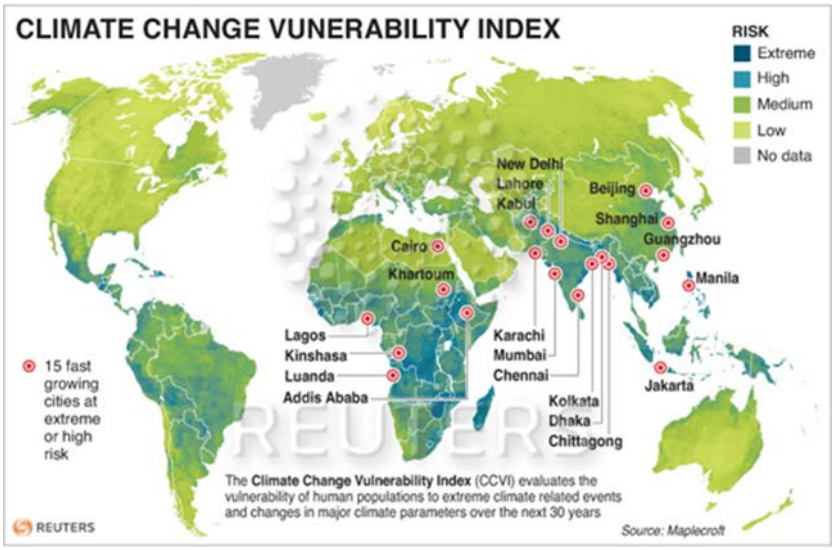
WORLD AFFAIRS COUNCIL
of Philadelphia

CLIMATE CHANGE

Topic Background for the Committee on Climate Change

"Climate change is the defining issue of our time. From the tropics to the poles, from small islands to large continents and from the poorest countries to the wealthiest. If we do not take urgent action, all our plans for increased global prosperity and security will be undone."
– Ban Ki-moon, Former United Nations Secretary-General

Statement of the Problem



Considered by many to be one of the most significant threats facing the global community today, **climate change** poses a range of potentially serious risks to human societies.[1] Based upon the work of hundreds of scientists around the world, the **United Nations' Intergovernmental Panel on Climate Change** (IPCC) has concluded that the steady rise of **greenhouse gas emissions (GHGs)** in the Earth's atmosphere is influencing global climate conditions. Furthermore, researchers believe that the changes to the climate are impacting the planet's **biophysical** and **ecological systems**, possibly threatening the long-term health of human, animal, and plant populations. By some estimates, if left unchecked, the atmosphere's concentration of greenhouse gases could double by the end of the century.[2]

Climate change poses multiple economic, political, and diplomatic challenges, with consequences for all spheres of life. While roughly 15 to 20 countries account for 75 percent of all global greenhouse emissions, no one country accounts for more than 26 percent of the global total.[3] Consequently, cutting greenhouse

[1] This briefing paper is prepared for a student simulation to draft resolutions on climate change under the auspices of the United Nations. As such, this paper does not address nor analyze the diversity of public, government, media and/or corporate opinion as to whether human-caused climate change exists. Among citizens of 39 countries surveyed, Americans, whose opinions on climate change are sharply drawn along political and ideological lines, remain among the least concerned about the threat posed by climate change. The Middle East comes in a close second. This contrasts to most populations around the globe, including Canada, Europe, the Asia/Pacific region, Latin America and Africa, where the majority of public opinion considers climate change to be a major threat to global health and national security (Pew Research Global Attitudes Project, June 24, 2014; Pew Research Center, November 11, 2013; Pew Research, Center for People and the Press, November 1, 2013).
[2] Future of Climate Change, United States Environmental Protection Agency, 2013.
[3] Each Countries Share of CO2 Emissions, Union of Concerned Scientist, 2011.

