SSICsim Fall 2014

SECONDARY SCHOOL INTERACTIVE CRISIS SIMULATION

GLOBAL WARMING 2050

COMMITTEE BACKGROUND GUIDE

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SSICSIM 2014

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A warm welcome to all delegates,

My name is Katrine Zimmermann, and I am honoured to be serving as the Director of the Global Warming 2050 committee at SSICsim 2014. This will be my second year serving as a Committee Director. As someone whose area of study is in the biological sciences, I have always been interested in the relationship between policy and science – whether that be the natural environment, population health, or new technologies. Last year, I asked delegates to explore the policies that affect our global response to disease, a topic that continues to remain relevant with the recent Ebola outbreak. This year, I am inviting delegates to look to the future we are in the process of creating, and consider the difficult choices that we will one day have to make.

It is hard to avoid hearing about global warming these days: whether it be a new study on the rate at which the world is rapidly becoming warmer; controversies over green technology funding and development; or a weather report calling for unusual temperatures phenomena. Climate change is becoming a priority for Canadians, and proposed policies related to it have been some of the government's most controversial. Additionally, we continue to live in a world that relies on unsustainable energy sources and where rates of carbon emissions are dramatically increasing.

The consequences of these choices are becoming apparent: animal populations are declining, disease is spreading, and unpredictable weather wreaks havoc on our homes and our food supplies. Unfortunately, the situation is only predicted to decline from here.

It's clear that, as global citizens, we need to act to stop climate change, but change won't be easy, and the consequences for most of us living in developed nations are still rather small. There isn't enough of an incentive for our governments to overcome the sometimes significant obstacles in the way of change. However, if we continue to do nothing, we're going to pay an even greater price in the future.

Delegates of Global Warming 2050, you are going to have an impact on these decisions. Whether you do so by raising your voice today, becoming involved tomorrow, or becoming the ones to make those decisions years from now, I hope that the perspectives you gain about the future in store for us and the difficult choices that must be made will stay with you as you navigate those choices and make the world a better place.

Best of luck,

Katrine Zimmermann

Introduction

It is the year 2050 C.E., and the worst-case environmental scenario is unfolding on Earth. Nearly a century ago, scientists had raised warnings about the harmful levels of carbon in Earth's atmosphere. If humanity did not act fast, they cautioned, in mere decades the Earth would face irreversible changes: higher temperatures, rising ocean levels, and the decimation of large numbers of animal populations unable to adapt quickly enough to the changing climate. Food and water would become increasingly scarce, and supporting the Earth's ever-expanding human population would be a struggle. Some of the changes required would be large, requiring the governments of the world to unite in adopting policy changes that, although painful in the short-term, would be necessary to save the planet. Other changes could be undertaken by individuals around the world, requiring small – but important – changes to their lifestyles, particularly in the wealthier, developed nations. Humanity would need to change its direction, but at the time this change was not impossible.

Throughout the late 1980s, the United Nations had held various conferences and panels to investigate the problem of climate change, leading to the United Nations Conference on Environment and Development, or Earth Summit, held in 1992[1]. At the Earth Summit, the United Nations Framework Convention on Climate change was negotiated, proposing to stabilize the concentration of greenhouse gases in the atmosphere at safe levels[2]. It would eventually be

[1] http://www.un.org/geninfo/bp/enviro.html
[2] http://www.climate-leaders.org/climate-change-resources/india-at-cop-15/unfccc-cop

ratified by all United Nations member states. To implement the convention, the Kyoto Protocol was drawn up in 1997, calling on nations to reduce their greenhouse gas emissions below 1990 levels by 2012, with subsequent emissions reductions targets to follow. Thirty-seven developed nations committed to the reductions, although unfortunately, the United States – the world's largest emitter at the time – was not a party to the Accords[3].

Climate change also entered the greater public awareness with the release of *An Inconvenient Truth* in 2006, a documentary about former American Vice-President Al Gore's efforts to raise awareness about global warming. The film received two Academy Awards and even today is considered one of the best-selling documentary films worldwide, decades after its release[4].

However, even as climate change increasingly became a concern to the global population, and political leaders voiced support for emissions reductions measures, it became clear that change was not meant to be.

