# 1NC

We negate the resolution

Contention one is terror

**terrorists have failed to commit nuclear terrorism**

**Earnhardt et al 21** (Rebecca L Earnhardt, Research Associate with the Nuclear Security program at the Stimson Center. Her research focuses on emerging technology threats to nuclear facilities, adaptation of nuclear security plans in times of crisis, and international nuclear security governance, Brendan Hyatt, nuclear security intern at the Stimson Center, Nickolas Roth, senior director of Nuclear Materials Security at the Nuclear Threat Initiative and senior research associate at the Project on Managing the Atom at the Harvard Kennedy School’s Belfer Center for Science and International Affairs, 14 January 2021, “A threat to confront: far-right extremists and nuclear terrorism”, Bulletin of the Atomic Scientists,<https://thebulletin.org/2021/01/a-threat-to-confront-far-right-extremists-and-nuclear-terrorism/>, DOA 3/28/2025) ESR

Could they really pull it off? **While some violent far-right extremists are clearly motivated to carry out catastrophic terrorist attacks,** a question remains: Do they possess the means and opportunity to conduct an act of nuclear terrorism? **There is no public evidence violent far-right extremist groups have obtained the resources or exhibited the requisite operational sophistication to carry out an act of nuclear terrorism**. Many of the plots involving far-right extremists and nuclear terrorism have been poorly conceived and were unlikely to succeed. These incidents, however, likely do not provide a complete picture of the threat, because publicly accessible information on the capability of these groups is limited, creating ambiguity about their general capabilities.

**The AFF drastically increase the risk of nuclear terror**

**Pashby 25** (Tom Pashby: contributor for the New Civil Engineer. 1/10/25, “US Government assessing risk of SMRs being used to make dirty bombs”, New Civil Engineer,<https://www.newcivilengineer.com/latest/us-government-assessing-risk-of-smrs-being-used-to-make-dirty-bombs-10-01-2025/>   //   DOA: 3/13/25)JDE

**The risk of small modular reactors (SMRs) being used to provide access to materials for dirty bombs (radioactive explosive devices) is being reviewed by the US Government.** The review follows the publication of a paper published in the Science journal looking at the increase in **demand for high-assay low-enriched uranium (HALEU)** **which can be used to fuel advanced modular reactors** (AMRs) **and SMRs.** The paper, titled The weapons potential of high-assay low-enriched uranium posited that “Recent promotion of new reactor technologies appears to disregard decades-old concerns about nuclear proliferation”. Scott Kemp , Edwin S. Lyman, Mark R. Deinert, Richard L. Garwin, and Frank N. von Hippel authored the paper, which said: **“Preventing the proliferation of nuclear weapons has been a major thrust of international policymaking for more than 70 years. “Now, an explosion of interest in a nuclear reactor fue**l called high-assay low-enriched uranium (HALEU), **spurred by billions of dollars in US Government funding, threatens to undermine that system of control**. “HALEU contains between 10 and 20% of the isotope uranium-235. At 20% 235U and above, the isotopic mixture is called highly enriched uranium (HEU) and **is internationally recognised as being directly usable in nuclear weapons.** “However, the practical limit for weapons lies below the 20% HALEU-HEU threshold. “**Governments** and others promoting the use of HALEU **have not carefully considered the potential proliferation and terrorism risks** that the wide adoption of this fuel creates.” The “terrorism **risks**” the paper refers to **can be understood to mean the creation of dirty bombs, which are relatively low-tech devices. Conventional explosives are used, rather than fission or fusion reactions, to spread radioactive material.** US Government responds to paper announcing review U.S. Department of Energy under secretary for nuclear security and National Nuclear Security Administration (NNSA) administrator Jill Hruby wrote a letter published on 2 January in the peer review ‘eLetters’ section of the academic paper published on 6 June 2024. Hruby said the paper in Science, and a subsequent debate between the authors the wider nuclear community, promoted the NNSA to respond. “Given concerns about climate change coupled with increased energy demand, nuclear energy is poised for growth,” she said. “Advanced and small modular reactors (A/SMRs) using HALEU fuel are under active development “NNSA recognises that reactor type, fuel enrichment level, fuel quantity, and fuel form are important factors in evaluating proliferation risks and believes that risk-informed and adaptive approaches to the proliferation challenges inherent in nuclear energy are warranted.” She continued: “NNSA has a program to support U.S. A/SMR developers on security- and safeguards-by-design and promotes best practices for nuclear energy deployment by partnering with the International Atomic Energy Agency (IAEA). “With its national laboratories, NNSA has regularly collected data and evaluated HALEU risks, and is currently finalising plans to commission a National Academies report. Although these reports are largely classified, the information is used to inform programs, develop actions, and make recommendations to stakeholders. “It is important to address proliferation concerns about HALEU and important to responsibly develop A/SMRs. NNSA commits to working with academia, industry, the public, and IAEA to do just that.” On 20 January 2025, President Trump will be sworn in for a second term, at which point he will be free to replace public servants with his preferred appointees at organisations including the NNSA. HALEU not being considered in the UK’s SMR competition The main focus of SMR developers in the UK is the UK Government’s Great British Nuclear (GBN) SMR competition. The competition winner or winners will have the opportunity to build a fleet of SMRs with government support on siting and funding. A GBN source confirmed to NCE that none of the developers in its SMR competition – name the developers – were proposing to use HALEU. NCE [has previously explored the topic of whether waste from SMRs could be used to make nuclear warheads](https://www.newcivilengineer.com/latest/could-small-modular-reactors-be-used-to-create-nuclear-warheads-09-10-2024/) after the Department for Energy Security and Net Zero (DESNZ) did not rule out whether it was investigating this possibility. HALEU still popular in wider SMR research Work on SMRs outside of the GBN competition continues to heat up. Last Energy UK and newcleo are both active in the UK and are pushing for micro modular reactors and advanced modular reactors respectively. King’s College London research fellow Ross Peel told NCE that **HALEU continues to be popular with SMR developers and the risks faced outside of the USA are similar.** Peel has recently authored papers with King’s on Insider Threat Security Considerations for Advanced and Small Modular Reactors and Nuclear Industry Views on the Security of Small Modular Reactors: Results of a pilot survey, both published in October 2024. Peel said he has been “very pro-nuclear” for years but **is** [**working to help the industry to address his security concerns around SMRs**](https://www.newcivilengineer.com/latest/security-planning-for-small-modular-reactors-not-where-it-should-be-academic-says-28-11-2024/)**, which he believes is “not where it should be”.** Peel said: “The article in Science caused a major argument when it came out and since, and is still doing so as more people become aware of it. The American Nuclear Society, for instance, prepared a letter to Science denouncing the article and tearing down the methods used by the authors, who are all highly respected non-proliferation scholars. “**HALEU is central to the plans of many developers of novel nuclear technology because of the various benefits it offers. The potential security and proliferation risks are real**, however, and proper consideration needs to be given to these. “**The technical risks of HALEU in the UK and US are not different**, although we do have a different background level of security risk than they do, which means that those technical risks might be experienced and managed in a different way. “Both countries have well-developed nuclear security infrastructure, however, which will help to manage these risks. **A lot of concern from both countries will likely be around the export of HALEU fuel to reactors abroad, in foreign countries with less mature nuclear security and non-proliferation systems**. “**Normalising the possession and use of uranium of up to 20% U-235 means that many states who might concern the US** and/or the UK **will be able to maintain a justifiable position that is that much closer to possessing nuclear weapons, whilst non-state actors** (terrorists, criminals, and even simple disgruntled employees at nuclear sites and more) **will potentially see their way to accessing a type of nuclear material that they could previously almost never imagine getting hold of.** “Developers should be taking seriously the increased security and proliferation risks associated with HALEU use. I would recommend this be considered from the earliest stages of reactor and fuel design – the decision to use HALEU must be based on a full consideration of all factors, including security risk and proliferation risk. “Technology designers who think about these issues throughout their design process, in an integrated way alongside safety, economics, operability and all the rest, will have the greatest chance of producing well-conceived designs that address risks effectively and produce cost-effective nuclear energy.” Mixed oxide (MOX) fuel is touted by some developers like newcleo as a way of reducing the burden on society of nuclear waste by using it to fuel its own AMR design. newcleo said: “Through an innovative combination of existing and proven technologies, and by reviving a nuclear industry model based on the manufacture and multi-recycling of Mixed Oxide (Mox) fuel, [newcleo aims to close the nuclear fuel cycle while safely producing clean, affordable, and practically inexhaustible energy required for low carbon economies](https://www.newcivilengineer.com/latest/advanced-modular-reactor-developer-newcleo-abandons-uk-as-hq-moves-to-paris-02-10-2024/).” Peel continued: “MOX is different to HALEU. MOX is about using a mixture of uranium oxide and plutonium oxide to make the fuel (usually – other oxides can creep in too). Almost all nuclear fuel today is uranium oxide. “HALEU is to do specifically with the uranium within the uranium oxide, specifically, how much of it is uranium-235 vs uranium-238. Most reactors today operate with 2-5% uranium-235 within the overall uranium. HALEU is about moving that into a range of up to 19.999% - going to 20% would make it HEU (highly enriched uranium, which is considered to be unacceptable due to weapons-use risks). “So in theory, you could put HALEU into MOX, although no-one has proposed this as the whole point of putting plutonium in there is to replace the need for uranium-235. If you have both plutonium and HALEU in the same fuel you’re effectively doing two complicated and costly processes a bit, rather than focussing on doing one process more.” Anti-proliferation body says lots of **SMRs increases weapons risk** The Nuclear Information Service (NIS) describes itself as “an independent, not-for-profit research organisation” which investigates the UK’s nuclear weapons programme. NIS director David Cullen said: “**This move by the NNSA is a tacit acknowledgement that warnings being raised about the proliferation risks of HALEU are not unfounded**. “I hope that some of the results of their study will be made public so that there is a greater understanding of the dangers, which are just as relevant to the UK as to the US. “We don't know very much about what would be done in the UK to mitigate the risk, as none of the SMR reactor designs have progressed very far in getting regulatory approval. “Only the Rolls-Royce SMR has passed the second stage of the Generic Design Assessment (GDA) process, which means that the Office for Nuclear Regulation have not identified any foundational problems with that design.” GDA allows regulators to assess the safety, security, safeguards and environmental aspects of new reactor designs before site-specific proposals are brought forward. The GDA process assesses new nuclear power plant designs for deployment in the UK, demonstrating they can be built, operated and decommissioned in accordance with the highest standards of safety, security, safeguards and environmental protection. Cullen continued: “The second stage does assess security and safeguards (i.e. measures to prevent clandestine diversion of nuclear material), but only to identify fundamental flaws. “The third stage of the process is much more detailed. I hope the ONR will have an opportunity to draw upon the work the NNSA is undertaking. “Unfortunately, **the industry’s vision for SMRs, where a much larger number of smaller reactors are deployed, substantially complicates both counter-proliferation monitoring and ensuring the security of nuclear material.** “**Design measures** might be able to counter some of the more opportunistic security threats against an individual site, but they **cannot meaningfully guard against the diversion of nuclear material by SMR operators.** “Fundamentally, **a greater number of sites and more material creates more opportunities for bad actors. There is no way to design around this basic fact**.”

**The NRC is woefully unprepared**

**GAO 24** (Government Accountability Office, independent, nonpartisan government agency within the legislative branch that provides auditing, evaluative, and investigative services for the United States Congress, September 2024, “PREVENTING A DIRTY BOMB Nuclear Regulatory Commission Has Not Taken Steps to Address Certain Radiological Security Risks”, GAO,<https://www.gao.gov/assets/gao-24-107014.pdf>, DOA 3/28/2025) ESR

**NRC has not implemented** the majority of the **actions** we have **recommended that would reduce the risk of a** radiological disaster resulting from a **dirty bomb**. Specifically, **NRC has not implemented 11 out of 18 actions** we have **recommended since 2012**. These unimplemented recommendations generally fall into two categories. First, NRC has not taken action to consider socioeconomic consequences in its decision-making criteria for determining security requirements for radioactive materials. Second, **NRC has not taken** the majority of the **actions** we have **recommended to strengthen the security of category 3 quantities of radioactive materials**. As stated previously, NRC has not incorporated consideration of the socioeconomic consequences of a dirty bomb into its decision-making when assessing risk for the development of security measures. So that NRC could be better assured its requirements reflect these significant and more likely consequences, in 2019 we recommended that NRC account for socioeconomic consequences in its decision-making regarding security measures for materials that could be used in a dirty bomb.41 **NRC** disagreed and, in its comments on our 2019 report, **stated that the likelihood of a dirty bomb was low and its regulations were sufficient** to provide for the safe and secure use of radioactive materials. Officials we interviewed for this report stated that this remains NRC’s position today and confirmed that NRC does not plan to implement this recommendation.

#### Accelerationist groups would attack

**Earnhardt et al 21** (Rebecca L Earnhardt, Research Associate with the Nuclear Security program at the Stimson Center. Her research focuses on emerging technology threats to nuclear facilities, adaptation of nuclear security plans in times of crisis, and international nuclear security governance, Brendan Hyatt, nuclear security intern at the Stimson Center, Nickolas Roth, senior director of Nuclear Materials Security at the Nuclear Threat Initiative and senior research associate at the Project on Managing the Atom at the Harvard Kennedy School’s Belfer Center for Science and International Affairs, 14 January 2021, “A threat to confront: far-right extremists and nuclear terrorism”, Bulletin of the Atomic Scientists,<https://thebulletin.org/2021/01/a-threat-to-confront-far-right-extremists-and-nuclear-terrorism/>, DOA 3/28/2025) ESR

