RADIANT
ENERGY GROUP

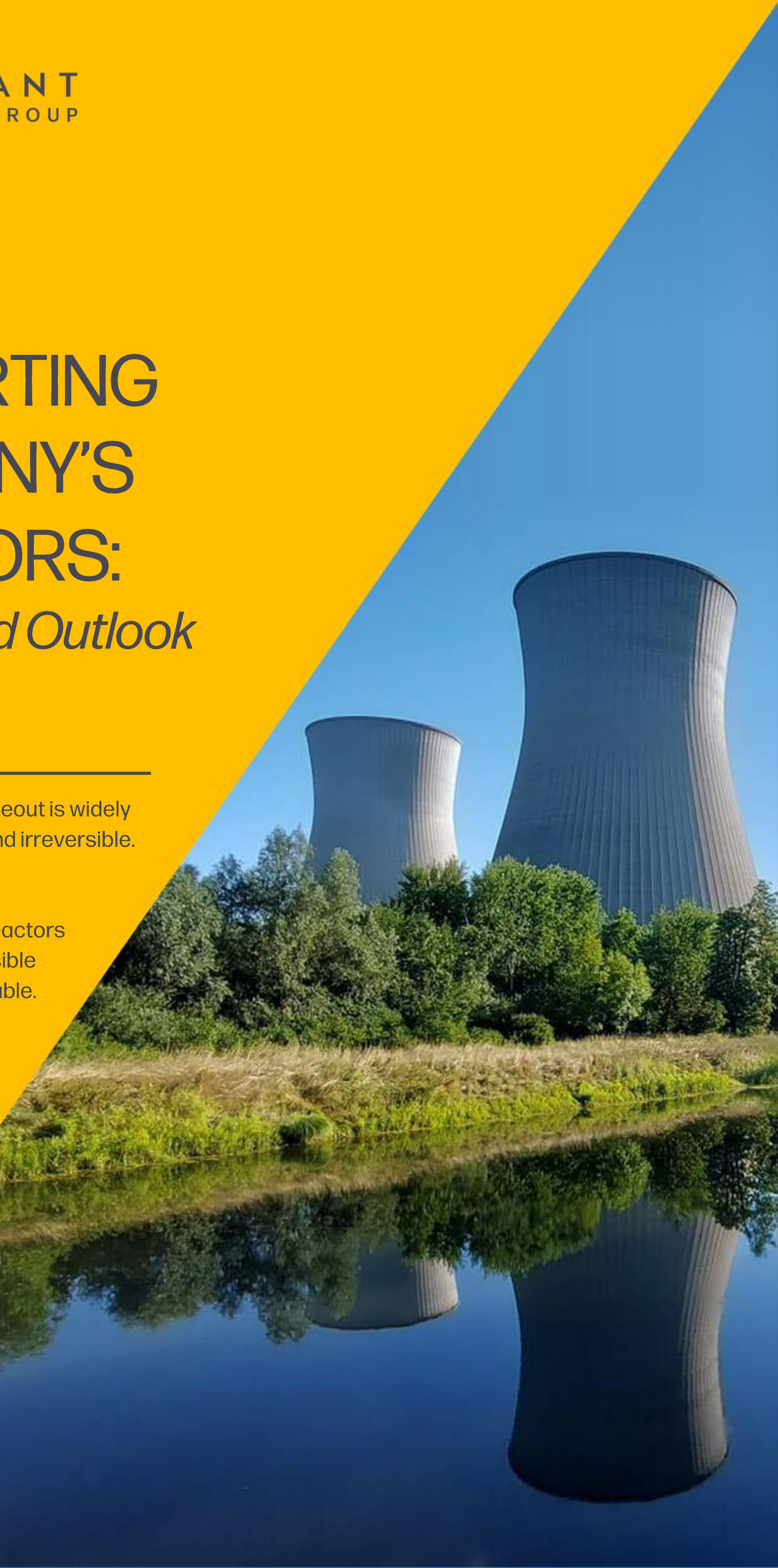
RESTARTING GERMANY'S REACTORS:
Viability and Outlook

June 2026

Germany's nuclear phaseout is widely characterized as final and irreversible. This is not the case.

Restarting Germany's reactors remains technically feasible and economically favorable.

No significant technical barriers prevent Germany's nuclear restart. Rather, it is a question of political will.



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Foreword

I first saw the construction site of the Philippsburg nuclear power plant on the Rhine back in 1972 as an engineering student. Right then and there, I knew I wanted to help develop this emerging energy source. Over the following decades, working as an engineer and manager, I had the honor to participate in the construction and operation of nuclear power plants across Germany. International colleagues consistently praised our plants for their design, reliability, and operating efficiency. Consequently, the nuclear phaseout completed in 2023 for political and ideological reasons resulted in the decommissioning of power plants that ranked among the world's best even by today's standards.

The recurring crises since 2022 regarding energy security and costs have made one thing obvious: we are missing nuclear power as a reliable, economical, and CO_2-free pillar of our energy supply. This led to discussions about keeping Germany's nuclear plants running, but the ruling government at the time ultimately rejected the idea. Despite this, the public debate about using nuclear power in Germany continues. This conversation is largely driven by other countries extending the lifespans of their existing plants and reactivating decommissioned ones, alongside numerous projects developing new Generation III+ and IV Small Modular Reactors (SMRs).

When looking at the prospect of returning to nuclear energy, it is worth remembering how we started. When Germany first embraced nuclear power in 1955 and built its plants throughout the 1970s and 1980s, we began from scratch without operating personnel, established sites, or operational experience. In contrast, a return to nuclear power today could build on a substantial legacy. Since German companies are still involved in decommissioning work and international exports, a vital core of skilled professionals and a functioning nuclear engineering industry remain intact.

Germany would benefit greatly from seizing this opportunity to rebuild its domestic nuclear power sector. By forcing the nuclear phaseout, the government did more than just end the use of nuclear energy. It also eliminated a source of CO_2-free baseload power generation that has no real alternative in the foreseeable future.

-- Ulrich Gräber, engineer, former Board Member of EnBW Kraftwerke, former CEO of Areva Germany, and author of the Spiegel bestseller "Kniefall vor der Unvernunft"

Executive Summary

Germany's nuclear phaseout, completed in April 2023 with the shutdown of the country's last three reactors, is widely characterized as final and irreversible. It is not. Germany's shuttered nuclear fleet remains physically recoverable, the technical precedents for restart are extensive and well-documented, and the economic case for reactivating these assets is strong. While the window of opportunity is gradually narrowing, it has not yet closed.

Reversing the nuclear phaseout and restarting German reactors depends solely on political will. The two most urgent measures include an immediate moratorium on the dismantling of reactors and an amendment to the Atomic Energy Act to allow nuclear power plants to be operated again.

Restarting Germany's shuttered reactors is technically feasible. Germany's reactors were designed to be durable, easily-accessible for maintenance, and accommodating of large component replacement. Thus, every major component of German reactors undergoing decommissioning can be repaired, overhauled, or replaced. No major technical barriers prevent these reactors from being restarted.

Restarting German reactors is the fastest and cheapest way to get reliable electricity added to the grid. The easiest group of reactors to restart could produce electricity at an average of €37 per megawatt-hour before the end of 2031. The most difficult restarts could produce electricity at roughly €58 per megawatt-hour by the mid-2030s. This is well below current market prices, which are climbing amid the conflict with Iran.

The majority of Germans support the continued use of nuclear energy in Germany.

Radiant Energy Group's latest polling, conducted in late 2025, found that 61% of the German public backs keeping nuclear in the country's energy mix – nearly three times the 22% who support a full phaseout and ban.

Restarting Germany's nuclear plants would provide benefits beyond electricity production. Returning German reactors to service would reduce emissions in Germany and neighboring countries. High-paying jobs would be preserved and created in the host communities, and reconstruction would open new opportunities for skilled tradespeople. Combined with the firm capacity the projects would bring back online, this revitalization of the industrial workforce could strengthen Germany's industrial base and slow the exodus of energy-intensive manufacturing.

Introduction

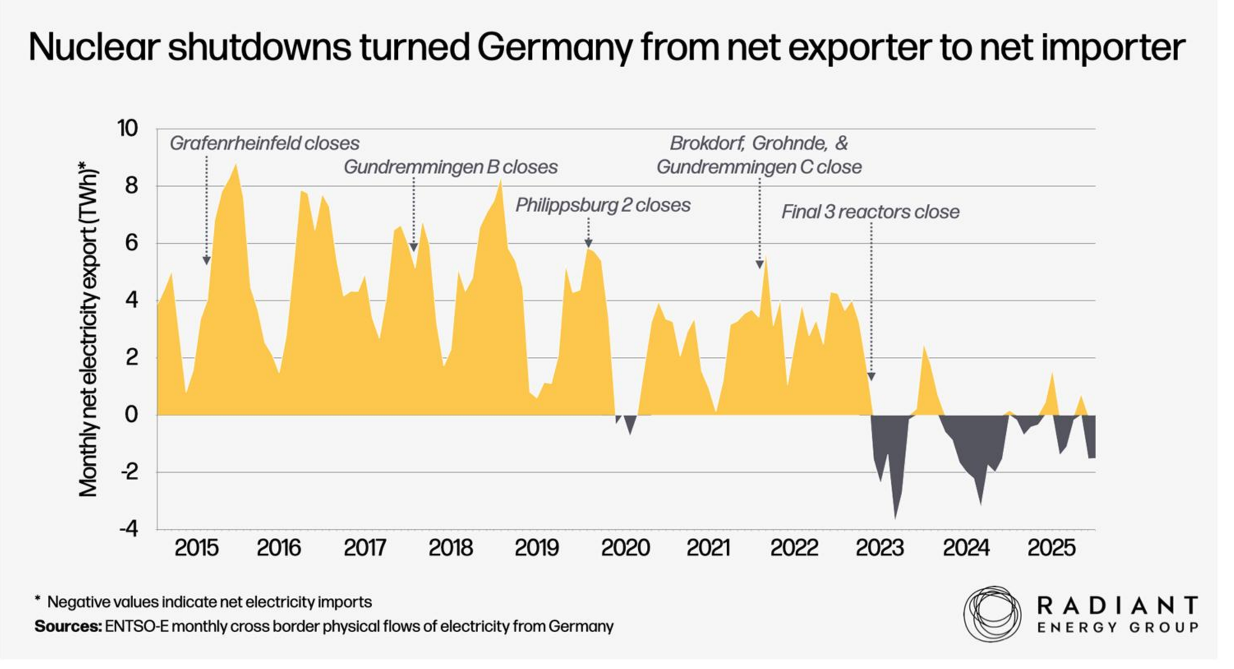
Germany's nuclear phaseout was intended to eliminate perceived nuclear risk and establish a new energy system of renewables firmed by imported gas under the Energiewende, a policy its proponents claimed would sustain industrial competitiveness and a high standard of living. Instead, the Atomausstieg led to enduring economic strain and energy insecurity. Germany now faces structurally elevated electricity prices and reduced supply reliability.

