

We negate the Resolved: The United States federal government should substantially increase its investment in domestic nuclear energy.

Our sole argument revolves around the environment

Renewable energy is rapidly advancing and can address energy needs by 2035

Beinhocker 25 Eric Beinhocker, 2-28-2025, "The Clean Energy Revolution Is Unstoppable", [Eric Beinhocker is a Professor of Public Policy Practice at the Blavatnik School of Government, University of Oxford. He is also the founder and Executive Director of the Institute for New Economic Thinking at the University's Oxford Martin School. INET Oxford is an interdisciplinary research center dedicated to the goals of creating a more inclusive, just, sustainable, and prosperous economy. Beinhocker is also a Supernumerary Fellow in Economics at Oriel College and an External Professor at the Santa Fe Institute.], <https://www.wsj.com/business/energy-oil/the-clean-energy-revolution-is-unstoppable-88af7ed5>, DOA 3-25-2025 //Wenzhuo recut //cy

Since Donald Trump's election, clean energy stocks have plummeted, major banks have pulled out of a U.N.-sponsored "net zero" climate alliance, and BP announced it is spinning off its offshore wind business to refocus on oil and gas. Markets and companies seem to be betting that Trump's promises to stop or reverse the clean energy transition and "drill, baby, drill" will be successful. But this bet is wrong. The clean energy revolution is being driven by fundamental technological and economic forces, that are too strong to stop. Trump's policies can marginally slow progress in the U.S. and harm the competitiveness of American companies, but they cannot halt The fundamental dynamics of technological change or save a fossil fuel industry that will inevitably shrink dramatically in the next two decades. Our research shows that once new technologies become established their patterns in terms of cost are surprisingly predictable. They generally follow one of three patterns. The first is a pattern where costs are volatile over days, months and years but relatively flat over longer time frames. It applies to resources extracted from the earth, like minerals and fossil fuels. The price of oil, for instance, fluctuates in response to economic and political events such as recessions, OPEC actions or Russia's invasion of Ukraine. But coal, oil and natural gas cost roughly the same today as they did a century ago, adjusted for inflation. One reason is that even though the technology for extracting fossil fuels improves over time, the resources get harder and harder to extract as the quality of deposits declines. here is a second group of technologies whose costs are also largely flat over time. For example, hydropower, whose technology can't be mass produced because each dam is different, now costs about the same as it did 50 years ago. Nuclear power costs have also been relatively flat globally since its first commercial use in 1956, although in the U.S. nuclear costs have increased by about a factor of three. The reasons for U.S. cost increases include a lack of standardized designs, growing construction costs, increased regulatory burdens, supply-chain constraints and worker shortages. A third group of technologies experience predictable long-term declines in cost and increases in performance. Computer processors are the classic example. In 1965, Gordon Moore, then the head of Intel, noticed that the density of electrical components in integrated circuits was growing at a rate of about 40% a year. He predicted this trend would continue, and Moore's Law has held true for 60 years, enabling companies and investors to accurately forecast the cost and speed of computers many decades ahead. Clean energy technologies such as solar, wind and batteries all follow this pattern but at different rates. Since 1990, the cost of wind power has dropped by about 4% a year, solar energy by 12% a year and lithium-ion batteries by about 12% a year. Like semiconductors, each of these technologies can be mass produced. They also benefit from advances and economies of scale in related sectors: solar photovoltaic systems from semiconductor manufacturing, wind from aerospace and batteries from consumer electronics. Solar energy is 10,000 times cheaper today than when it was first used in the U.S.'s Vanguard satellite in 1958. Using a measure of cost that accounts for reliability and flexibility on the grid, the International Energy Agency (IEA) calculates that electricity from solar power with battery storage is less expensive today than electricity from new coal-fired plants in India and new gas-fired plants in the U.S. We project that by 2050 solar energy will cost a tenth of what it does today, making it far cheaper than any other source of energy. At the same time, barriers to large-scale clean energy use keep tumbling, thanks to advances in energy storage and better grid and demand management. And innovations are enabling the electrification of industrial processes with enormous efficiency gains. The falling price of clean energy has accelerated its adoption. The growth of new