Far-right narratives of nuclear terror. **The intersection between violent far-right extremist ideology and catastrophic terrorism goes back decades. In** The Turner Diaries**, a 1978 novel labeled the “bible of the racist right,” the protagonists use acts of nuclear terror in service of the creation of a “white world**.” Protagonists bomb nuclear installations, seize nuclear weapons, target missiles at New York City and Tel Aviv, and ultimately destroy the Pentagon in a suicidal nuclear attack.[[3]](https://thebulletin.org/2021/01/a-threat-to-confront-far-right-extremists-and-nuclear-terrorism/#_ftn3) **The International Centre for Counterterrorism ties the Diaries to “at least 200 murders and at least 40 terrorist attacks/hate crimes” in the last 40 years**.[[4]](https://thebulletin.org/2021/01/a-threat-to-confront-far-right-extremists-and-nuclear-terrorism/#_ftn4) This includes Timothy **McVeigh’s 1995 bombing** of the Alfred P. Murrah Federal Building in Oklahoma City, resulting in the deaths of 168 people.[[5]](https://thebulletin.org/2021/01/a-threat-to-confront-far-right-extremists-and-nuclear-terrorism/#_ftn5) McVeigh, however, is not the only far-right terrorist to be inspired by the Diaries. **In 2011, violent far-right extremist Anders Breivik’s terror attacks killed 77 people in Norway. Dozens of pages in his 1,500-page “manifesto” discuss the execution of different acts of nuclear terrorism**.[[6]](https://thebulletin.org/2021/01/a-threat-to-confront-far-right-extremists-and-nuclear-terrorism/#_ftn6) **An increasingly active generation of violent far-right extremist groups and actors have adopted an especially dangerous ideology that is compatible with an act of nuclear terror: accelerationism**.[[7]](https://thebulletin.org/2021/01/a-threat-to-confront-far-right-extremists-and-nuclear-terrorism/#_ftn7) **Violent far-right extremists** who adopt accelerationism **view societal collapse as inevitable and seek to hasten that collapse in service of “total revolution”—the complete destruction of the existing system of governance.**[[8]](https://thebulletin.org/2021/01/a-threat-to-confront-far-right-extremists-and-nuclear-terrorism/#_ftn8) **Violent far-right extremists who adopt accelerationism hope to set off a series of violent chain events, with violence begetting more violence, destabilizing society**.[[9]](https://thebulletin.org/2021/01/a-threat-to-confront-far-right-extremists-and-nuclear-terrorism/#_ftn9) **Indiscriminate, highly destructive acts of terror—like a nuclear attack—are therefore perfect tools to sow chaos and accelerate this societal collapse. In Siege, one of the defining theoretical works of violent far-right accelerationism, author and accelerationist leader James Mason writes that, “[White supremacists] will be the single survivor in a war against the System**, a TOTAL WAR against the System.”[[10]](https://thebulletin.org/2021/01/a-threat-to-confront-far-right-extremists-and-nuclear-terrorism/#_ftn10) In a recent act of violent far-right extremist terrorism, Brenton Tarrant, the Australian perpetrator of the 2019 terrorist attack on Christchurch masjidain in New Zealand, wrote about accelerationism in his manifesto.[[11]](https://thebulletin.org/2021/01/a-threat-to-confront-far-right-extremists-and-nuclear-terrorism/#_ftn11) Groups with nuclear interests**. Inspired by the ideas of accelerationism, the modern breed of violent far-right extremism is becoming more destructive, and nuclear weapons certainly fit into this profile of catastrophic violence.** The intention to bring about a cataclysmic clash of civilizations bears resemblance to better known terrorist organizations like Al Qaeda and Aum Shinrikyo, both of which have pursued nuclear weapons. As director of intelligence and counterintelligence at the US Department of Energy, Rolf Mowatt-Larssen, once observed, “Osama bin Ladin has signaled a specific purpose for using WMD in al Qaeda’s quest to destroy the global status quo, and to create conditions more conducive to the overthrow of apostate regimes throughout the Islamic world.”[[12]](https://thebulletin.org/2021/01/a-threat-to-confront-far-right-extremists-and-nuclear-terrorism/#_ftn12) Like Al-Qaeda, **violent far-right extremists support the creation of a new society that is in line with their own ideology. One of the most notable and violent far-right extremist groups that have adopted accelerationism and operate in the United States is the Atomwaffen Division** (**AWD**).[[13]](https://thebulletin.org/2021/01/a-threat-to-confront-far-right-extremists-and-nuclear-terrorism/#_ftn13) The organization’s name translates from German to “**the nuclear weapons division**,” indicating that **its members have an explicit interest in nuclear terrorism**. Brandon Russel, a former Florida National Guard member and an AWD co-founder, is one case of an aspiring nuclear terrorist. **A heavily armed Russel and a fellow AWD member were recently arrested while in route to the Turkey Point nuclear power plant**. During the investigation officials found that Russel lived in an apartment with two AWD co-conspirators; in the apartment was a prominently placed copy of the Turner Diaries and a framed photo of Oklahoma City Bomber Timothy McVeigh. The trio stockpiled weapons and explosives with the intent to blow up, among other targets, a nuclear power plant. In their apartment, police found pipe bomb components, traces of the explosive hexamethylene triperoxide diamine, and detonators. Police also detected two radioactive materials—thorium and americium—in his bedroom.[[14]](https://thebulletin.org/2021/01/a-threat-to-confront-far-right-extremists-and-nuclear-terrorism/#_ftn14) **AWD was not the first far-right ext remist in America to consider using radioactive or nuclear materials in a terrorist attack. Several previously documented attempts by violent far-right extremists to commit acts of radiological terror indicate a longstanding interest among far-right actors in highly destructive, non-conventional acts of terror**.[[15]](https://thebulletin.org/2021/01/a-threat-to-confront-far-right-extremists-and-nuclear-terrorism/#_ftn15) In 2004, National Socialist Movement member Demetrius **Van Crocker attempted to build a dirty bomb to blow up a courthouse**.[[16]](https://thebulletin.org/2021/01/a-threat-to-confront-far-right-extremists-and-nuclear-terrorism/#_ftn16) In 2008, James **Cummings, a white supremacist, obtained four 1-gallon containers of a mix of depleted uranium and thorium-232. He planned to use these materials to assemble a dirty bomb**.[[17]](https://thebulletin.org/2021/01/a-threat-to-confront-far-right-extremists-and-nuclear-terrorism/#_ftn17) In 2013, a member of the Ku Klux Klan who worked at General Electric carried out research on radiation dispersal devices, learning what level of emission was required to kill humans.[[18]](https://thebulletin.org/2021/01/a-threat-to-confront-far-right-extremists-and-nuclear-terrorism/#_ftn18)

**Sarkar 21 confirms** (Jayita Sarkar is assistant professor of international relations at Boston University’s Frederick S. Pardee School of Global Studies. “It’s time to take domestic nuclear terrorism seriously.” *The Washington Post,* 27 January 2021,<https://www.washingtonpost.com/outlook/2021/01/27/its-time-take-domestic-nuclear-terrorism-seriously/>. // DOA: 07/03/2022) GG

