and the resulting debris specifically, most of the states in this bloc are not too concerned, largely because they are preoccupied with hazardous waste in their own countries. Countries in this group generally lack the expertise and resources to remediate contaminated sites, and therefore often seek international assistance.

Latin American Group

Though they have not ratified the Basel Ban Amendment, Colombia and Brazil both have their own domestic laws to prohibit the import of all hazardous wastes. Other Latin American countries have varying positions on the hazardous waste trade. For example, Mexico has been engaging in the trade with Canada and the US for several decades and does not believe a total ban is necessary. However, Pacific Rims countries are anxious about Japan's radioactive debris, and most of them do not have proper disposal techniques since hazardous waste management in Latin America is not as advanced relative to that in North America.

Discussion Questions

1. How can countries effectively raise awareness of contaminated land and similar issues?
2. What kinds of international programs should be promoted to remediate contaminated sites?
3. What is the most effective way to regulate the transboundary transport of hazardous wastes?
4. Should the export and import of hazardous wastes be monitored, and if so, what organization or body should this task be delegated to?
5. Who should be responsible for lands contaminated by wastes from another country?
6. What should be done in response to Japan's tsunami debris — which is accumulating along the coastlines of several countries and in the Pacific Ocean — some of which may be radioactive?

Additional Resources

<http://www.unep.org/hazardoussubstances/UNEPsWork/HazardousWaste/tabid/295/Default.aspx>

A overview of the United Nations Environment Programme and hazardous wastes

http://ban.org/country_status/country_status_chart.html#Explanation

A list of each country's involvement in waste trade ban agreements

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<http://ban.org/E-waste/technotrashfinalcomp.pdf>

Another great case study; a very detailed report by the Basel Action Network about hazardous waste in Asia

<http://www.grida.no/publications/vg/waste3/>

Published in July 2012, this is a very comprehensive report by UNEP on hazardous wastes.

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Topic B: Geoengineering

Overview

Among the scientific community, a consensus has formed that climate change is occurring, and that “most of the observed warming at the Earth’s surface over the last 50 years is likely to have been due to human activities.”¹ Consequently, scientists and politicians have experimented with numerous methods to try to combat the effect of climate change, yet little has been achieved. Moreover, efforts to at least stem and not worsen the problem, such as carbon emission reduction and energy conservation, are falling far short of “what many analysts think is needed to avoid dangerous changes in climate.”² These failures have pushed some policy-makers to explore more recent and nascent climate-change strategies, which includes, among others, geoengineering.

Geoengineering refers to the “deliberate planetary-scale manipulation of the planetary environment to counteract anthropogenic climate change.”³ Geoengineering technologies can be divided into two categories, those that remove carbon dioxide from the atmosphere, and those that reduce incoming sunlight. While these technologies directly combat the problem at hand, it is important to keep in mind that “all the most promising geoengineering methods have likely side effects that are worrisome.”⁴

This background guide will analyze conventional approaches to address global warming by reviewing historical efforts to stabilize the climate. With this contextual information, it will then discuss and evaluate the idea of geoengineering. Examples are provided to illustrate countries’ stances on developing geoengineering technologies.

Definitions of Important Terms

CLIMATE CHANGE MITIGATION: In the early 1990s, few were familiar with the technologies of geoengineering, and most proposals centred on climate change mitigation. This approach seeks to reduce greenhouse gas emissions from all sectors of society, such as energy production, transportation, and industry, and increase the use of energy from renewable sources.⁵

ADAPTION TO CLIMATE CHANGE: Adaptation to global warming is an alternate approach that recommends that countries try to adapt to climate changes, possibly while mitigation methods are being implemented. To this end, countries would invest in protecting critical assets such as power stations, transportation infrastructure, and major population centres from natural disasters such as flooding, drought, and rises in the sea level. In some extreme cases, this would also mean the systematic abandonment of settlements and existing infrastructure at risk.

GEOENGINEERING: Geoengineering does not fall into either of the above categories and is con-

¹Intergovernmental Panel on Climate Change

²Helm and Cameron, 325

³Hamilton, 2

⁴*Ibid.*, 326

⁵Institution of Mechanical Engineers

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sidered a separate field of study. It uses technology to try to slow the global temperature rise by either removing carbon dioxide (CO₂) from the atmosphere directly, or by reflecting solar radiation back into space.