technologies, from railroads to mobile phones, follows what is called an S-curve. When a technology is new, it grows exponentially, but its share is tiny, so in absolute terms its growth looks almost flat. As exponential growth continues, however, its share suddenly becomes large, making its absolute growth large too, until the market eventually becomes saturated and growth starts to flatten. The result is an S-shaped adoption curve. The energy provided by solar has been growing by about 30% a year for several decades. In theory, if this rate continues for just one more decade, **solar power with battery storage could supply all the world's energy needs by about 2035.** In reality, growth will probably slow down as the technology reaches the saturation phase in its S-curve. Still, based on historical growth and its likely S-curve pattern, we can predict that renewables, along with pre-existing hydropower and nuclear power, will largely displace fossil fuels by about 2050. For decades the IEA and others have consistently overestimated the future costs of renewable energy and underestimated future rates of deployment, often by orders of magnitude. The underlying problem is a lack of awareness that technological change is not linear but exponential: A new technology is small for a long time, and then it suddenly takes over. In 2000, about 95% of American households had a landline telephone. Few would have forecast that by 2023, 75% of U.S. adults would have no landline, only a mobile phone. In just two decades, a massive, century-old industry virtually disappeared. If all of this is true, is there any need for government support for clean energy? Many believe that we should just let the free market alone sort out which energy sources are best. But that would be a mistake. History shows that technology transitions often need a kick-start from government. This can take the form of support for basic and high-risk research, purchases that help new technologies reach scale, investment in infrastructure and policies that create stability for private capital. Such government actions have played a critical role in virtually every technological transition, from railroads to automobiles to the internet. In 2021-22, Congress passed the bipartisan CHIPS Act and Infrastructure Act, plus the Biden administration's Inflation Reduction Act (IRA), all of which provided significant funding to accelerate the development of the America's clean energy industry. Trump has pledged to end that support. The new administration has halted disbursements of \$50 billion in already approved clean energy loans and put \$280 billion in loan requests under review. The legality of halting a congressionally mandated program will be challenged in court, but in any case, the IRA horse is well on its way out of the barn. About \$61 billion of direct IRA funding has already been spent. IRA tax credits have already attracted \$215 billion in new clean energy investment and could be worth \$350 billion over the next three years. Ending the tax credits would be politically difficult, since the top 10 states for clean energy jobs include Texas, Florida, Michigan, Ohio, North Carolina and Pennsylvania—all critical states for Republicans. Trump may find himself fighting Republican governors and members of Congress to make those cuts. It is more likely that Trump and Congress will take actions that are politically easier, such as ending consumer subsidies for electric vehicles or refusing to issue permits for offshore wind projects. The impact of these policy changes would be mainly to harm U.S. competitiveness. By reducing support for private investment and public infrastructure, raising hurdles for permits and slapping on tariffs, the U.S. will simply drive clean-energy investment to competitors in Europe and China. Meanwhile, Trump's promises of a fossil fuel renaissance ring hollow. U.S. oil and gas production is already at record levels, and with softening global prices, producers and investors are increasingly cautious about committing capital to expand U.S. production. The energy transition is a one-way ticket. As the asset base shifts to clean energy technologies, large segments of **fossil fuel demand will permanently disappear.** Very few consumers who buy an electric vehicle will go back to fossil-fuel cars. Once utilities build cheap renewables and storage, they won't go back to expensive coal plants. If the S-curves of clean energy continue on their paths, the fossil fuel sector will likely shrink to a niche industry supplying petrochemicals for plastics by around 2050.¶ For U.S. policymakers, supporting clean energy isn't about climate change. It is about maintaining American economic leadership. The U.S. invented most clean-energy technologies and has world-beating capabilities in them. Thanks to smart policies and a risk-taking private sector, it has led every major technological transition of the 20th century. It should lead this one too.

Indeed - Weiss 25 (Tim Weiss, Co-Founder & CEO of Optera. "What 2025 Means for the Climate Crisis and Businesses", 1/17/25, SDC,
<https://www.sdcexec.com/sustainability/carbon-footprint/article/22930386/optera-what-2025-means-for-the-climate-crisis-and-businesses> DOA 3/17/25)SRT

As a result, investors, consumers, regulators and markets are paying closer attention to companies' climate initiatives than ever before. In the last few years, the U.S. government has introduced some initiatives to address climate change. However, the Trump administration is unlikely to accelerate emissions reduction activities through regulatory action. The president supports increased production of fossil fuels, rather than investing in new, forward-looking clean energy technologies. Because these technologies have not yet achieved economies of scale, a lack of federal investment will hamper their growth and adoption. The government's opposition to ESG and sustainability initiatives may also curtail regulations like