People wearing Oath Keepers paraphernalia attend a pro-Trump rally at Freedom Plaza in Washington on Jan. 5. (Jacquelyn Martin/AP) How can the new Biden administration address the threat of domestic [terrorism](https://www.washingtonpost.com/national-security/terror-watchlist-capitol-riot-fbi/2021/01/14/07412814-55f7-11eb-a931-5b162d0d033d_story.html?itid=lk_inline_manual_2), most vividly illustrated by the attempted [insurrection at the U.S. Capitol](https://www.nytimes.com/2021/01/07/us/names-of-rioters-capitol.html) on Jan. 6? Last week, 20,000 members of the National Guard were deployed for the inauguration to [protect](https://urldefense.proofpoint.com/v2/url?u=https-3A__www.npr.org_sections_congress-2Delectoral-2Dcollege-2Dtally-2Dlive-2Dupdates_2021_01_13_956458463_20-2D000-2Dnational-2Dguardsmen-2Dwill-2Dbe-2Ddeployed-2Dfor-2Dinauguration-2Dd-2Dc-2Dofficial-2Dsays&d=DwMF-g&c=RAhzPLrCAq19eJdrcQiUVEwFYoMRqGDAXQ_puw5tYjg&r=_9hD3xzK5Tf7yaruLxJ3L9Oz2d8kogGwQBbHCMJGA6Y&m=4o9_jvCcAqlX9-Mi3DxVbYFNpKEiOodlpXKW8qIWdp0&s=RkCzdCGXbG1rHBULZ4TI9qhcMWnbW12F2fRlTXAyWCs&e=) the new administration from far-right extremist violence, but a more serious threat looms. **Nuclear and radiological terrorism has prominently appeared in “**[**apocalyptically minded**](https://www.nytimes.com/2021/01/24/world/europe/capitol-far-right-global.html)**” white-supremacist ideology** for decades. The [policy community](https://www.armscontrol.org/factsheets/NuclearSecuritySummit) perceives the threat of nuclear terrorism as almost uniquely emanating from outside of U.S. borders, specifically from Islamist [terrorism](https://urldefense.proofpoint.com/v2/url?u=https-3A__www.wilsoncenter.org_book_deterring-2Dnuclear-2Dterrorism&d=DwMF-g&c=RAhzPLrCAq19eJdrcQiUVEwFYoMRqGDAXQ_puw5tYjg&r=_9hD3xzK5Tf7yaruLxJ3L9Oz2d8kogGwQBbHCMJGA6Y&m=4o9_jvCcAqlX9-Mi3DxVbYFNpKEiOodlpXKW8qIWdp0&s=FMe4pfN1GQuilD-qXgdWdIEfRyU3P3Syc_rSlgeTY7Q&e=) networks such as the Islamic State, al-Qaeda and their splinter groups. But in fact, **U.S. far-right extremist groups have a** [**history**](https://foreignpolicy.com/2019/08/16/white-supremacists-want-a-nuclear-weapon/) **of attempted procurement of nuclear weapons** and radiological materials to use against the federal government. Members of neo-Nazi groups such as [Atomwaffen Division](https://www.nbcnews.com/news/us-news/florida-neo-nazi-leader-gets-5-years-having-explosive-material-n836246), which literally means “atomic weapons” in German, and the National Socialist Movement have attempted in the [past](https://thebulletin.org/2021/01/a-threat-to-confront-far-right-extremists-and-nuclear-terrorism/) to access nuclear materials with the intent to cause harm. Fears of nuclear terrorism among U.S. policymakers go back at least to the 1970s, when armed insurgencies intensified in the Middle East. The 1972 [Munich massacre](https://urldefense.proofpoint.com/v2/url?u=https-3A__www.dw.com_en_1972-2Dmunich-2Dolympics-2Dmassacre-2Dan-2Davoidable-2Dcatastrophe_a-2D40405813&d=DwMF-g&c=RAhzPLrCAq19eJdrcQiUVEwFYoMRqGDAXQ_puw5tYjg&r=_9hD3xzK5Tf7yaruLxJ3L9Oz2d8kogGwQBbHCMJGA6Y&m=4o9_jvCcAqlX9-Mi3DxVbYFNpKEiOodlpXKW8qIWdp0&s=cKls-b5I9e_JY-dcQxZbG6UPk5jScDp8lQMQiRMjYR4&e=) by the Palestinian group Black September and the 1973 oil price shock that suddenly [empowered](https://urldefense.proofpoint.com/v2/url?u=https-3A__www.cambridge.org_core_books_oil-2Drevolution_18BC5F6167898A67BF843D015954F25E&d=DwMF-g&c=RAhzPLrCAq19eJdrcQiUVEwFYoMRqGDAXQ_puw5tYjg&r=_9hD3xzK5Tf7yaruLxJ3L9Oz2d8kogGwQBbHCMJGA6Y&m=4o9_jvCcAqlX9-Mi3DxVbYFNpKEiOodlpXKW8qIWdp0&s=ehJRej1jWkXIkOU9Dz7XLN75Vt-y61JHKz313RBOoGw&e=) petroleum-exporting countries fueled concerns of a [violent](https://www.nytimes.com/1978/06/18/archives/the-moslem-world-rekindles-its-militancy.html), non-White, Muslim world. India’s 1974 nuclear explosion, Pakistan’s nuclear weapons acquisition in response and new nuclear energy programs funded by petrodollars in Iran, Libya, Iraq and elsewhere further fanned [fears](https://urldefense.proofpoint.com/v2/url?u=https-3A__academic.oup.com_dh_article-2Dabstract_44_4_580_5850078&d=DwMF-g&c=RAhzPLrCAq19eJdrcQiUVEwFYoMRqGDAXQ_puw5tYjg&r=_9hD3xzK5Tf7yaruLxJ3L9Oz2d8kogGwQBbHCMJGA6Y&m=4o9_jvCcAqlX9-Mi3DxVbYFNpKEiOodlpXKW8qIWdp0&s=dz0m-znpbHnUimA680E0eFuodIIzuo3OGn7qWlScVg8&e=) of nuclear materials falling into “rogue” hands. In 1979, as the Iran hostage crisis played out on national [television](https://urldefense.proofpoint.com/v2/url?u=https-3A__www.youtube.com_watch-3Fv-3Dj5Sre4tk5l0-26t-3D165s&d=DwMF-g&c=RAhzPLrCAq19eJdrcQiUVEwFYoMRqGDAXQ_puw5tYjg&r=_9hD3xzK5Tf7yaruLxJ3L9Oz2d8kogGwQBbHCMJGA6Y&m=4o9_jvCcAqlX9-Mi3DxVbYFNpKEiOodlpXKW8qIWdp0&s=O_Ra9lJXUjT2er5boLuvupaFOMimIvIQvK6yU7dKn6s&e=) for over a year, the idea of radical Islam as a security threat became entrenched in U.S. political culture. But nuclear terrorism was also a domestic threat in the 1970s. Nuclear power was expected to grow that decade, and a large amount of plutonium (a radioactive material used in nuclear weapon design) was feared to be widely available. By the end of the decade, white-power activists, many of whom were Vietnam War veterans hardened by military training, had [organized](https://urldefense.proofpoint.com/v2/url?u=https-3A__www.hup.harvard.edu_catalog.php-3Fisbn-3D9780674237698&d=DwMF-g&c=RAhzPLrCAq19eJdrcQiUVEwFYoMRqGDAXQ_puw5tYjg&r=_9hD3xzK5Tf7yaruLxJ3L9Oz2d8kogGwQBbHCMJGA6Y&m=4o9_jvCcAqlX9-Mi3DxVbYFNpKEiOodlpXKW8qIWdp0&s=Z_sxaH4DnHkJ6n98Fwj9rgaU-ExvGW_GZmkVR-1zJFM&e=) for a violent armed struggle of “leaderless **resistance” against the federal government.** To them, the government was the source of unacceptable societal change that hurt White Christian Americans. In 1978, William [Pierce](https://urldefense.proofpoint.com/v2/url?u=https-3A__www.splcenter.org_fighting-2Dhate_extremist-2Dfiles_individual_william-2Dpierce&d=DwMF-g&c=RAhzPLrCAq19eJdrcQiUVEwFYoMRqGDAXQ_puw5tYjg&r=_9hD3xzK5Tf7yaruLxJ3L9Oz2d8kogGwQBbHCMJGA6Y&m=4o9_jvCcAqlX9-Mi3DxVbYFNpKEiOodlpXKW8qIWdp0&s=EgjMxAujdrRgflPXaFjHn1rOnb-lWBx-n1Tk_7GOg_E&e=), the founder of the neo-Nazi group National Alliance, published the novel “The Turner Diaries” under the pseudonym Andrew Macdonald. It sold over 500,000 copies worldwide and remains highly [popular](https://urldefense.proofpoint.com/v2/url?u=https-3A__www.npr.org_2019_04_02_708999681_turner-2Ddiaries-2Dinfluence-2Don-2Dwhite-2Dnationalists-2Dcontinues-2Dto-2Dgrow&d=DwMF-g&c=RAhzPLrCAq19eJdrcQiUVEwFYoMRqGDAXQ_puw5tYjg&r=_9hD3xzK5Tf7yaruLxJ3L9Oz2d8kogGwQBbHCMJGA6Y&m=4o9_jvCcAqlX9-Mi3DxVbYFNpKEiOodlpXKW8qIWdp0&s=oL71kFkHD8qSvJ96JUTHAGBuHTGbUuCp6JkbYM9PVb0&e=) among white supremacists. In the novel, right-wing extremists invade the Capitol to overthrow the U.S. government. Its narrator, Earl Turner, gloats that “not one of them is beyond our reach.” [Dubbed](https://urldefense.proofpoint.com/v2/url?u=https-3A__www.splcenter.org_fighting-2Dhate_intelligence-2Dreport_2004_turner-2Ddiaries-2Dother-2Dracist-2Dnovels-2Dinspire-2Dextremist-2Dviolence&d=DwMF-g&c=RAhzPLrCAq19eJdrcQiUVEwFYoMRqGDAXQ_puw5tYjg&r=_9hD3xzK5Tf7yaruLxJ3L9Oz2d8kogGwQBbHCMJGA6Y&m=4o9_jvCcAqlX9-Mi3DxVbYFNpKEiOodlpXKW8qIWdp0&s=-kVpW7cAqo-S0_VJxH431F8tbLJvB2nQzoj8qgQrzdA&e=) by the FBI as the “bible of the racist right,” the novel depicts 18 nuclear explosions in Manhattan alone and the destruction by nuclear weapons of Baltimore, Miami, the California coast and Detroit. It also provides plans to deliberately contaminate with radioactive materials a nuclear power plant in Evanston, Ill. The novel ends with Turner detonating a nuclear bomb over the Pentagon. He justifies the nuclear explosions and sabotage against non-White populations and “race criminals” (liberal Whites) in the name of establishing white supremacy in the United States and worldwide. “The Turner Diaries” has [inspired](https://urldefense.proofpoint.com/v2/url?u=https-3A__www.theatlantic.com_politics_archive_2016_09_how-2Dthe-2Dturner-2Ddiaries-2Dchanged-2Dwhite-2Dnationalism_500039_&d=DwMF-g&c=RAhzPLrCAq19eJdrcQiUVEwFYoMRqGDAXQ_puw5tYjg&r=_9hD3xzK5Tf7yaruLxJ3L9Oz2d8kogGwQBbHCMJGA6Y&m=4o9_jvCcAqlX9-Mi3DxVbYFNpKEiOodlpXKW8qIWdp0&s=vCy-dtf2AG0SJ89boBW5yeNfcrbgCAQkdILyCCiiFLs&e=) racially motivated armed robberies and more than [200](https://icct.nl/publication/the-turner-legacy-the-storied-origins-and-enduring-impact-of-white-nationalisms-deadly-bible/) killings in the United States. It greatly [influenced](https://urldefense.proofpoint.com/v2/url?u=https-3A__www.nytimes.com_2001_06_09_us_behind-2Da-2Dbook-2Dthat-2Dinspired-2Dmcveigh.html&d=DwMF-g&c=RAhzPLrCAq19eJdrcQiUVEwFYoMRqGDAXQ_puw5tYjg&r=_9hD3xzK5Tf7yaruLxJ3L9Oz2d8kogGwQBbHCMJGA6Y&m=4o9_jvCcAqlX9-Mi3DxVbYFNpKEiOodlpXKW8qIWdp0&s=tD8G5V9gvpIsc_dOxPUQgq1O6I5JpOzh-4qSa6_JufQ&e=) Timothy McVeigh, the Oklahoma City bomber, who perpetrated the [deadliest](https://urldefense.proofpoint.com/v2/url?u=https-3A__www.nytimes.com_2020_04_19_us_Timothy-2DMcVeigh-2DOklahoma-2DCity-2DBombing-2DCoronavirus.html&d=DwMF-g&c=RAhzPLrCAq19eJdrcQiUVEwFYoMRqGDAXQ_puw5tYjg&r=_9hD3xzK5Tf7yaruLxJ3L9Oz2d8kogGwQBbHCMJGA6Y&m=4o9_jvCcAqlX9-Mi3DxVbYFNpKEiOodlpXKW8qIWdp0&s=V8_4hOfVi3azrl8-znb4LjcJqGnX-3WuzHJIVijl9U0&e=) domestic terrorist attack on U.S. soil that killed 168 people in April 1995. The book has received [renewed](https://urldefense.proofpoint.com/v2/url?u=https-3A__www.latimes.com_entertainment-2Darts_books_story_2021-2D01-2D08_kathleen-2Dbelew-2Don-2Dthe-2Dturner-2Ddiaries&d=DwMF-g&c=RAhzPLrCAq19eJdrcQiUVEwFYoMRqGDAXQ_puw5tYjg&r=_9hD3xzK5Tf7yaruLxJ3L9Oz2d8kogGwQBbHCMJGA6Y&m=4o9_jvCcAqlX9-Mi3DxVbYFNpKEiOodlpXKW8qIWdp0&s=9R9RDGZLi95hgIAIV1OzcE_PiFy7vxKg3sXSJ0OiVpE&e=) attention after the attack on the Capitol. Amazon has [prevented](https://urldefense.proofpoint.com/v2/url?u=https-3A__www.theverge.com_2021_1_12_22227049_amazon-2Dthe-2Dturner-2Ddiaries-2Dq-2Danon-2Dpurge-2Dremoval-2Dcapitol-2Dattack&d=DwMF-g&c=RAhzPLrCAq19eJdrcQiUVEwFYoMRqGDAXQ_puw5tYjg&r=_9hD3xzK5Tf7yaruLxJ3L9Oz2d8kogGwQBbHCMJGA6Y&m=4o9_jvCcAqlX9-Mi3DxVbYFNpKEiOodlpXKW8qIWdp0&s=MBQbW_Ki3ZAMumNRzEpuuIOYSnlAbqWr4Eb1G4FCpR4&e=) its sale, and major [news](https://urldefense.proofpoint.com/v2/url?u=https-3A__www.nytimes.com_2021_01_12_books_turner-2Ddiaries-2Dwhite-2Dsupremacists.html&d=DwMF-g&c=RAhzPLrCAq19eJdrcQiUVEwFYoMRqGDAXQ_puw5tYjg&r=_9hD3xzK5Tf7yaruLxJ3L9Oz2d8kogGwQBbHCMJGA6Y&m=4o9_jvCcAqlX9-Mi3DxVbYFNpKEiOodlpXKW8qIWdp0&s=nVMbl-z4fs6xJtDRRFig4ZsqXnI_vzCXtbql_uGMSTE&e=) outlets have reported on its influence over far-right and white-supremacist groups. The analogies are chilling. The violent white-supremacist ideology that calls for nuclear and radiological attacks against non-White populations has spread outside the United States. Norwegian far-right terrorist Anders Behring Breivik, who [killed](https://urldefense.proofpoint.com/v2/url?u=https-3A__www.nytimes.com_2012_04_20_world_europe_norwegian-2Dsays-2Dattack-2Dwas-2Din-2Dthe-2Dworks-2Dfor-2Dyears.html&d=DwMF-g&c=RAhzPLrCAq19eJdrcQiUVEwFYoMRqGDAXQ_puw5tYjg&r=_9hD3xzK5Tf7yaruLxJ3L9Oz2d8kogGwQBbHCMJGA6Y&m=4o9_jvCcAqlX9-Mi3DxVbYFNpKEiOodlpXKW8qIWdp0&s=ui5YhFqmMpNoRXN1MaqjJsNgn0KIlXPp9c34dayeZTA&e=) 77 people in July 2011, had called for the [use](https://urldefense.proofpoint.com/v2/url?u=https-3A__fas.org_blogs_security_2011_07_norways-2Danders-2Dbreivik-2Dweapons-2Dof-2Dmass-2Ddestruction-2Dand-2Dpolitics-2Dof-2Dcultural-2Ddespair_&d=DwMF-g&c=RAhzPLrCAq19eJdrcQiUVEwFYoMRqGDAXQ_puw5tYjg&r=_9hD3xzK5Tf7yaruLxJ3L9Oz2d8kogGwQBbHCMJGA6Y&m=4o9_jvCcAqlX9-Mi3DxVbYFNpKEiOodlpXKW8qIWdp0&s=mEk-derL5vLrFI5JLm4jxQT3f-eVl7hneJY9Z3x2D2M&e=) of chemical, biological, radiological and nuclear agents against “cultural Marxists,” “multiculturalists” and those responsible for the Islamic “colonization” of Europe. In his 1500-page manifesto, he laid out plans for theft or unauthorized access to nuclear weapons and the procurement of nuclear materials through transnational smuggling networks. Breivik recommended the use of radiological agents and nuclear weapons after Jan. 1, 2020 — his deadline for Muslims in Europe to “assimilate.” Given the [leaderless](https://www.bostonglobe.com/2021/01/24/world/capitol-riot-puts-spotlight-apocalyptically-minded-global-far-right/) transnational networks of white supremacists, the call for nuclear and radiological attacks in Breivik’s manifesto as well as “The Turner Diaries” poses grave concerns. Policy experts reassure us that if taken seriously as a threat, nuclear terrorism is both [preventable](https://urldefense.proofpoint.com/v2/url?u=https-3A__www.belfercenter.org_publication_nuclear-2Dterrorism-2Dultimate-2Dpreventable-2Dcatastrophe&d=DwMF-g&c=RAhzPLrCAq19eJdrcQiUVEwFYoMRqGDAXQ_puw5tYjg&r=_9hD3xzK5Tf7yaruLxJ3L9Oz2d8kogGwQBbHCMJGA6Y&m=4o9_jvCcAqlX9-Mi3DxVbYFNpKEiOodlpXKW8qIWdp0&s=B7fSIWXCBGB9mQfHwPxKe0mpEKV-Olw3W8_Qv5mTDP0&e=) and [solvable](https://urldefense.proofpoint.com/v2/url?u=https-3A__www.belfercenter.org_sites_default_files_files_publication_bunnwier.pdf&d=DwMF-g&c=RAhzPLrCAq19eJdrcQiUVEwFYoMRqGDAXQ_puw5tYjg&r=_9hD3xzK5Tf7yaruLxJ3L9Oz2d8kogGwQBbHCMJGA6Y&m=4o9_jvCcAqlX9-Mi3DxVbYFNpKEiOodlpXKW8qIWdp0&s=xAm2fGUy20XSxhOsSp4ODvXMWrv0OVv3evG3MWKBAxk&e=). That violent white supremacists can easily infiltrate the [police](https://www.theguardian.com/us-news/2020/aug/27/white-supremacists-militias-infiltrate-us-police-report), the [military](https://www.usatoday.com/story/news/politics/2021/01/14/pentagon-review-extremism-after-veterans-arrested-capitol-riots/4159099001/) and [nuclear](https://www.tampabay.com/news/courts/criminal/judge-sets-release-conditions-for-neo-nazi-in-tampa-palms-explosives-case/2327088/) facilities make them an extremely serious and hard-to-detect national security risk. The [involvement](https://www.forbes.com/sites/tommybeer/2021/01/19/report-oath-keeper-becomes-first-capitol-rioter-charged-with-conspiracy/?sh=6317e9532af7) in the Capitol attack of the [Oath Keepers](https://www.splcenter.org/fighting-hate/extremist-files/group/oath-keepers), a far-right anti-government group that recruits former U.S. military and law enforcement personnel, demonstrates the extent of this threat. Screening far-right extremists within government institutions at local, state and federal levels needs to be a priority for the Biden administration. The key to preventing such a catastrophic attack will be moving beyond a one-dimensional understanding of terrorism as the violent threat of radical Islam, and better understanding the different ways in which far-right domestic terrorism has grown in the United States and the specific threats this brings. Despite ample evidence to support the concern that [insider threats](https://urldefense.proofpoint.com/v2/url?u=https-3A__www.cornellpress.cornell.edu_book_9781501706493_insider-2Dthreats_-23bookTabs-3D1&d=DwMF-g&c=RAhzPLrCAq19eJdrcQiUVEwFYoMRqGDAXQ_puw5tYjg&r=_9hD3xzK5Tf7yaruLxJ3L9Oz2d8kogGwQBbHCMJGA6Y&m=4o9_jvCcAqlX9-Mi3DxVbYFNpKEiOodlpXKW8qIWdp0&s=oDlx5dYiKBz0sN7rRb-FAzgwiMgLCbpwnxyNMzC8PVs&e=) pose high security risks in nuclear and radiological environments, little has been done at the policy level. The threat of nuclear terrorism is such that we must act preemptively, not after a devastating attack. The lessons of the past tell us that action will involve breaking down the artificial border between foreign and domestic policies. National security does not just mean preventing attacks from abroad. The siege of the Capitol came close to being far worse, and there are indications that some rioters intended to [harm](https://www.theguardian.com/us-news/2021/jan/13/alexandria-ocasio-cortez-aoc-capitol-attack-instagram-live-video) lawmakers. But just because we escaped the worst does not mean we can rest easy. **We must be proactive to prevent far-right domestic terrorism from going nuclear in this country.**

#### Triggers nuke war

**Hayes 18** (Peter Hayes is Director of the Nautilus Institute and Honorary Professor at the Centre for International Security Studies at the University of Sydney. “NON-STATE TERRORISM AND INADVERTENT NUCLEAR WAR,” *Nautilus Institute*, 1/18/18,<https://nautilus.org/napsnet/napsnet-special-reports/non-state-terrorism-and-inadvertent-nuclear-war/>) dwc 18

Conclusion We now move to our conclusion. Nuclear-armed states can place themselves on the edge of nuclear war by a combination of threatening force deployments and threat rhetoric. Statements by US and North Korea’s leaders and supporting amplification by state and private media to present just such a lethal combination. Many observers have observed that the risk of war and nuclear war, in Korea and globally, have increased in the last few years—although no-one can say with authority by how much and exactly for what reasons.//// However, states are restrained in their actual decisions to escalate to conflict and/or nuclear war by conventional deterrence, vital national interests, and other institutional and political restraints, both domestic and international. It is not easy, in the real world, or even in fiction, to start nuclear wars.[19] Rhetorical threats are standard fare in realist and constructivist accounts of inter-state nuclear deterrence, compellence, and reassurance, and are not cause for alarm per se. States will manage the risk in each of the threat relationships with other nuclear armed states to stay back from the brink, let alone go over it, as they have in the past. //// This argument was powerful and to many, persuasive during the Cold War although it does not deny the hair-raising risks taken by nuclear armed states during this period. Today, the multi-polarity of nine nuclear weapons states interacting in a four-tiered nuclear threat system means that the practice of sustaining nuclear threat and preparing for nuclear war is no longer merely complicated, but is now enormously complex in ways that may exceed the capacity of some and perhaps all states to manage, even without the emergence of a fifth tier of non-state actors to add further unpredictability to how this system works in practice. //// The possibility that **non-state actors** may **attack without advance warning** as to the time, place, and angle of attack presents another layer of uncertainty to this complexity as to how inter-state nuclear war may break out. That is, non-state actors with nuclear weapons or threat goals and capacities do not seek the same goals, will not use the same control systems, **and** will **use** radically **different organizational procedures** and systems to deliver on their threats compared with nuclear armed states. If used tactically for immediate terrorist effect, a non-state **nuclear terrorist could** violently attack nuclear facilities, exploiting any number of vulnerabilities in fuel cycle facility security, or **use actual nuclear** materials and even **warheads against** military or civilian **targets**. If a persistent, strategically oriented nuclear terrorist succeed in gaining credible nuclear threat capacities, it might take hostage one or more states or cities.//// If such an event coincides with already high levels of tension and even military collisions between the non-nuclear forces of nuclear armed states, then a non-state nuclear terrorist attack could **impel a nuclear** armed **state to escalate** its threat or even military actions **against other states,** **in the belief** that **this** targeted **state** may have **sponsored the non-state attack**, or was simply the source of the attack, whatever the declared identity of the attacking non-state entity. **This**outcome could **trigger** these states to go onto one or more of the pathways to inadvertent **nuclear war**, especially if the terrorist attack was on a high value and high risk nuclear facility or involved the seizure and/or use of fissile material. //// Some experts dismiss this possibility as so remote as to be not worth worrying about. Yet the history of nuclear terrorism globally and in the Northeast Asian region suggests otherwise. Using the sand castle metaphor, once built on the high tide line, sand castles may withstand the wind but eventually succumb to the tide once it reaches the castle—at least once, usually twice a day. Also, theories of organizational and technological failure point to the coincidence of multiple, relatively insignificant driving events that interact or accumulate in ways that lead the “metasystem” to fail, even if each individual component of a system works perfectly. Thus, the potential catalytic effect of a nuclear terrorist incident is not that it would of itself lead to a sudden inter-state nuclear war; but that at a time of crisis **when alert levels are** already **high**, when control systems on nuclear forces have already shifted from primary emphasis on negative to positive control, when **decision making is** already **stressed**, when **the potential for miscalc**ulation **is** already **high** due to shows of force indicating that first-use is nigh, when **rhetorical threats promising annihilation** on the one hand, or collapse of morale and weakness on the other **invite counter-vailing threats by nuclear adversaries or their allies** to gain the upper hand **in the “contest of resolve**,” and when organizational cybernetics may be in play such that purposeful actions are implemented differently than intended, **then a terrorist nuclear attack** may **shift** a coincident combination of some or all of these factors **to a threshold level where they** collectively **lead to** a **first-use decision** by one or more nuclear-armed states. If the terrorist attack is timed or happens to coincide with high levels of inter-state tension involving nuclear-armed states, then some or all of these tendencies will likely be in play anyway—precisely the concern of those who posit pathways to inadvertent nuclear war as outlined in section 2 above. //// The critical question is, just as a catalyst breaks some bonds and lets other bonds form, reducing the energy cost and time taken to achieve a chemical reaction, how would a nuclear terrorist attack at time of nuclear charged inter-state tension potentially shift the way that nuclear threat is projected and perceived in a four or five-way nuclear-prone conflict, and how might it affect the potential pathways to inadvertent nuclear war in such a system?//// Such a pervasive incremental effect is shown in Figure 6 below. Figure 6: Impact of a Terrorist Nuclear Threat or Attack on Interstate Nuclear Use Control //// Any one or indeed all of these starting nuclear control profiles may be disputed, as might the control profile at the end of the response arrow. (In Figure 6, each nuclear state responds to a terrorist nuclear attack by loosening or abandoning negative controls against unauthorized use, and shifts towards reliance mostly on positive procedural controls biased towards use). But each nuclear armed state will make its moves in response to the posited terrorist nuclear attack partly in response to its expectations as to how other nuclear armed states will perceive and respond to these moves, as well as their perception that an enemy state may have sponsored a terrorist nuclear attack—and considered together, it is obvious that they may not share a common image of the other states’ motivations and actions in this response, leading to cumulative potential for misinterpretation and rapid subsequent action, reaction, and escalation.