Experts have been unable to agree on the reasons resistance to implementing climate change policy was so strong in the early part of the twenty-first century, but it is clear that widespread resistance to undertaking action against climate change was in place by the mid-2000s. Canada emerged as an unlikely leader of the anti-environmental stance, becoming the first nation to withdraw from the Kyoto Protocol in 2011[5]. Despite international condemnation, emissions from Canada continued to increase, particularly with the continued development of the oil sands, a source of economic benefit for Canada. Approval of the Northern Gateway Pipelines in 2014 and the Keystone XL pipeline prior to the U.S. election in 2016 only served to increase oil extraction in the area. The United States also saw an opportunity to reduce its energy dependence on other countries, increasing its extraction of oil and natural gas within its own territory through 2020.

The first half of the twenty-first century did see a rise in climate change protest movements among the global population. The first People's Climate March was held in New York City in 2014, and in the following years became an annual, global event, held on September 22nd every year. The March became the world's most prominent environment-related day after Earth Hour activities ended in 2029 after years of declining participation, featuring celebrity concerts and global marches. However, in the past two decades enthusiasm has fallen due to a lack of resulting government action, and no new event has yet been able to take its place.

2031 marked a particularly destructive year for the world's wildlife populations, in which the tiger and leatherback turtle were declared extinct, among other species. One species experiencing an increase in population and range, however, was the mosquito. Malaria was first discovered in the United States and Japan that year, just five years after an outbreak of dengue fever killed nearly eight hundred Americans, and has since spread across the entire southern part of the country. Australia experienced its first cases of malaria the following year. A successful malaria vaccine was finally developed in 2035 by a private company, and thanks to the actions of

[3] http://unfccc.int/kyoto_protocol/items/2830.php
[4] http://www.imdb.com/title/tt0497116/
[5] http://www.cbc.ca/news/politics/canada-pulls-out-of-kyoto-protocol-1.999072

global NGOs is in the process of being distributed to populations worldwide. However, a vaccine for the dengue virus would not be developed until 2041, by a Chinese team, after millions of deaths. Despite the vaccine's creation, dengue continues to infect an estimated half billion people a year worldwide.

The assassination of Syrian dictator Bashar al-Assad in 2019 created a power vacuum in the region which was quickly filled by Islamic rebels. Combining their forces with the Islamic State of Iraq and the Levant, which an American-led coalition had been unable to defeat, the group formed a new government in Syria known as the Global Islamic State Movement Organization (GISMO), driving out the remaining Syrian population and becoming a haven for extremists worldwide. Allying with extremist movements in eastern Africa, Western inaction on climate change quickly became a rallying cry, and they opened their movement to environmentalist groups, eventually merging with such groups, including PETA in 2045. GISMO remains dedicated to removing Western influence from central Asia and Africa, with the eventual goal of ending wealthy nations' environmental destruction and capitalist systems. Coalition attempts to stop their terrorism were stymied when, in 2025, the state came into possession of North Korea's nuclear weapons, missing since leader Kim Jong-Un's death in 2021 and the reunification of the Korean Republic. These weapons have not yet been used, but they remain a deterrent against an attack on the state. Their environmental terrorism continues to strike at symbols of Western anti-environmentalism, particularly factories, coal plants, and owners of cars with poor emissions standards.

As of 2050, most nations have set targets for reducing carbon dioxide emissions and increasing energy from renewable sources, with mixed success. Germany has met its renewable energy targets set in 2010[6], with 80% of its energy needs coming from renewable energy sources at the present time. Within North America, Mexico, although an oil-producing nation, was also close to meeting ambitious emissions reductions targets set for this year, reducing emissions by 47% from 2012 levels, and successfully increasing its use of renewable energy sources. However, most nations have been less successful in reducing emissions. Although renewable energy sources make up a larger proportion of energy needs in nearly all United Nations member states, increased needs for energy, particularly in developing nations, cause the world to remain as reliant on carbon dioxide-emitting sources as ever.

In January of 2050, with the release of data noting the imminent extinction of the beloved polar bear, and following a successful marketing campaign by Coca-Cola to preserve its mascot, the United Nations decided to take action once again. Calling together delegates from all member nations to participate, it formed a new temporary committee, the United Nations Global Warming Action Committee, to develop a comprehensive, international solution to take action against global warming. Upon the request of the participating nations, delegates have been given a direct line to their home governments to communicate all requests for actions to be taken, and unprecedented power to influence such actions.