the SEC's climate disclosure rules. Without federal guidance, the **private sector must take the lead** on decarbonization initiatives. Market Demand for a Low-Carbon Economy **Companies have a lot to gain from transitioning** to a low-carbon economy. Consumers and **investors demand this change, even if the federal government does not continue** actively incentivizing the transition. Investor pressure for supply chain sustainability has surged 25% in five years. Another study found that sustainability is one of the top three purchasing criteria for corporate buyers, and 75% of consumers believe practicing a sustainable lifestyle is important. U.S. survey respondents said they would pay 10% more for environmentally friendly products. **Renewable energy makes business sense, too.** These **sources are cheaper and less subject to dramatic price swings** than fossil fuels, **while also reducing transition risks** in the supply chain. Bloomberg projects that **market dynamics** alone **will drive renewables to account for 50% of energy production in the next five years.** Taking no action will be costly to the planet and the bottom line. McKinsey estimates that failure to reduce emissions could put 20% of a company's profits at risk by 2030 because of the increased push toward sustainability. Companies are taking action toward this goal.

Affirming derails progress, every dollar spent on nuclear is a dollar taken away from renewables

CAN 24 Climate Action Network, 3-18-2024, "POSITION PAPER: The nuclear hurdle to a renewable future and fossil fuel phase-out," [Climate Action Network (CAN) Europe is Europe's leading NGO coalition fighting dangerous climate change. We are a unique network, in which environmental and development organisations work together to issue joint lobby campaigns and maximise their impact], <https://caneurope.org/position-paper-nuclear-energy/>, DOA 3-25-2025 //Wenzhuo recut //cy

More than three-quarters of the EU's greenhouse gas emissions stem from our energy consumption, **therefore it is vital to stop burning fossil fuels to limit temperature rise to 1.5°C**, the Paris Agreement target. Together with members, and external experts, we developed our Paris Agreement compatible (PAC) energy scenario, which provides a robust, science-based pathway for Europe's energy landscape. On the basis of this work, CAN Europe advocates for a phase-out of coal by 2030, gas by 2035, and a 100% renewables-based energy system by 2040, which requires the phase-out of nuclear power by then.

The **disruption of nuclear power** can be observed in many countries, not only in Europe. In Dubai, at COP28, CAN was strongly opposed to and called out countries, supporting and signing the pledge led by the USA, UK, France and 18 other countries to globally triple nuclear power in the next 25 years. This goal is much higher than the high bracket of International Energy Agency (IEA) scenarios, already based on improbable hypotheses and risks to distract from the tripling of Renewable Energy capacities that was agreed by a much larger group of countries at COP28. In 2023, there was an **alarming push and a surge in support for nuclear power** within the EU political space. This development is creating significant tension with proponents of energy sufficiency and a fully renewable energy system and marks a regressive step in efforts towards a sustainable and just energy transition. While nuclear champions claim that nuclear energy can work hand-in-hand with renewables, it is becoming increasingly clear that nuclear power acts as a significant hurdle to energy efficiency investments, the roll-out of renewables and fossil fuel phase-out in three spheres: the EU political debate, energy system planning, and decentralisation. Climate Action Network International, the global umbrella under which CAN Europe participates, with a community of almost 2000 members from civil society, in more than 130 countries, stands united in opposing new and existing nuclear power stations. In 2020, we reviewed and agreed the CAN Charta, the 'highest' document for all CAN members, the international secretariat and the regional nodes, and we listed under strategies "Promoting a nuclear-free future". A hurdle in the policy debate The starting gun for a renewed attempt at a nuclear renaissance was the inclusion of nuclear in the EU Taxonomy in 2022, and can be seen as the nuclear lobby's blueprint for its future ambitions – creating a large political debate using arguments of "technology neutrality" and a "level playing field" and forming alliances with fossil fuel advocates (in this case, fossil gas) in order to reduce ambition to sustainable solutions. Since then, a French-led campaign, manifested through the 14 Member State "Nuclear Alliance", coupled alongside the lobbying activities of the nuclear industry, has run roughshod through EU energy and climate policy over the last two years. Continuing the narrative of "technology neutrality" and a "level playing field", this mission has aimed at promoting nuclear energy at the direct expense of a transition to a 100% renewable-based energy system, in legislation such as the Renewable Energy Directive, Electricity Market Design and Net Zero Industry Act. Attempting to lower renewable ambition In the context of the Renewable Energy Directive (RED III) revision, France tested the waters in 2023 by calling for a low-carbon 'weighting' in EU renewables target in order to support a higher EU 2030 renewable energy target of 45%, where so-called 'low carbon' energy sources are taken into account when establishing national renewable energy targets. Though this did not see the light, a concession was won on renewable

