# Fairmont Prep PJ -- NDCAs -- Neg vs. Campbell

1AC--- space, climate

1NC--- accidents, russia, NEW: saudi

2AR--- space

2NR--- meltdowns

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## 1NC

### Contention 1 is Accidents

#### Trump is decking NRC independence allowing companies to skip steps causing Fukushima 2.0.

**Macfarlane 25** [Allison Macfarlane, Professor and director of the School of Public Policy and Global Affairs at the University of British Columbia, 2-21-2025, Trump just assaulted the independence of the nuclear regulator. What could go wrong?, Bulletin of the Atomic Scientists, https://thebulletin.org/2025/02/trump-just-assaulted-the-independence-of-the-nuclear-regulator-what-could-go-wrong/, GZR recut Oliver J]

**President Trump, through** his recent Executive Order, has **attacked independent regulatory agencies in the US government**. This order gives the Office of Management and Budget power over the regulatory process of until-now independent agencies. **These regulatory agencies include the Federal Elections Commission, the Federal Trade Commission, the Securities and Exchange Commission, the Federal Energy Regulatory Commission**—and my former agency, the Nuclear Regulatory Commission, which I chaired between July 2012 and December 2014.

**An independent regulator is free from industry and political influence**. **Trump’s executive order flies in the face of this basic principle by requiring the Office of Management and Budget to** “**review**” **these independent regulatory agencies’ obligations** “for consistency with the President’s policies and priorities.” **This essentially means subordinating regulators to the president**.

In the past, the president and Congress, which has oversight capacity on the regulators, stayed at arm’s length from the regulators’ decisions. This was meant to keep them isolated, ensuring their necessary independence from any outside interference. Trump’s executive order implies there are no longer independent regulators in the United States.

Independent regulators should not only be free from government and industry meddling; they also need to be adequately staffed with competent experts and have the budget to operate efficiently. They also need to be able to shut down facilities such as nuclear power plants that are not operating safely, according to regulations. To do this, they need government to support their independent decisions and rulemaking.

**Independence matters**. When I was chairman, I traveled the world talking about the importance of an independent regulator to countries where nuclear regulators exhibited a lack of independence and were subject to excessive industry and political influence. It is ironic that the US Nuclear Regulatory Commission—often called the “Gold Standard” in nuclear regulation—has now been captured by the Trump administration and lost its independence. So much for the Gold Standard; the Canadian, the French, or the Finnish nuclear regulator will have to take on that mantle now.

**To understand what is at stake, one needs to look no further than the Fukushima accident** in March 2011, **which showed the world how a country’s economic security is vulnerable to a captured regulator**. After a magnitude 9.0 earthquake followed by a massive tsunami, the Fukushima Daiichi nuclear power plant, with its six reactors on Japan’s east coast, lost offsite power. The tsunami flooded their backup diesel generators, and the plant fell into the station blackout, leading to the complete loss of all power on site.

With no power to operate pumps to get cooling water into the reactors’ cores or into spent fuel storage pools, three reactor cores melted down—the first within hours of loss of power—with a concomitant release of large amounts of radionuclides due to containment breaches from hydrogen explosions.

Firefighters desperately tried to get water into the spent fuel pool of Unit 4 to ensure that pool water did not boil off since the pumps were no longer working. Should the spent fuel rods have become uncovered and no longer cooled, the fuel’s temperature would rapidly increase, and the fuel rods would melt, causing the release of even larger amounts of radiation material into the atmosphere threatening the Tokyo metropolitan area. Fortunately, the emergency workers got water to the pool within a few days of the fuel being uncovered.

Nonetheless, 160,000 people evacuated from the area near the reactors and along the corridor of radiation contamination to the northwest of the Fukushima Daiichi plant. Overnight, the agricultural and fishing industries near Fukushima were devastated. **Within a year after the accident, all 54 reactors in Japan were shut down**—**a loss of about a third of the country’s electricity supply**. More expensive diesel plants had to be set up to compensate for some of the missing power. The direct economic costs of the accident were estimated to be on the order of $200 billion—and even that number excluded the costs of replacing the lost power and multiple reactor shutdowns due to the reassessment of seismic hazards. **Nearly 14 years later, only 13 nuclear reactors have been turned back on, and 21 have been permanently shut down**. (The other 20 reactors are waiting for regulatory and prefecture approval.)

An independent investigation by the Diet (Japan’s house of parliament) into the cause of the Fukushima accident concluded unequivocally that: “**The TEPCO Fukushima Nuclear Power Plant accident was the result of collusion between the government, the regulators and TEPCO, and the lack of governance by said parties**. They effectively betrayed the nation’s right to be safe from nuclear accidents.” Japan’s government and nuclear industry continue to struggle with the clean-up of the Fukushima site, and it purposely began in 2023 to release still-contaminated water into the Pacific Ocean. Nearby countries responded by banning fishing products from the region.

As the industry often says, **a nuclear accident anywhere is a nuclear accident everywhere**. After the Fukushima accident, the US nuclear industry spent over $47 billion in safety upgrades to respond to lessons learned from the Fukushima accident. **These included the realization that not only more than one reactor could fail at a single power plant**, but also that backup generators needed to be in safe locations, not subject to flooding and other forms of failure; that generic fittings for pumps and equipment were needed so that any nearby equipment could be connected during an accident; that containments should be able to be vented remotely; that natural events such as earthquakes and flooding could be underestimated in the original reactor designs; and that spent fuel pools needed to provide real-time data in accident conditions. The upgrades that resulted from these lessons have greatly increased the safety of reactors in the United States and elsewhere. They were required because each of these upgrades was deemed necessary to address the lessons learned by the independent regulator. On its own, the industry might not have undertaken any of these measures.

What could go wrong? **Several possible outcomes could occur because of Trump’s new executive order assaulting the independence of the Nuclear Regulatory Commission** (NRC).

**Proponents of small modular reactors**, for instance, **have pressured Congress and the executive branch to reduce regulation** and hurry the NRC’s **approval of their novel—and unproven—reactor designs. They wish their reactors could be exempted from the requirements that all other designs before them have had to meet**: **detailed evidence that the reactors will operate safely** under accident conditions. Instead, **these proponents**—some **with no experience in operating reactors**—**want the NRC to trust their simplistic computer models** of reactor performance **and essentially give them a free pass to deploy their untested technology** across the country.

An accident with a new small modular reactor (SMR) would perhaps not make such a big mess: After all, the source term of radiation would be smaller than with large reactors, like those currently operating in the United States. But the accident in Japan demonstrated that countries should expect that more than one reactor at a given site can fail at the same time, and these multiple failures can create even more dire circumstances, impeding the authorities’ ability to respond to such a complex radiological emergency. At Fukushima, the first explosion at Unit 1 generated radioactive debris that prevented emergency responders from getting close to other damaged reactors nearby. Since designers plan to deploy multiple SMR units to individual sites, such an accidental scenario appears feasible with SMRs.

Since its creation in 1975, the Nuclear Regulatory Commission has had an excellent and essential mission: to ensure the safety and security of nuclear facilities and nuclear materials so that humans and the environment are not harmed. **Trump’s incursion means the agency will no longer be able to fully follow through with this mission independently**—and Americans will be more at risk as a result. **If any US reactor suffers a major accident, the entire industry will be impacted**—and perhaps **its 94 reactors in operation will even be temporarily shut down**. Can the industry and the American people afford the cost of losing the independence of the nuclear regulator?

#### AND Energy Secretary Chris Wright has a history of neglecting safety.

**Accountable 25** [Accountable US (Accountable.US (A.US) is a nonpartisan, 501(c)3 organization that shines a light on special interests that too often wield unchecked power and influence in Washington and beyond.) February 4, 2025, Watchdog: Senate Confirms Oil Man & Serial Workplace Safety Violator Chris Wright as Trump’s Energy Secretary", https://accountable.us/watchdog-senate-confirms-oil-man-serial-workplace-safety-violator-chris-wright-as-trumps-energy-secretary/, GZR]

WASHINGTON, D.C. – Following the Republican-led Senate’s vote to confirm Chris Wright as **U.S. Energy Secretary**, Accountable.US Executive Director Tony Carrk released the following statement: “The choice of Chris Wright to run the powerful Energy Department was based on what’s best for the bottom line of Donald Trump’s big oil megadonors, not everyday consumers and workers. With his Project 2025 ties and financial stakes in the big oil and nuclear industry, Wright is just the wealthy insider Trump needs to carry out his plans for padding profits of energy special interests – even if it means higher prices at the pump. And with Wright’s company’s history of violating workplace safety standards and anti-discrimination laws, he’s now in the driver’s seat to sweep such problems under the rug for his industry friends.” BACKGROUND: Conflicts Of Interest With Energy Companies **Chris Wright is a member of the board of Oklo nuclear company and has business before the Department of Energy. Oklo’s application before the Nuclear Regulatory Commission was previously denied due to a lack of information about accidents and safety. Chris Wright claims he will step down from the board, but questions remain about whether he will fairly regulate and ensure accountability from energy industries** when he has spent so much of his career working for and serving on the boards of oil and gas and nuclear energy companies. Project 2025 Wright has been on the board of the Western Energy Alliance, an oil industry trade group that authored many of Project 2025’s oil and gas provisions. Chris Wright has been a member of the board of Western Energy Alliance (WEA) WEA is an oil industry trade group. WEA’s president authored the oil and gas provisions of Project 2025. Project 2025 would eliminate “key offices at the DOE, including the Office of Energy Efficiency and Renewable Energy, the Office of Clean Energy Demonstrations, the Office of State and Community Energy Programs, the Office of Grid Deployment, and the Loan Programs Office.” Workplace Safety and Racial Harassment **Questions remain whether Wright will look the other way when energy companies violate safety standards** and anti-discrimination laws, considering his company, Liberty Energy, was frequently fined over workplace safety standards and paid $265,000 to settle lawsuits from black and Hispanic employees who faced hostile work environment and were called slurs. **Under Chris Wright’s leadership, Liberty Energy has faced at least three separate penalties for workplace and safety violations** since 2023. Liberty Energy, in 2024, paid $265,000 to settle an EEOC discrimination lawsuit after black and Hispanic field mechanics faced racial harassment.

#### Affirming gives Wright the keys.

**Lynch 25** [James Lynch, news writer for National Review & B.A. in Political Science from Notre Dame, 2-7-2025, Chris Wright Makes Unleashing Nuclear Power Priority for American Energy Abundance, National Review, https://www.nationalreview.com/news/chris-wright-makes-unleashing-nuclear-power-priority-for-american-energy-abundance/, Willie T.]

In a letter to sent Thursday, American Nuclear Society CEO Craig Piercy suggested that Wright focus securing congressional appropriations to fulfill his promises about advancing the nuclear power industry and supporting innovative reactors.

“Many in the industry think additional government support will be needed to reach nth-of-a-kind nuclear plant construction **costs**, while others believe rising electricity demand alone will take care of that in time,” the letter reads.

“Either way, as secretary of energy, you will **need appropriations** to engineer any kind of nuclear ‘win.’ You will spend more time than you think **preparing budgets**, arguing with the Office of Management and Budget over what’s included, and then defending said budgets on Capitol Hill. Don’t let the bean counters steal from you!”

**Accidents cause BioD Loss.**

**Olsson 11** [Henrik von Wehrden, Joern Fischer, Patric Brandt, Viktoria Wagner, Klaus Kümmerer, Tobias Kuemmerle, Anne Nagel, Oliver Olsson, Patrick Hostert, 12-28-2011, Chair of Material Resources, Institute of Environmental Chemistry, Leuphana University Lüneburg, Scharnhorststr, 1, 21335 Lüneburg, Germany "Consequences of nuclear accidents for biodiversity and ecosystem services," Society for Conservation Biology, https://conbio.onlinelibrary.wiley.com/doi/full/10.1111/j.1755-263X.2011.00217.x, DOA: 3/30/2025] JZ

To characterize and quantify the potential **consequences of nuclear accidents for biodiversity and ecosystem services, we reviewed 521 published studies investigating the impacts of the Chernobyl disaster**, which, until now, has been the only available baseline event to empirically judge the consequences of catastrophic nuclear accidents (see online Supplementary Material for Methods). Specifically, our study aimed to (1) provide a summary of the spatial and temporal patterns of the documented effects of the Chernobyl disaster on a wide range of organisms, and (2) discuss the implications of nuclear accidents for the provision of ecosystem services, again, drawing on documented evidence in the aftermath of the Chernobyl accident. We conclude with four tangible take-home messages, intended to be **directly relevant to debates about the future of nuclear energy.**

Consequences or impacts to species

 Spatially, the documented effects of the Chernobyl disaster broadly follow known fallout patterns (Figure 1). However, variance in radiation levels is extremely high, not only between but also within sites. At a given study location, radiation levels have been shown to vary from 44,300 to 181,100 Becquerel per kilogram (Bq/kg) for mushrooms in southern Sweden (Mascanzoni 2009), from 3,000 to 50,000 Bq/kg for bats in Chernobyl (Gashchak et al. 2010), and from 176 to 587,000 Bq/kg for higher plants in southwestern Russia (Fogh & Andersson 2001); the latter equals almost a hundred times the threshold (600 Bq/kg) set by the European Union for Food that is deemed safe for consumption. High variance in radiation levels means that fallout maps based on extrapolations, models, and climate forecasts are not sufficient to evaluate radiation levels on a fine scale—field data are critically important for this purpose. Furthermore, radiation levels measured in the field and predicted fallout patterns based on meteorological data sometimes do not match (McAulay & Moran 1989), because additional factors, such as dry deposition, are not accounted for by climatic predictors (Arvelle et al. 1990). In addition, **some regions and types of ecosystems are systematically underrepresented in studies to date. For example, existing data is sparse for marine and aquatic ecosystems** (Figure 1).

