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Monitored this issue:

Nuclear and the new rightwing government in the Netherlands

Jan Haverkamp, WISE Netherlands

Since 2019, there is a relentless lobby in the Netherlands for more nuclear power.[1] During the record long coalition negotiations for the 2022 established centre-right government in the Netherlands, the conservative liberal VVD with support from the Christian Democrat CDA demanded an active nuclear policy. This included a lifetime extension of the oldest nuclear power plant in the EU, Borssele, after its initial closure date at 60 years of operation in 2033, two new large nuclear reactors and support for SMRs. During its tenure, the initially nuclear-sceptic progressive liberal (D66) climate minister Rob Jetten adapted to this situation. He started procedures in all three fields and set up a special department for the development of nuclear energy within the Ministry of Economic Affairs. At the end of his period as minister, this department counted around 45 employees, the EIA procedures for lifetime extension of Borssele was started, and Westinghouse, EdF and KHNP/KEPCO had received funds to carry out a feasibility study for two of their nuclear reactors, to be published in November 2024. He also established a special fund of 5 Bln Euro until 2030 for facilitation of this new nuclear policy, as part of the 35 Bln Euro climate package of that government.
Early elections because of migration policy in November 2023 led to more extreme right-wing government in June 2024. In the run-up to the formation of that government, the VVD demanded not two but four new reactors and another 9,5 Bln Euro for the construction of new nuclear power stations.
What does this mean for the development of nuclear energy in the Netherlands?

Cost studies adapted to new pro-nuclear policies

Over the last five years, it has become increasingly clear that nuclear energy is not a cheap solution for the country. A first scenario-studies[2] in 2020 to include more nuclear into the power-mix showed that this would inevitably lead to higher costs of decarbonisation. Because this did not fit the VVD narrative, the Minister of Economy quickly ordered a new, rather vague study from ENCO in Vienna, but written by a former director of the Borssele nuclear power plant, claiming that including nuclear would be cheaper.[3] The new 2022 government then initiated several other studies to back up the claim that new nuclear could be done. An initial scenario study by technical consultancy TNO in 2022[4] took up 5 GW of nuclear power in one of its runs, the TRANSFORM model, but under the assumption that nuclear capacity would deliver base-load (preferential operation 24/7) and under relatively optimistic cost assumptions for nuclear and relatively pessimistic for renewables. The 2024 update of this study[5] takes up nuclear in both its scenario's and comes to the conclusion that not taking up nuclear would be possible, but against increasing costs. With high nuclear

1 https://eu.boell.org/en/nuclear-lobby

2 https://www.berenschot.nl/media/so0fvuic/systeemeffecten_van_nucleaire_centrales_in_klimaatneutrale_energiescenario_s_2050.pdf

3 https://www.enco.eu/_files/ugd/083d85_6093f463583f4e968533777678bc20eb.pdf

4 https://publications.tno.nl/publication/34639421/ik1neX/TNO-2022-klimaatneutraal.pdf (only available in Dutch)

5 https://publications.tno.nl/publication/34642479/Acs6Uy/scheepers-2024-toekomst.pdf (only available in Dutch)

load factors (for TRANSFORM 90% and higher) and low-end construction cost estimates (7000 Euro/kWe), this conclusion seems to be somewhat under strain.
An economic assessment made in 2022 by Witteveen & Bos also comes to the conclusion that if new nuclear capacity can be built under extremely optimistic cost assumptions (CAPEX 4100 Euro/kWe for large reactors, base-load use; 2700 Euro/kWe for SMR's) inclusion of nuclear would lead to a slight cost advantage of 0,8%, be it within the margin of error.

Siting and increasing resistance

In the meantime, Climate Minister Jetten indicated that Borssele would be the preferred location for two new nuclear reactors. This was based on the expectation that there would be a large support for such a project in the region. This, however, appeared to be a lot more complex. The announcement was met with the founding of Borsele tot de kern,[6] a local resistance group, and Stroom naar de Toekomst,[7] a regional one, and also the regional environmental federation ZMF[8] voiced criticism. The municipality of Borsele then set up a citizen's forum of 100 randomly chosen citizens who formulated criteria that new nuclear projects would have to fulfil. Also the Province of Zeeland set up a list of (more regional) criteria. The Minister then pleaded he would take these criteria as much as possible into account, without making any promises.[9]
The government reacted by intensifying its information focus on the province of Zeeland. The nuclear department at the Ministry of Economy and Climate set up a dedicated website[10] and opened once a week an information centre Energy staffed by people from the Ministry, grid operator TenneT, Hynetwork (the hydrogen daughter of the natural gas company Gasunie), the province and municipality.[11] The government also installed two special nuclear energy relation managers with citizens, one for the Borsele area and one for the potential alternative area at the Maasvlakte, West of Rotterdam.
Also plans popping up all around the country for SMRs are increasingly met by criticism – from national organisations like WISE, or from regional and local groups and political parties.