The policy choice is stark: remain on a path where wholesale prices continue to push energy-intensive industries to scale back or relocate, Germany quietly fails to meet coal phaseout targets, and households absorb ever-higher prices; or bring back firm, affordable and clean power that will restore Germany's industrial and economic competitiveness. The difference between these outcomes is whether Germany elects to restart its existing nuclear plants, which remain capable of generating reliable output far more quickly and cheaply than any comparable newbuild alternative.

Consequences of the Atomausstieg

The consequences of the Atomausstieg for Germany's electricity supply have been immediate and measurable.

- Germany has shifted from a net electricity exporter to a net importer: where it exported around 50 terawatt-hours per year in the mid-2010s, it had net imports of around 9 terawatt-hours in 2023, the year of the final nuclear closures, rising to 18–26 terawatt-hours annually in the following years.[1]
- Today, wholesale electricity prices, while retreating from the extreme highs of 2022, have ranged between €80 and €100 per megawatt-hour, close to twice the inflation-adjusted 2010s average.[2] These elevated prices have persisted for five consecutive years without meaningful relief.
- Following the loss of Russian pipeline gas, the country now depends heavily on liquefied natural gas delivered by ship, a supply route that is more expensive, more volatile, and no less exposed to geopolitical disruption.
- Despite Germany's expenditure on the order of €600 billion on the Energiewende through the early 2020s, and the continued annual renewable energy subsidy expenditure of around €20 billion, wholesale prices remain at roughly twice the 2010s level.[3,4] The Federal Audit Office (Bundesrechnungshof) projects more than €460 billion in additional grid-expansion costs alone by 2045 to continue to support the transition.[5]
- Since February 2022, output in energy-intensive industries has fallen 15.2%, costing 53,300 jobs.[6] A 2025 survey of nearly 3,600 companies found that 59% of large industrial firms are considering cutting production or relocating abroad, up from 37% in 2022.[7]



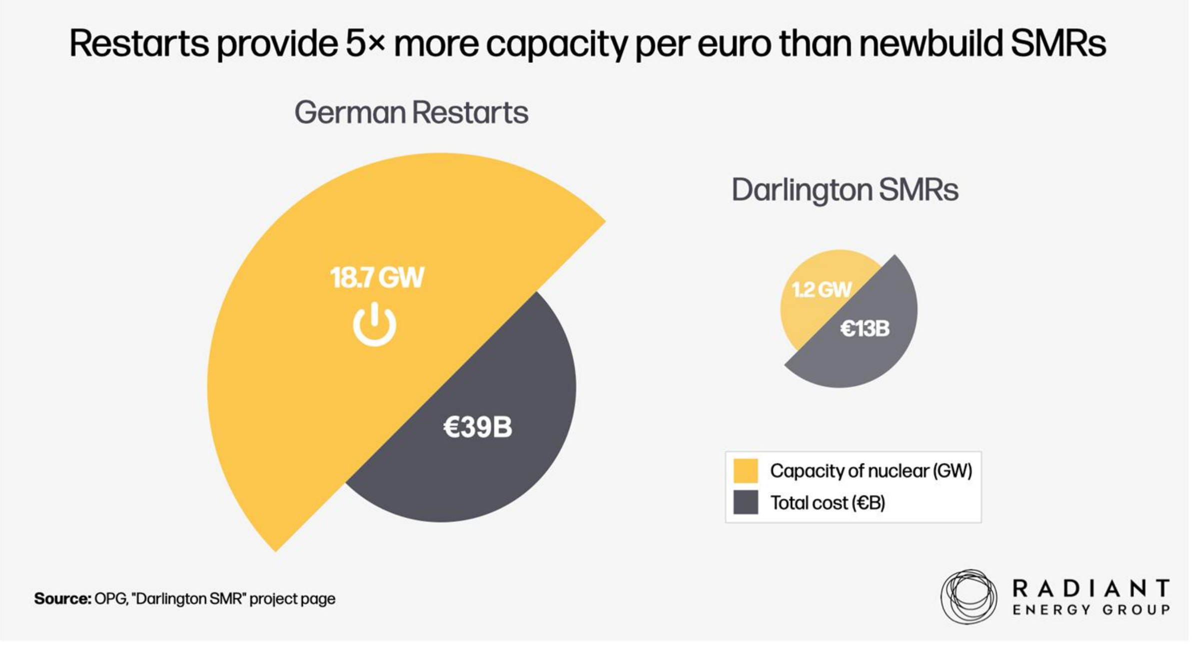
Consideration of a restart

The most obvious case for a restart is economic. Even the German reactors requiring the most extensive repairs could operate at an average of €58 per megawatt-hour by the mid-2030s, and the easiest-to-restart units could operate at as little as €31 per megawatt-hour as early as 2031. Compared with Western nuclear newbuild projects, restarts are dramatically cheaper on a cost-per-installed-megawatt basis, reflecting the value of existing infrastructure and prior capital investment. Even smaller economies are accepting far higher per-unit costs to build new nuclear capacity because they value its long-term role; Germany can obtain the same strategic benefit far more cheaply by restoring its existing fleet.

There is a clear political mandate to recommission these plants: 61% of Germans support continuing nuclear operation, nearly three times as many as oppose it. Since the 2022 energy crisis, political, scientific, and business voices have called with growing intensity for a reversal or reconsideration of the Atomausstieg, as other European countries have moved decisively to extend reactor lifetimes, reverse their own phaseout policies, and commission new nuclear power plants. Just in April 2026, the Belgian government announced formal talks with Engie, the current owner of the country's nuclear plants, to take over the fleet and pursue the option of restarting the reactors.[8]

Friedrich Merz called for a restart of German nuclear power plants before the 2025 federal election. Several prominent German figures have backed novel reactor technologies and small modular reactors (SMRs), while the SMR concepts closest to commercial deployment use the same proven light-water reactor technology as Germany's shuttered fleet. The same underlying political consensus is visible in Germany's interest in fusion, which reflects the need for firm, low-carbon baseload power.

Fusion technology, however, remains experimental, with no clear path to system-level deployment. No fusion device has ever generated electricity, in contrast to the seven decades over which fission has demonstrated reliable, cost-effective power generation delivered to the grid. The political appetite for fusion and small or alternative reactors acknowledges the need for nuclear energy, while avoiding the technology that can deliver it today.



For German industry, a restart program addresses the structural cause of an accelerating deindustrialization that no subsidy program can resolve. It restores affordable, firm, and crisis-resilient electricity supply with a largely domestic supply chain, years of on-site fuel storage, and a resilience against international disruption unmatched by any alternative. It makes the coal phaseout achievable by the mid-2030s on a foundation of firm low-carbon generation. And it positions Germany to participate in the largest nuclear investment cycle the Western world has seen in decades, rebuilding engineering and construction competencies with direct export value in a global market where 38 countries representing 70% of the world economy have committed to tripling nuclear capacity by 2050.

Background

Germany was once home to one of the world's largest nuclear fleets and stood among the leading suppliers of nuclear technology worldwide. Nuclear energy first came to Germany with the startup of its first research reactor near Munich in 1957. Construction of Germany's first nuclear power plant started a year later, and from the 1960s until the shutdown of its last three nuclear power plants in April 2023, nuclear was a significant source of Germany's energy supply. Reaching up to 30% grid penetration, nuclear energy was the second largest source of electricity in Germany for decades, and the largest in West Germany before reunification.[9]

Before the phaseout, Germany's nuclear industry had earned a reputation for rigorous engineering and strong operational performance, building and exporting its own reactor designs while developing capabilities across the fuel cycle. Much of this expertise endures: German firms continue to provide enrichment, fuel manufacturing, waste handling, component production, and plant maintenance services on the international market.

However, longstanding concerns around safety, waste, and environmental risk drove support for a nuclear phaseout policy, enacted in 2002 under Chancellor Gerhard Schröder's Social Democrat-Green coalition. A 2010 operational extension under Chancellor Angela Merkel was reversed after the Fukushima Daiichi nuclear disaster, prompting eight immediate shutdowns and a phased closure of the remaining reactors by 2022. While the final closures were delayed by several months due to Russia's invasion of Ukraine, the remaining reactors were shut down in April 2023.

Feasibility

The prospect of restarting Germany's nuclear fleet has frequently been dismissed as technically or economically infeasible. Radiant Energy Group's 2024 feasibility report drew on detailed assessments from industry insiders, current electricity prices, and comparable restart projects to evaluate restart potential reactor-by-reactor, establishing that restart is not only possible but well within reach.[10]

This report builds on that foundation. It provides a detailed analysis of the cost and timeline associated with restarting Germany's existing reactors, and assesses whether doing so remains economically viable under realistic financing and market conditions. The case for restart, however, extends beyond construction costs and projected power prices. The report therefore also examines the wider stakes: the preservation of industrial capacity and skilled employment, reduced exposure to volatile international gas markets, and the broader implications for Germany's industrial base and energy sovereignty.

