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International Atomic Energy Agency Background Guide 2022

Written by: Christopher Duggan and Melissa Salgado, Directors
Alejandro Better Corral and Connor Glenn Schultz, Assistant Directors



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13570 Grove Dr., Suite 294 • Maple Grove, MN 55311

www.nmun.org • info@nmun.org • 612.353.5649

Dear Delegates,

Welcome to the 2022 National Model United Nations New York Conference (NMUN•NY)! We are pleased to introduce you to our committee, the International Atomic Energy Agency (IAEA). This year's staff are: Directors Chris Duggan (Conference A) and Melissa Salgado (Conference B), and Assistant Directors Alejandro Better Corral (Conference A) and Connor Schultz (Conference B). Chris attended the Florida State University for International Affairs and currently studies Public Policy and Administration at St. Petersburg College. He is a Legal Specialist at Florin Roebig. Melissa is currently a lecturer of political science and graduated with an Bachelors and Masters in Political Science from the University of Texas at Tyler. Alejandro is currently a Law Student at Universidad San Francisco de Quito and is a Legal Assistant at Falconi Puig Abogados. Connor is a law student in Washington, DC looking to work in animal protection.

The topics under discussion for the International Atomic Energy Agency are:

1. The Future of Atoms: Artificial Intelligence for Nuclear Applications
2. The Nuclear Situation in Iran: Follow-Up on the Joint Comprehensive Plan of Action

The IAEA is an independent intergovernmental organization of the United Nations and serves as the world's preeminent forum on co-operation in the nuclear field. It works through scientific, technical, and policy means to ensure the safe, secure, and peaceful uses of nuclear technology. The IAEA provides assistance to Member States on the development and use of nuclear technologies for non-military purposes and establishes standards and guidelines for the use of nuclear material, equipment, and facilities. It is important for delegates to understand the crucial role the IAEA holds in achieving a safer and more peaceful world, and the critical leadership position it holds on global technical expertise.

This Background Guide serves as an introduction to the topics for this committee. However, it is not intended to replace individual research. We encourage you to explore your Member State's policies in depth and use the Annotated Bibliography and Bibliography to further your knowledge on these topics. In preparation for the Conference, each delegation will submit a Position Paper by 11:59 p.m. (Eastern) on 1 March 2022 in accordance with the guidelines in the [Position Paper Guide](#) and the [NMUN•NY Position Papers](#) website.

Two resources, available to download from the [NMUN website](#), serve as essential instruments in preparing for the Conference and as a reference during committee sessions:

1. [NMUN Delegate Preparation Guide](#) - explains each step in the delegate process, from pre-Conference research to the committee debate and resolution drafting processes. Please take note of the information on plagiarism, and the prohibition on pre-written working papers and resolutions. Delegates should not start discussion on the topics with other members of their committee until the first committee session.
2. [NMUN Rules of Procedure](#) - include the long and short form of the rules, as well as an explanatory narrative and example script of the flow of procedure.

In addition, please review the mandatory [NMUN Conduct Expectations](#) on the NMUN website. They include the Conference dress code and other expectations of all attendees. We want to emphasize that any instances of sexual harassment or discrimination based on race, gender, sexual orientation, national origin, religion, age, or disability will not be tolerated. If you have any questions concerning your preparation for the committee or the Conference itself, please contact the Under-Secretaries-General for the Peace & Security Department, Chase Mitchell (Conference A) and Collin King (Conference B), at usg.ps@nmun.org.

We wish you all the best in your preparations and look forward to seeing you at the Conference!

Sincerely,

Conference A

Christopher Duggan, *Director*

Alejandro Better Corral, *Assistant Director*

Conference B

Melissa Salgado, *Director*

Connor Schultz, *Assistant Director*

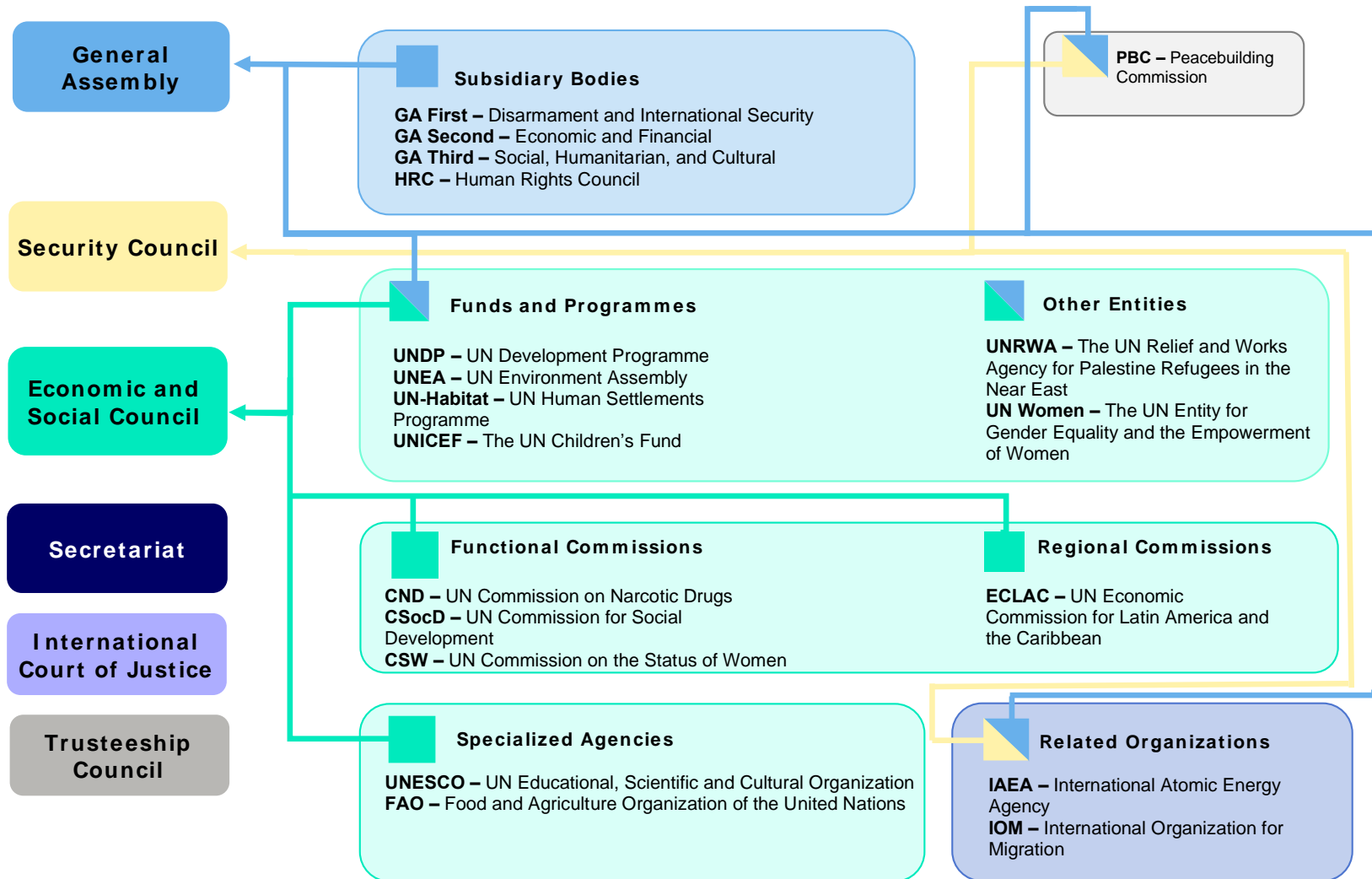


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United Nations System at NMUN•NY

This diagram illustrates the UN system simulated at NMUN•NY and demonstrates the reportage and relationships between entities. Examine the diagram alongside the Committee Overview to gain a clear picture of the committee's position, purpose, and powers within the UN system.



Committee Overview

“The Agency shall seek to accelerate and enlarge the contribution of atomic energy to peace, health, and prosperity throughout the world.”¹

Introduction

The International Atomic Energy Agency (IAEA) is an independent intergovernmental organization of the United Nations (UN) founded “in response to the deep fears and expectations resulting from the discovery of nuclear energy.”² The Agency’s creation began with a speech from United States President Eisenhower to the General Assembly in 1953 and was formalized with the unanimous adoption of the *Statute of the International Atomic Energy Agency* (the Statute) on 23 October 1956 by 81 Member States.³ Despite the compelling words of Eisenhower, the Agency had a rocky start due to the complicated international political climate of the Cold War.⁴ However in the aftermath of the Cuban Missile Crisis and the resulting concerns about nuclear weapons, the IAEA was able to launch its work effectively and with global political support.⁵ The Agency’s position and influence was particularly strengthened through the growing number of members and mounting worries over the nuclear situations in many regions, such as the violations of the safeguard provisions by Iraq and the Democratic People’s Republic of Korea, and the nuclear power plant catastrophe in Chernobyl.⁶

During the recent 65th meeting of the General Conference, held from 20-24 September 2021, the body voted on the budget update for 2021 and adopted the annual report of the IAEA for 2020.⁷ In addition to these items, the Member States discussed topics such as nuclear security, emergency preparedness and response, the Agency’s technical cooperation activities and cooperation in nuclear, radiation, transport and waste safety, and the IAEA’s safeguards in the Middle East and in the Democratic People’s Republic of Korea.⁸ Participants reviewed the ongoing implementation of the *IAEA Regulatory Cooperation Forum (RCF) Strategic Plan 2020-2024* (2020), and ensured newcomer countries had the support and resources they needed to achieve implementation of the plan.⁹ Additionally, the IAEA committed support to African academic institutions to enhance human resource development in nuclear science and technology, and the inaugural event of the Women in Nuclear regional Co-operation Agreement for the Promotion of Nuclear Science and Technology in Latin America and the Caribbean (ARCAL) Regional Chapter was held.¹⁰ As well, the European Nuclear Experimental Educational Platform presented at the European Nuclear Experimental Educational Platform and Nuclear Capacity Building Based on Research Reactors event, and Mexico organized the event Cooperating with Women in Nuclear: Supporting Talent in the Nuclear Field, among other milestone events.¹¹

Governance, Structure, and Membership

The General Conference, attended by all IAEA Member States, is the highest policy body of the IAEA and meets annually.¹² Apart from the annual meetings, the General Conference can also be convened at any

¹ UN Conference on the Statute of the IAEA, *The Statute of the IAEA*, 1956, art. II.

² Fischer, *History of the International Atomic Energy Agency: The first Forty Years*, 1997, pp. 1-3; New Zealand Ministry of Foreign Affairs and Trade, *UN Handbook 2021-22*, 2021, p. 374.

³ Fischer, *History of the International Atomic Energy Agency: The first Forty Years*, 1997, pp. 1-3.

⁴ *Ibid.*, pp. 1-3.

⁵ *Ibid.*, pp. 1-3.

⁶ *Ibid.*, pp. 1-3.

⁷ IAEA, *General Conference: Schedule*, 2021.

⁸ *Ibid.*

⁹ Llukmani, General Conference: Day 5 Highlights, IAEA, 2021.

¹⁰ Gruensteidl, With IAEA Support, African Academic Institutions Rally to Enhance Human Resource Development in Nuclear Science and Technology, IAEA, 2021; Llukmani, General Conference: Day 5 Highlights, IAEA, 2021.

