Powering Off: The Delayed Death of German Nuclear Energy during the Russian-Ukraine War

Intro:

On a seemingly ordinary evening in Lingen, Germany, on April 15th, 2023, the Emsland Nuclear Power Plant in the German State of Lower Saxony closed. This plant, along with the Isar 2 reactor in Bavaria and Neckarwestheim 2 reactor in Badem-Württemburg, closed that same night, marking the end of 60 years of Nuclear Energy in Germany.[1] When people in the town of Lingen woke up the next morning, the energy source that could power 3.5 million of their region's homes was extinguished.[2]

Lower Saxony's Minister of Environment and Energy, Christian Meyer of the Green Party, turning off a symbolic switch for the Emsland Nuclear Power Plant on April 15, 2023 (DPA)

Some reacted to that evening with glee. Lower Saxony's Minister of Environment and Energy, Christian Meyer of the Green Party, stated that it was a "great relief" and "an end to fear

[1]NDR. "AKW Emsland ist abgeschaltet: Wie geht es jetzt weiter?," April 17, 2023.
[2]RWE. "Dismantling Plant Emsland." Dismantling Plant Emsland. Accessed April 21, 2024.

of a reactor incident like those in Chernobyl or Fukushima."[3] Several hundred people outside of the Emsland plant celebrated the end of nuclear power with a demonstration, and Green Peace had nuclear phase-out festivals across the country.[4] However, not all were pleased with this decision. A CDU state parliament member, Christian Fühner from Lingen, was disappointed by the decision, stating the federal government was now relying on coal-fired power plants instead of "clean nuclear power."[5] Members of these power plants were also displeased, with the chairman of Preussen-Elecktra (which owned the Isar 2 Nuclear Plant and had a stake in the Emsland Plant) telling the press that it was an emotional moment for all of the nuclear reactor employees and affected him personally. One could perhaps even consider these reactions relatively muted given the circumstances, as this nuclear plant closure did not close in a time of a cheap and secure German energy supply. Just a year prior, Russia invaded Ukraine, causing Germany's energy supply to be in a state of disarray and soaring energy prices, as the German government had to quickly go cold turkey on its reliable source of Russian natural gas.

This event could perplex outsiders who do not understand this uniquely German scenario. Why would Germany and its Green Party decide to follow through on ending all of its nuclear energy in 2023, especially during a war that heavily strained Germany's energy supply? Why did the Federal government, even with a three-month delay, still decide to close down these last three nuclear plants with emission-intensive coal plants still running and the majority of the public against it? Was this the right decision for Germany and the Green Party to make, and what will the ramifications be politically, economically, and environmentally? This case study will investigate all these puzzles, looking at the rise of the anti-nuclear movement and the Federal government's decision to end, and then delay, nuclear energy's death, as well as the reactions and implications of this momentous decision.

Why did Germany Decide to End All Nuclear Power in the First Place?

This recent death of nuclear energy in Germany cannot be understood without first explaining the decades-long growth of anti-nuclear sentiment in Germany and the subsequent rise of its political power through the German Green Party. West Germany's anti-nuclear movement has existed ever since the 1970s, which arose out of the student movements of the late

[3]Ibid.
[4]Der Spiegel. "Kernenergie: Letzte Drei Atomkraftwerke in Deutschland Vom Netz Genommen," April 16, 2023.
[5]NDR. "AKW Emsland ist abgeschaltet: Wie geht es jetzt weiter?," April 17, 2023.

1960s and the subsequent *Bürgerinitiativen* (citizen movements that emphasized public political participation) of the 1970s.[6] These citizen initiatives adopted the new environmentalist ideals of the decade to protest against nuclear power plants, which they believed to be harmful to the planet due to their creation and disposal of nuclear waste.[7] This young and blossoming anti-nuclear movement gained national attention in West Germany in February 1975, when 28,000 protestors from local citizen groups occupied the construction site of a new nuclear power plant in the small town of Wyhl, fearing the industrialization and nuclear waste that would ensue if the plant was built.[8] After a well-publicized 10-month sit-in at the construction site (which garnered further public support after police used excessive force against the activists), the construction of the nuclear plant was canceled, marking the new political power of this anti-nuclear movement.[9]

Even though a green political party was only just a thought in the minds of some protestors at this time, many historians not only consider the protest at Wyhl the birthplace of the German anti-nuclear movement but also "the entire Green Movement."[10] The protests continued to spread to other cities, whether it was 30,000 people in 1976 protesting against building a nuclear power plant in Brokdorf or the 1977 protests against using salt mines as nuclear storage in Gorleben. The anti-nuclear movement only grew in notoriety.[11] When the three-mile island disaster in the US occurred, opposition to nuclear energy in Western Germany intensified even further, as 100,000 protesters went to Bonn (the West German capital) to demand the end to all nuclear energy.[12]

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[6]Christian Joppke. *Mobilizing Against Nuclear Energy : A Comparison of Germany and the United States*. Berkeley: University of California Press, 1993: 43.
[7]Ibid., 45.
[8]Ibid., 10.; Meyer, Jan-Henrik. "'Where Do We Go from Wyhl?' Transnational Anti-Nuclear Protest Targeting European and International Organizations in the 1970s." *Historical Social Research / Historische Sozialforschung* 39, no. 1 (147) (2014): 217.
[9]Christian Joppke. *Mobilizing Against Nuclear Energy : A Comparison of Germany and the United States*. Berkeley: University of California Press, 1993: 99.
[10]Meyer, Jan-Henrik. "'Where Do We Go from Wyhl?' Transnational Anti-Nuclear Protest Targeting European and International Organizations in the 1970s." *Historical Social Research / Historische Sozialforschung* 39, no. 1 (147) (2014): 217.
[11]Ibid., 111.
[12]NYT. "100,000 Flock to Bonn In Atom Power Protest." *The New York Times*, October 15, 1979, sec. Archives.