Although many measurements were undertaken in the aftermath of the Chernobyl accident worldwide, existing **studies are greatly** **biased toward few taxonomic groups** (Figures 2 and 3). Most studies have focused on topsoil measurements and accumulation in the plant layer, which is where radiation can be most easily measured. **Despite this bias, it is clear that for most well-studied groups, greatly elevated radiation levels can occur up to thousands of kilometers away from the disaster site.** For example, recorded radiation levels in mushrooms were up to 13,000 Bq/kg in Denmark in 1991 (Strandberg 2003) and up to 25690 Bq/kg in Norway in 1994 (Amundsen et al. 1996).

**The consequences of elevated radiation levels in many parts of a given ecosystem remain poorly understood, but are likely substantial.** For example, rats showed changes in sleep behavior after drinking water poisoned with “only” 400 Bq/l (Lestaevel et al. 2006), and onions have shown a significantly elevated rate of chromosomal aberrations at levels as low as 575 Bq/kg (Kovalchuk et al. 1998).

Although numerous studies have investigated physiological and morphological alterations in the vicinity of the Chernobyl accident site, hardly any studies have quantified the possibility of such alterations at larger distances. This could be a major shortcoming, because **radiation levels are known to be greatly increased in some organisms even at large distances from the accident site** (see earlier)—physiological or morphological alterations, therefore, are plausible, at least in isolated instances. Where such alterations occur, their long-term consequences on the ecosystem as a whole can be potentially profound (Kummerer & Hofmeister 2009).

The legacies of the environmental consequences of the Chernobyl accident are still prevalent today, 25 years after the event. Although many studies have shown a peak in radiation immediately after the catastrophe and then a continuous decline, **radiation levels measured throughout the ecosystem are still highly elevated.** For example, radiation levels in mosses (Marovic et al. 2008), soil (Copplestone et al. 2000), and glaciers (Tieber et al. 2009) have remained greatly elevated in several locations around Europe. The long-lasting legacy of the Chernobyl accident was also illustrated by intense wildfires in the Chernobyl region in 2010, which caused a renewed relocation of radioactive material to adjacent regions (Yoschenko et al. 2006). The persistence of high radiation levels can be attributed partly to the half-life rates of the chemical elements involved (e.g., 31 years for Caesium-137; 29 years for Strontium-90; and 8 days for Iodine-131).

In addition to elevated radiation levels, **morphological and physiological changes are by definition long-term in nature, and can even be permanent** if **genetic alterations occur**. For example, a range of bird species now have developed significantly smaller brains inside the core zone around the Chernobyl reactor site compared to individuals of the same species outside this zone (Møller et al. 2011). The consequences of such changes on long-term evolutionary trajectories remain largely unknown.

**Lethal mutations following exposure to nuclear fallout have been observed in various plant** (Abramov et al. 1992; Kovalchuk et al. 2003) and animal species (Shevchenko, et al. 1992; Zainullin et al. 1992), yet research has mainly been conducted within the Chernobyl region. Morphological changes have also been observed in a wide array of species, including plants (Tulik & Rusin 2005), damselflies (Muzlanov 2002), diptera (Williams et al. 2001), and mice (Oleksyk et al. 2004). In addition, some studies have documented.

**Physiological effects, such as changes in the leukocyte level (Camplani et al. 1999) and reduced** **reproduction rates** (Møller et al. 2008). **Changes in genetic structure** have been recorded in various organisms, including fish (Sugg et al. 1996) and frogs (Vinogradov & Chubinishvili 1999). More broadly, elevated radiation can **negatively affect the abundance of entire species groups**, such as insects and spiders (Møller & Mousseau 2009a), raptors (Møller & Mousseau 2009b), or small mammals (Ryabokon & Goncharova 2006).

How low levels of radiation affect different species is poorly understood; studies have suggested that low levels of radiation can have a **persistent influence on mutation rates** in Drosophila (Zainullin et al. 1992), and can weaken **immune (Malyzhev 1993) and reproductive systems (Serkiz 2003) of small mammals;** but again, most studies have been restricted to the Chernobyl accident area. A more obvious measure of permanent change is widespread death of organisms living in the direct vicinity of the disaster site (Figures 1 and 2).

Food web and ecosystem impacts

In addition to effects on individual species, **biological** **accumulation through the food web can negatively** **affect some species**—particularly those at higher trophic levels and those depending on strongly affected food items. Bioaccumulation poses a risk to affected species because it **exacerbates exposure to elevated radiation levels, and hence, leads to increased chances of physiological or morphological alterations.** For example, can radiation levels in top predators remain elevated for a long time even when species at lower trophic levels show negligible radiation levels, as demonstrated for the Trench (Tinca tinca) in the Kiev Reservoir (Koulikov 1996).

**Extinction!**

**Torres 16** [Phil Torres, biologist, science communicator, 2-10-2016, "Biodiversity Loss and the Doomsday Clock: An Invisible Disaster Almost No One is Talking About," Common Dreams, https://www.commondreams.org/views/2016/02/10/biodiversity-loss-and-doomsday-clock-invisible-disaster-almost-no-one-talking-about, DOA: 3/30/2025] JZ

But there's another global catastrophe that the Bulletin neglected to consider -- **a catastrophe that will almost certainly have conflict** multiplying **effects no less than climate change. I'm referring here to biodiversity loss** -- i.e., the reduction in the total number of species, or in their population sizes, over time. The fact is that in the past few centuries, the loss of biological diversity around the world has accelerated at an incredible pace. Consider the findings of a 2015 paper published in Science Advances. According to this study, we've only recently entered the **early stages of the sixth mass extinction event in life's entire 3.5 billion year history.** The previous mass extinctions are known as the "Big Five," and the last one wiped out the dinosaurs some 65 million years ago. Unlike these past tragedies, though, the current mass extinction -- called the "Holocene extinction event" -- is almost entirely the result of a one species in particular, namely Homo sapiens (which ironically means the "wise man").

"If the environment implodes under the weight of civilization, then civilization itself is doomed."

But **biodiversity loss isn't limited to species** extinctions. As the founder of the Long Now Institute, Stewart Brand, suggests in an article for Aeon, one could argue that a more pressing issue is the reduction in population sizes around the globe. For example, the 3rd Global Biodiversity Report (GBO-3), published in 2010, found that the total abundance of vertebrates -- a category that includes mammals, birds, reptiles, sharks, rays, and amphibians -- living in the tropics declined by a whopping 59% between 1970 and 2006. In other words, the population size of creatures with a spine more than halved in only 36 years. The study also found that farmland birds in Europe have declined by 50% since 1980, birds in North America have declined by 40% between 1968 and 2003, and nearly 25% of all plant species are currently "threatened with extinction." The latter statistic is especially worth noting because many people suffer from what's called "plant blindness," according to which we fail "to recognize the importance of plants in the biosphere and in human affairs." Indeed, plants form the very bottom of the food chains upon which human life ultimately depends.

Even more disturbing is the claim that amphibians "face the greatest risk" of extinction, with "42% of all amphibian species ... declining in population," as the GBO-3 reports. Consistent with this, a more recent study from 2013 that focused on North America found that "frogs, toads and salamanders in the United States are disappearing from their habitats ... at an alarming and rapid rate," and are projected to "disappear from half of the habitats they currently occupy in about 20 years." The decline of amphibian populations is ominous because amphibians are "ecological indicators" that are more sensitive to environmental changes than other organisms. As such they are the "canaries in the coal mine" that reflect the overall health of the ecosystems in which they reside. **When they start to disappear,** biggerproblems are sure to follow.

Yet another comprehensive survey of the biosphere comes from the Living Planet Report -- and its results are no less dismal than those of the GBO-3. For example, it finds that the global population of vertebrates between 1970 and 2010 dropped by an unbelievable 52%. Although the authors refrain from making any predictions based on their data, the reader is welcome to extrapolate this trend into the near future, noting that as **ecosystems** weaken**, the likelihood of** further population losses increases. This study thus concludes that humanity would "need 1.5 Earths to meet the demands we currently make on nature," meaning that we either need to reduce our collective consumption and adopt less myopic economic policies or hurry up and start colonizing the solar system.

Other studies have found that 20% of all reptile species, 48% of all the world's primates, 50% of all freshwater turtles, and68% of plant species are currently threatened with extinction. There's also talk about the Cavendish banana going extinct as a result of a fungus, and research has confirmed that honey bees, which remain "the most important insect that transfers pollen between flowers and between plants," are dying out around the world at an alarming rate due to what's called "colony collapse disorder" -- perhaps a good metaphor for our technologically advanced civilization and its self-destructive tendencies.

Turning to the world's oceans, one finds few reasons for optimism here as well. Consider the fact that atmospheric carbon dioxide -- the byproduct of burning fossil fuels -- is not only warming up the oceans, but it's making them far more acidic. The resulting changes in ocean chemistry are inducing a process known as "coral bleaching," whereby coral loses the algae (called "zooxanthellae") that it needs to survive. Today, roughly 60% of coral reefs are in danger of becoming underwater ghost towns, and some 10% are already dead. This has **direct** **consequences for humanity because coral reefs "provide us with food, construction materials (limestone) and** **new** **medicines,"** and in fact "more than half of new cancer drug research is focused on marine organisms." Similarly, yet another study found that ocean acidification is becoming so pronounced that the shells of "tiny marine snails that live along North America's western coast" are literally dissolving in the water, resulting in "pitted textures" that give the shells a "cauliflower" or "sandpaper" appearance.

Furthermore, human-created pollution that makes its way into the oceans is carving out vast regions in which the amount of dissolved oxygen is too low for marine life to survive. These regions are called "dead zones," and the most recent count by Robert Diaz and his colleagues found more than 500 around the world. The biggest dead zone discovered so far is located in the Baltic Sea, and it's been estimated to be about 27,000 square miles, or a little less than the size of New Hampshire, Vermont, and Maryland combined. Scientists have even discovered an "island" of trash in the middle of the Pacific called the "Great Pacific Garbage Patch" that could be up to "twice the size of the continental United States." Similar "patches" of floating plastic debris can be found in the Atlantic and Indian oceans as well, although these are not quite as impressive. The point is that "Earth's final frontier" -- the oceans -- are becoming vast watery graveyards for a huge diversity of marine lifeforms, and in fact a 2006 paper in Science predicts that there could be virtually no more wild-caught seafood by 2048.

Everywhere one looks, the biosphere is wilting -- and a single bipedal species with large brains and opposable thumbs is almost entirely responsible for this worsening plight. If humanity continues to prune back the Tree of Life with reckless abandon, we could be forced to confront a global disaster of truly unprecedented proportions. Along these lines, a 2012 article published in Nature and authored by over twenty scientists claims that humanity could be **teetering on the brink of a catastrophic, irreversible collapse of the global ecosystem**. According to the paper, there could be **"tipping points" -- also called "critical thresholds" -- lurking in the environment that, once crossed, could initiate radical and sudden changes in the biosphere**. Thus, an event of this sort could be preceded by little or no warning: everything might look more or less okay, until the ecosystem is suddenly in ruins.

We must, moving forward, never forget that just as we're minds embodied, so too are we bodies environed, meaning that **if the environment implodes under the weight of civilization, then civilization itself is doomed.** While the threat of nuclear weapons deserves serious attention from political leaders and academics, as the Bulletin correctly observes, it's even more imperative that we focus on the broader "contextual problems" that **could inflate the overall probability of wars and terrorism in the future.** Climate change and biodiversity loss are both conflict multipliers of precisely this sort, and each is a contributing factor that's exacerbating the other. If we fail to make these threats a top priority in 2016, the **likelihood of nuclear weapons -- or some other form of emerging technology, including biotechnology and artificial intelligence -- being used in the future will only increase.**

Perhaps there's still time to avert the sixth mass extinction or a sudden collapse of the global ecosystem. But time is running out -- the doomsday clock is ticking.

#### Independently, accidents turn *GLOBAL* sentiment against nuclear which kills aff solvency --- Fukushima proves.

**Paillere 20** [Dr. Henri PAILLERE has over 26 years of experience in the nuclear energy sector and is currently working as Head of the Planning and Economic Studies Section at the International Atomic Energy Agency, 11-27-2020, Nuclear Power 10 Years After Fukushima: The Long Road Back, IAEA, https://www.iaea.org/newscenter/news/nuclear-power-10-years-after-fukushima-the-long-road-back, Willie T.]

At the beginning of the new millennium, amid growing awareness of the link between energy-related greenhouse gas emissions and climate change, the notion of a ‘nuclear renaissance’ became popular. Scientists and policy makers identified low carbon nuclear power as a potential protagonist in the transition to clean energy.