¹¹ Llukmani, General Conference: Day 5 Highlights, IAEA, 2021.

¹² IAEA, *IAEA General Conference*, 2021.

time by the Director-General upon request of the Board of Governors or a majority of Member States.¹³ The functions and powers of the General Conference are described in Article V of the IAEA Statute.¹⁴ The General Conference discusses and makes decisions on matters within the scope set in the IAEA Statute, including the election of the Board of Governors, the approval of applications for membership, the appointment of the Director-General, and the decision upon changes made to the IAEA Statute.¹⁵ Additionally, the General Conference has the power to suspend Member States, considers the annual report of the IAEA, votes on the budget suggested by the Board of Governors, adopts reports submitted to the UN, and approves agreements made between the IAEA and the UN or other organizations.¹⁶

The Board of Governors, which consists of 35 representatives of IAEA Member States and is elected by the General Conference, meets five times annually and makes recommendations to the General Conference concerning the IAEA's accounts, actions, and budget, and considers applications for IAEA membership.¹⁷ The Board also prepares the annual report of the IAEA on the activities and actions of the Agency, which is presented to the General Conference each year.¹⁸ Overall, the Board is responsible for carrying out the functions of the IAEA as outlined in the Statute and according to its responsibilities to the General Conference.¹⁹

The Secretariat is headed by the Director-General and consists of four offices and six departments that carry out the day-to-day work of the Agency.²⁰ The Director-General's Office for Coordination, the Office of Internal Oversight Services, the Office of Legal Affairs, and the Office of Public Information and Communication provide administrative functions and support to the remainder of the Secretariat.²¹ The Departments of Management, Nuclear Energy, Nuclear Safety and Security, Nuclear Sciences and Applications, Safeguards, and Technical Cooperation carry out the IAEA's work in promoting disarmament, non-proliferation, and peaceful use of nuclear technology.²²

The IAEA currently has 173 Member States.²³ The Member States of the UN and of specialized agencies can become Member States of the IAEA by signing and ratifying the IAEA Statute, or a non-UN Member State can become a member of the IAEA by accepting the IAEA Statute and by being accepted by the General Conference.²⁴ A unique situation exists concerning the states that are Member States of the IAEA but have not joined the *Treaty on the Non-Proliferation of Nuclear Weapons* (NPT) (1968), and the States parties to the NPT that are not Member States of the IAEA.²⁵ Currently, there are 189 States parties to the NPT and while India, Pakistan, North Korea and Israel have not joined the NPT, they are, with the exception of North Korea, Member States of the IAEA.²⁶

Mandate, Function, and Powers

According to Article 2 of the Statute, the Agency aims to “accelerate and enlarge the contribution of atomic energy to peace, health and prosperity throughout the world” and thus, the primary role of the IAEA is to ensure that atomic energy is used for safe, secure, and peaceful purposes.²⁷ The mandate is

¹³ UN Conference on the Statute of the IAEA, *The Statute of the IAEA*, 1956, art. V.

¹⁴ Ibid.

¹⁵ Ibid.

¹⁶ Ibid.

¹⁷ IAEA, *Board of Governors*, 2021.

¹⁸ UN Conference on the Statute of the IAEA, *The Statute of the IAEA*, 1956, art. VI.

¹⁹ Ibid.

²⁰ IAEA, *Organizational Chart*, 2013; IAEA, *Employees & Staff: Strength Through Diversity*.

²¹ IAEA, *Organizational Chart*, 2013.

²² Ibid.

²³ IAEA, *List of Member States*, 2021.

²⁴ UN Conference on the Statute of the IAEA, *The Statute of the IAEA*, 1956, art. IV; IAEA, *List of Member States*, 2021.

²⁵ World Nuclear Association, *Safeguards to Prevent Nuclear Proliferation*, 2016.

²⁶ Ibid.

²⁷ UN Conference on the Statute of the IAEA, *The Statute of the IAEA*, 1956, art. III.

further defined by the provisions of the NPT, which establishes binding international law concerning non-proliferation of nuclear weapons, the disarmament of existing nuclear weapons systems, and the advancement of peaceful nuclear technology, thereby defining the tasks and responsibilities of the IAEA.²⁸

The functions of the IAEA are described in Article 3 of the Statute, and consist of the assistance and surveillance of the peaceful use of atomic energy accomplished through the provision of research and technical assistance for the practical application and development atomic energy.²⁹ To that end, the IAEA makes provisions about the standards for materials, services, equipment, and facilities to conduct research and produce atomic power.³⁰ Furthermore, the IAEA encourages and assists in the exchange of information, training, and the interchange of scientists.³¹ Additionally, the IAEA is able to acquire the facilities, plants, and equipment necessary to conduct its tasks and responsibilities.³²

Under its safeguard provisions in Article 7 of the Statute, the IAEA has the power to examine facilities and equipment, which includes the right to send inspectors to Member State facilities and to request progress reports from those states.³³ Furthermore, the IAEA has the power to require information on health and safety standards, and on the production and recovery on fissionable materials.³⁴ In case of non-compliance with IAEA provisions, the Agency is able to take further sanctioning steps including the suspension or termination of IAEA assistance or the withdrawal of material and equipment provided by the Agency.³⁵

Additional functions of the IAEA are set out in Article 3 of the NPT, which obliges states parties to the treaty to accept safeguard provisions, which should be negotiated between the Member State and the IAEA in accordance with the provisions outlined in the Statute and the NPT.³⁶ The IAEA is responsible for supervising and ensuring compliance to the established safeguard provisions, including the prevention of the misuse of nuclear material for non-peaceful usage, such as nuclear weapons or other explosive nuclear devices, and the supervision of the production, possession, and usage of fissionable material.³⁷ Finally, the Statute establishes the IAEA's reporting requirements to UN bodies, including annual reports to the General Assembly, reports to the Security Council as needed, and reports to other organs regarding matters within the "competence" of those bodies.³⁸

Recent Sessions and Current Priorities

The 64th annual General Conference of the IAEA took place on September of 2020.³⁹ With the Covid-19 pandemic ongoing, the conference took the format of both in-person and virtual meetings.⁴⁰ For the 64th conference, 500 delegates from 141 Member States of the IAEA as well as members from other international organizations, the media, and non-governmental organizations were in attendance.⁴¹ Resolutions adopted at the conference include ensuring the IAEA continues to carry out its mandate during the Covid-19 pandemic, strengthening the effects of safeguards, and the uses of nuclear technology and science especially in relation to the Zoonotic Disease Integrated Action (ZODIAC)

²⁸ UN General Assembly, *Treaty on the Non-Proliferation of Nuclear Weapons*, 1968.

²⁹ UN Conference on the Statute of the IAEA, *The Statute of the IAEA*, 1956, art. III A.

³⁰ Ibid.

³¹ Ibid.

³² Ibid.

³³ Ibid., art. XII.

³⁴ Ibid., art. III A.

³⁵ Ibid., art. III A.

³⁶ UN General Assembly, *Treaty on the Non-Proliferation of Nuclear Weapons*, 1968.

³⁷ Ibid.

³⁸ UN Conference on the Statute of the IAEA, *The Statute of the IAEA*, 1956, art. III.

³⁹ IAEA, *64th General Conference Concludes: Resolutions Adopted*, 2021.

⁴⁰ Ibid.

⁴¹ Ibid.

Project.⁴² Further resolutions adopted at the conference were focusing on the Non-Proliferation of Weapons particularly in the Democratic People's Republic of Korea.⁴³ The general conference also saw the approval of the budget for the 2021 year, and approving of the financial statements for the 2019 year.⁴⁴

The 65th annual conference of the IAEA was held from 20-24 September 2021, and in alignment with Austrian COVID-19 guidelines at the time, was held in-person with a possibility of remote connection.⁴⁵ During the meeting, the IAEA committed support to African Academic Institutions to enhance human resource development in nuclear science and technology, and the inaugural event of the Women in Nuclear regional Co-operation Agreement for the Promotion of Nuclear Science and Technology in Latin America and the Caribbean (ARCAL) Regional Chapter was held.⁴⁶ As well, the European Nuclear Experimental Educational Platform presented at the European Nuclear Experimental Educational Platform and Nuclear Capacity Building Based on Research Reactors event, and Mexico organized the event Cooperating with Women in Nuclear: Supporting Talent in the Nuclear Field, among other milestone events that reinforced the current IAEA priorities.⁴⁷

Other programmatic work of the IAEA continues apace, including the Peaceful Uses Initiative (PUI), which was launched in 2010, and aims to finance unfunded projects in the area of peaceful usage of nuclear technologies as well as to provide additional financial support to projects that foster technical cooperation.⁴⁸ Examples of such events are the outbreak of Ebola in West Africa or the effects of the Zika virus in Latin America, whereby the PUI provides training courses on nuclear derived techniques to advance the research on the Ebola and Zika virus.⁴⁹ Nuclear technologies also play a crucial role in effectively addressing many of the challenges set out by the SDGs, such as in health care to diagnose, cure, or palliate disease; in agriculture, to monitor and protect the environment to identify and protect water resources; and in energy production, to support the production of clean, sustainable, and affordable energy for everybody.⁵⁰

The IAEA has continued the effort of peaceful uses by creating the Zoonotic Disease Integrated Action (ZODIAC) Project in June 2020 in order to help countries with outbreaks which may have originated in animals.⁵¹ Zoonotic diseases refers to infections originating in animals that can be transmitted to humans.⁵² These outbreaks can be caused by bacteria, fungi, parasites, or viruses similar to COVID-19 and is part of IAEA's response to the COVID-19 pandemic.⁵³ Through ZODIAC, "veterinary and public health officials from Member States benefit from joint research and development activities and from expert guidance as well as from the technical, scientific and laboratory support of the IAEA and its

⁴² IAEA, *64th General Conference Concludes: Resolutions Adopted*, 2021; IAEA, *ZODIAC: An IAEA initiative towards the early detection and prevention of the next zoonotic outbreaks; moving forward from COVID-19*, 2020.

⁴³ IAEA, *64th General Conference Concludes: Resolutions Adopted*, 2021.

⁴⁴ Ibid.

⁴⁵ Llukmani, General Conference: Day 5 Highlights, IAEA, 2021; IAEA, *General Conference: Arrangements for the Conference (GC65/17)*, 2021.

⁴⁶ Gruensteidl, With IAEA Support, African Academic Institutions Rally to Enhance Human Resource Development in Nuclear Science and Technology, IAEA, 2021; Llukmani, General Conference: Day 5 Highlights, IAEA, 2021.

⁴⁷ Llukmani, General Conference: Day 5 Highlights, IAEA, 2021.

⁴⁸ IAEA, *Ten Years of the Peaceful Uses Initiative*, 2020.

⁴⁹ IAEA, *Ten Years of the Peaceful Uses Initiative*, 2020; IAEA Office of Public Information and Communication, *Scientists Learn to Detect Zika Virus Using Nuclear-Derived Technique*, 2016.

⁵⁰ IAEA, *IAEA and the Post-2015 Development Agenda*, 2015; IAEA, *Atoms for Peace and Development: How the IAEA supports the Sustainable Development Goals*, 2016.