Timeline

1950s & 1960s	Weather and climate modification and weather control (which are distinct from the modern concept of weather modification) are viewed as a priorities by the US and the USSR and are the subject of much research. Today, weather and climate modification is generally referred to as <i>geoengineering</i> instead.
1965	The first widely recognized report to acknowledge climate change, titled <i>Restoring the Quality of Our Environment</i> , is published. One of the possible solutions that it recommends is employing “a suit of geoengineering options.”
1974	Russian physicist Mikhail Budyko proposes the injection of anthropogenic sulphate into the atmosphere.
1983	Geoengineering as a form of counteracting climate change is seriously discussed for the first time in a 1983 report published by the National Academy of Sciences, a non-profit organization based in the United States.
1997	Dr. Edward Teller, a Nobel laureate known for creating the hydrogen bomb, and two colleagues submit a paper to the 22nd International Seminar on Planetary Emergencies in support of geoengineering.
1997	The Kyoto Protocol on Climate Change is signed.
2002	Nobel laureate Paul J. Crutzen declares his support for geoengineering in an article published in the journal <i>Nature</i> .
2005	Yuri Izrael, a former vice-chair of the Intergovernmental Panel on Climate Change and head of the Moscow-based Institute of Global Climate and Ecology Studies, proposes the release of 600,000 tonnes of sulphur aerosol into the atmosphere to reduce the global temperatures by a few degrees.
2007	The IPCC concludes in a report that geoengineering technologies are unstable and should be treated with special caution.
2008	The UN Convention on Biological Diversity (CBD) imposes a moratorium on ocean fertilization.
2009	Yuri Izrael conducts the first real-world experiment of releasing sulphur aerosol to the atmosphere in Russia.
2009	The Copenhagen Conference is convened in Denmark.
2010	The moratorium proposed in 2008 by the CBD is expanded to cover all types of geoengineering technologies.
2011	The UN Climate Change Conference agrees to establish a legally binding treaty to serve as a continuation of the Kyoto Protocol (which is due to expire in 2012 and 2013) by 2015.

Historical Analysis

Governments will almost always thoroughly peruse a treaty and ensure that the requirements imposed are lax enough so they are sure compliance is feasible, before agreeing to be bound by its terms; otherwise they simply refuse to join.⁶ The Kyoto Protocol, which has been successful in securing legal compliance but has nonetheless a disproportionately small actual impact on global warming, illustrates some of the problems with typical treaty-signing practices.

In 1992, the United Nations Conference on Environment and Development (informally known as the Earth Summit) produced the UN Framework Convention on Climate Change (UNFCCC), an treaty on the environmental ratified by all UN members except Niue, the Cook Islands and the constituents of the European Union. The 1992 summit reaffirmed the role of the Intergovernmental Panel on Climate Change (IPCC), a scientific organization that assesses information related to human-induced climate change, the impacts of human-induced climate change, and strategies for adaptation and mitigation.

States party to the UNFCCC met annually from 1995 onwards, in Conferences of the Parties (COPs), to assess progress in addressing climate change. The third COP in 1997 produced the Kyoto Protocol, a milestone in the history of climate-change policies. The Protocol set out to do two things: “[set] targets for the reduction of emissions from industrialized countries...[and establish] a framework for the evolution of wider and deeper reductions subsequently.”⁷ Evaluating the success of the Protocol today, the frequent claim that the Kyoto Protocol has had little impact on climate change is true, but only to an extent: the Protocol has been successful in bringing together a coalition of parties to work towards an eventual wider and deeper agreement.

Climate change is difficult to deal with because the basic conditions for agreement, compliance, enforcement are largely absent. Some of the problems include the fact that “the allocation of responsibility for the existing stock of carbon in the atmosphere is complex,”⁸ that deep cuts in emissions are possible only with the collective action of many nations that hold different ideas, and that carbon emission reduction is not high on the political agenda and is often a peripheral concern to other issues like economic development. Yet there is little time to waste: much evidence suggests that in the absence of effective mitigation over the coming decades, emissions may increase at a higher rate than previously estimated, exacerbating the issue.

