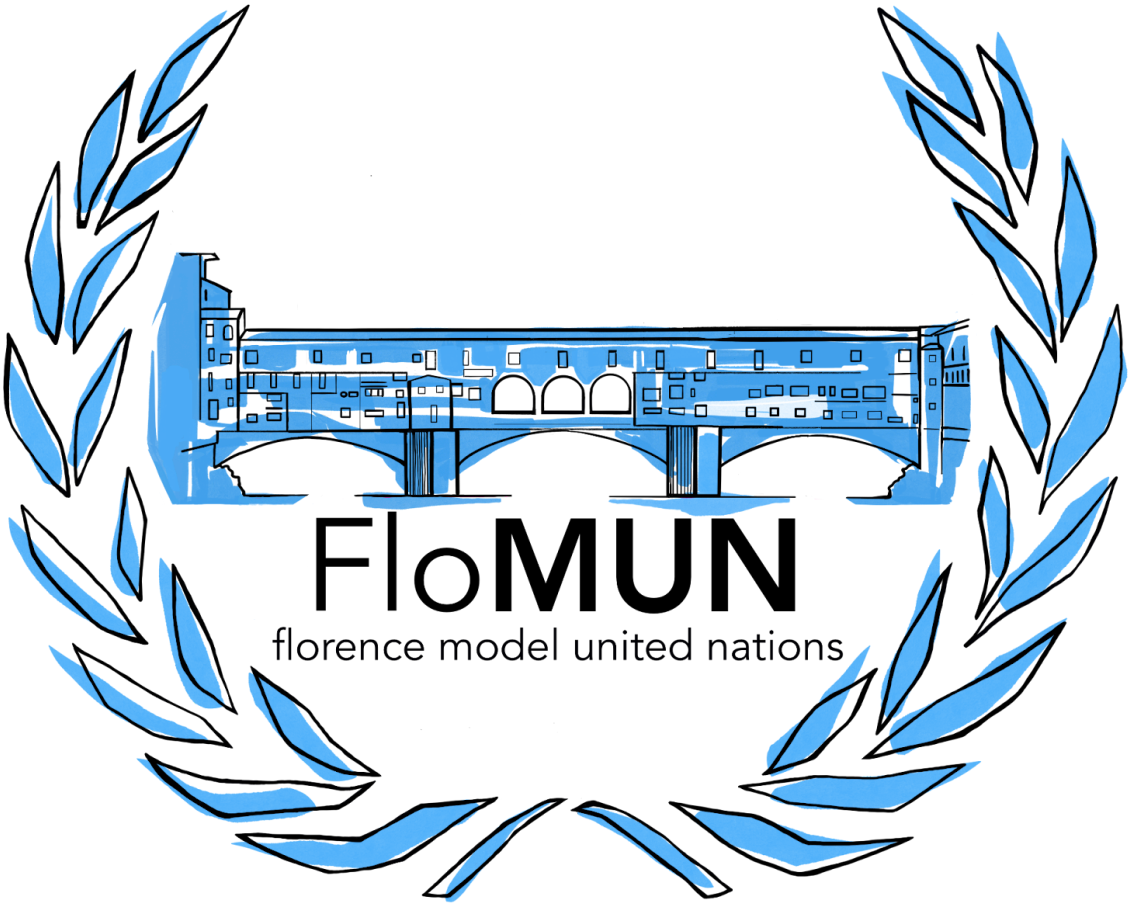

Florence Model United Nations

Research Guide

Organized by the International School of Florence

Committee: Environmental Committee 2

Topic 1: Evaluating the sustainability of nuclear energy.

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I. Introduction

The United Nations has been actively engaged in environmental issues since the time that it was founded after World War II. The Environmental Committee has been developing and playing a significant role in raising awareness of global environmental problems throughout the years.