#### Nuclear war causes extinction

**Starr 14** (Steven Starr: Director, Clinical Laboratory Science Program at the U of Missouri. Senior scientist for Physicians for Social Responsibility. 5/30/14, “The Lethality of Nuclear Weapons: Nuclear War has No Winner”, Centre for Research on Globalization,<http://www.globalresearch.ca/the-lethality-of-nuclear-weapons-nuclear-war-has-no-winner/5385611>   //   DOA: 4/1/21)JDE

Paul Craig Roberts held top security clearances. He has repeatedly warned that a US-Russian nuclear war would wipe out the human race, along with all other complex forms of life. As a scientist with expert knowledge, I wish to echo and explain his warning.//// **Nuclear war has no winner**. Beginning in 2006, several of the world’s leading climatologists (at Rutgers, UCLA, John Hopkins University, and the University of Colorado-Boulder) published a series of studies that evaluated the long-term environmental consequences of a nuclear war, including baseline scenarios fought with merely 1% of the explosive power in the US and/or Russian launch-ready nuclear arsenals. They concluded that **the consequences of even a “small” nuclear war would include catastrophic disruptions of global climate**[i] **and massive destruction of Earth’s protective ozone layer**[ii]. These and more recent studies predict that **global agriculture would be so negatively affected by such a war, a global famine would result, which would cause up to 2 billion people to starve to death**. [iii]//// These peer-reviewed studies – which were analyzed by the best scientists in the world and found to be without error – also predict that **a war fought with less than half of US or Russian strategic nuclear weapons would destroy the human race**.[iv] In other words, a US-**Russian nuclear war would create such extreme long-term damage to the global environment that it would leave the Earth uninhabitable for humans and most animal forms of life**.//// A recent article in the Bulletin of the Atomic Scientists, “Self-assured destruction: The climate impacts of nuclear war”,[v] begins by stating://// “A nuclear war between Russia and the United States, even after the arsenal reductions planned under New START, could produce a nuclear winter. Hence, **an attack by either side could be suicidal, resulting in self-assured destruction**.” In 2009, I wrote an article[vi] for the International Commission on Nuclear Non-proliferation and Disarmament that summarizes the findings of these studies. It explains that **nuclear firestorms would produce millions of tons of smoke, which would rise above cloud level and form a global stratospheric smoke layer that would rapidly encircle the Earth. The smoke layer would remain for at least a decade, and it would act to destroy the protective ozone layer** (vastly increasing the UV-B reaching Earth[vii]) as well as block warming sunlight, thus creating Ice Age weather conditions that would last 10 years or longer.//// Following a US-Russian nuclear war, **temperatures in the central US and Eurasia would fall below freezing every day for one to three years; the intense cold would completely eliminate growing seasons for a decade or longer. No crops could be grown, leading to a famine that would kill most humans and large animal populations.//// Electromagnetic pulse from high-altitude nuclear detonations would destroy the integrated circuits in all modern electronic devices**[viii], including **those in commercial nuclear power plants. Every nuclear reactor would almost instantly meltdown; every nuclear spent fuel pool** (which contain many times more radioactivity than found in the reactors) **would boil-off, releasing vast amounts of long-lived radioactivity. The fallout would make most of the US and Europe uninhabitable. Of course, the survivors of the nuclear war would be starving to death anyway**.////

Contention two is tradeoff

The renewable market is thriving

**DiGangi 25** (Diana DiGangi: Reporter for Utility Dive. 1/21/25, “2025 Renewable Energy Outlook: Full speed ahead as second Trump administration begins”, Utility Dive,<https://www.utilitydive.com/news/2025-outlook-renewable-energy-inflation-reduction-act-trump-administration/737234/>   //.  DOA: 3/25/25)JDE

**The renewables industry begins 2025 with the Inflation Reduction Act continuing to spur record investment, and spiking load growth providing new opportunities for deployment**. At the same time, interconnection queues across the country remain clogged, siting, permitting, financial and other challenges continue, and industry critic Donald Trump just began his second term as president. “It’s an interesting moment, because there is this really rapid change, and yet we’re stuck in some really key ways,” said Heather O’Neill, president and CEO of Advanced Energy United. “The interconnection queue is one really clear example where, yes, there’s some progress — FERC’s putting out reform measures — and yet we’re not unleashing the full promise and the economic opportunity and activity that we could.” **After decades of flat load growth, U.S. electricity demand** [**could rise 128 GW over the next five years**](https://www.utilitydive.com/news/shocking-forecast-us-electricity-load-could-grow-128-gw-over-next-5-years-Grid-Strategies)**, according to a report last month from Grid Strategies**. At the same time, the number of new transmission interconnection requests has risen by 300% to 500% over the last decade, with 2.5 TW of clean energy and storage capacity currently waiting to connect to the grid, said an [October report from the Department of Energy](https://www.energy.gov/eere/wind/articles/transmission-interconnection-roadmap-offers-plan-clear-queues-clean-energy). However, O’Neill said, the “**the macro trends are incredibly positive … We are in the middle of an energy transformation**.” She attributed some of her optimism to the scale of investment and growth that the industry has been seeing. **The energy storage sector is especially dynamic right** now, O’Neill said: “A few years ago, [there was] very little in the way of storage capacity showing up, but with so much innovation in the technology, the cost curves are coming down. When we think about how to manage load, storage plays a key role in that.” Global energy storage installations boomed 76% in 2024 and are projected to continue that streak in 2025, [according to a November report from BloombergNEF](https://about.bnef.com/blog/headwinds-in-largest-energy-storage-markets-wont-deter-growth), but BNEF noted that growth may be impacted by “uncertainties stemming from the new Trump administration.” **Trump has spoken out against electric vehicles and said he will “rescind all unspent funds under the misnamed Inflation Reduction Act.”** Congress is expected to try to [claw back EV tax credits from the IRA](https://www.utilitydive.com/news/inflation-reduction-act-permitting-reform-legislation-congress-elections/730332/), which could impact the battery industry. Trump has also said he would end offshore wind “on day one” and embraced oil and gas generation, but **vowed last month to** [**expedite federal permits and environmental reviews**](https://www.utilitydive.com/news/trump-speed-up-permits-megaprojects/735782/) **for construction projects that represent an investment of $1 billion or more — a move that could benefit clean energy.** Felisa Sanchez, a partner with law firm K&L Gates’ maritime and finance practice groups, said that **Trump’s goal to end offshore wind may come into conflict with his goal of boosting the U.S. economy and its domestic manufacturing. “It’s hard to say ‘we’re going to end offshore wind’ when you’re also impacting a vast supply chain that has already been going for the last few years that has been implemented** — when ports have been developed, and vessels have started to either be under construction or have come out of the yard ready to work in offshore wind,” she said. **The need to meet load growth on the electric side is not going away. And any administration – Republican, independent, Democratic – foremost in their mind is going to be a strong resilient economy. That’s going to be dependent upon a best-in-class electric distribution grid.** Paul DeCotis Senior partner and head of East Coast energy and utilities at West Monroe John Northington, a government affairs advisor and a member of K&L Gates’ public policy and law practice group, said he anticipates that the **offshore wind industry may adapt to the new administration by shifting away from “‘steel in water is good for the environment’ as the main message.” “Maybe for the next four years, it’s that steel in water is good for jobs, it’s money, it’s good for America,**” he said. “Talking about the business benefits, rather than environmental benefits, could be a change in trend for some of these companies.” When speaking to Utility Dive in December, Northington said he was also hopeful about the bipartisan Energy Permitting Reform Act of 2024, sponsored by Sen. Joe Manchin, I-W.Va., and Sen. John Barrasso, R-Wyo. — but the bill was not included in the continuing resolution passed later that month, “taking permitting off the table for this Congress,” said Manchin, who retired in early January. New demands on the grid Regardless of how Trump’s second term shapes the U.S. generation mix, his administration will be dealing with an anticipated 3% annual average load growth over the next five years — a level which hasn’t been seen since the 1980s, according to a [December report from Grid Strategies](https://www.utilitydive.com/news/shocking-forecast-us-electricity-load-could-grow-128-gw-over-next-5-years-Grid-Strategies/734820/). “The need to meet load growth on the electric side is not going away. And any administration — Republican, independent, Democratic — foremost in their mind is going to be a strong resilient economy,” said Paul DeCotis, a senior partner and head of East Coast energy and utilities at West Monroe. “That’s going to be dependent upon a best-in-class electric distribution grid.” Surging load growth is driven largely by data center demand, which a [December report from Lawrence Berkeley National Laboratory](https://www.energy.gov/articles/doe-releases-new-report-evaluating-increase-electricity-demand-data-centers) found has tripled over the past decade and is projected to double or triple again by 2028. The increase in demand is also the result of industry electrification and growth in domestic manufacturing. That growth “means continued capital investment in the [energy] industry, regardless of the administration,” DeCotis said. **“I don’t think any administration is going to want to come in and all of a sudden see brownouts and blackouts and not enough capacity to meet demand, or have to stall demand and the job growth that goes with it, because they can’t meet energy needs**.” O’Neill said she believes that **states will also continue to drive the clean energy transition forward, as they’re where “energy policies happen …. where the investments become real**.” State governors and commissioners “want manufacturing in their state,” she said. “They want data centers in their state. The siting reform conversation is one that I think is not a partisan conversation. It’s: how do we help unlock some of this desired economic activity? For us, the siting and building issues will be something that we’re going to work on in the states, regardless of the landscape in D.C.” **The projects that are being facilitated through [the IRA] are not isolated in blue states.** For example, we’re doing projects all over the country and seeing projects work in states like Ohio and Pennsylvania that didn’t used to work. Dan Smith Vice president of markets at DSD Renewables In addition to states and utilities, companies like Microsoft, Amazon and Meta are also helping to drive the demand for clean energy — investing billions in renewable energy deployment in addition to seeking nuclear and natural gas generation to handle load from their data centers. Molly Jerrard, head of demand response at Enel North America, said she expects that in 2025, “significant load growth .... will challenge our grid’s flexibility and put the reliability of local systems to the test.” “**Combine this with aging infrastructure, congestion, and the uptick in climate-driven grid stress, utilities and grid operators will need to put a bigger focus on adoption of demand response programs and distributed energy resources to address these challenges and increase grid stability**,” Jerrard said. However, she said, “inconsistent data access standards” from utilities continue to limit the scalability of virtual power plants, a potent demand response solution. O’Neill is excited about VPPs, she said, as she sees “a ton of innovation” flowing into the sector and expanding the ways that VPPs can offer grid flexibility. “We’re seeing virtual power plants across different regions of the country — whether it’s coastal or Texas — where you’ve got utilities and commissions really putting virtual power plants to the test,” she said. “They’re managing the load, they’re shaving peak loads, and they don’t have to build as much [generation].”

Trump will not decrease renewables

​​**Chu and Hurst 25** (Daniel Chu, CFA: Portfolio Manager at ClearBridge Investments. Shane Hurst, CFA: Portfolio Manager at ClearBridge Investments. 2/28/25, “Renewables under Trump: Likely better than expected”, Franklin Templeton,<https://www.franklinresources.com/articles/2025/clearbridge-investments/renewables-under-trump-likely-better-than-expected>   //   DOA: 3/25/25)JDE

Key takeaways: **While the new Trump administration creates elevated risk as it shifts clean energy policy, our view is that any changes to the Inflation Reduction Act (IRA)**—which we expect to be **less than the market anticipates—will ultimately have a muted impact** on the short- and long-term renewables outlook. Given Republican support for the IRA**, the slim majority in Congress will make it difficult for Trump to enact meaningful cuts.** **Demand for renewable energy will continue to be strong regardless of policy changes due to factors such as artificial intelligence (AI)**, as we think the market overlooks the changing electricity demand for renewable energy. Muted impact on short- and long-term renewables outlook It has been an active first few weeks in office for US President Donald Trump, and true to expectations, policy uncertainty remains high. Infrastructure investors have been watching closely as, while there are some expected policy tailwinds, concern has grown over potential headwinds from the new administration, particularly for renewable energy utilities. **While we acknowledge elevated risk and volatility as Trump shifts clean energy policy, our view is that any changes to the IRA—which we expect to be less than the market anticipates—will ultimately have a muted impact on the short- and long-term renewables outloo**k. As such, we remain comfortable with our existing contracted renewables exposure. Onshore wind and solar, for example, are particularly leveraged to **production tax credit (PTC) and investment tax credit (ITC) subsidies**. The funding package under the IRA extends across multiple technologies and applications, with onshore wind and solar tax credits being only a portion of the total package. **While there have been significant headlines about Trump rolling back subsidies, there has been no substantial commentary regarding the potential elimination of the PTCs and ITCs**. So far, Trump’s focus has been on **curtailing subsidies outside of the PTC and ITCs, such as electric vehicles (EV) tax credits** and, more recently, reviewing loans from the Department of Energy. We believe this is important signaling regarding the priorities of the Trump administration. Offshore wind is the only area in contracted renewables we believe is at significant risk. This is a clear distinction from onshore wind and solar, as the administration has halted the issuance of any new offshore wind leases following Trump’s pre-election comments opposing it (which requires more extensive federal government involvement). Tax credits may moderate to historical norms, yet remain growth-friendly Do we think Trump will leave the PTC and ITC credits alone? These credits could be rolled back somewhat, as the new administration looks for sources of funds to extend the Tax Cuts and Jobs Act of 2017 and other policy priorities. However, **we think the cuts will be moderate and not impact the long-term outlook for key renewable players.** The duration of the PTC and ITC subsidies may be reduced from their current 10+ year duration to something shorter, such as five years. Recall that PTC and ITCs existed prior to the IRA; a moderation back to older norms is a reasonable assumption. However, we think it still represents an attractive backdrop to incentivize investments. Onshore wind and solar projects (with the PTC and ITC framework) worked perfectly well under Trump in his first term, and we think it will be the same in his second term. In addition, **removal of the PTC and ITC provisions would need to be approved by Congress (Trump cannot do this under executive order), where many Republican members are key beneficiaries of these tax credits to their states. In fact, last year 18 House Republicans signed a letter of support for the IRA, highlighting some of the general economic benefits and jobs to many Republican states.** Given this, the slim majority in Congress will make it difficult for Trump to enact meaningful cuts to the IRA. It is worth noting that **one of the largest renewable energy companies in the world, has expressed confidence in its ability to continue to meet development targets even under a more draconian scenario.** As risk around IRA repeal has been discussed extensively over the last 18 months, companies have been able to adjust accordingly. **Lastly, demand for renewable energy will continue to be strong regardless of policy outcomes. We believe the market overlooks the growing demand for electricity from renewable sources** (Exhibits 1 and 2), much of which is being driven by the increasing electricity needs of the large language models driving AI adoption. Even in a scenario where 50% of electricity demand is met through natural gas and nuclear power, renewables growth will need to accelerate meaningfully; by some estimates, we would see renewables’ compound annual growth rate almost doubling.

