

# GUIDELINES

IAEA



# MUN DES LYCÉENS

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International Atomic Energy Agency Guidelines

## Introduction

The International atomic energy agency is an international agency founded in 1957 with several purposes: to promote the use of nuclear technologies, (both energetic and non-energetic use of nuclear, such as radio for example), to organize and lead the international nuclear research and to assure the security and safety of nuclear installations and uses. This second mission also includes the fact that the IAEA is the organization that watches over every nuclear material and installation, to prevent non-peaceful use of these technologies. Therefore, one of its key achievements is the NPT, the Non-Proliferation Treaty that the IAEA is promoting in every country to develop the peaceful use of nuclear energy.

To keep it short, IAEA mission is to promote and watch the atom.

The purpose of this guideline is to give you the key information that you need to have to get into the two topics of the committee, and to help you during your preparation work and research.

## **Topic 1 : How to implement an efficient international framework for research in nuclear energy?**

### **Introduction:**

Since the 20th century and the discovery of radioactivity, nuclear research had been a strategic issue for governments: acquiring both nuclear weapons and nuclear infrastructures had been for the biggest countries a challenge to take up. Today, the world is facing climate change that forces us to change our way to meet our energy needs without using fossil energy anymore. As nuclear energy could be at least a temporary solution, nuclear research has become an even more important challenge: being able to develop new types of reactors that last longer, with less risk and better efficiency or even being able to master nuclear fusion could be a way to provide ourselves with energy.

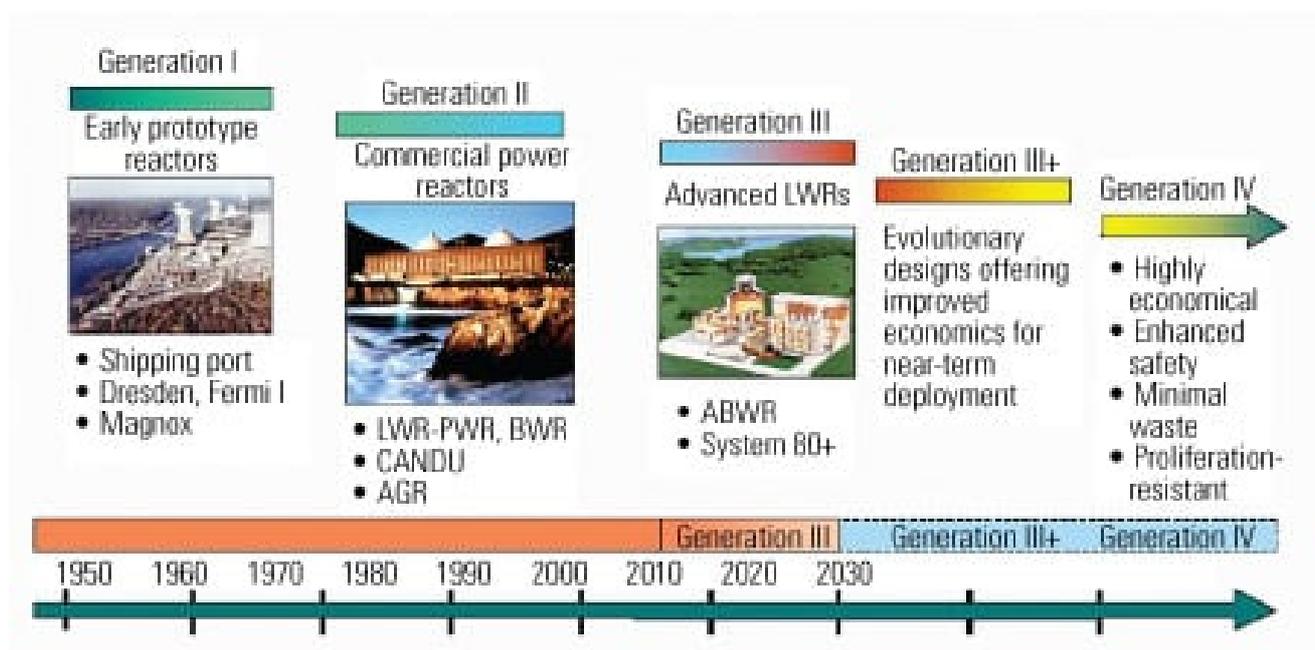
Part of the IAEA action is to set an international frame for international nuclear research, with cooperation between its members. The agency conducts multiple coordinated research projects, with the participation of several members every time. But the issues about this international nuclear research are multiples: it is technologically very complex, it is expensive and nuclear remains a strategic power for a country, therefore there is today no actual efficient international research on these topics.

The purpose of this first topic is to implement an efficient international framework on nuclear research, and this guideline will help you in your research: it will explain what the goal of nuclear research is today, how it works and what are the actual hurdles of nuclear research to overcome.

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## The purposes of nuclear research:

The key word that the nuclear research is following today is efficiency: the objectives are to develop reactors that needs less resources to work, that produce more energy and that last longer, but also reactors that generate less nuclear waste that we can't destroy and that are less risky.



