NUCLEAR MONITOR

June 26, 2025| Issue #928

A PUBLICATION OF WORLD INFORMATION SERVICE ON ENERGY (WISE) AND THE NUCLEAR INFORMATION & RESOURCE SERVICE (NIRS)

WISE/NIRS Nuclear Monitor

The World Information Service on Energy (WISE) was founded in 1978 and is based in the Netherlands.

The Nuclear Information & Resource Service (NIRS) was founded in the same year and is based in the U.S. WISE and NIRS joined forces in the year 2000 to produce Nuclear Monitor.

Nuclear Monitor is published in English, 10 times a year, in electronic (PDF) format only. Back issues are published on the WISE website two months after being sent to subscribers (www.wiseinternational.org/nuclear-monitor).

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ISSN: 2542-5439

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PINC – Brussels mirage instead of realistic analysis of the role of nuclear power

Jan Haverkamp
senior expert nuclear energy and energy policy for WISE and Greenpeace Netherlands

Friday 13 June, the European Commission published the 8th version of the so-called PINC – the illustrative programme for the development of nuclear energy in the European Union. Such a report is made roughly every seven years on the basis of art. 40 of the Euratom Treaty. The last PINC came out in 2016, so EU policy was based on an already nine year old paper. In this new PINC, the European Commission announces again that it expects nuclear energy to grow in the EU. From the current roughly 90 GW installed capacity to around 109 GW in 2050. PINC assumes construction of around 60 GW new capacity in the form of large reactors within the next 25 years. It furthermore states that if it is possible to prolong the operational lifetime of existing reactors to 70 or even 80 years, the total capacity could grow up to 144 GW. Lifetime extension appears to be the most important motor behind nuclear developments, not new build. Above that, the Commission counts on an additional 17 to 53 GW of small modular reactors (SMRs).
This development would need around 205 Bln€ investments in new large nuclear power stations, and 36 Bln€ in lifetime extensions. But that is only when construction times are not overdrawn. When, for example, new nuclear power stations will be five year past schedule, there will be 9 GW capacity less installed in 2050, against an extra cost of 45 Bln€. This leaves the total investment volume up to 2050 also in case of delays above the 200 Bln€.

The Commission thinks that the costs of more nuclear in the energy system will at least partially be compensated by lower investments in grid and storage, but does not give hard scenarios to back that up.
The information in PINC on SMRs is roughly that what has been brought forward already by the SMR Industrial Alliance, a coalition of the nuclear industry, SMR startups and nuclear lobby groups.

Concerning financing, the report delivers less news. The financing models that are currently tried out mainly in the UK and the Czech Republic are not fundamentally different than what was brought forward in the 2016 PINC: power purchase agreements (PPAs), regulated asset base (RAB), contracts for difference (CfD) and above all a very large lot of state participation. What is new is that the European Investment Banks (EIB) in Luxembourg is supposed to stimulate PPAs, contracts that before start of operation of a new power station fix the power sales price for large industrial consumers in order to ease financing.

Construction of 60 GW before 2050 would means, according to the European Commission's DG ENER staff document accompanying the PINC paper, that on every moment around 15 new large nuclear power stations should be under construction. On this moment, that is only one: the relatively small 440 MW Mochovce 4 reactor in Slovakia. Because you cannot count on having these 15 from day one, according to DG ENER, it has to be counted with a much larger number in the 2030s and 2040s. The Commission recognises that this could be problematic for the supply chain, especially because the large forging capacity for reactor vessels and other large

parts is globally lacking for that. The EU only has 1 or 2, South Korea and South Africa each one and Japan 2 forging installations that would be able to deliver those. But they have to cover the entire globe outside of China, Russia and India, which produce their own parts.

Lack of a skilled working force is only minimally addressed with remarks that suggest we should simply open a can of 180.000 to 250.000 newly educated and certified workers in the EU. A 1.5 Mln€ Euratom programme should enable that.

During the public participation period for this PINC 2025, WISE and Greenpeace also asked attention for the need to assess safety risks as a result of acts of war and related needed upgrades, and the issue of liability.
There is a large and overdue need for stress-tests of all operational and planned nuclear reactors around the risks in time of war.
Also the issue of liability should be urgently revisited. Bulgaria currently has a liability cap of only 50 Mln€ in case of a severe nuclear accident, but also the minimal financial guarantees of 1,2 Bln€ in the Netherlands or 2,5 Bln€ in Germany are hopelessly inadequate in comparison with the around 80 Bln€ cash-flow that was need in the first year after the Fukushima nuclear disaster in 2011.
Yet, PINC does not address any of this. In spite of the fact that these are typically issues that the European Commission should take steps on.

