Myths about nuclear power

Many people believe that nuclear power is the solution to the world's energy needs. This is often due to misinformation and half-knowledge. Because there is a lot to be said against it: For example, reactor disasters, the globally unresolved question of where to store highly radioactive nuclear waste, and the problematic extraction of uranium as the basis for nuclear power. The fact is that uranium has been radioactive for thousands of years and is therefore harmful to humans and the environment. So what is there to the idea that nuclear power is helpful and good for the future?

Nuclear Power as a Lifeline in Times of Crisis?

In politics, nuclear power is seen as a climate-friendly solution to the energy crisis: The European Union (EU) even classified nuclear power as “sustainable” in 2022. France, the third-largest operator of nuclear power plants (NPPs) after the USA and China, was particularly keen to achieve this. At the 2023 World Climate Conference in Dubai, the nuclear lobby announced the goal of tripling nuclear power capacity by 2050. And at the Nuclear Energy Summit in Brussels in March 2024, the representatives of the more than 30 participating nuclear states confirmed this target.

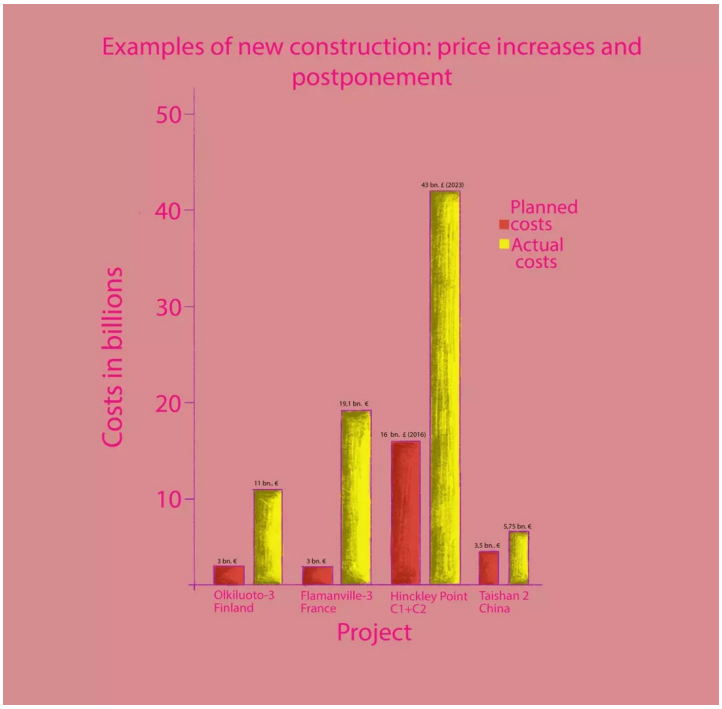
The reality is different. When new nuclear power plants are built, the projects get out of hand: they cost many times more than originally planned and their construction takes considerably longer than planned. The additional costs are usually borne by taxpayers, i.e. the general public. The sluggish nuclear power plants are also hardly compatible with a renewable energy system.

Nevertheless, half-truths and untruths about nuclear power persist right up to the highest political circles and dominate the debates about the future of this energy source. We use facts and figures to show what is true about the myths surrounding the topic.

Overview: 10 Arguments for Nuclear Power – and Why They Are Wrong

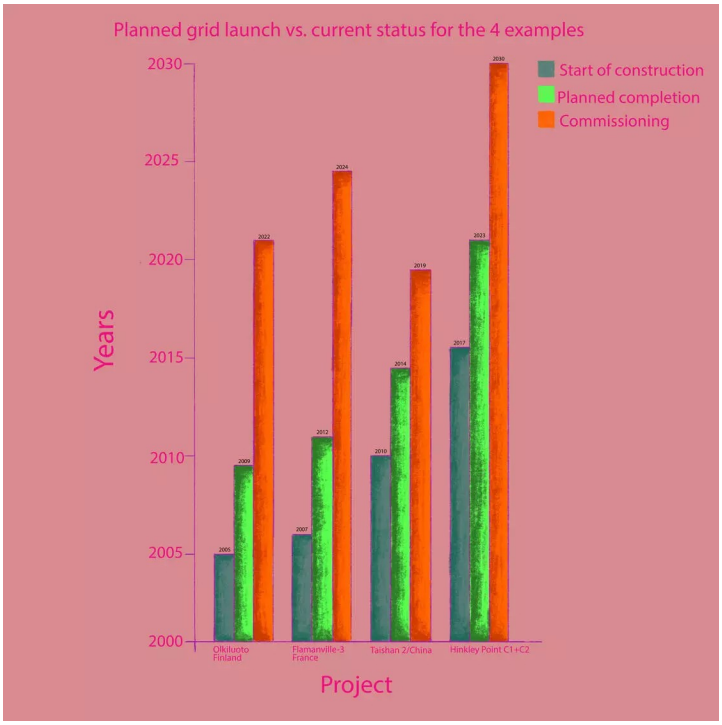
1 - Nuclear power helps to solve the climate crisis

“Nuclear power can make a significant contribution to solving the climate crisis - at least as a temporary solution.”



The opposite is the case: worldwide, coal-fired power plants generate 2200 gigawatts of electricity. To replace them with nuclear power plants, around 1500 new nuclear reactors would have to be built.