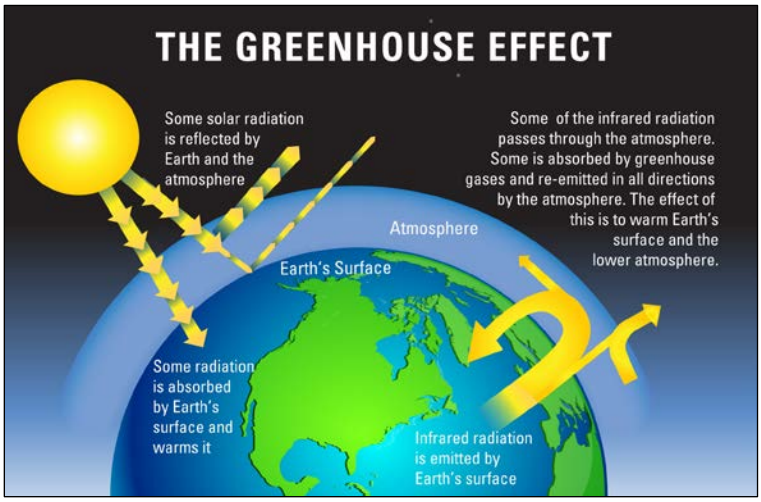
gas emissions requires broad cooperation between countries, as well as innovative solutions by governments, businesses, and individuals, alike.

Defining Climate Change

Climate change refers to any distinct and measureable change in the climate that lasts for a long period of time, generally decades or longer.[4] Examples of climate change can be seen in the sustained shifts in the average global temperature, **precipitation patterns**, size of glaciers, sea ice coverage, and wind patterns. Causes of climate change include natural sources, like volcanic activity, shifts in the sun's energy, and/or ocean circulations[5], as well as some naturally occurring greenhouse gases. Human activities that most scientists believe affect the Earth's climate include the burning of **fossil fuels** (primarily coal, petroleum/oil, and natural gas) and land development (e.g., **deforestation**, **urban development**).

The Greenhouse Effect

The "greenhouse effect" is a natural phenomenon that regulates the Earth's temperature.[6] As the sun shines on the planet, some **solar radiation** is reflected back into space. The remainder of the radiation is absorbed by the land, ocean, and atmosphere. This absorbed radiation warms the planet, and some of it is sent back as **infrared or longwave radiation**, much of which escapes into space.



By examining bubbles of air trapped in glaciers, scientists have determined that atmospheric levels of carbon dioxide and other greenhouse gases began rising with the **Industrial Revolution** (around 1750) as more wood and coal were burned, and more land was cleared for agriculture to support rapidly increasing populations. With the discovery of petroleum and natural gas in 1857, the emissions of carbon dioxide, methane, and other greenhouse gases accelerated. Because these gases are known to trap longwave radiation in the atmosphere and prevent its escape into space, the balance naturally maintained by the greenhouse effect has shifted.

Measuring Climate Change and Predicting its Impact

While sometimes used interchangeably, climate change and **global warming** are not the same thing. Global warming refers to the average increase in temperatures near the Earth's surface and in the lowest layer of the atmosphere. Most scientists have concluded that global warming, experienced in rising sea levels and/or changes in a region's annual precipitation, is likely a *consequence* of climate change.

[4] Glossary of Climate Change Terms, Environmental Protection Agency, 2016.
[5] Through a process called thermohaline, the oceans currents redistribute large amounts of heat around the planet. Pattern changes in thermohaline circulation can cause abrupt changes in the climate (Potsdam Institute for Climate Impact Research).
[6] Students' Guide to Global Climate Change, Environmental Protection Agency, 2016.

The international scientific community continues to build complex computer models designed to reflect the changes in the Earth's atmosphere, the rate of change, and the resulting consequences to human health. These models suggest that the concentration of greenhouse gases in the atmosphere has been gradually increasing, putting the Earth on a path to warm approx. 4.5° Fahrenheit (approx. 2.5° Celsius) by 2050.[7]

Researchers conclude that a gradual rise in the atmosphere's average temperature may lead to more extreme weather events, including drought, flooding, heat waves, and hurricanes. Policy experts also predict that, if left unchecked, increased frequencies of extreme weather conditions will affect international **food security**, water supply, global health, and future wars and conflicts. All nations will experience climate change, but those living in the poorest and/or most under-resourced regions of the world, most in the **Global South**, will be the most severely affected.