Finally, PINC is ushering some phrases about the future of nuclear fusion, without coming with any concrete news, nor acknowledging the ongoing delays in the ITER programme.

Short: in spite of a wave of viewpoints sent to the Commission calling for writing this time a PINC that is based on reality, this version is no different than its predecessors in being over-optimistic, and hardly offers a basis for sensible energy policy, let alone nuclear energy policy. The Commission is gambling even heavier than in the past on lifetime extension of nuclear reactors, but given the fact that already four decades hardly any new reactors were build in Europe, this only offers a temporary reprieve. Also in case of extreme lifetime extension to 60, 70 or even 80 years of operation, total nuclear capacity will in the end decrease. The amount of down-hours due to technical problems, and the chances on a severe accident will only increase over that time.
The estimates of amounts of new reactors will rejoice the nuclear lobby, but the chances on them really being built, with increasing construction costs, only decreases by the day.

We have to conclude that the lobby push in the last decade by countries like France and the Czech Republic, now also supported by Poland, Sweden and the Netherlands and hailed by the (extreme) right all over the continent, getting even more impetus from the new lack of critical realism from the side of Germany, is impacting Brussels nuclear policy considerably. Resulting in a lot of pie-in-the-sky, and a stronger distraction from effective climate action than ever before.

Information:

PINC and staff documentation:
https://energy.ec.europa.eu/publications/communication-nuclear-illustrative-programme-under-article-40-euratom-treaty_en

The Greenpeace / WISE viewpoint communicated in the public consultation running up to the PINC: [we need a link still at WISE, now can be obtained from the author]

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Is there a nuclear renaissance?

Gerard Brinkman, WISE-Netherlands

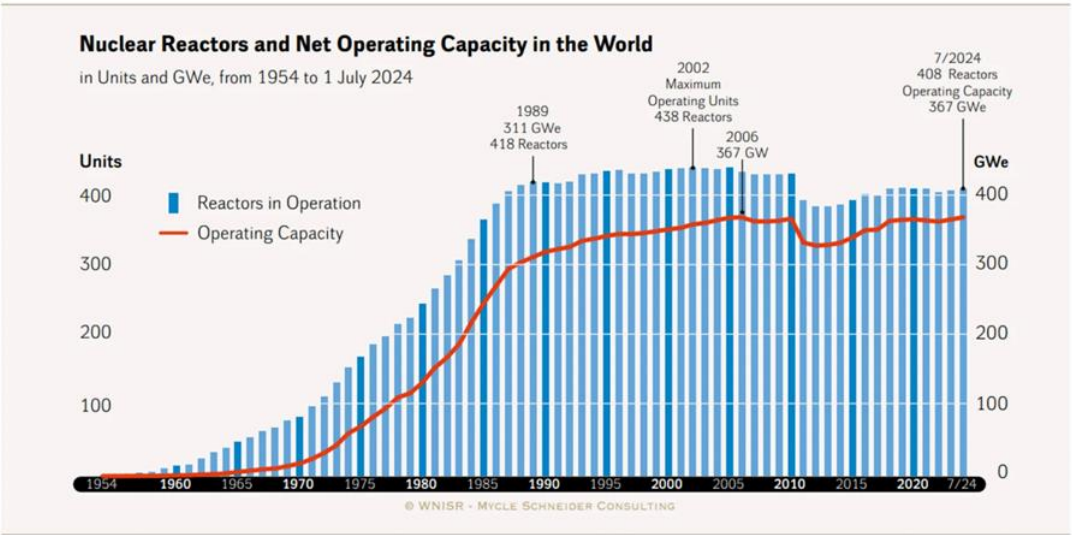
When you read the headlines in the newspapers about breakthroughs in the nuclear world, don't take them seriously. According to some newspapers, new nuclear power plants are springing up like mushrooms. There is supposedly a booming sector worldwide. The International Energy Agency (IEA) published a report in January 2025, in which it talks about "The path to a new Era for Nuclear Energy"[1]. In the real world, however, nuclear energy is on the decline. A factcheck.

closed. In total, 1 reactor was added, not exactly 'the new era' that the IEA has in mind.

A group of independent energy experts annually compile the nuclear figures in the extensive World Nuclear Industrial Status Report [3] and they come to similar conclusions.