Substantial investment in nuclear energy would trade off with renewables

**Hockenos 22** (Paul Hockenos is a Berlin-based journalist and author of Berlin Calling: A Story of Anarchy, Music, the Wall and the Birth of the New Berlin, 11/24/22, “Why Nuclear Power and Renewables Don’t Mix” Energy Transition,<https://energytransition.org/2022/11/why-nuclear-power-and-renewables-dont-mix/#:~:text=%E2%80%9CNuclear%20is%20inherently%20inflexible%2C%20and,of%20nuclear%20actively%20hinders%20both.%E2%80%9D>, DOA: 3/26/25) ST

But **Couture**, a Canadian national who has lived and worked in Berlin for over a decade, **takes issue with the contention that nuclear segues well with clean energy**, even the smaller SMRs. “**Nuclear power and** **variable** **renewables** **like solar and wind** **are like oil and water**. **They don’t mix,** at least not well,” he says. Even the SMRs that the IAEA touts, says Couture, do not ramp up and down easily. “**Nuclear** **is** inherently **inflexible**, and **to accommodate** the **variability** of **wind and solar** **output**, what **we** ultimately **need** is both **flexible** sources of **supply, and** greater flexibility of **demand**. **The presence of** **nuclear actively hinders both.”** Couture explains **that** **they compete against each** **other rather than working together**. **Nuclear**, he argues, “**wants to operate as much as possible**, while **solar and wind want to be** **dispatched all the time, for the simple reason that they have a near-zero marginal cost and outprice everything else** on the market. **Put those two together and you have the following situation: as soon as you reach** **modest levels of** **variable** **renewables** **in the mix**, one of two things starts happening: **either solar and wind** **start** **pushing out** **the** **nuclear,** **or nuclear starts pushing out the solar and wind. Like oil and water**,” he says. And **Couture is not alone** **in his analysis**. A University of **Sussex** **Business School** **study** **concludes** that **nuclear and renewable** **energy** **programs do not** **tend to** **co-exist** **well** together **in low-carbon energy systems but instead crowd each other out and limit effectiveness.**

**Lovins 22** (Amory Bloch Lovins is an American writer, physicist, and former chairman/chief scientist of the Rocky Mountain Institute. He has written on energy policy and related areas for four decades. April 12, 2022 “Nuclear energy should not be part of the global solution to climate change” Utility Drive,<https://www.utilitydive.com/news/nuclear-energy-should-not-be-part-of-the-global-solution-to-climate-change/620392/>, DOA: 4/2/25) LLO

**The “best analysis” behind the opinion piece’s assertion that renewables plus nuclear “can create the most cost-effective carbon-free energy system” adds nuclear** [**only if it’s very cheap**](https://doi.org/10.1016/j.joule.2018.08.006) **(assuming learning curves** [**not observed for modern reactors**](https://doi.org/10.1016/j.enpol.2016.03.052)**, let alone for** [**types of reactors that do not exist**](https://vibrantcleanenergy.com/wp-content/uploads/2021/01/VCE-UCSD-01272021.pdf)**).** It also assumes that renewables and storage are far costlier than BNEF’s empirical data show (unable to follow observed learning curves), and excludes most grid-flexibility [resources](https://doi.org/10.1016/j.rser.2018.04.113). Diverse peer-reviewed studies without such artificial constraints — [56 of which were published](http://web.stanford.edu/group/efmh/jacobson/Articles/I/CombiningRenew/100PercentPaperAbstracts.pdf) by April 2021, then many more, e.g., [here](https://www.nrel.gov/news/program/2021/the-challenge-of-the-last-few-percent-quantifying-the-costs-and-emissions-benefits-of-100-renewables.html), [here](https://doi.org/10.1016/j.renene.2019.02.077), [here](https://dx.doi.org/10.1016/j.energy.2021.120467) and [here](https://www.oxfordmartin.ox.ac.uk/publications/empirically-grounded-technology-forecasts-and-the-energy-transition/) — better match empirical market choices and need no nuclear power to minimize cost or carbon. Competing climate solutions In over 24,000 actual market projects, **new unsubsidized renewables make electricity 5–13 times cheaper than nuclear newbuild** according to BNEF; merchant bank [Lazard analysis](https://www.lazard.com/perspective/levelized-cost-of-energy-levelized-cost-of-storage-and-levelized-cost-of-hydrogen/) finds 3–8 times. Per dollar, renewables therefore provide 3–13 times more kWh and can displace 3–13 times more fossil-fueled generation. Still-cheaper efficiency is even more climate-effective. As my 2019 nuclear-and-climate [analysis](https://www.worldnuclearreport.org/-World-Nuclear-Industry-Status-Report-2019-.html) and its summaries [here](https://www.eesi.org/files/Amory_Lovins_032x21_v3.pdf) and [here](https://www.forbes.com/sites/amorylovins/2019/11/18/does-nuclear-power-slow-or-speed-climate-change/) noted, **grid** [**integration**](https://doi.org/10.1016/j.tej.2017.11.006) **costs matter too when comparing electrical resources — but not much. They’d need to be about 2–12 times renewables’ levelized cost of energy (LCOE) for nuclear to rival renewables, but the opposite is true.** Solar and windpower integration costs are at worst comparable to their LCOE. In the U.K., these grid integration costs are [modest](https://ukerc.ac.uk/publications/the-costs-and-impacts-of-intermittency-2016-update/), and U.S. utilities find they’re manyfold [below](https://emp.lbl.gov/sites/default/files/2020_wind_energy_technology_data_update.pdf) renewables’ LCOE even at 85% wind share, so adding them into the comparison can’t flip the outcome as the opinion piece claims. BNEF finds that even a flat load is now most cheaply by variable renewables, plus backup that’s also carbon-free if it’s demand-side, renewable, or storage. **That’s why the International Energy Agency forecasts renewables to provide at least** [**95%**](https://www.iea.org/reports/renewables-2021/executive-summary) **of the world’s new capacity, or around 305 GW/year, through 2026.** Moreover**, including grid integration (or** [**similarly small**](https://doi.org/10.1016/j.rser.2018.04.113) **grid expansion) costs would probably increase nuclear’s cost disadvantage, because big thermal plants typically incur severalfold** [**higher**](https://doi.org/10.1016/j.tej.2017.06.002) **integration** [**costs**](https://www.utilitydive.com/news/how-renewables-are-changing-the-way-we-operate-the-grid/364541/) **than** [**wind**](https://cleanpower.org/wp-content/uploads/2021/01/AWEA-Reliability-White-Paper-2-12-15.pdf) **or solar farms**, consistent with longstanding [Lawrence Berkeley National Laboratory](https://eta-publications.lbl.gov/sites/default/files/lbnl-5559e.pdf) and [National Renewable Energy Laboratory](https://www.nrel.gov/docs/fy11osti/51860.pdf) findings. **That’s because those renewables’ outages are far smaller, slower, shorter and more predictable — often more predictable than demand itself. Renewables largely avoid big thermal plants’ high intermittency (forced-outage) costs for reserve margin, spinning reserve and cycling.** Those costs too must be counted and compared. **Adding ”**[**complementary**](https://www.erneuerbareenergien.de/energiewende-20/speicher/stats-does-nuclear-help-integration-renewables)**″ nuclear power doesn’t help but** [**harms**](https://www.erneuerbareenergien.de/technik/windtechnik/low-carbon-future-nuclear-and-renewables-possible-combination) **variable renewables. Its** [**cycling limitations**](https://energytransition.org/2018/03/can-nuclear-and-renewables-coexist/) **and high capital cost require maximum runtime, but nearly-zero-operating-cost renewables idle reactors by dispatching whenever available.** Reactors can’t have both a high and a low capacity factor — pick one. Moreover, **cycling reactors spoils their economics via lifetime, maintenance and efficiency penalties, and spreading high fixed costs over less output. The same holds true for proposed (but often** [**rejected**](https://spectrum.ieee.org/the-forgotten-history-of-small-nuclear-reactors) **long ago)** [**Small Modular Reactors**](https://news.bloomberglaw.com/environment-and-energy/why-nuclear-power-is-bad-for-your-wallet-and-the-climate)**, which bring** [**greater**](https://www.ieefa.org/smr/) **economic and use-case** [**challenges**](https://www.pnas.org/content/115/28/7184)**, novel** [**safety**](https://www.ucsusa.org/resources/advanced-isnt-always-better) and [proliferation](https://www.tandfonline.com/doi/abs/10.13182/NT13-A19873) issues that are now making the Department of Energy [undercut](https://www.energyintel.com/0000017e-ff91-df96-a1fe-fffddf990000) the mission of the Department of Defense, and [lesser](https://www.ewg.org/news-insights/news/why-small-modular-nuclear-reactors-wont-help-counter-climate-crisis) carbon savings achieved [later](https://www.foreignaffairs.com/articles/2021-07-08/nuclear-energy-will-not-be-solution-climate-change). **Thus nuclear newbuild, already grossly uncompetitive when renewables generate a minor share, gets more so as they grow.** It’s also [slower](https://doi.org/10.1016/j.erss.2018.08.001), so it cut global 2010–20 carbon emissions [fivefold less than renewables](http://www.iea.org/articles/global-energy-review-co2-emissions-in-2020) did. As President Emmanuel Macron of France just [said](https://www.nytimes.com/2022/02/10/world/europe/france-macron-nuclear-power.html), “We need to massively develop renewable energies because it is the only way to meet our immediate electricity needs, since it takes 15 years to build a nuclear reactor.” **Most existing reactors** [**cost more just to operate**](https://www.worldnuclearreport.org/-World-Nuclear-Industry-Status-Report-2019-.html) **than replacing them with similarly carbon-free efficiency and renewables.** The opinion piece urges compounding that misallocation with billions more in [subsidies](https://www.forbes.com/sites/amorylovins/2019/11/18/does-nuclear-power-slow-or-speed-climate-change/) to keep uneconomic reactors running and save carbon. **But letting them exit the market instead would open up demand and grid capacity for cheaper carbon-free competitors to contest, saving more carbon starting a year or two later as efficiency and renewables overtake and reverse transient gas substitution. Duct-taping new nuclear subsidies to more-popular renewables diverts more capital to less climate-effective nuclear projects**, saving less carbon. And **nuclear phaseouts work. In 2010–20, Japan, despite suppressing windpower,** [**replaced**](https://www.eesi.org/files/Amory_Lovins_032x21_v3.pdf) **with renewables and efficiency its entire lost 30%-nuclear output**, displacing the [21 zombie reactors](https://www.worldnuclearreport.org/World-Nuclear-Industry-Status-Report-2021-773.html) sidelined for the past 10–14 years. Germany (30% nuclear in 2000) meanwhile offset its nuclear closures with renewables and efficiency while [slashing coal generation 64% and lignite 37%](https://www.cleanenergywire.org/factsheets/germanys-energy-consumption-and-power-mix-charts). It now plans to triple its pace of renewable expansion to get off fossil fuels even faster — and achieve even quicker efficiency gains to displace Russian gas “at Tesla speed.” Balancing a renewably powered grid Decarbonization without “firm” generators looks “extremely costly” only if most grid-flexibility solutions are excluded. At least ten [carbon-free methods](https://doi.org/10.1016/j.tej.2017.11.006) (the [International Renewable Energy Agency found 30](http://irena.org/publications/2021/Jun/World-Energy-Transitions-Outlook)) — not just the costliest one, giant batteries — can keep grids [reliable](https://e360.yale.edu/features/three-myths-about-renewable-energy-and-the-grid-debunked) as they become renewable. In rough [order](https://doi.org/10.1016/j.tej.2020.106827) of increasing cost, they are: Electric end-use efficiency (or negawatts) could [quadruple](https://www.reinventingfire.com/) in the U.S. by 2050, costing a tenth today’s average retail price. Lower energy intensity provided [77%](https://www.iea.org/reports/energy-efficiency-2017) of global 2014–16 decarbonization, cut 1975–2021 U.S. primary energy use [60%](https://www.eia.gov/totalenergy/data/monthly/pdf/mer.pdf), and can do [far more](https://www.ipcc.ch/report/ar6/wg3/), especially with [integrative design](https://doi.org/10.1088/1748-9326/aad965) and [rethinking](https://www.rmi.org/profitable-decarb/) supposedly “harder-to-abate” [sectors](https://sloanreview.mit.edu/article/decarbonizing-our-toughest-sectors-profitably/). Not comparing or competing efficiency overbuys supply and complicates grid balancing. Flexible [demand](https://www.raponline.org/knowledge-center/time%20-varying-and-dynamic-rate-design/) that shifts certain loads’ timing without inconveniencing customers can exceed the demonstrated residential peak load savings. For example, eight kinds of “flexiwatts” could [eliminate](https://www.rmi.org/wp-content/uploads/2018/02/Insight_Brief_Demand_Flexibility_2018.pdf) the Texas grid’s steep evening load ramp as people come home and turn stuff on just as solar power fades — and could also cut nonrenewable capacity 24% and daily summer load range about 42%, make renewables 26% more valuable, and pay back in about five months. Competing such load-shaving and -shifting building-efficiency [retrofits](https://doi.org/10.1063/5.0064570) against electricity storage can eliminate most long-duration storage needs ([small](https://www.50hertz.com/en/News/FullarticleNewsof50Hertz/11597/elia-group-publishes-roadmap-to-net-zero-our-vision-on-building-a-climate-neutral-european-energy-system-by-2050) anyhow) in four key U.S. regions, cutting investment by at least an order of magnitude. More-accurate forecasting already makes East [Danish](https://ens.dk/sites/ens.dk/files/Globalcooperation/development_and_role_of_flexibility_in_the_danish_power_system.pdf) windpower dispatchable in day-ahead hourly markets, just as offshore windpower is [stabilizing](https://www.tennet.eu/de/tinyurl-storage/news/tennet-startet-redispatch-20-mit-45-gw-offshore-windparks/) the German grid. Renewable diversification by type and location captures valuable [complementarity](https://doi.org/10.3934/energy.2020.5.749); just combining anticorrelated sites can [double](https://www.researchgate.net/publication/228407884_Spatial_and_temporal_%20interactions_of_solar_and_wind_resources_in_the_next_generation_utility) U.S. windbelt productivity. **Dispatchable renewables — virtually all renewables except photovoltaics and wind (subject to #3) — and industrial cogeneration can directly balance PV and wind variations.** Storing heat or coolth, even in existing buildings’ fabric, is a vast, low-cost grid-balancer, as NREL found. Behind-the-meter batteries (often cost-effective even in [2014](https://rmi.org/wp-content/uploads/2017/03/RMI-TheEconomicsOfBatteryEnergyStorage-FullReport-FINAL.pdf)) will soon be joined by terawatts of profitable storage opportunities in parked bidirectionally charging electric vehicles. Just EVs plus ice-storage air conditioning could [enable 100% renewable](https://www.youtube.com/watch?v=MsgrahFln0s) power for ERCOT in 2050, with excellent economics and no bulk storage. Pumped storage worldwide totaled 158 GW in [2019](https://www.energy.gov/sites/default/files/2021/01/f82/us-hydropower-market-report-full-2021.pdf) with another 53 GW under construction and 226 GW under consideration, plus compressed air, gravity, and other emergent non-chemical methods. Readily storable power-to-X “green molecules” (hydrogen or ammonia) can run fuel cells or existing gas plants in any desired quantity, and have reportedly reached [$2.7/kgH2](http://www.xinhuanet.com/2020-12/18/c_1126879207.htm) in [China](https://www.bnef.com/insights/26313). **Grid-scale battery storage added** [**5.2 GW**](https://www.iea.org/reports/energy-storage) **in 2020**, rivaling gross nuclear build, then far outpaced it, with 358 GW / 1 [TWh](https://www.bnef.com/insights/27619) to be [added](https://about.bnef.com/blog/global-energy-storage-market-set-to-hit-one-terawatt-hour-by-2030/) by 2030. It’s [blackstartable](https://youtu.be/zNyB9GdNsyg), can [stabilize](https://reneweconomy.com.au/powerlink-looks-to-battery-storage-to-help-solve-grid-stability-problems/) grids better than rotating [machines](https://reneweconomy.com.au/tesla-big-battery-sets-new-record-as-testing-for-hornsdale-expansion-enters-final-stage-65376/) (as renewables can [too](https://reneweconomy.com.au/wind-farms-could-be-core-providers-of-grid-stability-says-aemo-42857/)), and has profitably run a GW-scale 96%-renewable grid (or smaller at [100%](https://youtu.be/zNyB9GdNsyg)) for [nearly a week](https://reneweconomy.com.au/south-australia-winds-up-2021-with-smashing-new-renewables-record/).