This is completely unrealistic: the new reactors in Finland, France and England were and are far behind schedule and cost well over 10 billion euros per reactor. Instead, the money should be

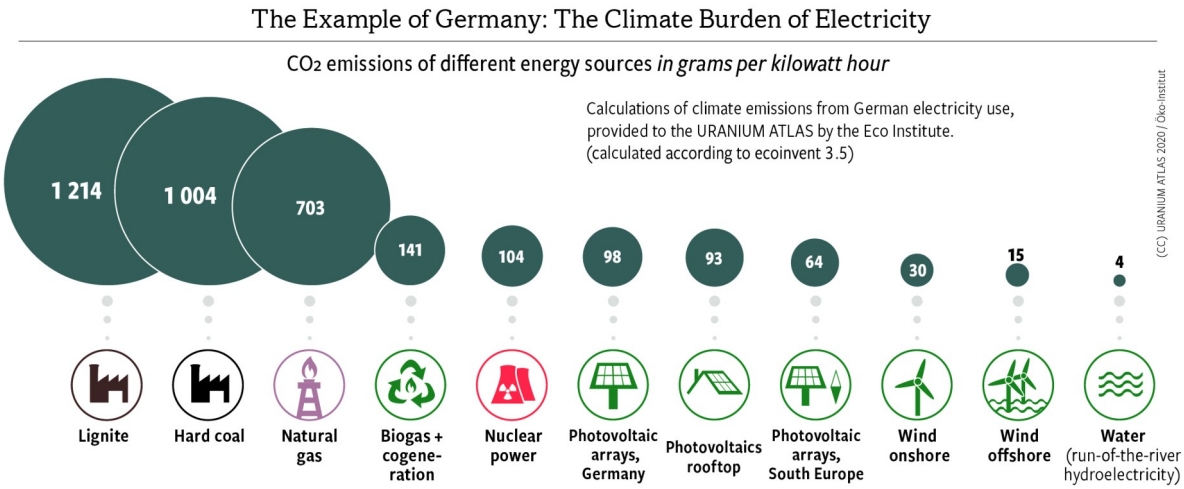


used to develop renewable energies (solar, wind, geothermal, etc.). Germany could cover its entire energy requirements for electricity, heat and transport on the basis of regenerative technologies. Nuclear power therefore prevents the solution to the climate crisis!

Based on renewable technologies, Germany could cover the entire energy demand for electricity, heating, and transport. Therefore, nuclear power hinders the solution to the climate crisis!

2 - Nuclear power is climate-neutral

„Unlike coal and gas, nuclear power does not release any CO2, so it is climate neutral.“



Yes, no harmful greenhouse gases are released in the nuclear power plant itself during electricity production. And nuclear power is comparatively low in CO2 compared to coal and natural gas. However, nuclear power is by no means climate-neutral because the mining, processing and transportation of the uranium fuel and all downstream processes do cause CO2.

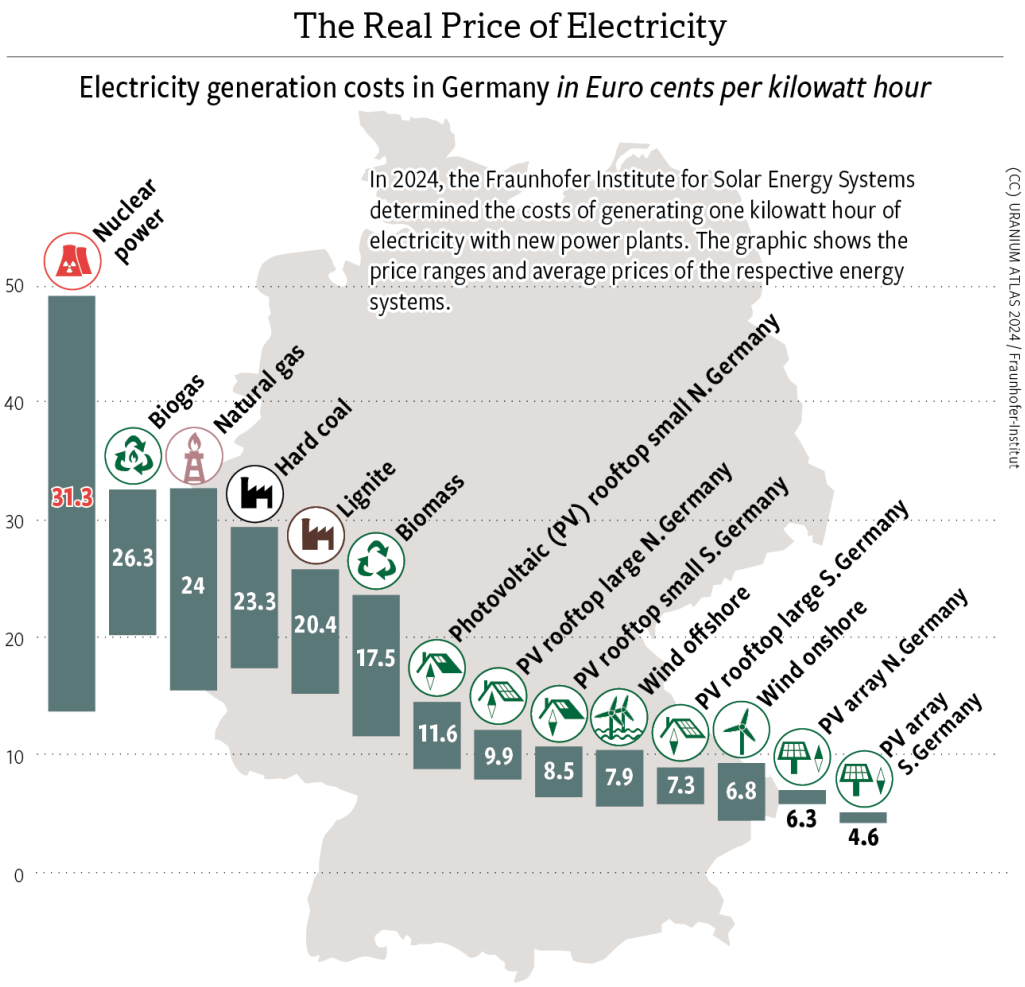
Nuclear power is not clean either: It carries high risks for humans and the environment, which are often overlooked in this argument. Uranium is radioactive. Even during extraction, miners are exposed to radiation day after day. Diseases such as lung cancer, birth defects in unborn children, and other health issues can result. It is neither CO2-neutral nor clean, but extremely dangerous! The graphic shows the duration it takes for atoms of a specific type to split half of their atomic nuclei through radioactive decay processes. Often, the new atoms formed in this process are also radioactive. Such a decay chain can be seen here, ending at lead, which is no longer radioactive and thus considered stable.