The United Nations Environmental Programme (UNEP) was founded in 1972 following the first world conference on Human Environment in Stockholm ("United Nations Conference on the Human Environment, Stockholm 1972 | United Nations"), and always played the role of monitoring the state of the environment, informing policies with science and coordinating responses to the world's environmental challenges. The UNEP has been working closely with the 193 member states of the UN and its other stakeholder to address many of the most important environmental challenges and to motivate worldwide commitment and coordinated action, since the programme has been founded. This programme also played a leading role with its connection for 15 multilateral environmental agreements.

The UNEP's first headquarters were opened on 2 October 1973, located in the outskirts of Nairobi, Kenya. There were many other historical achievements on the environmental challenges as time went on. In the same year as the headquarters were opened, MARPOL, the treaty that imposed strict rules on the shipping industry, aimed to help prevent marine pollution. Additionally, the Bonn Convention, established in 1979, provides a global platform for the conservation of migratory species and their habitats. In 1992, leaders signed the Convention for Biological Diversity, aiming for the sustainable use of its components and reasonable sharing of its benefits as the utilization of genetic resources develops; this entered into force in 1993, protected areas were expanded, financial resources were used for supporting biodiversity protection. Just in the most recent years, in 2021 and 2022, leaders met in China aiming to develop a new global framework for preserving biodiversity, and continuing these actions since 1993. Actions to promote sustainable fisheries and agriculture were also carried out in communities worldwide.

Over more than 50 years, the role of the UNEP has been continuously significant worldwide. Throughout the years, the committee worked closely with many member states in combating many environmental issues. This includes the conservation of biodiversity, protections of species and environment from chemical pollution, actions towards reducing pollution from nuclear usage, and most importantly, the goal for reaching global sustainable development.

II. Definition of Key Terms

- **UNEP:** The United Nations Environment Programme, founded in 1972 following the Human Environment Conference in Stockholm in the same year.

- **IAEA:** The International Atomic Energy Agency, or known as the world's 'Atoms for Peace and Development' organisation within the UN.

- **IEA:** International Energy Agency

III. General Overview

Nuclear energy always had a significant impact towards the relationship between energy consumption and human development. The development of this new energy consumption method that is

said to be cleaner and more reliable, seems to be more beneficial towards a more sustainable future with less environmental damage, such as pollution. The IAEA (International Atomic Energy Agency) in the UN Environment Programme has always worked as the centre for cooperation in the nuclear field, promoting the safe, secure and peaceful use of nuclear technologies globally. However, the use of nuclear energy also brings up a major environmental concern, which is the creation of radioactive wastes such as uranium mill tailings, used reactor fuel, and other radioactive wastes; the existence of these waste materials can be dangerous to human health for thousands of years, which is one of the biggest challenges of the sustainable development of nuclear energy consumption. ("Nuclear power and the environment - U.S. Energy Information Administration")

The history of nuclear energy has been defined by a few key events which have led to the technology we have today. From discovering the science of atomic radiation, atomic change and nuclear fission; to developing nuclear weapons (atomic bombs), and lastly developing the tools to manipulate it to act as a useful technology tool in energy consumption. The development of nuclear weapons was a revolutionary period between the superpowers in the 20th century, where the use of nuclear weapons began, most significantly in the case of the bombing of Hiroshima and Nagasaki in 1945, where approximately 60000 - 80000 people died instantly. After World War II, a new focus on projects which utilised nuclear energy were initiated to produce steam and electricity. It was clear that this new form of energy would allow development of compact long-lasting power sources which could have various applications. ("Outline History of Nuclear Energy") However, other than military use, the risk of this new technology has also been shown in historical consequences that were caused by accidents because of inadequate operations, such as the 1986 Chernobyl accident and the 2011 Fukushima accident. Consequences of the accidents included contaminations and major safety issues with the radiological impact on people and the environment. Therefore, the IAEA has developed a globally recognised IAEA Safety Standards, to introduce a high level of safety of protecting people and the environment from the harmful effects of ionizing radiation. ("Atomic Energy | United Nations") The IAEA has also made a mission statement on nuclear energy consumption as a whole, where they recognise that nuclear material should only be used for peaceful purposes under proper safety standards. ("The IAEA Mission Statement | IAEA")