Since 1990, the number of nuclear reactors has fluctuated slightly above 400. The dip in 2011 had everything to do with the tsunami and the subsequent nuclear disaster in Fukushima, Japan. The country closed a large number of

Figure 6 · World Nuclear Reactor Fleet, 1954–mid-2024



Sources: WNISR, with IAEA-PRIS, 2024

The past ten years

The International Atomic Energy Agency (IAEA) keeps track of how many new nuclear power plants are added to grid and how many are closed in a public database, Power Reactor Information System, PRIS [2]. Looking at the figures from 2015 to 2024, 67 new nuclear reactors started supplying power. In the same period, 66 nuclear reactors were permanently

nuclear power plants. The red line in the graph above is the amount of electricity produced by existing nuclear power plants worldwide. It increases slightly every year. New nuclear power plants often have a greater capacity than the nuclear power plants that are closed. The IEA therefore already enthusiastically headlined that nuclear power will probably reach an all-time high record in 2025.

[1] https://iea.blob.core.windows.net/assets/b6a6fc8c-c62e-411d-a15c-bf211ccc06f3/ThePathtoaNewEraforNuclearEnergy.pdf

[2] https://pris.iaea.org/pris/

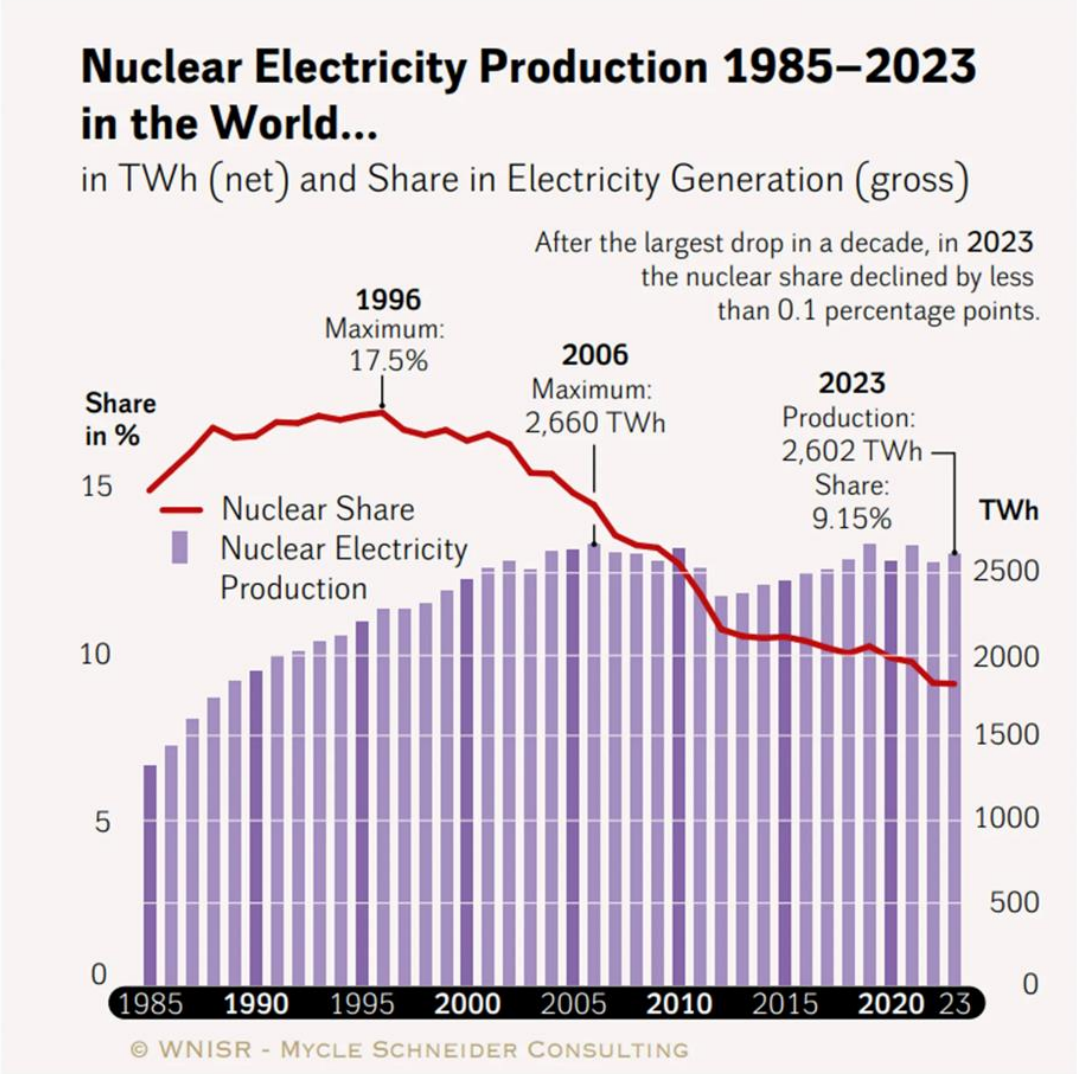
[3] https://www.worldnuclearreport.org/IMG/pdf/wnisr2024-v2.pdf