Nuclear Restart and Rebuild: Precedents and Rationale

Nuclear power plants as long-lived infrastructure

Nuclear power plants differ fundamentally from combustion-based power plants in their economic character, and are better understood by analogy to hydroelectric plants than to gas or coal generators. In a fossil fuel plant, the dominant cost over the operational lifetime is fuel; the physical plant itself is relatively inexpensive to build. In a nuclear power plant, as in a hydroelectric dam, the relationship is inverted: the overwhelming share of lifetime cost lies in the initial capital investment, while operating costs remain low and stable. This distinction has profound implications for how existing nuclear assets should be valued.

The physical structures of nuclear power plants are exceptionally durable, constructed from heavily reinforced concrete with wall thicknesses measured in meters. The mechanical and electrical components within them, while subject to wear, are conservatively engineered for long service lives and can all be replaced. Steam generators, pressurizers, pumps, valves, instrumentation and control systems, and turbine equipment have all been routinely replaced at operating plants worldwide. The reactor pressure vessel is the one major component that has not yet been replaced in commercial practice, largely because the need has not yet arisen, a reflection of how durably these vessels were designed rather than of any inherent limit.

This replaceability, combined with the durability of the civil structures, means that nuclear power plants are candidates for successive lifetime extensions. Plants have already received licenses covering 80 years of total operation in the US, and 100-year licensing is currently under regulatory consideration.[11] Other countries, including the Czech Republic, France, Canada and the UK, are likewise extending reactor operation well beyond original design lifetimes under their own regulatory systems. Like a hydroelectric dam, a nuclear power plant is therefore best understood not as industrial equipment with a fixed service life, but as a capital investment capable of generating value across multiple generations if properly maintained.

It is precisely this infrastructure-like nature that has led investors and policymakers to reconsider shuttered plants rather than abandon them. Nuclear power plants closed due to political pressure or poor economic conditions have been and continue to be restarted, or substantially rebuilt and returned to service.

Restart of Canadian and American reactors in the past

Nuclear restarts are not theoretical; shut-down plants have already been returned to service. The Tennessee Valley Authority's Browns Ferry units, idled in the 1980s, were refurbished and brought back online through the 1990s and 2000s. Ontario restarted multiple reactors at Pickering and Bruce. Ontario's 2014 coal phaseout was made possible largely by the restored nuclear capacity, with Toronto's chronic smog days disappearing as a direct consequence. Ontario in particular offers a direct parallel for Germany: a large industrial economy that eliminated a carbon-intensive generation source by returning idled nuclear capacity to service rather than replacing it.

Current ongoing restart efforts

Today, restarts are occurring across multiple countries and for a variety of reasons. Japan, which suspended the operation of its entire nuclear fleet following the Fukushima Daiichi accident in 2011, has been methodically returning reactors to service. Fifteen reactors have been restarted to date, with a further ten currently progressing through the regulatory approval process.[12]

In the United States, the Palisades nuclear power plant in Michigan presents a particularly striking case. Its new owner originally acquired the plant with the intention of completing its decommissioning, only to reverse course and pursue a full restart instead. Palisades has since been relicensed, is in the process of loading fuel, and is working toward a return to commercial operation in 2026.[13] Two further restarts are underway at Duane Arnold in Iowa and at Three Mile Island Unit 1 in Pennsylvania.[14,15]

Taiwan offers perhaps the most geopolitically pointed example. Having only recently shut down several of its reactors, Taiwan is now reversing that decision in order to fortify its electricity supply in an increasingly precarious strategic environment.[16] Across all of these cases, a consistent pattern emerges: plants that were shut down for reasons ranging from economics to politics to public anxiety have proven worth restarting once the underlying conditions changed. Germany's situation fits squarely within this pattern.

Just weeks after Radiant Energy Group published its report evaluating the potential for Belgian reactor restarts, the Belgian government announced formal talks with the plants' current owner Engie about a possible state acquisition of the fleet.[17] This is a first step toward the government's broader goal of extending the operation of Belgium's existing reactors and developing new nuclear capacity. All decommissioning was halted immediately while negotiations proceed this year.

Rebuilding efforts

Nuclear power plants are strong candidates for rebuilding precisely because their value is concentrated in what is hardest to replicate: the licensed site, the civil structures, the grid connection, and the established regulatory relationship. In a rebuilding effort, the building and site infrastructure are retained while a new nuclear steam supply system (NSSS, the reactor and associated primary circuit components) is installed, reusing little or none of the original mechanical equipment. Because the most capital-intensive elements are already in place, rebuilding is substantially cheaper and faster than constructing a new plant on a greenfield site.

Among Germany's restartable reactors, the majority are candidates for restart through targeted overhaul and repair. A smaller number, however, are in a condition where a full rebuilding program is required. Even in those cases, the cost and timeline remain significantly more favorable than new construction.

Technical basis for restart and rebuild

The physical work required to return a shut-down, partially decommissioned nuclear plant to service, whether in the precedents described above or in a German restart and rebuilding effort, consists largely of familiar nuclear repair, replacement, and modernization work.

German nuclear power plants are particularly good candidates for such work because of their generous sizing, ergonomic and maintenance-friendly design, and conservative engineering. This especially applies to the pressurized-water reactor fleet that accounts for 11 of the 14 reactors assessed in this report. The containment structures were designed from the outset with large-component handling in mind. Reactor buildings with removable equipment airlocks provide the opening and working space needed for major components to be removed and reinstalled without breaching the containment structure. This capability has been demonstrated in practice both in Germany and at German-designed plants abroad, including through steam-generator replacement at Obrigheim and whole-component steam-generator removals at Unterweser and Grafenrheinfeld.[18]

Even the reactor pressure vessel is not the permanently fixed, irreplaceable component it is sometimes assumed to be. In German pressurized-water reactors, the vessel was introduced into the containment building during original construction through the opening later occupied by the equipment airlock. The same basic route remains available for removal and installation if replacement is required. If the vessel itself is damaged rather than destroyed, repair by welding is a proven option. Full reactor pressure vessel replacement has not yet been carried out in commercial practice, but this reflects a lack of need rather than technical impossibility.

Restarting and rebuilding Germany's nuclear power plants would also create an opportunity to modernize these assets. Some upgrades follow naturally from the work already required to restart. Full digital instrumentation and control systems are the clearest example. Because I&C systems will largely have to be rebuilt regardless, installing modern digital systems is the natural choice. Similarly, since steam generators and turbine-island equipment will in many cases require replacement anyway, it is a logical step to add thermal efficiency improvements at the same time.

Further improvements, thermal power uprates, enhanced fuel-cycle flexibility, improved load-following, district heating, process heat, or advanced core retrofits, remain optional rather than prerequisites for restart. These measures could position restarted reactors as broadly comparable to several of the newer designs currently under construction worldwide.

Photo credit: Noah Rettberg

Current State and Restart Cost of the German Nuclear Fleet

Reactor restart assessment

Each plant's systems and equipment have been organized into defined component groups and assigned one of three condition categories based on accumulated evidence from industry experts. Intact groups require only routine maintenance and minor repairs; repairable groups have sustained damage requiring extensive overhaul or replacement of individual elements; and groups requiring complete replacement have been rendered non-functional through advanced decommissioning, physical damage, or deterioration beyond repair. The overview below uses icons to present a simplified set of component groups, abstracted from those used in the assessment. Fully rendered icons indicate intact equipment groups, half-rendered icons indicate repairable groups, and fully faded icons indicate groups requiring complete replacement.

Engineering overview of Germany's nuclear restart fleet

Reactor	Heavy Transport Connection	Grid Transmission	Tower/River Cooling	Turbine & Generator	Main Coolant System	Reactor Systems	Emergency Power	Auxiliary Systems	Containment Building
GROUP A – BEFORE 2032									
Brokdorf 1,410 MW	PORT – Intact	Intact	River – Intact	Intact	Intact	Intact	Intact	Intact	Intact
Emsland 1,335 MW	RAIL – Intact	Intact	Tower – Intact	Repairable	Repairable	Repairable	Intact	Repairable	Intact
Grohnde 1,360 MW	RAIL – Intact	Intact	Tower – Intact	Repairable	Repairable	Repairable	Intact	Repairable	Intact
Neckarwestheim 2 1,310 MW	PORT – Intact	Intact	Tower – Intact	Repairable	Repairable	Repairable	Intact	Repairable	Intact
Isar 2 1,410 MW	RAIL – Intact	Intact	Tower – Intact	Repairable	Repairable	Repairable	Intact	Repairable	Intact
GROUP B – BEFORE 2033									
Krümmel 1,346 MW	RAIL – Intact	Intact	River – Intact	Repairable	Repairable	Repairable	Requires replacement	Repairable	Intact
Gundremmingen C 1,288 MW	RAIL – Intact	Intact	Tower – Requires replacement	Repairable	Repairable	Repairable	Intact	Repairable	Intact
Gundremmingen B 1,284 MW	RAIL – Intact	Intact	Tower – Requires replacement	Repairable	Repairable	Repairable	Intact	Repairable	Intact
GROUP C – 2033–2034 *									
Biblis A * 1,310 MW	RAIL – Intact	Intact	Tower – Requires replacement	Requires replacement	Repairable	Repairable	Requires replacement	Requires replacement	Intact
Biblis B * 1,380 MW	RAIL – Intact	Intact	Tower – Requires replacement	Requires replacement	Repairable	Requires replacement	Requires replacement	Requires replacement	Intact
Philippsburg 2 * 1,461 MW	RAIL – Intact	Intact	Tower – Requires replacement	Requires replacement	Repairable	Repairable	Requires replacement	Repairable	Intact
Unterweser * 1,482 MW	RAIL – Intact	Intact	River – Intact	Requires replacement	Requires replacement	Requires replacement	Requires replacement	Requires replacement	Repairable
Grafenrheinfeld * 1,430 MW	PORT – Intact	Intact	Tower – Requires replacement	Requires replacement	Requires replacement	Requires replacement	Requires replacement	Requires replacement	Repairable
Neckarwestheim 1 * 900 MW	PORT – Intact	Intact	Tower – Requires replacement	Requires replacement	Requires replacement	Requires replacement	Requires replacement	Requires replacement	Repairable

The status shown reflects conservatively anticipated plant condition as of 1/1/2027. Icons represent a simplified, consolidated selection of analyzed component groups. Heavy-transport mode shown per reactor (RAIL or PORT). PORT denotes a plant-owned barge/ship landing.

