



ORBITAL MUN CONFERENCE

Hosted by British International School of Ljubljana

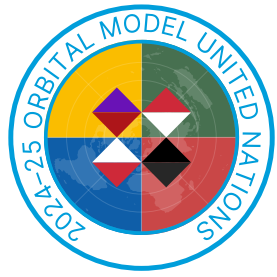
BLLED 2025

BACKGROUND GUIDE

NUCLEAR ENERGY

Issue: Should countries be allowed to develop nuclear energy independently, or should it be a globally regulated resource under the UN's control?

Prepared by: Ema Seršen and Zoja Čotar



Dear Delegates,

Welcome to the second Orbital Model United Nations! We are excited to host our partner schools in Bled, Slovenia from 2–5 February 2025.

The organising committee has worked hard over the past few months to create topics and background guides which represent some of the pressing issues the world faces as we move further into this century. These topics are nuclear energy, AI in warfare, animal cruelty, and immigration.

As the world experiences more effects of climate change, many see nuclear energy as a promising alternative to fossil fuels. Recently, we have seen various new wars spark across the world, with AI being introduced in several. Animal testing has long been a question of whether the ends justify the means, something particularly relevant after the COVID-19 pandemic. Migration is often the product of many factors, some of these being the aforementioned climate change and war. Mass migration has monumental consequences for both the country of departure and the country of destination. The worldwide political landscape seems more and more fraught with danger, and so the need for international cooperation and pragmatism is heightened.

My name is Naomi Goddard, and I am honoured to be Secretary General for this Orbital MUN. I am from London but study at the British International School of Ljubljana and am thrilled that we are the host country this year. For Year 12, my subjects are English Literature, History, French, Spanish, and Psychology.

These background guides have been prepared by the chairs of each committee in order to provide a foundation of information on each topic and to facilitate individual research. They are in no way exhaustive, with the ideas provided serving simply as examples for potential discussion.

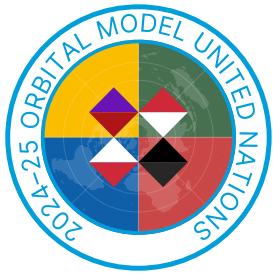
You, the delegates, are strongly encouraged to extend your research beyond the background guide. You are invited to further explore the sources cited in each guide as well as others encountered elsewhere.

Together with the Deputy Secretary General, Ema Seršen, the organising team (Isabella Magill, Anna Rozanova, Moises Camarero Trujillo, Zoja Čotar, and Lila De Launey) and Committee Chairs, we are looking forward to welcoming you to discuss these critical issues facing the world today.

Naomi Goddard

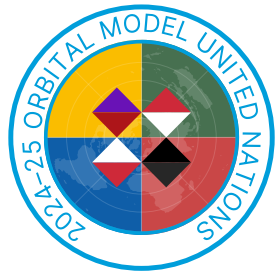
MUN Secretary General

Ljubljana, November 2024



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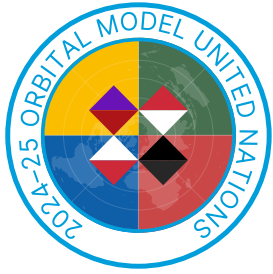


INTRODUCTION

The use of nuclear energy has been a subject of global debate since its discovery. While nuclear energy offers a powerful, low-carbon energy source, it also presents risks associated with nuclear weapons proliferation, accidents, and environmental harm. The question of whether countries should be able to develop nuclear energy independently or under international regulation remains critical. Balancing national sovereignty with global security is the challenge at the heart of this issue.

