



International Atomic Energy Agency

Directed By: Violet Sherer

TSMUN XXVII BACKGROUND GUIDE 2023

Topic I: Addressing Climate Change

Topic II: Nuclear Applications for Food Security and Agriculture



Dear Delegates

Welcome to Tallahassee Southern Model United Nations. My name is Violet Sherer and I am the Director of the International Atomic Energy Agency for TSMUN 2023.

The topics under discussion for this year's International Atomic Energy Agency are:

- I. Addressing Climate Change
- II. Nuclear Applications for Food Security and Agriculture

The International Atomic Energy Agency (IAEA) serves as the UNs forefront organization on nuclear science and technology. Established in 1957, its main task is to promote the peaceful use of nuclear energy and prevent proliferation of nuclear weapons. The agency partners with Member State and organizations around the world to promote the safe and Peaceful use of nuclear technology through assistance an exchange of scientific and technical information.¹

I hope you find this background guide useful in your preparation for the conference. This background guide is meant to introduce delegates to the topic that will be discussed in committee and provide guidance as delegates begin their research. Delegates are strongly encouraged to research the positions, views, and opinions of their Member States as well as relevant regional and international frameworks, past resolutions, and organizations and initiatives.

Each delegation will submit a position paper for the committee. Delegates must turn in their papers before the start of the first committee session. Papers may be emailed to iaea@tsmun.org and can also be submitted through a USB drive or hard copy. For a position paper guide and an example position paper, please visit <http://www.tsmun.org/position-papers.html>. Papers that are not in the correct format will not be eligible for awards. For conference information, resources for preparation, scholarships, and other useful information, visit <http://www.tsmun.org/>. If you have any questions leading up to the conference, feel free to contact me at sc@tsmun.org. I look forward to seeing you all in committee.

Sincerely,

Violet Sherer, International Atomic Energy Agency Director

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¹ "2015 Review Conference of the Parties to the Treaty on the Non-Proliferation of Nuclear Weapons." United Nations. United Nations, May 22, 2015.



Committee Overview

Introduction

The IAEA is the world's leading intergovernmental forum on nuclear energy and technology, promoting technical cooperation and the peaceful use of nuclear energy. The IAEA was established in 1957 as an autonomous organization under the UN with its headquarters in Vienna, Austria. It works with 164 Member States and a vast array of organizations and partners around the world to promote the peaceful use of nuclear energy and to assist Member States with the exchange of scientific and technical information.² The core activities of the IAEA include safeguarding nuclear materials and verifying that they are not used for military purposes, helping Member States improve their nuclear safety and security and radiological emergency preparedness, and to help Member States with the peaceful applications of nuclear science and technology.³ Although the IAEA has limits on its authority to achieve these, under comprehensive safeguard agreements, it has limited abilities to verify that Member States are peacefully using nuclear energy and not as weapons. Under the Treaty on the Non-Proliferation of Nuclear Weapons (NPT), the IAEA is designated as a key actor in the verification that no party is violating the treaty.⁴

History

The IAEA was established in 1957 in response to the growing fears of nuclear technology and eagerness to discover the many things that nuclear technology has to offer.⁵ It began as an initiative from the United States's president Eisenhower called Atoms for Peace; in which the United States and Soviet Union would donate materials to a stockpile administered international agency to be used for civil purposes, such as energy. 's mission as to both promote nuclear technology and to control it as well.⁶

In 1986, the IAEA provided immediate support to the Soviet Union after the Chernobyl Nuclear Power Plant reactor explosion, and with other UN organizations on the Chernobyl Project provide radiological assessment of the explosion's aftermath. On March 11th, 2011, after an earthquake, a 15-meter tsunami disabled the power supply of three Fukushima Daiichi reactors. High amounts of radioactive materials were released over the next 4 to 6 days and the accident was rated a level 7 on the International Nuclear and Radiological Event Scale. Due to the tsunami, 12 of 13 backup generators were disabled. The three units that were affected had the task of maintaining proper

² *ibid*

³ "International Atomic Energy Agency: Atoms For Peace." International Atomic Energy Agency - the atoms for peace and development organization. IAEA, 2023.