Procedures without zero-option

In the meantime, several planning procedures have started. This includes the scoping phase for the EIA for lifetime extension of Borssele, the adoption of a national energy plan (including a strategic environmental assessment), and the preparation for a financing plan for new nuclear power stations. What is remarkable is that those procedures exclude the so-called zero-option – an energy policy phasing out nuclear power. The argumentation so far has been, that the decision for lifetime extension of Borssele and new nuclear capacity was taken in the coalition agreement of 2022, but that is not a decision on which citizens can have much influence. Given the need for taking the zero-option into account under the obligations of public participation in the Aarhus Convention,[12] this may prove an obstacle for procedures further down the line (the EIA for Borssele, site specific EIA's for new capacity, etc.).

Lifetime extension Borssele depending on feasibility and ownership

The owners of the current Borssele nuclear power plant, for 70% the province of Zeeland and several municipalities, are unwilling to

6 https://www.borseletotdekern.nl/bladzijden/actueel.html

7 https://stroomnaardetoekomst.nl/web/

8 https://zmf.nl/nieuws/kernenergie-dat-kan-nee-moet-anders/

9 https://www.omroepzeeland.nl/nieuws/16411170/zeeuwen-overhandigen-voorwaarden-kerncentrales-maar-minister-belooft-niets

10 https://www.overkernenergie.nl/

11 https://www.zeeland.nl/actueel/overige-agenda/infopunt-energie-zeeland-elke-week-op-donderdagmiddag-open-1300-tot-1700-uur

12 https://unece.org/environment-policy/public-participation/aarhus-convention/text, art. 6(4) of the Convention stipulates early public participation when all options are open.

carry the further risks, especially the financial ones, of the ageing reactor. They are now negotiating with the state for nationalisation of the power station.[13]

A turn to the right

The newly formed right-wing government has so far been rather silent on its nuclear plans, except for mentioning in its Agreement on Main Issues that it intends to continue the preparations for lifetime extension of Borssele and the construction of two new nuclear reactors, plus wanting two more reactors and investigating the possibilities for SMRs.[14] This follows the wishes from the VVD fraction in Parliament, the party that also set the new Minister for Climate and Green Growth, Sophie Hermans. It is likely that the Netherlands will become more active within the Nuclear Alliance, the group of pro-nuclear countries spearheaded by France and the Czech Republic in the EU.

Paul Dorfman reviews Prof MV Ramana's new book; 'Nuclear is Not the Solution: The Folly of Atomic Power in the Age of Climate Change'

Prof MV Ramana's new book, 'Nuclear is Not the Solution: The Folly of Atomic Power in the Age of Climate Change' is a tour de force.

Underpinned by Ramana's significant reputation, experience and expertise; step by step, the book analyses sets of nuclear issues and arguments in an accessible and understandable way. Importantly, Ramana unviels the logic behind the powerful groups with vested interests involved in the maintenance of the nuclear status quo, currently working hard to greenwash a spectacularly dirty industry.

Climate Risk

The key finding is that nuclear energy, whether large Generation III reactors or small modular reactors (SMRs), cannot resolve the climate crisis. New nuclear is just too late and too costly. Even a limited expansion would significantly accelerate environmental, ecological, and military proliferation risks - whilst taking valuable resources from the roll-out of more flexible, safe, and cost-effective renewable, storage, and energy efficiency technologies.

Even beyond the horrific implications of meltdown and the intractable problem of radioactive waste, new nuclear is just not practicable at scale. Ramana suggests that any appraisal of future energy technology depends on two important parameters: cost and time – with nuclear failing on both counts. This is because nuclear is far more costly than its renewable competitors wind and solar, and given the need for rapid transformation, it's just too slow. Construction of only one nuclear plant takes an average of ten years. Including regulatory and planning permits and fundraising adds on yet another decade.

Ramana notes that the Intergovernmental Panel on Climate Change (IPCC) and other international bodies have warned that to mitigate irreversible damage from climate change, CO2 emissions have to be reduced drastically by 2030. Given the very slow roll-out of new nuclear, the inevitable conclusion

13 https://www.overkernenergie.nl/actueel/nieuws/2024/06/04/rijksoverheid-start-verkennende-gesprekken-over-eigendom-kerncentrale-borssele

14 https://www.kabinetsformatie2023.nl/binaries/kabinetsformatie/documenten/publicaties/2024/05/16/hoofdlijnenakkoord-tussen-de-fracties-van-pvv-vvd-nsc-en-bbb/20240515+Hoofdlijnenakkoord+PVV+VVD+NSC+BBB.pdf

is that it cannot even begin to contribute within that time-frame.

In other words, new nuclear energy simply cannot be scaled fast enough to match the rate at which the world needs to lower carbon emissions to stay under 1.5 degrees Celsius, or even 2 degrees. Here, the high cost and the very slow rate of reactor deployment largely explain why the share of global electricity produced by nuclear has been steadily declining.

Small Modular Reactor (SMRs)

When times get tough, the nuclear industry always diverts attention to new technologies it claims will solve the problems of existing designs. The latest magic bullet is SMRs. Even though no commercial order is even close to being placed, SMRs are presented in the press as quick, cheap, safe, and under construction.