[6] http://www.germanenergyblog.de/?page_id=283

Key Issues

Ocean Levels Rising

The increase in global temperature is not distributed evenly worldwide: the greatest increases have been seen in the Arctic, which has faced extensive melting of ice in the past decades. In the last decade, Arctic summers have been completely free of ice. The rapid melting has led to an increase in ocean levels worldwide, with extensive impacts on the world's population.

The most visible consequences of rising ocean levels is the disappearance of entire islands, some of which are home to large populations of people. Nations such as Kiribati and the Maldives, both comprised of multiple islands in the Pacific Ocean, are at imminent risk of disappearing entirely, and solutions have not yet been agreed upon as to their continued status as nations, or where their population may emigrate. However, many other nations with low-lying coastal areas are also losing land. Many of the world's largest cities, particularly in India, China, and the United States, are coastal, and at risk of disappearing due to rising sea levels, which would lead to millions of people being displaced within their own nations. Even inland nations may find themselves dealing with an influx of climate refugees, although environment-related causes are still not considered to be a legitimate cause for refugee status by most United Nations member nations. An update to the United Nations Convention Relating to the Status of Refugees was briefly considered in 2032, but was ultimately not passed.

Melting Arctic ice has also had important economic effects in the north: with ice-free summers, the region is more open to oil extraction projects, which are becoming increasingly economically viable as reserves that were once more easily accessed have become depleted. The once legendary Northwest Passage has also become a reality in the past few decades, opening up shipping routes that have the potential to positively impact the world's economy. This includes nations that do not have territory in the Arctic itself, but still wish to reap the benefits. Although informal agreements were made by Arctic nations in the early 2010s regarding territory, tensions are once more beginning to rise as nations must decide on a course of action that both benefits themselves as much as possible and maintains peace in the region.

Drought and Storms

The rising temperatures due to global warming also have a major effect on weather patterns. Contrary to popular opinion during the early years of the century, this is not limited to simply making the world warmer: instead, weather-related events around the world are expected to become more intense as a result. As witnessed even as early as the late 2000s, these effects include drought in already-dry areas, increased rainfall during existing rainy seasons, and the intensification of storms.

Drought has the potential to impact the global population in major ways. Locally, a drier environment is at high risk for wildfires, a phenomenon that has been particularly damaging to the west coast of the United States in previous decades. Population displacement and property damage are common. Available fresh water is also important for a population's health and hygiene, and in the last two decades the world has seen a resurgence in some water-transmissible

diseases in regions of drought despite efforts to improve infrastructure and education for water-related hygiene.

In the past five decades, the world has also seen its storms grow more intense. An increase in flooding during rainy seasons has caused many deaths and driven even more from their homes worldwide. Hurricanes in particular have grown stronger, with seven of the top ten strongest hurricanes recorded occurring since 2035. Hurricane seasons have been extended to last more than half the year even as they are also extending their reach, even to cities once considered too far inland or too far north to face serious damage. Cities such as New York City now face regular hurricane alerts. In 2046 the Canadian city of Toronto suffered a great loss when a statue erected to commemorate the achievements of early 21st century mayor Rob Ford was washed away during Hurricane Tory*. It was truly a tragic moment for the city.

On a more global scale, the world's food supply is negatively impacted by drought and other extreme weather conditions. Besides a lack of rain needed for optimal growth, warmer temperatures can reduce a crop's yield, and a scarcity of both the crop and the water needed to grow it will lead to higher food prices. Even staple crops are becoming unaffordable for much of the world's population. Crops can also be damaged by intense storms and flooding, further reducing their yield and increasing the cost to farmers. Climate change-intensified flooding has had a particular impact on rice farms in Asia over the past half-century, many of which are small and owned by local farmers. A staple food for the diets of billions is becoming increasingly unaffordable, with no alternative in sight.

Animal Populations

The effects of global warming are not limited to humans. Animal populations are also facing a significant impact due to the effects of climate change on their environments. Perhaps the best-known example is that of the polar bear, which is losing its home due to the melting of Arctic ice, and faces extinction. Their population has declined by two-thirds in the past forty years. Other animal populations facing extinction include koalas, pandas, many frog species, and other Arctic and Antarctic species such as penguins.