Protesters demonstrating against the planned nuclear power plant in Wyhl in August 1974 (Archiv Soziale Bewegungen Freiburg)

As these protests continued, the movement's leaders realized this anti-nuclear movement needed political representation to enact the changes it desired. Consequently, the Green Party (*die Grüne*) came into existence. At its creation, the anti-nuclear movement and the Green Party were one and the same, with the Green Party being formed in 1980 directly by leaders of the anti-nuclear movement.[13] In 1983, the Green Party received 5.7% of the vote (surpassing the 5% requirement), and after having already established itself in multiple state governments, the Green Party entered the *Bundestag* (the federal parliament) for the first time.[14] Although this young Green Party was not yet large enough to end the majority government of the conservative CDU/CSU and FDP, their opposition to nuclear energy and burgeoning political power led the SPD (the Social Democratic Party) to shift their stance from pro-nuclear energy in 1979 to a

[13]Wiliarty, Sarah Elise. "Nuclear Power in Germany and France." *Polity* 45, no. 2 (April 2013): 281–96.
[14]Ibid.

position of calling for its abandonment by 1986.[15] Moreover, when the Chernobyl disaster occurred in 1986, it affected West Germany profoundly and, in response, only strengthened the Green Party's support. The potential dangers of nuclear energy were now very close to home, with fears of radioactively contaminated food and children no longer being allowed to play outside in the grass.[16] As a result, the anti-nuclear movement gained more momentum, and the Green Party increased in popularity, receiving 8.3% of the vote in 1987.[17]

When the Green Party finally became part of a governing coalition in 1998 (with the SPD), they finally had the political opportunity to end nuclear energy and prioritized it immediately. In 2001, after two years of negotiations, the coalition was able to pass the first German nuclear phase-out law: the Atomic Energy Law.[18] This law put a cap of 2623 billion kWH of lifetime production for the current 19 nuclear reactors in Germany, which would limit the operation of those reactors to an average of 32 years, as well as ban the construction of new power plants.[19] This law was heavily opposed by the CDU, FDP, and energy utility companies, who argued that nuclear reactors in Germany, no matter how much the Greens claimed, were not at risk of a similar Chernobyl-level accident, with German standards being much safer than their Soviet equivalents.[20] These opposition parties and companies also emphasized how nuclear energy in Germany was important for the nation's industry, was cheaper than other energy sources, and would be critical for meeting the climate change targets of the Kyoto Protocol.[21]

Therefore, when the conservative CDU and FDP regained political power over the Greens to change this law in 2009, they took the opportunity and passed an amendment to the Atomic Energy Law in the Bundestag (their amendment circumvented the *Bundesrat* to avoid opposition from German states, which was an anti-democratic process that only caused further unpopularity for the amendment).[22] This amendment increased the amount of lifetime energy these nuclear reactors could use and thus gave 8-year extensions for nuclear reactors built before

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[15]Jahn, Detlef, and Sebastian Korolczuk. "German Exceptionalism: The End of Nuclear Energy in Germany!" *Environmental Politics* 21, no. 1 (February 1, 2012): 159–64.
[16]Wiliarty, Sarah Elise. "Nuclear Power in Germany and France." *Polity* 45, no. 2 (April 2013): 281–96.
[17]Conradt, David. "Green Party of Germany | Policies, Platform, Leader, & Election Performance | Britannica," December 15, 2023.
[18]Schreurs, Miranda A. "The Politics of Phase-Out." *Bulletin of the Atomic Scientists* 68, no. 6 (November 1, 2012): 33.
[19]World Nuclear News. "A Guide: The End of Germany's Nuclear Power : Nuclear Policies," April 14, 2023.
[20]Schreurs, Miranda A. "The Politics of Phase-Out." *Bulletin of the Atomic Scientists* 68, no. 6 (November 1, 2012): 34.
[21]Ibid., 34.
[22]Ibid., 35.

1980 and 14-year extensions for newer nuclear reactors.[23] This change was very controversial at the time, with polling finding that 49% of the German public was against any extensions and 29% wanted extensions to be limited to a maximum of 10 years.[24]

However, after the 2011 nuclear disaster in Fukushima, Japan, Germany's decision-making on nuclear energy policy changed instantly. After such a terrible incident, which one could not blame on poor Soviet technology and standards, the German public was brought back to their harrowing memories during Chernobyl and grew scared of nuclear energy. The Green Party had all the vindication they needed. On March 15, 2011, just four days after the crisis, Chancellor Angela Merkel, who was previously supportive of nuclear energy, announced a three-month pause on the nuclear extension plan, safety checks of all nuclear power plants, and the temporary shutdown of all nuclear reactors that started operation before 1980 (all seven of them with one already closed).[25] Just four months after the catastrophe, the government overwhelmingly passed (513 in favor and 79 against) another amendment to the Atomic Energy Law to end nuclear power in Germany.[26] This law, which had support from 80% of the population, permanently shut down all old nuclear power plants already temporarily closed, and the remaining nine reactors would all be planned for shutdown by 2022 (one plant shut down in 2015, 2017, and 2019, and the remaining six reactors in 2021 and 2022).[27] After decades of fighting, the anti-nuclear movement and its political arm of the Green Party had succeeded in bringing their dream to fruition. There was no longer any discussion: the funeral date for nuclear power in Germany had been set.