Although geoengineering was conceived of long before the adoption of the Kyoto Protocol, and small-scale projects have been undertaken in various parts of the world, the large-scale manipulation of the environment has only been seriously considered in recent years.

Evaluating Climate Change Mitigation

Climate change mitigation targets the root causes of global warming and encourages the reduction of carbon emissions. Mitigation measures frequently take the form of carbon emission reduction and the use of renewable energy. Carbon emission reduction yields the least side effects and

⁶Helm and Cameron, 335

⁷*Ibid.*, 17

⁸*Ibid.*, 19

is preferred by most scientists because of its predictability. Renewable energy is certainly a good long-term strategy — there is, after all, a finite supply of fossil fuels — but it will be expensive to develop, initially at least; “the cost of some renewable technologies is [currently] high because they are immature...[but is] likely to fall faster than the costs of fossil fuels” as the quantity of coals, oils, and natural gases gets smaller and smaller.⁹

However, one of the problems with this approach that has been thoroughly discussed in environmental conferences is a lack of political will among the international community. In order for mitigation strategies to work, countries have to make strong commitments that can often be incredibly expensive; for example, the development of renewable energies will likely need to be funded at least in part by the government. There is some cause for optimism: according to the Stern Review on the Economics of Climate Change, “the costs of stabilising the climate are significant but manageable if governments start to take strong action now.”¹⁰ The urgency of the situation, it seems, is often lost on politicians however: many countries still refuse to commit to emission cuts if they interfere with economic activities. Without a collective effort, it becomes very difficult if not impossible to achieve meaningful targets. That is to say, all countries must act in concert; if any of the large, industrial powers, such as the United States, decline to commit to emission cuts, the problem will continue to exist. Nevertheless, mitigation will likely remain the focus of environmental treaties, as it is the only reliable method that addresses the sources of global warming.

Evaluating Climate Change Adaptation

Strictly speaking, climate change adaptation does not offer a solution to global warming, but rather seeks to minimize the effects. If the international community does not commit to a plan to stabilize the climate in the near future, adaptation becomes a necessity; the Stern Review on the Economics of Climate Change points out that “adaptation is the only response available for the impacts that will occur over the next several decades before mitigation measures can have an effect.” Adaptation can take several forms, possibly involving “measures and strategies that contribute either to building adaptive capacity (i.e. undertaking research, gathering data, creating the information and supportive structures) or delivering adaptation actions (actions that help to reduce vulnerability to climate risks or exploit opportunities).”¹¹

The emergence of geoengineering complicates the role of climate change adaptation. Since a country’s adaptive capacity is closely related to its social and economic development, developing countries and least developed countries are less likely to be able to adapt to climate changes. Some African states argue for a total ban on geoengineering, claiming that if the side effects do prove to be harmful on an international level, then their already limited resources to dealing with climate change will have to be stretched even further.

Evaluating Geoengineering

The largest problem with geoengineering is its unpredictable side effects. For example, attempting

⁹Helm and Cameron, 296

¹⁰Stern, 1

¹¹Institution of Mechanical Engineers

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to offset rising emissions of greenhouse gases by artificially modifying albedo (the reflective power of a surface) will likely produce several harmful and unwanted effects, some of which can be seen directly and others which can be inferred from analysis, including the acidification of the oceans, possible changes in rainfall (perhaps inducing drought), and the alteration of ecosystems.¹² Consequently, some critics argue that “the cure of geoengineering might be worse than the disease” and that geoengineering is merely an excuse by governments to not reduce carbon emissions.

Acknowledging the disadvantages of geoengineering, we must also take note of its great potential. Geoengineering offers relatively quick benefits with fairly small costs and does not require the collective effort of the world to succeed — a single nation or even a regional community can fund a project on its own. In fact, some “private companies are already funding experiments on iron fertilization of oceans”, though with little success to date.¹³ Moreover, geoengineering is still a very new field. Nearly every experiment carried out is designed on a small-scale; thus, the positive feedback may be underestimated. In any event, geoengineering technology is still developing and there is significant room for improvement.¹⁴

n.b. Geoengineering is different from weather modification, which does not specifically concern climate change.