Going forward, towards a new era in the safe use of this clean energy, the number of new projects, policies and investments are increasing as a result of the demand for clean and secure electricity grows all around the world. The IAEA is also supporting more countries in their transition to nuclear energy, the latest projects suggests that at present, 31 countries operate power plants, with 419 reactors in operation, a combined electrical capacity of 378.1 GW, producing about 10% of the world's electricity. In addition, over 62 reactors are currently under construction, which highlights the growing adoption of nuclear energy in the global perspective. (Atuhaire)

IV. Major Parties Involved and their Views

- **Germany:** Since the nuclear disaster of Fukushima in 2011, Germany has been focused on phasing out their reliance on nuclear power, deeming the potential environmental consequences higher than the benefits. The last three German power plants were closed down in 2023

- **IAEA (The International Atomic Energy Agency):** This agency strengthens the global nuclear safety and security framework and is also a key player in the effort to prevent nuclear terrorism. ("The International Atomic Energy Agency - United States Department of State")

- **U.S. adults**: Overall 56% remain supportive of more nuclear power plants to generate electricity, according to a Pew Research Centre survey in May 2024. (Leppert and Kennedy)
    - Men remain more likely in favour than women (Support rate: 70% men, 44% women)
    - Republicans remain more likely in favour than Democrats (Support rate: 67% Republicans, 49% Democrats)
        - Within the Democratic Party they still have strong divisions on the topic of nuclear energy (49% support, 49% oppose).

- **The public in the EU:** have strongly divided opinions, having almost identical shares of respondents expressing support (44%) and opposition (45%) to nuclear energy. (European Parliamentary Research Service) indicated by the Eurobameter on nuclear energy production, conducted in 2008.
    - The poll showed that citizens in countries with operational nuclear power plants were more likely to support nuclear energy.
    - Recent studies show that, since 2019, there is a gradual rise in support for nuclear power, and the reason is largely related to the war in Ukraine.

- **France**: their energy policy now integrates additional nuclear power together with renewable energy resources, aiming to achieve carbon neutrality by 2050. ("French nuclear energy policies")
    - France plays an important role in the International Thermonuclear Experimental Reactor (ITER) project, showing their ambition to demonstrate the potentials of nuclear energy, and it is an international collaboration involving 33 countries; this includes the EU, the US, Russia, China, Japan, South Korea, and India.

- **China**: is aiming to generate 200 GW of nuclear power by 2025; also, going forward, China is planning to replace its 2990 coal-fired power plants with clean energy sources by 2060. (Coelho)
    - The policies made are largely motivated by the consequential air pollution result from coal-fired power plants, and China's policy is to have a closed nuclear fuel cycle. ("Nuclear Power in China")

- **The UK government:** puts the use of nuclear energy as the focal point of its strategy to reach net zero carbon emissions by 2050, which also includes other renewable energy use. (Nuclear Industry Association)
    - Nuclear energy is currently providing approximately 15 - 20% of the UK's electricity service.

- **Russia:** is one of the few countries that has an energy policy highly prioritizing nuclear energy use. ("Nuclear Power in Russia")

- Rosatom's long-term strategy going ahead to 2050 includes having safe nuclear power plants by using fast reactors with a closed fuel cycle. Ultimately aiming for eliminating the production of radioactive waste from power generation.