The Debate to Delay the Last Three Nuclear Plants' Closure

By the beginning of 2022, only the country's last three nuclear power plants were left in operation. In just 11 years, nuclear power went from accounting for 18% of Germany's power generation to just 6%.[28] To the Green Party's delight, the nuclear phase-out plan was progressing

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[23]World Nuclear News. "A Guide: The End of Germany's Nuclear Power : Nuclear Policies," April 14, 2023..
[24]Schreurs, Miranda A. "The Politics of Phase-Out." *Bulletin of the Atomic Scientists* 68, no. 6 (November 1, 2012): 34.
[25]Ibid p.36
[26]World Nuclear Association. "Energiewende," July 1, 2020.
[27]Christian Joppke. *Mobilizing Against Nuclear Energy : A Comparison of Germany and the United States*. Berkeley: University of California Press, 1993: 162.; Schreurs, Miranda A. "The Politics of Phase-Out." *Bulletin of the Atomic Scientists* 68, no. 6 (November 1, 2012): 37.
[28]Van Halm, Isabeau. "Shift in Germany's Perception of Nuclear Energy - Energy Monitor." Energy Monitor, September 28, 2022.

as expected, but the world had other plans. Just two months later, something very unexpected (at least to German politicians) occurred that would completely upend Germany's energy calculations and force the Green Party to change course. On February 24th, 2022, Russia invaded Ukraine. The German government and the Green Party, whether it wanted to or not, would be forced to reconsider its energy decisions, as Germany was one of the most reliant nations in the EU for Russian natural gas, with 55% of Germany's natural gas coming from Russia (with natural gas composing 27% of Germany's overall energy mix).[29] Germany now had to deal with the struggle of weaning off Russian energy while also following a decade-old plan to shut off its own energy production in the same year.

Many in the international and German political community saw the necessity of maintaining Germany's nuclear energy production for the time being and implored Germany to do so. On March 3rd, the International Energy Agency (IEA), of which Germany is a part, called on all its members to delay closing their nuclear reactors, arguing they would be a necessary and needed source of energy while the EU weans off Russian gas.[30] The Prime Minister of Bavaria, Markus Söder, who was supportive of the 2011 phaseout plan at the time, stated to the press that keeping the last three nuclear plants for three to five years would "help a lot," especially compared to the alternative of extending the lives of dirty coal power plants.[31] Moreover, in July, the French EU Internal Market Commissioner urged Germany to keep its three nuclear reactors open for just a few months longer to neutralize Russia's ability to use energy as a weapon.[32]

However, the Green Party was not keen on keeping Nuclear energy alive, even with the present circumstances. The current governing coalition, the Traffic Light Coalition (named because of the Red SPD, Green Green Party, and Yellow FDP), had the Green Party leading the Federal Ministry of Economy and Environment, and its Minister Robert Habeck had no appetite to continue operating nuclear reactors. Minister Habeck was skeptical of Söder's plea, arguing that "Nuclear Power would not help us in the Winter of 2022/23," claiming that the last three nuclear reactors would need to undergo additional safety inspections and would require

[29]Oltermann, Philip. "How Reliant Is Germany – and the Rest of Europe – on Russian Gas?" *The Guardian*, July 21, 2022.
[30]IEA. "A 10-Point Plan to Reduce the European Union's Reliance on Russian Natural Gas – Analysis." IEA, March 3, 2022.
[31]Der Spiegel. "Energieversorgung: Söder plädiert für längeren Betrieb der Atomkraftwerke." *Der Spiegel*, March 2, 2022, sec. Wirtschaft.
[32]Koch, Moritz. "EU-Kommissar Fordert Längere AKW-Laufzeiten in Deutschland." Handelsblatt, July 5, 2022.

additional fuel supplies.[33] Minister Habeck was not outright hostile to the idea of temporarily keeping nuclear energy if truly needed but stated in a press release that the decision should have "no ideological bias" and "should not be abused for a false debate."[34] On March 8th, Habeck's ministry (BMVK) with the Ministry of the Environment and Nuclear Safety (BMUV) released a press release stating that extending the life of these nuclear plants "could only make a little contribution to solving the problem, at very high economic costs and with constitutional and security risks," and thus recommended not extending the life of these plants.[35] Yet, unlike the 2011 decision, the public was not uniformly on the Green Party's side. Polling showed that amid the distressing war and energy insecurity Germany was facing, 57% of the public supported keeping the nuclear plants alive longer.[36]

Climate Action and Economy Minister Robert Habeck speaking against extending all three nuclear power plants' lives to save natural gas at a Berlin Press Conference on August 16th, 2022 (Reuters)

[33]Der Spiegel. "Energieversorgung: Söder plädiert für längeren Betrieb der Atomkraftwerke." *Der Spiegel*, March 2, 2022, sec. Wirtschaft.
[34]phoenix [@phoenix_de]. Tweet. *Twitter*, March 3, 2022. https://twitter.com/phoenix_de/status/1499394528884658178.
[35]Bundesumweltministeriums. "Bundesumweltministerium und Bundeswirtschaftsministerium legen Prüfung zur Debatte um Laufzeiten von Atomkraftwerken vor- BMUV - Pressemitteilung." Bundesministerium für Umwelt, Naturschutz, nukleare Sicherheit und Verbraucherschutz, March 8, 2022.
[36]Gordon, Paul. "Majority of Germans Is in Favour of Oil and Gas Embargo against Russia - Survey." Clean Energy Wire, March 14, 2022.