Marine animals are also at risk due to warming ocean temperatures and ocean acidification, the result of larger amounts of carbon dioxide in the water. Sea turtles, dolphins and whales, and many species of fish, including salmon, are threatened due to global warming.

As changing climate eliminates the habitat of some animals, it increases the habitable spaces of others, often plants, that can invade new regions of the world and become pests, competing with native species for limited resources such as food and space. One of the greatest concerns related to species migration, however, is the expansion of dangerous infectious diseases. For instance, mosquitoes, which prefer warm, humid climates, can carry diseases such as the West Nile virus, malaria, or dengue fever, all of which have spread across greater stretches of territory in the last fifty years as northern regions of the world become warmer and more humid during the summer.

Possible Solutions

Many different solutions to combat global warming have been proposed over the years, generally falling under two categories: mitigation, and adaptation.

Mitigation

Carbon Emissions Reduction: These policy options were particularly popular at the turn of the century, with 'cap-and-trade' schemes – allowing companies that produced fewer emissions to sell their excess capacity to companies that emitted more carbon – being the most popular, implemented nearly worldwide within two decades. Carbon taxes proved to be less popular, and remain uncommon. Many companies are have also begun to implement a capture and storage system to prevent carbon from entering the atmosphere in the first place, but the high cost and side effects, such as air pollution, have been passed on to citizens. Although emissions rate increases have declined since 2020, the world continues to produce more carbon each year than it did in the previous year, and so calls for emissions reductions schemes such as these have persisted.

Alternative Energy: Improvements in technology have led to reduced costs for many environmentally friendly technology, such as solar panels and electric cars, which have been happily adopted by most wealthier nations. However, resistance remains high to some alternatives, including wind farms and nuclear energy, and solar panels alone still provide less than half the energy required for the majority of developed nations.

Reforestation: Not only are trees important absorbers of carbon dioxide, their removal is often to make space for people or livestock, both of which contribute to carbon dioxide emissions. Replanting forests has been suggested as part of a solution to reducing atmospheric carbon dioxide and preventing desertification.

Adaptation

Genetically Modified (GM) Crops: Agricultural companies have made progress in developing strains of crops that may be effective in combating hunger-related effects of global warming. These crops tend to have higher yields, are resistant to pests or disease, and can grow in harsher conditions than natural varieties. However, stigma against genetically modified crops remains high in many parts of the world, particularly Europe, where labelling of GM foods is still required, and the higher costs of these seeds is a barrier to their use by independent farmers and less wealthy nations.

Atmospheric Carbon Removal: Reducing emissions alone might have prevented harmful effects back in 2000, but in 2050 the amount of carbon dioxide currently in the atmosphere is already enough to negatively impact the global environment. Some techniques for removing carbon dioxide from the atmosphere have been under development for some time now, and research teams feel they are close to a breakthrough, but costs are high and results are still uncertain.

Solar Radiation Management: Another option to reduce the effect of global warming is to reflect sunlight, which would have the effect of reducing the Earth's temperature. This could be accomplished in a number of different ways, including: increasing cloud cover, increasing cloud reflectivity, or increasing the concentration of other microscopic particles (called aerosols). While the technology for these alternatives currently exists and is relatively inexpensive, the potential effects for the environment are not yet known. The potential for unintended consequences is high.

Interplanetary Migration: An international mission led by NASA and comprised of astronauts from the United States, Russia, China and Canada first landed on Mars in 2043, with a successful follow-up mission in 2047. Individual nations' missions are expected to follow, with private companies including SpaceX, expected to reach Mars later this year. Since 2040, research into terraforming and other methods of making Mars habitable has increased dramatically, and early reports have been promising.

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Appendix 1: Country List

Country List

1. Australia
2. Bangladesh
3. Brazil
4. Canada
5. China
6. Egypt
7. France
8. Germany
9. India
10. Indonesia
11. Iran
12. Isreal
13. Italy
14. Japan
15. Mexico
16. Nigeria
17. Philippines
18. Russia
19. Saudi Arabia
20. South Africa
21. South Korea
22. Turkey
23. United Kingdom
24. United States
25. Venezuela