⁵¹ IAEA, *ZODIAC: An IAEA initiative towards the early detection and prevention of the next zoonotic outbreaks; moving forward from COVID-19*, 2021; IAEA, *Zoonotic Disease Integrated Action (ZODIAC)*, 2020.

⁵² Ibid., p. 2.

⁵³ Ibid.

partners.⁵⁴ The project also includes access to expertise, training, and technology that can help with disease diagnostics and with pathogen surveillance.⁵⁵

The ZODIAC Project encompasses the IAEA's mandate by fostering research, innovation, and development with nuclear technologies.⁵⁶ This project works with not only Member States but with the Food and Agriculture Organization (FAO), the World Health Organization (WHO), and the World Organization for Animal Health (OIE).⁵⁷ The main purpose of the project is to be able to identify pathogens in its early stages, trace its movements, and to have an emergency response prepared in case of new outbreaks.⁵⁸ The ultimate goal of the project would be to prevent outbreaks from happening by detecting possible diseases and also provide data on how zoonotic diseases can affect human health.⁵⁹ Those who are members of the IAEA will also have access to an IAEA Response Team should an emergency occur that is related to a zoonotic disease outbreak.⁶⁰ The IAEA has been instrumental in providing over 120 countries with testing equipment to rapidly detect COVID-19 under related auspices.⁶¹

Every five years the NPT parties meet to review and reform the agreements within the treaty.⁶² The most recent conference was held in 2015 and ended unsuccessfully with States parties unable to reach a consensus on the substance of the Final Document.⁶³ In light of the COVID-19 pandemic the 2020 NPT Review Conference was postponed to be held no later than February 2022.⁶⁴ Topics to be discussed include the advancement of peaceful uses of nuclear energy, regional disarmament and non-proliferation, nuclear disarmament, and other issues.⁶⁵ Despite not being able to hold a NPT Review Conference, the work of the IAEA has continued through efforts like the IAEA's Comprehensive Capacity Building Initiative (COMPASS) for systems of accounting for and control of nuclear material (SSACs) and safeguards implementation (SRAs).⁶⁶ Through COMPASS, the IAEA works with Member States and tailors to their needs on strengthening both their SRAs and the SSACs.⁶⁷

Conclusion

The primary aim of the IAEA is to guarantee the peaceful use of nuclear material.⁶⁸ The Agency faces dual challenges: to advance nuclear technology and to spread knowledge on effective and sustainable usage of nuclear energy; and to simultaneously prevent the usage of nuclear material for atomic weapons and non-peaceful purposes.⁶⁹ The work of the IAEA is crucial in the development of nuclear security standards that allow for the development of peaceful uses of nuclear technologies to guarantee the protection of human health and the environment.⁷⁰ However several key challenges continue to undermine the ability of the Agency to enforce these standards, such as the COVID-19 pandemic, and

⁵⁴ IAEA, *ZODIAC: An IAEA initiative towards the early detection and prevention of the next zoonotic outbreaks; moving forward from COVID-19*, 2021.

⁵⁵ *Ibid.*

⁵⁶ *Ibid.*, p. 2.

⁵⁷ *Ibid.*, p. 2.

⁵⁸ *Ibid.*, p. 2.

⁵⁹ *Ibid.*, p. 2.

⁶⁰ *Ibid.*, p. 2.

⁶¹ IAEA, *IAEA Launches Initiatives to Help Prevent Future Pandemics*, 2020.

⁶² UN, Conference to the Parties of the NPT, *2015 Review Conference of the Parties to the Treaty on the Non-Proliferation of Nuclear Weapons (NPT)*.

⁶³ UN, Conference to the Parties of the NPT, *2015 Review Conference of the Parties to the Treaty on the Non-Proliferation of Nuclear Weapons (NPT)*; Meyer, *A failed nuclear NPT review conference: Fin de regime?, 2015*; Baklitskiy, *The 2015 NPT Review Conference and the Future of the Nonproliferation Regime*, 2015.

⁶⁴ UN NPT Review, *Latest Updates and News*, 2021.

⁶⁵ UN NPT Review, *Background*, 2021.

⁶⁶ IAEA, *COMPASS – IAEA Comprehensive Capacity-Building Initiative for SSACs and SRAs*, 2020.

⁶⁷ *Ibid.*

⁶⁸ UN Conference on the Statute of the IAEA, *The Statute of the IAEA*, 1956.

⁶⁹ Llukmani, General Conference: Day 5 Highlights, *IAEA*, 2021; IAEA, *Atoms for Peace and Development: How the IAEA supports the Sustainable Development Goals*, 2016.

⁷⁰ IAEA, *The IAEA Mission Statement*.

the situations in North Korea and the Middle East.⁷¹ As the IAEA continues its work toward the realization of the SDGs through its day-to-day operations, implementation of the PUI, usage of the ZODIAC project, and preparation for the 2020 NPT Review Conference, focus remains addressing current security challenges facing the Agency and ensuring the continued political will of its members.⁷²

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Fischer, D. (1997). *History of the International Atomic Energy Agency: The first Forty Years*. Retrieved 19 September 2021 from: http://www-pub.iaea.org/MTCD/publications/PDF/Pub1032_web.pdf

This publication covers the first forty years of the IAEA's history and describes the foundation and developments of the Agency during that period. The publication particularly concentrates on the foundation of the Agency and the difficulties the IAEA faced during the period of the Cold War. The publication provides an in-depth and comprehensive oversight of the challenges and achievements of the Agency during the first forty years after its creation. Even though the publication is quite old and lacks the development of the last twenty years, it is a helpful and rich source to learn about the first years of the Agency and the challenges during the Cold War and post-Cold War period.

International Atomic Energy Agency. (n.d.). *Atoms for Peace and Development: How the IAEA supports the Sustainable Development Goals*. Retrieved 4 November 2021 from:

https://www.iaea.org/sites/default/files/sdg-brochure_forweb.pdf

The report explains very well the connection between the responsibilities and tasks of the IAEA and the Sustainable Development Goals. The Agency shows how nuclear energy can contribute to advance the Goals and how their projects and initiatives can advance many areas to make them become reality. This publication is a good way to help delegates connect the IAEA's work not purely to nuclear and energy security, but also to often overlooked humanitarian and development aims. The diversification of the IAEA's work is well illustrated and should motivate delegates to perceive the Agency as more than just a supervisor of the distribution of nuclear weapons and nuclear energy usage.

United Nations, Conference on the Statute of the International Atomic Energy Agency. (1956). *The Statute of the International Atomic Energy Agency*. Retrieved 4 November 2021 from:

<https://www.iaea.org/sites/default/files/statute.pdf>

The Statute is the founding document of the IAEA that outlines and describes the terms and conditions of the establishment and the functioning of the Agency. The Statute includes objectives, functions, rules for memberships, and further regulations concerning the structure and the work of the IAEA. The Statute is the ideal source to get familiar with the Agency's mandate, responsibilities and functions, powers, and possibilities. This source is a good starting point for the research of delegates and provides a basis for the knowledge necessary to continue research on the substantive work and actions of the Agency.

United Nations, General Assembly, Twenty-second session. (1968). *Treaty on the Non-Proliferation of Nuclear Weapons (A/RES/2373 (XXII))*. Retrieved 4 November 2021 from:

[http://www.undocs.org/A/RES/2373\(XXII\)](http://www.undocs.org/A/RES/2373(XXII))

The Treaty on the Non-Proliferation of Nuclear Weapons is one of the most important treaties leading and defining the IAEA's responsibilities, mandate, and powers. The Treaty depicts a major achievement of the Agency and significantly advanced the combat against the spread of nuclear weapons. The Treaty provides delegates with the necessary knowledge on the current legal situation on the proliferation of nuclear

⁷¹ Fischer, *History of the International Atomic Energy Agency: The first Forty Years*, 1997.

⁷² IAEA, *ZODIAC: An IAEA initiative towards the early detection and prevention of the next zoonotic outbreaks; moving forward from COVID-19*, 2021; IAEA, *Ten Years of the Peaceful Uses Initiative*, 2020.



weapons and shows possible gaps and necessary improvements that delegates should discuss and negotiate on.

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1. The Future of Atoms: Artificial Intelligence for Nuclear Applications

Introduction

The International Atomic Energy Agency (IAEA) defines artificial intelligence (AI) as “a collection of technologies that combine numerical data, process algorithms and continuously increasing computing power to develop systems capable of tracking complex problems in ways similar to human logic and reasoning.”⁷³ In 2019, Audrey Azouley, the Director-General of the United Nations Educational, Scientific and Cultural Organization (UNESCO), stated that AI will lead to a new form of human civilization, but that the international community must ensure that it is developed through a “humanist approach, based on values and human rights.”⁷⁴ The United Nations Security Council has also discussed potential threats to international peace and security posed by Artificial Intelligence and other emerging technologies, particularly technology-based inequalities and the potential for an AI arms race, and officials at the United Nations Office for Disarmament Affairs (UNODA) have highlighted AI as driving interest in autonomy in weapons and other military applications.⁷⁵ At the same time, various United Nations (UN) bodies and programs have highlighted the potential for AI to be used for development, protection of the natural environment, and advancement of science policy.⁷⁶ Regardless of the field or function, UN officials have consistently called for clear norms and ethics while using this emerging technology.⁷⁷

The second article of the *Statute of the International Atomic Energy Agency* (1957) established the agency’s objective of accelerating the use of atomic energy for peaceful and nonmilitary purposes.⁷⁸ At its 64th General Conference, the IAEA held a side-event called “The Future of Atoms: Artificial Intelligence for Nuclear Applications,” marking the first-time that artificial intelligence-related applications for nuclear energy were discussed in an IAEA forum.⁷⁹ The potential of machine learning was discussed at this event in the context of the environment, health, and knowledge management, including for advancing fusion research.⁸⁰ The United Nations Office of Information and Communications Technology (OICT) describes the function of machine learning as machinery that, instead of programming it to do a task, it is given multiple examples, learning from itself in every one of them.⁸¹ During the meeting, four key areas of AI applications in nuclear sciences were discussed: AI for cancer staging and treatment, advancing fusion research with AI, protecting water and the environment with AI, and the role of AI ethics in shaping the future.⁸²

International and Regional Framework

While not addressing nuclear technology specifically, Article 27 of the *Universal Declaration of Human Rights* (UDHR) (1948), expresses that “everyone has the right freely to participate in the cultural life of the community, to enjoy the arts and to share in scientific advancement and its benefits.”⁸³ Many subsequent frameworks have built on this basic premise, including the first significant document that established international controls and oversight of nuclear energy, the *Treaty on the Non-Proliferation of Nuclear Weapons* (NPT) (1968).⁸⁴ The NPT mandates the responsibility of establishing safeguarding procedures to the IAEA, which verifies compliance with the NPT through routine inspections.⁸⁵ The NPT also

⁷³ Broussard, *The Future of Atoms: Artificial Intelligence for Nuclear Applications*, 2020.

⁷⁴ Azoulay, *Towards an Ethics of Artificial Intelligence*, 2021.

⁷⁵ Roberts, *The UN Security Council Tackles Emerging Technologies*, 2021, p. 1.