As the war raged on, the Green Party was still hesitant to extend the lives of these three nuclear plants, but pressure from the FPD, the public, and international politicians continued. By August, Minister Habeck stated that while he still was against keeping the last three nuclear plants open, he was willing to allow for a limited extension of the Isar 2 nuclear power plant in Bavaria due to the lack of wind power in the state.[37] After a stress test on the German electricity grid system was conducted in September for Habeck's ministry, the four German transmission system operators determined that an energy crunch could occur in extreme scenarios (which luckily did not arise because of the 2022/23 winter's abnormal warmth).[38] The Green Party, even if it wanted to, could not shirk off this finding. In response, Habeck announced that Isar 2 and Neckarwestheim 2 should run as a reserve until mid-April 2023 in case they were needed, with the condition that no new nuclear fuel elements were to be loaded.[39] However, the FDP, along with the CSU/CSU opposition, called for a longer extension of several years to better handle and smooth out the energy crisis, even if it meant procuring new fuel rods.[40] FDP parliament group leader Johannes Vogel claimed that "Habeck's emergency reserve was a step ahead" but still only a "political emergency exit" and argued that the zero-emission nuclear energy should be "a matter of reason," with all three plants continuously running until 2024.[41] The government then set a deadline of October 10th to decide on a proposed amendment for the nuclear extension.[42]

The deadline for the draft law arrived, but due to the Green Party and the FDP's diametrically opposed visions of nuclear energy's future role, no decision was made.[43] Time was ticking, as Isar 2 required repairs if its life was to be extended, and if no decision was promptly made, the reactor would no longer have enough reactivity to continue operation. After an intense closed-door cabinet meeting over what would happen to the Emsland reactor, there was still no solution.[44] The Green Party may have had to accept the temporary life of two of the three

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[37]Wehrmann, Benjamin. "German Econ Min Says Limited Extension of One Single Nuclear Plant Conceivable." Clean Energy Wire, August 22, 2022.
[38]Klimaschutz, BMWK-Bundesministerium für Wirtschaft und. "Stresstest zum Stromsystem: BMWK stärkt Vorsorge zur Sicherung der Stromnetz-Stabilität im Winter 22/23," September 5, 2022.
[39]Ibid.
[40]Wehrmann, Benjamin. "Econ Min Proposes to Keep Two of Germany's Remaining Nuclear Plants on Standby during Winter." Clean Energy Wire, September 6, 2022.
[41]Ibid.
[42]Tagespiegel. "Termin wieder verstrichen: Ampel kann sich bei Atomkraft-Reserve nicht einigen." *Der Tagesspiegel Online*, October 10, 2022.
[43]Ibid.
[44]DW. "Germany's Scholz Seeks to End Coalition's Nuclear Squabble." dw.com, October 16, 2022.

reactors, but going any further would mean going against their policy commitments. Wanting to avoid a crisis, Chancellor Scholz himself had to intervene in the dispute (which is typically not done) and call for the opening of all three reactors until April 15th, with the condition that no new nuclear fuel rods would be purchased.[45] This decision displeased some members of the Green Party, with one member stating that keeping the Emsland plant open was "unfortunate and had no factual or technical reason."[46] Habeck, on the other hand, reluctantly agreed, as he understood the necessity of some political compromise, stating, "I can live and work with it."[47] Therefore, on November 11th, the Bundestag passed an amendment to the Atomic Energy Law to keep the last three nuclear reactors open until April 15th, 2023.[48] The Green Party was forced to adapt, and nuclear energy in Germany could now see its true death day, even if it was slightly later than initially desired.

The Day of Reckoning for Nuclear Energy Comes:

As April 15th fast approached, many groups in the country tried to pressure the federal government to change course or reverse its decision, but the Green Party stood firm. The FDP, as a part of the governing coalition, continued to call for the closure to be extended, but their pleas fell on deaf ears. FDP General Secretary Bijan Djir-Sarai told news outlets, "It is regrettable that the Greens are blocking [our extension] and have no insight," adding that the government was making a "strategic mistake" and "regrettably missing the opportunity to ensure more climate protection and lower energy prices without major effort."[49] Habeck retorted that the last three plants would have "sooner or later gone into dismantling" and argued that "the security of energy supply in Germany was guaranteed during this difficult winter and will continue to be guaranteed."[50] Prime Minister Markus Söder was so irritated by the government's refusal to change course that immediately after the plants closed, he called for the Bavarian Isar 2 reactor

[45]Rinke, Andreas, Riham Alkousaa, Tom Käckenhoff, and Riham Alkousaa. "Germany Pushes to Extend Lifespan of Three Nuclear Plants -Letter." *Reuters*, October 17, 2022.
[46]Ibid.
[47]Ibid.
[48]DW. "German Parliament Approves Nuclear Plants Life Extension." dw.com, November 11, 2022.
[49]T-Online. "Mehrheit der Deutschen dagegen: Atomausstieg laut Habeck 'unumkehrbar.'" www.t-online.de, April 10, 2023.; T-Online. "Kurz vor Atomkraftwerk-Aus: FDP setzt sich für Verlängerung ein." www.t-online.de, April 3, 2023.
[50]Frankfurter Allegemeine. "Atomausstieg: Habeck garantiert Energieversorgung für den Winter." FAZ.NET, April 10, 2023.

to continue running under state responsibility.[51] This audacious plan was expectedly denied by the federal government, with the Green Federal Environment Minister Seffir Lemke saying, "it is downright depressing how a Prime Minister so carelessly ignores licensing and constitutional issues and aspects of nuclear safety," adding that the idea would go against the basic law of the constitution.[52] Even FDP Djir-Sarai agreed, adding that it would be infeasible until a new federal law was written to allow for this.[53]