	Mitigation	Adaptation	Geoengineering
Costs	Will require financial commitment now	Will require financial commitment whenever governments deem adaptation necessary	Will require financial commitments now
Benefits	Will benefit mostly later generations	Will benefit mostly the generation that bears the costs	Will benefit mostly the generation that bears the costs
Geographic Areas Affected	Local costs, global benefits	Local costs, relatively local benefits	Usually local costs, global benefits
Sectors Affected	Focus is on emissions from energy consumption	Affects many sectors	Only a few options are likely to garner political support
Governance Issues	Dominated by national goals and international negotiations	Dominated by state and local agencies, but the need for coordination is great	International oversight is needed because of the concerning consequences of rogue nations or individuals acting unilaterally

¹²Helm and Cameron, 329-330

¹³Brown and Benjamin, 129

¹⁴Helm and Cameron, 327

Current Situation

Post-Kyoto negotiations on greenhouse gas emissions have generally failed to meet the expectations of the scientific community and environmental groups. Following initial talks in Germany, Bangkok and Barcelona, the 2009 Copenhagen Conference in Denmark was supposed to adopt a treaty to succeed the Kyoto Protocol, which expires at the end of 2012, but delegates at the conference failed to agree on measurable goals and ultimately created only a non-binding “agreement,” the Copenhagen Accord. Similarly, the 2010 UN Climate Change Conference merely reaffirmed that it is necessary to keep the global temperature within 2°C of pre-industrial levels, instead of taking more proactive measures.

There have been a few bright spots, however sparse. One is the establishment of the Green Climate Fund, a channel through which developed countries can offer financial assistance to assist countries in the developing world adapt to climate change. In addition, in 2011, the UN Climate Change Conference was held in Durban, South Africa, to continue the unfinished mission of the Copenhagen Conference. All countries agreed to a document that promised the adoption of a legally binding treaty before 2015, which, though criticized by many groups to be tardy and insufficient, is certainly better than nothing. There are also certain regional efforts worth mentioning. The European Union, for instance, established a climate change plan that seeks to cut carbon emission to 20% below the 1990 levels;¹⁵ unfortunately, “the rhetoric, the plethora of initiatives, directives, and interventions have not been matched by outcomes.”¹⁶

While the world continues to struggle with implementing climate change mitigation and adaptation, small-scale geoengineering projects have been launched by both developed nations, such as the United States, the United Kingdom, and Japan, and some developing countries, including China and India.

Currently, there is no international agreement governing geoengineering, and regulations are sometimes vague even at the national level. Fears over the unknown side effects of geoengineering led delegates at the UN Convention on Biological Diversity (CBD) in 2008 to impose a de facto moratorium on ocean fertilization, and at the 2010 Conference of Parties in Japan, the moratorium was expanded to cover all geoengineering technologies.¹⁷ However, the weak legal status of these regulations and the lack of enforcement meant the moratoriums had little practical effect. In fact, in early 2009, the German Minister of Research authorized an ocean fertilization geoengineering experiment in the Scotia Sea, blatantly flaunting the 2008 CBD agreements. In the long term, however, bans on geoengineering will likely be insufficient; consequently, there is some desire among the international community and the UN to come up with a regulatory system that monitors geoengineering research and activities.¹⁸

Case Study: Geoengineering in the Arctic

The changes in Arctic Sea have long been the subject of discussion in the scientific community; the

¹⁵SETIS

¹⁶Helm and Cameron, 228

¹⁷ETC group, 39

¹⁸Helm and Cameron, 338

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ice is melting at an increasing rate, which may have severe consequences for the world. For Peter Wadhams, a leading expert on sea ice at the University of Cambridge, “accelerating climate change in the Arctic has forced him to abandon his scepticism about geoengineering.”¹⁹ Indeed, “given the Arctic’s sensitivity to global warming, its role in the Earth’s radiation balance and all the other ways it affects the global climate, it has been singled out as a region that could deserve special attention from geo-engineers.”²⁰

In recent years, “scientists and policymakers increasingly advocate research into the deployment of solar radiation management (SRM) technique over the Arctic ice sheet, to slow the melting that has resulted from global climate change.”²¹ Stratospheric sulphate aerosols have been demonstrated in a laboratory setting to lower temperatures, and preliminary results have been quite impressive. However, due to the inherently complex nature of the global climate system, no one can conclude with certainty that the success in the laboratory will translate to success when deployed in the natural world. The injection of sulphate aerosols is just one example, though, of geoengineering: many other schemes have been proposed to address the rapid shrinkage of Arctic sea ice.