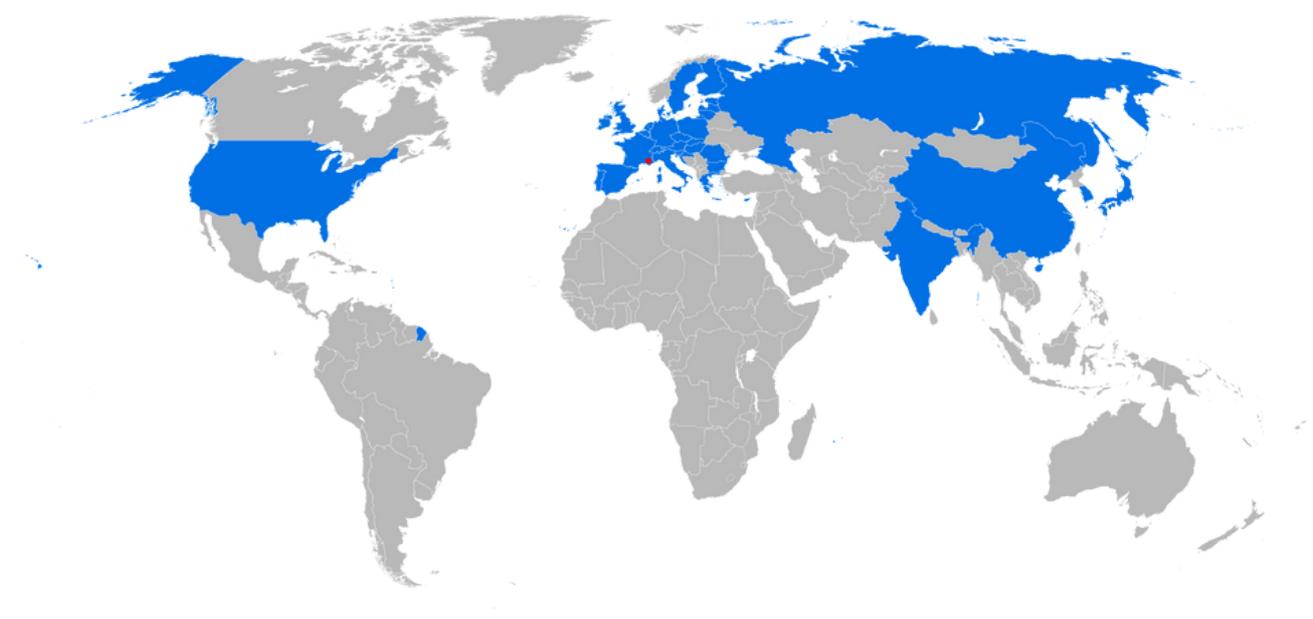
Today, most of the reactors in the world (364 of 437) are Generation II reactors, and the challenge is to be able to master on a short-term perspective Generation III and III+ reactors that are indeed more efficient. The focus is on EPR reactors, whose performances are significantly better both in terms of safety and economic rentability than the Generation II reactors, and that also last longer. There are today 3 EPR in the world, two in China and one in Finland.

## The Nuclear Fusion and the ITER Project:

However, to successfully develop these reactors, a country needs to have both the technologies, the infrastructures, and the staff capable of building and monitoring these new installations. This leads to a first issue: nuclear research is led by a small number of countries, like the US, China, India, or the European Union.

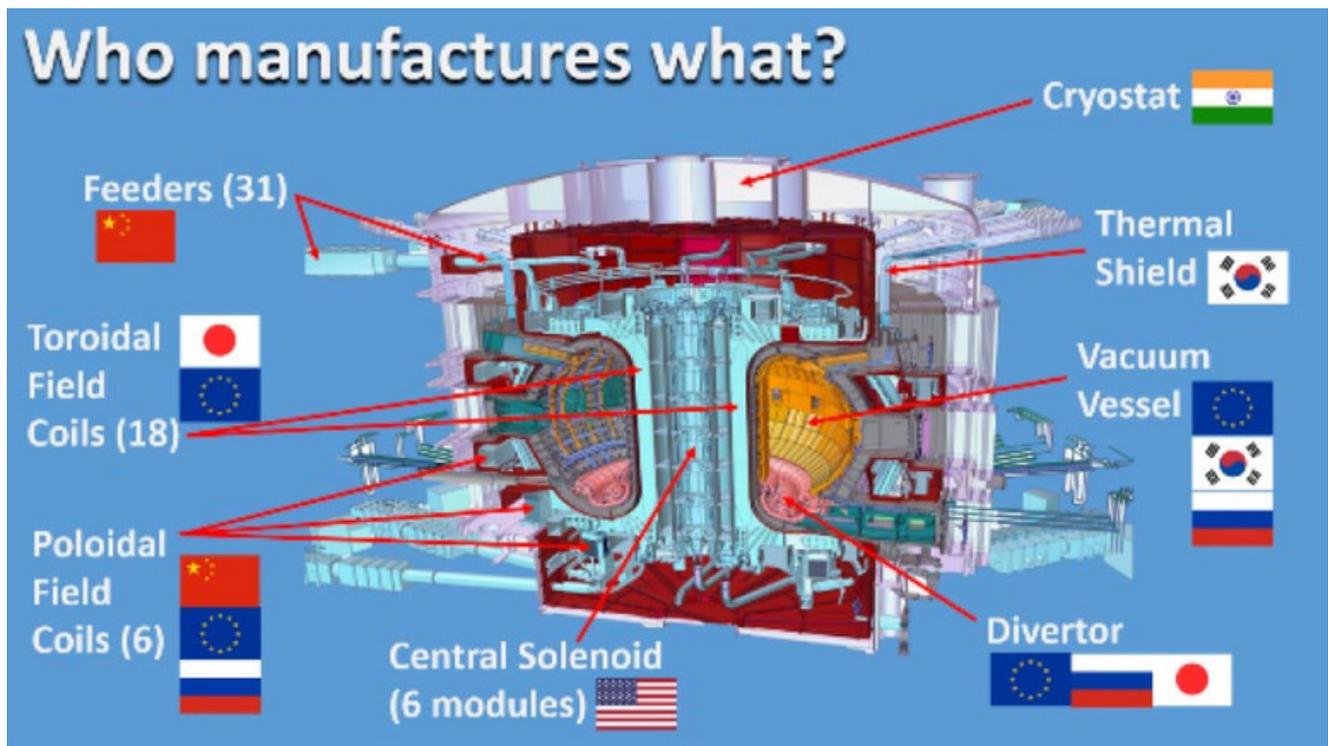
Nuclear fusion is also a target for nuclear science today, as it could be a potential source of energy that produces more energy than it consumes it. The research today on this topic is embodied by the international ITER project.