Major Threats Posed By Climate Change

No matter where you live, climate change threatens to disrupt our environment and way of life now and in the future. However, not all people will face the negative effects of climate change equally. Nevertheless, it is in all of our interest to take action against climate change. Below are some of the major threats of climate change:

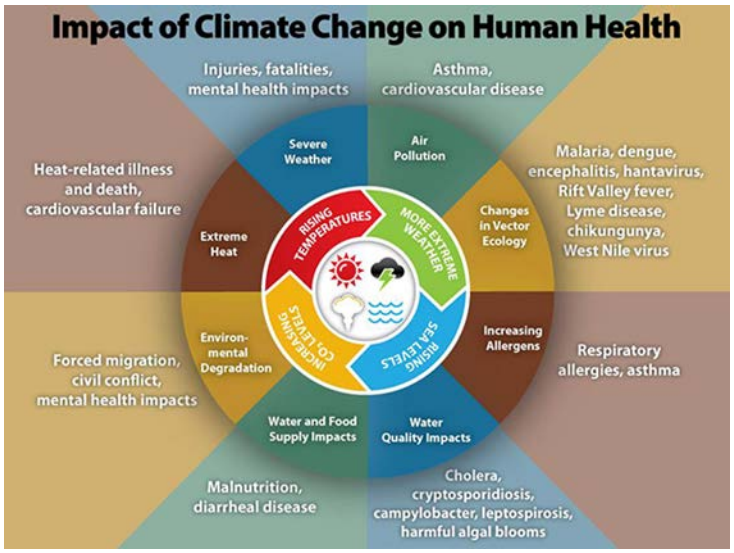
- **Rising Sea Levels** – Rising sea levels in wealthy and developing places, like New York City and Dhaka, Bangladesh, respectively, present a dangerous threat to millions of people. As ocean waters warm and glaciers melt, sea-levels will rise. This will affect nearly half of the world's population as 44% of people live within 150 kilometers (93 miles) of the ocean.[8] Places as diverse as Canada, India, Denmark, Nigeria, and Indonesia will be tremendously impacted, with long term effects on population, economics, and energy.
- **Extreme Weather** – In the Caribbean and Southeast Asia, as well as other places around the world, hurricanes, tsunamis, and other forms of extreme weather have increased in severity and frequency in the past decade. This can result in more flooding, destroyed infrastructure, damaged crops, and the loss of human life.
- **Changing Precipitation Patterns** – Climate change will likely result in an increase in the number of droughts and floods. For countries in sub-Saharan Africa and the Middle East, unpredictable precipitation patterns will have a great impact on agriculture and farming, disrupting millions of lives and livelihoods.
- **Higher Temperatures** – A warmer earth will impact many aspects of life, especially with population growth and urbanization. Higher temperatures will increase the number of forest fires and lead to greater food insecurity and **water scarcity**.

As noted, those countries in the Global South (for example, Guatemala, Laos, Angola, and Yemen) will be most affected by climate change.[9] However, it is the countries in the **Global North** (for example, the United States, France, Russia, and Australia) that have been the major contributors to climate change. Yet as **developing countries** seek to expand their economies, they face increasing pressure to do so in environmentally-friendly ways, despite **developed countries** having achieved their status in ways that have potentially harmed the environment. Additionally, the economies of developed countries depend

[7] Major Greenhouse Gas Reductions Needed by 2050: IPCC, Climate Central, 2014.
[8] 2012 State of the Climate: Global Sea Level, NOAA, 2013.
[9] Climate change will hit poor countries hardest, study shows, The Guardian, 2013.

on **consumption** that not only hurts the environment, but the people living in developing countries. This makes fighting climate change highly complex and political, especially considering the economic impact of climate change.