hydrogen and gained provisions to facilitate nuclear-produced hydrogen – risking further watering down a renewables-based technology pathway. The EU Commission launched its proposal for the Net Zero Industry Act (NZIA) in March 2023 as a response to the Inflation Reduction Act (IRA) of the United States. While nuclear was included as a list of technologies that were seen as making a contribution to decarbonisation, the EU Commission President, Ursula von der Leyen, refused to include it in the list of “strategic technologies”, which could receive additional support. The list was limited, as to be better targeted, at technologies such as solar, wind, energy storage, heat pumps and grid technologies. The final political agreement has led to the inclusion of “nuclear fission energy technologies” as strategic, while this debate allowed the list to become so extensive it practically loses any strategic element. Delaying fossil phase out via dirty trade-offs During the Electricity Market Design reform, nuclear and fossil fuel promoters in the Parliament attempted to derail a deal supporting renewables and flexibility. In the Council, due to the focus of the Nuclear Alliance on the Contracts for Difference (supported by some coal dependent countries) the negotiations were delayed by several months and conversations redirected away from renewables, leading to a deal supporting subsidies for existing and new nuclear reactors and a prolongation of subsidies to coal power plants via capacity mechanisms. Wasting time and diverting attention As the nuclear debate aggressively dominates political negotiations, media, and public discourse, it blatantly diverts critical attention from advancing the existing, affordable, sustainable solutions to the energy transition. This overwhelming focus on nuclear power not only overshadows but also poses a risk of derailing the European energy transition, hindering progress towards aligning with the ambitious yet achievable goal of a 100% renewable energy system by 2040. A hurdle to a fully renewables based power system CAN Europe’s assessment of the draft National Energy and Climate Plans highlights that not a single Member State plan is aligned to a 1.5°C compatible trajectory, nor minimum EU climate and energy requirements for 2030. Increased ambition is required on energy efficiency, energy savings, renewables and fossil fuels phase-out, while Member States are betting on false solutions to the challenge at hand, such as nuclear energy. As highlighted in our NECP analysis, the EU has inadequate renewables expansion, grossly insufficient investment in energy efficiency, late coal phase-out deadlines and gas dependence, while countries such as Bulgaria, Czechia, Estonia, France, Hungary, the Netherlands, Poland, Romania and Slovenia, are considering new nuclear that might never materialise. In 2023, Sweden has revised its 2040 target for 100% renewable electricity to 100% decarbonised electricity, to allow for continued and new nuclear power, and it is now clear that it can only happen with direct state aid. Italy, which voted against nuclear power in a referendum, is now investigating future nuclear power, while delaying quitting coal by 4 years. The largest nuclear power plant in Europe, the Zaporizhzhia Nuclear Power Plant in Ukraine, is currently occupied by the Russian military and Rosatom in an active warzone, but has not prevented Ukraine from including new nuclear power in its reconstruction. The Paris Agreement Compatible (PAC) scenario, on the other hand, emphasises renewables-based electrification, calling for determined and heightened attention to enable a 100% renewable-based EU energy system by 2040, and foresees no need for nuclear power in Europe. Nuclear power is too expensive When compared to renewables, the latest analysis from World Nuclear Industry Status Report, using the data from Lazard, determines that the levelized cost of energy (LCOE) for new nuclear plants makes it the most expensive generator, estimated to be nearly four times more expensive than onshore wind, while unsubsidized solar and wind combined with energy storage (to ensure grid balancing) is always cheaper than new nuclear. When compared against energy savings, analysis by Hungarian NGO Clean Air Action Group highlights that it is more economically efficient to invest in the renovation of households to save energy than in the construction, operation, and decommissioning of a new nuclear reactor. These findings were confirmed by a separate study by Greenpeace France, that showed that by investing 52 billion euros in a mix of onshore wind infrastructure/photovoltaic panels on large roofs, it would be possible to avoid four times more CO2 emissions than by investing the same amount in the construction of six EPR2 nuclear reactors by 2050, while electricity production triples. By investing 85 billion euros of government subsidies in energy savings by 2033, it would be possible to avoid six times more cumulative CO2 emissions by 2050 than with the construction program of six EPR 2 reactors. This would also make it possible to lift almost 12 million people out of energy poverty in a decade. Recent European projects in Slovakia, the UK, France, and Finland demonstrate the dramatic rising costs. EDF admitted that the costs for the British nuclear facility Hinkley Point C will skyrocket to 53.8 billion euros for the scheduled 3.2 GW power plant, more than twice as much as scheduled in 2015 when the plant was approved. The French project in Flamanville was originally projected to cost 3.3 billion euros when it began construction in 2007, but has since risen to 13.2 billion euros (16.87 billion euros in today’s money). The Finnish Olkiluoto-3 project 1.6GW reactor cost 3 times more than the original forecast price, reaching 11 billion euros. Slovakia’s second generation reactors Mochovce 3 and 4 ballooned costs to 6.4 billion euros from an initially estimated 2.8 billion. Slovenia’s president announced that a new 1.6GW reactor would cost 11 billion euros, following the Finnish