V. Relevant UN Documents and Articles

1. Website title: World Nuclear Association
    - Title: Nuclear Energy and Sustainable Development
    - Nuclear Energy and Sustainable Development
2. Website title: ScienceDirect
    - Title: Assessing the environmental sustainability and justice dimensions of nuclear electricity under circular economy and energy transition frameworks.
    - Is nuclear energy really sustainable? A critical analysis on the example of the Polish energy transition plan - ScienceDirect
3. Website title: Nuclear Energy Agency (NEA)
    - Title: Government and Nuclear
    - Government and Nuclear Energy
4. Website title: World Nuclear Association
    - Title: Outline History of Nuclear Energy
    - Outline History of Nuclear Energy
5. Website title: IAEA International Atomic Energy Agency
    - Topics | IAEA.
6. Website title: IAEA Nuclear Energy Series
    - Title: Stakeholder Engagement in Nuclear Programmes
    - IAEA Nuclear Energy Series Stakeholder Engagement in Nuclear Programmes
7. Website title: United Nations
    - Title: Advancing Nuclear Research: Countering Cancer and Climate Change
    - Advancing Nuclear Research: Countering Cancer and Climate Change | United Nations
8. Website title: Nuclear Energy Agency (NEA)
    - Title: Sustainable development and nuclear energy
    - Sustainable development and nuclear energy
9. Website title: World Nuclear Association
    - Title: Nuclear Power in the World Today
    - Nuclear Power in the World Today
10. Website title: European Parliament
    - Title: Nuclear energy in the European Union
    - Nuclear energy in the European Union

VI. Questions to Consider

- How is nuclear energy in comparison to fossil fuels and renewables in regards to carbon emission?

- What are some of the long-term environmental risks of radioactive waste disposal?
- What are some of the major risks involving nuclear accidents, and what can be done to minimize them?
- Is nuclear power really more cost effective in comparison to other renewable resources when taken into consideration construction, maintenance and decommission costs?
- What are some of the impacts for future generations regarding the nuclear waste storage?
- What are some of the improvements we can see regarding safety in modern day reactor designs?
- What are some of the roles that international regulations and agreements play in nuclear energy development?

VII. Conclusion

It's important to regard nuclear energy's low carbon footprint, and its use of fewer materials and less land. The use of nuclear energy today avoids emissions roughly equal to the removal of one-third of all cars from the world's roads (“Nuclear Essentials”). Nuclear fuel density is about 1 million times greater than that of other energy sources. In fact, nuclear fuel from the last 60 years has been used and produced by the U. S. nuclear energy industry could fit on a 10 yard deep football field. Not only is it a low-carbon energy, but it's also an extremely reliable source of energy. It has roughly supplied a fifth of America’s power each year since 1990 (“Nuclear Power is the Most Reliable Energy Source and It's Not Even Close”).

Although nuclear energy provides a major role in reducing carbon emissions, it also poses environmental and safety challenges. Some of these include, the creation of radioactive wastes such as uranium mill tailings, used reactor fuel and other radioactive wastes. The safety issue for human health is that these materials remain radioactive for thousands of years (“Nuclear power and the environment - U.S. Energy Information Administration”). Furthermore, nuclear energy poses high costs, at least twice as expensive as renewable energy, even after taking into consideration its longer operating life (“CSIRO confirms nuclear fantasy would cost twice as much as renewables”).

International efforts that have already been taken include the International Atomic Energy Agency (IAEA), which fosters the efficient and safe use of nuclear power by supporting existing or new nuclear programmes around the world (“Nuclear energy, safe use of nuclear power | IAEA”). Another global policy ensuring the responsible use of nuclear energy is The Office of International Nuclear Energy Policy and Cooperation (INEPC), which collaborates with international partners to support the safe and secure use of nuclear energy. (“International Nuclear Energy Policy and Cooperation”). To combat the issue and concerns around safety and cost, there have been developments in nuclear technology. For example, the creation of fusion and small modular reactors (SMRs), or nuclear duels and waste management. The issue is, nuclear fusion requires very high temperature, density, and time for the atoms to fuse together. (“Advanced nuclear technologies and their role in the energy transition”)

In conclusion the future of nuclear energy depends on balancing sustainability, safety and collaboration. This means member nations must weigh the pros and cons, and decide how to create a more sustainable and safe world for all.

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