However Ramana, a noted academic expert on the SMR issue, explains why these reactors are not commercially viable and why they will never resolve the undesirable consequences of building nuclear – including high costs, safety, security and accident risks, radioactive waste production, and nuclear weapon proliferation. Indeed, as he says, most SMR designs are merely theoretical concepts, and will take decades to commercialise, even if people were willing to pay the much higher costs involved.

Sustainability

Whereas nuclear advocates argue that the technology is clean and green, Ramana draws our attention to the inevitable negative externalities associated with nuclear power production, not least uranium mining, which has been responsible for contaminating land and water around the world, especially in areas occupied by Indigenous communities. Given these inevitable impacts, nuclear power seems neither clean nor sustainable.

Investment Drivers

The book also addresses a key paradox: Despite all its intractable problems, why do governments and private corporations continue to fund new nuclear power?

Ramana explains that large and financially powerful organizations have profited from building and operating nuclear plants by making the public pay for their high costs through either electricity bills or taxes. The public also will have to pay the long-term expenses associated with dealing with the multiple forms of radioactive waste and the subsidies aimed at inducing private companies to invest in nuclear power. Here, Ramana turns to the socio-technological work of Chomsky, noting the underlying systemic socialisation of cost and risk allied to the privatisation of profit.

Perhaps unsurprisingly, Ramana suggests that the key alliance for the nuclear industry is the one with the government, explaining why government support is critical to nuclear power, describing the many ways in which the nuclear enterprise is supported by subsidies and the skewing of the electricity market - adding that a central driver is the close connection between the production of civil nuclear energy and nuclear weapons.

Renewable Evolution

Not only is nuclear slow and expensive, it's also far too inflexible to keep going up and down with the swings of electricity demand. In contrast, the variability of wind and solar technologies can be more easily integrated into evolving, flexible electricity grids capable of adjusting output to fluctuating demand, providing stable power.

In this context, Ramana discusses the evolution of the electricity system and how it could change to accommodate the continuing increase in energy supplied by wind and solar plants. Importantly, he notes that matching the varying outputs of wind and solar necessitates enhanced flexible responses - but that goes against the economic logic guiding the corporate organisations that operate nuclear and large fossil fuel plants.

Nuclear Politics

Ramana underlines the political nature of nuclear power and how it functions best only under a social and economic system oriented toward unrestrained material expansion - the underlying cause of the climate crisis. As he concludes, 'talking about nuclear power from new reactors serves to delay dealing with the climate crisis. Procrastination might be the thief of time, but it is good business strategy for companies that profit from the current system.' A hard lesson we should all learn, and the quicker the better.

Dr Paul Dorfman

Visiting Fellow, Science Policy Research Unit, Sussex Energy Group, University of Sussex.

Member, Irish Govt Radiation Protection Advisory Committee.

Chair, Nuclear Consulting Group

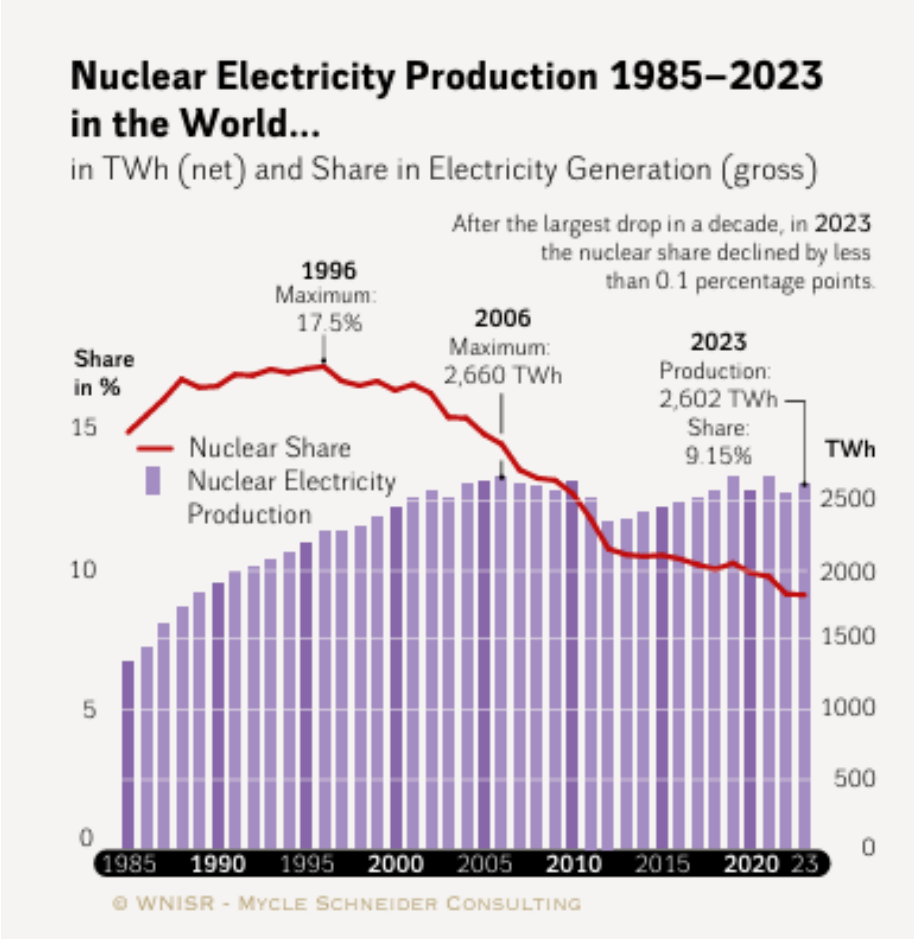
World Nuclear Industry Status Report 2024