Located in France, this project is followed by numerous countries like Russia, China, the EU, the USA, Japan. The purpose is to create a reactor with nuclear fusion, which could be able to generate an energy source that does not emit any CO<sub>2</sub>.



This map represents all the countries that participate in this initiative.

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The previous illustration gives you the concrete repartition of the project

ITER is the first nuclear project with that level of international cooperation, engaging state investments. The difficulty to have that level of international cooperation is due to the strategic aspect of nuclear energy: as the countries developed their own process to exploit the nuclear energy from the resources to the infrastructures, they also developed their own nuclear research sector. Nuclear research also goes along with the question of nuclear safety, as every country establishes its own norms and its own procedures, although the IAEA already gives an international framework on nuclear safety. But this project is a shift in the mindset of nuclear research that the countries must use to establish this international framework for nuclear research.

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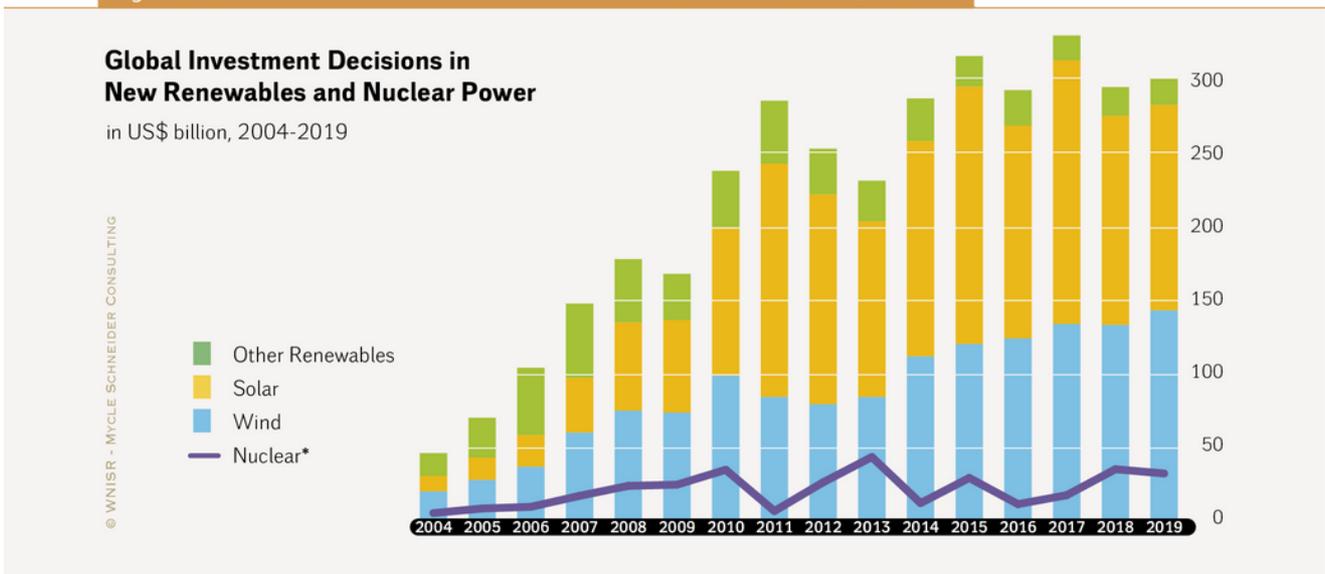
It is also important to add that international collaboration exists already in the nuclear market for the construction of nuclear facilities: as an example, the project of the nuclear reactor of Hinkley point C in the UK is led by a cooperation between CGN, a Chinese company, and EDF, a French company.

## What makes efficient international research difficult to get:

We previously said that international research is difficult to get because of the too important strategic aspect of nuclear research.

One other issue about nuclear research is about the fundings of the research:

Figure 48 - Global Investment Decisions in Renewables and Nuclear Power 2004–2019



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The biggest part of the global investment to find new energy solutions is on renewable energy, leaving approximately 50 billion dollars of global investment in nuclear energy, which is for example 3 times less than the investment in wind energy.

There is also another tendency to highlight: the irregularity of the investment: nuclear energy is a difficult topic for public opinion, and therefore for governments. Therefore, investment in nuclear research isn't constantly a priority, and that creates instability for international research. This could be a problem to address to create an efficient nuclear research framework.

Finally, we could say that the biggest issues that make it difficult to establish an efficient and international framework for nuclear research are the strategic importance of nuclear energy, the lack of investment in it, and especially the uncertainty about this investment.

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## Keys questions :

To conclude, these are key information that you should have to know the position of your country:

- Has your country participated in IAEA international nuclear research programs?
- How works your country national research
- Is your country still investing in nuclear energy?
- How is the nuclear park in your country?
- Is your country supporting the ITER project ?