Nevertheless, these dramatic calls to extend these three nuclear reactors were indicative of the significant changes in public sentiment toward closing down nuclear reactors. According to polling the week before the closing for the German Press Agency, only 26% of respondents supported the decision to close down the nuclear plants, with 32% wanting to keep the plants open for another limited period of time and 33% wanting the plants to continue running with no time limit (totaling a majority of 65% who disagreed with the decision).[54] A majority of supporters of every party except the Greens wanted to keep the reactors open, and even the Green Party itself was now split, with only 56% of their supporters agreeing with the decision.[55] People's apprehensions changed eleven years after Fukushima: people were no longer afraid of an atomic crisis, but fearful of paying their costly energy bills.[56] This fear of energy prices could be seen in the data when grouped by region, with people in eastern Germany (who still have lower incomes compared to their Western counterparts) being even less supportive of getting rid of nuclear energy.[57]

When the last three plants closed, the Green Party was unsurprisingly excited. They finally accomplished something they had been dreaming of for the past forty years. Ricarda Lang, head of the Green's parliamentary group, tweeted that this momentous occasion would mark "the final entry into a new age of renewables," and the Green Party declared that this day would further accelerate the country toward renewable energies, noting that wind and solar

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[51]tagesschau.de. "Breiter Widerstand gegen Söders AKW-Forderung." tagesschau.de, April 17, 2023.
[52]Ibid.
[53]Ibid.
[54]T-Online. "Mehrheit der Deutschen dagegen: Atomausstieg laut Habeck 'unumkehrbar.'" www.t-online.de, April 10, 2023
[55]Ibid.
[56]Rühle, Lea. "77 Prozent der Verbraucher machen sich zunehmend Sorgen wegen steigender Energiepreise | YouGov." YouGov, May 10, 2022.
[57]T-Online. "Mehrheit der Deutschen dagegen: Atomausstieg laut Habeck 'unumkehrbar.'" www.t-online.de, April 10, 2023

power had much lower production costs compared to nuclear energy.[58] Greenpeace had nuclear phaseout festivals in Berlin and Munich, and they even installed a giant T-Rex surrounded by nuclear waste being slain in front of the Brandenburg Gate (even though dinosaurs are typically associated with fossil fuels).[59]

Greenpeace's display celebrating the end of nuclear power in front of the Brandenburg gate on the week of April 15th, 2023 (Greenpeace)

However, not all reactions were so positive. Many environmentalists were against the decision, noting how climate-harming coal was often being used as a replacement for the nuclear energy being lost. Greta Thunberg, the famous climate activist, protested the opening of new coal mines in Germany in 2022 and stated that she thought "it was a very bad idea to focus on coal when [nuclear power] is already in place," adding that "if you already have [nuclear power plants] running, I feel it's' a mistake to close them and focus on coal."[60] At the same time Greenpeace was celebrating the end of nuclear energy at the Brandenburg, the Nuklearia association was also protesting the decision there, as they believed that nuclear energy was

[58]DW. "German Politicians Split as Last Nuclear Plants Close." dw.com, April 16, 2023.
[59]Ibid.
[60]Hallam, Mark. "Greta: Germany Making 'mistake' by Ditching Nuclear for Coal." dw.com, October 11, 2022.

needed to "protect nature and the climate."[61] Deputy Parliamentary leader of the CDU said the closure of the nuclear reactors was "a black day for climate protection in Germany," and their party released a message stating that this decision would result in more emissions for the time being, as well as make Germany more dependant on energy from other nations as an energy importer.[62] Moreover, many industry leaders were against the decision, with the President of the Association of German Chambers of Commerce and Industry (DIHK) expressing that the government should "expand the supply of energy and not restrict it any further."[63] Clearly, the decision to end nuclear energy was not as unanimous as it had been just a decade ago. Yet, the Green Party, still holding dearly to their initial dreams, refused to budge on their commitments.

Did Germany make the "Right Decision"?

Was the federal government and Greens' decision to close down these last three nuclear plants the "right" decision? To answer this question, we will examine the implications of this decision economically, environmentally, and politically, and then, from there, draw conclusions. This will not be an analysis of whether it was the "right" decision to close down all nuclear power plants since 2011, as that already has considerable analysis and is almost an entirely different question. Rather, this will analyze whether it was correct to follow through with the decision with this law already in place.

The "Right" Economic Decision?

To understand whether Germany's decision to close these three nuclear reactors was the correct economic decision, one must understand how the withdrawal affected energy prices and production. Looking at daily average wholesale energy prices the week of the shutdown, there was no noticeable increase in energy prices following the reduction of the energy supply.[64]