⁴ *ibid*

⁵ "History." IAEA. IAEA, June 8, 2016.

⁶ Davenport, Kelsey. "Inspectors for Peace: A History of the International Atomic Energy Agency." Inspectors for Peace: A History of the International Atomic Energy Agency | Arms Control Association. Arms Control Association, November 2022.



reactor cooling and water circulation functions. Work was done in the weeks after to restore these entities by numerous individuals. No one was injured from the cause of nuclear reactors and Fukushima has caused no further problems.

Governance, Structure and Membership

As of March 2nd, 2022, there are 175 out of 193 members in the IAEA. There are around 2560 staff that run this agency and six major departments that provide an organizational framework for the IAEA: *Management, Nuclear Sciences and Applications Nuclear Energy and Security, Technical Cooperation and Safeguards*. Safeguard inspectors and analysts check nuclear material and make sure everything is in check as well as verify the whereabouts of sensitive nuclear material. The IAEA has a policy-making body comprising 175 member states and a 35-member Board of Governors. This body decides on the Agency's m's and budgets.

Conclusion

With more nations looking to develop nuclear weapons and Member States increasing the productivity of nuclear energy, the IAEA provides strength and oversight on global nuclear security and safety. It has implemented safety standards and programs that help member states use nuclear energy for the world's benefit. Moreover, the IAEA is a key player in the fight against climate change and draws attention as well as uses resources to improve nuclear energy. Numerous challenges still face this committee such as North Korea, Iran, and other territories in the world that pose indicate nuclear terror threats, however, the work done in this committee is crucial to the development of peace and nuclear security.



Topic I: Addressing Climate Change

Introduction

In December of 2015, the UN adopted a legally binding treaty on climate change known as the Paris Agreement. This international treaty aims to limit the increased warming of the Earth, keeping it below 1.5 degrees Celsius compared to pre-industrial levels, and to pass the peak of greenhouse gasses (GHG) as soon as possible. The Paris agreement is a milestone in multilateral action against climate change and serves as a basis for many Member States' strategies on climate change.⁷ Nuclear energy is considered to have a key role in the ambitious achievement of the Paris Agreement, therefore the IAEA, and the use of nuclear science and technology, has played an active role in the mitigation of climate change.⁸ The use of nuclear power in place of conventional energy sources has been found to significantly reduce carbon dioxide emissions. In the past century, the use of nuclear energy has prevented approximately 70 gigatons of additional carbon dioxide emissions. Additionally, the IAEA has helped Member States use nuclear technologies to monitor, measure, and adapt to climate change and its impacts.⁹

Current Situation

Climate change has been marked as one of the most critical issues that the world faces today, threatening the production of food, the rising of sea levels, the shifting of weather patterns, and the lives of millions. The main driver behind climate change is the increased amounts of greenhouse gasses in the atmosphere due to human activity. These GHGs are vital to the survival of all life on Earth, allowing the planet to retain some of the sun's heat to keep it warm. Since the start of the industrial revolution, excess GHG emissions from human activity have caused the level of these gasses in the atmosphere to increase, and for the increased warming of the Earth, causing the widespread changes to Earth's oceans, atmosphere, cryosphere (the parts of Earth's surface covered by frozen water) and the biosphere (areas of Earth's surface categorized by the presence of life).¹⁰ According to the United Nations Environment Programme (UNEP), the average global temperature in 2019 was 1.1 degrees above pre-industrial temperatures, exposing people to more severe weather events such as heat waves and stronger storms.¹¹ Since the adoption of the Paris Agreement, as mentioned above, many Member States fall short on their promises set forth in the agreement, lagging behind on the process of decarbonization necessary

⁷ "The Paris Agreement." Unfccc.int. United Nations Climate Change.