The Impact of Climate Change on Human Life



Equally as damaging as the environmental consequences of climate change are the consequences on human life. Damage to property and infrastructure, disruption in work and productivity, increased **migration**, threats to **international security**, and unreliable energy are all effects of a changing climate. As different places on the globe will face differences in the type and severity of environmental consequences, the same is true for how global change will impact our lives.

In a recent poll of over 750 experts conducted by the **World Economic Forum**, a catastrophe caused by climate change was viewed as the biggest threat to the global economy.[10] As weather patterns change, societies are disrupted in new and unexpected ways. **Supply chains** and **ecosystems** change, affecting the delivery of goods and services and all other aspects of the global market. Whether it be from the above-mentioned threats, or their consequences, catastrophe resulting from climate change is a serious threat to our current economic system.

For example, a drought in East Africa could require millions of people to be in need of food assistance. It would not only affect the people living in that area, but all people connected to the economy of that region. If crops are lost and agricultural production is down, food prices will fluctuate, people will migrate, and essential goods and services will become scarcer. These effects will be felt throughout all parts of society, often with the burden falling hardest on the poor.

Another impact of climate change is sustainability. As nations in the Global South seek to expand and develop their economies, they often face strong pressure to do so in sustainable and environmentally-friendly ways. However, the largest economies in the world – the United States, China, and Germany for instance – often depend on and have been developed by unsustainable practices. In turn, countries in the Global South do not want to forfeit their own economic development to solve a problem they themselves did not create.

Different countries will certainly have different interests when it comes to climate change and taking action to protect and preserve our planet. Knowing a country's interests is critical to being able to reverse the negative effects of climate change.

[10] Global Risks Report 2016, World Economic Forum, 2016.

International Efforts on Climate Change

International efforts to address climate change began with the United Nations' 1988 Intergovernmental Panel on Climate Change, which was tasked with analyzing the international research and scientific data pertaining to the risk of human-induced climate change. The first report, issued in 1992, formed the basis of the *United Nations Framework Convention on Climate Change (UNFCCC)*, which has since been ratified by 196 countries, including all United Nations Member States.

Recognizing that the Earth's climate is a shared resource that calls for international cooperation, the UNFCCC provided a framework to tackle the complexity and challenges triggered by a shift in rising global temperatures. Specifically, the UNFCCC identified industrial and other emissions of greenhouse gases as the largest contributors to climate instability, and called on nations to adopt policies and best practices to reduce these pollutants. Additionally, it called for "common but differentiated responsibilities" between the wealthier, industrialized nations and the less developed countries, and further called upon those industrialized nations to share their knowledge, technology, and financial resources with developing nations.

This approach is due to the fact that each country has its own interest in pursuing action against climate change. Countries possessing large amounts of fossil fuels may want different policies than those countries without these resources. Developed nations, like the United States and Japan, whose economies largely depend on fossil fuels and other systems that contribute to global warming, will have to take more drastic measures to reduce their **carbon footprint**. To do so will require change that many will not be in favor of as it may affect their economic well-being.

In addition, countries that will face the brunt of climate change the hardest, like Bangladesh, Haiti, Sierra Leone, South Sudan, and the Philippines, may want some form of compensation from those countries less affected and those who have been the greatest emitters of greenhouse gases.

These political complexities make implementing the plans to tackle climate change challenging. Getting each nation to implement internationally agreed upon goals will look different around the world as nations pursue their own interests.

Recent International Action on Climate Change

In 2016, a majority of the world's governments agreed on an ambitious plan to tackle climate change, known as the Paris Agreement.

This agreement set out a global action plan to put the world on track to avoid dangerous climate change by limiting global warming to well below 2°C (3.6°F). The agreement is due to enter into force in 2020. Those who have **ratified** the agreement here agreed to:

- a long-term goal of keeping the increase in global average temperature to **well below 2°C** above pre-industrial levels; and,
- to limit the increase to **1.5°C**, since this would significantly reduce risks and the impacts of climate change.