example, demonstrating that these high prices are here to stay. In order to finance new and ongoing projects, the EU has approved State Aid for nuclear, in the case of Hungary, Belgium, and the United Kingdom, while national governments seek support schemes. Despite making references to technology-neutrality, this creates an unlevel playing field slanted against renewable energy. Given the significant investment gap to achieve 2030 climate targets, and the limited fiscal space of many Member States, investments in nuclear risk divert precious public resources into projects of poor value-for-money compared to alternatives in a renewables-based system, while reducing the availability of public resources for all other components of the energy transition. Such a choice would equally fail to reduce prices for consumers in the context of the current fossil fuel energy crisis. Finally, the costs would be even larger if accounting for “unpaid externalities” borne by taxpayers and the public at large, from nuclear accident risks that are impossible to insure against by private actors. The costs of decommissioning of a nuclear power plant, which can cost 1-1.5 billion euros per 1000 MW, are often borne by the public as these costs are poorly taken into account when planning a new nuclear installation. The cost associated with storing radioactive waste for hundreds of thousands of years is also often undervalued, alongside costs associated with radioactive leaks from plants or storage facilities, as demonstrated by the radioactive leaks in the UK Sellafield site, causing tension with Ireland and Norway. To lower costs, attempted lowering of safety and environmental standards can be expected, posing risks to communities, nature, and society at large, also as a burden to future generations. New nuclear construction is too slow. A rapid transition requires the use of existing technologies and solutions which can most quickly be rolled-out such as renewables, primarily solar and wind, energy efficiency, and system flexibility. For years, new nuclear energy projects in Europe have been plagued with delays and, coupled with an untrained workforce, are unable to support the speed of decarbonisation necessary. New nuclear plants typically take 15-20 years for construction, hence failing to address immediate decarbonisation needs to 2030. Indicatively, France's six new reactors are estimated by its network operator to enter into use in 2040-2049, much too late to have any meaningful impact on emissions reduction needed already now, with a view to pathways to 2050, and beyond, for a sustainable future.

The grid can't handle both types of energy

CANE 24 finds “POSITION PAPER: The nuclear hurdle to a renewable future and fossil fuel phase-out.” CAN Europe. March 18, 2024. <https://caneurope.org/position-paper-nuclearenergy/>. Accessed March 8, 2025.

The inflexibility of nuclear, caused by technical limitations, safety requirements and economic factors, prevents the feed-in of renewable electricity into the grid, causing grid congestion and curtailment. Nuclear's dominance over grid capacity can block the connection of new renewable energy projects, where even announced and then abandoned plans for a new nuclear unit can delay renewable projects connection, allowing for continued fossil fuel usage. Grid structures designed for large-scale, centralised nuclear power, make it more challenging, time-consuming and costly to introduce small-scale distributed renewable power.

Nuclear systems are incompatible with renewable development

Hockenos 22 [Paul Hockenos, "Why Nuclear Power and Renewables Don't Mix", 11/24/2022, EnergyTransition, <https://energytransition.org/2022/11/why-nuclear-power-and-renewables-dont-mix/>]

Nuclear energy's proponents regularly claim that among the technologies' many benefits, it is well suited to provide round-the-clock balancing support for intermittent renewables. After all, they say, solar and wind power are weather dependent and nuclear isn't, thus it will