⁸ "The Potential Role of Nuclear Energy in National Climate Change Mitigation Strategies." IAEA-TECDOC-1984. IAEA, 2021.

⁹ "Solutions for Climate Change: The IAEA and CoP." IAEA. IAEA, August 4, 2022.

¹⁰ "change-mitigation-strategies." "Climate Change." Global Issues: Climate Change. United Nations.

¹¹ Unep. Facts about the climate emergency. UNEP.



to prevent the warming of the Earth beyond 1.5 degrees Celsius by 2030.¹² Despite this lagging behind of commitments, Member States continue to work together to attain net-zero carbon emission and prevent the climate crisis from progressing past 1.5 degrees Celsius.

The IAEA promotes the application of nuclear technology as a way to tackle climate change, highlighting its applications in the Annual United Nations Climate Change Conferences, often referred to as COP. Nuclear power provides the world with 10 percent of its electricity and over 25 percent of its low carbon electricity, with the potential to provide the world with net-zero carbon emissions.¹³ According to the United Nations Energy Commission for Europe, if nuclear energies are not implemented to high carbon-emitting energy sources such as fossil fuels, the international climate objectives will not be met, further showcasing the importance of nuclear technology in the fight against climate change¹⁴. Additionally, the IAEA's 2022 publication of its "Climate Change and Nuclear" report detailed the potential of nuclear technology for a carbon neutral or low carbon future. The global power sector is responsible for more than a third of the world's energy-related GHG emissions, and the transportation, industrial, and building sectors make up over 50 percent of the world's energy-related GHG emission. These sectors often heavily rely upon fossil fuels for energy, making them critical sectors to address in the path to net-zero GHG emissions. Investment into nuclear power systems and the phasing out of fossil fuels, although likely to pose major challenges to each Member State, will allow for the decarbonization of power systems and a step further towards net-zero GHG emissions¹⁵.

Actions Taken by the UN

The IAEA has taken an active role in the global effort against climate change. It has assisted Member States implement nuclear science and technologies to build climate resistance; helping them adapt, monitor, and mitigate its effects. With the increased scarcity of water and food and the more frequent natural disasters caused by climate change, the IAEA has assisted Member States apply nuclear technology to adapt to these changes. This includes fields such as agriculture (including plant breeding, pest control, and crop and soil management), and livestock production, allowing Member States to become more resilient to the effects of climate change.¹⁶ Additionally, the IAEA helps Member States adapt to freshwater and food shortages, loss of ecosystems, and the risk to infrastructure from climate-induced weather.¹⁷ This includes assisting with the use of nuclear technologies to monitor and measure the changes in various environments, allowing for further research on the effects climate change has on ecosystems around the world and to identify and monitor the risks of climate change. The IAEA has also helped Member States develop nuclear energy systems to mitigate climate change through research and technical cooperation on nuclear sciences and technology and by promoting the use

¹² *ibid*

¹³ *ibid*

¹⁴ "International Climate Objectives Will Not Be Met If Nuclear Power Is Excluded, According to UNECE Report." UNECE . UNECE, August 11, 2021.

¹⁵ "Climate Change and Nuclear Power 2022." IAEA. IAEA, August 19, 2020.

¹⁶ Mayhew, Noah. "The IAEA and Climate Change: Adaptation, Monitoring and Mitigation." IAEA. IAEA, January 17, 2019.