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- <https://www.iaea.org/fr/projects/coordinated-research-projects> (to search IAEA research program)
- <https://www.iaea.org/>

## **Topic 2: Nuclear disarmament: Ensure further efficiency of the NPT (Treaty of Non-Proliferation).**

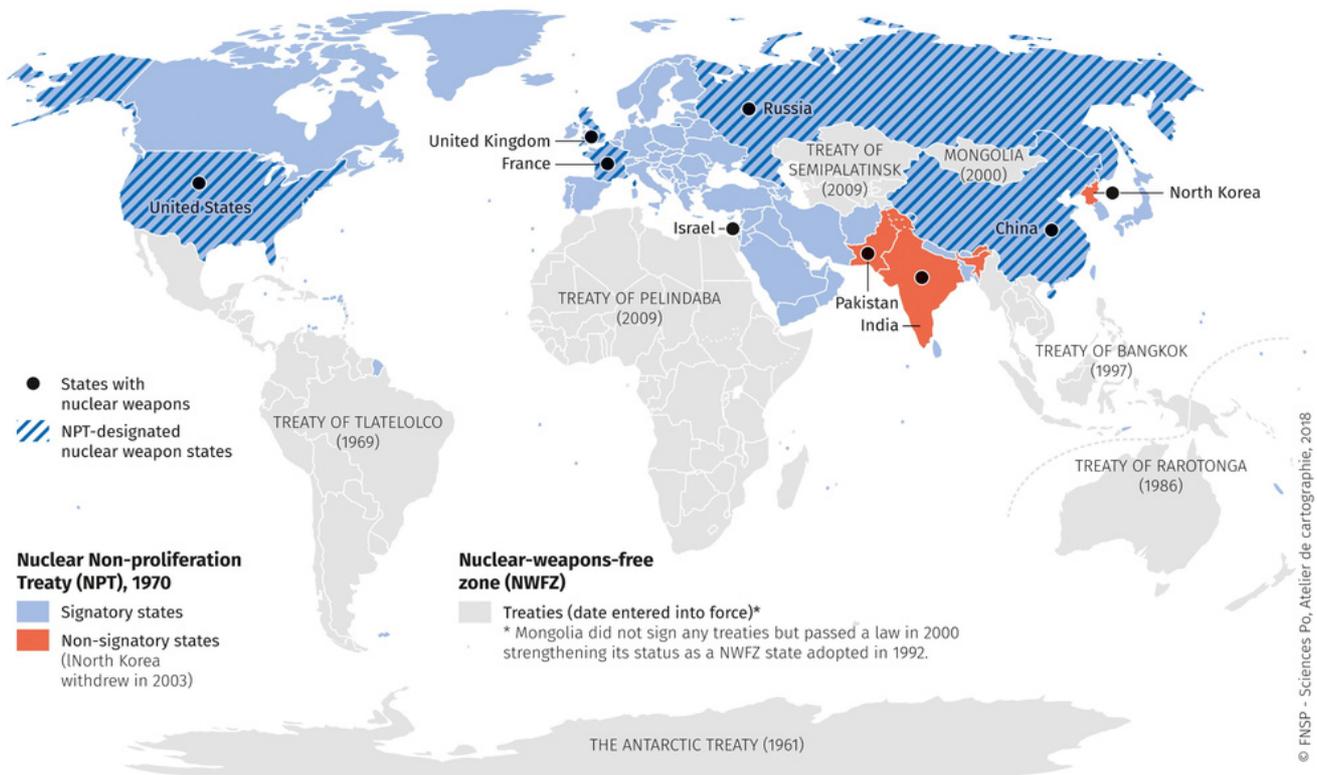
### **Introduction:**

Since its creation, IAEA has focused on promoting the use of civil nuclear use and limiting the risks of a non-pacific use of nuclear energy. Therefore, IAEA biggest success that follows both these objectives is the Non-Proliferation Treaty, established in 1968 and signed today by 191 countries. This massive step was made in a particular context: it followed the 1962 Cuba crisis, which made the world realize the actual risk of a use of nuclear weapons and therefore of a nuclear war. Since these events and the treaty, the tensions about the use of nuclear weapons have gradually decreased and other agreements about disarmament have followed. However, this disarmament isn't completed today, and current issues about nuclear weapons exist, such as the Iranian crisis or the case of North Korea, that proves the limit of the TNP when it comes to non-pacific nuclear use today. Additionally, the other purpose of the TNP was to promote the use of nuclear energy and its development in new countries, which remains today an objective for the IAEA, as acquiring and monitoring nuclear energy is still for many countries a huge technological and scientific challenge to process.

Also, the key to this guideline is to establish the current situation of nuclear use in the world, both in terms of military and civil use of nuclear energy. That would help us to measure how much had already been done by AIEA thanks to the NPT and all the disarmament agreements that followed it, and what should still be done to ensure further efficiency of the NPT.

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## The NPT:



The NPT is the most important multilateral treaty about disarmament and nonproliferation of nuclear weapons. It was established in 1968, and since 1995 it is considered indefinitely extended. It is signed by 191 States, that all engaged not to develop a nuclear program to acquire the nuclear bomb (except the five countries that already had it).

There are three principles of the NPT:

- Non-proliferation: Every non-nuclear state is engaged not to develop any military nuclear program, and the five nuclear weapon states committed themselves not to transfer nuclear weapons to non-nuclear states, and not to help them to manufacture nuclear weapons. Non-nuclear states also recognize AIEA as a safeguard to verify that their nuclear activities remain pacific.