If, as in Arlit in Niger in the middle of the Sahara, millions of tons of highly toxic and radioactive rock and sludge are stored in the open air, every storm carries harmful particles into the homes of local residents.

The disasters in Chernobyl in 1986 and Fukushima in 2011 show that no reactor is safe. Severe weather, wars and other extreme events can destroy nuclear power plants and make entire regions uninhabitable. Nuclear power is therefore neither CO2-neutral nor clean, but extremely dangerous!

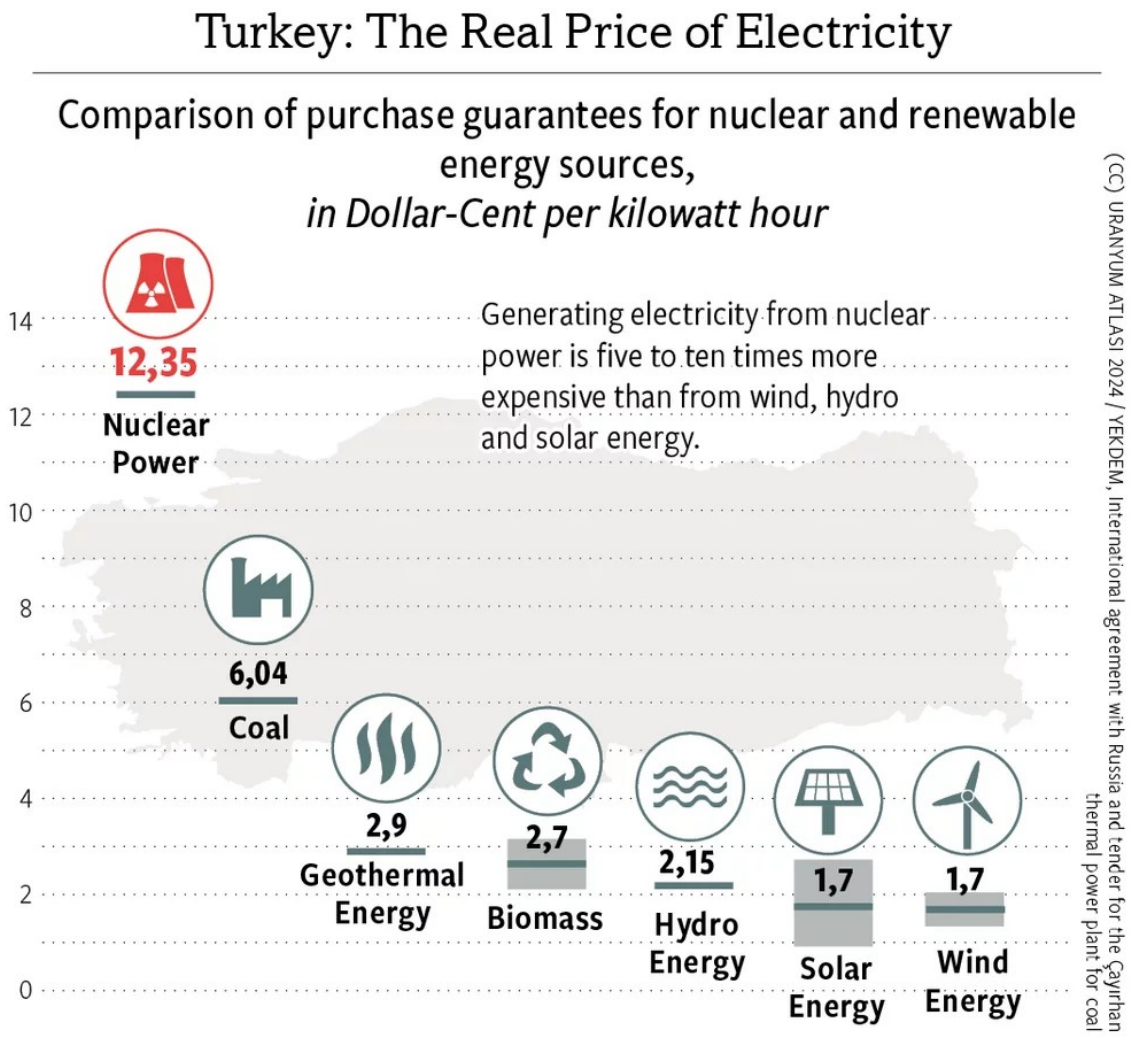
3 - Nuclear power is cheap!

“Nuclear power in Germany only costs 2 to 3 cents per kilowatt hour. We should therefore invest in nuclear power!”



Only the ongoing operating costs were taken into account in this calculation. The many billions for the construction of a reactor and the state subsidies for research and final storage are missing. If a new nuclear power plant were to be built in Germany today, it would cost between 13.6 and 49 cents per kilowatt hour of nuclear power, depending on the operating time of the power plant.

This does not even include the costs for the final storage of the resulting nuclear waste. In Germany, as everywhere else, these are mainly financed through taxes. So nuclear power is very expensive – the costs are just hidden. Green electricity from new wind and photovoltaic plants, on the other hand, costs far less than nuclear power – everywhere in the world!

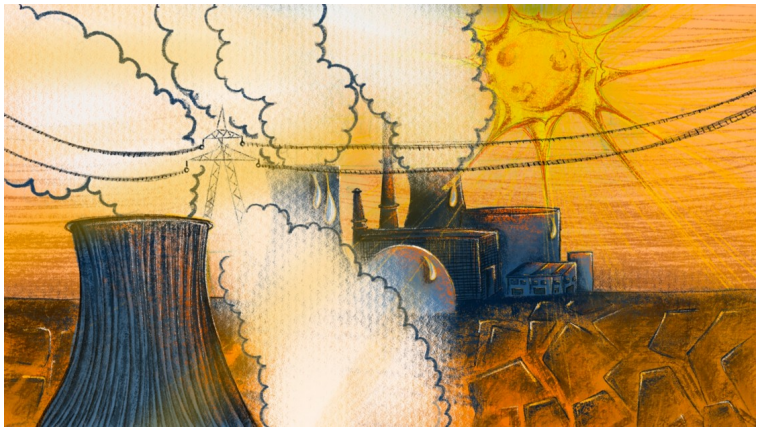


In contrast, green electricity from new wind and photovoltaic plants costs far less than nuclear power, everywhere in the world!