**Renewable industry would be harmed immediately**

**Haywood et al 23** (Luke Haywood is head of climate and energy at the European Environmental Bureau (EEB) in Brussels and guest researcher at the Mercator Research Centre on Global Commons and Climate Change and at the German Institute for Economic Research (DIW Berlin), institutions where he previously held postdoc positions. He holds a PhD from the Paris School of Economics and is particularly interested in the distributional consequences of climate policies, including questions of just transition. The EEB is part of the civil-society-led consortium modeling an energy scenario compatible with 1.5 degrees, the Paris-Agreement Compatible (PAC) scenario. Marion Leroutier is a post-doctoral researcher at the Stockholm School of Economics (SSE), based at Misum, a multidisciplinary research center on sustainability and also affiliated with SSE’s Department of Economics. She will join ENSAE and CREST as a tenure-track assistant professor in September 2024. In the 2023/2024 academic year, she will be a postdoctoral fellow at the Institute for Fiscal Studies (IFS). She is an applied environmental economist focusing on two major environmental issues, ambient air pollution and climate change. Robert Pietzcker is a senior scientist at the Potsdam Institute for Climate Impact Research (PIK) with a background in physics and economics. He leads the National Energy Transitions Team (together with Falko Ueckerdt) in the Energy Systems group of Research Department 3 – Transformation Pathways. His work focuses on analyzing the energy transition in the EU and Germany and providing insights on the climate policies needed to achieve greenhouse gas neutrality. August 2023, “Why investing in new nuclear plants is bad for the climate”, Joule,<https://www.sciencedirect.com/science/article/pii/S2542435123002817>   //   DOA: 3/3/25)JDE

Building new nuclear takes time we do not have The business case and economics may be poor, but in light of the very real threat of climate catastrophe, should we not invest in all alternatives to fossil fuels? **The problem is that building nuclear plants is slow and delivery is uncertain.** Even the International Atomic Energy Agency and Nuclear Energy Agency—organizations promoting the use of nuclear energy—**assume construction times of around one decade**,[13](https://www.sciencedirect.com/science/article/pii/S2542435123002817#bib13) whereas **renewables can come online in a fraction of that time**. Given lags in planning and regulatory approval, any new nuclear plants would come online too late to help decarbonize our economies on time. **However, even this time frame appears optimistic: all recent nuclear new-builds in Organisation for Economic Cooperation and Development (OECD) countries have been seriously delayed—Olkiluoto took 16 years instead of five, while Flamanville is over 11 years behind schedule.** The 5th and 6th EPR plants offer a similarly bleak picture: plans to build Hinkley Point C were first announced in 2008, with an aim of going online in the early 2020s. Grid connection is now planned for 2026. For Sizewell C, community consultation began in 2012, the planning application was submitted in 2020, and the reactor is expected to become operational in 2032**. Given these time horizons, delays, and associated cost overruns, investments in nuclear power appear to be very dangerous bets in light of the need to quickly reduce EU power sector emissions by 2030** and to close to zero before 2040 in line with climate objectives. Finally, Granger et al.[16](https://www.sciencedirect.com/science/article/pii/S2542435123002817#bib16) investigate various SMR technologies and fail to see how any could make a “significant contribution to greenhouse gas mitigation by the middle of this century.” Conclusion: **In solving the climate crisis, new nuclear is a costly and dangerous distraction With ample time, it may be possible to build nuclear power to the highest safety standards and remain economical even taking into account costs of storing nuclear waste for thousands of years. However, building nuclear plants takes many years of planning and construction and is costly, while the climate crisis demands urgency and requires such large investments that cost efficiency is of key importance**. Relying on nuclear new-builds to achieve the EU climate targets is virtually impossible: even under very optimistic assumptions, new nuclear in France will only start providing low-emission electricity in 2035—too late for the much faster reductions of power sector emissions required by the EU climate targets. And what would happen if there is further delay, as was the case for all recent nuclear constructions in OECD countries? **In a decarbonizing world, delays in nuclear constructions translate to increased emissions. If governments and economic actors believe that nuclear power will come online at a certain date, they will not make alternative plans, and without alternative plans, the current carbon-intensive electricity system will remain in place—rendering climate targets unachievable.**

**Nuclear energy won’t be implemented quickly enough**

**Sovacool and Cooper 8** (Benjamin K. Sovacool is a Research Fellow in the Energy Governance Program at the Centre on Asia and Globalization, part of the Lee Kuan Yew School of Public Policy at the National University of Singapore. He is also an Adjunct Assistant Professor at the Virginia Polytechnic Institute & State University. Christopher Cooper is Principal Partner for Oomph Consulting, LLC, and the former Executive Director of the Network for New Energy Choices. 2008, "Nuclear Nonsense: Why Nuclear Power is No Answer to Climate Change and the W Change and the World's Post-Kyoto Energy Challenges gy Challenges", [William & Mary Environmental Law and Policy Review](https://scholarship.law.wm.edu/wmelpr),<https://scholarship.law.wm.edu/cgi/viewcontent.cgi?article=1040&context=wmelpr>, DOA: 3/2/24) RWC

**Nuclear power plants have long construction lead times and meet with a plethora of uncertainties during the construction process, making planning and financing difficult, especially when the balance of supply and demand for electricity can change rapidly within a short period of time. Long construction times become significant because costs mount quickly during construction delays.** Halting construction of a nuclear power plant for two years, for example, adds about fifteen percent to the final cost of electricity.'48 **The nuclear demonstration plant at Shippingport, Pennsylvania, for instance, was budgeted at forty-eight million dollars in the early 1950s, but ended up costing eighty-four million dollars by the time it was completed on December 2, 1957,** and that excludes government subsidies and R&D costs.'49 In the 1970s and 1980s excessively high forecasts of growth in demand for electricity led to overbuilding of generating plants and massive electric system cost over-runs in many states. One infamous example was in Washington State, where the Washington Public Power System ("WPPS") began a construction program for as many as seven new nuclear power plants in the early 1970s.50 WPPS believed that regional electricity requirements "would grow by 5.2 percent each year" well into the 1990s and started building nuclear power plants to meet their projections.'' **At the same time, the massive backlog of nuclear power plant orders after the 1973 oil crisis caused a severe shortage of skilled nuclear engineers and architects; sixty-nine plants were ordered in 1973 and 1974**.152 "[**Problems of plant design, poor craftsmanship, and labor strikes caused even longer delays; five-year construction estimates lengthened to tenor twelve-year periods."**'53 One WPPS project started in 1970 was not finished until 1984,"M and the WPPS annual report in 1981 projected that $23.7 billion was needed to complete one of its plants after $5 billion had already been expended,' 5 all the while electricity growth dropped significantly below original projections.'56 By the mid-1980s, WPPS faced financial disaster and all but one of the plants was cancelled, leading to the country's largest municipal bond default.5 7 The entire experience came to be called the "WHOOPS" fiasco, as a play on the WPPS acronym, and is an enduring lesson of the risk associated with investing in large power plants. Consumers across the Northwest are still paying for WHOOPS in their monthly electricity bills. 5 "While WHOOPS is perhaps the most spectacular example, ... similar 'boom and bust' cycles in nuclear power plant construction and cost-overruns occurred in many states during... [the 1980s], and directly produced the high electricity rates... [that spurred] the 'electric restructuring' movement of the mid-1990s." 59 "[B]etween 1972 and 1984, . . . more than $20 billion in construction payments flowed into 115 nuclear power plants that were subsequently abandoned by their sponsors.""8 The Shoreham Nuclear Power Plant adjacent to the Wading River in East Shoreham, New York cost ratepayers $6 billion, but was closed by protests in 1989 before the plant could generate a single kWh of electricity. 6' **Indeed, an assessment recently undertaken by the Congressional Budget Office of the actual construction costs for seventy five of the existing nuclear power plants in the United States documented that they exceeded anticipated costs by more than 300 percent.** The quoted cost for these plants by the industry was $2312 per installed kW-totaling $89.1 billion, but the real cost was an astronomical $7294 per installed kW--exceeding $283.8 billion.162 The estimated and actual costs of the seventy-five U.S. nuclear plants can be found in Appendix Table A. Across the border in Canada, delays and cost overruns on nuclear power plants accounted for 15 billion of the nearly 20 billion Canadian dollars of "stranded debt" created by Ontario Hydro.16 3 The risk of construction cost overruns is not relegated to the past. **Modern nuclear plants are the most expensive and capital intensive structures ever built and they are the lynchpin of an industry that is already the most capital intensive in the entire U.S. economy.**"M Luis Echdvarri, head of the Nuclear Energy Agency ("NEA"), reports that initial construction of a new nuclear reactor consumes close to 60% of the project's total investment, compared to about 40% for coal and 15% for natural gas power plants. 65 Even assuming the low-end of industry averages, new reactors would cost around $2000 per installed kW-meaning a 4 GW plant will cost $8 billion to build." The price tag for building 190 reactors in the U.S. at this rate would exceed $380 billion.

**Renewables are key to sustaining the grid**

**Climate Nexus 17** (Climate Nexus is a non-profit journalism and climate communication organization. The organization is primarily focused on the role of the United States in Climate Change. May 31, 2017, “Integrating Reliable Renewable Energy into the U.S. Electrical Grid” Climate Nexus,<https://climatenexus.org/climate-issues/energy/integrating-reliable-renewable-energy-u-s-electrical-grid/?utm_source=chatgpt.com>, DOA: 3/28/25) LLO