⁷⁶ Trepelkov, Mr. Alex Trepelkov, *Officer-in-Charge, Division for Sustainable Development Goals, DESA*, 2019.

⁷⁷ Ibid.

⁷⁸ Conference on the Statute of the International Atomic Energy Agency, *Statute of the International Atomic Energy Agency*, 1957.

⁷⁹ Broussard, *The Future of Atoms: Artificial Intelligence for Nuclear Applications*, 2020.

⁸⁰ Ibid.

⁸¹ IAEA, *What is Machine Learning?*, 2018.

⁸² IAEA, *The Future of Atoms: Artificial Intelligence for Nuclear Applications*, 2020.

⁸³ UN General Assembly, *Universal Declaration of Human Rights (A/RES/217 A (III))*, 1948.

⁸⁴ UN Codification Division, Office of Legal Affairs, *Treaty on the Non-Proliferation of Nuclear Weapons*, 1968.

⁸⁵ Ibid.

established a basic principle for nuclear technology, explicitly allowing Member States to use such technology for peaceful purposes.⁸⁶ The *Convention on Nuclear Safety* (CNS) (1994), established the fundamental safety principles that Member States who have nuclear power plants need to follow.⁸⁷ One of the main principles in the CNS is that all states parties need to create their own regulatory framework and body that govern their nuclear installations.⁸⁸ In paragraph 70 of the *2030 Agenda for Sustainable Development* (2015), a new Technology Facilitation Mechanism was launched as a system to allow the UN to formally support the use of technology in support of the Sustainable Development Goals (SDGs), particularly SDG 17 to (“strengthen the means of implementation and revitalize the global partnership for sustainable development”).⁸⁹

Scientific and technological advancement in nuclear-related areas are further regulated by newer international frameworks, such as the *Agreement on the Establishment of the ITER International Fusion Energy Organization for the Joint Implementation of the ITER project* (2007), which created an international project with the purpose of demonstrating the scientific and technological feasibility of technology such as AI and of fusion energy for peaceful projects.⁹⁰ The *Comprehensive Nuclear-Test-Ban Treaty* (1996) (CTBT) bans all nuclear explosions, and prevents damage caused by radioactivity from nuclear explosions to all animals, humans, and plants.⁹¹ Article II of the CTBT determined that the Conference of the States Parties will “consider and review scientific and technological developments that could affect the operation of” the treaty.⁹² The first international instrument that addressed nuclear waste effects on the environment was the *Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management* (1997), which established fundamental safety principles with a peer review process to the Convention on Nuclear Safety.⁹³ The Convention seeks to ensure that there are effective procedures against potential hazards for all individuals, society and the environment.⁹⁴

On a regional level, there are currently five nuclear-weapon-free zones (NWFZs), where the acquisition, possession, placement, testing and use of nuclear weapons is prohibited.⁹⁵ The regional treaties that created the aforementioned NWFZs are: *Treaty of Tlatelolco* (1967), *Treaty of Rarotonga* (1985), *Treaty of Bangkok* (1995), *Treaty of Pelindaba* (1996), and the *Treaty on a Nuclear-Weapon-Free Zone in Central Asia* (2006).⁹⁶ Said treaties not only prohibit nuclear weapons, but also regulate the use of nuclear energy and the creation of nuclear energy plants.⁹⁷ None of these treaties have acknowledged AI.⁹⁸

Role of the International System

IAEA has various inter-governmental legal instruments regarding nuclear safety.⁹⁹ These include the *Code of Conduct on the Safety and Security of Radioactive Sources* (2004) and the *Code of Conduct on*

⁸⁶ UN Codification Division, Office of Legal Affairs, *Treaty on the Non-Proliferation of Nuclear Weapons*, 1968.

⁸⁷ IAEA, *Convention on Nuclear Safety*, 1994.

⁸⁸ Ibid.

⁸⁹ UN DESA, *Technology Facilitation Mechanism*, 2021.

⁹⁰ International Atomic Energy Agency, *Agreement on the Establishment of the ITER International Fusion Energy Organization for the Joint Implementation of the ITER project*, 2007.

⁹¹ Comprehensive Nuclear-Test-Ban Treaty Organization, *Who We Are*, 2021.

⁹² Preparatory Commission for the Comprehensive Nuclear-Test-Ban Treaty Organization, *Comprehensive Nuclear-Test-Ban Treaty*, 1996, p. 8.

⁹³ IAEA, *Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management*, 2021.

⁹⁴ IAEA, *Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management*, 1997, p. 8.

⁹⁵ United Nations Platform for NWFZ, *Overview of Nuclear-Weapons-Free Zones*, 2021.

⁹⁶ Ibid.

⁹⁷ Ibid.

⁹⁸ Roberts, *The UN Security Council Tackles Emerging Technologies*, 2021.

⁹⁹ IAEA, *Codes of Conduct*, 2021.

the Safety of Research Reactors (2006).¹⁰⁰ One of the five IAEA Safety Standards Committees is the Waste Safety Standards Committee, dedicated to ensuring that all nuclear waste is disposed of correctly.¹⁰¹ Nuclear safety standards have also been developed in collaboration with civil society and private sector collaboration, for example in 2008 an international organization called World Institute for Nuclear Security was created to “improve the effectiveness and efficiency of security arrangements for nuclear materials through the sharing and promotion of good practices among security professionals.”¹⁰² Similarly, the AI-Waste Project, led by the Know-Center in cooperation with Graz University of Technology, seeks to increase the recycling share by at least 10% through the use of AI and Machine Learning.¹⁰³

The IAEA also publishes an annual report on the developments made over the last year regarding major obstacles, activities, and achievements related to safeguards, safety, and science and technology.¹⁰⁴ For instance, the *IAEA Annual Report 2019* (2019) stated that, in 2019, 28 Member States were “actively considering, planning, or embarking on a nuclear power program.”¹⁰⁵ The Annual Report also covers themes such as food and agriculture, human health, water resources, and the environment.¹⁰⁶

There are also several initiatives between UN agencies, such as the Joint Programme between the Food and Agriculture Organization (FAO) and IAEA, that work towards managing nuclear safety with animal production and health, environmental protection, and soil and water management, among others.¹⁰⁷ A joint World Health Organization (WHO) and IAEA publication *Technical Specifications of Radiotherapy equipment for Cancer Treatment* (2021) highlights the potential uses for nuclear and radioactive equipment in medicine.¹⁰⁸ The European Commission found that AI can also be used to strengthen climate predictions, help decarbonize industries from building to transport, and help to better allocate renewable energy.¹⁰⁹ However, a study done by MIT Technology Review found that training several common large AI models emits nearly five times the lifetime emission of an average car, so these disadvantages must be mitigated appropriately.¹¹⁰

The pivotal Rio+20 Conference, *The Future We Want* (2012), outlined the importance of every country having access to environmentally sound technologies, new knowledges, know-how, and expertise in paragraph 270.¹¹¹ In that spirit, FAO organized a global forum in June 2021 to discuss “Artificial Intelligence for a Digital Blue Planet.”¹¹² The forum brought together data analysts, scientists and researchers to discuss how AI could be used to promote the use of knowledge with the purpose of improving marine ecosystems.¹¹³

Several non-governmental organizations are also dedicated to peace and global security initiatives, such as the Stockholm International Peace Research Institute (SITRI).¹¹⁴ In a 2019 report, *The Impact of Artificial Intelligence on Strategic Stability and Nuclear Risk*, SITRI provides a detailed explanation about the relationship between machine learning, AI, and nuclear weapons, discussing nuclear early warning,

¹⁰⁰ IAEA, *Codes of Conduct*, 2021.

¹⁰¹ IAEA, *Radioactive Waste and Spent Fuel Disposal*, 2021.

¹⁰² IAEA, *Nuclear Security gets a Boost with Initiative Aimed at Private Sector*, 2008.

¹⁰³ Waste Management World, *Improving Waste Recycling with Artificial Intelligence*, 2021.

¹⁰⁴ IAEA, *IAEA Annual Report 2019*, 2020.

¹⁰⁵ *Ibid.*, p. 25.

¹⁰⁶ *Ibid.*, p. 3.

¹⁰⁷ IAEA, *Joint FAO/IAEA Centre of Nuclear Techniques in Food and Agriculture*.

¹⁰⁸ World Health Organization, *Technical Specifications of Radiotherapy equipment for Cancer Treatment*, 2021.

¹⁰⁹ Ekin, *AI can help us fight climate change. But it has an energy problem, too*, 2019.

¹¹⁰ Hao, *Training a single AI model can emit as much carbon as five cars in their lifetimes*, 2019.

¹¹¹ United Nations Conference on Sustainable Development, *The Future We Want*, 2012. p. 69.

¹¹² Food and Agriculture Organization of the United Nations, *Artificial Intelligence for a Digital Blue Planet*, 2021, p. 1.

¹¹³ *Ibid.*, p. 2.

¹¹⁴ Stockholm International Peace Research Institute, *Home*, 2021.

nuclear command, and autonomous nuclear weapons.¹¹⁵ Furthermore, the report raised questions as to whether AI could be used to properly identify patterns and improve early warning systems.¹¹⁶ In 2018, the Rand Corporation published *How Might Artificial Intelligence Affect the Risk of Nuclear War?*, a report resulting from a series of workshops with experts on AI and nuclear security that examined the impact of advanced computing on nuclear security through 2040.¹¹⁷ The *Global Partnership on Artificial Intelligence* (GPAI), a multi-stakeholder initiative, also works in this area with the objective of diminishing the gap between theory and practice in AI related scenarios.¹¹⁸ GPAI's *Responsible Development, Use and Governance of AI Working Group Report* (2020), catalogued various projects that promote the responsible research and development of AI systems and applications.¹¹⁹

Nuclear Advancement in Environmental Issues

According to the Organisation for Economic Co-operation and Development (OECD) and the Nuclear Energy Agency (NEA), nuclear waste management and managing its effects on surrounding environments is a critical issue when discussing the use of nuclear energy.¹²⁰ While management of nuclear material has improved significantly with aboveground storage mechanisms being more successful and leaving a minimal impact on the environment, NEA points to a continual need for the environmentally ethical practice of nuclear energy, as sustainable development relies upon long term practices that are not just efficient, but account for the environment and the communities they service.¹²¹ The International Telecommunications Union, in collaboration with IAEA, is set to host an event on November 24, 2021 entitled, "AI for Nuclear Energy."¹²² According to preliminary event information, ITU and IAEA indicate the use of AI to address nuclear safety and disaster management will be a focal point.¹²³

An example of failures of these recommended practices was seen in September 1987, when a shielded and strongly radioactive Caesium-137 medical source in Goiânia, Brazil was wrongfully disposed of, creating one of the worst radioactive accidents in history.¹²⁴ Over the next few days, 20 people were hospitalized, with four casualties due to radiation exposure.¹²⁵ This incident, which became known as the Goiânia Accident, has since become a key example of failures in radiation exposure management.¹²⁶ The Brazilian authorities, acting in cooperation with the IAEA, managed to control the exposure, quarantine radioactive areas, and correctly dispose of all contaminated material once they were alerted to the incident, which was after dozens of individuals had already been exposed.¹²⁷ IAEA has remarked that radioactive waste is unavoidable, so spent fuel and radioactive waste must be managed with extreme caution and responsibly to avoid environmental disasters.¹²⁸ A method developed by Nankai University's College of Artificial Intelligence found that applying AI to nuclear transportation equipment can effectively reduce accidents rates by more than 50%.¹²⁹ Nankai University's study also indicates there is high

¹¹⁵ Stockholm International Peace Research Institute, *The Impact of Artificial Intelligence on Strategic Stability and Nuclear Risk*, 2019.