4 - Nuclear power contributes to energy security

“Renewables alone are not enough: especially in winter, when the sun only shines for a few hours a day and there is no wind, nuclear power is needed to secure the energy supply. Otherwise there is a risk of a dark doldrums.”

This was said by a number of nuclear power fans after the final phase-out of nuclear power. However, both Climate Minister Robert Habeck and Klaus Müller, head of the Federal Network Agency, stated that the shutdown of the last nuclear power plants in April 2023 posed no supply risk: The last three nuclear power plants were not needed to supply Germany with electricity in winter. In fact, significantly less lignite and hard coal was burned to generate electricity because renewables increased to a 55% share and the winter was mild. In a fully renewable energy system, gas turbines that burn green hydrogen will be the main means of bridging potential supply gaps. This means that dark doldrums are definitely a problem, but nuclear power is not the solution.

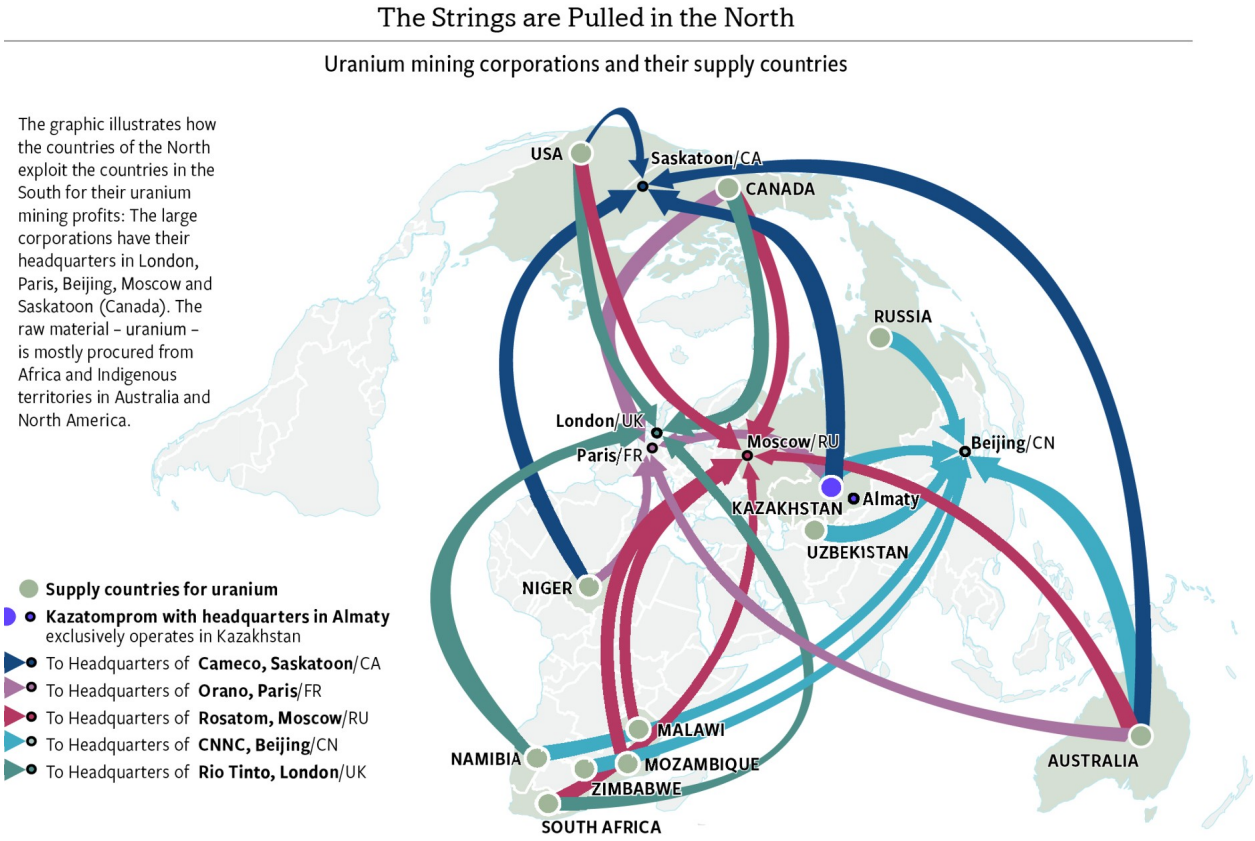


How little nuclear power plants contribute to energy security was further demonstrated by the scorching summer of 2022: more than half of France's 56 nuclear power plants were shut down by mid-August 2022! In addition to planned outages for maintenance, several plants had to be taken offline due to high water temperatures and low water levels. Even at the beginning of December 2022, 27 reactors were still out of operation. The state-owned utility EdF had to compensate for the shortfall at great expense.

Even in the event of natural disasters such as hurricanes, floods or earthquakes, nuclear power plants have to be shut down for safety reasons, which is costly and the residual risk of a major disaster always remains. Nuclear power is therefore completely unsuitable for energy security!

5 - Nuclear power makes us independent of energy imports.

“In contrast to gas, which many countries imported from Russia for a long time, nuclear power is a reliable and often even domestic source of energy. That's why it should be promoted!”