Nuclear energy worldwide in decline

Gerard Brinkman, WISE Netherlands

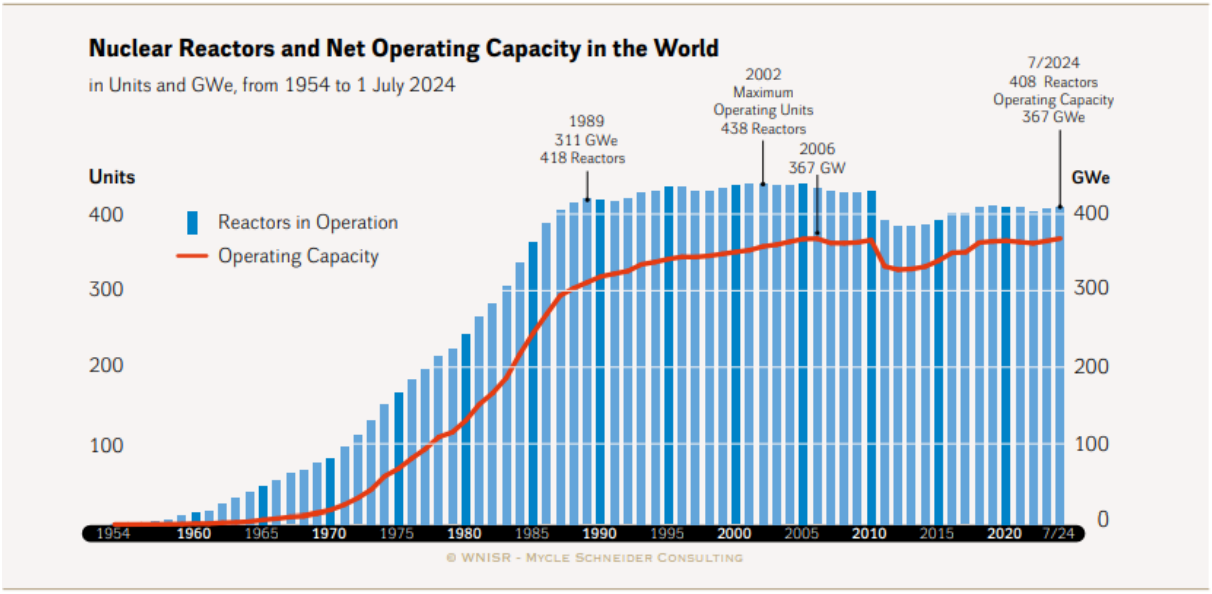
Last week, the annual World Nuclear Industry Status Report was published. This report lists the most important nuclear developments. As in previous editions, the main conclusion of this 2024 edition is that nuclear energy is further declining in global electricity production. Its share has fallen to 9.1%. Solar and wind are much cheaper and are taking off.

In 1996, nuclear power plants produced at their maximum. The share of nuclear power was at its highest worldwide in that year, at 17.5%.



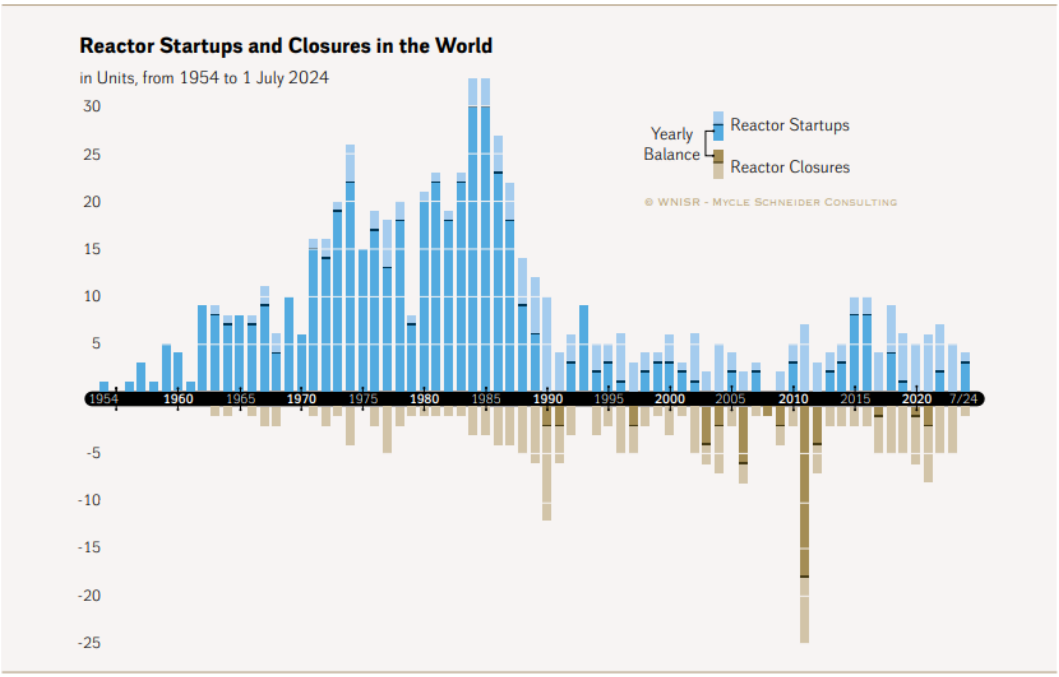
Last year, nuclear energy's share in the global electricity mix was still 9.2%. The big question is of course what is causing the decline. The most important thing is that the number of operating nuclear power plants remains the same, while more and more electricity is gradually being used in the world.