Share of nuclear power is declining

Looking a little closer at that “all-time high record”, there is something to be said about the claim. There is a small, steady growth of nuclear power output. But as a share of electricity production, nuclear energy is declining further and further. This is clearly visible in the previously mentioned WNISR.

stations are under construction. However, that does not seem likely.

According to the WNISR, just over 60 new reactors have been under construction for years. Since the construction period is on average around ten years, around 6 to 7 new nuclear reactors are added each year. This corresponds to the 67 new nuclear power

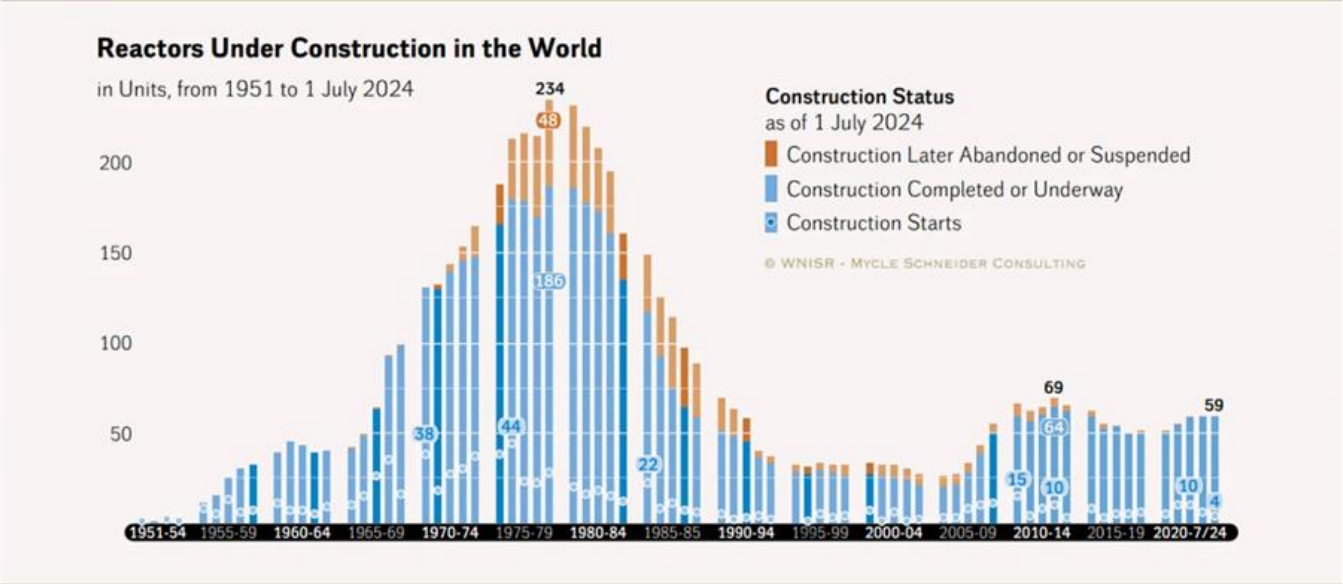


The red line shows the percentage of nuclear power to global electricity production. The maximum for nuclear energy was in 1996. The share of nuclear energy then was more than 17%. In the meantime, this has fallen to just over 9%. Instead of growth or even stabilization, the share continues to fall.

In the real world, there is still little sign of a nuclear renaissance. Of course, this could change if suddenly a lot of nuclear power

plants over the past ten years, mentioned before in this article. But nuclear power plants will also be closed. Even if you can extend their lifespan, they will still age and will have to be closed sooner or later. A large number of nuclear power plants were built between 1975 and 1985. These nuclear power plants are therefore more than forty years old, may last another ten to twenty years, but will then really close at some point. It is therefore

Figure 8 · Nuclear Reactors "Under Construction" in the World



Sources: WNISR, with IAEA-PRIS, 2024

expected that the number of nuclear power plants will decrease in the coming years instead of increasing.

What about the 'small ones': SMRs?