¹¹⁶ Stockholm International Peace Research Institute, *The Impact of Artificial Intelligence on Strategic Stability and Nuclear Risk*, 2019.

¹¹⁷ Geist, *How Might Artificial Intelligence Affect the Risk of Nuclear War?*, 2018.

¹¹⁸ Global Partnership on Artificial Intelligence, *Responsible Development, Use and Governance of AI Working Group Report*, 2021.

¹¹⁹ The Global Partnership on Artificial Intelligence, *Responsible Development, Use and Governance of AI Working Group Report*, 2020, p. 5.

¹²⁰ Nuclear Energy Agency, *Sustainable Development and Nuclear Energy*.

¹²¹ Ibid.

¹²² AI for Good, *AI for nuclear energy*, ITU, 2021.

¹²³ Ibid.

¹²⁴ IAEA, *Radiation Sources: Lessons from Goiania*, 1988, p. 1.

¹²⁵ Ibid., p. 1.

¹²⁶ Ibid., p. 1.

¹²⁷ Ibid., p. 3.

¹²⁸ IAEA, *Linking Nuclear Power and Environment*, p. 2.

¹²⁹ NatureResearch, *New Heights for Artificial Intelligence*, 2021.

demand for AI when transporting nuclear material, as it can significantly raise efficiency and fill the role of transportation personnel in Member States such as China.¹³⁰

The *IAEA Annual Report 2019* (2019) stated that, during a nuclear emergency, it is necessary to analyze environmental samples in a quick and effective manner, in order to support rapid emergency decisions.¹³¹ For this purpose, IAEA established a worldwide network of analytical laboratories with the sole purpose of analyzing environmental data retrieved from nuclear emergencies, called Analytical Laboratories for the Measurement of Environmental Radioactivity (ALMERA).¹³² ALMERA works by pooling environmental samples from the network's laboratories, and constantly comparing them to radioactive samples.¹³³ This gives ALMERA a wide variety of samples to verify the amount of radioactivity and how to act during an environmental crisis.¹³⁴

Outside the realm of nuclear waste management, AI can be used to prevent further incidents through the field of climate modeling, where it can be used to accurately predict the impact that future power plants will have in carbon dioxide emissions.¹³⁵ For example, *Microsoft* developed a program called "IMAZON", where AI can prototype deforestation risks and predict where industries, including nuclear industries, can build their infrastructure with the least possible environmental impact.¹³⁶ Isotope hydrology, which uses radioactive materials to assess groundwater and atmospheric cycles, has also been highlighted as a major avenue for potentially using AI to advance international sustainability goals.¹³⁷ Isotope science, especially when applied to weather and water systems, generates massive amounts of data that is often shared in databases but is difficult for scientists, even those with access to advanced technology, to process and interpret.¹³⁸ AI, especially if made equitably available, may allow for this data to be far more interpretable, allowing for better water management and assessment of the effect of human activities on water resources.¹³⁹

The *2030 Agenda for Sustainable Development* established an overarching principle of "leaving no one behind," and some Member States have highlighted that AI presents an opportunity to better meet that goal.¹⁴⁰ Data analysis powered by AI or machine learning has been identified as having the potential to correctly predict regions of poverty, positively influence goods and services allocation to said regions, prevent dangerous instances of exposure, and advance sustainability goals.¹⁴¹

The Role of Ethics in AI: Nuclear Research and Knowledge Management

At its AI event in 2020, IAEA highlighted the need for the future of AI to recognize the interconnectedness of new technologies with human lives through a continuum of political, social, environmental, and ethical concerns.¹⁴² That same year, UNESCO created their Ad Hoc Expert Group on Ethics of AI with the objective of drafting recommendations for an ethical use of this type of emerging technologies.¹⁴³ UNESCO also held a virtual event in June 2021 to examine the draft text of the *Recommendation on the Ethics of Artificial Intelligence*, which, if approved, will be submitted for a vote by Member States in the

¹³⁰ NatureResearch, *New Heights for Artificial Intelligence*, 2021.

¹³¹ IAEA, *IAEA Annual Report 2019*, 2020, p. 56.

¹³² IAEA, *ALMERA (Analytical Laboratories for the Measurement of Environmental Radioactivity)*, 2017, p. 2.

¹³³ Hamlat, *International Atomic Energy Agency's Analytical Laboratories for the Measurement of Environmental Radioactivity network: Experiences and perspectives in the North and Latin America region*, 2019, p. 1.

¹³⁴ *Ibid.*, p. 3.

¹³⁵ Snow, *How Artificial Intelligence Can Tackle Climate Change*, 2019.

¹³⁶ Microsoft, *IMAZON*.

¹³⁷ IAEA, *The Future of Atoms: Artificial Intelligence for Nuclear Applications*, 2020.

¹³⁸ *Ibid.*

¹³⁹ *Ibid.*

¹⁴⁰ United Nations Sustainable Development Group, *Leave No One Behind*, 2021.

¹⁴¹ Austin, *How AI/ML is helping to eradicate poverty*, 2019.

¹⁴² IAEA, *The Future of Atoms: Artificial Intelligence for Nuclear Applications*, 2020.

¹⁴³ Intellectual Property Institute, *UNESCO Ad Hoc Expert Group on Ethics of AI*, 2020.

General Conference of UNESCO at its 41st Session.¹⁴⁴ The preliminary report stated that when AI machine learning decisions are applied, these cannot be fully understood and that AI is “not value neutral, but inherently biased, among others, due to the data on which they are trained, and the choices made while training on the data.”¹⁴⁵ The report also emphasized that AI can either contribute to worsen the problems of exclusion and inequality in the world, or it can be used for noble purposes.¹⁴⁶

Experts in the field have highlighted that it is critical to consider ethical dilemmas associated with AI.¹⁴⁷ Some of these dilemmas are to emerge from the “black box environment,” where the underlying steps of the analysis conducted by an AI are not transparent.¹⁴⁸ There are also concerns regarding data privacy and confidentiality and a lack of widespread discussion and understanding of where the benefits of AI end and potential risks begin.¹⁴⁹ As AI and machine learning processes are automatic and people operating them have no influence on their outputs, researchers have highlighted that there should be careful consideration of how and where these technologies should be applied.¹⁵⁰

IAEA reports have stated that ethics is not only present in correlating AI and nuclear power, but also ensuring that every possible risk-prevention assessment are made.¹⁵¹ After the 1986 Chernobyl Nuclear Plant accident, IAEA’s Member States adopted the *Convention on Early Notification of a Nuclear Accident* (CENNA) (1986).¹⁵² CENNA requires States to report any essential data about a nuclear accident, successfully creating a notification system where other States can be fully aware of the gravity of each situation.¹⁵³ While the Chernobyl accident pre-dated the common usage of AI, in the Convention, the IAEA highlighted that one of the most discussed ethical dilemmas regarding nuclear energy is if the benefits exceed the risks, a similar quandary to what the international community is currently facing with AI.¹⁵⁴ Member States with nuclear capacities have the responsibility of ensuring their citizens understand the risks that come with nuclear power plants, and do so ethically, and that includes the type and purpose of the technology used, such as AI.¹⁵⁵

Conclusion

AI can benefit society in the areas of medicine, water resource management, and nuclear fusion research, among others, but also has potential risks.¹⁵⁶ In September 2020, IAEA held its first event to discuss the uses of AI in nuclear-related areas, launching a formal international dialogue for the first time.¹⁵⁷ The use of AI and its combination with nuclear technology has the potential to generate assist in environmental management, poverty reduction, and other areas.¹⁵⁸ However, much work has yet to be done to understand the ethical dilemmas of both AI and its application.¹⁵⁹

¹⁴⁴ UNESCO, *Intergovernmental Meeting related to the draft Recommendation on the Ethics of Artificial Intelligence*, 2021.

¹⁴⁵ UNESCO, *Preliminary Report on the First Draft on the Recommendation on the Ethics of Artificial Intelligence*, 2021, p. 3.

¹⁴⁶ *Ibid.*, p. 3.

¹⁴⁷ Currie, *Ethical Principles for the Application of Artificial Intelligence (AI) in Nuclear Medicine*, 2020, p. 2.

¹⁴⁸ *Ibid.*, p. 2.

¹⁴⁹ *Ibid.*, p. 2.

¹⁵⁰ *Ibid.*, p. 5.

¹⁵¹ IAEA, *The Future of Atoms: Artificial Intelligence for Nuclear Applications*, 2020.

¹⁵² IAEA, *Convention on Early Notification of Nuclear Accidents*, 2021.

¹⁵³ IAEA, *Convention on Early Notification of Nuclear Accidents*, 1986, p. 3.

¹⁵⁴ Energy Advisory Group of the Working Committee on Church and Society, World Council of Churches, *Public Acceptance of Nuclear Power – Some Ethical Issues*, p. 4.

¹⁵⁵ *Ibid.*, p. 4.

¹⁵⁶ IAEA, *The Future of Atoms: Artificial Intelligence for Nuclear Applications*, 2020.

¹⁵⁷ *Ibid.*

¹⁵⁸ Snow, *How Artificial Intelligence Can Tackle Climate Change*, 2019.

¹⁵⁹ UNESCO, *Preliminary Report on the First Draft on the Recommendation on the Ethics of Artificial Intelligence*, 2021, p. 3.

Further Research

In beginning their research, delegates should consider the following questions: What resources are needed to create a framework about AI risks and benefits? How could an ethical guideline about the use of AI in nuclear research be adopted by the nuclear capable countries? Is it possible to ensure that regulations are in place for emerging technologies such as AI? How can machine learning be best leveraged in nuclear research? Can machine learning be used to predict nuclear uses and protect civilians from exposure incidents?

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The Preliminary Report on the First Draft of the Recommendation on the Ethics of Artificial Intelligence gives a clear image of how ethics could be applied to Artificial Intelligence, including specific concrete recommendations and best practices. It explores the potential ethical principles that AI should have, and how should they be applied. Delegates will find this resource useful for having context on what AI is, and how ethics might be effectively applied in the field.

Broussard, E. (2020). *The Future of Atoms: Artificial Intelligence for Nuclear Applications*. IAEA. Retrieved 6 August 2021 from: <https://www.iaea.org/newscenter/news/the-future-of-atoms-artificial-intelligence-for-nuclear-applications>

The IAEA Future of Atoms: Artificial Intelligence for Nuclear Applications webpage discusses what artificial intelligence means for nuclear energy, and how the IAEA should discuss it. This particular article explains the background of the issue and the possible consequences that artificial intelligence could have on nuclear power and waste management. As this article was published after the 64th Annual General Conference side-event was held, it demonstrates the input that IAEA received from its members and provides the most up-to-date recommendations and best practices. Delegates will find this resource useful since it serves as a starting point for IAEA's current thinking on AI.