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



Sources: WNISR, with IAEA-PRIS, 2024

Since 1990, the number of nuclear power plants has fluctuated at just over 400. Although new nuclear power plants are being connected, approximately the same number are being shut down. This is clearly visible in the balance below.



Sources: WNISR, with IAEA-PRIS, 2024

Since around 1990, the blue line (new nuclear power plants) and the brown line (closures) have been in balance. The only sharp exception is 2012, when Japan closed its nuclear power plants as a precaution after the Fukushima disaster. In the first half of 2024 (the rightmost column), more

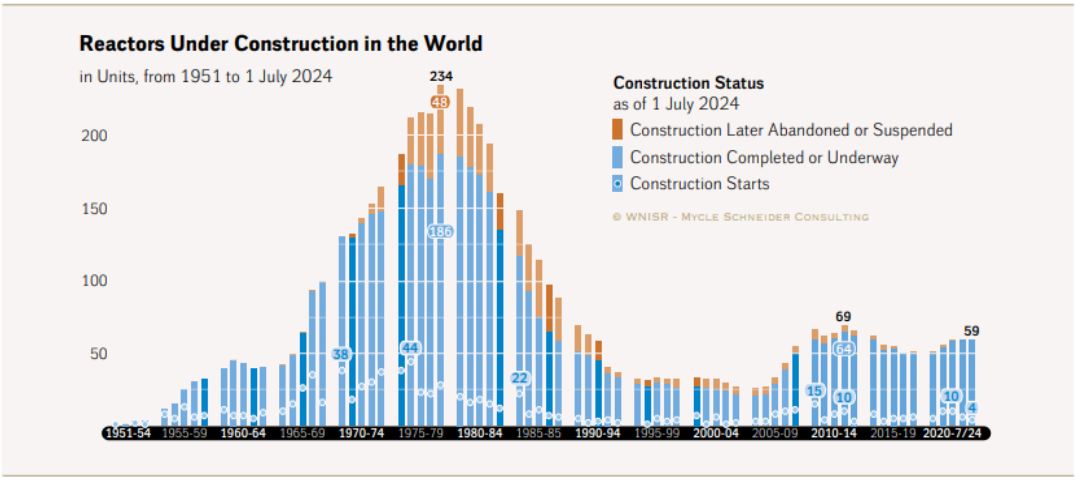
nuclear power plants will have been added than closed. Whether this will herald a nuclear renaissance is still very much the question. According [to figures from the IAEA](), the current figure (September 2024) is 4 new and 2 closed.

Year: 2024

New connections to the grid	
BARAKAH-4	(1310 MW(e), PWR, UAE) on 23 March
FANGCHENGGANG-4	(1000 MW(e), PWR, CHINA) on 9 April
KAKRAPAR-4	(630 MW(e), PHWR, INDIA) on 20 February
VOGTLE-4	(1117 MW(e), PWR, USA) on 6 March
Permanent shutdowns	
KURSK-2	(925 MW(e), LWGR, RUSSIA) on 31 January
MAANSHAN-1	(936 MW(e), PWR, TAIWAN,CHINA) on 28 July

That many new nuclear power plants are being built is at least a myth. Since 2010, the number of nuclear power plants under construction has fluctuated around 60.