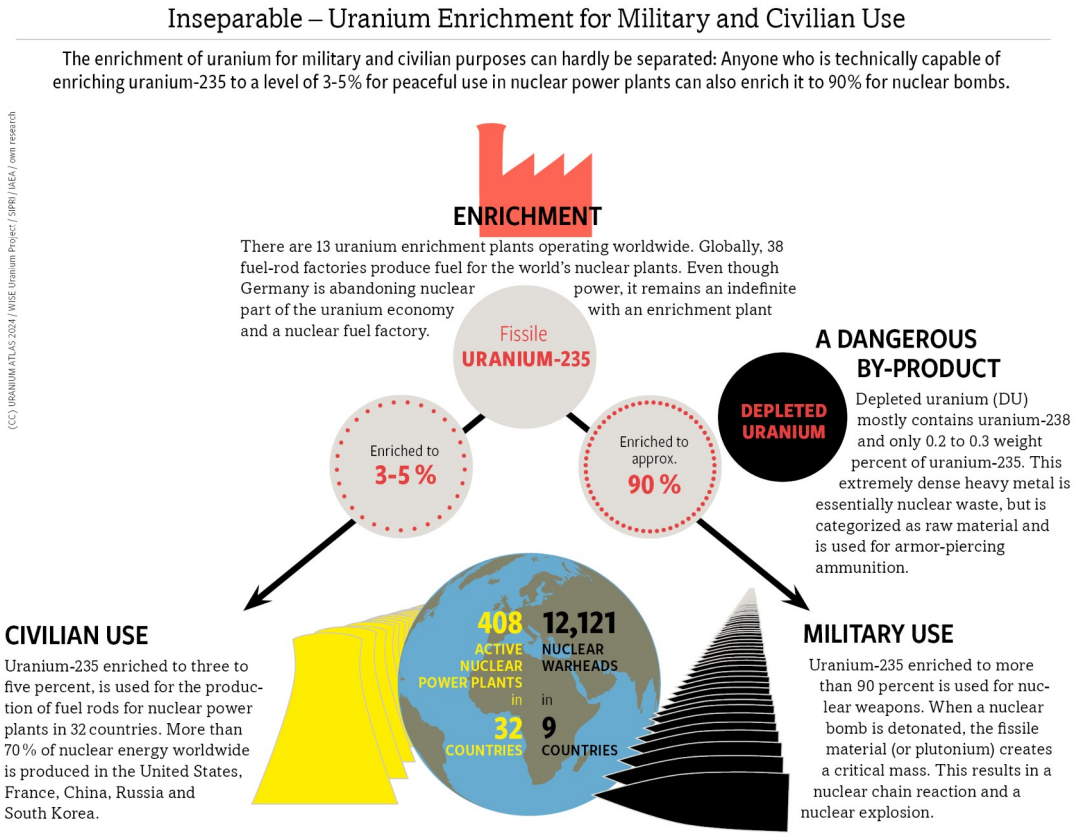
This is nonsense: most countries around the world import uranium from other countries for their nuclear power. Although the EU, with around 100 nuclear reactors, is the world's largest consumer of uranium, it is dependent on fuel from all over the world. Nevertheless, the argument was very prominent in the 2022 election campaign in France. Yet a large proportion of the uranium for the French nuclear power plants comes from Niger!

85 percent of the world's uranium is mined in just 5 countries: Kazakhstan, Canada, Namibia, Australia and Uzbekistan. The raw material of the nuclear age is further processed in 13 enrichment plants and 38 fuel element factories worldwide. This means that anyone who uses nuclear power is dependent on other countries.

This has not changed since the Russian war of aggression against Ukraine: In 2023, the EU sourced 23.5 percent of the uranium it needed from Russia, with a further 21 percent coming from Russia's ally Kazakhstan. 18 reactors in East Europe can only be operated with Russian fuel elements. So nuclear power is far from making us independent!

6 – Nuclear power is for peaceful purposes only.

„Nuclear power and nuclear weapons have nothing to do with each other.“



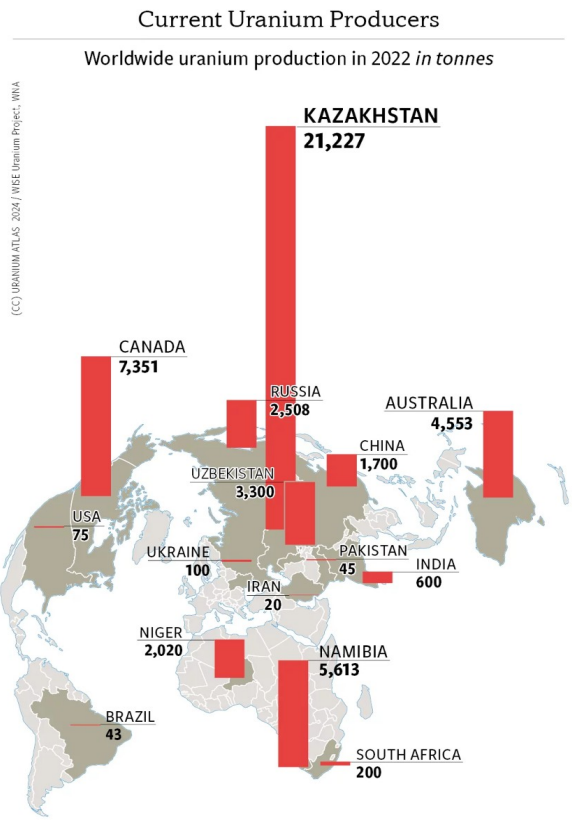
Initially, nuclear power was only developed in the 1940s to build the atomic bomb during the Second World War. Uranium, on the other hand, was initially mined exclusively for military purposes during the Cold War. East and West wanted to “deter” each other with nuclear weapons.

It was not until the 1960s that nuclear power began to be used as a source of electricity, but even this could not be separated from the military side: The knowledge, material and technology of nuclear power always contribute to military use.

What's more, anyone who can enrich uranium - and you always have to in order to use it - can also use the technology to build nuclear bombs. In a nuclear power plant, around one percent of the uranium is converted into plutonium. This can be used to build a plutonium bomb. After 1945, the first nuclear power plants therefore only had the task of supplying plutonium for bombs. The peaceful use of nuclear power is therefore the prerequisite for military use! And vice versa: anyone who wants to ban nuclear weapons must ultimately also campaign for the phase-out of nuclear energy!