However, the accident at the Fukushima Daiichi Nuclear Power Plant, operated by the Tokyo Electric Power Company (TEPCO), on 11 March 2011 dealt a blow to plans for swiftly scaling up nuclear power to address not only climate change, but also energy poverty and economic development. As the global community turned its attention to strengthening nuclear safety, several countries opted to phase out nuclear power.

Following efforts to strengthen nuclear safety and with global warming becoming ever more apparent, nuclear power is regaining a place in global debates as a climate-friendly energy option. That is due to its vital attributes: zero emissions during operation, 24/7 availability, a small land footprint and the versatility to decarbonize ‘hard-to-abate’ sectors in industry and transportation. But even as technology-neutral organizations such as the Intergovernmental Panel on Climate Change (IPCC) and the International Energy Agency (IEA) recognize nuclear power’s ability to address major global challenges, the extent to which this clean, reliable and sustainable source of energy will achieve its full potential remains uncertain.

The Fukushima Daiichi accident and public acceptance in some countries continue to *cast a shadow* over nuclear power’s prospects. Furthermore, in some major markets, nuclear power lacks a favourable policy and financing framework that recognize its contributions to climate change mitigation and sustainable development. Without such a framework, nuclear power will struggle to deliver on its full potential, even as the world remains as dependent on fossil fuels as it was three decades ago.

Impact on electricity generation

The biggest immediate blow to nuclear electricity generation came in Japan. With public confidence in nuclear power at record low levels following the accident, authorities suspended operations at 46 of the country’s 50 operational power reactors. Nuclear energy, a strategic priority since the 1960s, supplying almost a third of Japan’s electricity, was suddenly shelved. In 2019, nuclear power provided only 7.5% of Japan’s electricity. Just nine nuclear power reactors have resumed operation.

Meanwhile, public and government opinion turned against nuclear power in some other countries as well. Germany, less than three months after the accident, decided to phase out nuclear power entirely by 2022. All but six of the country’s 17 power reahttps://thecommonsenseshow.com/activism-agenda-21-conspiracy/how-coming-cascadia-subduction-zone-event-will-produce-extinction-level-event-part-onectors have since been permanently shut down. Nuclear power produced about 12% of the country’s electricity in 2019 compared with around 25% before the accident at Fukushima Daiichi, while coal-fired plants remained the largest source of electricity, according to the IEA. Elsewhere, Belgium confirmed plans to exit nuclear power by 2025. In Italy, a government-backed plan to bring back nuclear power, shuttered since 1990, fizzled. And countries such as Spain and Switzerland decided not to build new nuclear plants. Between 2011 and 2020, some 48 GWe of nuclear capacity was lost globally as a total of 65 reactors were either shut down or did not have their operational lifetimes extended.

### Contention 2 is Russia

#### Russia’s economy is at the brink --- oil is Putin’s last straw.

**Matthews 25** [Owen Matthews, Degree in Modern History at Oxford University, 3-13-2025, The Russian economy is on the **brink of collapse** and Putin knows it, The Independent, https://www.the-independent.com/news/world/europe/russia-economy-putin-ukraine-war-deal-talks-trump-b2714371.html, Willie T.] \*\*edited for objectionable language\*\*

How close is Russia’s economy to collapse? As Donald Trump’s negotiators open direct talks with the Kremlin, Kyiv’s European allies hope that a final push on sanctions against Russia could be Ukraine’s last – and best – hope of victory. Mr Trump has warned that the US could impose a “devastating” financial blow on Russia if Putin refuses to accept the ceasefire agreement. “There are things you can do that wouldn’t be pleasant in a financial sense. I can do things financially,” he said in the Oval Office.

Putin intended his full-scale invasion of Ukraine to be a three-day operation that would force regime change in Kyiv. Neither Putin nor his military or economic planners anticipated a grinding war that now soaks up over **40 per cent of Kremlin spending**.

Nor did they expect Europe to impose serious sanctions, and even less did they anticipate the destruction of three of the four Gazprom gas pipelines under the Baltic Sea that before the war supplied over 30 per cent of Europe’s gas.

The result in Russia has been **rampant inflation**, currently running at over 9 per cent, crippling **[staggering] interest rates** of 21 per cent and runaway price hikes on staple goods that far **outpace the headline inflation rate** and have hit ordinary Russians hard.

Last summer the price of **eggs jumped by 42 per cent**, **bananas by 48 per cent, tomatoes by 39.5 per cent and potatoes by 25 per cent**. The Russian ruble has lost over **half of its value** since Putin first invaded Crimea in 2014, and over $600bn of the Kremlin’s foreign currency reserves have been frozen in Western banks.

More than **1,000 Western businesses** – including Ikea and McDonald’s – pulled out, as did Western car manufacturers. Imports of Western goods – especially technology – are now **expensively routed through sanctions-busting neighbours** like Kazakhstan and Georgia. And last month Russian utility companies hiked prices for electricity by up to **250 per cent.**

“Everyone drives Chinese cars these days, but there are no spare parts,” says Alexandra, 39, a former journalist who lives in Moscow and whose ex-husband is fighting in Ukraine. “The only foreign cars you buy are right-hand-drive [from Japan]. Anyone with a mortgage is paying crazy interest. People complain how expensive everything has become.”

Russia spent more on its military in 2024 than the rest of Europe combined, according to the International Institute for Strategic Studies’ latest Military Balance report – a staggering $462bn, if adjusted for purchasing power. The Kremlin’s spending splurge on its war effort has produced some winners, notably the 1.5 million troops currently serving in Putin’s army who are paid up to $2,500 a month to fight – four times the average salary in Russia’s most impoverished provinces.

Massive losses on the battlefield have **worsened labour shortages**, with a record-low unemployment rate of 2.4 per cent. Factories are **running at capacity and beyond**. Russia’s economy has “reached the **limits of its productive capacity** while demand continues to be stimulated,” Central Bank chief Elvira Nabiullina warned the Russian parliament in November, predicting a fatal combination of economic stagnation and inflation known as “stagflation”.

For the first three years of the war, the Kremlin’s war spending fuelled GDP growth which peaked at a staggering 5.4 per cent in early 2024. But 2025 will be the year that growth flatlines, experts predict.

The Kremlin has been able to afford its spending spree thanks, mostly, to India and China, which have continued to import Russian oil in record quantities. The EU has in theory capped the price that customers can pay for Russian Urals crude at $60 a barrel – somewhat below the current market price of $67. But so-called “attestation fraud” – such as making up the difference in fake transportation and other costs – makes the rules easy to bend.

Natural gas has **never been sanctioned** by the EU at all – and until 1 January of this year, 13 per cent of Europe’s piped gas was still being shipped from Russia through Ukrainian pipelines to Slovakia and Hungary.

Ukrainian fire and fury are currently doing damage to Russia’s war economy that near-**nonexistent European sanctions have failed to achieve**

Southern Europe **continues to import** millions of cubic meters of Russian gas via Turkey. And despite its posturing, Europe still sources more than 15 per cent of its liquefied natural gas or LNG from Russia – with some 17.8m tonnes of LNG docking in European ports in 2024, **up by more than 2 million tonnes from the year before**, according to analysts Rystad Energy.

In fact the only really effective “sanctions” on the Russian energy sector – which accounts for over **two-thirds of government revenues** – have been in the form of Ukrainian drone attacks on Russian oil refineries, pumping stations and storage facilities. Ukrainian fire and fury are currently doing damage to Russia’s war economy that European “sanctions” have failed to achieve.

International pressure has made it harder, but not impossible, for the Russian war machine to obtain important components such as semiconductors. And sanctions have certainly “achieved the crucial goal of leaving Russia’s economy highly unstable in the medium to long term”, according to Oliver Ruth of London’s Royal United Services Institute.

The current crazy levels of expenditure are unsustainable, so Putin has a strong economic incentive to bring his war to an end. Ukraine’s economy is also under attack.

But on the flip side, even as Russia’s economy slips into stagflation Ukraine’s economy is doing far worse. Concerted Russian assaults, damage to vital energy infrastructure and mass emigration have inflicted catastrophic damage of up to 40 per cent of the country’s pre-war GDP. Kyiv’s budget payments to millions of soldiers and state employees are currently being paid by the EU. Without those subsidies – the lion’s share of the €60bn in direct financial support so far sent by Brussels – Ukraine’s government finances would instantly collapse.

Ukraine’s European allies hoped that sanctions would force Putin into taking an early off ramp and bring his **economy crashing down**. That hasn’t yet happened yet – largely because Europe has been unable to kick its addiction to Russian gas, and the US did not want to risk a global **oil price spike by cutting off Russian exports.**

But while they have **not brought Putin to his knees**, they have made the war disastrous for Russia. As Moscow and Washington begin talks in Riyadh, and European leaders hold their own emergency meeting, keeping up economic pressure on Putin is the real weapon that they still have left in their arsenal.

#### Sanctions won’t come.

**Bush 25** [Daniel Bush, Master of Arts in U.S. politics @ Columbia & B.A. from NYU, 3-13-2025, If Trump wants new pressure on Moscow, oil and gas is 'only thing left', Newsweek, https://www.newsweek.com/if-trump-wants-new-pressure-moscow-oil-gas-only-thing-left-2044476, Willie T.] \*\*brackets in original\*\*

Perhaps Trump's **best available option** to pressure Moscow is the one thing he might be **least willing to do**, experts said: put a much tighter squeeze on Russia's oil and gas exports, which provide Russia with its **main source of revenue** and help pay for the war in Ukraine.

"If you're trying to get to a quicker settlement to the conflict in Ukraine, that's what you go after, those continued [Russian] energy sales," said Emily Kilcrease, a senior fellow at the Center for a New American Security. "It's the only thing left."

But Kilcrease said the Trump administration may be hesitant to take a "full-blown approach on energy-related sanctions against Russia, because that would cause additional turmoil" during a **moment of rising economic uncertainty** at home over the president's trade policies.

Trump's **domestic energy agenda** also makes it harder for him to go after the **heart of Russia's economy**. He has blamed his predecessor for the rise in energy prices that was largely driven by Russia's invasion of Ukraine, and ran on a promise to cut costs and lower inflation. A new spike in prices at the pump sparked by tougher energy sanctions on Russia could backfire with voters, analysts said.

"President Trump came in **promising to drive prices at the pump down** by half. That highlights the **delicate needle** he has to thread in engaging with Russia on energy right now," said Mark Finley, an energy expert at Rice University's Baker Institute. "I suspect they'll be very cautious about sanctions that would risk taking Russian **barrels off the market place."**

Russia has found ways to skirt the sanctions, however, including by relying on a so-called "shadow fleet" of vessels to continue exporting oil by sea. Russia has also continued exporting natural gas to parts of Europe and ramped up its energy exports to China, India and other countries that have not participated in the sanctions.

Russian **oil and gas revenue increased by 26 percent** to $108 billion last year, a Reuters report shows. The European Union spent more on Russian oil and gas in 2024 than it did on financial assistance to Ukraine, according to a study published last month by the Centre for Research on Energy and Clean Air.

So far, the West "hasn't wanted to put **real pressure** on Russia," Oleksandr Merezhko, the chairman of the Ukraine Parliament's Foreign Affairs Committee, said in a phone interview with *Newsweek.* Trump could do that, he said, "by depriving Russia of the profits it receives from selling oil and gas."

There are several steps the U.S. and allies could take, Merezhko and others said. They include lowering the price cap on Russian oil, cracking down harder on the shadow fleet operators and placing secondary sanctions on companies and trading partners like China that continue buying Russian energy.

#### Affirming decreases oil demand AND insulates Americans from sanctioning Russia.

**Zadrowski 24** [William Zadrowski, Squadron Commander @ the USAF Academy & bound for B.S. in Military and Strategic Studies, 12-8-2024, Nuclear Energy: The Overlooked Energy Solution, Modern Diplomacy, https://moderndiplomacy.eu/2024/12/08/nuclear-energy-the-overlooked-energy-solution/, Willie T.]

The U.S. faces a persistent energy worry. Over the last few years, **electricity demand has soared** while U.S.-based energy suppliers have tried their best to keep up. While energy demand usually fluctuates throughout the year due to varying weather conditions and as the seasons change, the U.S. Energy Information Administration has shown that energy demand has steadily increased over the last fifty years. This can be attributed to population growth and the expansion of electricity production to meet society’s rapidly growing energy needs. While total electricity supply has adequately met the increasing demand over the last fifty years, the steadily increasing need for greater electricity places the U.S. in a vulnerable situation – one that can become susceptible to disruptions and shortages. The power sector already experiences immense strain during peak electricity consumption, namely during periods of intense weather such as heatwaves, snowstorms, and other weather phenomena. Considering the **already-strained power sector** in the U.S., further concerns about energy security in the U.S. center around the U.S.’s ability to create **viable alternative energy solutions** to ensure energy demand is met with adequate supply in the event of energy disruptions.