* – Group C capacities reflect power uprates due to baseline modernization included in the rebuild scope.

Intact | Repairable | Requires replacement

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Restart priority

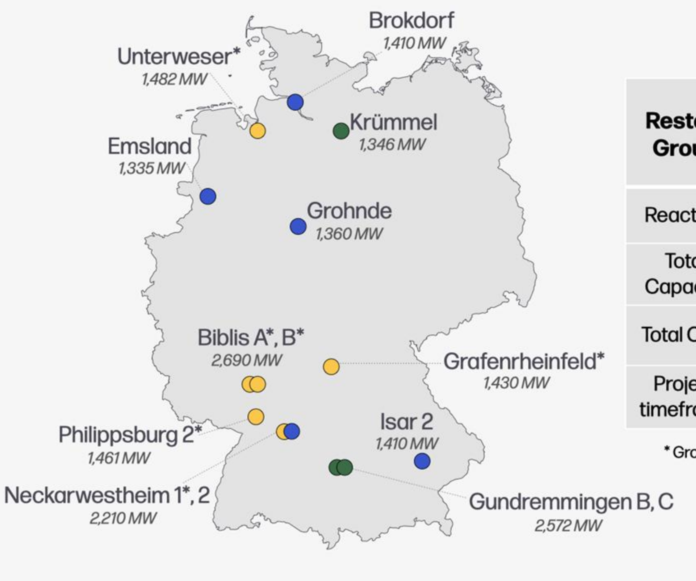
Germany's fourteen restartable nuclear reactors fall into three priority groupings based on technical condition, decommissioning progress, restart complexity, and operational risk.

Priority Group A comprises the five most recently shuttered reactors, all pressurized water reactors whose shared lineage enables a fleet-built restart approach with significant economies of scale. In combination with limited decommissioning progress, they are the most viable and least risky candidates, forming the natural first phase of any restart program.

Priority Group B consists of boiling water reactors (BWRs) with restart costs broadly comparable to Group A. However, the smaller BWR workforce and the absence of a shared design across a larger group preclude fleet-built efficiencies, making these reactors somewhat more challenging despite the similar cost profile. This positions them as the second phase of the program.

Priority Group C reactors require extensive rebuilding rather than straightforward restart, including a new nuclear steam supply system and, in four of six cases, a new reactor pressure vessel. Despite public doubts about their viability, the cost and time of building alternative replacement capacity make them strong rebuilding candidates, concluding the restart program as the third and final phase.

Germany's restartable nuclear fleet



Restart Group	Priority Group A (By 2032)	Priority Group B (By 2033)	Priority Group C* (2033-2034)
Reactors	5 reactors	3 reactors	6 reactors
Total Capacity	6.83 GW	3.92 GW	7.96 GW
Total Cost	€8.5 B	€5.0 B	€25.8 B
Project timeframe	41 - 50 months	49 - 55 months	52 - 63 months

* Group C capacities reflect the uprated plant post-rebuild

Reactor restart cost and timeline

Reactor (net capacity, annual generation)	Federal State	Project cost (M€)	Restart timeframe (months)*
Priority A – 53.7 terawatt-hours (TWh)			
Brokdorf – 1.410 GW (11.1 TWh)	Schleswig-Holstein	1,000	41*
Emsland – 1.335 GW (10.5 TWh)	Niedersachsen	1,700	44*
Grohnde – 1.360 GW (10.7 TWh)	Niedersachsen	2,200	50
Neckarwestheim 2 – 1.310 GW (10.3 TWh)	Baden-Württemberg	1,700	47*
Isar 2 – 1.410 GW (11.1 TWh)	Bayern	1,900	50
Priority B – 30.9 terawatt-hours (TWh)			
Krümmel – 1.346 GW (10.6 TWh)	Schleswig-Holstein	1,600	55
Gundremmingen C – 1.288 GW (10.2 TWh)	Bayern	1,700	49
Gundremmingen B – 1.284 GW (10.1 TWh)	Bayern	1,700	49
Priority C** – 62.7 terawatt-hours (TWh)			
Biblis A – 1.310 GW (10.3 TWh)**	Hessen	4,100	63
Biblis B – 1.380 GW (10.9 TWh)**	Hessen	4,400	54
Philippsburg 2 – 1.461 GW (11.5 TWh)**	Baden-Württemberg	4,400	63
Unterweser – 1.482 GW (11.6 TWh)**	Niedersachsen	4,800	55
Grafenrheinfeld – 1.430 GW (11.3 TWh)**	Bayern	4,800	55
Neckarwestheim 1 – 0.900 GW (7.1 TWh)**	Baden-Württemberg	3,300	52

** Figures represent the duration of the repair, modernization, and refurbishment work. A restart in under four years (48 months) is not expected at any plant, due to the necessity of recruiting, training, and certifying plant personnel as well as establishing the infrastructure (including full-scope simulators) required for this purpose.*

*** Values for annual generation and net capacity in priority group C account for power uprates due to baseline modernization included in the rebuild scope.*

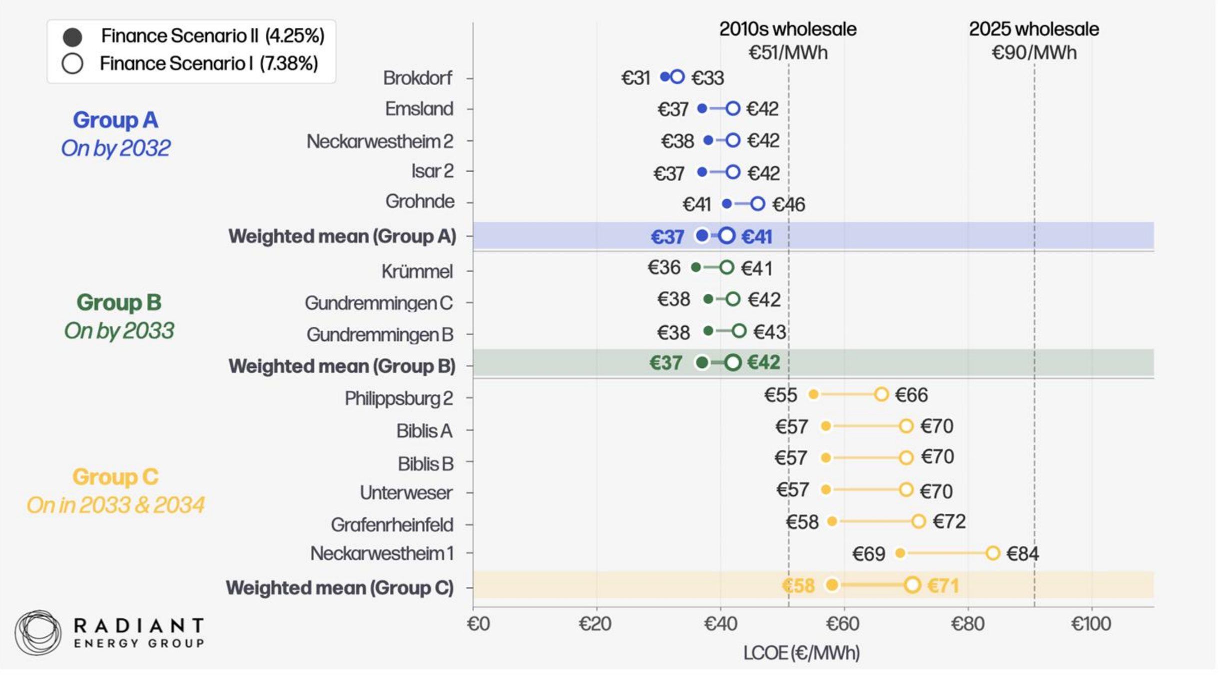
Electricity Costs of Restarted German Reactors

The levelized costs of electricity calculated below reflect two financing scenarios. The first assumes private market conditions, with a weighted average cost of capital (WACC) of 7.38%. The second reflects long-term, state-backed financing at a WACC of 4.25%. In both cases a 20-year debt repayment period is assumed, standard for energy infrastructure. Reactors are ordered by restart priority, and the mean electricity cost for each priority group is weighted by each plant's respective output.