¹⁷ *ibid*



of safe, efficient, secure, and sustainable nuclear power through the further development of existing nuclear programs.¹⁸ They also help Member States build a knowledgeable professional base to operate these systems.¹⁹

One of the ways that the IAEA achieves this three-prong approach of adapting, monitoring, and mitigating, is through its *Technical Cooperation Programme* (TC). TC helps Member States recognize and meet their sustainable energy needs and improve nuclear safety worldwide through “capacity building, knowledge sharing, and partnership-building, support for networks, and procurement.” It also serves as its primary method of addressing Member States’ key priorities and transferring nuclear technology to them.²⁰

Regional and International Framework

One important regional framework addressing GHG emissions, and their global impact is the Clean Energy Ministerial (CEM). The CEM is an international organization that brings together some of the most influential Member States with the primary objective of accelerating clean energy transitions. These transitions aim to transform all sectors of economies, including, but not limited to, clean: power, transport, industry, buildings, and solutions.²¹ One of CEM’s initiatives is *Nuclear Innovation: Clean Energy Future* (NICE). This international initiative focuses on leading the global conversation on how nuclear energy and its role in a future of clean energy through a holistic approach within the context of broader clean energy systems. NICE also seeks to create blueprints for Member states on how they can transition to clean energy through research and provide technical analysis on the potential rise of nuclear technology.²² Another CEM initiative is the *21st Century Power Partnership* (21CPP). This initiative has four key focuses for power transformation around the world: supporting Member States with country-level policy and implementation, knowledge and best-practice sharing, the strengthening of and disbursement of tools, and the strengthening of expert capacity.²³

The International Energy Agency (IEA), an international organization that works with governments and industry to promote sustainable energy, helps Member States achieve sustainable energy through policy recommendations that include reliability, sustainability, and affordability. For example, the IEA released a fuel report in 2019 titled *Nuclear Power in a Clean Energy System*, detailing specific policy recommendations for Member States based on research on nuclear power in advanced economies, and how government actions can ensure safe, sustainable nuclear technology that will help to achieve international climate goals. This

¹⁸ “Nuclear Science and Technology for Climate Change Mitigation, Adaptation and Monitoring.” International Atomic Energy Agency Vienna . IAEA, September, 2022.

¹⁹ *ibid*

²⁰ “About the TC Programme.” IAEA. IAEA, February 9, 2016.

²¹ “Advancing Clean Energy Together.” Clean Energy Future. Clean Energy Ministerial , December 5, 2022.

²² “Bringing Nuclear into the Clean Energy Conversation: About the Nice Future Initiative.” About the NICE Future initiative | NICE Future Initiative | NICE Future Initiative. Clean Energy Ministerial.

²³ “21st Century Power Partnership.” 21st Century Power Partnership Home Page | NREL. Clean Energy Ministerial.



framework helps Member States address issues in nuclear power and work towards cleaner, more sustainable energy that will reduce GHG emissions and mitigate climate change.²⁴

Conclusion

Climate change remains one of the most pressing issues of our time, causing rising sea levels, shifting and more extreme weather patterns, food and water scarcity, and many more affecting all Member States around the world. The challenge of climate change is one of great scale, but one that can be solved through creative solutions such as those in nuclear science and technology. Nuclear technology that assists Member States adapt to the effects of climate change and helps them become more resilient and that allows for clean energy production systems with little to no GHG emissions. How can ideas such as these, on nuclear technology, be implemented on a wide scale so that Member States can have low emission energy systems? What challenges must be overcome for Member States to implement nuclear technology for clean energy and climate resilience? What can the IAEA do within its mandate in order to do this and help Member States, and the world, move towards net-zero GHG emissions and prevent the global temperature from reaching 1.5 degrees above pre-industrial temperatures.

²⁴ IEA. "Nuclear Power in a Clean Energy System – Analysis." IEA. IEA, May 2019



Topic II: Nuclear Applications for Food Security and Agriculture

Introduction

With war being waged in Ukraine and increasing climate concerns, food insecurity has doubled within the last three years.²⁵ According to the State of Food Security and Nutrition in the World report of 2022 of the Food and Agriculture Organization (FAO), the pandemic's effect on food security has worsened over time and generated many inequalities between countries, especially those whose economies have not yet rebounded.²⁶ The IAEA is actively involved in agriculture sciences and plays key roles in the dissemination of information of international research progress, training of nuclear scientists, and in safely providing radioactive equipment. Through the Joint FAO/IAEA Centre of Nuclear Techniques in Food and Agriculture, the IAEA promotes extensive research on the use of radioactive isotopes to deliver technologies that better fields from climate-safe agriculture to food safety and quality.²⁷ The goal of this topic is to discuss new technologies that may be available to Member States and to promote the use of nuclear technologies through the mandates of the IAEA.