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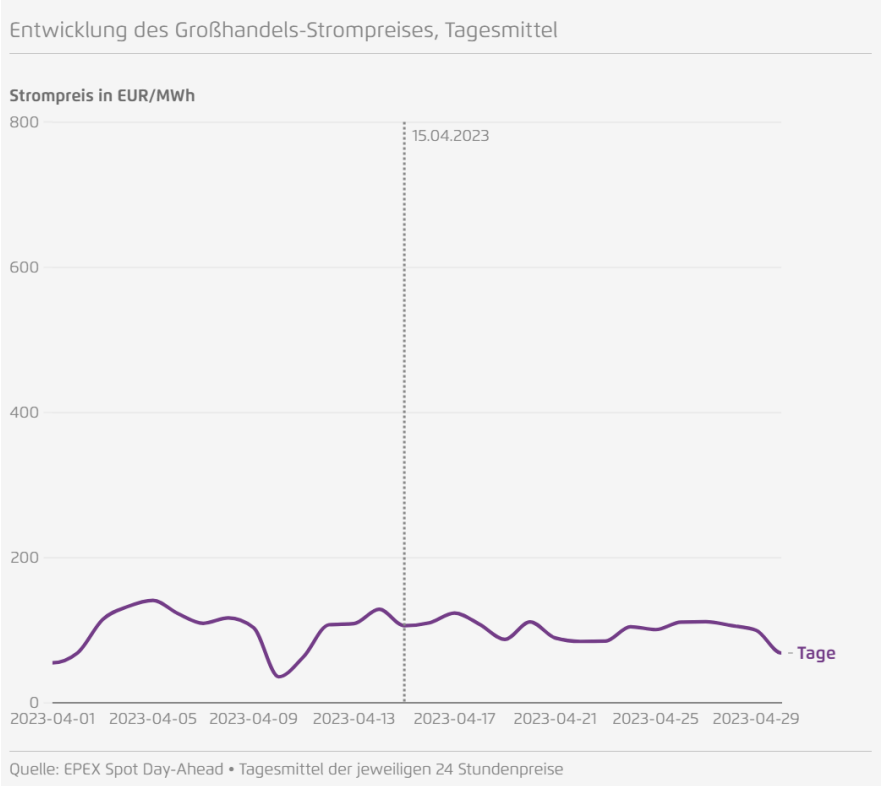
[61]Tagesschau.de. "Deutschlands letzte Atomkraftwerke vom Netz genommen." tagesschau.de, April 16, 2023.

[62]ZDF. "Spahn kritisiert Festhalten am Atomausstieg." ZDFheute, April 11, 2023.; DW. "German Politicians Split as Last Nuclear Plants Close.", April 16, 2023.

[63]Ibid.

[64]Huneke, Fabian. "Ein Jahr Kernkraftausstieg," April 15, 2024.



A Graph of Average Daily Wholesale Energy Prices the Week of Closure, according to research done by think Agora Energiewende[65]

Nonetheless, it is unlikely that the elimination of nuclear energy had no effect on energy prices, as it is more likely that any price increase due to the reduction in supply was offset by other occurrences in the energy market. Unfortunately, this effect was quite difficult to see as energy prices and the energy market were quite volatile during the Russian-Ukraine war, but calculations done by Prognos AG found that if the three nuclear reactors had kept running, energy prices would have been 3 Euros per megawatt lower (0.3 cents per kilowatt hour).[66] This price impact is very insubstantial, considering that the average price before the shutdown was 129 Euros and 110 Euros the day after the shutdown.[67] According to Prognos Analyst Marco Wünsch, this difference is the price is only equal to around one percent of a person's electricity bill and thus "be in the range that no one would notice."[68] This effect on energy prices was especially unnoticeable because, at the same time, France's nuclear fleet began fully running

[65]Ibid.
[66]Ibid.
[67]Ibid.
[68]Storch, Lorenz. "Winter ohne Atomkraft gut überstanden – und Strom ist billiger." BR24, April 15, 2024.

again after completing their safety inspections, which allowed Germany to no longer temporarily support France with energy.[69] Moreover, there was an increase in renewable energy production simultaneous to the closure of the plants, hiding the slight price increase even further.[70]

The fears about a nuclear exit leading to higher energy prices were unsubstantiated, but the concerns of Germany becoming an energy importer were still real. For the first time since 2003, Germany became a net energy importer, with Germany importing significantly more energy in the second quarter of 2023 (importing 18.5 Billion Kilowatt hours of energy and exporting 11.4 Billion Kilowatt Hours of energy), with the difference being about equal to the amount of energy the three nuclear power plants used to generate (7.4 Billion Kilowatt hours).[71] However, this change was not only the result of these nuclear power plants powering off, but also the effect of cheaper energy now being produced elsewhere in Europe compared to Germany, as Germany still had all the required energy supply capacity for its own nation if needed. Coal energy produced in Germany was now being out-competed by cheaper renewable energy in the Alps and Scandinavia, and in addition to German export demand being reduced, France's nuclear fleet was fully operational again and no longer required German support.[72] It must be noted, however, that a quarter of the energy imported into Germany was nuclear energy, making up 1.1% of the electricity demand in Germany.[73]

Therefore, after looking at this data, one cannot say that the closure of these three nuclear power plants led to an energy shortage nor a noticeable increase in prices for households, as energy prices have only continued to fall since April 15th.