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- Disarmament: Every signatory engages himself to pursue negotiation to end the nuclear arms race and to reach nuclear disarmament.
- Cooperation for pacific use and development of nuclear energy: The treaty encourages every nuclear state to cooperate scientifically and technologically with non-nuclear states to develop civil nuclear use. It also guarantees the right to have its own nuclear research and pacific use for every signatory.

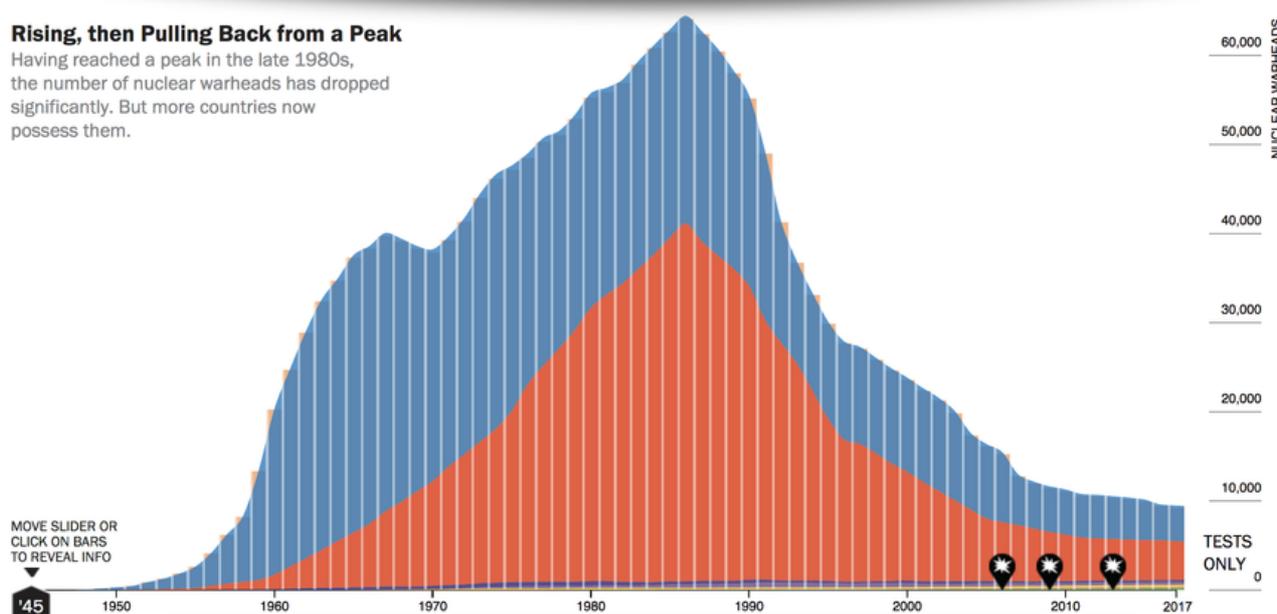
It also established a safeguard system under the responsibility of the IAEA, whose mission is to watch over every signatory's respect of the treaty. Every 5 years, IAEA organizes a conference of examination of the NPT to pursue its objectives.

## Nuclear Arsenal in the world:



### Rising, then Pulling Back from a Peak

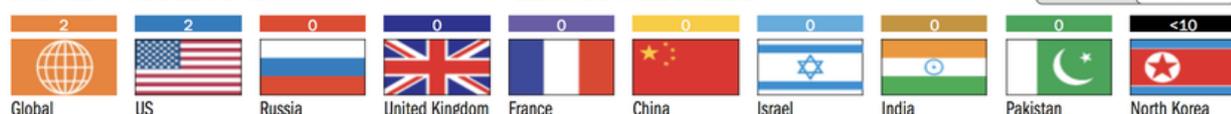
Having reached a peak in the late 1980s, the number of nuclear warheads has dropped significantly. But more countries now possess them.



STOCKPILED WARHEAD COUNT BY YEAR

CLICK A FLAG TO HIDE OR REVEAL

COMPARATIVE CUMULATIVE



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This graphic gives you a panorama on the evolution of nuclear weapon stocks since 1945. There are 3 tendencies that we want to highlight:

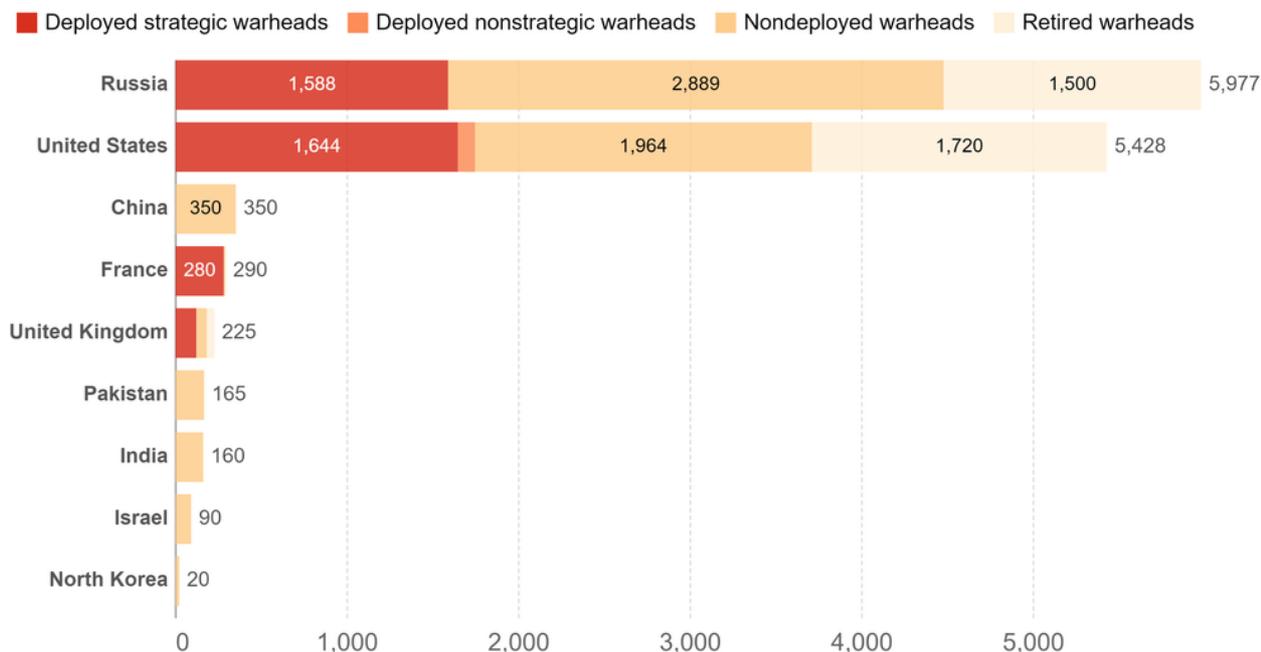
- The actual disarmament of the World: since the end of the Cold War, nuclear weapon stocks have significantly declined: from more than 60000 nuclear warheads in the 1980s, it has now decreased to about 10000. It clearly must be linked to the geopolitical context: the end of the Cold War meant that there was no need for a strong nuclear dissuasion anymore. It led to a significant agreement, the Start One Treaty in 1991, that established a limit of 6000 nuclear warheads for each signatory, the United-States, and the Soviet Union.
- Current stagnation of disarmament: For almost 15 years, this reduction of the number of nuclear weapons has not been really accurate: it shows a lack of efficiency of the current disarmament politics.
- The contrasted consequences of the NPT: Since 1968, 3 new countries have acquired the nuclear threat status: Israel, India, and Pakistan. The key point is that none of these 3 countries have signed the NPT. Therefore, the outcome of the NPT is mixed: on the one hand, all the signatories have respected the engagement of nonproliferation, whereas some of them already had a nuclear program in progress that they stopped. On the other hand, the IAEA had been unable to prevent these 3 new countries from developing a nuclear arsenal. The issue is the same today with North Korea, which is not a signatory from the treaty and is today developing its own nuclear program.

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## Estimated nuclear warhead inventories, 2022

Our World  
in Data

Strategic warheads are designed for use away from the battlefield, such as against arms industries or infrastructure. Deployed are those on ballistic missiles or bomber bases. Retired are those queued for dismantlement.



Source: Federation of American Scientists (2022)

OurWorldInData.org/nuclear-weapons/ • CC BY

Note: The exact number of countries' warheads is secret, and the estimates based on publicly available information, historical records, and occasional leaks. Warheads vary substantially in their power.

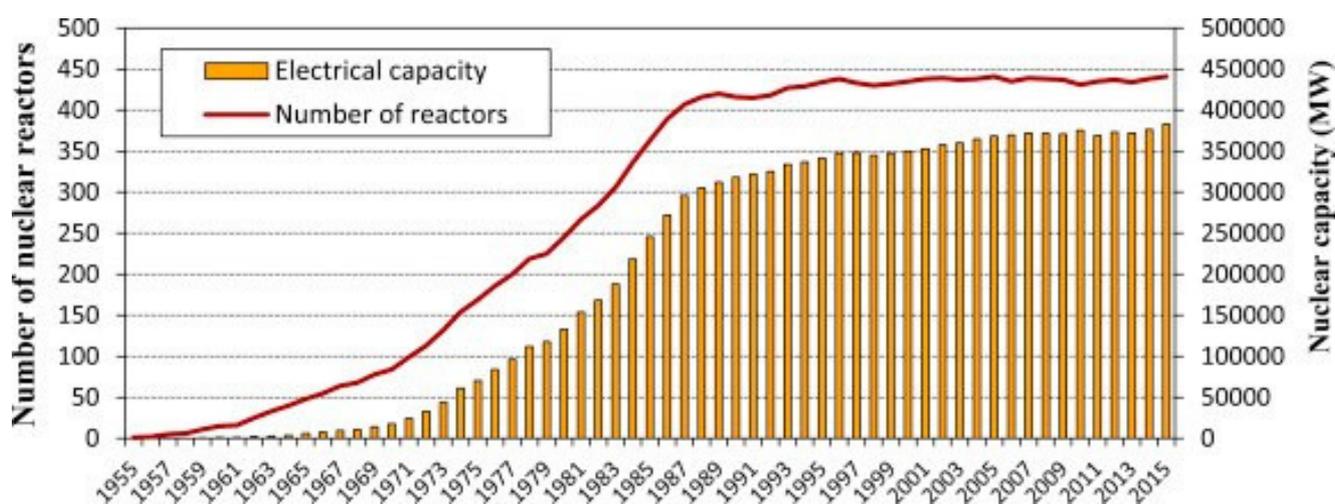
To go forward with the disarmament topic, it is important to have in mind what the current nuclear warheads arsenal is.

Although the number of warheads is likely to reduce during the next few years, global disarmament must be nuanced: it is quantitative disarmament, not qualitative. All the 5 signatories that already had a nuclear weapons stock (China, the United States, Russia, France, United Kingdom) have today a more sophisticated arsenal, despite several agreements during different Conferences of examination of the NPT.