International Atomic Energy Agency. (1988). Radiation sources: Lessons from Goiânia. *IAEA Bulletin*, 4 (1): 10-17. Retrieved 6 August 2021 from:

<https://www.iaea.org/sites/default/files/publications/magazines/bulletin/bull30-4/30402781017.pdf>

This Bulletin covers the events that happened in Goiânia, one of the worst radioactive civilian exposure incidents, due to the mismanagement and disposal of nuclear medical apparatus. It explains how IAEA acted, and what could have been different if a correct nuclear waste management was applied. The bulletin will give delegates a view of how IAEA responds to these types of incidents, and how improvements in technology, tracking, and management can prevent these incidents from occurring in the future.

United Nations, International Atomic Energy Agency. (1986). *Convention on Early Notification of a Nuclear Accident (INFCIRC/335)*. Retrieved 5 August 2021 from:

<https://www.iaea.org/sites/default/files/infirc335.pdf>

The Convention on Early Notification of a Nuclear Accident is one of the few international frameworks that currently exists about recommendations for response to a nuclear accident. This framework was adopted after the Chernobyl disaster, so it reflects the recommendations in hindsight about how this incident could have been prevented. Delegates will find that this source provides a useful historical lens on such situations can be prevented in the future, and the impact of technology on nuclear management.

United Nations, International Atomic Energy Agency. (2020). *IAEA Annual Report 2019*. Retrieved 6 August 2021 from: <https://www.iaea.org/sites/default/files/publications/reports/2019/gc64-3.pdf>

Every year, the International Atomic Energy Agency publishes their Annual Report, where the most significant projects, resolution, treaties, and objectives accomplished throughout the year prior to its publication are discussed. The IAEA Annual Report 2019 discusses said activities carried out between January 2019 and December 2019. Delegates should read said reports to be familiar with what IAEA activities have been for the last year, putting special emphasis on their goals for the future.

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2. The Nuclear Situation in Iran: Follow-Up on the Joint Comprehensive Plan of Action

Introduction

The UN is committed to the long-term goal of creating a world free of nuclear weapons through disarmament and non-proliferation.¹⁶⁰ At the same time, safe development of nuclear technologies could be essential to the goal of decarbonizing energy and reducing the effects of climate change.¹⁶¹ Unlike with nuclear weapons, peaceful uses of nuclear technology do not require that uranium or plutonium be artificially enriched to their “weapons-grade” states of over 90% purity, making their usage more feasible and sustainable.¹⁶² However, as intent is difficult to prove from inspections alone, the International Atomic Energy Agency (IAEA) is limited in its ability to determine whether nuclear enrichment is being done for peaceful or non-peaceful purposes without inspection of enrichment facilities.¹⁶³

At the September 2002 regular session of the IAEA General Conference, the Islamic Republic of Iran announced that it was starting development of nuclear power.¹⁶⁴ This announcement alarmed the international community, which had long viewed achieving global nuclear disarmament and non-proliferation as central to maintaining peace and security.¹⁶⁵ In response to Iran’s announced nuclear activities, the IAEA Board of Governors requested that Iran allow for inspections of its nuclear program consistent with its existing agreements with the agency.¹⁶⁶ Over the following years, the Security Council passed four resolutions, Security Council resolution 1696, *Expresses concern at the intentions of Iran’s nuclear programme and demands that Iran halt its uranium enrichment programme* (2006); resolution 1737, *On measures against Iran in connection with its enrichment-related and reprocessing activities, including research and development* (2006); resolution 1747, *On further measures against Iran in connection with its development of sensitive technologies in support of its nuclear and missile programmes* (2007); and resolution 1803, *On further measures against Iran in connection with its development of sensitive technologies in support of its nuclear and missile programmes* (2008), calling upon Iran to comply with the demands set forth by the IAEA board of governors.¹⁶⁷

In 2014, Iran entered into negotiations with the IAEA and the “P5+1,” the five permanent members of the Security Council, China, France, Russia, The United Kingdom, and the United States (US), alongside Germany.¹⁶⁸ The resulting agreement was the *Joint Comprehensive Plan of Action* (JCPOA) (2015), an agreement that required Iranian compliance with existing IAEA agreements in exchange for sanctions

¹⁶⁰ UN General Assembly, *Report of the Secretary-General on the Work of the Organization (A/RES/75/1)*, 2020, p. 117.

¹⁶¹ UNECE, *Technology Brief: Nuclear Power*, 2021, p. 1.

¹⁶² Bragin et al., *Proliferation-resistance and safeguardability of innovative nuclear fuel cycles*, IAEA, 2001.

¹⁶³ IAEA Board of Governors, *NPT Safeguards Agreement with the Islamic Republic of Iran, (GOV/2021/29)*, 2021.

¹⁶⁴ Aghazadeh, Statement at the 46th General Conference of the International Atomic Energy Agency, IAEA, 2002; IAEA, *IAEA and Iran: Chronology of Key Events*.

¹⁶⁵ UN General Assembly, *2010 Review Conference of the Parties to the Treaty on the Non-Proliferation of Nuclear Weapons*, 2010.

¹⁶⁶ IAEA Board of Governors, *Implementation of the NPT Safeguards Agreement in the Islamic Republic of Iran*, 2006.

¹⁶⁷ UN Security Council, *Expresses concern at the intentions of Iran’s nuclear programme and demands that Iran halt its uranium enrichment programme ((S/RES/1696)(2006))*, 2006; UN Security Council, *On measures against Iran in connection with its enrichment-related and reprocessing activities, including research and development ((S/RES/1737) (2006))*, 2006; UN Security Council, *On further measures against Iran in connection with its development of sensitive technologies in support of its nuclear and missile programmes ((S/RES/1747)(2007))*, 2007; UN Security Council, *On further measures against Iran in connection with its development of sensitive technologies in support of its nuclear and missile programmes ((S/RES/1803) (2008))*, 2008.

¹⁶⁸ Rozen, World powers, Iran agree on roadmap for ‘marathon’ nuclear talks, *AL Monitor*, 2014.

relief.¹⁶⁹ In addition to enforcing these agreements, the JCPOA strictly limited quantities of stockpiled uranium as well as centrifuges for ten years, while also blocking development of plutonium-based heavy water reactors for fifteen years.¹⁷⁰ The intended effect of these restrictions was to effectively block plutonium-based nuclear production and extend the amount of time it would take for Iran to create a “significant quantity” of weapons-grade uranium, or “breakout time,” to one year.¹⁷¹

In May of 2018, the US announced its withdrawal from the JCPOA, and the resumption of sanctions against Iran.¹⁷² Iran maintained compliance with the terms of the agreement until May 2019, when it announced its intent to begin enriching uranium above the 3.67% limit set by the JCPOA.¹⁷³ Newly elected US president Joseph Biden has indicated willingness to re-negotiate and re-enter the JCPOA.¹⁷⁴

International and Regional Framework

The central international agreement in the field of nuclear non-proliferation is the *Treaty on the Non-Proliferation of Nuclear Weapons* (NPT).¹⁷⁵ The NPT was signed in 1968, and commits signatories to refraining from transferring or assisting in the development of nuclear weapons, or receiving such aid in the furtherance of their own development of nuclear weapons.¹⁷⁶ The NPT also requires that non-nuclear weapon member states negotiate Comprehensive Safeguard Agreements (CSA) with the IAEA.¹⁷⁷ CSAs require disclosure of nuclear activities and acceptance of IAEA inspection of nuclear facilities.¹⁷⁸ In addition, the IAEA in 1996 added a new requirement to its CSAs known as Modified Code 3.1, which requires that Member States not only give information related to declared nuclear facilities, but also disclose design information for new facilities as soon as their construction is authorized.¹⁷⁹ Finally, the IAEA has negotiated Additional Protocols with Member States that further clarify inspection and reporting commitments.¹⁸⁰

The JCPOA imposed severe restrictions upon Iran’s nuclear development, including relocating all enrichment activities to the Natanz Enrichment facility, capping uranium enrichment to 3.67%, and imposing limits on types and quantities of centrifuges used in nuclear facilities.¹⁸¹ The JCPOA also requires that Iran meet the requirements of its agreements with the IAEA.¹⁸² Iran agreed upon a CSA with the IAEA in 1974.¹⁸³ Iran signed an Additional Protocol in 2003, but did not ratify it.¹⁸⁴ Iran also did not comply with the requirements of Modified Code 3.1 (1996).¹⁸⁵ These gaps in Iranian compliance were closed by the JCPOA, which explicitly required that Iran meet the requirements of its CSA, Modified Code

¹⁶⁹ IAEA Board of Governors, *Joint Comprehensive Plan of Action implementation and verification and monitoring in the Islamic Republic of Iran in light of United Nations Security Council (GOV/2015/72)*, 2015.

¹⁷⁰ Samore, *The Iran Nuclear Deal: A Definitive Guide*, *Harvard Kennedy School: Belfer Center*, 2017, pp. 18-27.

¹⁷¹ *Ibid.*

¹⁷² BBC News, *Iran nuclear deal: Trump pulls US out in break with Europe allies*, 2018.

¹⁷³ Amano, *Introductory Statement to the Board of Governors*, IAEA, 2019.

¹⁷⁴ Biden, *Joe Biden: There’s a smarter way to be tough on Iran*, CNN, 2020.

¹⁷⁵ UN General Assembly, *Preparatory Committee for the 2020 Review Conference of the Parties to the Treaty on the Non-Proliferation of Nuclear Weapons*, 2020, p. 1.

¹⁷⁶ UNODA, *Treaty on the Non-Proliferation of Nuclear Weapons (NPT): Article 1*, 1968.

¹⁷⁷ UNODA, *Treaty on the Non-Proliferation of Nuclear Weapons (NPT): Article 3*, 1968.

¹⁷⁸ IAEA, *The Structure and Content of Agreements Between the Agency and States Required in Connection with the Treaty on the Non-Proliferation of Nuclear Weapons*, 1972.

¹⁷⁹ Arms Control Association, *Safeguards Agreements at a Glance*, 2020.

¹⁸⁰ IAEA, *Model Protocol Additional to the Agreement(s) Between State(s) and the International Atomic Energy Agency for the Application of Safeguards International Atomic Energy Agency*, 1997.

¹⁸¹ IAEA Board of Governors, *Joint Comprehensive Plan of Action implementation and verification and monitoring in the Islamic Republic of Iran in light of United Nations Security Council (GOV/2015/72)*, 2015, p. 6.

¹⁸² *Ibid.*

¹⁸³ IAEA, *NPT Safeguards Agreement with the Islamic Republic of Iran: Report by the Director General*, GOV/2020/47, 2020.

¹⁸⁴ IAEA, *Communication Dated 29 January 2021 from the Permanent Mission of the Islamic Republic of Iran to the Agency*, 2021.

¹⁸⁵ IAEA, *Implementation of the NPT Safeguards Agreement in the Islamic Republic of Iran*, 2006.