Although many governmental officials and scientists from countries such as the United States and the United Kingdom have urged for the international community to fund projects in the Arctic, these plans have been hindered by a pivotal issue that remains unresolved, the problem of governance. Who should take charge of and oversee the geoengineering projects, and who should be held responsible in the event of a negative outcome? Since most Arctic countries and the indigenous communities in the Arctic region do have the capacity to pursue geoengineering technologies, should an outside party be given the permission to have control over the Arctic sea ice for the operation of geoengineering programs, or would this be seen as a violation of sovereignty? Some scholars have argued that the Arctic Council is the most appropriate organization to oversee the process,²² but others have criticized the organization’s lack of binding authority.

Various suggestions have been proposed, but the number of options to address the rapidly deteriorating situation in the Arctic have dwindled to just two: geoengineering and adaptation. With time running out, it is more important than ever that the international community respond with answers.

Possible Solutions and Controversies

Below are possible solutions that this committee may wish to consider. However, this is by no means a comprehensive list, and delegates should strive to be innovative yet realistic.

Reconsideration of the 2010 Moratorium

More and more scholars have stated that making geoengineering a taboo topic is not only unnecessary, but also counterproductive.²³ The moratorium imposed in 2010 had little practical impact

¹⁹Aldhous

²⁰Egede-Nissen and Henry

²¹*Ibid.*

²²*Ibid.*

²³Helm and Cameron, 328

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on restricting the practice of geoengineering and will likely merely dissuade or be a hindrance to countries who are likely to do the most responsible testing, assessment, and possibly, deployment of geoengineering systems. Effectively, “a taboo would leave less responsible governments and individuals — those most prone to ignore or avoid inconvenient international norms — to control the technology’s fate.”²⁴

The removal of the moratorium would most likely be opposed by developing and least developed countries who do not have the capacity to experiment with geoengineering themselves and are therefore unwilling to bear the risks of the technology.

International Regulation

The creation of an international treaty to oversee the deployments of geoengineering projects and/or the establishment of an organization to objectively examine geoengineering and will be important going forward, especially if the 2010 moratorium is lifted but even if it is not. The argument against this proposal, as advanced by some countries, is that too much involvement in and focus on such a new and unreliable technology as geoengineering may merely be a dangerous distraction from the world’s real task of climate change mitigation, which, though not particularly effective, remains to be the most reliable way to combat climate change.

If this committee decides to increase the involvement of the international community in geoengineering, it must also determine what roles countries that do not have nor seek geoengineering capabilities, should play. Some nations that fall into this category have rejected geoengineering on its premises, while others are limited by economic and scientific resources; should these countries still be given the opportunity to take part in the discussion or the supervision of geoengineering projects? In any event, this committee should also consider measures to prevent countries from being exploited by the possible commercialization of geoengineering.

In addition, the selection of sites to conduct geoengineering experiments has always been a source of controversy. The 2008 moratorium was imposed to protect oceans from excessive acidification tests; if the ban is lifted, does this imply that countries will have the freedom to continue with their currently suspended projects in the Pacific Ocean, or any other bodies of water? This question has currently led to a catch-22: while some countries refuse to allow further experiments given the many unknown effects of geoengineering projects, these effects cannot be ascertained, and it is impossible to prove geoengineering as a net positive, without further research and experimentation.

Geoengineering in the Private Sector

Geoengineering does not require multiple groups to act simultaneously, as do many other means of combating climate change. As there is no internationally recognized definition of a geoengineer, even a single person with enough money can therefore experiment with geoengineering projects, certainly a concerning prospect. There is no consensus about such scenarios at the international level: some countries have nationalized geoengineering technologies, while others have no legislation to prevent private entities from engaging in geoengineering.