Reactor (installed net capacity, GW)	LCOE @ 7.38% WACC (€/MWh) – Scenario I	LCOE @ 4.25% WACC (€/MWh) – Scenario II
Priority A		
Brokdorf (1.410)	33	31
Emsland (1.335)	42	37
Isar 2 (1.410)	42	37
Neckarwestheim 2 (1.310)	42	38
Grohnde (1.360)	46	41
Priority A – weighted mean	41	37
Priority B		
Krümmel (1.346)	41	36
Gundremmingen C (1.288)	42	38
Gundremmingen B (1.284)	43	38
Priority B – weighted mean	42	37
Priority C*		
Biblis A (1.310)*	70	57
Biblis B (1.380)*	70	57
Philippsburg 2 (1.461)*	66	55
Unterweser (1.482)*	70	57
Grafenrheinfeld (1.430)*	72	58
Neckarwestheim 1 (0.900)*	84	69
Priority C – weighted mean	71	58

** Values for net capacity in priority group C account for power uprates due to baseline modernization included in the rebuild scope.*

LCOE of German Nuclear Restarts

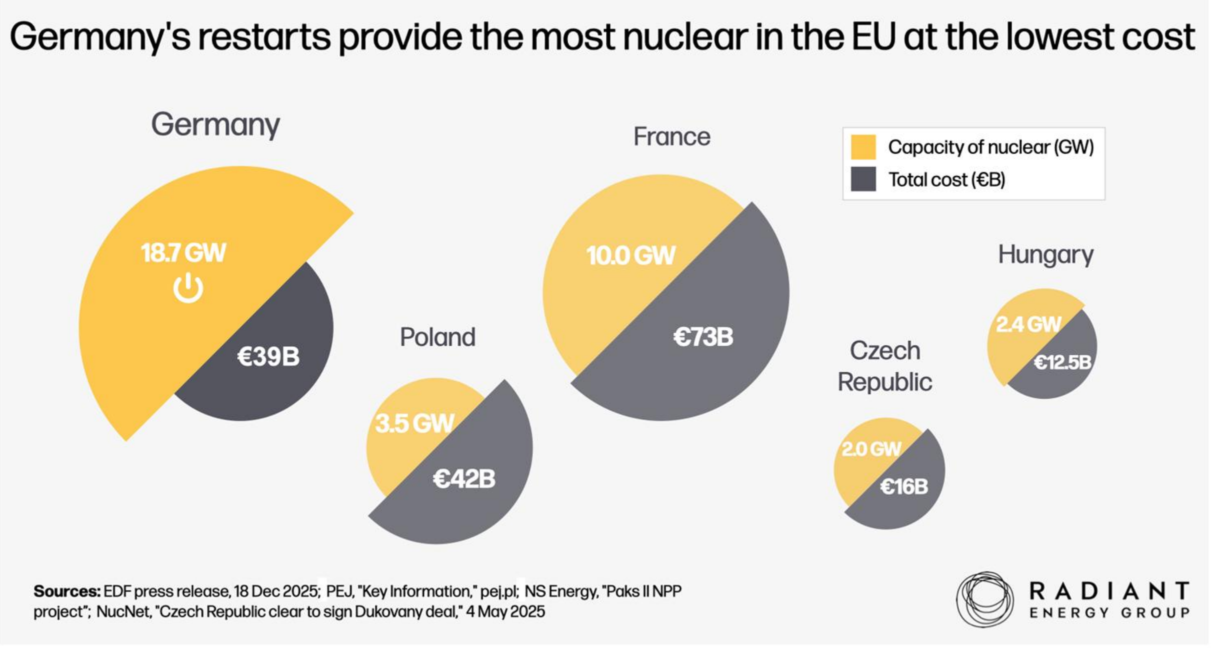


Comparison to Contemporary Nuclear Newbuild Projects

The comparison with Western newbuild sharpens the economic case decisively. The total restart cost of Priority Group A reactors combined is lower than any single newbuild project currently under construction in the Western world. The same is true of Priority Group B reactors. Priority Group C, the most demanding restart group, still comes in cheaper than the newbuild projects in Poland, the United Kingdom, and France. On a cost-per-installed-megawatt basis, the gap widens: Priority Groups A and B run at roughly €1.3 million per megawatt, an order of magnitude below the most expensive Western projects, and Priority Group C at €3.3 million remains comfortably below all of them.

Smaller and less wealthy countries are committing to spend far more per unit of capacity on new construction, often financed through state guarantees, because they recognize the long-term value nuclear delivers. Germany would obtain that same value at a fraction of the cost, and at borrowing rates available to almost no one else.

The size of the program is also unmatched in the West. The full program's 18.7 GW of restored capacity is almost twice the size of France's six-unit EPR2 program, the largest single nuclear undertaking currently planned in Western Europe.[19] Priority Group A alone is about twice Poland's three-AP1000 commitment; Priority Group B is by itself larger than that Polish program; Priority Group C approaches the French EPR2 program in scale.[20]



The timing of the restarts also presents a significant advantage. Priority Group A reactors could return to the grid around 2031, ahead of every Western newbuild project currently under construction or in advanced preparation with the sole exception of Hinkley Point C, which broke ground for first nuclear concrete in 2018. Priority Group B would follow in 2032, beaten only by Paks II in Hungary. Priority Group C could come online in 2033 and 2034, still ahead of the major projects in Poland, France, the Czech Republic, and the UK's Sizewell C, all of which target the late 2030s, with schedule risks that could push completion into the 2040s.

Germany alone has the technical opportunity to approach China's pace of nuclear deployment over the coming decade. No other Western country is in a position to add this amount of additional nuclear capacity on the grid before 2033; existing restart candidates in the United States and Belgium total only a few gigawatts combined, and Western newbuild lead times rule out construction as a path to comparable scale on that timeline.

Photo credit: Anna Veronika Wendland

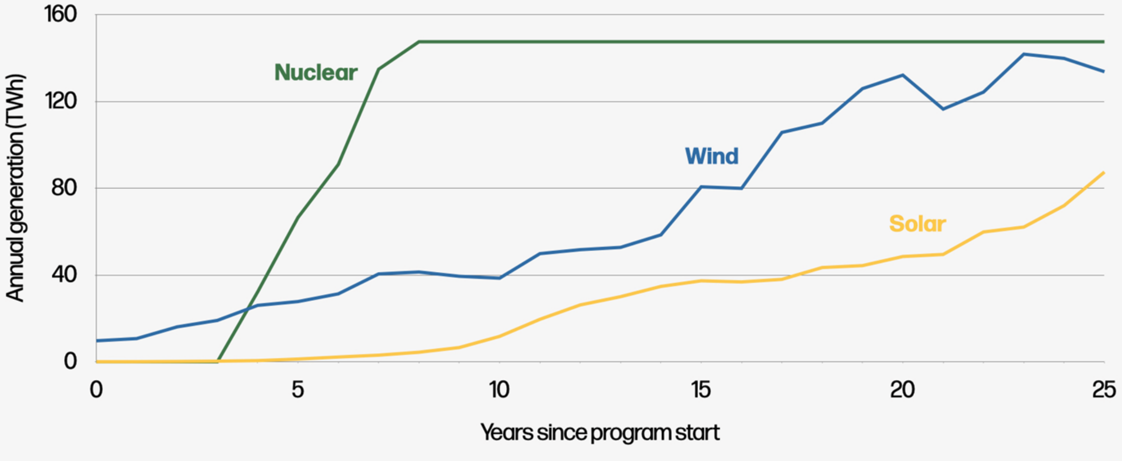
Electricity Supply Impact

Scale of additional electricity generation in context

The electricity generation added to the German grid by a full restart program would be substantial. Priority Group A reactors, which could come online in 2031, would contribute 54 terawatt-hours of additional annual generation. Priority Group B, capable of returning to service in 2032, would add a further 31 terawatt-hours. Priority Group C, completing the program, would add 62 terawatt-hours. The three groups together would produce nearly 150 terawatt-hours of firm, dispatchable generation per year, equivalent to nearly a third of Germany's current 470 terawatt-hours in annual grid load.[21]

To place this figure in context: the entire German wind energy buildout from 2000 to the present has added about 130 terawatt-hours of annual generation to the grid, and solar generation has climbed to about 90 terawatt-hours over the same period.[22] The full restart program would therefore deliver a greater increment of generation than either of those buildout efforts achieved over more than two decades, and would do so within less than ten years of a political decision to proceed.

A nuclear restart could outpace German wind and solar buildout



Sources: Annual nuclear generation based on restart timeline, assuming 2027 program launch. Annual wind and solar generation since introduction of EEG (Renewable Energy Sources Act) in 2000, from AGEE-Stat / BMWK Zeitreihen.

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Beyond the amount of added electricity, the character of nuclear generation matters for how the grid operates. Germany's redispatch costs have risen sharply in recent years as renewable penetration has grown and firm capacity has retired.[23] Restarted German reactors would produce firm, dispatchable output around the clock and across all seasons, and their geographical distribution would help reduce the magnitude and frequency of the imbalances that drive those costs.

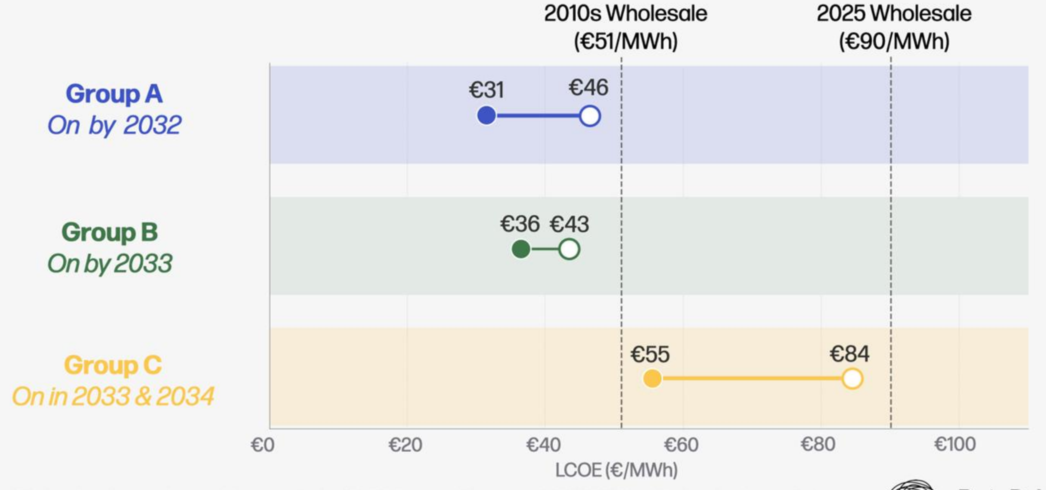
The timing of this additional generation also aligns with a growing need for reliable power. Germany's ongoing decarbonization of transport, heating, and industry will require electricity consumption to rise substantially over the coming decades. The approximately 150 terawatt-hours added by a full restart program directly supports this transition. For an industrial economy as dependent on affordable, uninterrupted electricity as Germany's, that systemic contribution provides the stable foundation that makes deep electrification of the broader energy system achievable.