3.1, and the Additional Protocol.¹⁸⁶ These requirements include: the declaration of quantities and locations of all nuclear activities and materials; notice, under Modified Code 3.1, of decisions to construct new facilities; and, disclosure of research regarding the nuclear fuel-cycle, which involves the enrichment of uranium, extraction of energy, and disposal of waste.¹⁸⁷ Additionally, Iran must allow the IAEA to access any location in a nuclear facility after twenty-four hours of notice, or two hours of notice if a request is made during an ongoing inspection.¹⁸⁸ The IAEA Director General may also seek access to undeclared nuclear sites through “special inspections” if they deem such access necessary to confirm the accuracy and completeness of information given by Iran.¹⁸⁹ Consulting with Iran is necessary for this process, and in the event of a dispute over an attempted special inspection, the situation is reported to the IAEA Board of Governors.¹⁹⁰

The JCPOA also includes the following time-based limitations on Iranian nuclear development: 25 years of declaration and monitoring of all stocks of Uranium core concentrate; 20 years of declaration and monitoring of centrifuge equipment; 15 years of monitoring of excess centrifuges, and 10 years of mandatory use of a Procurement Channel that involves approval of JCPOA members for imports and exports of certain materials.¹⁹¹

In exchange for Iranian compliance with the terms of the JCPOA, all UN sanctions and the majority of US and European Union (EU) sanctions were lifted.¹⁹² The Security Council included in resolution 2231 (2015) a “snapback” provision that allows for any JCPOA party to lodge a complaint with the Security Council in the event of Iranian non-compliance.¹⁹³ Should the Security Council not pass an extension of the sanctions relief within thirty days, then the sanctions are restored.¹⁹⁴ US sanctions relief came in the form of unfreezing accounts containing \$115 billion in oil revenue, rescission of banking sanctions, and the lifting of restrictions on trade with Iranian automotive, shipping, and insurance firms.¹⁹⁵ The EU also unfroze Iranian accounts, alongside lifting its oil embargo and shipping and shipbuilding sanctions.¹⁹⁶ Further US and EU sanctions relief was to come eight years after adoption day or after the IAEA had concluded that all Iranian nuclear material was being used for peaceful activities.¹⁹⁷ This date also marked when Iran planned to seek ratification of its Additional Protocol.¹⁹⁸

The IAEA Director General is required to submit quarterly reports to the Board of Governors on Iran’s implementation of the terms of the JCPOA, and to report to the Security Council if there are reasonable grounds “to believe there is an issue of concern.”¹⁹⁹ In addition, the IAEA gives annual reports to the General Assembly, during which it references the Iran nuclear situation.²⁰⁰

¹⁸⁶ IAEA Board of Governors, *Joint Comprehensive Plan of Action implementation and verification and monitoring in the Islamic Republic of Iran in light of United Nations Security Council (GOV/2015/72)*, 2015.

¹⁸⁷ Samore, *The Iran Nuclear Deal: A Definitive Guide*, Harvard Kennedy School: Belfer Center, 2017, p. 32.

¹⁸⁸ *Ibid.*, p. 32.

¹⁸⁹ *Ibid.*, p. 32.

¹⁹⁰ *Ibid.*, p. 32.

¹⁹¹ *Ibid.*, p. 32.

¹⁹² *Ibid.*, p. 32.

¹⁹³ UN Security Council, *On Joint Comprehensive Plan of Action (JCPOA) on the Islamic Republic of Iran's nuclear programme ((S/RES/2231) (2015))*, 2015.

¹⁹⁴ *Ibid.*

¹⁹⁵ Samore, *The Iran Nuclear Deal: A Definitive Guide*, Harvard Kennedy School: Belfer Center, 2017, p. 59.

¹⁹⁶ *Ibid.*, p. 59.

¹⁹⁷ IAEA Board of Governors, *Joint Comprehensive Plan of Action implementation and verification and monitoring in the Islamic Republic of Iran in light of United Nations Security Council (GOV/2015/72)*, p. 12-13.

¹⁹⁸ *Ibid.*

¹⁹⁹ *Ibid.*, p. 3.

²⁰⁰ Willis, UN General Assembly: IAEA Director General Highlights the Crucial Role of Nuclear Technologies in Fighting Pandemics and Climate Change, *IAEA Office of Public Information and Communication*, 2020.

Role of the International System

Annex IV of the JCPOA established the Joint Commission, an entity composed of the JCPOA parties alongside the European Union’s High Representative of the Union for Foreign Affairs and Security Policy.²⁰¹ The Joint Commission is charged with approving certain proposed Iranian nuclear activities, resolving disputes over alleged breaches by any JCPOA parties, and regulating sale of nuclear materials to Iran.²⁰² Regarding the latter of these three responsibilities, the Joint Commission was charged with establishing a “Procurement Channel,” which requires that states seek approval prior to transferring or selling any items included in the Nuclear Suppliers Group Trigger List.²⁰³ The Joint Commission reports to the Security Council once every six months regarding the status of the Procurement Channel.²⁰⁴ The Joint Commission meets quarterly, or upon the request of any JCPOA party, and all decisions must be made by consensus except those concerning JCPOA access rights to Iranian nuclear sites, which require the vote of five members for passage.²⁰⁵

In addition to restrictions upon Iranian nuclear development, the JCPOA also includes numerous provisions for cooperation on peaceful nuclear energy development, subject to approval by the Joint Commission.²⁰⁶ Among these provisions are: the facilitation of Iranian acquisition of light water reactors through construction assistance, supply of equipment, and technical training; construction of the Arak heavy-water reactor in coordination with the P5+1; Russian partnership with Iran in constructing centrifuges; and the establishment by Iran of a Nuclear Safety Center to share best practices with regulatory bodies in other member states.²⁰⁷ In 2019, Iran signed a commercial contract with China for assistance in the design of a renovated Arak reactor.²⁰⁸

The IAEA’s enforcement of the JCPOA has become a central subject of annual reports by the IAEA Director-General to the UN General Assembly First Committee.²⁰⁹ The Security Council also engages in a semi-annual briefing on implementation of resolution 2231 and the JCPOA, most recently meeting on 30th June 2021.²¹⁰ The Security Council also receives annual reports from the UN Secretary-General and the Joint Commission on implementation of the two documents.²¹¹

In the wake of US withdrawal from the JCPOA, several European Union countries formed the Instrument in Support of Trade Exchanges (INSTEX) in 2019, a legal entity aimed at facilitating trade with Iran without triggering US sanctions.²¹² However, progress in developing INSTEX has been slow, with the first transaction under the regime, an export of medical goods from Europe to Iran, not completed until March 2020.²¹³ Despite these challenges, EU countries have maintained extensive dialogue with Iran in attempts to preserve the JCPOA.²¹⁴

²⁰¹ IAEA Board of Governors, *Joint Comprehensive Plan of Action implementation and verification and monitoring in the Islamic Republic of Iran in light of United Nations Security Council (GOV/2015/72), Annex IV*, 2015.

²⁰² IAEA Board of Governors, *Joint Comprehensive Plan of Action implementation and verification and monitoring in the Islamic Republic of Iran in light of United Nations Security Council (GOV/2015/72)*, 2015, p. 4.

²⁰³ IAEA Board of Governors, *Joint Comprehensive Plan of Action implementation and verification and monitoring in the Islamic Republic of Iran in light of United Nations Security Council (GOV/2015/72) Annex IV*, 2015.

²⁰⁴ *Ibid.*

²⁰⁵ IAEA Board of Governors, *Joint Comprehensive Plan of Action implementation and verification and monitoring in the Islamic Republic of Iran in light of United Nations Security Council (GOV/2015/72) Annex IV*, 2015.

²⁰⁶ Samore, *The Iran Nuclear Deal: A Definitive Guide*, Harvard Kennedy School: Belfer Center, 2017, p. 66.

²⁰⁷ *Ibid.*, p. 66.

²⁰⁸ World Nuclear News, *China, Iran sign first contract for Arak redesign*, 2017.

²⁰⁹ UN General Assembly, *General Assembly Endorses Atomic Energy Agency Report, as Delegates Voice Support for Its Proposal to Help States Use Nuclear Science in Tackling Pandemics*, 2021.

²¹⁰ UN Security Council Report, *Iran Non-proliferation Briefing*, 2021.

²¹¹ UN Security Council Report, *June 2021 Monthly Forecast: Middle East: Iran*, 2021.

²¹² Girardi, *INSTEX, A New Channel To Bypass U.S. Sanctions And Trade With Iran*, *Forbes*, 2019.

²¹³ United Kingdom Foreign and Commonwealth Office, *INSTEX successfully concludes first transaction*, 2020.

²¹⁴ Allen, *Europe’s Role in Reconstituting the Iran Nuclear Deal*, *CEPA*, 2021.

Iran has recently attempted to establish regional security alliances, including the Hormuz Peace Endeavour (HOPE), which Iran announced at the 74th General Assembly.²¹⁵ HOPE includes the goal of nuclear safety in its plan of action.²¹⁶ However, no other state has joined HOPE as of September 2021.²¹⁷ Iran has attempted twice to join the ranks of the Shanghai Cooperation Organization (SCO), an alliance of Eurasian powers including China, India, and Russia.²¹⁸ However Iran remains an observer state to the SCO, and future membership is unlikely as long as relations with the US remain hostile.²¹⁹ Saudi Arabia has stated that renewed talks related to the JCPOA should be followed by regional negotiations to expand upon the provisions of the agreement.²²⁰

The breakdown of the JCPOA

After other parties refused to follow the US's lead in demanding Iranian compliance with terms of the JCPOA past their expiration dates, the US abandoned the deal in May of 2019.²²¹ After a year of continued compliance, Iran is now exceeding JCPOA-mandated limits on the number of installed centrifuges, the concentration of enriched uranium, and the number of locations for enrichment.²²² Additionally, on 15 February 2021, Iran informed the IAEA that it intended to suspend implementation of "voluntary measures," including its Additional Protocol, Modified code 3.1, inspection access pursuant to the JCPOA, and transparency related to enrichment levels and manufacturing of centrifuge components.²²³ The IAEA and Iran entered an agreement on 23 February 2001 to maintain the other aspects of the agreement for a three-month window, which was extended by another month on 24 May 2001.²²⁴ However, this agreement was not extended, and has now lapsed after Iran refused an IAEA request for images from inside a nuclear site.²²⁵ While JCPOA parties engaged in six rounds of negotiations in Vienna earlier in 2021, talks have stalled since June.²²⁶ According to President Biden's lead negotiator, Robert Malley, Iran's rapid nuclear development since it withdrew from the JCPOA may soon make it impossible to return to the existing agreement.²²⁷

Additionally, the IAEA has expressed concern over four locations in Iran seemingly being used for nuclear storage and enrichment activities.²²⁸ In response to IAEA requests for information related to these locations, Iran has refused to answer questions related to three of the locations, while giving an unsubstantiated written statement on a fourth.²²⁹

Iran has justified its decision to suspend full compliance with the JCPOA based upon Paragraph 26 of the agreement, which notes that Iran would treat "re-imposition of the sanctions specified in Annex II, or such an imposition of new nuclear-related sanctions, as grounds to cease performing its commitments under this JCPOA in whole or in part."²³⁰ The Foreign Ministers of France, Germany, and the United Kingdom

²¹⁵ IAEA, *Communication Dated 29 January 2021 from the Permanent Mission of the Islamic Republic of Iran to the Agency*, 2021.

²¹⁶ Ibid.

²¹⁷ Ibid.