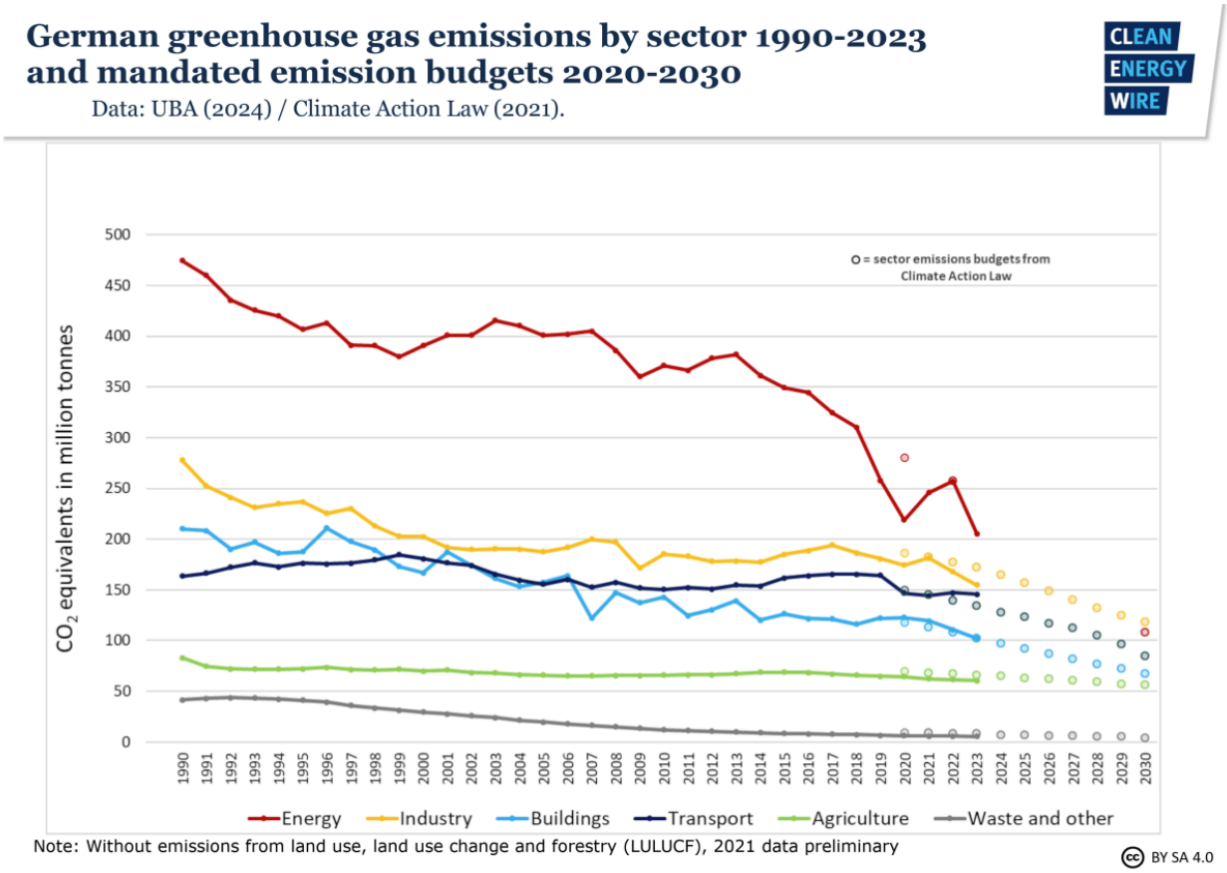
The "Right" Environmental Decision?

There was also the fear that the closure of these three nuclear power plants would increase emissions, with fossil fuels replacing these reactors. This occurred with the nuclear reactors phased out between 2011 and 2020, with reductions in nuclear electricity production being offset by increases in coal-fired production and net imports, leading to increased carbon

[69]Wehrmann, Benjamin. "Nuclear Exit without Notable Effect on German Power Price in First Month – Agency." Clean Energy Wire, May 16, 2023.
[70]Ibid.
[71]Kyllman, Carolina, and Aniket Narawad. "Germany's Electricity Export Surplus Decreases Significantly in First Half of 2023." Clean Energy Wire, September 7, 2023.
[72]Wehrmann, Benjamin. "Q&A - Germany's Nuclear Exit: One Year After." Clean Energy Wire, March 26, 2024.
[73]Huneke, Fabian. "Ein Jahr Kernkraftausstieg," April 15, 2024.

emissions and air pollution.[74] This was not the case, though, when these last three nuclear reactors were closed, as energy from these plants was instead replaced with more renewable energy. According to the Fraunhofer ISE research institute, there was a net increase of 33 terawatt hours of renewable energy in the year following the closure that replaced the 28 terawatt hours of energy lost from the three nuclear power plants.[75] Moreover, coal-fired production fell by an incredible 54 terawatts over the following year, as coal energy was no longer as economically competitive compared to other countries' energy, along with a reduction in the amount of energy Germans used.[76] This transition led to the country's lowest level of carbon dioxide emissions since the 1960s, with renewable energy production now having over a 50% share.[77] Nevertheless, one should note that this decrease in coal energy was exaggerated by the 2022 increase in coal energy usage, which was a response to the shortage of Russian natural gas. Additionally, one could argue that this 2023 decrease in coal power could have been even more significant if nuclear power had also been maintained alongside the reduction in coal and the increase in renewables.

[74]Jarvis, Stephen, Olivier Deschenes, and Akshaya Jha. "The Private and External Costs of Germany's Nuclear Phase-Out." *Journal of the European Economic Association* 20, no. 3 (June 1, 2022): 1311–46.
[75]Wehrmann, Benjamin. "Q&A - Germany's Nuclear Exit: One Year After." Clean Energy Wire, March 26, 2024.
[76]Huneke, Fabian. "Ein Jahr Kernkraftausstieg," April 15, 2024.
[77]Alkousaa, Riham. "Germany's 2023 CO2 Emissions Fall to Lowest in 70 Years but Drop Not yet Sustainable - Study." *Reuters*, January 4, 2024, sec. Environment.



A Graph of Greenhouse Gas emissions by sector from 1990-2023, according to data from the *Umweltbundesamt* (Germany's Federal Environment Agency)[78]

Therefore, while the closure of these last three nuclear power plants certainly did not aid in reducing emissions, the government's work to simultaneously decrease coal usage and expand renewables ensured that carbon emissions did not increase as a direct result of abandoning nuclear energy.

The "Right" Political Decision?

Even though the German government's decision may not have been so obviously a "right" or "wrong" decision economically or environmentally, the public certainly did not see that ambiguity. Right-wing parties, including the far-right AFD, weaponized the decision to end nuclear energy during the Russian-Ukraine war to antagonize the SPD and the Greens.[79] After

[78]Appunn, Kerstine, Freja Eriksen, and Julian Wettengel. "Germany's Greenhouse Gas Emissions and Energy Transition Targets." Clean Energy Wire, March 22, 2024.
[79]Münchau, Wolfgang. "The AfD's Nuclear Option." *New Statesman* (blog), September 5, 2023.