Electricity cost impact

During the 2010s, Germany benefited from affordable wholesale electricity prices, a combination of cheap Russian natural gas, low carbon prices under the EU emissions trading system, and the continued operation of the nuclear fleet's best-performing reactors. That era of affordable electricity ended in 2020 and has not returned. Prices rose with increasing gas prices in 2021 and surged to extreme levels during the energy crisis triggered by Russia's invasion of Ukraine in 2022.[24] Today they remain elevated due to persistently higher gas and CO_2 prices, the completion of the Atomausstieg, and the decommissioning of additional fossil-fired capacity. The inflation-adjusted mean wholesale electricity price of the 2010s, expressed in 2026 terms, was €51 per megawatt-hour.[25] German wholesale electricity prices averaged around €90 per megawatt-hour in 2025 and have climbed further in 2026 amid the supply shock from the conflict in Iran.

Against this backdrop, the electricity cost figures produced by the restart cost model are striking. Priority Group A and B reactors, even when financed entirely under private market conditions at the higher WACC of Scenario I, could produce electricity at €41 and €42 per megawatt-hour respectively. This is below the inflation-adjusted 2010s average, meaning

Every German reactor restart undercuts the average 2025 wholesale price



Notes: Filled circles show each group's lowest individual LCOE (Scenario II financing, 4.25% WACC); unfilled circles show its highest (Scenario I financing, 7.38% WACC). WACC = weighted average cost of capital.

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that large quantities of firm, dispatchable, low-carbon electricity could be made available to German industry at prices more affordable than anything the market has offered in the past five years, and indeed below the level that prevailed during what is now retrospectively regarded as a period of unusual affordability.

Priority Group C reactors present a higher cost, but substantially below the prices that have prevailed throughout the five years of energy crisis since 2020. For any industrial consumer that has spent half a decade paying crisis-level electricity prices, even the Priority Group C figure represents a significant and meaningful reduction.

Realization of emission and coal phaseout goals

Germany's coal phaseout, officially targeted for 2038 at the latest, is already under pressure. It is increasingly unlikely that the earlier target of 2030 for western Germany will be met if replacement gas-fired capacity is not available on time; policymakers have begun to warn that plant closures may be delayed to protect supply security.[26]

Coal in Germany has been in managed decline for over a decade. Hard coal mining has ceased entirely, and no new lignite mines are being developed.[27] Unlike nuclear power plants, coal plants do not benefit from the infrastructure longevity previously described. Their systems and equipment wear out in a way that is not straightforwardly reversible; the 40-year design life of a coal plant is a genuine expiry date that does not apply to nuclear plants. Attempting to run Germany's coal fleet into the 2040s is not without supply risk, as by then a growing share of the fleet will be operating well beyond its design life, after years of minimal maintenance investment.

A nuclear restart program addresses this directly. Restarted nuclear plants would add approximately 150 terawatt-hours of annual generation, more than replacing the roughly 90 terawatt-hours currently generated by coal. Their restored installed capacity would also largely cover the approximately 30 gigawatts of coal capacity on the grid today.[28]

Through a nuclear restart program, Germany can realistically achieve its Kohleausstieg by the mid-2030s, or at the absolute latest by 2038, on a foundation of firm low-carbon generation rather than on the hope that sufficient renewable and storage capacity materializes in time.

Industrial Implications

Alleviating energy supply and price pressure on German industry

Through the 1990s, 2000s, and 2010s, Germany managed to retain a greater share of its heavy and energy-intensive industries than most of its peers in the developed world. German wealth, the living standards of its population, and its position as the third-largest economy in the world were sustained in no small part by this industrial base and the affordable and reliable domestic energy supply that made it viable.

That foundation is now gone. With cheap pipeline gas eliminated, domestic coal in terminal decline, and the nuclear fleet shut down, Germany has lost the energy supply conditions that underpinned its industrial competitiveness. The consequences are already visible: Germany is experiencing significant and acute deindustrialization, driven not only by high energy prices but also by genuine doubts around supply security in an era of escalating conflicts across Europe, Asia, and the Middle East.[29] Measures such as the proposed Industriestrompreis, a subsidized industrial electricity rate, may provide short-term relief but represent no structural solution for the medium- or long-term.

For Germany to halt and ultimately reverse its deindustrialization, investors in energy-intensive and heavy industry must be confident in the availability of affordable, reliable, and crisis-resilient electricity over long investment horizons. Nuclear restarts provide precisely that assurance. Without it, no combination of subsidies or short-term market interventions will be sufficient to rebuild investor confidence in Germany as a location for energy-intensive industrial production.

The German engineering sector in the nuclear renaissance

Since the launch of the initiative at the 2023 COP28 climate conference, 38 countries representing approximately 70% of the global economy have committed to tripling global nuclear electricity generation by 2050.[30] The decades ahead could see a volume of new reactor construction, and a scale of refurbishment, uprating, and life extension work on existing plants, not witnessed outside of China at any point this century. The capital flows associated with this renaissance are substantial; nuclear's inherently capital-intensive nature means that even a moderate number of new builds represents enormous industrial procurement.

Germany currently stands as a conspicuous outsider to this coalition, by far the largest Western economy not among its signatories. Despite possessing world-class capabilities in mechanical engineering, metalworking, precision machining, electrical engineering, and nuclear technology, the German economy, with the exception of a handful of dedicated nuclear service companies, is largely excluded from the investment and procurement activity that the nuclear renaissance is generating.

Restarting Germany's shuttered reactors, all of which are of German design, would change this directly. The process of restarting, refurbishing, and where necessary rebuilding these plants would force the reconstitution of a robust and comprehensive domestic nuclear supply chain. Unlike smaller countries that must import reactor technology to meet their nuclear ambitions, Germany's scale of energy demand makes a wholly domestic nuclear supply chain economically viable. A vertically integrated German nuclear industry would then be positioned to offer reactor technology, components, engineering services, and operational expertise to the growing number of countries seeking to expand their nuclear fleets.

The harder restart and rebuilding work of Priority Group C plants is particularly valuable in this context. Executing these more demanding projects rebuilds precisely the construction and engineering competencies that have atrophied since Germany last built a reactor. It is those competencies that open the door to new reactor construction, whether SMRs or large conventional units, for both domestic use and export. A nuclear restart program is therefore not only an energy policy decision; it is an industrial policy decision with consequences that extend well beyond Germany's borders.

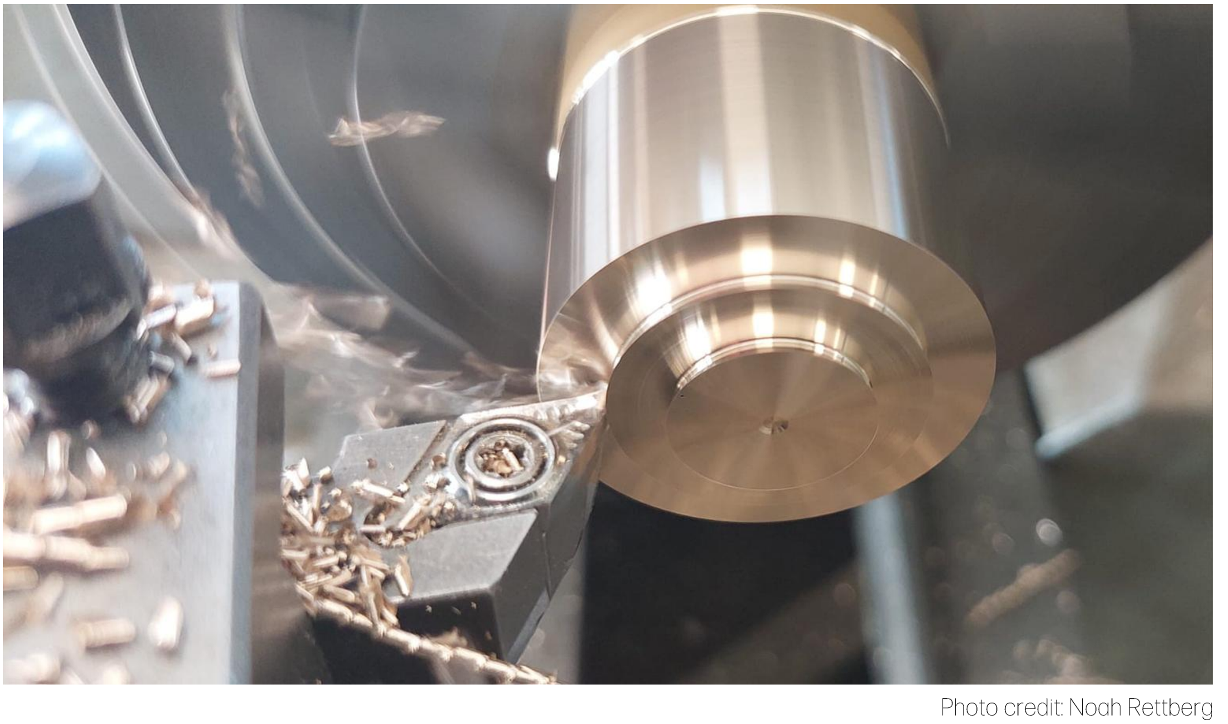


Photo credit: Noah Rettberg

Additional Considerations

The cost of decommissioning

As described above, the phaseout of nuclear power in Germany has come at a high economic cost, including a decline in electricity tax revenue, increased electricity prices, reduced industrial activity, and the loss of emissions-free dispatchable power from the grid.

Beyond these impacts, the process of prematurely shutting down and decommissioning nuclear plants carries its own significant expenses. A study by Siempelkamp NIS Ingenieurgesellschaft mbH, a German engineering firm specializing in decommissioning, indicates that decommissioning costs for pressurized water reactors (PWRs) in six European countries, including Germany, range from €320 million to €1.5 billion per unit. The estimated decommissioning costs for Germany's Grohnde and Isar 1 and 2 reactors are approximately €1 billion each.[31]

Although significant dismantling has taken place since the final closure of the plants, Germany's reactor decommissioning program is not expected to be completed until the 2040s. In the coming decades, tens of billions of euros will be spent on nuclear in Germany through decommissioning. However, under current energy policy, Germans will miss out on the much larger benefits that operational reactors could offer over mere decommissioning activity.