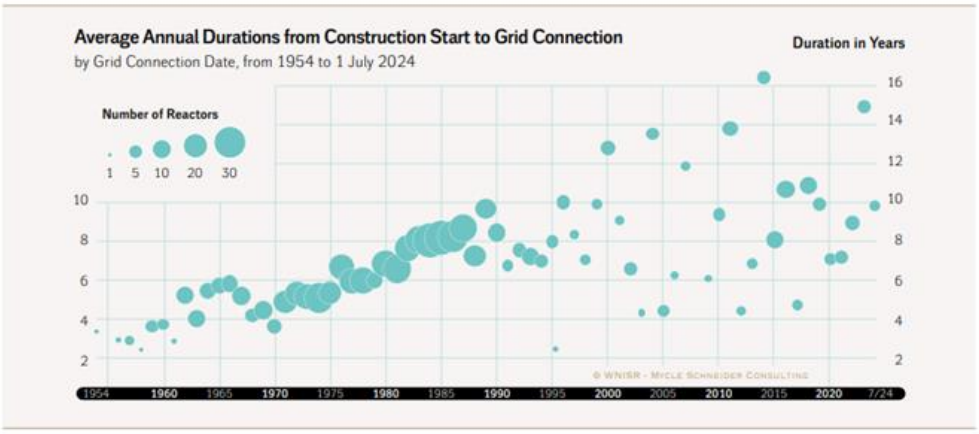
Figure 8 · Nuclear Reactors "Under Construction" in the World



Sources: WNISR, with IAEA-PRIS, 2024

The long construction time of nuclear reactors remains problematic. The average time from start of construction to grid connection for the five reactors started up in 2023 was 14.9 years, on average almost six years longer than the construction times of units started up in 2022 (9 years).

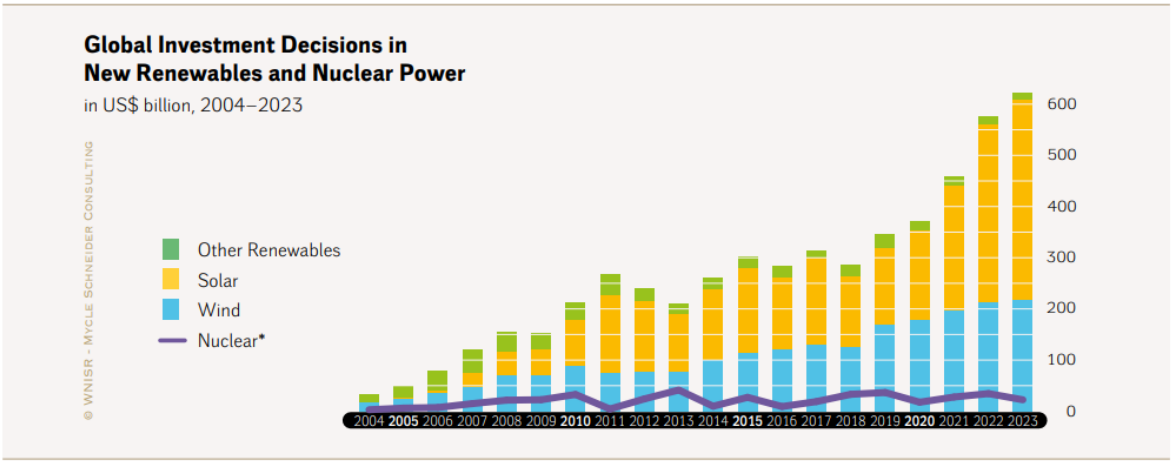
Figure 11 · Average Annual Construction Times in the World



Sources: WNISR, with IAEA-PRIS, 2024

The nuclear renaissance is also not yet visible in the investments in nuclear energy. While there is growing investment in new solar and wind parks, nuclear energy remains a marginal phenomenon.

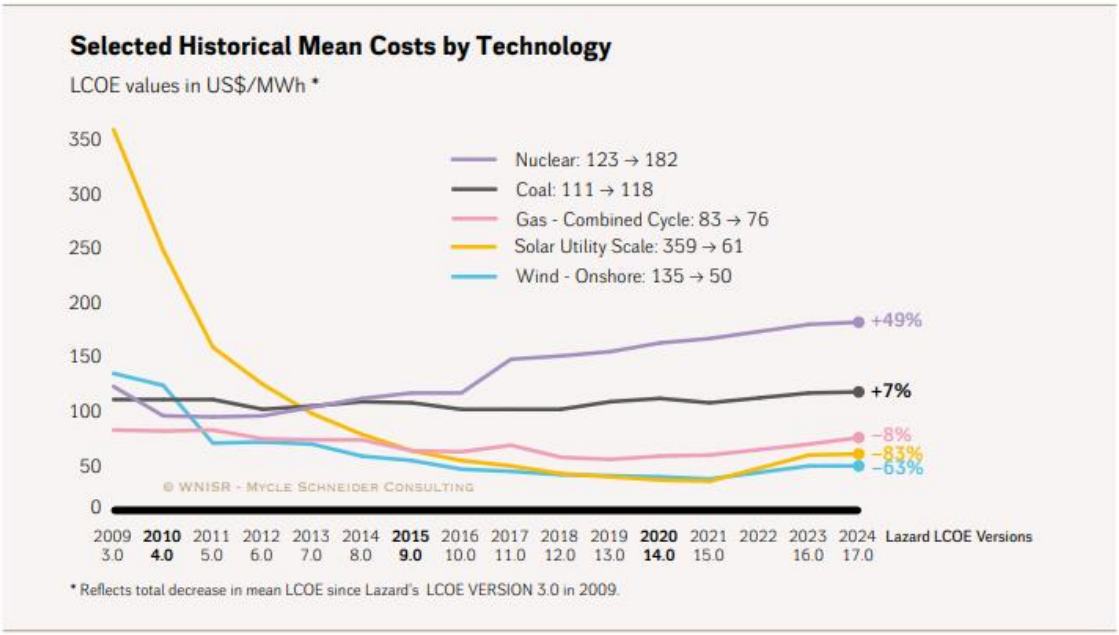
Figure 56 · Global Investment Decisions in Renewables and Nuclear Power, 2004–2023