In order to achieve this, each country must now sign and indicate their consent to be bound by the Agreement. The Paris Agreement will be in full legal force and effect when at least 55 Parties to the

UNFCCC that account for at least 55 percent of the total global greenhouse gas emissions have deposited their instruments of ratification, acceptance, approval or accession. This means that the United States, China, and India must agree, as these countries together make up more than 50% of all greenhouse gas emissions.

The Challenge

The threats posed by climate change, in both in scale and complexity, will affect almost every country in the world. A crisis of this magnitude requires universal action; no one country can tackle this challenge on its own. It is essential for the international community to act swiftly and cooperatively to address the causes and issues surrounding climate change. To achieve this goal, it will be critical to understand how different countries will act on climate change given their position in the global economy. For example, coal-producing countries like Poland, South Africa and Kazakhstan, may not want to dramatically reduce their carbon footprint because of the potentially negative economic consequences. Thus, it is imperative to understand that international action on global change must factor in the many different motivations for pursuing sustainability and climate resiliency. In this committee, delegates will come together to discuss these issues and debate the responsibilities that individual countries have with respect to this growing global concern.

Questions to Consider

1. Why does climate change affect different places on Earth in different ways? How will climate change affect countries in the Global South?

2. What policies has your country already undertaken to manage greenhouse gas emissions? What policies or measures can your country pursue that will achieve the greatest reductions in greenhouse gas emissions?

3. Which sectors of your country's economy will likely bear the costs of regulations to reduce emissions?

4. What are the predicted economic costs and benefits of implementing measures to lower greenhouse gas emissions? What are some of the possible costs and benefits for *not* taking action on lowering your country or region's greenhouse gas emissions?

5. What are the biggest contributors to greenhouse gas emissions in your country or global region?

6. Which interest groups (businesses, industry, etc.) in your assigned country have the most influence on climate policy decisions?

7. How does the increasing power of rising economic growth and political power (e.g., China, India, Brazil, Russia, South Africa, Mexico, Turkey, etc.) affect the implementation of an international agreement on climate change?

8. How can renewable energy play a role in your country or region's efforts to reduce GHG emissions?

Quick Facts[11]

- Global sea level rose about 17 centimeters (6.7 inches) in the last century. The rate in the last decade, however, is nearly double that of the last century.
- All three major global surface temperature reconstructions show that Earth has warmed since 1880. Most of the warming occurred in the past 35 years, with 15 of the 16 warmest years on record occurring since 2001. The year 2015 was the first time the global average temperatures were 1 degree Celsius or more above the 1880-1899 average. Even though the 2000s witnessed a solar output decline resulting in an unusually deep solar minimum in 2007-2009, surface temperatures continue to increase.
- The number of record high temperature events in the United States has been increasing, while the number of record low temperature events has been decreasing, since 1950. The U.S. has also witnessed increasing numbers of intense rainfall events.

[11] These facts are taken from climate.nasa.gov.

Helpful Resources

- *The Global Risks Report 2016*, The World Economic Forum
  Climate change is identified as the greatest risk to the global economy.
- Global Climate Change: Vital Signs of the Planet, NASA
  An excellent resource from NASA on all things related to climate change.
- Bill Nye the Science Guy explains climate change
  A short video that explains climate change in an easy to understand way.
- Climate Change is the World's Biggest Risk, Climate Central
  Charts and graphs illustrating the risks of climate change.
- United Nations Framework Convention on Climate Change
  The guiding framework for international agreements on climate change.
- Intergovernmental Panel on Climate Change
  This international body is responsible for assessing the science related to climate change.
- UN Sustainable Development Goals
  A summary of the action the UN is taking to tackle climate change.
- National Geographic explains climate change in a video
  Climate change 101 in an interesting video.
- UN news related to climate change
  A great resource for finding the most up to date news on climate change.
- The Climate Reality Project
  Eight great infographics on climate change.
- Resources for the Future
  A source of interdisciplinary research on climate change.
- World Resources Institute, Climate
  Ideas on climate mitigation and adaptation.