7 – Nuclear power also helps the countries that produce uranium.

„If we promote nuclear power in Europe, poor countries like Namibia and Niger where uranium is mined benefit from it.“



This is not true: African countries or the indigenous communities of North America and Australia, on whose land uranium is mined, gain practically nothing from uranium wealth.

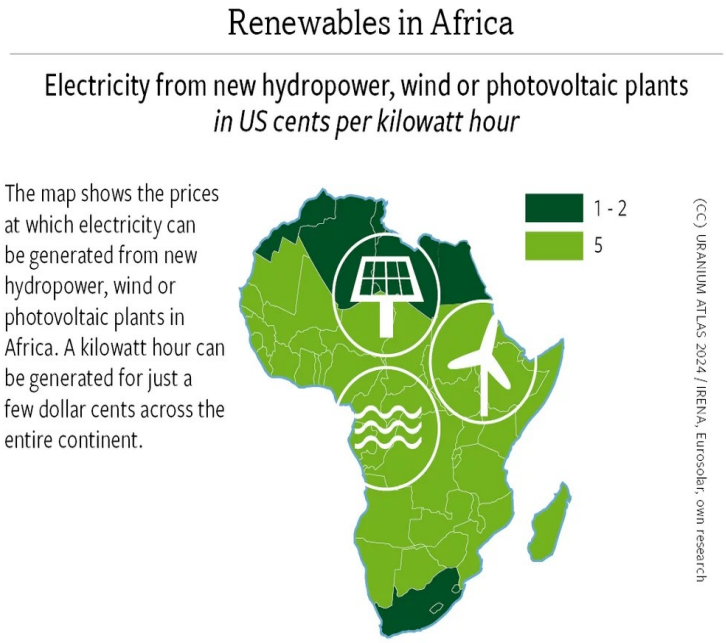
Niger is a particularly impressive example of this. Historically, the country is one of the world's largest uranium producers. Most of the uranium went to France, which ruled Niger as a colonial power until 1960. The country is one of the poorest in the world, but now has a radioactive legacy for which the French mining company Orano is not implementing sufficient safety and remediation measures.

In the southwest of the USA, four million tons of uranium ore have been mined on the territory of the indigenous Diné since the 1950s. However, the more than 500 abandoned mines within the reserve have still not been rehabilitated. There is hardly a family that has not lost a member to lung cancer. Uranium mining therefore only causes problems for poor countries and indigenous peoples. All the more reason to prevent nuclear power!

8 - Nuclear power also brings energy security and development to African countries.

„African countries are facing an energy crisis. Building new nuclear power plants will help!“

The first nuclear power plant is already being built in Egypt – with Burkina Faso, Ghana, South Africa, Nigeria and Kenya, there are several African countries that also want to build new NPPs.



But how sensible is this?

In fact, almost 600 million people south of the Sahara have no access to electricity. When the sun goes down, every second person lives in the dark. But nuclear power will not help to electrify individual countries or large parts of the continent. This is mainly due to the gigantic costs of nuclear power. In contrast to the comparatively rich industrialized countries, African states cannot co-finance nuclear power; in other words, they make themselves dependent on foreign investors.

At the same time, solar and wind power can be produced very cheaply across Africa. No other continent has more potential. The electricity can often be used where it is generated, which also helps with economic development. Since the electricity demand is often low, large transmission networks are not required, especially if energy storage is also used. Nuclear power plants in African countries are therefore absolute nonsense!

9 – Small nuclear reactors and fusion reactors are the future.

„Small Modular Reactors are less dangerous and can be deployed much more flexibly than conventional nuclear power plants, and the fusion reactor will solve all our energy problems“

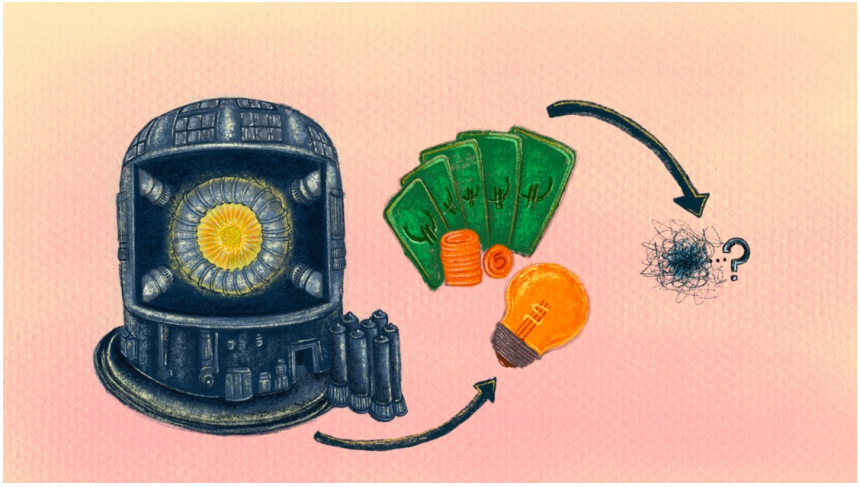
There is nothing to suggest that small nuclear reactors (SMRs) will ever be built in significant numbers. Precisely because SMRs are small, they are even less economical than large nuclear power plants. It is estimated that at least 3,000 SMRs would have to be built before the technology pays off.

But why? The future is solar and wind all over the world.

Only during so-called dark doldrums, when neither the sun is shining nor the wind is blowing, is a replacement needed. But nuclear power is not suitable for this. It is already wickedly expensive in continuous operation; using it only on a daily or hourly basis makes it unaffordable.

Quite apart from that, it still produces highly radioactive waste.

And yes: each individual small reactor contains less radioactive material than a large one and is therefore not quite as dangerous. But because a large number of small reactors would have to be built, the risk increases many times more. So relying on “small” nuclear power plants makes no sense at all.