This panorama on nuclear weapons shows both a relative success in terms of nonproliferation and a relative failure in terms of disarmament of the NPT.

## Civil use of nuclear energy:

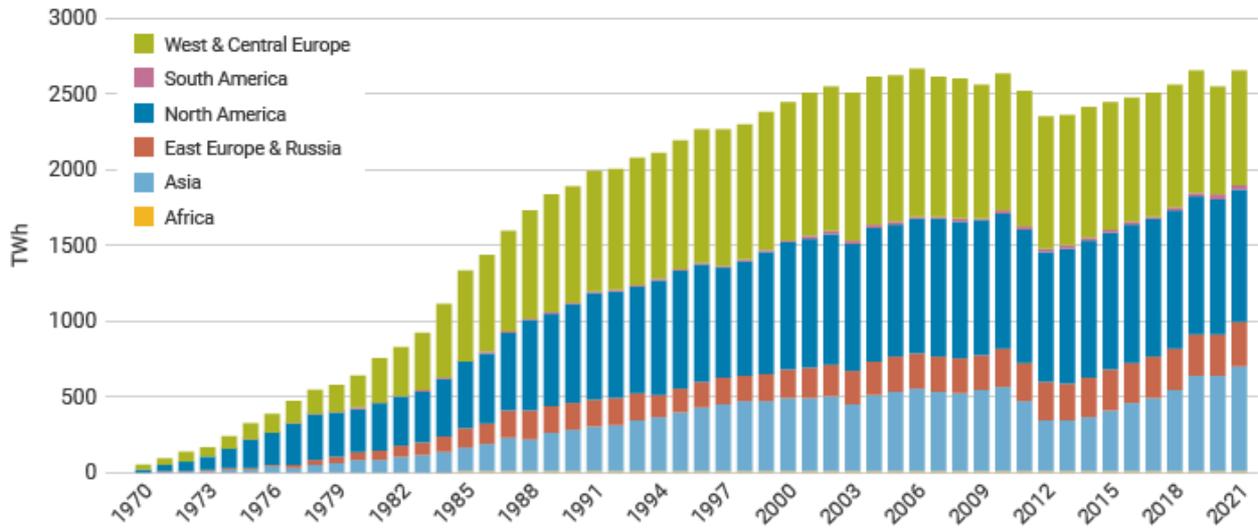
The other main target of the NPT is the development of nuclear technologies for civil uses. To evaluate how it could be more efficient, we also must analyze the situation of nuclear energy in the world.



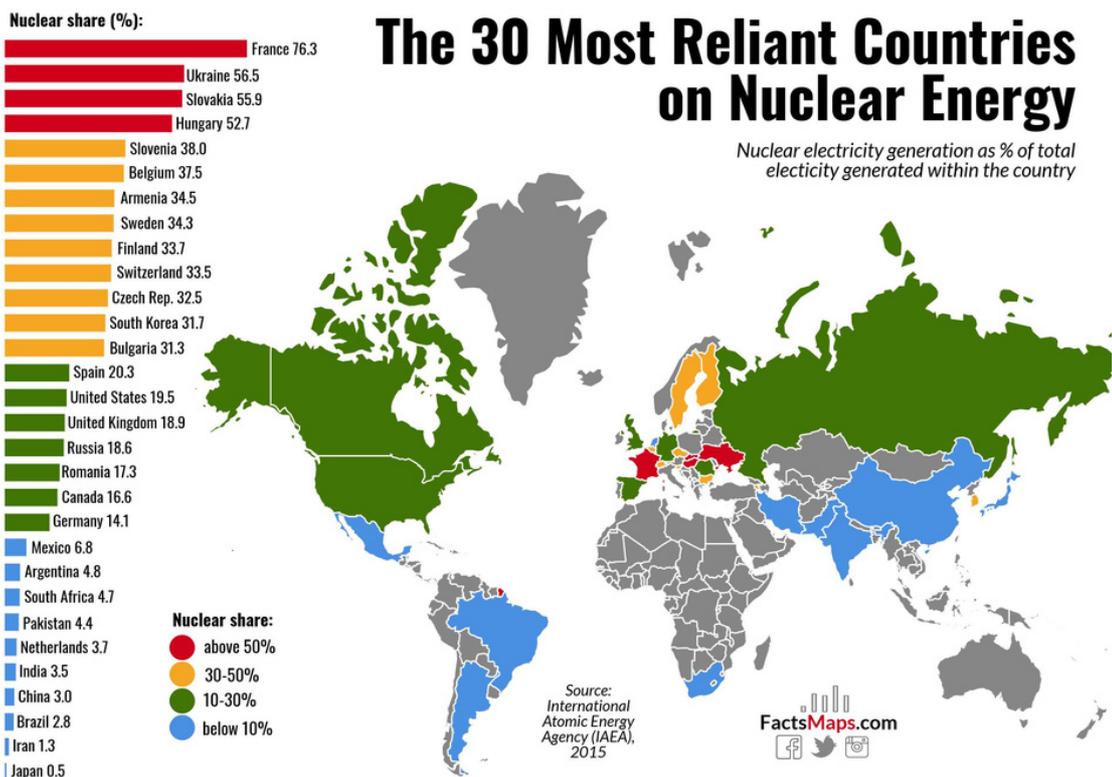
Since 1968, the number of nuclear reactors in operation and the electrical capacity of nuclear energy in the world have significantly increased. There are currently 437 nuclear reactors in operation in the world, with a total net capacity of production of 389,5 GW.