For many nuclear fans, the Small Modular Reactor is the promise of the future. They are supposed to be easy to build due to their small size, can be easily assembled on the building site like an Ikea cupboard, and are supposed to be inherently safe. There are now more than 100 players on the market, all of whom believe that their design has a good future. The problem, however, is that we have hardly any experience with SMRs. A few pilot designs have been built in Russia and China, but in the western world there have only been disappointments so far. The American NuScale has been developing an SMR since 2007 and for a while it even seemed that a number of them would be built in Idaho. But in the end, the regional governments could not settle the financing and the project was terminated[4]. All SMR designs are still in the phase of research or approval by a nuclear authority.

As with the large nuclear power plants, a major problem lies with the costs. Even if a few dozen of a certain design are built, that does not yet bring with it the economies of scale that should ultimately make the SMR cheaper. Then you will have to build a few hundred of them and there is no prospect of that. In any case, it will take years before the first SMR is built in the West and then it is questionable whether many will follow.

When you read headlines about breakthroughs in the world of nuclear energy, don't take them seriously. Nuclear energy is on its way out.

[4] https://www.world-nuclear-news.org/Articles/Idaho-SMR-project-terminated

Cost of French nuclear waste repository raises up to 38 billion

Jan van Evert

The French radioactive waste management agency Andra has published a new estimate of the overall cost of constructing, operating and closing France's planned deep geological repository for high- and intermediate-level radioactive waste. The new figure is between 26.1 and 37.5 billion euros (at 2012 prices).

France plans to construct the Centre Industriel de Stockage Géologique (Cigéo) repository in a natural layer of clay near Bure, to the east of Paris. The repository consists of an underground system of disposal tunnels. The site would store 10,000 m3 high activity waste and 73,000 m3 long-lived medium activity waste produced by nuclear power plants, nuclear research centres and used nuclear fuel processing facilities.

That is a lot more expensive than previously calculated. In 2005, Andra estimated the cost of the facility at between 13.5 and 16.5 billion euros. However, in 2009 it re-estimated the cost at around €36 billion. In October 2014, Andra gave a revised cost estimate for Cigéo of €34.4 billion, based on 2012 prices. Early in 2016, the French Minister for Ecology, Sustainable Development and Energy set a target cost of 25 billion euros for the Cigeo project, covering the planned 150 years for its construction and operating. That now appears to be wishful thinking. The cost of the project and the location will be reviewed again, at least by 2026.

The facility is to be financed by radioactive waste generators: EDF, Orano and the French Alternative Energies and Atomic Energy Commission. Construction could begin by 2027 if the French nuclear safety authority (ASNR) approves the application, The first waste packages would be received in 2050. That is considerably later than the original date of 2035-2040.

Czech government gambles by signing deal with South-Korean company

Jan van Evert

The Czech state-controlled company EDU II and Korea Hydro & Nuclear Power (KHNP) signed final contracts on June 4th to build two new nuclear power plants.
The deal, worth €15.7 billion, is crucial for the country that relies on nuclear power produced by the southern Dukovany and Temelin plants for 40 percent of its electricity consumption.
The contracts were signed in great haste and online, just hours after a court rejected a complaint by the French company EDF and returned it to a lower-instance court which is due to pass its verdict on June 25.

EDF, which had submitted an offer to supply its EPR nuclear plants, had challenged the tender and won the injunction from a lower court last month. The signing of the contract, that was planned for May 7th, had to be cancelled, with a South Korean delegation already en route to Prague. But EDF has also contested alleged state support for KHNP, illegal in the EU, in a complaint to the European Commission. It claims that KHNP's offer was so low that it implied state aid. A good point: a recent report commissioned by the British government states that the average cost to build a nuclear power plant is 15 to billion euros.

"Chances that KHNP will not build the units in the end are still considerable, despite the signature", Petr Barton, a data economist at the Datarun analytical platform, told AFP. A day after the signature, Czech Industry and Trade Minister Lukas Vlcek told Czech Radio there were "several potential risks" to the deal. “I think it will constitute a rather complex legal problem", said Jiri Gavor, who leads the Association of Independent Energy Suppliers.

Prague expects construction to begin in 2029 and the first unit at Dukovany should be in operation in 2036. “The Czech state is taking 80 percent ownership of the Dukovany II power plant project," said Vlček.

The fact that KHNP wants to build two large nuclear reactors in the Czech republic is remarkable, considering that it has recently withdrawn from similar projects in The Netherlands, Slovenia and Sweden. Another bidder, Westinghouse, was eliminated from the competition earlier.

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