UN SUSTAINABLE DEVELOPMENT GOAL 7 (SDG 7)

SDG7 aims to ensure access to affordable, reliable, sustainable, and modern energy for all. Nuclear energy plays a complex role in this goal, as it can provide a low-carbon energy source but also raises significant safety, security, and environmental concerns. Nuclear energy meets the SDG 7 as nuclear power generation produces minimal greenhouse gas emissions compared to fossil fuels, making it a critical option for reducing climate change impacts while providing reliable energy. Another reason is nuclear plants operate continuously, providing a stable base-load power supply. This reliability complements intermittent renewable sources like wind and solar, helping to stabilize the energy grid as UN goal is to create a sustainable world. Energy is a fundamental driver of economic growth, social development, and environmental sustainability.



KEY TERMS

Access to Nuclear Technology: The ability of countries to obtain and use nuclear technology for energy production and other purposes.

Compliance: Adherence to laws, regulations, and standards, particularly in the context of international treaties and agreements.

Developing Nations: Countries with lower levels of industrialization, lower incomes, and lower human development indices, often seeking to improve their energy access and economic growth.

Environmental Impact: The effect that a particular action, such as nuclear energy production, has on the natural environment.

Equitable Access: Fair and just availability of resources or technology, ensuring that all countries, especially developing ones, have opportunities to benefit from nuclear energy.

Fast Neutron Reactors: A type of nuclear reactor that uses fast neutrons to sustain the fission reaction, allowing for more efficient use of nuclear fuel.

Global Regulation: The idea that an international authority should oversee and control the development and use of nuclear energy to ensure safety and prevent misuse.

International Atomic Energy Agency (IAEA): A global organization that promotes the peaceful use of nuclear energy and ensures compliance with nuclear safety and non-proliferation agreements.

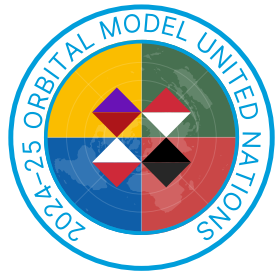
International Organizations: Entities formed by multiple countries to address issues that affect them collectively, such as the UN and IAEA.

Manhattan Project: A secret U.S. government project during World War II that developed the first nuclear weapons.

National Sovereignty: The right of a country to govern itself and make its own decisions without external interference.

Non-Proliferation: Efforts to prevent the spread of nuclear weapons and ensure that nuclear technology is used only for peaceful purposes.

Nuclear Accidents: Unintended events that result in the release of radioactive materials, such as the Chernobyl disaster in 1986 and the Fukushima disaster in 2011.



Nuclear Energy: Energy produced from nuclear reactions, typically through the process of nuclear fission, where atomic nuclei split to release energy.

Nuclear Fuel: Material used in nuclear reactors to produce energy, typically uranium or plutonium.

Nuclear States: Countries that possess nuclear weapons or have developed nuclear energy programs.

Safety Standards: Established guidelines and rules designed to ensure the safe operation of nuclear facilities and the protection of public health and the environment.

Small Modular Reactors (SMRs): Compact nuclear reactors that can be manufactured at a plant and transported to sites for installation, offering flexibility and potentially enhanced safety.

Treaty on the Non-Proliferation of Nuclear Weapons (NPT): An international treaty aimed at preventing the spread of nuclear weapons while promoting peaceful uses of nuclear energy.

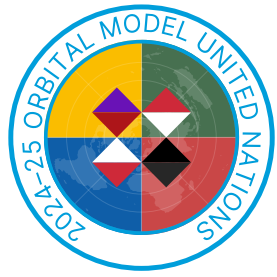


HISTORICAL CONTEXT

Early Development of Nuclear Energy: The development of nuclear energy began in the mid-20th century, initially linked to weapons development (e.g., the Manhattan Project). After World War II, nuclear technology was repurposed for peaceful uses, such as energy production, though the risks of proliferation remained.

International Oversight and Treaties: Over the years, international frameworks like the Treaty on the Non-Proliferation of Nuclear Weapons (NPT) have sought to limit the spread of nuclear weapons while allowing for peaceful nuclear energy use under certain safeguards. The International Atomic Energy Agency (IAEA) monitors compliance with the NPT and promotes safe and peaceful nuclear technologies. However, countries like North Korea and Iran have tested the limits of these agreements, raising concerns about independent nuclear development.