Operating licenses

All German reactors undergoing decommissioning still hold their original operating licenses. Although federal laws currently make commercial production of nuclear electricity illegal, their licenses remain valid. Decommissioning activities are managed under amendments to the existing operating licenses.

It remains unclear, however, if and how these licenses would need to be amended or reissued for renewed operation. Since the last reactors were commissioned in 1989, nuclear licensing requirements have changed, with new international standards in place.

For instance, guidelines initially adopted in 1979 established requirements to mitigate risks associated with aircraft accidents (FLAB). Newer German plants were designed with these requirements already in view. Analyses have shown that these plants can even withstand the impact of large passenger aircraft.[32] Building structures at older plants can reach a comparable level of protection through structural reinforcement or other measures.

One special consideration is whether the repairs necessary for restarts would trigger environmental impact assessments (EIA). Depending on the scope of the repair measures at each plant, the requirements for an EIA may be met. This, too, is ultimately a question of political will. Germany already exempts some solar and wind farms from EIA requirements, and similar treatment could be extended to nuclear restart work.

The key issues for licensing concern the legal and regulatory processes needed for plant repair and restart. These challenges are primarily procedural rather than technical. There are no technical barriers preventing these plants from being repaired and brought up to current regulatory standards for operation.

The U.S. is setting a precedent for this type of undertaking. The Nuclear Regulatory Commission has begun evaluating Constellation Energy's proposal to restore Three Mile Island Unit 1, now the Crane Clean Energy Center, to operational status. The NRC's comprehensive review includes assessments of safety, environmental impact, and emergency preparedness. If this review proceeds as expected, Constellation could achieve its stated target of a restart in 2027.[33]

Waste

Decommissioning Germany's reactors rather than restarting them does not eliminate the need to manage nuclear waste. Countries with active nuclear programs have taken the lead on waste management solutions, while Germany, without active reactors, falls behind. For example, Finland has completed key facilities for its deep geological repository and is conducting trial operations, while Sweden has issued a final construction permit for its repository.[34]

Restarting Germany's reactors would have a minimal impact on the overall volume of nuclear waste to be managed. Each German reactor generates about 25 tonnes of spent nuclear fuel per year. If all of the restartable reactors were brought back online, continued operation would add roughly 350 tonnes of spent fuel annually. Over a 20-year period, this would increase the current stockpile of unrecycled spent nuclear fuel from around 11,000 tonnes to approximately 18,000 tonnes.[35]

This amount of waste could be reduced by up to 80% if spent fuel is recycled into Mixed Oxide fuel (MOX), which German reactors have used in the past. Many of the restartable reactors can already be partially loaded with this recycled fuel. For plants that require new reactor pressure vessels or new core internals as part of their restart program, they can be rebuilt to run entirely on this recycled MOX fuel. As in the past, this recycling could be done in France. This fuel plan would greatly reduce the final volume of any waste requiring deep geological disposal.

Fuel supply

A commonly cited concern is that a return to nuclear would create new dependence on Russia for enriched fuel. In reality, a return to nuclear would strengthen rather than weaken German energy security. The fuel supply for restarted German reactors presents no dependencies on countries hostile to Germany or supply routes susceptible to geostrategic chokepoints. The nuclear fuel supply chain, from enrichment through fuel fabrication, is almost entirely domestic through Germany's stake in Urenco and its fuel manufacturing capabilities. The only input that must be sourced externally is natural uranium, which is abundant and available from allied producers including Canada and Australia. If absolute energy independence becomes a national priority, spent fuel could be reprocessed in Germany, and domestic uranium mineral deposits could be exploited.

Additionally, multiple years of nuclear fuel can be stockpiled on site, securing supply and bolstering energy security.

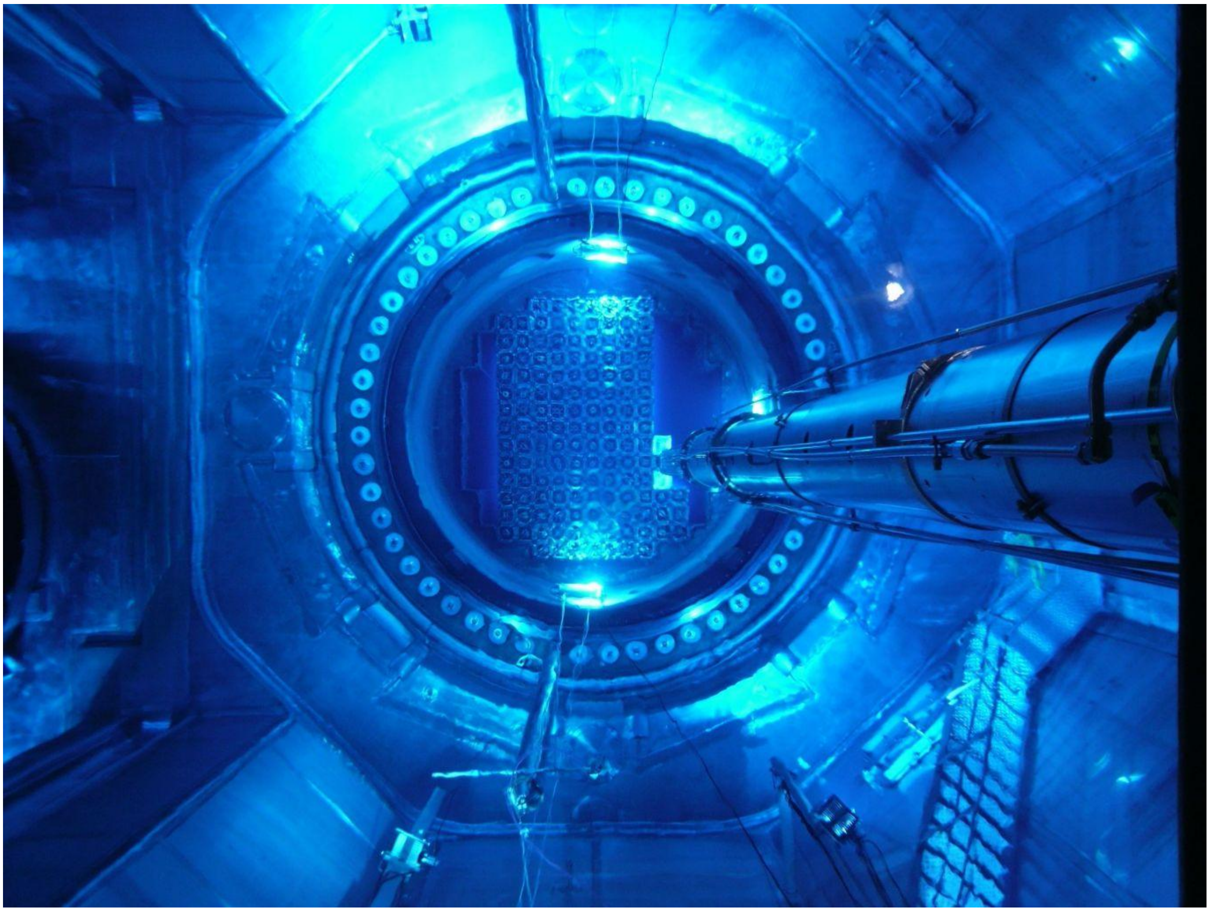


Photo credit: Anna Veronika Wendland

Workforce rehiring and training

Germany's nuclear workforce has declined during the course of the nuclear phaseout, but it has not disappeared. Whereas nuclear plant closures led to large layoffs in the U.S., German plants retained most of their workforce after the shutdowns. Staffing levels were gradually reduced as retiring employees were not replaced, or replaced by contractor personnel. Still, each site with spent fuel continues to require a substantial number of licensed staff on-site for safety and maintenance, and many of those now working on decommissioning are former operating staff. Restart therefore requires a rehiring, retention, and requalification effort built on a residual workforce, not the creation of a nuclear workforce from scratch.

More recently shut-down plants retain well over half the number of direct staff they had during power operation, which typically ranged from 300–400 full-time employees per reactor.

As of May 2026, Emsland still has close to 300 employees. Brokdorf and Isar 2 each retain over 200 employees, with around 400 total remaining for Isar across both units at the site.

Restart would require three parallel personnel measures: retaining and reassigning existing plant staff, recalling former employees where possible, and recruiting and training new staff. Approximately 100 additional employees will be needed at each plant as part of the restart preparation process. This effort could be eased by rehiring experienced personnel who have retired or moved to other sectors. Nuclear industry employees often identify strongly with their work — a reflection of stable, high-wage jobs, the specialized nature of their roles, and the close-knit communities fostered at these plants — which suggests many would likely respond positively to a recall to duty.