Sources: BNEF, 2023 and 2024 and WNISR Original Research, 2024[769]

An important aspect lies in the cost development. Lazard, a renowned agency that analyses and advises investors, calculates the costs per MWh each year and determines that solar power has become 83% cheaper compared to 2009, wind on land 63% cheaper and nuclear energy has become 49% more expensive. Investors simply do not like higher costs. The graph shows that due to higher costs and inflation, solar and wind have also increased in price in recent years.

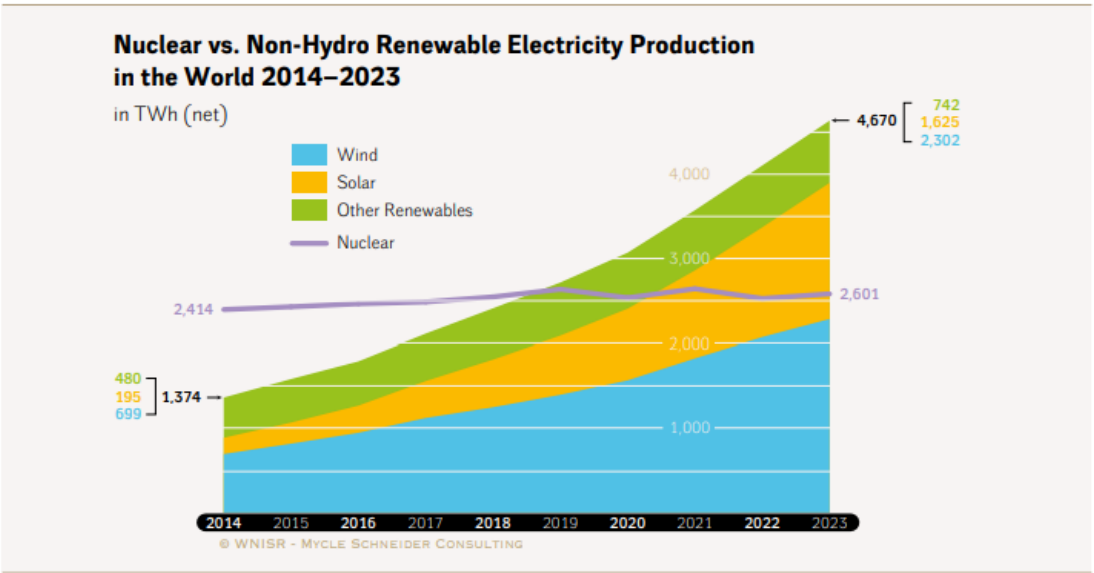
Figure 58 · The Declining Costs of Renewables vs. Traditional Power Sources



Source: Lazard Estimates, 2024

The result of all these investments is that the production of sustainable energy is growing strongly worldwide and nuclear energy is stagnating.

Figure 61 · Nuclear vs. Non-Hydro Renewable Electricity Production in the World

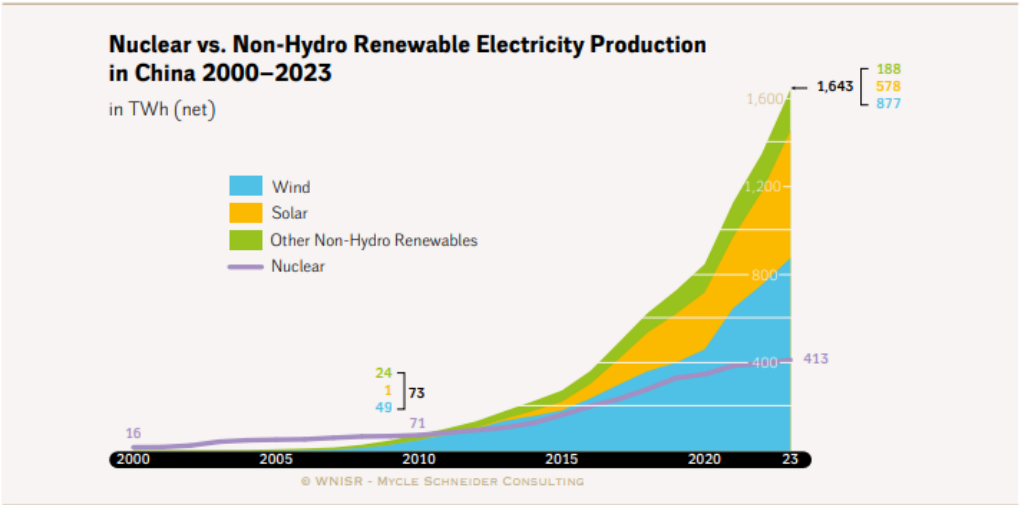


Sources: Energy Institute, 2024

China

There is still a major misconception about China. The image that persists is that nuclear power plants in China are being connected to the grid on a regular basis. But what is happening there is that the share of renewable energy is increasing dramatically.