**In 2016, renewable energy accounted for** [**over half of all new generating capacity**](https://www.eia.gov/todayinenergy/detail.php?id=29492) **for the third consecutive year. This rapid expansion of wind and solar capacity throughout the U.S. electrical grid has contributed many benefits to our electricity system. These include a more secure and reliable grid, cost savings for consumers and health, economic and environmental** [**gains**](https://climatenexus.org/climate-change-news/millar-study-relies-faux-pause-optimism/)**.** The growth of renewables contributed to a [reduction in power sector carbon emissions](https://www.eia.gov/todayinenergy/detail.php?id=26232) — in 2015 emissions reached their lowest point since 1993. [All renewable sources](https://www.eia.gov/energyexplained/index.cfm?page=electricity_in_the_united_states) combined provide about 15 percent of U.S. electricity, though that percentage varies from state to state. **The** [**falling cost of gas and renewables**](https://www.eia.gov/outlooks/aeo/pdf/electricity_generation.pdf) **has made it harder for coal and nuclear power to compete on price.** The growth of renewable energy enables grid operators to draw power from a more diverse range of sources. Throughout history, operators worked with the inherent variability and uncertainty of all power sources, as well as fluctuation in demand to maintain reliable electricity for customers. While the output of renewable energy varies with the changing conditions of wind and sun, balancing the changes in supply and demand does not present an entirely new challenge. **Renewables are helping to drive technological advances that are modernizing the grid while increasing its security and lowering costs. Government studies show that renewables give grid operators new tools to maintain reliability, and their widespread distribution can balance out daily intermittency.** The National Renewable Energy Laboratory (NREL) estimates that renewables could supply up to [four-fifths](http://www.nrel.gov/docs/fy13osti/52409-ES.pdf) (p. iii) of total U.S. power generation by 2050 while balancing supply and demand. California, Texas and Iowa are currently demonstrating the benefits that renewables provide to the grid, through a combination of widespread deployment, innovative regulation and cutting-edge technology. Maintaining Grid Reliability **Today’s power grid is heavily reliant on aging infrastructure which “makes it susceptible to a wide variety of threats including** severe weather and other natural disasters, **direct physical attack or cyberattack, and accidents associated with the age of the grid or human error**” (p. 1), according to the [CNA Military Advisory Board](https://www.cna.org/CNA_files/PDF/National-Security-Assured-Electrical-Power.pdf). For example, **extreme weather can present major challenges to maintaining grid reliability with traditional coal and nuclear plants. The January 2014 polar vortex brought such frigid temperatures to the eastern and southern U.S. that some coal plants shut down** because they could not access [frozen coal stockpiles](http://www.nerc.com/pa/rrm/January%202014%20Polar%20Vortex%20Review/Polar_Vortex_Review_29_Sept_2014_Final.pdf) (p. 3). Although gas usage rose and prices spiked due to higher demand, **grid operators were able to maintain power supply with** [**strong wind power output**](http://www.aweablog.org/wind-power-once-again-saves-millions-by-keeping-energy-prices-in-check-during-cold-snap/) **and** [**temporary reductions to consumer electricity use**](http://www.ercot.com/content/meetings/ros/keydocs/2014/0306/ROS_Jan_6_EEA_Report.pdf)**, d**[**e**](http://www.aweablog.org/wind-power-once-again-saves-millions-by-keeping-energy-prices-in-check-during-cold-snap/)**m**[**o**](http://www.aweablog.org/wind-power-once-again-saves-millions-by-keeping-energy-prices-in-check-during-cold-snap/)**n**[**s**](http://www.aweablog.org/wind-power-once-again-saves-millions-by-keeping-energy-prices-in-check-during-cold-snap/)**t**[**r**](http://www.aweablog.org/wind-power-once-again-saves-millions-by-keeping-energy-prices-in-check-during-cold-snap/)**a**[**t**](http://www.aweablog.org/wind-power-once-again-saves-millions-by-keeping-energy-prices-in-check-during-cold-snap/)**i**[**n**](http://www.aweablog.org/wind-power-once-again-saves-millions-by-keeping-energy-prices-in-check-during-cold-snap/)**g t**[**h**](http://www.aweablog.org/wind-power-once-again-saves-millions-by-keeping-energy-prices-in-check-during-cold-snap/)**a**[**t**](http://www.aweablog.org/wind-power-once-again-saves-millions-by-keeping-energy-prices-in-check-during-cold-snap/)[**a**](http://www.aweablog.org/wind-power-once-again-saves-millions-by-keeping-energy-prices-in-check-during-cold-snap/)[**m**](http://www.aweablog.org/wind-power-once-again-saves-millions-by-keeping-energy-prices-in-check-during-cold-snap/)**o**[**r**](http://www.aweablog.org/wind-power-once-again-saves-millions-by-keeping-energy-prices-in-check-during-cold-snap/)**e d**[**i**](http://www.aweablog.org/wind-power-once-again-saves-millions-by-keeping-energy-prices-in-check-during-cold-snap/)**ver**[**s**](http://www.aweablog.org/wind-power-once-again-saves-millions-by-keeping-energy-prices-in-check-during-cold-snap/)**e gri**[**d**](http://www.aweablog.org/wind-power-once-again-saves-millions-by-keeping-energy-prices-in-check-during-cold-snap/)[**i**](http://www.aweablog.org/wind-power-once-again-saves-millions-by-keeping-energy-prices-in-check-during-cold-snap/)**n**[**c**](http://www.aweablog.org/wind-power-once-again-saves-millions-by-keeping-energy-prices-in-check-during-cold-snap/)**r**[**e**](http://www.aweablog.org/wind-power-once-again-saves-millions-by-keeping-energy-prices-in-check-during-cold-snap/)**a**[**s**](http://www.aweablog.org/wind-power-once-again-saves-millions-by-keeping-energy-prices-in-check-during-cold-snap/)**e**[**s**](http://www.aweablog.org/wind-power-once-again-saves-millions-by-keeping-energy-prices-in-check-during-cold-snap/)[**resilience**](http://www.aweablog.org/wind-power-once-again-saves-millions-by-keeping-energy-prices-in-check-during-cold-snap/)[**t**](http://www.aweablog.org/wind-power-once-again-saves-millions-by-keeping-energy-prices-in-check-during-cold-snap/)**o a w**[**i**](http://www.aweablog.org/wind-power-once-again-saves-millions-by-keeping-energy-prices-in-check-during-cold-snap/)**de a**[**r**](http://www.aweablog.org/wind-power-once-again-saves-millions-by-keeping-energy-prices-in-check-during-cold-snap/)**r**[**a**](http://www.aweablog.org/wind-power-once-again-saves-millions-by-keeping-energy-prices-in-check-during-cold-snap/)**y o**[**f**](http://www.aweablog.org/wind-power-once-again-saves-millions-by-keeping-energy-prices-in-check-during-cold-snap/)[**p**](http://www.aweablog.org/wind-power-once-again-saves-millions-by-keeping-energy-prices-in-check-during-cold-snap/)**o**[**t**](http://www.aweablog.org/wind-power-once-again-saves-millions-by-keeping-energy-prices-in-check-during-cold-snap/)**e**[**n**](http://www.aweablog.org/wind-power-once-again-saves-millions-by-keeping-energy-prices-in-check-during-cold-snap/)**t**[**i**](http://www.aweablog.org/wind-power-once-again-saves-millions-by-keeping-energy-prices-in-check-during-cold-snap/)**a**[**l**](http://www.aweablog.org/wind-power-once-again-saves-millions-by-keeping-energy-prices-in-check-during-cold-snap/)[**disturbances**](http://www.aweablog.org/wind-power-once-again-saves-millions-by-keeping-energy-prices-in-check-during-cold-snap/)**.**

#### If the power grid goes down the military loses readiness and increases likelihood of an attack

**CNA 09** (The Center for Naval Analyses is a federally-funded nonprofit research and analysis organization based in Arlington County, Virginia. May 2009, “Powering America’s Defense: Energy and the Risks to National Security” CNA (Center for Naval Analyses), https://www.cna.org/archive/CNA\_Files/pdf/mab\_2-final.pdf , DOA: 3/28/25) LLO

**As the resiliency of the grid continues to decline, it increases the potential for an expanded and/ or longer duration outage from natural events as well as deliberate attack. The DSB noted that the military’s backup power is inadequately sized for its missions and military bases cannot easily store sufficient fuel supplies to cope with a lengthy or widespread outage. An extended outage could jeopardize ongoing missions in far-flung battle spaces for a variety of reasons**: • **The American military’s logistics chains operate a just-in-time delivery system** familiar to many global businesses. **If an aircraft breaks down in Iraq, parts may be immediately shipped from a supply depot in the U.S. If the depot loses power, personnel there may not fill the order for days, increasing the risk to the troops in harm’s way.** • **Data collected in combat zones are often analyzed at data centers in the U.S. In many cases, the information helps battlefield commanders plan their next moves. If the data centers lose power, the next military move can be delayed, or taken without essential information. • The loss of electrical power affects refineries, ports, repair depots, and other commercial or military centers that help assure the readiness of American armed forces. When power is lost for lengthy periods, vulnerability to attack increases.** President Obama, Congress, and major utilities, among others, are discussing an upgrade of the national electrical grid for a variety of reasons. We add our voice to this discussion with a singular perspective: **we see that our national security is directly linked to the security and reliability of our system of energy production and delivery.**

#### A wide range of actors would attack

**Ribeiro 25** (Anna Ribeiro Industrial Cyber News Editor. Anna Ribeiro is a freelance journalist with over 14 years of experience in the areas of security, data storage, virtualization and IoT. March 26, 2025, “ODNI 2025 Threat Assessment notes threats from Russia, China, Iran, North Korea targeting critical infrastructure, telecom” Industrial Cyber,<https://industrialcyber.co/reports/odni-2025-threat-assessment-notes-threats-from-russia-china-iran-north-korea-targeting-critical-infrastructure-telecom/>, DOA: 4/2/25) LLO

**The Office of the Director of National Intelligence (ODNI) identified in its 2025 Annual Threat Assessment of the U.S. intelligence community that Russia, China, Iran and North Korea, individually and collectively, are** [**challenging**](https://industrialcyber.co/reports/ransomware-state-actors-hacktivists-exploited-geopolitical-tensions-to-target-critical-infrastructure-in-2024/) **U.S. interests in the world by attacking or threatening others in their regions,** with asymmetric and conventional hard power tactics and promoting alternative systems to compete with the U.S., primarily in trade, finance, and security. The 2025 Threat Assessment report highlights that **a wide range of foreign actors are targeting U.S.** health and safety, **critical infrastructure**, industries, wealth, and government. **It emphasizes that state adversaries and their proxies are also trying to weaken and displace U.S. economic and military power in their regions and across the globe.** The ODNI [said](https://www.dni.gov/index.php/newsroom/reports-publications/reports-publications-2025/4058-2025-annual-threat-assessment) in its report that a range of cyber and intelligence actors target wealth, [critical infrastructure,](https://industrialcyber.co/critical-infrastructure/uat-5918-apt-group-targets-taiwan-critical-infrastructure-possible-linkage-to-volt-typhoon/) telecom, and media. **Nonstate groups are often enabled, both directly and indirectly, by state actors, such as China and India, as sources of precursors and equipment for drug traffickers. “State adversaries have weapons that can strike U.S. territory or disable vital U.S. systems in space for coercive aims or actual war. These threats reinforce each other, creating a vastly more complex and dangerous security environment.” It added that both state and nonstate actors pose multiple immediate threats to the Homeland and U.S. national interests. “Terrorist and transnational criminal organizations are directly threatening our citizens.** Cartels are largely responsible for the more than 52,000 U.S. deaths from synthetic opioids in the 12 months ending in October 2024 and helped facilitate the nearly three million illegal migrant arrivals in 2024, straining resources and putting U.S. communities at risk.” The ODNI 2025 Threat Assessment report detailed financially motivated cyber criminals continue to prey on inadequately defended U.S. targets, such as healthcare systems and municipal governments, that could have a broad impact on the U.S. populace and economy. Others have conducted attacks on critical infrastructure, disrupting utility company business networks or manipulating poorly secured [control systems](https://industrialcyber.co/isa-iec-62443/iec-publishes-iec-62443-2-12024-setting-security-standards-for-industrial-automation-and-control-systems/). In mid-2024, ransomware actors attacked the largest payment processor for U.S. healthcare transactions, hampering prescriptions and causing extended delays in accessing electronic health records, patient communications, and medication ordering systems and forcing some ambulances to divert patients to other hospitals. Also, U.S. water infrastructure has become a more common target. Last October, criminal actors [conducted cyber attacks](https://industrialcyber.co/threat-landscape/dhs-warns-of-escalating-threats-to-us-critical-infrastructure-in-2025-homeland-threat-assessment/) against both large and small water utilities in the U.S., possibly inspired by attacks against water infrastructure by Russian hacktivists and Iranian cyber actors in 2023 that had little effect but drew substantial publicity. The ODNI noted that the **PRC remains the most active and persistent cyber threat to the U.S. government, private sector, and** [**critical infrastructure**](https://industrialcyber.co/cisa/us-exposes-medusa-ransomware-threat-as-over-300-organizations-targeted-across-critical-infrastructure-sector/) **networks. “The PRC’s campaign to preposition access on critical infrastructure for attacks during crisis or conflict**, tracked publicly as Volt Typhoon, and its more recently identified compromise of U.S. telecommunications infrastructure, also referred to as [Salt Typhoon](https://industrialcyber.co/ransomware/cisco-talos-warns-of-prolonged-intrusions-in-us-critical-infrastructure-by-salt-typhoon-hackers-using-lotl-techniques/), demonstrates the growing breadth and depth of the PRC’s capabilities to compromise U.S. infrastructure.” **It added that if Beijing believed that a major conflict with Washington was imminent, it could consider aggressive cyber operations against U.S.** [**critical infrastructure**](https://industrialcyber.co/features/empowering-organizations-to-protect-critical-infrastructure-with-advanced-ot-network-monitoring-for-cyber-threat-defense/) **and** [**military assets.**](https://industrialcyber.co/critical-infrastructure/us-military-and-intelligence-agencies-release-guidance-on-safeguarding-space-industry-from-cyber-threats/) **Such strikes would be** [**designed to deter**](https://industrialcyber.co/threat-landscape/fdd-study-reveals-gaps-in-us-militarys-cyber-talent-recruitment-and-retention-calls-for-reforms/) **U.S. military action by impeding U.S. decision-making, inducing societal panic, and interfering with the deployment of U.S. forces.** The ODNI 2025 Threat Assessment report mentioned that China is using an aggressive, whole-of-government approach, combined with state direction of the private sector, to become a global S&T superpower, surpass the United States, promote self-reliance, and achieve further economic, political, and military gain. Beijing has prioritized technology sectors such as advanced power and energy, AI, biotechnology, quantum information science, and semiconductors, further challenging U.S. efforts to protect critical technologies by tailoring restrictions narrowly to address national security concerns. “China is accelerating its S&T progress through a range of licit and illicit means, to include investments, intellectual property acquisition and theft, cyber operations, talent recruitment, international collaborations, and sanctions evasion,” the 2025 Threat Assessment report observed. “Some forecasts indicate China’s technology sectors will account for as much as 23 percent of its gross domestic product by 2026, more than doubling since 2018. In addition to private funding, the PRC government is investing hundreds of billions of dollars in priority technologies, such as AI, microelectronics, and biotechnologies, in pursuit of its self-reliance goals.” It also recognized that China almost certainly has a multifaceted, national-level strategy designed to displace the United States as the world’s most influential AI power by 2030. China is experiencing a boom in generative AI with the rapid emergence of a large number of PRC-developed models and is broadly pursuing AI for smart cities, mass surveillance, healthcare, S&T innovation, and intelligent weapons. The report expects that the PRC will likely continue posturing to be in a position of advantage in a potential conflict with the United States. The PRC will continue trying to press Taiwan on unification and will continue conducting wide-ranging cyber operations against U.S. targets for espionage and strategic advantage. China will likely struggle to constrain the activities of PRC companies and criminal elements that enable the supply and trafficking of fentanyl precursors and synthetic opioids to the United States, absent greater law enforcement actions. Also, China’s military operations to project power over Taiwan and its efforts to assert sovereignty claims in the South and East China Seas occur routinely with confrontations that increase the concern of miscalculations potentially leading to conflict. China has demonstrated the ability to compromise U.S. infrastructure through formidable cyber capabilities that it could employ during a conflict with the U.S. The ODNI 2025 Threat Assessment report detailed that **Russia’s advanced cyber capabilities, its repeated success compromising sensitive targets for intelligence collection, and its past attempts to pre-position access on U.S. critical infrastructure make it a** [**persistent counterintelligence**](https://industrialcyber.co/cisa/cisa-reaffirms-to-safeguard-us-critical-infrastructure-against-escalating-threats-from-qilin-ransomware-group/) **and cyber attack threat.** Moscow’s unique strength is the practical experience it has gained integrating cyber attacks and operations with wartime military action, almost certainly amplifying its potential to focus combined impact on U.S. targets in time of conflict. Also, Russia has demonstrated real-world disruptive capabilities during the past decade, including gaining experience in attack execution by relentlessly targeting Ukraine’s networks with disruptive and [destructive malware](https://industrialcyber.co/threats-attacks/cisa-fbi-provide-updates-on-destructive-malware-targeting-organizations-in-ukraine-including-whispergate-malware/). The report also observed that Russia continues to train its military space elements and field new anti-satellite weapons to disrupt and degrade U.S. and allied space capabilities. It is expanding its arsenal of jamming systems, directed energy weapons (DEWs), on-orbit counterspace capabilities, and ASAT missiles designed to target U.S. and allied satellites. Russia is using EW to counter Western on-orbit assets and continues to develop ASAT missiles capable of destroying space targets in LEO. The ODNI 2025 Threat Assessment report identified that Russia will continue to be able to deploy anti-U.S. diplomacy, coercive energy tactics, disinformation, espionage, influence operations, military intimidation, cyberattacks, and gray zone tools to try to compete below the level of armed conflict and fashion opportunities to advance Russian interests. It also mentioned that Iranian investment in its military has been a key plank of its efforts to confront diverse threats and try to deter and defend against an attack by the U.S. or Israel**. Iran continues to bolster the lethality and precision of its domestically produced missile and UAV systems, and it has the largest stockpiles of these systems in the region.** It considers them critical to its deterrence strategy and power projection capability, and Iran uses their sales to deepen global military partnerships. **Iran’s growing expertise and willingness to conduct aggressive cyber operations also make it a major threat to the security of U.S. and allied and partner networks and data.** Iran’s growing expertise and willingness to conduct aggressive cyber operations make it a major threat to the security of U.S. networks and data. **Guidance from Iranian leaders has incentivized cyber actors to become more aggressive in developing capabilities to conduct cyber attacks.** Iran often amplifies its influence operations with offensive cyber activities. During the Israel-HAMAS conflict, U.S. private industry tracked Iranian influence campaigns and cyber attacks. In June 2024, an IRGC actor compromised an email account associated with an individual with informal ties to then-former President Trump’s campaign and used that account to send a targeted spear-phishing email to individuals inside the campaign itself. The IRGC subsequently tried to manipulate U.S. journalists into leaking information illicitly acquired from the campaign. “**North Korea is funding its military development—allowing it to pose greater risks to the United States**—and economic initiatives by stealing hundreds of millions of dollars per year in cryptocurrency from the United States and other victims,” the ODNI 2025 Threat Assessment report noted. “Looking forward, the North may also expand its ongoing cyber espionage to fill gaps in the regime’s weapons programs, potentially targeting defense industrial base companies involved in aerospace, submarine, or hypersonic glide technologies.” The ODNI 2025 Threat Assessment report states that Iran has become a key military supplier to Russia, especially of UAVs, and in exchange, Moscow has offered Tehran military and technical support to advance Iranian weapons, intelligence, and cyber capabilities. “North Korea has sent munitions, missiles, and thousands of combat troops to Russia to support the latter’s war against Ukraine, justified as fulfilling commitments made in the Treaty on Comprehensive Strategic Partnership that Pyongyang and Moscow announced in June 2024.”