Nuclear Accidents and Global Impact: Accidents like Chernobyl (1986) and Fukushima (2011) have highlighted the potential dangers of nuclear energy when not carefully managed. These incidents have renewed calls for stricter international control to prevent both weapons proliferation and nuclear disasters.

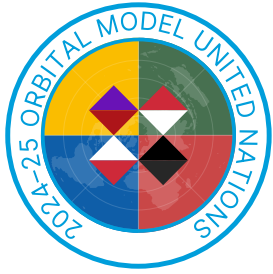


CURRENT SITUATION

Independent Development of Nuclear Energy: Currently, most countries that pursue nuclear energy do so independently, but they are often subject to IAEA regulations and inspections. States like the United States, Russia, China, and France have well-established nuclear energy programs, while other nations like India and Pakistan have developed both civilian and military nuclear capabilities outside the NPT framework.

Calls for Global Regulation: Some, such as United States, Japan, Canada and South Korea argue that nuclear energy should be globally regulated due to the risks of weapons proliferation, environmental disasters, and unequal access to nuclear technology. Advocates of UN control believe that stricter international oversight could ensure compliance with safety standards, the current safety standers include waste management, radiational protection and more. Countries must safely manage and dispose of radioactive waste, using methods like deep geological repositories for long-term storage, which protect human health and the environment.

Resistance to Global Regulation: On the other hand, some nations resist global regulation, citing national sovereignty, energy independence, and economic benefits. Developing countries, in particular, argue that they should not be denied access to nuclear technology, which could provide a much-needed energy source for their growing populations. Countries with significant nuclear capabilities, like the U.S. and Russia, also prefer to maintain independent control over their nuclear programs.



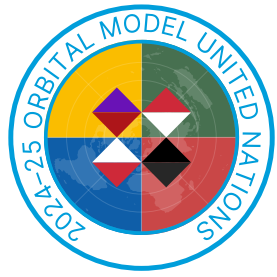
ISSUES AND DEBATES

National Sovereignty vs. Global Security: Should states have the right to develop nuclear energy without international oversight, or does the global community have a responsibility to regulate a technology that poses such significant risks?

Non-Proliferation and Disarmament: How can the international community ensure that nuclear energy is used for peaceful purposes without contributing to nuclear weapons proliferation? Should countries outside the NPT be allowed to maintain nuclear programs?

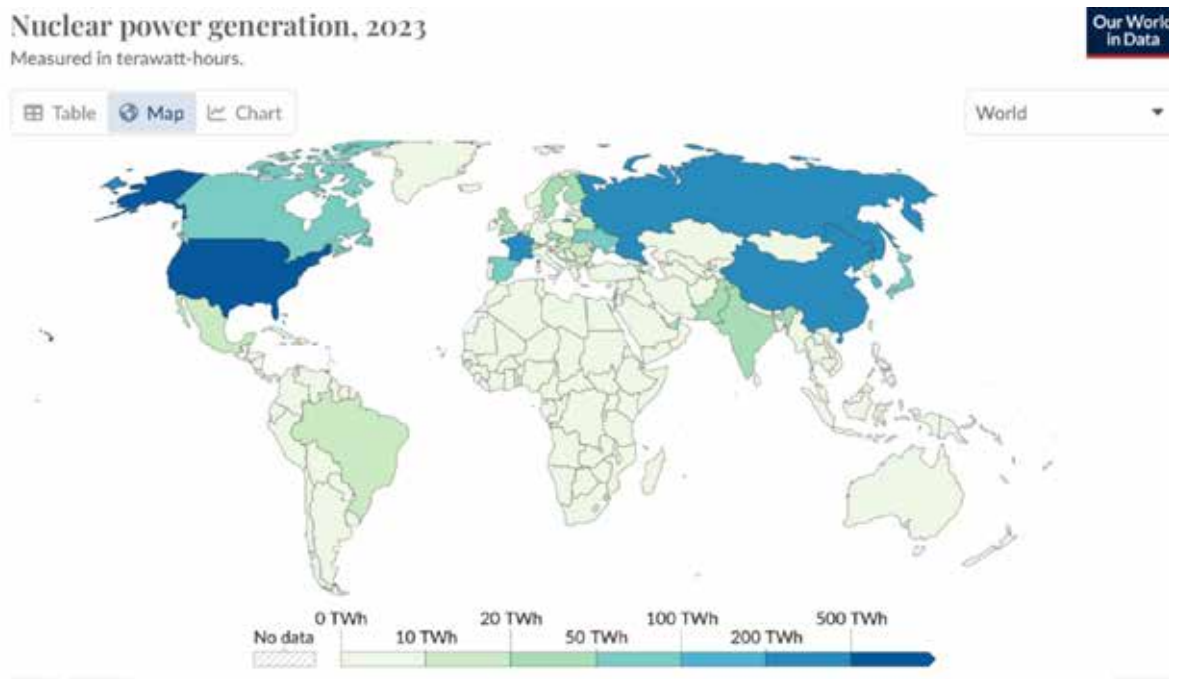
Environmental and Safety Concerns: Given the risks of nuclear accidents, should there be stricter global safety standards, or should countries retain autonomy over their energy programs?