²¹⁸ Kaleji, Iran and the SCO: Continued Obstacles to Full Membership, *Eurasia Daily Monitor*, 2020.

²¹⁹ Kaleji, Iran and the SCO: Continued Obstacles to Full Membership, *Eurasia Daily Monitor*, 2020.

²²⁰ Reuters, *Saudi official: Expanded talks should follow any Iran nuclear deal*, 2021.

²²¹ Alcaro, Europe's Defence of the Iran Nuclear Deal: Less than a Success, More than a Failure, *The International Spectator*, 2021, pp. 55-72.

²²² IAEA Board of Governors, *Verification and Monitoring in the Islamic Republic of Iran in Light of United Nations Security Council Resolution 2231 (2015)*, Report by the Director General, GOV/2021/31, 2021.

²²³ Ibid.

²²⁴ IAEA Board of Governors, *Verification and Monitoring in the Islamic Republic of Iran in Light of United Nations Security Council Resolution 2231 (2015)* (GOV/2021/31), 2015, p. 3; IAEA, *IAEA and Iran - IAEA Reports*.

²²⁵ Hafezi, Iran refuses to give nuclear site images to IAEA, *Reuters*, 2021.

²²⁶ Macias, Iran nuclear deal talks are stuck after substantial progress, negotiator says, *CNBC*, 2021.

²²⁷ Sanger, Biden Promised to Restore the Iran Nuclear Deal. Now It Risks Derailment, *NYT*, 2021.

²²⁸ IAEA Board of Governors, *NPT Safeguards Agreement with the Islamic Republic of Iran*, (GOV/2021/29), 2021.

²²⁹ IAEA, *IAEA Director General's Introductory Statement to the Board of Governors*, 2021.

²³⁰ IAEA, *Communication Dated 29 January 2021 from the Permanent Mission of the Islamic Republic of Iran to the Agency* (INFCIRC/953), 2021.

have stated that Iran is not within its right to unilaterally reduce compliance with the JCPOA, and that it must instead utilize the agreement's dispute resolution mechanism.²³¹ In contrast, the US position under the Trump administration was that Iran was within its rights under the agreement to suspend compliance after re-introduction of US sanctions.²³²

Possible routes for restoration of the JCPOA

Iran's permanent representative to the UN, Ambassador Kazem Gharibabadi, stated on 4 March 2021 that Iran will resume its implementation of the Additional Protocol once other members of the JCPOA restore their compliance with the terms of the agreement.²³³ US president Joe Biden promised during his campaign that "[i]f Iran returns to strict compliance with the nuclear deal, the United States would rejoin the agreement as a starting point for follow-on negotiations."²³⁴

The IAEA 65th General Conference is set to begin in September 2021, with "Application of IAEA Safeguards in the Middle East" set as an item in the provisional agenda.²³⁵ The Security Council has yet to pass any resolution regarding the withdrawal of either the US or Iran from the JCPOA. Prior to the JCPOA, the Security Council echoed IAEA requests and demands with resolutions and imposed sanctions, such as through Security Council resolution 1737 (2006).²³⁶

Disarmament Case Study: South Africa

South Africa, the only state to dismantle its own nuclear weapons arsenal, acts as a case study of effective nuclear disarmament and international cooperation.²³⁷ South Africa began its pursuit of nuclear weapons in 1971.²³⁸ South Africa opted for a low-tech "gun-type" design, allowing it to evade nonproliferation controls.²³⁹ Upon the discovery of South Africa's nuclear program, the IAEA responded by removing the nation from its Board of Governors in 1977, and refusing to allow South Africa to participate in the 1979 IAEA General Conference.²⁴⁰ Development continued until 1989, when South Africa officially suspended its nuclear program.²⁴¹ In 1991, South Africa became a signatory of the NPT, before signing a CSA with the IAEA later that same year.²⁴² The IAEA then spent two years reviewing the scope of the South African nuclear program.²⁴³

South Africa only agreed to sign the NPT after regional rivals Zambia and Tanzania agreed to do so as well, which was then successfully negotiated.²⁴⁴ Currently, three Middle East and South Asian regional

²³¹ Federal Foreign Office, *Joint statement by the Foreign Ministers of France, Germany and the United Kingdom on the Joint Comprehensive Plan of Action: 14 January 2020*, 2020.

²³² Congressional Research Service, *Iran's Nuclear Program: Tehran's Compliance with International Obligations*, 2021, p. 5.

²³³ Congressional Research Service, *Iran's Nuclear Program: Tehran's Compliance with International Obligations*, 2021.

²³⁴ Biden, Joe Biden: There's a smarter way to be tough on Iran, *CNN*, 2020.

²³⁵ IAEA, *General Conference Sixty-Fifth regular session Agenda*, 2021.

²³⁶ UN Security Council, *On measures against Iran in connection with its enrichment-related and reprocessing activities, including research and development ((S/RES/1737) (2006))*, 2006.

²³⁷ Babbage, White Elephants: Why South Africa Gave Up the Bomb and the Implications for Nuclear Nonproliferation Policy, *Journal of Public and International Affairs*, 2004.

²³⁸ Horton, Out of (South) Africa: Pretoria's Nuclear Weapons Experience (INSS Occasional Paper 27), *USAF Institute for National Security Studies*, 1999.

²³⁹ *Ibid.*

²⁴⁰ *Ibid.*

²⁴¹ *Ibid.*

²⁴² Blix, Statement to the Thirty-Seventh Session of the General Conference of the International Atomic Energy Agency, *IAEA*, 1993.

²⁴³ Horton, Out of (South) Africa: Pretoria's Nuclear Weapons Experience (INSS Occasional Paper 27), *USAF Institute for National Security Studies*, 1999.

²⁴⁴ Albright, *Revisiting South Africa's Nuclear Weapons Program: Its history, dismantlement, and lessons for today*, 2016, p. 210.

powers have not signed the NPT: India, Israel, and Pakistan.²⁴⁵ These powers becoming signatories to the NPT could improve the chances of resumed cooperation by Iran.²⁴⁶ The South African case also differs in that its agreement not only covered nuclear weapons themselves, but also their delivery systems.²⁴⁷ Expanding coverage of a JCPOA successor or re-agreement to also cover delivery systems could improve its efficacy by closing off another aspect of nuclear capability beyond the warhead itself.²⁴⁸

Conclusion

Resolution of the Iran nuclear crisis is crucial to maintaining regional and international security.²⁴⁹ The IAEA 65th General Conference was held from 20-24 September 2021.²⁵⁰ In a joint statement on 12 September 2021, Iran and the IAEA announced that there would be a private meeting between the two parties at the General Conference, an upcoming visit from the IAEA Director-General to Iran, and a grant of permission for inspectors to replace storage media on inspection equipment within Iran.²⁵¹ The Security Council is set to be briefed on the issue by the Secretary-General in December 2021.²⁵²

Further research

In researching this topic, delegates should keep in mind the following questions: in what ways could future agreements improve upon and extend the JCPOA's requirements? How can the IAEA not only prevent weaponized Iranian nuclear development, but also promote peaceful nuclear energy in the country? How does the election of President Joe Biden, who promised re-entry into the JCPOA, to the US presidency impact the possibility of future? Can lessons be adapted from the experience of South African disarmament to the Iranian context? Could rising powers, such as Brazil and India, become members of future negotiations with Iran? How can regional negotiations be successfully brokered with Member States such as India, Pakistan, and Israel to further progress on Iranian nuclear disarmament?

Annotated Bibliography

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This Model Protocol was signed by Iran in 2003, and compliance with its terms was an obligation under the JCPOA. It details the obligations of Iran for informational disclosures and allowance for IAEA inspections. Iran's failure to comply with the terms in this document was a leading cause for the negotiation of the JCPOA. Additionally, disputes over Iran's compliance with the JCPOA since 2015 have centered on the terms contained within this document. Regardless of the future of the JCPOA, this document serves as a crucial starting point for determining the IAEA's future monitoring of Iranian nuclear development.

International Atomic Energy Agency. (2021). *IAEA and Iran - IAEA Reports*. Retrieved 27 June 2021 from: <https://www.iaea.org/newscenter/focus/iran/iaea-and-iran-iaea-reports>

²⁴⁵ Miller, Israel, India, and Pakistan: Engaging the Non-NPT States in the Nonproliferation Regime, *Arms Control Association*.

²⁴⁶ Ibid.

²⁴⁷ Albright, *Revisiting South Africa's Nuclear Weapons Program: Its history, dismantlement, and lessons for today*, 2016, p. 210.

²⁴⁸ Ibid., p. 210.

²⁴⁹ UN DGC, Iran nuclear deal still best way to ensure peace, DiCarlo tells Security Council, *UN News*, 2020.

²⁵⁰ IAEA, *General Conference Sixty-Fifth regular session Agenda*, 2021.

²⁵¹ IAEA and Islamic Republic of Iran, *Joint Statement by the Vice-President and the Head of Atomic Energy Organization of the Islamic Republic of Iran and the Director General of the International Atomic Energy Agency*, 2021.

²⁵² United Nations Security Council Report, *Iran Non-proliferation Briefing*, 2021.

This webpage contains a comprehensive list of official IAEA publications relating to Iran's nuclear program and the IAEA's efforts to obtain Iranian compliance with treaties and other international agreements. The page includes reports back to 2003, and continually updates as new reports are published. The page is an immensely useful resource for delegates, both for a historical perspective on IAEA activities and as an update on current issues and priorities for the Agency.

International Atomic Energy Agency. (2021). *IAEA and Iran: Chronology of Key Events*. Retrieved 27 June 2021 from: <https://www.iaea.org/newscenter/focus/iran/chronology-of-key-events>

This entry acts as a sister page to the IAEA and Iran – IAEA Reports webpage. Rather than containing a comprehensive listing of documents, this page instead gives a rundown of key events in the Iran nuclear issue. Like its sister page, this page continues to update as events unfold, making it an excellent source for delegate research both for historical perspective and current updates.

International Atomic Energy Agency Board of Governors. (2015). *Joint Comprehensive Plan of Action implementation and verification and monitoring in the Islamic Republic of Iran in light of United Nations Security Council Resolution 2231 (2015) (GOV/2015/72)*. Retrieved 13 August 2021 from: <https://www.iaea.org/sites/default/files/gov-2015-72.pdf>

This document represents the central text of this entire issue. The JCPOA outlines the terms of a slowdown to Iranian nuclear development, as well as monitoring and dispute resolution mechanisms. It also outlines the suspension of sanctions by other parties to the agreement. While the compliance of both the United States and Iran has eroded since its adoption, the JCPOA is still the guiding force of international involvement with Iran's nuclear development and will likely act as a model for whatever future form this involvement will take.

Samore, G. (2017). *The Iran Nuclear Deal: A Definitive Guide*. Harvard Kennedy School: Belfer Center. Retrieved 26 June 2021 from:

<https://www.belfercenter.org/sites/default/files/files/publication/IranDealGuide2017.pdf>

An excellent overview of the JCPOA that transforms the often-overwhelming original text into a readable, well synthesized document. The second section, "Verification and Compliance," is particularly useful for understanding the details of the IAEA's role in the JCPOA. The breakdown of removed sanctions will also give important context to delegates for the incentives the other parties to the agreement granted in exchange for Iranian compliance as they begin their research.

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