Nuclear Energy: Where It’s Been and Where It’s Going

The U.S.’s energy consumption portfolio **consists largely of fossil fuels**, accounting for more than **eighty percent** of the U.S.’s total energy consumption in 2023. Putting aside environmental concerns and considerations, the U.S. needs to invest more in another energy source capable of matching fossil fuel consumption in the near future. The best solution to this concern is nuclear energy. Although the U.S. consumes a significant proportion of available electricity from nuclear sources, roughly nine percent, nuclear energy has the potential to **supplement the U.S.’s dependency** on fossil fuels. The nuclear power industry cannot replace the need for fossil fuels, nor should it, but it would provide a safety net for supply chain disruptions and create alternatives to domestic energy consumption. This would prove especially important when considering the fragility of fossil fuel imports from foreign sources and the detriment to national security should there be a fossil fuel shortage in the U.S. and/or abroad. For this to happen, though, obstacles to nuclear power production must be overcome.

The U.S. already has **nuclear energy production** facilities and infrastructure to contribute to the existing energy portfolio, but not nearly at the same scale as fossil fuels. Why might this be? The short answer might be that there exist **high initial costs to producing the infrastructure and plants** required to make a nuclear reactor; however, the more likely reason would be widespread public opposition to and negative perception of nuclear energy production in the U.S. As many American citizens could point out, nuclear energy’s past is riddled with catastrophic meltdowns and lasting environmental impacts – things that pose obvious issues with public support investment into nuclear energy production. Notable incidents such as the Chornobyl meltdown, the Fukushima disaster, and the Three Mile Island Accident are well-known examples the public tends to associate with nuclear energy. The risk of a nuclear meltdown and severe environmental effects from accidents at nuclear power facilities are legitimate concerns and should not be ignored, however, nuclear power plant infrastructure and production technology have progressed significantly, partially influenced by these notable disasters to prevent similar accidents from ever occurring in the future. The nuclear power industry is not the same as it was some twenty years ago – it has seen significant increases in safety, regulation, and output optimization through new technologies. If the public can continue moving towards greater support for widespread nuclear power production, which appears to be trending that way in recent years, nuclear energy as the **main source of consumer energy** consumption in the U.S. is a real possibility.

Nuclear Energy as a Domestic **Alternative to Fossil Fuels**

Nuclear power production for energy’s sake is not the primary reason for the needed increase in nuclear power output. The need for increased output stems from the vulnerabilities in the U.S.’s energy supply and demand trends. Over the last few years, the U.S. has increased its crude oil exports and became a net exporter of crude oil in 2021, according to the U.S. Energy Information Administration. The U.S. being able to produce more crude oil than it consumes is great for energy security interests since it means the U.S. is less dependent on foreign oil, at least when compared to when the U.S. was a net importer of foreign oil. A decreased dependency on foreign fossil fuel imports provides a host of benefits to the U.S. One of these is the **increased stability** of fossil fuel supply. Considering that the U.S.’s largest source of crude oil and other fossil fuel imports are from areas of the world with complex geopolitical concerns, such as armed conflict, crude oil supply chains face the ever-persistent threat of disruption, whether from direct conflict or supply management used as a tool of coercion, For example, countries that export crude oil may use their production capabilities as a tool of coercion and pressure by restricting the supply of their exports to certain markets, often those that align with their political goals and ideals. This disruption of crude oil was seen following the start of the Russo-Ukraine war, where shortly after the invasion of Ukraine, Russian oil exports were drastically decreased to Western countries following embargoes and sanctions, namely put in place by those in the European Union (EU) and the U.S. These sanctions were designed to be a form of hard power in which the EU and the U.S. **aimed to deter Russian aggression** in hopes that it would accomplish a political end. Whether or not these sanctions are producing their desired effect is beside the point, but they resulted in the **increase in crude oil prices** in the U.S. and abroad, since a major exporter of crude oil, Russia, could not supply crude oil to the U.S. In terms of international diplomacy, the U.S. pursued an option to deal with Russia and its invasion of Ukraine which had **immediate effects on the U.S. economy** and the fossil fuel industry. Whether it proved successful for U.S. interests is yet to be determined, but one thing is certain – if the U.S. had a greater energy consumption available to consumers from nuclear power, crude oil prices may not have increased, as less crude oil and fossil fuels would be needed to power homes, businesses, and other everyday electricity consumers since nuclear power could have **reduced the demand for fossil fuels**.

#### Decreased demand means more exports.

**Rua 13** [Antonio Rua, Senior Economist @ Banco de Portugal & Associate Professor of Economics @ Nova School of Business and Economics, September 2013, Is there a role for domestic demand pressure on export performance?, European Central Bank, https://www.ecb.europa.eu/pub/pdf/scpwps/ecbwp1594.pdf, Willie T.]

Typically, export performance is modeled as a function of the foreign demand for a country’s output and a country’s price competitiveness indicator. In general, the foreign demand is proxied by the evolution of imports in the trade partners and its relative evolution vis-à-vis exports is used as a measure of market share developments. The relative price advantage of a country over its competitors is often captured by the real exchange rate. Ceteris paribus, a depreciation makes the country’s products cheaper relative to its competitors in the foreign market, which will raise the corresponding demand and increase exports leading to an increase of the market share. These factors are essentially related to the demand side. In fact, most studies **do not consider supply** side variables explicitly when modeling exports. However, it has been recently widely acknowledged that such determinants are far from able to fully explain export performance (see, for example, Fagan et al. (2001, 2005), di Mauro and Forster (2008), European Commission (2010), Dieppe et al. (2012)). Such evidence reinforces the need to search for other factors that may influence exports dynamics.

In line with some previous literature, this paper suggests considering domestic demand pressure as an additional explanatory variable. In fact, it is likely that domestic conditions influence firms willingness or ability to supply exports. In a context of high domestic demand pressure, firms will work at full capacity and will not be able to follow, in the short-run, external demand increases. In contrast, during a domestic recession, firms will be able to **allocate more resources** to exports. In other words, in periods of **slacking** domestic demand firms try to **compensate** for the decline in domestic sales through increased efforts to export while in boom periods production can be mainly sold on the domestic market. Early work focusing on the short-run effects of domestic demand pressure on exports includes Ball et al. (1966), Smyth (1968), Artus (1970, 1973), Zilberfarb (1980), Faini (1994), Sharma (2003), among others. In those studies it was found a significant negative effect of domestic demand pressure on exports for several countries, including the United Kingdom, **the United States**, Germany, Israel, Turkey, Morocco and India. Thus, when modeling export performance, one should take into account not only the driving forces of external demand but also **domestic demand**, as the former affect exports from the demand side and the latter from the supply side. More recently, there has been theoretical and empirical research at the firm level that allows for a better understanding of the negative relationship between domestic demand and exports. Such developments will also contribute to influence the macroeconometric modeling of exports.

In this paper, we revisit the theoretical role of domestic demand pressure on exports and assess its importance on modeling the export performance of the Portuguese economy.1 Besides the recent literature at firm level, such assessment is also motivated by the fact that the standard exports modeling approach is unable to capture properly the Portuguese export performance over the most recent period. In particular, it has been observed a significant and continuous increase of exports market share which cannot be explained by developments on price competitiveness indicators. Such phenomenon is happening along with a dramatic fall of domestic demand. In fact, this relationship could be particularly important in the current economic situation, not only in Portugal but also in other European countries under macroeconomic adjustment and facing strong declines of domestic demand

#### Empirically, increased supply lowers oil prices --- decks Russia’s military and economy.

**Cooper 24** [Luke Cooper, Associate Professorial Research Fellow In International Relations @ The London School Of Economics and Political Science, 11-10-2024, Will oil decide the fate of the Russia-Ukraine War?, International Politics and Society Journal, https://www.ips-journal.eu/topics/foreign-and-security-policy/will-oil-decide-the-fate-of-the-russia-ukraine-war-7836/, Willie T.]

Saudi Arabia’s decision to increase oil supply at a time of falling global demand could **jeopardise** the Russian war effort. With Russia already selling its oil at discounted rates and with higher production costs, a low-price environment in oil markets may impact its ability to **finance its aggression** in Ukraine.

Russia and Saudi Arabia have **previously clashed** in oil markets. For a brief one-month period at the outset of the Covid-19 pandemic, Russia launched a foolish price war, increasing production as the world moved into lockdown. Once Saudi Arabia responded in kind, the oil price **went into freefall**. In an illustration of how geopolitics ‘overdetermines’ oil markets, the trigger for the negotiations that brought the crisis to an end was allegedly US President Donald Trump’s threat to withdraw American military assistance from Saudi Arabia. Under this geopolitical pressure and collapsing market demand, making a **price war potentially ruinous for all parties**, Russia and Saudi Arabia stepped back, agreeing to the supply cuts required to stabilise world prices.

As recounted in Cambridge professor Helen Thompson’s Disorder: Hard Times in the 21st Century, the oil supply glut in 2014 – 2016 was also shaped by the competitive postures of the United States, Russia and Saudi Arabia. Then as now, Saudi Arabia increased the supply of oil into the world market at a time of falling demand with the economic aim of disincentivising American investment in shale oil and the geopolitical aim of pressuring Russia and Iran to retreat from their support for the Assad regime in Syria. That Russia was able to weather the financial crisis produced by the combination of Western sanctions and the Saudi expansion in oil supply, emerging with the Assad regime intact and Russia’s hold on occupied southern and eastern Ukraine stable, provides a salutary warning for the hope that the present conjuncture may prove problematic for Putin’s regime. But with Russia facing both much **more radical external sanctions** – in effect its near-removal from the Western trade and financial order altogether – and **fighting an enormously costly all-out war** against Ukraine, the **conjuncture** of late 2024 poses a **far more serious challenge.**

The limits of military Keynesianism

Trends in the global oil market **bear down heavily on Russia’s strategic choices**. By 2030, the International Energy Agency anticipates that global supply capacity will outstrip demand by some 8 million barrels per day, a situation they describe as ‘staggering’ and ‘unprecedented’ (outside of the Covid-19 pandemic). As Iran and the Gulf States have oil wells close to the surface, making them cost-efficient to extract from, these states are in a much more commercially advantageous position to cope with falling oil prices. Their breakeven price for new drilling projects is also far lower than that of their international competitors, including Russia and the United States.

By moving towards a more competitive posture, Saudi Arabia is challenging America’s more expensive production but also tacitly acknowledging that the OPEC+ group has a diminished price-setting power. For Russia, this is the worst of both worlds. Unlike the United States, it has an oil-dependent economy, which benefits from the cartel power of OPEC+. Yet, unlike Saudi Arabia, its oil is not cheap to extract, making it poorly equipped to deal with low-price conditions. This drives a short-term escalatory logic for Russia’s war on Ukraine, requiring rapid battlefield successes prior to the emergence of low-price oil market conditions.

With oil accounting for between **30-50 per cent of annual state budget** revenues since 2014, Russia is, fundamentally, a petrostate.

Russia’s successful adaption of its domestic economy to the war effort has been an important story of the full-scale invasion to date. The Russian state has utilised a suite of policies that Volodymyr Ishchenko, Ilya Matveev and Oleg Zhuravlev identify as ‘military Keynesianism’, with war-related spending stimulating demand in the economy. They note, in particular, the important distributional effects of this in terms of wage growth and industrial expansion, how this may have impacted support for the war effort among the Russian working classes and the internal limits that these policies have encountered in the form of acute labour shortages constraining economic output.

Putting the Russian war economy in a global context that recognises its oil dependency can help us build a **fuller picture of its vulnerabilities**. While sanctions have ruptured Russia’s relationship to Western markets, this does not make its war economy autarchic. On the contrary, revenues from oil exports are **critical**. As the Oxford Institute for Energy Studies has argued, the Russian economy is dualistic in the sense that it may be divided between revenue-generating sectors (of which the most important is oil) and revenue-dependent sectors that are sustained through the distribution of rents. With oil accounting for between 30-50 per cent of annual state budget revenues since 2014, Russia is, **fundamentally, a petrostate**. The Putin regime manages these rents and has **drawn on them** to fund military aggression in Ukraine.

While Russia has not been publishing trade data since the full-scale invasion, estimates from Bruegel suggest that, despite its successful application of military Keynesian instruments, it continues to **fund its trade deficit** in non-fossil fuel goods through the sale of fossil fuels (delivering an overall surplus). As these imports are necessary to meet the **needs of the Russian populace** and the state’s war effort, maintaining the flow of oil rents is critical.

Russia has faced rising costs while selling to markets at a discounted rate (advantaging non-Western buyers in general and India and China in particular).

#### It’s instant AND turns case.

**Baltvilks 22** [Witajewski; Expert @ the Centre for Climate and Energy Analyses @ the Polish National Centre for Emission Management; April 26; euractiv; “How the green paradox and climatepolicy can become Putin’s nightmare,” https://www.euractiv.com/section/energy/opinion/how-the-green-paradox-and-climate-policy-can-become-putins-nightmare/; DOA: 3-21-2025] tristan

**Russia’s** **invasion** of Ukraine **pushed** global **oil** and **gas** **prices** even **higher** than they stood in 2021 because of the Russian **export** **restriction**. Many experts believe that further sanctions on Russia, including the gradual isolation of Russia in the sphere of global trade, would **keep** oil and gas **prices** **high** in the medium term.