Access to Nuclear Technology: How can the international community ensure fair access to nuclear energy for developing countries while preventing the misuse of technology for military purposes?



KEY STAKEHOLDERS

Nuclear States: Countries like the United States, Russia, China, France, and the UK have established nuclear energy programs and influence in international regulations through the IAEA and other bodies.



Source: <https://ourworldindata.org/nuclear-energy>

Developing Nations: Many developing countries such as Iran, South Africa, Brazil and Pakistan argue for the right to pursue nuclear energy as part of their development strategies but face challenges in gaining access to nuclear technology.

International Organizations: The United Nations, through the IAEA and other arms, plays a central role in regulating nuclear technology and ensuring compliance with non-proliferation treaties.

Non-Nuclear States: Countries without nuclear energy programs, especially those in volatile regions, often support stricter global regulations to prevent the spread of nuclear weapons.

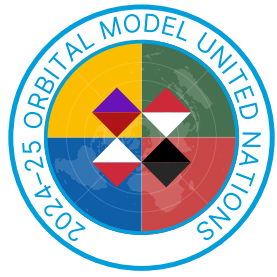


POSSIBLE SOLUTIONS

The debate over nuclear energy development centers on a tension between national sovereignty and global security. While nuclear energy offers potential benefits, its risks must be managed through international cooperation. Delegates will need to consider the merits of independent national control versus global regulation and propose solutions that balance the interests of all stakeholders. Ultimately, the goal is to create a framework that promotes the safe, equitable, and peaceful use of nuclear energy.

QUESTIONS TO CONSIDER

- **Should countries be free to pursue nuclear energy independently, or is global oversight necessary for safety and security?**
- **How can the international community ensure that nuclear energy is not used for military purposes?**
- **What role should the UN and other international organizations play in regulating nuclear energy?**
- **Should developing nations have the same access to nuclear technology as established nuclear states?**



MAJOR NATIONS INVOLVED

The United States of America

The United States is the world's largest producer of nuclear energy, with over 90 reactors generating around 20% of the country's electricity. Nuclear power is a key part of the U.S. energy mix, providing a stable and reliable source of carbon-free electricity. However, the nuclear industry faces challenges, including aging infrastructure, competition from cheaper natural gas, and renewable energy. While no new plants have been commissioned recently, the U.S. is focusing on extending the life of existing reactors and exploring advanced nuclear technologies like small modular reactors (SMRs) to maintain its position in nuclear energy production and meet carbon reduction goals.