Glossary of Terms

- **Biophysical systems**: the living and non-living surrounding of an organism or population, including the factors that influence the evolution, development, and survival of that organism or population.
- **Carbon footprint:** the amount of carbon dioxide and other carbon compounds emitted due to the consumption of fossil fuels by a particular person, group, etc.
- **Climate change: a** change in global or regional climate patterns, in particular a change apparent from the mid to late 20th century onwards and attributed largely to the increased levels of atmospheric carbon dioxide produced by the use of fossil fuels.
- **Consumption (economic)**: the use of goods and serves by households and individuals.
- **Deforestation**: the permanent destruction of forests in order to make the land available for other uses.
- **Developing countries:** a poor agricultural country that is seeking to become more advanced economically and socially.
- **Developed countries:** nations that has a lot of industrial activity and where people tend to have higher incomes.
- **Ecosystems**: a group of interconnected elements, formed by the interaction of a community of organisms with their environment.

- **Food insecurity**: the state of being without reliable access to a sufficient quantity of affordable, nutritious food.
- **Fossil Fuel:** a natural fuel such as coal, oil, or gas, formed in the past from the remains of living organisms.
- **Global North**: a term used to refer to developed countries in North America, Europe, developed parts of Asia, Australia, and New Zealand.
- **Global South:** a term used to refer to developing countries in Africa, Latin America, developing Asia, and the Middle East.
- **Global warming:** a gradual increase in the overall temperature of the earth's atmosphere generally attributed to the greenhouse effect caused by increased levels of carbon dioxide, chlorofluorocarbons, and other pollutants.
- **Greenhouse effect:** the process by which radiation from a planet's atmosphere warms the planet's surface to a temperature above what it would be without its atmosphere.
- **Greenhouse gases (GHGs):** carbon dioxide, carbon monoxide, methane, oxides of nitrogen and halocarbons.
- **International security:** also called global security, refers to the collection of measures taken by states and international organizations, such as the United Nations, European Union, Association of Southeast Asian Nations, and others, to ensure mutual survival and safety.
- **Industrial Revolution:** the transition to new manufacturing processes in the period from about 1760 to sometime between 1820 and 1840.
- **Longwave radiation (infrared):** the energy radiating from the Earth as infrared radiation at low energy to Space. OLR is electromagnetic radiation emitted from Earth and its atmosphere out to space in the form of thermal radiation.
- **Migration:** the movement by people from one place to another with the intentions of settling, permanently in the new location. The movement is often over long distances and from one country to another, but internal migration is also possible.
- **Precipitation patterns:** how often, where, when, and to what extend rain, snow, sleet, or hail that fall to the ground.
- **Ratify:** to sign or give formal consent to (a treaty, contract, or agreement), making it officially valid.
- **Solar radiation:** radiant energy emitted by the sun, particularly electromagnetic energy.
- **Southeast Asia:** a sub-region of Asia, consisting of the countries that are geographically south of China, east of India, west of New Guinea and north of Australia.
- **Sub-Saharan Africa:** geographically, the area of the continent of Africa that lies south of the Sahara desert. According to the UN, it consists of all African countries that are fully or partially located south of the Sahara.
- **Supply chains:** the sequence of processes involved in the production and distribution of a commodity.
- **United Nations' Intergovernmental Panel on Climate Change:** the United Nations body that assesses the scientific, technical and socio-economic information relevant for the understanding of the risk of human-induced climate change.
- **Urbanization (Urban development):**
- **Water scarcity:** the lack of sufficient available water resources to meet the demands of water usage within a region.

- **World Economic Forum:** a nonprofit foundation committed to improving the state of the world by engaging business, political, academic, and other leaders of society to shape global, regional, and industry agendas.