The basic idea of nuclear fusion is not to split atomic nuclei, as in a nuclear power plant, but to fuse two atoms into a new one. At its surface, the sun is 6,000 degrees Celsius hot, and at its core, it's 15,000 degrees. These are the conditions under which nuclear fusion occurs, and which we must simulate to make fusion happen on Earth. No material in the world can withstand these conditions.

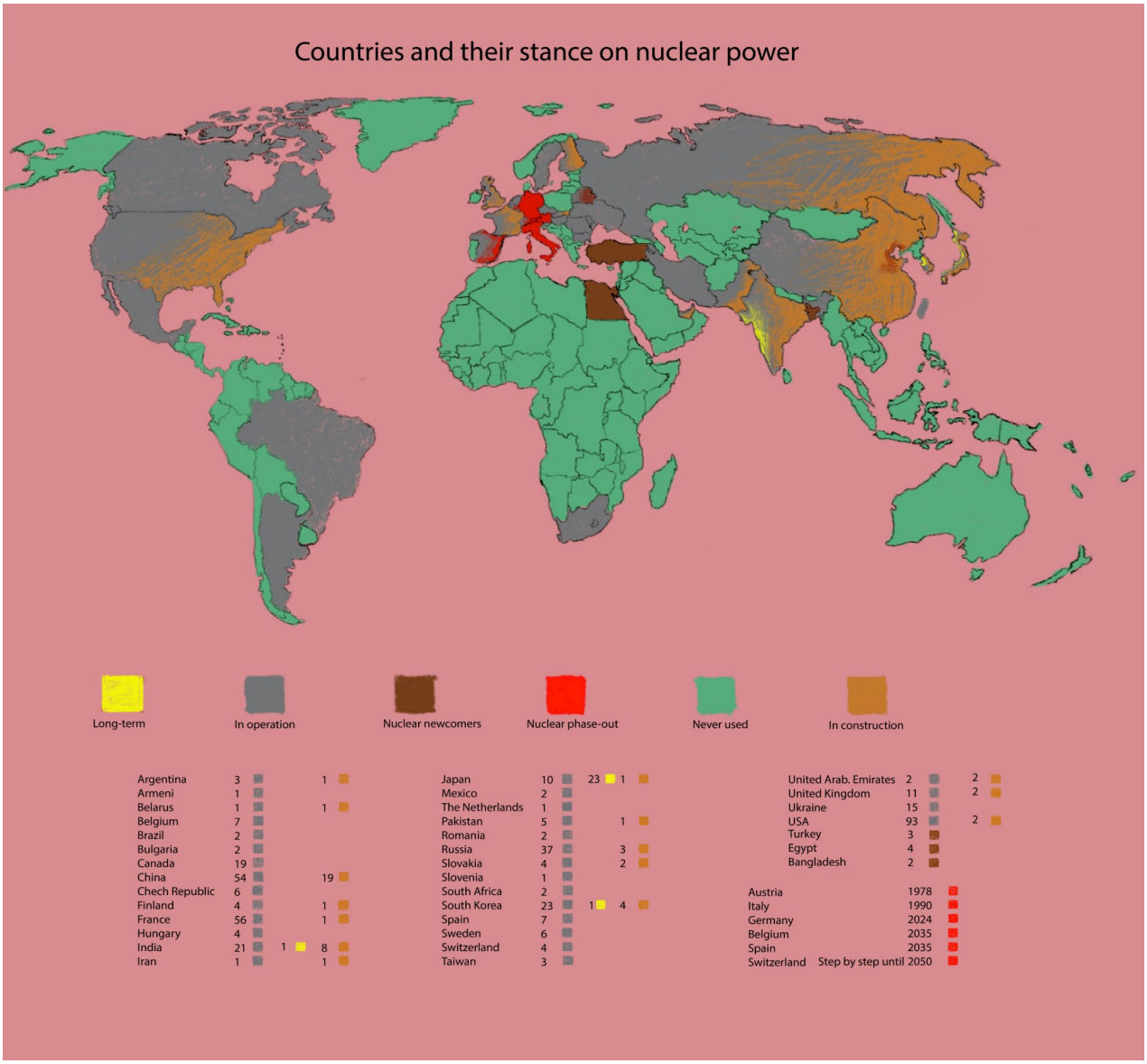
So far, around 100 billion euros, dollars and pounds have been invested in fusion research without generating a single kilowatt hour of electricity. Mini nuclear power plants and fusion research are a waste of money.

Renewable energies should be promoted right away!

10 - Germany is the only country that is phasing out nuclear power, while the rest of the world is continuing to rely on it.

„The whole world is promoting nuclear power and building new reactors – only Germany is not. This is a strategic mistake!“

Germany is not that alone: although there are currently 407 nuclear power plants in operation worldwide, they are concentrated in 31 countries. There are also Turkey, Egypt and Bangladesh, where nuclear power plants are being built for the first time.



Another number speaks volumes:
159 of the 193 UN member states do not use nuclear power.

And some countries want to follow Germany's example and phase out nuclear power:
Resolutions have been passed in Belgium and Spain, both for the year 2035. Switzerland wants to build no more new NPPs and let the existing NPPs running for as long as they are safe. Austria decided to phase out nuclear power back in 1978. Italy phased out nuclear power after the Chernobyl nuclear disaster. The last reactor was shut down in 1990.

Germany is therefore in good company with its nuclear phase-out.

Use and share!

A contribution by Horst Hamm and Franza Drechsel. Text by Franza Drechsel. Online editing by Florian Leiner and Alina Kopp. Illustrations by Katherine Rodríguez García. Content based on the Uran Atlas.