Current Situation

During the COVID-19 pandemic, effects of hunger were unprecedented. The pandemic generated vast inequalities regarding access to healthy diets and caused price fluctuation of food, crippling crucial supply chains.²⁸ The FAO acknowledges global food security is heading in the wrong direction after the pandemic. Economic recovery has been unequal globally especially due to war in Ukraine and extreme climate disasters disrupting supply chains even further, especially in low-income countries (LICs).²⁹ In 2021, hunger affected 278 million people in Africa, making it the most affected region per capita at 20.2 percent, behind Asia at 425 million (9.1%) and Latin America and the Caribbean at 56.5 million (8.6%).³⁰

Sustainable Development Goal (SDG) 2 of the 2030 Agenda is zero hunger and FAO estimates that nearly 670 million people will still be undernourished as of 2030, prospectively unchanged from 2015 when the 2030 Agenda was set.³¹

Solving food security is a complex issue including factors such as trade, transportation, safe food storage, food quality and safety and governmental policy.

²⁵ "Global Food Crisis: Let's Move from 'Despair to Hope and Action', Urges Guterres | UN News." United Nations. United Nations, 2022.

²⁶ "2.1 Food Security Indicators – Latest Updates and Progress towards Ending Hunger and Ensuring Food Security." FAO. FAO, 2022.

²⁷ "Food and Agriculture." IAEA. IAEA, April 13, 2016.

²⁸ "The State of Food Security and Nutrition in the World 2022." FAO. FAO, 2022.

²⁹ Ibid

³⁰ Ibid

³¹ Ibid



Actions Taken by the UN

The IAEA and FAO work together to provide funding for more than 200 national and regional cooperation projects, massing up to \$14 million in annual expenditures.³² With the recent 66th General Conference of the IAEA (GC66), Member States passed a total of 14 resolutions.³³ One of these resolutions, resolution 8 titled ‘Strengthening the Agency’s technical cooperation activities,’ acknowledges the importance of technical cooperation (TC) programs and affirms the need for LDCs to develop peaceful nuclear technologies through specialized frameworks that will be covered in the next section.³⁴ The strengthening of TC programs give LDCs a leg up in peaceful nuclear research they would otherwise have no opportunity to conduct.

Resolution 6, titled ‘Nuclear and radiation safety,’ acknowledges a recent report conducted by the Codex Committee on Contaminants in Foods regarding reports of radionuclide contaminated food and drinking water.³⁵ The IAEA also recently published a report focusing on contaminated food and water supplies excluding radioactive emergencies, like large scale reactor waste failures and meltdowns. While the IAEA passed contamination guidelines in 2014, this only concerns emergency scenarios.³⁶ The report focuses on three ways food can become contaminated, existing exposure conditions, emergency exposure conditions, and planned exposure conditions.³⁷ Existing exposure conditions include natural radionuclides from the Earth’s crust and previous testing of nuclear weapons. Emergency exposure conditions are the result of nuclear infrastructure failures, which eventually lead to existing exposure conditions. Planned exposure conditions are authorized discharge of radionuclides, often in negligence to existing regulations. Many guidelines are presented in the report used to track contamination, including assessment of radionuclide doses in diets and in individual foods.³⁸

Regional and International Framework

The IAEA is specially designed to create regional and international frameworks for peaceful nuclear research through collaboration hubs. As mentioned before in the ***Current Situation***, resolution 8 of GC66 promotes the use of technical cooperation among less developed countries (TCDC) to be sure to meet the specific needs of all Member States, including LDCs.³⁹

The Regional Strategic Framework for Technical Cooperation with the IAEA–CARICOM Member States for 2020-2026 analyzes agriculture and food production strategy in the Wider Caribbean Region (WCR) using an analysis method called SWOT (Strength, Weakness,

³² Ibid

³³ “General Conference Archives.” IAEA. IAEA, 2022.