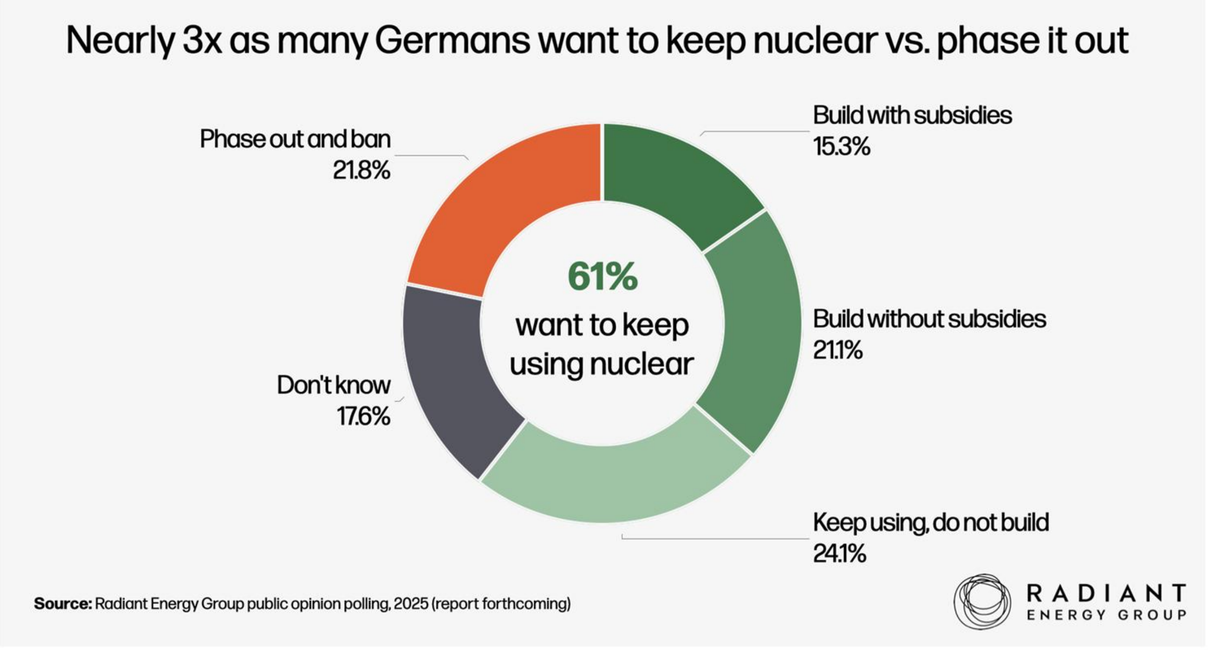
Additionally, Germany's conventional power-plant workforce provides a natural recruitment pool. The turbine island equipment of a nuclear plant is largely familiar to experienced steam-plant personnel. With nuclear-specific training, radiation protection, and operating procedures, experienced conventional power-plant personnel can be trained for operator, engineering, and technical roles within roughly three years.

The workforce challenge is manageable but time-sensitive. Each year of continued decommissioning, early retirement, and staff dispersal reduces the pool of personnel directly available for restart.

Public opinion

Recent polls show broad support among Germans for restarts in their country. Radiant Energy Group's nuclear attitudes survey, conducted in 2025, found that 61% of the German public backs keeping nuclear in the country's energy mix – nearly three times the 22% who support a full phaseout and ban.[36] In fact, more than half of those who want to continue using nuclear want to go further and build new plants.

Nuclear is also viewed by the German public as a cost-saver. 39% of Germans expect it to lead to cheaper energy bills, while just 22% expect it to make bills more expensive.[37] Its strongest perceived attribute, however, is reliability. 54% of those surveyed view nuclear as a reliable energy source, against only 30% who see it as unreliable.[38] Together, these figures point to a German public that credits nuclear with delivering affordable and dependable power.



Next Steps

Several concrete policy measures are required to translate the findings of this report into action. None of them are technically complex or politically unprecedented; each falls well within the normal scope of legislative and regulatory activity available to the federal government.

The first and most time-sensitive step is the immediate imposition of a moratorium on the decommissioning of all 14 restartable German nuclear power plant units. Every month of continued decommissioning narrows the restart options available and raises the cost of eventual reactivation. A moratorium requires no major capital investment and preserves options that, once lost, cannot be recovered. Following the moratorium, each plant should undergo a formal technical assessment by an independent expert panel (Sachverständigengutachten), establishing precisely which components are irreparable and would require replacement regardless of restart. Decommissioning of those specific components can continue; all other dismantling activity should cease.

In parallel, the Atomgesetz (Atomic Energy Act) must be amended to permit the commercial generation of nuclear electricity once again. This does not require a complex or lengthy legislative procedure; it can be accomplished through a straightforward vote in the Bundestag and should be treated as a matter of priority rather than a subject for extended political negotiation.

A further legislative change is required to address the Nachhaftungsgesetz, the law governing liability for nuclear power plants. In its current form, this legislation does not permit the transfer of liability in the event of a transfer of ownership, meaning that any sale of a nuclear plant to a new operator leaves the original owner still legally exposed to future liabilities despite no longer owning the asset. This provision effectively prevents external investors or operators from acquiring Germany's nuclear plants, since current owners are unlikely to sell them while retaining liability for facilities they no longer control.[39] Amending the Nachhaftungsgesetz to permit full liability transfer alongside ownership transfer is a prerequisite for any private-sector-led restart effort.

Finally, nuclear energy should be classified as clean energy under German law, placing it on equal regulatory footing with wind and solar. This would make nuclear restart and newbuild projects eligible for low-interest KfW financing on the same terms currently available to renewable energy projects, significantly reducing the cost of capital for restart investments and removing a structural disadvantage that has no technical or environmental justification.

Conclusions

Germany's nuclear phaseout was presented as permanent and irreversible. In reality, it is neither. The shuttered fleet remains to a large degree intact, with most of the value in each site preserved; every major component can be repaired or replaced using procedures demonstrated at comparable plants worldwide; and the economic case for restart is strong across all three priority groups.

Restarted Priority Group A and B reactors can, regardless of the financing model, produce electricity below the inflation-adjusted 2010s average at a time when wholesale prices have sat at approximately twice that average for five consecutive years. Priority Group C reactors, the most demanding scope in the program, can produce electricity at €58 per megawatt-hour, substantially below current market prices.

The comparison with Western newbuild alternatives makes the opportunity cost of inaction concrete. The total restart cost of all Priority Group A or all Priority Group B reactors is lower than the cost of any single newbuild project currently underway in the Western world. Priority Group A and B are cheaper by an order of magnitude per installed megawatt than the most expensive Western projects. The full program restores 18.7 GW of capacity, almost twice the size of France's EPR2 program, delivered faster and at a fraction of the cost. Countries with considerably less economic weight than Germany are committing to spend far more per unit of capacity on new construction because they recognize the long-term value nuclear delivers. Germany's position is more favorable than any of them.

Beyond investment costs, the restart program addresses the root cause of Germany's accelerating deindustrialization by restoring affordable, firm, and crisis-resilient energy supply with a largely domestic supply chain. It makes the coal phaseout achievable by the mid-2030s. And it positions Germany to participate in the largest nuclear investment cycle the Western world has seen in decades, rebuilding engineering and construction competencies with direct export value in a global market where 38 countries have committed to tripling nuclear capacity by 2050.

The window of opportunity for restarts gradually closes as decommissioning progresses, experienced personnel retire, and supply chains further atrophy. Each year of inaction incrementally raises costs, extends timelines, and narrows options. It is worth restating that this report's assessment conservatively assumes a decommissioning state as of January 1, 2027; any action taken before that point would leave the plants in a more favorable condition than the analysis assumes, strengthening the case further.

The case for restart across every dimension examined in this report is compelling now. It will remain compelling for some time. It will not remain compelling indefinitely. That time frame is established not by any technological constraint but by political will, and closes with every disassembly contract executed and every experienced professional who elects to retire early.

Methodology

Public information about the status of decommissioning and specific reactor details is limited. Nuclear industry managers worry that decommissioning contracts could be jeopardized if reactors are considered for refurbishment. Additionally, much of the challenge in obtaining assessments stems from a prevailing internal culture of compliance. This has discouraged open discussion. As a result, industry experts contributed information for this report under the condition of anonymity. Information has been gathered on a rolling basis since Radiant Energy Group's 2023 report, with updates reflecting decommissioning progress, newly available information, and planned steps as they were executed or delayed.

Information was collected from individuals at multiple levels of the industry. On the plant side, contributors included current and former plant managers, shift supervisors, and floor-level workers with direct operational knowledge of specific facilities. On the contractor side, the network extended to managers, supervisors, and workers employed by the external companies that provide specialized services to German nuclear plants – firms whose personnel often have detailed, current knowledge of conditions inside facilities that are formally closed to outside visitors. This breadth of sourcing was deliberate. Information gathered from senior personnel tends to reflect official positions and high-level timelines, while input from workers closer to the physical plant captures the on-the-ground reality of what has actually been removed, what condition remaining systems are in, and how decommissioning work is actually progressing relative to schedule.

Modeling restart cost and timeline is based on a gravimetric approach, reflecting common industry practices, to estimate the cost of procurement of components and their installation inside the power stations, procurement of tools and equipment, and writing of procedures and documentation. It assumes a fixed period of preparation upfront to the beginning of repair and rebuild works. It assumes that multiple sub-projects can be executed concurrently at each plant.

The restart investment and timeline analyses use conservative assumptions for a hypothetical baseline plant condition at each facility as of January 1, 2027. All plants are assumed to receive new instrumentation and control systems, a new full-scope simulator, and a fully recruited and trained operating staff. Components are repaired where possible; damaged components are treated as destroyed and costed as full replacements. Reactors requiring rebuilding of turbine and steam generators are considered to undergo power uprates through efficiency improvements.

Total restart costs for each facility are summed and subjected to a conservative risk adjustment: a 35% cost overrun is assumed as the baseline, reflecting the uncertainties inherent in working on facilities in various stages of decommissioning and without direct inspection access. A margin of error of ±20% can be applied.

Similarly conservative assumptions underpin the estimated levelized cost of electricity calculated for each reactor. For operating costs, senior figures from the German nuclear industry were consulted directly, drawing on their pre-shutdown experience and adjusting for inflation and today's cost environment. The resulting figures were then checked against publicly available financial data. Fuel cost assumptions were developed the same way, with historical costs updated to reflect inflation and today's higher uranium and enrichment prices. A contribution of €4 per megawatt-hour is also assumed for funding future decommissioning and waste disposal.

A single capital structure was applied across both financing scenarios: 75% debt and 25% equity, with a 20-year debt repayment period standard for energy infrastructure.

Scenario I reflects private market conditions, with a 10% return on equity matching private investor expectations for this risk profile and a 6.5% commercial bank debt rate, producing a weighted average cost of capital (WACC) of 7.38%.

Scenario II reflects long-term strategic and state-backed financing: restarted plants generate revenue well beyond the 20-year repayment period, suiting infrastructure and pension funds with longer horizons and lower return requirements, while their public value makes them strong candidates for state support. Germany's high sovereign credit rating would allow government lending at 3.5% while still earning a return. A 6.5% equity return and 3.5% debt rate yield a WACC of 4.25%.

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ABOUT RADIANT ENERGY GROUP

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