always be there when the sun isn't shining and the wind is still. Take this 2019 statement by the International Atomic Energy Association (IAEA): "Nuclear power can generate enormous amounts of reliable, carbon free electricity. It works day and night, at all times of the year. This stability is the reason why nuclear power has typically been used as baseload—operating continuously with little if any variation in output. Some nuclear power plants [Small Modular Reactors, SMRs], however, now contribute to the stability of electricity grids by backing up the intermittent output of renewable sources through flexible operation or load following—adjusting production as electricity demand fluctuates." Of course, in light of France's acute energy crisis this year – currently over half of its nuclear is down – it's hard to call nuclear power reliable. And there's plenty of evidence that nuclear isn't carbon-free, either. A 2014 Intergovernmental Panel on Climate Change (IPCC) report, for example, which takes into account the entire life cycle of a nuclear power plant, estimates a range of 3.7 to 110 grams of CO2 equivalent per kilowatt-hour. And the SMRs generate more CO2 during construction than those built in previous decades, due to stricter safety regulations, Ben Wealer of the German Federal Office for the Safety of Nuclear Waste Management (BASE) told Deutsche Welle. But Couture, a Canadian national who has lived and worked in Berlin for over a decade, takes issue with the contention that nuclear segues well with clean energy, even the smaller SMRs. "Nuclear power and variable renewables like solar and wind are like oil and water. They don't mix, at least not well," he says. Even the SMRs that the IAEA touts, says Couture, do not ramp up and down easily. "Nuclear is inherently inflexible, and to accommodate the variability of wind and solar output, what we ultimately need is both flexible sources of supply, and greater flexibility of demand. The presence of nuclear actively hinders both." Couture explains that they compete against each other rather than working together. Nuclear, he argues, "wants to operate as much as possible, while solar and wind want to be dispatched all the time, for the simple reason that they have a near-zero marginal cost and outprice everything else on the market. Put those two together and you have the following situation: as soon as you reach modest levels of variable renewables in the mix, one of two things starts happening: either solar and wind start pushing out the nuclear, or nuclear starts pushing out the solar and wind. Like oil and water," he says. And Couture is not alone in his analysis. A University of Sussex Business School study concludes that nuclear and renewable energy programs do not tend to co-exist well together in low-carbon energy systems but instead crowd each other out and limit effectiveness. Beleaguered France and its nuclear developer EDF, Couture underscores, is a case and point. "What many nuclear engineers, and much of EDF management, seem to have failed to appreciate is that power systems in the future need one thing, and lots of it, and that's flexibility." And flexibility, he says, is one thing that nuclear is ill-equipped to provide. "People who work in power markets know this," says Couture, "but it merits underscoring: nuclear is the least flexible power source on the grid." As a result, France has one of the most inflexible power systems in the EU, and as we've seen recently, one of the most brittle, he says. "While other countries across Europe are making headway in increasing the flexibility of demand, accelerating the digitalization and real-time operation of the power system, including appliances, loads, and metering, France is lagging behind. EDF and its management have bequeathed an ossified, inflexible power system to future generations of French citizens, a power system that is going to be increasingly vulnerable to interruption due to maintenance- and climate-related risks and events (low water levels in rivers, lack of cooling water, brittle pipes, etc.)" Keeping in mind that the average age of France's nuclear fleet is 37 years old, Couture argues, the entire fleet is at a heightened risk of malfunction in the years ahead. The inability of nuclear power to ramp down effectively to "make room" for cheap wind and solar is one of the main reasons why France's own domestic renewable energy development has lagged its peers, and why it has only belatedly and begrudgingly allowed the expansion of interconnections with the Iberian peninsula, argues Couture. "EDF doesn't want all this low-cost solar and wind from Spain and Portugal entering their system, and getting in the way of their nuclear fleet. It took a lot of arm-twisting and some EU funding to get a new power line built in the last year or two." Now, what does this mean for today? France – and by extension, Europe's – power supply crunch would be far less acute if France had allowed greater interconnection capacity to be developed to the Iberian peninsula, i.e. if nuclear had been able to "make more room" for wind and solar in the system, says Couture. "[For Example] The inability of France's nuclear fleet to make room for wind and solar in this way has thus

exacerbated the continent-wide power supply crunch we're now seeing. And now that the tide is going out and over half of France's nuclear fleet is down, we can see clearly how vulnerable France's nuclear build-out has ultimately left it."

This has historically happened in a lot of places

Harvey **Wasserman**, Progressive.org, 04-22-20**23** // // Earth Day 2023: A Newly Post-Nuclear Germany vs. California's Reactor Relapse // <https://progressive.org/latest/earth-day-2023-germany-vs-california-wasserman-04222023/> // accessed 3-28-2025 // ashe