The People's Republic of China

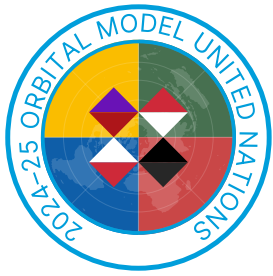
China is rapidly expanding its nuclear energy program to meet growing electricity demand and reduce reliance on coal. With over 50 reactors currently operational, nuclear power accounts for around 5% of China's electricity production. However, China has ambitious plans to significantly increase this share in the coming decades. The country is investing in both traditional large-scale reactors and advanced technologies such as small modular reactors (SMRs) and pebble-bed reactors. China also plays a leading role in nuclear technology exports, building plants abroad. The government sees nuclear power as crucial for reducing carbon emissions and achieving energy security.

The Russian Federation

Russia is a major player in global nuclear energy, with over 38 reactors providing about 20% of the country's electricity. The state-owned corporation Rosatom dominates both domestic and international nuclear energy markets, exporting nuclear technology and building reactors in several countries. Russia is investing in new nuclear plants and life extensions for older reactors, while also pioneering advanced nuclear technologies like fast neutron reactors and small modular reactors (SMRs). The country also leads in the production and reprocessing of nuclear fuel. Nuclear energy is seen as essential for Russia's energy security and its global influence in the energy sector.

Japan

Japan's nuclear energy situation has been evolving since the Fukushima Daiichi disaster in 2011, which led to the shutdown of all nuclear reactors for safety reviews. Before the disaster, nuclear power provided about 30% of Japan's electricity. Since then, Japan has restarted a few reactors under stricter regulations, with nuclear power now contributing about 6-7% of the country's energy. Despite public resistance, the government views nuclear energy as crucial for reducing greenhouse gas emissions and ensuring energy security, given Japan's heavy reliance on imported fossil fuels. Future plans include restarting more reactors and possibly exploring new nuclear technologies.



The Republic of Korea

South Korea is a major user of nuclear power, with 24 reactors generating about 30% of the country's electricity. The nation has a strong nuclear industry, with advanced reactor designs and successful exports of nuclear technology, particularly to the UAE. South Korea is also a leader in developing next-generation reactors like small modular reactors (SMRs). However, the government's stance on nuclear energy has fluctuated in recent years, with plans to phase out nuclear power under one administration and reversed plans to maintain and expand nuclear capacity under the current administration. Nuclear power remains key to South Korea's energy security and climate goals.

The Republic of India

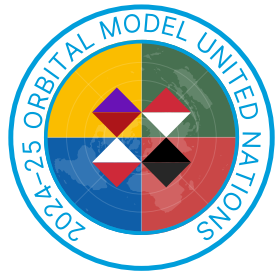
India is steadily expanding its nuclear energy program to meet its growing energy demands and reduce its reliance on fossil fuels. Nuclear power currently contributes about 3% of India's electricity, with 22 reactors in operation and more under construction. India plans to significantly increase this share by developing new reactors, including indigenous designs and international collaborations, such as with Russia. The country is also investing in advanced technologies like thorium-based reactors due to its abundant thorium reserves. Despite some delays in construction, nuclear power is seen as a key component of India's strategy to achieve energy security and reduce carbon emissions.

England

England relies on nuclear power for about 15-20% of its electricity, with nine operational reactors. However, many of these are nearing the end of their lifespan. The UK government has committed to maintaining nuclear as part of its clean energy strategy to achieve net-zero carbon emissions by 2050. New projects, such as Hinkley Point C are under construction, while others including Sizewell C are in planning. The UK is also investing in advanced technologies, including small modular reactors (SMRs). Despite challenges, the future energy mix despite high costs and delays, nuclear energy remains a key component of England's energy security.

Canada

Canada generates about 15% of its electricity from nuclear power, primarily from its 19 reactors located in Ontario. The country's nuclear sector is dominated by CANDU (Canada Deuterium Uranium) reactors, which are known for their ability to use natural uranium as fuel. Ontario relies heavily on nuclear power, with about 60% of its electricity coming from nuclear sources. Canada is also a leading global producer of uranium, a critical component in nuclear fuel. The country is investing in small modular reactors (SMRs) for future energy solutions and sees nuclear power as key to meeting its climate and energy security goals.