Chancellor Scholz briefly called nuclear energy "a dead horse" in September, right-wing parties quickly jumped on him, with the AFD calling Scholz's coalition "a dead horse," the FDP noting that "other industrial nations are riding that horse with some success," and CDU Michael Gross-Brömer saying there was no need to kill a horse that could have been ridden a few more years.[80] These parties saw the closure of these nuclear power plants as an easy scapegoat for why Germany's economy was not as strong currently and why there were higher energy costs relative to before COVID-19 (which was the result of many factors). Since then, right-wing parties like the AFD and CDU have continued to see rising public support, while the SPD and Greens are losing support.[81] In the same month as those "dead horse" comments, the governing coalition faced the lowest approval rating it had since it started in 2021, with only 19% of polling respondents saying they were "satisfied" with the performance of the government.[82] On the one-year anniversary of the nuclear exit, polling found that a majority of Germans (51.6%) believed that the phasing out of nuclear power was a mistake, with only 28.4% believing that it was the right decision.[83] Even if the decision to kill German nuclear energy may not have led to the nightmare scenarios right-wing parties had prophesied, it could very well lead to some nightmare scenarios for the Green Party come the next election.

Aftermath and Conclusion:

Despite a year having passed, the public has not forgotten about the controversy surrounding the Green Party's decision. At the beginning of 2024, the head of the IEA, Fatih Barol, stated in an interview that Germany's exit from nuclear energy "was a historic mistake" and that they should "have at least left the remaining nuclear power plants online," reigniting some criticism.[84] At the same time, the CDU was pushing for a debate about reopening the three nuclear plants, even though the energy industry thought it would be infeasible.[85] Consequently, in April 2024, the CDU filed a motion in the *Bundestag* to halt the dismantling of the three nuclear

[80]Ibid.
[81]Staudenmeier, Rebecca, and Sabine Kinkartz. "Satisfaction in German Government Plummets." dw.com, September 1, 2023.
[82]Ibid.
[83]Verivox. "Mehrheit Der Deutschen Hält Atomausstieg Für Einen Fehler," April 15, 2024.
[84]Matthes, Sebastian, and Jens Münchrath. "IEA-Chef Fatih Birol: „Der Ausstieg aus der Kernkraft ist ein historischer Fehler"." Handelsblatt, January 23, 2024.
[85]Beck, Kilian. "Merz' CDU fordert „Option" Kernkraft – Antwort der Betreiber fällt klar aus." Merkur, January 13, 2024.

plants until a future government could make a final decision in the future.[86] Most shocking of all, in a bombshell report released last week, political news magazine Cicero accused Habeck's ministry of intentionally covering up critical technical reports before publishing their March 8th press release that spoke against extending the lives of the three nuclear power plants (discussed on page 8).[87] After winning a lawsuit against Habeck's ministry for not being able to access all the documents related to the ministry's press release, Cicero gained access to files that had damning information.[88] Cicero claims that junior green ministers re-wrote documents to fictiously argue that the nuclear power plants were not safe on a technical and security basis.[89] Moreover, Cicero asserts that internal emails reveal that Habeck's ministry followed through with this deceit out of a desire to end any debate on keeping nuclear energy.[90] Now Habeck is facing calls for investigation as well as resignation, even though he denies the allegations and states that "it is untrue that reports [were] changed into the opposite."[91] In an appalling turn, the Green Party is now under scrutiny for potentially ignoring their ethical obligations to achieve their goals.

Germany's federal government, with the Green Party at the driving wheel, accomplished something many perceive as rare in politics: they kept their promise. Nuclear energy was now finally dead in Germany, a goal that the Green Party had ever since they started protesting at construction sites in Wyhl. Yet, that decision was not the right political move for the Green Party's own future. By attempting to avoid the current war's changed context, they lost track of how people's outlooks on nuclear energy had changed. With the rising fears of climate change, a change in national security circumstances, and growing anxiety about energy prices and the economy for average citizens, the Green Party should have adapted more to the changing surroundings of the time. The Green Party was so blinded by their objective of ending nuclear energy that they failed to see what the people, including many of their own supporters, right in

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[86]Wehrmann, Benjamin. "Nuclear Exit without Notable Effect on German Power Price in First Month – Agency." Clean Energy Wire, May 16, 2023.
[87]Oliver, Matt. "German Greens Accused of Lying over Nuclear Power Safety to Force Plant Shutdowns." *The Telegraph*, April 26, 2024.
[88]Gräber, Daniel. "Habecks Geheimakten - Wie die Grünen beim Atomausstieg getäuscht haben | Cicero Online." Cicero, April 25, 2024.
[89]Oliver, Matt. "German Greens Accused of Lying over Nuclear Power Safety to Force Plant Shutdowns." *The Telegraph*, April 26, 2024.
[90]Gräber, Daniel. "Habecks Geheimakten - Wie die Grünen beim Atomausstieg getäuscht haben | Cicero Online." Cicero, April 25, 2024.
[91]Packroff, Jonathan, and Nikolaus J. Kurmayer. "German Green's Minister Robert Habeck under Fire over 2022 Nuclear Shutdown." www.euractiv.com, April 26, 2024.

front of them wanted. They failed to realize that policy promises should be followed with the current public in mind, not the public of the past. So, while the delayed closure of these three nuclear power plants may not have directly led to higher energy prices or increased emissions, it allowed the Green Party's political opponents to scapegoat them as the problem destroying Germany. The Green Party and the SPD may have succeeded in killing nuclear energy during wartime, but because of their obstinacy, an electoral war coming next election may kill their ability to retain political power.

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