On April 15, **Germany** claimed a huge global landmark by becoming one of the world's wealthiest nations to pull the plug on atomic power. The decision dates back to 2011, when Germany's powerful Green movement led a national demonstration aiming to **shut** the **seventeen atomic reactors** that, at the time, provided around a quarter of the nation's electricity. Before the rally took place, four reactors blew up in Fukushima, Japan, sending huge clouds of radioactive fallout into the air and ocean. Germany's then-Chancellor Angela Merkel—who has a Ph.D. in quantum chemistry—ordered eight reactors immediately shut, and soon announced a plan to shut the remaining nine by December 31, 2022. This *energiewende*, or "energy transition," substitutes wind, solar, battery storage, and increased efficiency for nuclear power reactors, **moving Germany toward full reliance on renewables**. Germany, **since then [Germany] has invested billions in the renewables sector**, transitioning whole towns to locally owned, rooftop solar power and corporate wind power pumped in from large turbines in the North Sea. The shutdown of the final three reactors was delayed by nearly four months due to natural gas shortages caused by the Russian war in Ukraine. It was also complicated by a major atomic breakdown **in** neighboring **France**. **Heavily reliant on nuclear power**, France's **more than fifty** standard-design **reactors succumbed to** a wide range of **problems, including** generic **structural flaws and warming rivers** too hot to cool their super-heated radioactive cores. In 2022, with more than half its fleet of reactors under repair, France made up for the energy shortfall by importing power from Germany, much of it fired by the burning of coal. This prompted the nuclear industry to criticize Germany's plan by pointing to a rise in the country's CO2 emissions from burning increased quantities of coal, failing to note that much of that power was being exported to France to compensate for its own shuttered reactors. **California, whose** economy may now be slightly larger than Germany's, has taken an opposite route. Two of its **last four reactors**—at San Onofre, between Los Angeles and San Diego—**were shuttered** in 2012 and closed permanently **in 2013** after flaws were found in the turbines and other components. In 2016, a deal was reached to shut the Golden State's last two reactors, located at Diablo Canyon, nine miles west of San Luis Obispo. In the 1970s and 1980s, thousands of protestors were arrested at Diablo Canyon, more than at any other American nuclear plant. The 2016 shutdown deal involved another *energiewende*, based on blueprints to replace Diablo's power with a huge influx of new wind, solar, battery, and efficiency installations. The agreement was approved by the California state legislature, Pacific Gas & Electric (PG&E), the federal Nuclear Regulatory Commission (NRC) and the state Public Utilities Commission. It was signed by then-Governor Jerry Brown, then-Lieutenant-Governor Gavin Newsom, and a wide range of local governments, unions, and environmental groups, all of whom assumed the state would thus be nuke-free once Unit Two was shut in 2025—the date its original forty-year license would expire. But **along the way, the state experienced two** close calls with **partial blackouts**. During both incidents, Newsom, now the governor, asked consumers to dial back their energy use. Ironically, independent battery capacity—mostly controlled by individual owners—helped the state stay lit.

That's terrible, renewables are preferable to nuclear for many reasons

First, nuclear power is inefficient and actually consumes more water than ANY OTHER ALTERNATIVE.

Harvey Wasserman of Progressive finds – wrote The People's Spiral of U.S. History. (Harvey, "How Nuclear Power Causes Global Warming," Progressive.org, 9-21-2016, <https://progressive.org/latest/nuclear-power-causes-global-warming/>, Accessed 7-25-2021, LASA-SC)

Every nuclear generating station spews about two-thirds of the energy it burns inside its reactor core into the environment. Only one-third is converted into electricity. Another tenth of that is lost in transmission. According to the Union of Concerned Scientists: Nuclear fission is the most water intensive method of the principal thermoelectric generation options in terms of the amount of water withdrawn from sources. In 2008, nuclear power plants withdrew eight times as much freshwater as natural gas plants per unit of energy produced, and up to 11 percent more than the average coal plant. Every day, large reactors like the two at Diablo Canyon, California, individually dump about 1.25 billion gallons of water into the ocean at temperatures up to 20 degrees Fahrenheit warmer than the natural environment. Diablo's "once-through cooling system" takes water out of the ocean and dumps it back superheated, irradiated and laden with toxic chemicals. Many U.S. reactors use cooling towers which emit huge quantities of steam and water vapor that also directly warm the atmosphere. These emissions are often chemically treated to prevent algae and other growth that could clog the towers. Those chemicals can then be carried downwind, along with radiation from the reactors. In addition, hundreds of thousands of birds die annually by flying into the reactor domes and towers. The Union of Concerned Scientists states: The temperature increase in the bodies of water can have serious adverse effects on aquatic life. Warm water holds less oxygen than cold water, thus discharge from once-through cooling systems can create a "temperature squeeze" that elevates the metabolic rate for fish. Additionally, suction pipes that are used to intake water can draw plankton, eggs and larvae into the plant's machinery, while larger organisms can be trapped against the protective screens of the pipes. Blocked intake screens have led to temporary shut downs and NRC fines at a number of plants. And that's not all. All nuclear reactors emit Carbon 14, a radioactive isotope, invalidating the industry's claim that reactors are "carbon free." And the fuel that reactors burn is carbon-intensive. The mining, milling, and enrichment processes needed to produce the pellets that fill the fuel rods inside the reactor cores all involve major energy expenditures, nearly all of it based on coal, oil, or gas.