There are two eras to distinguish: from the second world war to the 1980s, many European countries and the United States have massively invested in nuclear infrastructures (also in parallel with their military nuclear investment). The investment in new nuclear reactors comes today from “primo-nuclear” (countries that acquire their first reactors) or developing countries: for example, the Turkey and Bangladesh are two countries currently building their first nuclear reactor.

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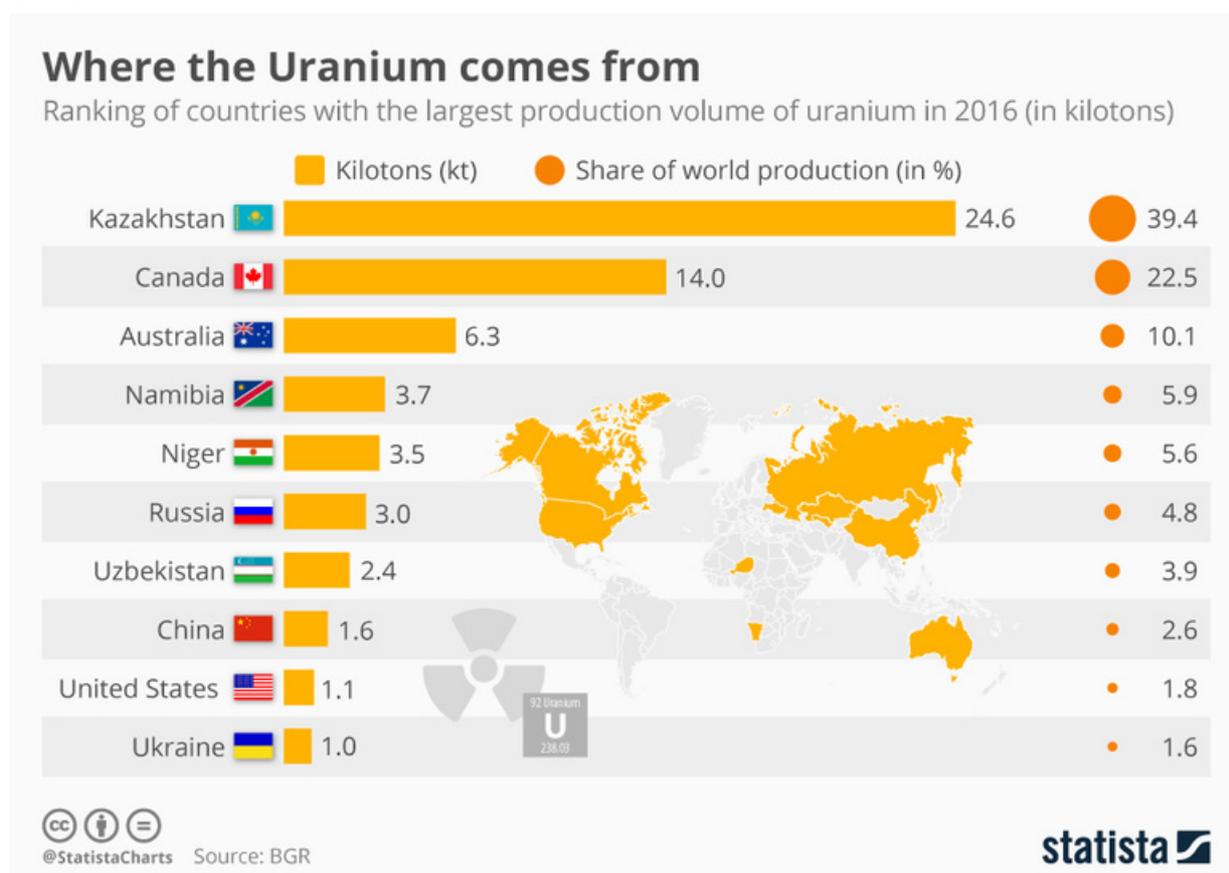
This history of nuclear infrastructures is also an explanation of the repartition of the production of electricity due to nuclear energy in the world, as the biggest producers are in Northern America and in Europe and in Asia. It is also important to notice that there is only one country using nuclear energy in Africa, South Africa. The disparities between different geographical spaces are therefore clear.



The importance of nuclear energy remains therefore very real in Europe and in Northern America, whereas in the rest of the world it appears relatively insignificant.

We can therefore establish that the NPT has indeed encouraged the development of nuclear energy in the world. Today, 32 countries have developed nuclear infrastructures, and some others are developing their first nuclear infrastructures. But the dynamic is not just in favor of the development of nuclear energy: Germany decided for example to stop using nuclear energy after the accident of Fukushima in 2011.

This development also asks the question of nuclear resources, such as uranium: if too much country uses nuclear energy without a safeguard on uranium or nuclear resources, it could become an source of tension in the future



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## Keys questions :

To conclude, these are key information that you should have to know the position of your country:

- Is your country a signatory of the NPT?
- Does your country use nuclear energy or invest in nuclear energy?
- Is your country a nuclear power?
- Which disarmament agreement has your country signed?
- Is your country in favor of the development of nuclear energy? If yes, in which IAEA program is he participating?
- What is your country's point of view on the efficiency of the NPT?
- Is your country respecting the NPT?
- How is your country providing nuclear resources ?

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- <https://thebulletin.org/nuclear-notebook/>
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**Antoine COLLIN**

Chair International Atomic Energy  
Agency

antoine.collin@edhec.com



EDHEC NATIONS UNIES

**EDHEC Nations Unies**  
24 Avenue Gustave-  
Delory CS 50411  
59057 Roubaix Cedex 1  
France

 [www.edhecnationsunies.com](http://www.edhecnationsunies.com)

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