Ironically, **high** global **prices** **imply** that many Asian **countries** are more likely to **purchase** Putin’s **oil**, especially if it is **offered** at a **lower** **price**. Should this happen, Putin’s oil revenues will remain high, and sanctions by G7 countries will not achieve their primary goal.

This risk can be avoided if sanctions are complemented by a firm climate policy.

The ability of climate policy to influence the oil market and oil prices is illustrated in the so-called green paradox. The green paradox is a hypothetical scenario in which the **announcement** of a rigid **climate** **policy** becomes a **signal** for **oil** **producers** that the **demand** for oil will **end** soon, motivating them to **sell** as **much** as they **can** as soon as they can.

**Flooding** the **market** with oil **depresses** its **price** and **incentivises** **consumers** to **use** **more**. If this were to happen, emissions would increase, **rendering** the climate **policy** **ineffective**. The green paradox is particularly relevant in the context of oil markets, but the mechanisms of the paradox can also apply to natural gas and coal.

Until recently, the green paradox was a problem for climate change economists, but the one who should be most concerned is, in fact, Vladimir Putin. The green paradox has the potential to turn radical climate policy into a weapon against Putin’s regime. It is especially important because Russia, the second-largest worldwide gas producer and the third-largest oil producer, currently uses fossil fuels as a weapon against the West for the purpose of pacification.

A **clear** and credible **commitment** by the largest economies in the world to halve the consumption of oil over the next two decades would be a **clear** **signal** to all oil producers that their **resources** will soon **lose** **value**. **No** **producer** with low extraction costs will **keep** its **reserves** for the **future** — they will **attempt** to **pump** their **oil** into the market as long as it **exists**.

**Low**-**cost** oil from Saudi Arabia and the United Arab Emirates will, at least partly, **crowd** **out** the more **expensive** **product** from **Russia**, Venezuela and Iran. Even if that crowding out is not complete, the low oil price will **render** these countries’ **oil** **revenues** **negligible**. In Russia, where **oil** **rents** constitute more than **9% of** the nation’s **GDP** (**36%** of public-sector **revenue**), this will unavoidably **complicate** the **financial** **landscape** of the regime.

#### A losing warfront ensures nukes.

**Stein 24** [Janice Stein, founding director of the Munk School of Global Affairs & Public Policy and the Belzberg Professor of conflict management with the Department of Political Science at the University of Toronto, “How impossible is the risk of nuclear escalation in Ukraine?”, Bulletin of the Atomic Scientists, 20 December 2024, https://thebulletin.org/2024/12/how-impossible-is-the-risk-of-nuclear-escalation-in-ukraine/ //akang]

In the bizarre interregnum since the US presidential elections, world leaders have been calling President-elect Donald Trump in Florida before his inauguration on January 20. Some of them worry that the ongoing war between an increasingly desperate Ukraine that kills a Russian general in Moscow as it did this week and an emboldened Russia could spin out of control through miscalculation. The darkest scenario is one that culminates in escalation when Russia detonates a nuclear weapon. How likely is such a scenario in the few weeks left before inauguration day?

The likelihood of nuclear escalation cannot be estimated. The atomic bombings of Hiroshima and Nagasaki by the United States in 1945 are the only cases of the use of nuclear weapons. That strategy was deliberate, not a product of miscalculation, and can best be described as “escalate to de-escalate.” There is no case of nuclear escalation through miscalculation from conventional war to nuclear fighting. No estimate of likelihood has any validity unless there are a large enough number of cases to generate a probability distribution. Nuclear escalation occurs in a world of what Oxford University’s John Kay calls “[**radical uncertainty**](https://wwnorton.com/books/9781324004776)” in which historical information provides **no reliable guidance.**

One way to think about nuclear escalation in the context of Russia’s current war against Ukraine is to build scenarios in which Russia uses a nuclear weapon and then trace a logically compelling pathway back to the present. It then becomes possible to ask what conditions could enable such a pathway to escalation.

Tactical nuclear weapon. In one scenario that has been discussed, Russia explodes a tactical nuclear weapon to **force Ukraine** to end the fighting and agree to cede Crimea and the four Ukrainian provinces that Russia **is currently occupying** and claiming as its own. Under what conditions is it possible that Russia might adopt such a strategy? Detonating a single tactical nuclear weapon would provide very limited battlefield advantage to Russian forces, and there is some risk that the radioactive fallout could blow back and inflict harm on nearby Russian troops.

Nor would the damage from a single tactical nuclear weapon be grave enough to so demoralize the Ukrainian public that it would buckle under the pressure. If anything, the use of a tactical nuclear weapon would likely radicalize Ukrainians who have been reluctantly moving toward grudging acceptance of a ceasefire.

Were Russia to use a tactical nuclear weapon, such a strategy might backfire. The Ukrainian public might well rally around the flag, unite behind its leader, and stiffen its resistance to ceasefire proposals that are increasingly the subject of discussion inside Ukraine.

Finally, the detonation of a single tactical nuclear weapon—however small its payload—would break the “nuclear taboo” that has held for almost eight decades. **In** October 2022, encouraged by the United States, Russia’s key partners—China and India—signaled their strong opposition to the use of any nuclear weapon under any circumstances. Now isolated from the West, Russian President Vladimir Putin would not want to alienate his fellow leaders of the nine BRICS countries, which include China, India, and Iran.

There is, therefore, no compelling logic that supports the use of even a single tactical nuclear weapon. What conditions could change that logic?

Russia could face a situation where its forces are being pushed back and **out of Ukraine**. Putin faced a version of that scenario in the autumn of 2022 when Ukraine’s armed forces were pushing the Russian army back. It was then that the CIA issued the estimate that there was a 50 percent chance that Russia would use a nuclear weapon.

After Ukrainian troops broke through and pushed Russian forces back from Kharkiv in the northeast and Kherson in the south, US intelligence overheard a conversation among senior Russian military commanders about when and how Moscow might use a tactical nuclear weapon in Ukraine. Putin was reportedly not part of these conversations. That intelligence was circulated inside the US government in mid-October. In addition, there are unconfirmed reports that Russia moved some tactical weapons out of storage and loosened operational controls that would make the use of a tactical nuclear weapon easier. It was these two developments that pushed up the US intelligence estimate that Russia might use a nuclear weapon.

Around the same time, Russian Defense Minister Sergei Shoigu, in one of his calls with US Defense Secretary Lloyd Austin, accused Ukraine of planning to use a “dirty bomb.” Concern among Western officials grew that Putin was preparing a false flag operation. Only a long phone call between Gen. Mark Milley, then chairman of the US Joint Chiefs of Staff, and Russian Gen. Valery Gerasimov, reduced the tensions. The most senior military officer from each country discussed Russia’s doctrine governing the use of nuclear weapons and reassured one another. This episode tells us that even when Russian forces were retreating in Ukraine, Putin did not break the nuclear taboo.

Russia has since **significantly lowered the threshold** of when it would use nuclear weapons. In November 2024, Putin signed a decree amending Russia’s nuclear doctrine in two important ways. The doctrine now declares that Russia has the right to use nuclear weapons against a non-nuclear state that attacks Russia or its **allies** and is supported by a nuclear power. In addition, Russia’s nuclear doctrine released in 2020 declared that Russia would use nuclear weapons in response to a conventional attack when the very **existence of the state is in jeopardy**. The new amendment lowers that threshold to a conventional attack that is a critical threat to Russia’s sovereignty or territory.

Putin also railed against the Biden administration’s decision in November to allow Ukraine to use US-supplied longer-range Army Tactical Missile Systems, or ATACMS, against military installations inside Russia and warned that this decision was tantamount to NATO declaring war on Russia. Moscow then launched the Oreshnik, an intermediate-range ballistic missile equipped with multiple warheads, against Ukraine. The missile can carry nuclear warheads. Despite the bellicose rhetoric and the new missile launch, Russia has not loosened operational controls on any tactical nuclear weapons nor moved any of these weapons out of storage. Instead, Gerasimov again reassured the current chairman of the Joint Chiefs of Staff, Gen. Charles Q. Brown Jr., in a phone call that the missile launch was planned long before the announcement about the ATACMS.

#### Extinction!

**Sarg 15** [Dr. Stoyan Sarg, 10-9-2015, Director of the Physics Research Department at the World Institute for Scientific Exploration, PhD in Physics, "The Unknown Danger of Nuclear Apocalypse," Foreign Policy Journal, https://www.foreignpolicyjournal.com/2015/10/09/the-unknown-danger-of-nuclear-apocalypse/, accessed: 11-5-2023] // sid

With the new NATO plan for installation of nuclear tactical weapons in Europe, nuclear missiles may reach Moscow in only 6 minutes, and the opposite case is also possible in the same time. The question is: how can we be sure that this will not be triggered by a human error or computer malfunction. An adequate reaction dictated by the dilemma “to be or not to be” and the concept of preventive nuclear strike may **lead to a nuclear consequence** that is difficult to stop. At the present level of distributed controlled systems and military global navigations, this will lead to **unstoppable global nuclear war.** However, there is **something not predicted**, of which the military strategists, politicians and powerful forces are not aware. Probably, it will not be a nuclear winter that they hope to survive in their underground facilities. The most probable consequence will be a partial **loss of the Earth’s atmosphere** as a result of one or many powerful simultaneous tornadoes caused by the nuclear explosions. In a tornado, a powerful **antigravitational effect** takes place. The official science does not have an adequate explanation for this feature due to an incorrect concept about space. The antigravitational effect is **not a result of the circling air**. It is a specific physical effect in the aether space that is **dismissed in physics** as it is currently taught. Therefore, the effective height of this effect is **not limited to the height of the atmosphere**. Then in the case of many simultaneous powerful tornadoes, an effect of **suction of the earth atmosphere** into space might take place. Such events are **observed on the Sun** and the present physical science does not have an explanation for them. The antigravitational effect is accompanied by **specific electric and magnetic fields** with a twisted shape. This is observed in tornado events on the Sun. Some effects in the upper Earth atmosphere known as sprites have a similar **combination of electrical and magnetic fields** but in a weaker form. They are also a mystery for contemporary physical science.

At the time of atmospheric nuclear tests, made in the last century, a **number of induced tornadoes are observed** near the nuclear mushroom as shown in Figure 1.

The strongest **antigravitational effect**, however, occurs in the central column of the formed nuclear mushroom. The analysis of underwater nuclear tests also indicates a **strong antigravitational effect**. It causes a rise of a vertical column of water. In the test shown in Figure 2, the vertical column contains millions tons of water. Thermonuclear bombs are **multiple times more powerful**. The largest thermonuclear bomb of the former Soviet Union tested in 1961 is 50 megatons. It is 3,300 times more powerful than the bomb dropped by USA on Hiroshima at the second world war and may kill millions.

It is known that Mars once had liquid water and consequently an atmosphere that has mysteriously disappeared. If the scenario described above takes place, the **Earth will become a dead planet** like Mars. The powerful politicians, military adventurers and their financial supporters must be aware that even the most secured underground facility wi**ll not save them** if a global nuclear conflict is triggered. Their disgraced end will be more miserable than the deaths of the **billions of innocent human beings**, including the animal world.

### Contention 3 is Saudi Arabia

#### The US and Saudi Arabia are engaged with hopes of security agreements.

**Depetris 25** [Daniel R. Depetris, Foreign policy analyst based in New York & a columnist for The National Interest, 1-30-2025, How Donald Trump Should Deal With Saudi Arabia, Newsweek, https://www.newsweek.com/how-donald-trump-should-deal-saudi-arabia-opinion-2023659, Willie T.]

On Jan. 23, his second full day in office after being sworn in as the 47th president, Donald Trump picked up the phone and dialed his **first foreign leader**. The honor didn't go to the leader of a formal U.S. treaty ally like Canada or the United Kingdom, but rather to **Saudi Crown Prince Mohammed bin Salman** (MBS). This wasn't a surprise given the relationship the two men conjured up. In his first term, Trump jetted to Saudi Arabia for his **first overseas trip.** The visit was a precursor to what would turn out to be a blossoming U.S.-Saudi relationship over the next four years. Trump showered the Saudis with billions of dollars in military equipment; continued to assist the Saudi-led military campaign against the Houthis in Yemen; joined Riyadh's economic embargo against Qatar; and defended MBS when the U.S. intelligence community assessed that he was responsible for the October 2018 murder of journalist Jamal Khashoggi.

Trump and MBS are prepared to pick up where they left off. The two view each other as force multipliers for their respective agendas. Trump looks at the Saudi crown prince and sees a high net-worth individual who could throw a **gargantuan amount of petrodollars** into the American economy. In Trump, MBS spots a transactional businessman who couldn't care less about high-browed concepts like the rules-based international order.

Both men are also nationalists to the core. MBS can relate to Trump's "Make America Great Again" mantra because he is following the same playbook in the kingdom. MBS wants to make his country stronger and wealthier than ever before, best exemplified by his Vision 2030 economic campaign to diversify Saudi Arabia from an oil-pumping machine into a center of banking, finance, and sports.

Trump would be wise to remember this as he interacts with MBS. Saudi officials may highlight their strategic relationship with Washington as mutually-beneficial, but the kingdom won't be doing the United States any favors. And the concessions the Saudis do make will almost certainly be paired with demands.