In terms of climate,

"Two's a crowd: Nuclear and renewables don't mix." ScienceDaily, October 5, 2020, <https://www.sciencedaily.com/releases/2020/10/201005112141.htm>. Accessed March 9, 2025.

If countries want to lower emissions as substantially, rapidly and cost-effectively as possible, they should prioritize support for renewables, rather than nuclear power. That's the finding of new analysis of 123 countries over 25 years by the University of Sussex Business School and the ISM International School of Management which reveals

that nuclear energy programmes around the world tend not to deliver sufficient carbon emission reductions and so should not be considered an effective low carbon energy source. Researchers found that unlike renewables[1], countries around the world with larger scale national nuclear attachments do not tend to show significantly lower carbon emissions -- and in poorer countries nuclear programmes actually tend to associate with relatively higher emissions.

In contrast,

Khan, Anwar et. al. "Efficacy of CO2 emission reduction strategies by countries pursuing energy efficiency, nuclear power, and renewable electricity." Energy, August 1, 20**24**, <https://doi.org/10.1016/j.energy.2024.131418>. Accessed March 9, 2025.

As such, this research proposes hierarchical analyses using stepwise regression and pairwise correlation **for 133 countries over 31 years** to explain how they use their energy sources, including efficiency, nuclear, and renewable electricity pathways, to mitigate CO2 emissions. Firstly, the results discover that **renewable electricity effectively mitigates CO2 emissions**, further supported by the incremental change in the R-squared value. Secondly, the results do not support the idea that nuclear power mitigates CO2. In contrast, it is noted that the efficacy of nuclear power on CO2 emission mitigation is effective through the moderation of GDP..

Renewables are more carbon efficient

B. Lovins 21 [Amory B. Lovins, "Why Nuclear Power Is Bad for Your Wallet and the Climate", 12/17/2021, No Publication, <https://news.bloomberglaw.com/environment-and-energy/why-nuclear-power-is-bad-for-your-wallet-and-the-climate>, Accessed 04/04/2025] //IA

Does climate protection need more nuclear power? No—just the opposite. Saving the most carbon per dollar and per year requires not just generators that burn no fossil fuel, but also those deployable with the least cost and time. Those aren't nuclear. Making 10% of world and 20% of U.S. commercial electricity, nuclear power is historically significant but now stagnant. In 2020, its global capacity additions minus retirements totaled only 0.4 GW (billion watts). Renewables in contrast added 278.3 GW—782x more capacity—able to produce about 232x more annual electricity (based on U.S. 2020 performance by technology). **Renewables** swelled supply and **displaced as much carbon in 38 hours as nuclear did all year.** As of early December, 2021's score looks like nuclear -3 GW, renewables +290 GW. Game over. The world already invests annually \$0.3 trillion each, mostly voluntary private capital, in energy efficiency and renewables, but about \$0.015–0.03 trillion, or 20–40x less, in nuclear—mostly conscripted, because investors got burned. Of 259 US power reactors ordered (1955–2016), only 112 got built and 93 remain operable; by mid-2017, just 28 stayed competitive and suffered no year-plus outage. In the oil business, that's called an 89% dry-hole risk.

Reducing climate change is key, every degree matters.

Cassella 23 **For every 0.1 °C degree of warming from now on, the world could suffer roughly 100 million deaths.** "If you take the scientific consensus of the 1,000-ton rule seriously, and run the numbers, anthropogenic global warming equates to a **billion premature dead bodies**

over the next century," explains energy specialist Joshua Pierce from the University of Western Ontario in Canada. "Obviously, we have to act. And we have to act fast." The human death rate from climate change is extremely tricky to calculate, even in the present day. The United Nations reports that every year, environmental factors take the lives of about 13 million people, and yet it's not clear how many of these deaths are directly or indirectly due to climate change. Some experts argue abnormal temperatures on their own may already claim as many as five million lives a year. Other estimates are much lower. Part of the problem is that the global effects of climate change are manifold. Crop failures, droughts, flooding, extreme weather, wildfires, and rising seas can all impact human lives in subtle and complex ways. Predicting the future death toll of these climate catastrophes is inherently imperfect work, but Pierce and his coauthor, Richard Parncutt from the University of Graz in Austria, think it's worth pursuing. They argue measuring emissions in terms of human lives makes the numbers easier for the public to digest, while also underlining how unacceptable our current inaction is. Y u

Thus, we negate