²⁴Helm and Cameron, 328

Geoengineering and Climate Change Mitigation

While climate change mitigation has shown to be ineffective, or not as effective as it needs to be, in the past few decades, the option of geoengineering is also ridden with danger. This committee should therefore discuss past international actions, identify the reasons behind the failures of previous treaties, and whether climate change mitigation should still be pursued, and if so, whether it should be combined with geoengineering.

Bloc Positions

Geographical groups are determined as per the UNEP membership list [here](#).

United States, Canada, Israel, Australia

These four countries have two key similarities: they all have the capacity to independently research and deploy geoengineering techniques, and all of their greenhouse gas emissions have increased in recent years. In addition, all members of this group have employed mitigation measures, but none have proven to be particularly effective. While the United States is a leading force in promoting geoengineering, the other three members are relatively neutral.

Western European Group

All members of the European Union are staunch supporters of climate change mitigation, despite the fact that some member states produce large amounts of emissions. Meanwhile, most Western European nations have also expressed interest in exploring options other than mitigation. The UK, Germany, and, to a lesser extent, France, are the largest supporters of geoengineering in this group.

Eastern European Group

The greenhouse gas emissions of all members have increased from 2000 to 2005. Russia has the most experience with geoengineering, while most other nations in this bloc do not have the resources to deploy geoengineering schemes. While some countries have not been successful in carrying out mitigation measures as specified by the Kyoto Protocol, many (Russia is a key exception) continue to consider mitigation as the only viable method of combating climate change.

Asia-Pacific Group

Most of the countries in this group are developing nations and thus often struggle between carbon emission reduction and industrialization. Many nations that do not have the capability to deploy geoengineering schemes in this bloc are generally conservative and hesitant about whether to uphold the 2010 moratorium. On the other hand, China and several other countries with high carbon emissions are seeking alternatives to mitigation that will not hinder economic development; therefore, they will most likely advocate geoengineering.

African & Latin American Groups

Countries in these two groups generally share the same stance on climate change mitigation: they believe it is the only option which can truly solve the climate crisis. Nevertheless, geoengineering has been tried on a small scale in some nations with relatively robust economies, such as Brazil and

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Mexico. While most African countries are strongly against the removal of the 2010 moratorium as they are unwilling to bear the risks and consequences of other nations' actions, reactions to geoengineering vary in the Latin American group, with the more economically developed countries, expectedly, being more open towards geoengineering proposals.

Discussion Questions

1. Should the 2010 moratorium on all geoengineering technologies be upheld or repealed? If the latter, should new restrictions be put in place on geoengineering?
2. What can be done to effectively regulate and monitor geoengineering schemes in general?
3. What should be done to incorporate countries without the necessary capabilities to research or deploy geoengineering projects themselves, if anything at all?
4. Should private entities be allowed to experiment with geoengineering, and if so, how should they be regulated?
5. Should the United Nations Environment Programme, or some other international body, oversee the selection of location for geoengineering experiments?
6. Going forward, what combination of geoengineering, mitigation, and adaptation should countries choose to deal with climate change?

Additional Resources

http://www.colby.edu/sts/climateengineers.pdf?referer=http%3A%2F%2Fworks.bepress.com%2Fjames_fleming%2F1%2F

An overview of the history of geoengineering

http://www.hm-treasury.gov.uk/d/Executive_Summary.pdf

The executive summary an important report on climate change

<https://www.cbd.int/doc/emerging-issues/etcgroup-geopiracy-2011-013-en.pdf>

Case studies against geoengineering

<http://www.publications.parliament.uk/pa/cm200910/cmselect/cmsctech/221/221.pdf>

An informative report by the Science and Technology Committee of the House of Commons in Britain, on the regulation of geoengineering

<http://www.stpp.fordschool.umich.edu/policy-consultations/GAO%20papers/Item%20B17-Geoengineering%20in%20the%20Arctic,%20GAO%20STPP%20Working%20Paper%2010-3.pdf>

An essay that discusses the governance dilemma of geoengineering in Arctic

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