Ukraine

Ukraine heavily relies on nuclear energy, with nuclear power providing about 50% of its electricity. The country operates 15 reactors across four nuclear power plants, with Zaporizhzhia, Europe's largest nuclear power plant, being a key facility. Ukraine has long-term plans to expand its nuclear capacity and reduce reliance on fossil fuels. However, the conflict with Russia has posed significant challenges, particularly regarding the safety and operation of nuclear facilities. Some examples include an increase in cybersecurity measures and decentralization of control and monitoring. Despite these difficulties, Ukraine views nuclear energy as crucial for its energy independence and long-term stability, and continues to collaborate with international partners on safety and development projects.

The Republic of Finland

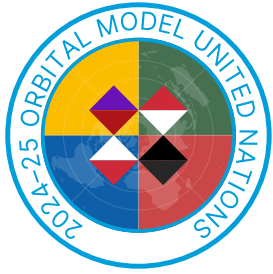
Finland relies on nuclear power for about 30% of its electricity, with five reactors spread across two plants: Olkiluoto and Loviisa. The country is notable for its long-term commitment to nuclear energy, seeing it as essential for energy security and reducing carbon emissions. Finland recently completed its Olkiluoto-3 reactor, one of Europe's largest, which started operation in 2022 after several delays. Finland is also a leader in nuclear waste management, constructing the world's first geological repository for spent nuclear fuel, known as Onkalo. The Finnish government views nuclear power as a key part of its strategy to achieve carbon neutrality by 2035.

The Kingdom of Belgium

Belgium generates about 50% of its electricity from nuclear power, with seven reactors operating across two nuclear power plants: Doel and Tihange. However, Belgium has been planning a phased nuclear energy exit due to public concerns about safety and the aging infrastructure of its reactors. The government initially aimed to close all reactors by 2025, but rising energy costs and geopolitical challenges have led to discussions about extending the lifespan of some reactors. Belgium continues to explore options for energy transition, including renewable energy sources, while nuclear power remains a significant part of its energy mix for now.

The Federative Republic of Brazil

Brazil's nuclear energy program is relatively small but plays an important role in the country's energy mix. Brazil operates two reactors at the Angra Nuclear Power Plant, which contribute about 3% of the nation's electricity. A third reactor, Angra 3, is under construction and expected to significantly boost nuclear capacity once completed. Brazil is rich in uranium resources, and the country is working to become more self-sufficient in the nuclear fuel cycle. Although nuclear energy remains a minor part of Brazil's overall energy portfolio, which is dominated by hydropower, the government is looking to expand nuclear power to diversify its energy sources.



The Republic of South Africa

South Africa is the only African nation with a commercial nuclear power plant, the Koeberg Nuclear Power Station, which provides about 5% of the country's electricity. Koeberg, located near Cape Town, has two reactors and plays a key role in South Africa's energy mix. While the country relies heavily on coal, the government has explored options to expand nuclear capacity as part of its strategy to reduce carbon emissions and improve energy security. Plans for additional nuclear projects have faced delays due to financial constraints and political challenges, but nuclear energy remains an important consideration in South Africa's long-term energy strategy.

The Czech Republic

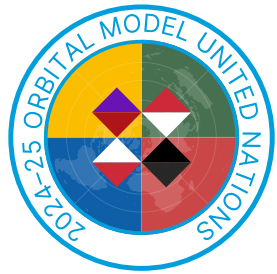
The Czech Republic relies on nuclear power for approximately 30-35% of its electricity, with six reactors operating at two main plants: Dukovany and Temelín. The country views nuclear energy as critical for reducing reliance on coal and ensuring energy security. The government has plans to expand its nuclear capacity by building new reactors at both existing plants, with the first new unit expected at Dukovany. Czechia committed to nuclear power as part of its long-term strategy to meet climate goals and reduce carbon emissions, while maintaining a stable and reliable energy supply for its growing economy.