Trump is likely pleased with Riyadh's stated commitment to invest $600 billion into the U.S. economy over the next four years. But what seems like a benevolent act smells a lot like a transparent bribe to purchase more U.S. defense investment. For nearly two years, Riyadh has been negotiating with U.S. officials on an upgrade to the U.S.-Saudi defense relationship. The original concept was to provide the kingdom with a U.S. security guarantee in the form of a treaty, largely as a reward for the Saudis normalizing diplomatic relations with Israel. While the war in Gaza has diminished the prospects of the Saudis normalizing ties with Israel anytime soon, they are still intent on bringing the United States closer militarily.

Saudi Arabia has good reason to keep Washington in its camp. Although Iran is unmistakably weaker today courtesy of Israel's military operations against Hamas and Hezbollah as well as Bashar al-Assad's fall, the Saudis can't discount the Iranians as powerless. Iran retains proxies in Yemen and Iraq, maintains a formidable missile capability, and is improving upon a nuclear program that MBS' late uncle, King Abdullah, wanted the United States to destroy nearly two decades ago. Despite a years-long ceasefire with the Houthis, the Yemeni militia group isn't going to disappear and might resume fighting against the Saudi-backed Yemeni government if peace talks remain stalled. The United States is the big, warm security blanket the Saudis would like to use during chilly times.

Yet what's good for the Saudis isn't necessarily good for the Americans. What exactly would Washington get for offering Riyadh a security guarantee? This is precisely the question Trump, who believes the American people have been taken advantage of by other countries for decades, should be asking.

#### Affirming is perceived as a transition to reliable energy.

**Larson 25** [Aaron Larson, Writer @ Power Magazine, 3-3-2025, Trump Energy Policy Changes Signal Major Industry Shifts in 2025 and Beyond, POWER Magazine, https://www.powermag.com/trump-energy-policy-changes-signal-major-industry-shifts-in-2025-and-beyond/, Willie T.]

“We see a potentially bifurcated outcome with respect to IRA repeal, with a greater-than-appreciated probability that the IRA may remain intact,” Morgan Stanley Research speculated. The group acknowledged, however, that IRA repeal risk remains a key area of concern for clean energy investors. “Our base case for IRA-related spending remains intact: expect efforts to challenge or delay disbursements through the executive branch, as well as potentially targeted repeal efforts/accelerated phase-outs as Republicans attempt to find offsets for tax-cut extensions, but broader repeal is a lower probability event,” the team of analysts, strategists, and researchers said.

Morgan Stanley expects tariffs to continue being used for leverage to reduce the trade deficit and increase the competitiveness of U.S. manufacturing. Meanwhile, the group said there is **significant bipartisan support** for nuclear power, as it is **viewed as** a critical source of **reliable and clean power** needed to support **growing energy demand** in the U.S. stemming from artificial intelligence and the onshoring of manufacturing. “The ADVANCE Act, which passed the Senate by a vote of 88–2, is clear evidence of this bipartisan support. This gives us confidence that if there were to be any changes to the IRA, the nuclear PTC [production tax credit] would likely be untouched,” the group said.

Concerning natural gas, Trump lifted the pause on new Department of Energy permits for LNG export facilities, easing the path for new facilities to advance. “Beyond LNG, the Trump administration may target a roll-back of greenhouse gas limits for new and existing power plants, potentially helping gas to take a larger share of electricity demand growth,” Morgan Stanley Research said.

#### That kills impetus for America to maintain US-Saudi ties and defense commitments --- that’s why it’s resilient despite fissures.

**Krane 24** [Jim Krane, Wallace S. Wilson Fellow for Energy Studies @ the Rice University Baker Institute for Public Policy’s Middle East Energy Roundtable, February 2024, How the Energy Transition Is Imposing New Strains on US-Saudi Relations, Foreign Policy Research Institute, https://www.sciencedirect.com/science/article/abs/pii/S0030438724000097, Willie T.]

Abstract: The energy transition is initiating **long-term oil market** trends that look likely to undermine the strategic importance of oil-producing countries for the US government. The trends suggest US voters and future US administrations will be **less exposed to price swings** and other risks in the global oil market. Diminishing risk exposure, in turn, reduces imperatives for US policymakers to spend so heavily on security provision in the Persian Gulf, or to resolve diplomatic rifts with major producers such as Saudi Arabia. Saudi policy changes since 2016, and the reduced willingness to use spare production capacity in ways that benefit Washington, may have amplified a pre-existing appetite for such a downgrade.

The US-Saudi relationship faces **future strains** arising from the energy transition and resulting shifts in crude oil export destinations and use. These risks are not related to any major decline in oil demand and arise even if global oil demand remains robust. Three risks are outlined here. Taken together, these three trends suggest that future US administrations and voters may find themselves more insulated from international oil market risk. Diminishing risk exposure, in turn, reduces imperatives for US policymakers to **invest in Gulf security** provision or to **resolve diplomatic rifts** with Riyadh.

Climate-driven efforts to reduce oil demand are likely to **migrate into diplomatic relations** between producer and importing states.1 As the dominant player within the Organization of Petroleum Export Countries and a longtime US partner, Saudi Arabia has potential to be among those affected. This article highlights three potential knock-on effects of climate policy on interstate dynamics, with a focus on Saudi Arabia and the United States.

First, the shift in oil demand away from the rich countries of the Organization of Economic Cooperation and Development (OEC) and toward developing countries may result in a reduction in the strategic importance of oil. This effect implies negative spillovers for Gulf security. The onset of oil substitutes in transportation is weakening oil’s long-held monopoly on the transport market in the United States and OECD countries which maintain modern militaries such as those within the NATO alliance.2 While oil demand remains robust in non-OECD countries—and may even grow overall in coming decades—non-OECD countries cannot yet provide the same level of hard security protection for big producers like those in the Persian Gulf.

Second, a similar effect could arise from the increasing share of oil being converted into petrochemicals. While producers view petrochemicals—and the plastics they produce—as crucial sources of future oil and gas demand, it is clear that trade in petrochemical feedstocks requires less strategic oversight than the transport fuels that power global economies, trade, and militaries.

The third knock-on effect is related to the rapid growth of electric vehicles, or EVs, as a percentage of new personal vehicle sales in the United States. Vehicles powered by rechargeable batteries insulate motorists from direct exposure to frequent swings in oil prices. **Reduced voter exposure** to oil markets weakens the negative correlation between motor fuel **prices and US presidential popularity**. Other democracies with market-based fuel prices may see similar effects. In the United States, high levels of EV penetration could give the US president a freer hand in curtailing diplomatic engagement with Saudi Arabia and other oil producing countries when difficulties arise. The notable US presidential deference toward Saudi Arabia, especially evidenced during times of oil market tightness, may no longer be needed.

Background: Presidential Approval and Fuel Prices

US relations with Saudi Arabia and other Persian Gulf monarchies have been **based around oil** since the 1930s. Those ties became more strategic in the wake of the 1973 Arab oil embargo. Then, oil’s importance to the global economy was demonstrated by the quadrupling of prices and resulting inflation and other economic contagions.

For the next five decades—and continuing at the time of writing— oil’s availability and pricing has remained a **central facet** of US energy security and Washington’s relationship with Saudi Arabia, the only producer to consistently maintain meaningful spare oil production capacity that can quickly be brought online to ease prices. As such, the US-Saudi relationship remains a **major concern of US presidents**, in part since presidential **standing with US voters remains negatively correlated with the oil price**.4

Oil has an outsized presence in the US political economy. Motor fuel purchases account for roughly five percent of total consumer spending, on average.5 Some 83 percent of American adults drive a personal vehicle several times per week.6 Retail gasoline prices are widely displayed on roadside signs and drivers have near universal access to price information, allowing them to gauge effects on their personal wealth and spending.

Many US voters also hold off-base assumptions that the US president retains significant short-term influence over US gasoline prices and therefore that such **prices may be affected by electoral choices**. Constituencies with longer average commutes to work are more likely to hold the president accountable for high prices.7 Presidential behavior tends to uphold this fiction, with gasoline price discussions taking place in presidential debates, and presidents “taking credit” for reductions.8 In reality, the US president has little control over global oil prices that form the largest portion of US gasoline prices. US prices are determined on worldwide supply and demand decisions made largely outside the United States.9

Summary of US National Interests at Stake in the Middle East

*Vital*

• That Israel survives as a free state.

• That there be no major sustained curtailment in energy supplies to the world.

• That no state in the region hostile to the United States acquire new or additional weapons of mass destruction (WMD) capabilities.

*Extremely Important*

• That there be no hostile regional hegemon in the Persian Gulf. • That the Middle East peace process continues toward success. • That the United States maintain good relations with the region's pro

Western Arab regimes and that these regimes survive domestically. • That regional terrorism be held in check.

*Important*

• That the states of the region adopt or maintain moderate forms of governance and show growing respect for fundamental human rights.

Strategic Importance of Oil

Beyond voter perceptions, access to oil is a chief American global **strategic interest.** Ensuring the “viability and stability of major global systems” including energy supplies is ranked fourth on a prominent list of “vital” US interests. It ranks behind only prevention of nuclear war, ensuring the survival of US allies, and prevention of failed states on US borders.10

The importance of oil is based on several factors. These include oil’s prominence as the leading source of energy for the US and global economies; oil’s near-monopoly among transportation fuels; Americans’ world-leading oil demand; and the role of Saudi Arabia as the world’s largest exporter and only regular holder of spare capacity.

Future changes in oil’s command of the US market for transportation fuel could begin to erode the importance of oil relative to other compelling national interests. Competing interests relevant to the US-Saudi relationship include discouraging human rights violations in foreign countries; promoting democracy; and promoting climate and environmental policy improvements. These three countervailing interests were far down the list at the start of the current century, ranked as “important” rather than “vital.” Were oil’s strategic importance to undergo a significant decline, it becomes possible for countervailing concerns to challenge those of oil in the US Saudi relationship.

Protecting global access to oil is a **key mission of the US military** and diplomatic forces focused on the Gulf, leading the United States to spend at least $100 billion per year on military bases and troop deployments in the region.11 However, skepticism about the continued need for such a large Middle Eastern presence has emerged from US defense scholars seeking a reduction in the US military commitment to the Gulf.12

Weakening US-Relations with Saudi Arabia

Meanwhile, US ties with Saudi Arabia have cooled. Some of the evolution is due to a dramatic increase in US oil production since the onset of the so-called “shale revolution” in the 2000s. As the United States rose from being the No. 3 producer in 2007 to the No. 1 oil producer in 2022, its relationship with oil exporting states changed from one of a customer to that of a competitor. The expansion of OPEC into the OPEC+ cartel in 2016 was a response to growth of nearly 10 million barrels per day growth in US oil production between 2007 and 2019. Saudi oil policymakers found themselves shedding influence as OPEC production cuts were offset by increases in US shale output. The shale response undermined OPEC’s intended increase in global prices.13 Oil policymakers from Saudi Arabia began strategizing closely with counterparts in Russia to combat what they viewed as US “free riding” on OPEC cuts. The Saudi-Russian partnership within the expanded cartel has strengthened since 2016 and remained intact at the time of writing, despite Russia’s invasion of Ukraine.14

Some of the US-Saudi estrangement has little to do with oil. Among Gulf ruling elites, perceptions and discourse suggest that Washington’s strategic attention—if not its actual spending on regional deployment—has diminished. Tepid US responses to the 2019 missile and drone attacks on Saudi oil infrastructure and to a similar attack on an Abu Dhabi fuel depot in 2022 provides evidence for such fears.15 Another is the growing US focus on “pivoting” from the Middle East to focus on competition with China—although the Gulf has also become a forum for US-Beijing competition. Further areas of **friction** include differing priorities in relations with Iran and on conflicts in the **M**iddle **E**ast and **N**orth **A**frica**.**

From the US side, dissatisfaction with Saudi Arabia has grown since the **Yemen invasion** and the 2018 murder in Istanbul of Saudi dissident Jamal **Khashoggi**, who resided in Washington. Joe Biden denigrated Saudi Arabia and its leadership on multiple occasions during his successful presidential campaign. Upon taking office in 2021, Biden found that his campaign rhetoric had damaged his working relationship with King Salman’s regime.16

Possibly as a result, customary Saudi oil market cooperation has **not been forthcoming** during the Biden presidency. Saudi leadership under King Salman and Crown Prince Mohammed bin Salman has exhibited markedly less deference toward the United States. Prior to the accession of King Salman, Saudi oil market strategy was generally supportive of the US perspective. A memoir by former Saudi oil ministry adviser Ibrahim Almuhanna provides useful detail on the ministry’s long-running strategy, documenting moments when production increases were made to assist then President Donald Trump’s allies in the US midterms in 2018 and Barack Obama’s reelection in 2012. Almuhanna underscored the importance of the Saudi-US relationship in oil market decisions.17

Since Biden took office, such assistance has evaporated. The kingdom led OPEC+ to three large production cuts18 at times when prevailing oil prices were unusually high for such intervention. The first of these cuts, with oil around $90/barrel, succeeded in raising oil prices at a particularly unwelcome time. Global inflation remained a problem. For Biden, the October 4 cut came weeks ahead of the national midterm election and not long after the US president and his advisers visited Saudi Arabia to request an increase in oil production, or at least a delay in cutting until an OPEC meeting scheduled for Nov. 3, after the US election.19 Oil market disagreement quickly escalated into a major diplomatic confrontation. The timing of the intervention suggested that Saudi officials sought to undermine the election prospects of US Democratic Party candidates—given that party’s greater resistance to the Saudi regime and fossil fuels—and assist the chances of Republicans, seen by Saudi elites as friendlier toward Saudi interests.