³⁴ “66th IAEA General Conference.” IAEA. IAEA, February 22, 2022.

³⁵ “66th IAEA General Conference.” IAEA. IAEA, February 22, 2022.

³⁶ “IAEA Publications.” IAEA: International Atomic Energy Agency. IAEA. Accessed January 12, 2023.

³⁷ Ibid

³⁸ Ibid

³⁹ Ibid



Opportunity, and Threats.⁴⁰ The WRC is highly reliant on agricultural output in regards to their economies and, with proper guidelines, can be a potential source of poverty reduction.⁴¹ Many Member States in the WRC agriculture employment ranges from 7-17%, however Haiti in particular is upwards of 50%.⁴² The strengths of the status of agriculture in the WRC include innovative sectors using nuclear technologies to mutate and strengthen crops and incredible biodiversity, while weaknesses include poor land management, leading to desertification, isolated research initiatives, and food loss due to lack of infrastructure.⁴³ Opportunities include the increase of international agriculture markets (especially after the crash caused by the Russo-Ukraine conflict), biofuels, and room for growth regarding dissemination of research.⁴⁴ Threats include climate change destroying arable farmlands and aquatic environments and therefore reducing production, emergence of stronger pests which encourage pesticide use, and food products used to produce biofuel.⁴⁵

The African Regional Cooperative Agreement for Research, Development and Training related to Nuclear Science and Technology (AFRA) focused their attention on mitigating the effects of climate change on agricultural sectors during GC66.⁴⁶ During a panel event titled, ‘Enhancing Capacities of Member States in Africa to Achieve Food Security Through the Peaceful Use of Nuclear Techniques’ experts presented the progress of African Member States in nuclear technologies to enhance agriculture, including a case study on Namibian drought-tolerant crops which used the stable isotope 15-nitrogen to empirically track the amount of nitrogen absorbed by the crops.⁴⁷ The study shows an increase of yield by 30% with a decrease of fertilizer used also by 30%.⁴⁸ Another project conducted in Morocco uses fallout radionuclides to determine erosion points in soil.⁴⁹ Over 40% of land in Morocco is subject to deforestation, furthermore, by using stable isotopes and fallout radionuclides, scientists were able to track the movement of soil.⁵⁰ Doing so allows scientists to predict the best locations for agricultural practice while avoiding soil overflowing into water reservoirs during the harsh rain Morocco experiences.⁵¹

Conclusion

The IAEA’s purpose is to encourage the use of peaceful nuclear technologies through the investigation of Member State nuclear supplies, dissemination of international nuclear research and technologies, and promotion and implementation of collaboration frameworks which provide nuclear opportunities to all Member States, of which who qualify. Agriculture is regarded as one

⁴⁰ “WWW-Pub.iaea.org.” IAEA Publications. IAEA.

⁴¹ Ibid

⁴² Ibid

⁴³ Ibid

⁴⁴ Ibid

⁴⁵ Ibid

⁴⁶ “Improving Food Security in Africa with Nuclear Techniques.” IAEA. IAEA, September 29, 2022.

⁴⁷ “Drought-Tolerant Crops to Contribute to Food Security in Namibia.” IAEA. IAEA, March 13, 2019.

⁴⁸ Ibid

⁴⁹ Ibid

⁵⁰ “How to Win a Fight against Soil Erosion: Nuclear Science Helps Farmers in Morocco.” IAEA. IAEA, February 26, 2018.

⁵¹ Ibid



of the strongest poverty reduction sectors and innovative nuclear technologies provide even more growth potential for LDCs.



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