Figure 63 · Nuclear vs. Non-Hydro Renewables in China, 2000–2023



Source: Energy Institute, 2024

Nuclear power generation is increasing steadily, but the growth of solar and wind is particularly spectacular.

Small Modular Reactors

While a number of countries see SMRs as the future of nuclear power, experience so far suggests otherwise. The few existing cost estimates all show that SMRs will be more expensive per unit of installed capacity than large reactors.

In the WNISR report, the authors quote a top executive from the American NuScale, a major player in the SMR market.

“During a conference call announcing the termination of the UAMPS project in November 2023, NuScale’s Chief Executive Officer explained the decision by saying: “Once you’re on a dead horse, you

dismount quickly. That's where we are here." The metaphor of dismounting from a dead horse might be a fit for other efforts to promote SMRs."

Conclusion

The report shows that the nuclear renaissance is not happening: the big change is in the increase of solar & wind, while the share of nuclear energy is actually decreasing.

Source: https://www.worldnuclearreport.org/

Germany's search for final nuclear waste repository could drag on into 2070s – report

Sören Amelang, Clean Energy Wire (Germany)

Germany's ongoing hunt for a final repository for highly radioactive nuclear waste could last until the 2070s, a report has warned. However, the country's environment ministry said the findings were outdated and that the search may be completed earlier. The report by the Institute for Applied Ecology (Öko-Institut), which was commissioned by the country's Federal Office for the Safety of Nuclear Waste Management (BASE), said a decision on a location can be expected in 2074 at the earliest under ideal conditions, reports Zeit Online. This would be more than 40 years later than the original 2031 target, which the government already gave up almost two years ago. The environment ministry said the report did not take into consideration significant progress in efforts to shorten the search, for example by saving time on long exploration periods.

The ministry declared in November 2022 that the search won't be completed in 2031, following a paper by the Federal Company for Radioactive Waste Disposal (BGE) that estimated the search could take until 2046 or, in another scenario, until 2068. The next step will be for the BGE to propose shortlisted siting regions at the end of 2027, the ministry said. "This is the right time to discuss and regulate further acceleration in a transparent manner. A great deal of time can be saved, particularly in the surface and underground exploration," it added. But Journalist Bernward Janzing wrote in a commentary it was questionable how much the "scientifically well designed" process can be accelerated without compromising high safety standards.

Germany completed its nuclear phase-out last year and will now have to store 1,900 large containers, or around 28,100 cubic metres (m3), of high-level radioactive waste by 2080 (Figure 1), when all its nuclear power stations and many research facilities will have been finally decommissioned and the fuel elements treated at other facilities. Highly radioactive, heat-generating waste accounts for only five percent of Germany's radioactive refuse, but is responsible for 99 percent of the radiation. It is currently held at temporary storage facilities near decommissioned nuclear power stations and in central interim repositories. Construction of a repository following a location decision is scheduled to take about 20 years, according to current plans. The process of transporting and storing thousands of casks in the final repository will then take decades more. Experts from a parliamentary storage commission said that loading and sealing the repository could be expected to last "well into the next century".

Sören Amelang
Clean Energy Wire (Germany)
This article was first published on
https://www.cleanenergywire.org/news/germanys-search-final-nuclear-waste-repository-could-drag-2070s-report

UK to invest £196m into creating Europe's first ever advanced nuclear fuel facility

Jan van Evert, reporter Nuclear Monitor

The United Kingdom is to invest £196 million to build a uranium enrichment plant in Capenhurst, Cheshire in the North West of England. The facility will be built by Urenco (which is part-owned by the U.K. government) which will co-fund the facility. The new plant will produce high assay low-enriched uranium or HALEU (enriched to greater than 5 and less than 20 weight-percent U-235) at the rate of 10 tons per year by 2031 for export or use domestically. The funding is part of a £300 million ($380 million) programme announced in January. The plan is still in place after the Labour party was voted to power on July 4. The government said it would ensure other countries are not reliant on Russia for this advanced nuclear fuel, a market which it currently dominates. Britain will be the first European nation outside Russia to produce HALEU. Officials said the fuel was needed to power new advanced modular reactors which they say will be key to meeting ambitions to quadruple the UK's nuclear capacity by 2050. HALEU is a controversial nuclear fuel: it can be used to make nuclear weapons.

NUCLEAR NEWS

World Nuclear Power Status

Number of Reactors
(as of September 2024)

Compared to the last edition of the Nuclear Monitor (918); one reactor has changed from long term outage status to operational status.

Dirty Secrets of Nuclear Power in an Era of Climate Change

by Doug Brugge and Aron Datesman

This open access book provides a review of the limitations and drawbacks to nuclear power, and conveys why nuclear power is a less than desirable option in terms of addressing climate change.
https://link.springer.com/book/10.1007/978-3-031-59595-0