Republic of Hungary

Hungary generates about 50% of its electricity from nuclear power, primarily from the Paks Nuclear Power Plant, which operates four reactors. Nuclear energy is a cornerstone of Hungary's energy strategy, aimed at reducing reliance on imported fossil fuels and meeting climate goals. The Hungarian government plans to expand nuclear capacity by building two additional reactors at Paks, known as Paks II, in collaboration with Russia's Rosatom. Despite some delays, the Paks II project is seen as essential for ensuring long-term energy security and reducing carbon emissions, as Hungary seeks to maintain nuclear power as a key part of its energy mix.

Slovenia

Slovenia operates a single nuclear power plant, the Krško Nuclear Power Plant, which it shares with Croatia. This plant provides about one-third of Slovenia's electricity, contributing to the country's stable and low-carbon energy mix. Slovenia is considering extending Krško's lifespan beyond 2043 and is exploring options for a second reactor to further support its energy independence and reduce reliance on fossil fuels. However, nuclear expansion faces challenges, including public concerns, regulatory hurdles, and substantial investment requirements. The government is also prioritizing renewable sources, aiming to balance its energy mix while addressing environmental and energy security goals.



The Slovak Republic

Slovakia is highly dependent on nuclear energy, with nuclear power providing around 55% of the country's electricity, one of the highest shares globally. The country operates four reactors at two nuclear power plants: Bohunice and Mochovce. Slovakia is also expanding its nuclear capacity with the completion of a third unit at Mochovce, and a fourth unit is under construction. Nuclear power is central to Slovakia's strategy for energy security and reducing carbon emissions, given its goal to decrease reliance on fossil fuels. The government continues to support nuclear energy as a reliable and sustainable source for the country's long-term energy needs.

The United Arab Emirates

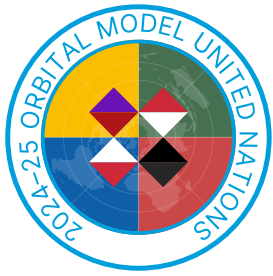
The United Arab Emirates (UAE) is a newcomer to nuclear power but has rapidly developed its capacity with the Barakah Nuclear Power Plant, the first in the Arab world. The plant, once fully operational, will have four reactors and is expected to supply about 25% of the UAE's electricity. This move is part of the UAE's broader strategy to diversify its energy mix and reduce reliance on fossil fuels while meeting rising electricity demand. The country views nuclear energy as essential for achieving its climate goals and providing a stable, long-term energy source. The UAE collaborates internationally to ensure safe and efficient nuclear development.

The Islamic Republic of Pakistan

Pakistan generates around 5-7% of its electricity from nuclear power, with six operational reactors at two main plants: Chashma and Karachi. The country has been steadily expanding its nuclear capacity to address growing energy demands and reduce dependence on fossil fuels. Pakistan has collaborated with China to build additional reactors, including the recently completed Karachi Nuclear Power Plant Unit 3. Nuclear energy is seen as a key component of Pakistan's strategy for energy security and reducing carbon emissions. Despite international concerns about nuclear proliferation, Pakistan continues to develop its civilian nuclear program under strict safeguards and regulatory oversight.

The Islamic Republic of Iran

Iran's nuclear energy program is centered around the Bushehr Nuclear Power Plant, which currently has one operational reactor contributing about 2% of the country's electricity. Iran plans to expand its nuclear energy capacity with additional reactors at Bushehr and other sites, aiming to reduce reliance on fossil fuels and diversify its energy mix. The country's nuclear program has faced international scrutiny due to concerns over potential weaponization, leading to sanctions and diplomatic negotiations. Despite this, Iran asserts that its nuclear program is for peaceful purposes, including energy production and medical applications, and continues to develop its nuclear capabilities under strict supervision.



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