For his part, Biden vowed to respond. “There’s going to be some consequences for what they’ve done with Russia,” Biden told CNN. “I’m not going to get into what I’d consider and what I have in mind. But there will be consequences.”20 Democrats in Congress openly discussed measures such as arms sales curbs and allowing OPEC and Saudi Arabia to be sued for manipulating prices under US antitrust law.

At the time of this writing in February 2024—more than a year after vowing “consequences” for Riyadh—**none had materialized**. Administration officials had backed away from earlier threats and **emphasized cooperation** on long-held **security ties** and Riyadh’s support for US goals in Yemen, Sudan, and Ukraine.21 OPEC’s April cut drew a muted US response, with a Biden administration spokesperson describing it as inadvisable.22 A third OPEC cut in June 2023 triggered a Biden administration statement that lower oil prices explained the cartel’s response. The issue was folded into US-Saudi talks around Riyadh’s normalization with Israel in return for US security guarantees and nuclear assistance, along with Israeli concessions toward the Palestinians.23 Those talks were postponed after the October 2023 Hamas attack and subsequent Israeli war in Gaza but have since been revived amid a search for a permanent solution to the conflict. An eventual formalized US-Saudi security pact, if it came about, could serve to halt the drift in relations discussed here.

#### Prospects of US security guarantees cap Saudi nuclear ambitions.

**Byman 24** [Daniel Byman, Professor in the School of Foreign Service @ Georgetown, 5-6-2024, Will Saudi Arabia Get the Bomb?, Foreign Affairs, https://www.foreignaffairs.com/saudi-arabia/will-saudi-arabia-get-bomb, Willie T.]

GATEWAY TECHNOLOGIES

Although Saudi Arabia’s current nuclear ambitions are ostensibly for peaceful purposes, civilian programs can be a prelude to military ones. Iran, North Korea, Libya, Iraq, and Syria all clandestinely pursued nuclear weapons programs while pretending to adhere to safeguards. These examples demonstrate the challenges of detecting and preventing covert nuclear proliferation if countries have enrichment capabilities as part of their civilian nuclear programs, underscoring the urgent need for strict verification protocols.

A civilian nuclear program could facilitate a nuclear weapons program by giving Saudi Arabia dual-use technologies such as fuel rods, reprocessing facilities, and advanced reactor designs. The reactors and uranium-enrichment capabilities would provide the kingdom with the infrastructure and knowledge base necessary for advancing its nuclear capabilities through a diversion of materials or expertise toward military applications. Riyadh could then use its advanced enrichment technologies, such as gas centrifuges, to produce weapons-grade uranium, evading detection by international inspectors through concealment and deception. Saudi Arabia could also separate the uranium isotopes needed for highly enriched uranium within civilian facilities, making it challenging for inspectors to detect the existence of a military program. Enriched uranium necessary to fuel nuclear reactors could also be diverted and further enriched to levels suitable for a nuclear explosion. A Saudi civilian nuclear program would therefore amount to a latent nuclear capability—the technical capacity to proliferate if it desired to do so. With that, Saudi Arabia would join 31 other states, including Brazil, Egypt, Germany, and Japan, that have held this status throughout history.

The next and more aggressive step would be to escalate from latency to nuclear hedging—the strategic use of a civilian nuclear program as a bargaining chip—or to direct adversarial behavior (as North Korea, for instance, has done). Saudi Arabia could enrich uranium, increase its production of centrifuges, buy nuclear material and equipment from other states, or garner domestic political support for nuclear weapons possession, all with the hope of increasing its bargaining power.

FIGHTING FIRE WITH FIRE

A number of factors could drive Saudi Arabia to seek to possess nuclear weapons, including a desire to bolster national security, **deter potential adversaries**, and enhance its **geopolitical influence**. But the main motive will likely emerge from Saudi Arabia’s **neighbor and rival: Iran.** Tehran, which has had its own civilian nuclear program since the 1950s, is edging closer and closer to **nuclear weapons capability**. Iran might be able to produce enough weapons-grade uranium for a nuclear bomb within a matter of weeks, although it would likely take at least another six months to develop a weapon capable of striking a precise target. For now, Iran appears to have decided not to take the next step and weaponize its nuclear program, but the potential endures—and could grow amid mounting regional volatility and as Tehran strengthens its ties to another revisionist nuclear power, Russia. Saudi Arabia has not shied away from making its nuclear **intentions clear** should Iran go down that nuclear road: its de facto leader, Crown Prince Mohammed bin Salman, has said that if Iran were to successfully develop a weapon, Saudi Arabia, too, “**will have to get one.”**

Part of the motivation would be the fear that an emboldened Iran could step up its **support for militant groups** such as Hezbollah, the Houthis, and Hamas, knowing that a nuclear weapon gives it some **protection from a U.S. or Israeli military response**. Iran might also use military force against Saudi Arabia, Israel, or other foes on its own, secure in the knowledge that there are likely **limits to escalation** if the United States or other countries oppose Iranian aggression. Saudi Arabia may also be interested in pursuing nuclear weapons to **match Iranian prestige**, believing in the reputational value of the bomb and wanting to reinforce its position and authority in the region.

Washington must work to restrict Saudi Arabia’s ability to develop its own nuclear weapons program.

Iranian nuclear advances could also prompt other countries in the region, such as the United Arab Emirates or Turkey, to shift toward weaponization, triggering a Saudi move in the same direction. The UAE has come under criticism for failing to divulge information about its civilian nuclear facilities, and Turkish President Recep Tayyip Erdogan has previously suggested that Turkey should not be forbidden from obtaining nuclear weapons. Riyadh, which sees itself as a regional leader, would not want either country—especially the UAE, a major competitor—to beat it to the nuclear finish line.

Saudi nuclear hedging or proliferation would entail **several major risks**. First, Iran and Saudi Arabia could face the stability-instability paradox, the idea that although nuclear weapons may contribute to stability at the strategic level by deterring major war between nuclear-armed states, they can simultaneously **fuel distrust and escalation at a lower level**. If Iran continues to enrich enough uranium for a nuclear warhead, Riyadh might believe that a Saudi nuclear deterrent could stabilize relations between the two adversaries. But a nuclear weapon would not necessarily deter Iran from pursuing a confrontational foreign policy; Tehran has repeatedly demonstrated its willingness to **spar with its nuclear-armed enemy, Israel,** and to encourage militant action against others in the region. Iran has also fomented unrest in Saudi Arabia itself, inciting riots at the hajj in 1987 and supporting an array of antigovernment groups such as the Shiite terrorist organization Hezbollah al-Hejaz. In neighboring Iraq, Tehran has backed a wide array of actors, including Asa’ib Ahl al-Haq and Kataib Hezbollah, both of which have attacked U.S. forces in the region. For Iran, these groups are a way of expanding its influence on the ground and giving it means to undermine rivals or strike at its enemies beyond its borders.

Second, the increasingly prominent role of nuclear weapons in Iranian-Saudi relations **risks misperception** and, in turn, escalation between the two countries. Saudi Arabia might interpret Iran’s pursuit of nuclear capabilities, even if for hedging purposes, as a signal of hostile intent or as a precursor to weaponization. Iran might see Saudi Arabia’s program as threatening and pursue weaponization itself. This misinterpretation could lead Saudi Arabia to accelerate its own nuclear program, believing it needs a deterrent against a nuclear-armed Iran. This doom spiral of nuclear competition between the two adversaries could lead to an **arms race** in the region, further increasing the likelihood of a **miscalculation or conflict.**

TOEING THE NUCLEAR LINE

Washington can play a deciding role in determining whether Saudi Arabia acquires a nuclear weapon, but a major question remains: How far is the United States willing to go to protect Saudi Arabia against Tehran? How Riyadh ultimately chooses to respond to a nuclear Iran depends in large part on whether the United States gives Riyadh firm **security guarantees**, such as a commitment to placing Saudi Arabia under its nuclear umbrella—or even creating a formal security alliance similar to the ones that prevail in Europe or East Asia. Although there are ongoing talks about a formal defense relationship, a U.S.-Saudi security arrangement is far from certain, particularly if Donald Trump wins the presidency. The former president’s refusal to respond to an Iranian attack on a Saudi oil-processing facility in 2019, whereby Tehran crossed what was long assumed to be a U.S. redline, did little to assure Saudi officials that a second Trump administration would have Riyadh’s back.

Beyond a security alliance that would assuage fears of a nuclear Iran, the United States could push Riyadh to sign on to a “123 Agreement” for nuclear cooperation. These deals, named after a section of the U.S. Atomic Energy Act, allow access to U.S. civil nuclear technology in exchange for an explicit commitment to refrain from weaponization.The United States has negotiated these agreements on a case-by-case basis with 47 countries, including Brazil, Japan, and Turkey. The agreements usually require a country to adhere to the IAEA safeguards, restrict enrichment levels, and return spent nuclear fuel to the United States to prevent reprocessing for weapons material. The gold standard version of a 123 Agreement includes a total ban on enrichment as an extra layer of protection.

One obstacle to such an agreement, however, is Riyadh’s stated desire to enrich uranium domestically to generate electricity through controlled nuclear fission reactions, instead of relying on pre-enriched uranium from external sources. If the United States is unable to negotiate a total ban on enrichment and unwilling to make other concessions, Saudi Arabia may turn to other countries, such as **China**, for assistance with nuclear technology, leading to a **loss of transparency** over nuclear activities and facilities—and a loss of influence for the United States. Riyadh has long maintained friendly ties with Beijing, and in recent years, their relationship has grown even closer. In 2019, the two powers finalized a $10 billion agreement aimed at developing a refining and petrochemical complex, and later that year, Chinese geologists helped Saudi Arabia **identify uranium deposits** in the northwestern part of the country. Beijing has also made **diplomatic overtures** to Riyadh, having helped broker the Saudi-Iranian rapprochement in 2023.

To preempt a Saudi turn to China, the United States may therefore need to compromise. Washington could consider offering to build a uranium-enrichment facility in Saudi Arabia, which would grant Riyadh greater control over its nuclear fuel supply chain and reduce its dependence on foreign suppliers. The technological expertise and self-sufficiency that would result from having a nuclear energy sector align with Saudi Arabia’s ambitions to diversify its economy as the world weans itself off oil. The United States could still insist on strong measures to prevent Saudi Arabia from developing a military program; it could demand, for example, that any enrichment facility be run by U.S. personnel, or install a remote shutdown mechanism as a safeguard in the event of a physical takeover. But Washington must be clear-eyed about such provisions: these measures would certainly decrease the risk of Saudi nuclear proliferation, but they would not eliminate them.

SAUDI ARABIA AS IT IS

It is vital that the United States works to restrict Saudi Arabia’s ability to develop its own nuclear weapons program from the start. Washington cannot afford delays; back in 2009, human rights concerns delayed a 123 Agreement with the UAE in Congress, and any agreement with Saudi Arabia will be sure to receive even more scrutiny. But concerns over proliferation in the Middle East should prevail.

As an alternative to Saudi enrichment, Washington could offer to guarantee a reliable supply of enriched uranium for Saudi Arabia’s reactors, eliminating its need for domestic enrichment facilities. Possibilities range from a long moratorium on Saudi domestic enrichment to having enrichment facilities run by U.S. rather than Saudi personnel, with remote shutdown mechanisms in case of a potential takeover. Washington could condition a ban on enrichment as part of bilateral defense cooperation. This could take the form of a formal ban signed onto by Riyadh, or a nonbinding supplementary document accompanying a formal agreement that contains an additional provision wherein Saudi Arabia agrees not to set up a fuel cycle infrastructure. That approach would allow Riyadh to retain a technical right to enrichment, but one it would agree in advance not to exercise. Given Iran’s increasingly aggressive regional posture, a beefed-up U.S.-Saudi security agreement will remain a top Saudi priority—and a **powerful incentive** for Riyadh to cap its nuclear ambitions.

The United States could lose Saudi support for normalization with Israel and cede influence to rivals such as China.

#### That spurs regional prolif and miscalculated nuclear wars.

**Edelman 11** [ERIC S. EDELMAN, Distinguished Fellow @ the Center for Strategic and Budgetary Assessments & Fmr. US Undersecretary of Defense for Policy, 1-1-2011, The Dangers of a Nuclear Iran, Foreign Affairs, https://www.foreignaffairs.com/articles/persian-gulf/2011-01-01/dangers-nuclear-iran, Willie T.]

Developing nuclear weapons remains a slow, expensive, and difficult process, even for states with considerable economic resources, and especially if other nations try to constrain aspiring nuclear states' access to critical materials and technology. Without external support, it is unlikely that any of these aspirants could develop a nuclear weapons capability within a decade.