Sources

In General

https://netzeronuclear.org/news/landmark-ministerial-declaration-puts-nuclear-energy-at-the-heart-of-action-on-climate-change

https://world-nuclear.org/news-and-media/press-statements/industry-statement-at-brussels-nuclear-energy-summ

No contribution to solving the climate crisis

https://www.worldnuclearreport.org/World-Nuclear-Industry-Status-Report-2023, zur Bauzeit siehe Seiten 61-63.

https://www.rosalux.de/publikation/id/40912/der-uranatlas, Siehe S. 56-57

https://www.diw.de/de/diw_01.c.816924.de/publikationen/politikberatung_kompakt/2021_0167/100__erneuerbare_energie_fuer_deutschland_unter_besonderer_b__tudie_in_kooperation_mit_der_100_prozent_erneuerbar_stiftung.html

https://www.dont-nuke-the-climate.org/

https://www.umweltbundesamt.de/service/uba-fragen/sollten-wir-mehr-kernkraftwerke-bauen-um-das-klima

https://de.nucleopedia.org/wiki/Kernkraftwerk_Taishan

https://www.worldnuclearreport.org/IMG/pdf/wnisr2023-v5.pdf, (Kosten Flamanville S. 365)

Neither climate neutral nor clean

https://www.rosalux.de/publikation/id/40912/der-uranatlas, Siehe S. 56

https://media.greenpeace.org/archive/Report--Left-in-the-Dust-27MZIFIXELWO.html

https://www.wise-uranium.org/uoafr.html#ARLIT

Expensive

https://www.ise.fraunhofer.de/de/veroeffentlichungen/studien/studie-stromgestehungskosten-erneuerbare-energien.html

https://www.worldnuclearreport.org/World-Nuclear-Industry-Status-Report-2023, zu den Kosten von Flamanville, S. 117

https://www.rosalux.de/pressemeldung/id/50249/tuerkischer-uranatlas-zeigt-wie-teuer-atomkraftstrom-ist.

No contribution to energy security

https://www.nuclear-free.com/mediaportal/news/1-jahr-atomausstieg.html

https://www.handelsblatt.com/politik/deutschland/atomausstieg-das-ist-die-bilanz-nach-einem-jahr/100032488.html

www.fr.de/wirtschaft/in-frankreich-geht-das-licht-aus-91951133.html

https://green-planet-energy.de/fileadmin/docs/publikationen/Studien/studie-ein-jahr-atomausstieg-energiewirtschaftlicher-rueckblick.pdf

Existing energy dependencies

https://euratom-supply.ec.europa.eu/activities/market-observatory_en

https://rosalux.de/publikation/id/40912/der-uranatlas, Siehe S. 22-23, 26-28

Civil and military use of nuclear power is connected

https://www.greenpeace.de/klimaschutz/energiewende/atomausstieg/plutonium

https://www.youtube.com/watch?v=42290Oc-tak&t=2343s

https://www.atomwaffena-z.info/wissen/atombombe/eigenschaften

Uran producers don't profit

https://www.brot-fuer-die-welt.de/fileadmin/mediapool/downloads/fachpublikationen/sonstige/Standpunkt-Atomkraft-de-v04.pdf

https://www.bmz.de/de/laender/niger/soziale-situation-16962

https://hdr.undp.org/data-center/human-development-index#/indicies/HDI

https://www.rosalux.de/publikation/id/40912/der-uranatlas, Siehe S. 14-15

Nuclear power also does not contributes to energy security and development in African countries

https://www.dw.com/de/warum-afrika-auf-atomkraft-und-nicht-auf-solarstrom-setzt/a-67136060

https://www.statista.com/statistics/1221698/population-without-access-to-electricity-in-africa/

https://www.africa-business-guide.de/de/maerkte/energiewirtschaft#:~:text=Mehr%20als%2040%20Prozent%20der,alle%20Menschen%20mit%20Strom%20versorgt.

https://www.kfw-entwicklungsbank.de/%C3%9Cber-uns/News/News-Details_684096.html

https://www.giz.de/de/downloads/Studie_Renewable%20Energy%20Transition%20Africa_DE.pdf

Small nuclear reactors and fusion reactors are not the future

https://www.handelsblatt.com/politik/international/smr-verhilft-die-neue-technologie-der-atomkraft-zu-einem-comeback/100001683.html

https://www.base.bund.de/DE/themen/kt/kta-deutschland/neue_reaktoren/neue-reaktoren_node.html

https://www.base.bund.de/SharedDocs/Downloads/BASE/DE/berichte/kt/gutachten-small-modular-reactors.pdf?__blob=publicationFile&v=6

https://www.oeko.de/publikation/neue-reaktorkonzepte/

www.gtai.de/de/trade/russland/branchen/rosatom-setzt-auf-mini-reaktoren-und-schnelle-brueter-677596

https://www.fr.de/politik/mini-atomkraftwerk-wird-nicht-gebaut-92671935.html

Nuclear fusion won't safe us

www.ngo-online.de/2019/09/16/eurosolar-nachrichten/ [EUROSOLAR Nachrichten Rückschau, 01-07-2005: Statt unrealistischer atomarer Blütenträume Sonnenenergie direkt nutzen]

https://www.stmwk.bayern.de/allgemein/meldung/7056/bayern-startet-die-mission-kernfusion-ministerpraesident-dr-markus-soeder-und-wissenschaftsminister-markus-blume-stellen-masterplan-vor.html

https://www.greenpeace.de/klimaschutz/energiewende/atomausstieg/scheinloesung-kernfusion

https://.zeit.de/2022/53/kernfusion-atomkraft-forschung-durchbruch-energie

https://www.grueneliga-berlin.de/publikationen/der-rabe-ralf/aktuelle-ausgabe/kernfusion/

Only few countries use nuclear power

https://www.fdp.de/ausstieg-aus-der-kernkraft-ist-strategischer-fehler

https://www.dw.com/de/belgien-l%C3%A4sst-zwei-akws-zehn-jahre-l%C3%A4nger-am-netz/a-64333070

https://www.energiezukunft.eu/politik/spanien-legt-zeitplan-fuer-atomausstieg-vor#:~:text=Spanien%20plant%20den%20Atomausstieg%20bereits,s%20bereits%20seit%20mehreren%20Jahrzehnten.

https://www.zeit.de/wirtschaft/2017-05/schweiz-volksabstimmung-atomausstieg-energiewende

https://orf.at/stories/3087241/