There is, however, at least one state that could receive **significant outside support**: Saudi Arabia. And if it did, proliferation could accelerate throughout the region. Iran and Saudi Arabia have long been geopolitical and ideological rivals. Riyadh would face tremendous pressure to respond in some form to a nuclear-armed Iran, not only to deter Iranian coercion and subversion but also to preserve its sense that Saudi Arabia is the leading nation in the Muslim world. The Saudi government is already pursuing a nuclear power capability, which could be the first step along a slow road to nuclear weapons development. And concerns persist that it might be able to accelerate its progress by exploiting its close **ties to Pakistan**. During the 1980s, in response to the use of missiles during the Iran-Iraq War and their growing proliferation throughout the region, Saudi Arabia acquired several dozen CSS-2 intermediate-range ballistic **missiles from China**. The Pakistani government reportedly brokered the deal, and it may have also **offered to sell Saudi Arabia nuclear warheads** for the CSS-2s, which are not accurate enough to deliver conventional warheads effectively.

There are still rumors that Riyadh and Islamabad have had discussions involving nuclear weapons, nuclear technology, or security guarantees. This "Islamabad option" could develop in one of several different ways. Pakistan could sell operational **nuclear weapons and delivery systems** to Saudi Arabia, or it could provide the Saudis with the infrastructure, material, and technical support they need to produce nuclear weapons themselves within a matter of years, as opposed to a decade or longer. Not only has Pakistan provided such support in the past, but it is currently building two more heavy-water reactors for plutonium production and a second chemical reprocessing facility to extract plutonium from spent nuclear fuel. In other words, it might accumulate more fissile material than it needs to maintain even a substantially expanded arsenal of its own.

Alternatively, Pakistan might offer an extended deterrent guarantee to Saudi Arabia and deploy nuclear weapons, delivery systems, and troops on Saudi territory, a practice that the United States has employed for decades with its allies. This arrangement could be particularly appealing to both Saudi Arabia and Pakistan. It would allow the Saudis to argue that they are not violating the NPT since they would not be acquiring their own nuclear weapons. And an extended deterrent from Pakistan might be preferable to one from the United States because stationing foreign Muslim forces on Saudi territory would not trigger the kind of popular opposition that would accompany the deployment of U.S. troops. Pakistan, for its part, would gain financial benefits and international clout by deploying nuclear weapons in Saudi Arabia, as well as strategic depth against its chief rival, India.

The Islamabad option raises a host of difficult issues, perhaps the most worrisome being how India would respond. Would it target Pakistan's weapons in Saudi Arabia with its own conventional or nuclear weapons? How would this expanded nuclear competition influence stability during a crisis in either the Middle East or South Asia? Regardless of India's reaction, any decision by the Saudi government to seek out nuclear weapons, by whatever means, would be highly destabilizing. It would increase the **incentives of other nations** in the Middle East to pursue nuclear weapons of their own. And it could increase their ability to do so by eroding the remaining barriers to nuclear proliferation: each additional state that acquires nuclear weapons **weakens the nonproliferation regime**, even if its particular method of acquisition only circumvents, rather than violates, the NPT.

N-PLAYER COMPETITION

Were Saudi Arabia to acquire nuclear weapons, the Middle East would **count three nuclear-armed states**, and perhaps more before long. It is unclear how such an n-player competition would unfold because most analyses of nuclear deterrence are based on the U.S.-Soviet rivalry during the Cold War. It seems likely, however, that the interaction among three or more nuclear-armed powers would be more prone to miscalculation and escalation than a bipolar competition. During the Cold War, the United States and the Soviet Union only needed to concern themselves with an attack from the other. Multipolar systems are generally considered to be less stable than bipolar systems because coalitions can shift quickly, upsetting the balance of power and creating incentives for an attack.

More important, emerging nuclear powers in the Middle East might not take the **costly steps necessary** to preserve regional stability and avoid a nuclear exchange. For nuclear-armed states, the bedrock of deterrence is the knowledge that each side has a secure second-strike capability, so that no state can launch an attack with the expectation that it can wipe out its opponents' forces and avoid a devastating retaliation. However, emerging nuclear powers might not invest in expensive but survivable capabilities such as hardened missile silos or submarine-based nuclear forces. Given this likely vulnerability, the **close proximity** of states in the Middle East, and the **very short flight times** of ballistic missiles in the region, any new nuclear powers might be compelled to "**launch on warning**" of an attack or even, during a crisis, to use their nuclear forces **preemptively**. Their governments might also **delegate launch authority** to lower-level commanders, heightening the **possibility of miscalculation and escalation**. Moreover, if early warning systems were not integrated into robust command-and-control systems, the risk of an **unauthorized or accidental launch** would increase further still. And without sophisticated early warning systems, a nuclear attack might be **unattributable or attributed incorrectly**. That is, assuming that the leadership of a targeted state survived a first strike, it might not be able to accurately determine which nation was responsible. And this **uncertainty**, when combined with the **pressure to respond quickly**, would create a significant risk that it would **retaliate against the wrong party**, potentially triggering a regional nuclear war.

Most existing nuclear powers have taken steps to protect their nuclear weapons from unauthorized use: from closely screening key personnel to developing technical safety measures, such as permissive action links, which require special codes before the weapons can be armed. Yet there is **no guarantee that emerging nuclear powers would be willing or able to implement these measures**, creating a significant risk that their governments might lose control over the weapons or nuclear material and that nonstate actors could gain access to these items. Some states might seek to mitigate threats to their nuclear arsenals; for instance, they might hide their weapons. In that case, however, a single intelligence compromise could leave their weapons vulnerable to attack or theft.

#### Extinction!

**Sarg 15** [Dr. Stoyan Sarg, 10-9-2015, Director of the Physics Research Department at the World Institute for Scientific Exploration, PhD in Physics, "The Unknown Danger of Nuclear Apocalypse," Foreign Policy Journal, https://www.foreignpolicyjournal.com/2015/10/09/the-unknown-danger-of-nuclear-apocalypse/, accessed: 11-5-2023] // sid

With the new NATO plan for installation of nuclear tactical weapons in Europe, nuclear missiles may reach Moscow in only 6 minutes, and the opposite case is also possible in the same time. The question is: how can we be sure that this will not be triggered by a human error or computer malfunction. An adequate reaction dictated by the dilemma “to be or not to be” and the concept of preventive nuclear strike may **lead to a nuclear consequence** that is difficult to stop. At the present level of distributed controlled systems and military global navigations, this will lead to **unstoppable global nuclear war.** However, there is **something not predicted**, of which the military strategists, politicians and powerful forces are not aware. Probably, it will not be a nuclear winter that they hope to survive in their underground facilities. The most probable consequence will be a partial **loss of the Earth’s atmosphere** as a result of one or many powerful simultaneous tornadoes caused by the nuclear explosions. In a tornado, a powerful **antigravitational effect** takes place. The official science does not have an adequate explanation for this feature due to an incorrect concept about space. The antigravitational effect is **not a result of the circling air**. It is a specific physical effect in the aether space that is **dismissed in physics** as it is currently taught. Therefore, the effective height of this effect is **not limited to the height of the atmosphere**. Then in the case of many simultaneous powerful tornadoes, an effect of **suction of the earth atmosphere** into space might take place. Such events are **observed on the Sun** and the present physical science does not have an explanation for them. The antigravitational effect is accompanied by **specific electric and magnetic fields** with a twisted shape. This is observed in tornado events on the Sun. Some effects in the upper Earth atmosphere known as sprites have a similar **combination of electrical and magnetic fields** but in a weaker form. They are also a mystery for contemporary physical science.

At the time of atmospheric nuclear tests, made in the last century, a **number of induced tornadoes are observed** near the nuclear mushroom as shown in Figure 1.

The strongest **antigravitational effect**, however, occurs in the central column of the formed nuclear mushroom. The analysis of underwater nuclear tests also indicates a **strong antigravitational effect**. It causes a rise of a vertical column of water. In the test shown in Figure 2, the vertical column contains millions tons of water. Thermonuclear bombs are **multiple times more powerful**. The largest thermonuclear bomb of the former Soviet Union tested in 1961 is 50 megatons. It is 3,300 times more powerful than the bomb dropped by USA on Hiroshima at the second world war and may kill millions.

It is known that Mars once had liquid water and consequently an atmosphere that has mysteriously disappeared. If the scenario described above takes place, the **Earth will become a dead planet** like Mars. The powerful politicians, military adventurers and their financial supporters must be aware that even the most secured underground facility wi**ll not save them** if a global nuclear conflict is triggered. Their disgraced end will be more miserable than the deaths of the **billions of innocent human beings**, including the animal world.

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### AT: Space

#### [NL] Fusion is a myth -- takes into account breakthroughs, etc.

Philip **Ball** [graduate @Oxford; author of the acclaimed *Critical Mass: How One Thing Leads to Another]*, "What Is the Future of Fusion Energy?," June 1, 20**23**

<https://www.scientificamerican.com/article/what-is-the-future-of-fusion-energy/> // Oliver J \*\*images omitted\*\*

Nuclear fusion won’t arrive in time to fix climate change, but it could be essential for our future energy needs

Last December physicists working on fusion **claimed a breakthrough**. A team at the National Ignition Facility (NIF) in California announced it had [extracted more energy from a controlled nuclear fusion reaction than had been used to trigger it](https://www.scientificamerican.com/article/nuclear-fusion-lab-achieves-ignition-what-does-it-mean/). It was a global first and a significant step for physics—but **very far** from enabling practical exploitation of fusion as an energy source. The high-profile announcement elicited a familiar pattern of responses to fusion research: acclaim from boosters of the technology and dismissals from skeptics, who complain that scientists continually promise that fusion is **just 20 years away** (or 30 or 50, take your pick).

These fervent reactions reflect the [high stakes for fusion](https://www.scientificamerican.com/article/the-road-to-fusion/). The world is increasingly desperate for an abundant source of clean energy that can **mitigate the climate crisis** created by burning fossil fuels. Nuclear fusion—the merging of light atomic nuclei—has the potential to produce energy with near-zero carbon emissions, without creating the dangerous radioactive waste associated with today's nuclear fission reactors, which split the very heavy nuclei of radioactive elements. Physicists have been studying fusion power **since the 1950s**, but turning it into a practical energy source has remained frustratingly elusive. Will it ever be [a significant source of power for our energy-hungry planet](https://www.scientificamerican.com/article/its-time-for-congress-to-support-fusion-energy/)—and if so, will it arrive in time to save Earth from meltdown?

The latter question is one of the few in this field to which there is a clear answer. Most experts agree that we're unlikely to be able to generate large-scale energy from nuclear fusion before around **2050** (the cautious might add on another decade). Given that the global temperature rise over the current century may be largely determined by what we do—or fail to do—about carbon emissions before then, fusion can **be no savior.** (Observatory columnist Naomi Oreskes also makes this point [here](https://www.scientificamerican.com/article/why-nuclear-fusion-wont-solve-the-climate-crisis/).) “I do think fusion looks a lot more plausible now than it did 10 years ago as a future energy source,” says Omar Hurricane, a program leader at Lawrence Livermore National Laboratory, where the NIF is housed. “But it's not going to be viable in the next 10 to 20 years, so we **need other solutions**.”

Decarbonizing by mid-century will therefore **depend on other technologies**: renewables such as solar and wind; nuclear fission; and perhaps carbon-capture techniques. As we look further out, though, there are good reasons to think fusion will be a key part of the energy economy in the second half of the century, when more developing countries will start requiring Western-size energy budgets. And solving the problem of climate change is not a one-time affair. If we can navigate the bottleneck of the next few decades without transforming the climate too radically, the road beyond may be smoother.

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### AT: Climate

#### T - Uranium and released vapors increase emissions.

**Jacobson 24** [Mark Z. Jacobson, Professor of Civil and Environmental Engineering @ Stanford, 10-10-2024, 7 reasons why nuclear energy is not the answer to solve climate change, One Earth, https://www.oneearth.org/the-7-reasons-why-nuclear-energy-is-not-the-answer-to-solve-climate-change/, Willie T.]

6. Carbon-Equivalent Emissions and Air Pollution

There is **no such thing** as a zero- or close-to-zero emission nuclear power plant. Even existing plants emit due to the **continuous mining and refining of uranium** needed for the plant. Emissions from new nuclear are 78 to 178 g-CO2/kWh, **not close to 0.** Of this, 64 to 102 g-CO2/kWh over 100 years are emissions from the background grid while consumers wait 10 to 19 years for nuclear to come online or be refurbished, relative to 2 to 5 years for wind or solar. In addition, all nuclear plants emit 4.4 g-CO2e/kWh from the **water vapor and heat they release**. This **contrasts** with solar panels and wind turbines, **which reduce** heat or water vapor fluxes to the air by about 2.2 g-CO2e/kWh for a **net difference** from this factor alone of **6.6 g-CO2e/kWh.**

In fact, China’s investment in nuclear plants that **take so long** between planning and operation instead of wind or solar resulted in China’s CO2 emissions **increasing 1.3 percent** from 2016 to 2017 **rather than declining** by an estimated average of 3 percent. The resulting difference in air pollution emissions may have caused **69,000 additional air pollution deaths** in China in 2016 alone, with additional deaths in years prior and since.

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