#### US respond with nuclear weapons to conventional attack

**Snider 22** (Ted Snider is a regular columnist on U.S. foreign policy and history at Antiwar.com and The Libertarian Institute. He is also a frequent contributor to Responsible Statecraft and other outlets. Oct 27, 2022, “When the US threatens to use nuclear weapons” Responsible Statecraft,<https://responsiblestatecraft.org/2022/10/27/when-the-us-threatens-to-use-nuclear-weapons/?utm_source=chatgpt.com>, DOA: 3/29/25) LLO

The U.S. statement goes beyond that**. The State Department announcement states that its nuclear retaliation policy would be triggered not only by an attack on the U.S. but also by an attack on U.S. allies.** And this is not an aberration. Sherman was not going rogue or speaking irresponsibly. **The 2018 U.S. Nuclear Posture Review** [**states**](https://media.defense.gov/2018/Feb/02/2001872886/-1/-1/1/2018-NUCLEAR-POSTURE-REVIEW-FINAL-REPORT.PDF) **that "the United States would only consider the employment of nuclear weapons in extreme circumstances to defend the vital interests of the United States, its allies, and partners. Extreme circumstances could include significant non-nuclear strategic attacks.**" (Editor's note: Biden's new 2022 Nuclear Posture Review announced Thursday afternoon [reaffirms this statement entirely](https://responsiblestatecraft.org/2022/10/27/bidens-new-nuclear-weapons-policy-carries-the-seeds-of-a-new-nuclear-arms-race/).) **The U.S. also insists that it "has never adopted a 'no first use' policy." Washington, then, seems to have the most permissive nuclear first strike policy in the world today**, given that its use of nuclear weapons extends to the defense of "allies and partners" and not just self-defense. **This is not the first time the U.S. has threatened North Korea with its ultimate firepower. In his 2017 UN address, Trump** [**insisted**](https://www.nbcnews.com/politics/white-house/trump-un-north-korean-leader-suicide-mission-n802596) **that "the United States has great strength and patience, but if it is forced to defend itself or its allies, we will have no choice but to totally destroy North Korea."** A month earlier, **Trump** [**threatened**](https://www.nytimes.com/2017/08/08/world/asia/north-korea-un-sanctions-nuclear-missile-united-nations.html) **that if North Korea made “any more threats to the United States. . . . they will be met with fire and fury like the world has never seen.”**

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On heg

#### NU: Trump collapses heg

**Warner 25** (Daniel Warner is the author of [An Ethic of Responsibility in International Relations](https://www.amazon.com/exec/obidos/ASIN/1555872662/counterpunchmaga). (Lynne Rienner),February 14, 2025,“[The United States is Falling Apart and the World is Taking Notice](https://www.counterpunch.org/2025/02/14/the-united-states-is-falling-apart-and-the-world-is-taking-notice/)”, Counterpunch,<https://www.counterpunch.org/2025/02/14/the-united-states-is-falling-apart-and-the-world-is-taking-notice/>, DOA 3/11/25) KC

**The United States is imploding. The reign of Donald Trump is not only challenging and threatening the very foundations of its constitutional democracy, it is calling into question the U.S.’s post-World War II hegemonic role.** Empires or hegemonic powers rise and fall. Often they are defeated by emerging powers. Sometimes their decline takes place over time. But rarely do they self-destruct as spectacularly as the U.S. is doing. **The U.S. implosion is dramatic in its intensity and rapidity. In just over three weeks, Donald Trump has been able to redefine the United States’ position in the world from a global power to an international outcast.** Despite whatever military and economic power the U.S. still has, its image and global leadership have been undermined by President Trump’s foreign policy decisions. The word “implode” is rarely used in international relations. The decline of empires or hegemonic powers is usually due to external forces. The Roman Empire fell because of a series of invasions by “barbarian tribes.” The Ottoman Empire fell because it aligned with Germany during World War I and was formally dismantled after the War because it had chosen the losing side. The United States is now in the throes of losing its global position by an implosion based on President Trump’s policies. Internationally, Trump has undermined the U.S.’s global image and influence by systematically provoking allies, neutrals and competitors. Besides targeted tariff threats and proposals for territorial expansion into Greenland, Panama and Canada, the president has made two policy decisions that have led to universal condemnation with major global repercussions. The first is his decision to gut the United States Agency for International Development (A.I.D.). While there are certainly inefficiencies in any institution that spent $38 billion in 2023 and operates in 177 different countries, A.I.D. has been fundamental in projecting a positive American image throughout the world. As an example of its outreach, Samantha Power, the former administrator of A.I.D., wrote in The New York Times how out of the $38 billion spent, “nearly $20 billion was for health programs (such as those that combat malaria, tuberculosis, H.I.V./AIDS and infectious disease outbreaks) and humanitarian assistance to respond to emergencies and help stabilize war-torn regions…Other U.S.A.I.D. investments…pay dividends in the longer term, such as giving girls a chance to get an education and enter the work force, on growing local economies.” Foreign assistance is all about human capital. It is a crucial element in projecting soft power. When President John F. Kennedy established A.I.D. in 1961, he said in a message to Congress; “We live at a very special moment in history. The whole southern half of the world–Latin America, Africa, the Middle East, and Asia–are caught up in the adventures of asserting their independence and modernizing their old ways of life. These new nations need aid in loans and technical assistance just as we in the northern half of the world drew successively on one another’s capital and know-how as we moved into industrialization and regular growth.” He acknowledged that the reason for the aid was not totally altruistic, “For widespread poverty and chaos lead to a collapse of existing political and social structures which would inevitably invite the advance of totalitarianism into every weak and unstable area. Thus our own security would be endangered and our prosperity imperilled. A program of assistance to the underdeveloped nations must continue because the nation’s interest and the cause of political freedom require it.” The fear of Communism was obvious in 1961. The motivation behind U.S. foreign assistance is always humanitarian and political at the same time; the two can never be separated. **Today, the United States is competing with China and its Belt and Road Initiative for global influence. Trump’s freezing and defunding U.S. foreign assistance is not a defeat to China; it’s a default, a no-show. Defunding and freezing foreign assistance effects millions of people throughout the world and invites even allies to look to China as a partner in trade and development.** Whereas the A.I.D. example is an excellent case study of a major power purposefully retreating globally (withdrawal from the World Health Organization and the Paris Accord on climate change included), Trump’s proposal for the Gaza Strip is an outright, active, foreign policy autogoal. (A former advisor to Bernie Sanders called it Trump’s “apocalyptic daydream.”) Trump’s insistence that the United States will take control of Gaza, evicting almost two million people from their homeland in order to create a place “better than Monaco,” “the Riviera of the Middle East,” has generated international condemnation. “[Forcible displacement of an occupied group](https://www.politico.eu/article/donald-trump-take-palestinians-out-of-gaza/) is an international crime, and amounts to ethnic cleansing,” Navi Pillay, chair of the United Nations Commission of Inquiry on the Occupied Palestinian Territory, told Politico. “There is no way under the law that Trump could carry out the threat to [dislocate Palestinians](https://www.politico.com/news/magazine/2024/10/12/where-middle-east-war-will-be-won-or-lost-00183506) from their land,” she said. Politically, the Foreign Ministry of Saudi Arabia, a key actor in stabilizing relations in the Middle East, forcefully dismissed the proposal; “Saudi Arabia also reiterates its previously announced unequivocal rejection of any infringement on the legitimate rights of the Palestinian people, whether through Israeli settlement policies, the annexation of Palestinian lands, or attempts to displace the Palestinian people from their land,” it said. Egypt, Jordan and other Arab countries have also rejected the plan. King Abdullah II of Jordan gracefully avoided directly responding to the plan during his joint press conference with Trump. But following the meeting, [the King said on X, “I](https://x.com/KingAbdullahII/status/1889397746227884099) reiterated Jordan’s steadfast position against the displacement of Palestinians in Gaza and the West Bank. This is the unified Arab position.” The only country who seem pleased is Israel, with Prime Minister Netanyahu smiling like a Cheshire cat listening to Trump present the plan during their joint press conference. In three weeks, Donald Trump has imploded whatever positive image the United States might have had internationally. While he may think he is doing what his MAGA followers want, international reactions – save Israel’s – are further nails in the coffin of United States hegemony.

#### T: Deficit

**Alexander and Sanders 12** (Ryan Alexander served as president of Taxpayers for Common Sense from 2006 through 2019, after serving on the board for more than seven years. She has testified on Congress on a wide range of topics relating to federal spending, subsidies, and fiscal policy, and her comments have been featured in The New York Times, The Washington Post, The Los Angeles Times, The Wall Street Journal, and on CNN, Fox News, CBS News, ABC News, and NPR, among other outlets. Over the past two decades, Ryan has served as a litigating attorney, funder, small business owner, and nonprofit executive. Ryan co-founded Appalachian Mountain Advocates, which she continues to chair, and sits on the boards of directors of the Fund for Constitutional Government, Project on Government Oversight, and R Street Institute. Ryan received a B.A. with honors from Wesleyan University in Middletown, Connecticut, a law degree from the University of Wisconsin at Madison, and was awarded a National Association for Public Interest Law Equal Justice Fellowship. Senator Bernie Sanders from Vermont. 8/26/12,”Stop the nuclear-industry welfare program “, Grist,<https://grist.org/nuclear/stop-the-nuclear-industry-welfare-program/>   //   DOA: 4/3/25)JDE

**With this nation facing a $15 trillion national debt**, there is no shortage of opinions about how to move toward deficit reduction in the federal budget. One topic you will not hear discussed very often on Capitol Hill is the idea of ending one of the oldest American welfare programs — t**he extraordinary amount of corporate welfare going to the nuclear energy industry.** Many in Congress talk of getting “big government off the backs of private industry.” Here’s an industry we’d like to get off the backs of the taxpayers. As a senator who is the longest-serving independent in Congress, and as the president of an independent and nonpartisan budget watchdog organization, we do not necessarily agree on everything when it comes to energy and budget policy in the United States. But one thing we strongly agree on is the need to end wasteful subsidies that prop up the nuclear industry. **After 60 years, this industry should not require continued and massive corporate welfare. It is time for the nuclear power industry to stand on its own two feet.** **Nuclear welfare started with research and development**. According to the nonpartisan Congressional Research Service, since 1948 the federal government has spent more than $95 billion (in 2011 dollars) on nuclear energy R&D. That is more than four times the amount spent on solar, wind, geothermal, biomass, biofuels, and hydropower combined. But **federal R&D was not enough; the industry also wanted federal liability insurance too**, which it got back in 1957 with the Price-Anderson Act. This federal liability insurance program for nuclear plants was meant to be temporary, but Congress repeatedly extended it, most recently through 2025. Price-Anderson puts taxpayers on the hook for losses that [exceed $12.6 billion](http://money.cnn.com/2011/03/25/news/economy/nuclear_accident_costs/index.htm) if there is a nuclear plant disaster. **Government estimates show the cost for such a disaster could reach $720 billion in property damage alone, so that’s one sweetheart deal for the nuclear industry!** R&D and Price-Anderson insurance are still just the tip of the iceberg**. From tax breaks for uranium mining and loan guarantees for uranium enrichment to special depreciation benefits and lucrative federal tax breaks for every kilowatt-hour from new plants, nuclear is heavily subsidized at every phase**. The industry also bilks taxpayers when plants close down with tax breaks for decommissioning plants. Further, **it is estimated that the federal costs for the disposal of radioactive nuclear waste could be as much as $100 billion.** **Even with all of those subsidies, the private sector still will not agree to finance a new nuclear plant, so wealthy nuclear corporations recently secured access to** [**$18.5 billion in taxpayer-backed loan guarantees**](http://m.ucsusa.org/nuclear_power/nuclear_power_and_global_warming/nuclear-power-subsidies-report.html)**.** Maybe the Wall Street banks agree with the Congressional Budget Office, which estimated the **risk of default on nuclear loans at** [**above 50 percent**](http://www.americanprogress.org/issues/2010/03/nuclear_financing.html)**.** The nuclear industry’s financial troubles are not new. In the 1960s and ’70s, 100 reactors were cancelled due to cost overruns. Things were so bad that [Forbes called it](http://www.forbes.com/forbes/2010/0927/energy-technology-nuclear-power-southern-company.html) “the largest managerial disaster in business history.” Despite this history, **some want to dramatically increase federal loan guarantees for nuclear plants.** **It is shocking that the nuclear industry continues to receive so much federal support at a time of record debt.** Of course, nuclear subsidies benefit some of the wealthiest and most powerful energy corporations in America, which may explain the persistence of nuclear welfare. For example, Exelon, which takes in $33 billion in revenue annually, is the leading operator/owner of nuclear reactors in the United States. Entergy, with revenues of more than $11 billion annually, is the second largest. Together, these two companies own or operate almost one-third of U.S. reactors, and based on their revenue they are doing pretty well. Why do they need federal welfare year after year after year? Will it ever end? Well, as Secretary of Energy Steven Chu confirmed at a recent Senate hearing, **without federal liability insurance and loan guarantees, no one would ever build a new nuclear plant. Whether you support nuclear energy or not, we should all be able to agree that with record debt, we cannot afford to continue to subsidize this mature industry and its multi-billion-dollar corporations**. If the nuclear industry believes so fervently in its technology, then nuclear companies and Wall Street investors can put their money where the mouth is. Let them finance, insure, and pay for nuclear plants themselves.

#### Deficits diminish defense spending eventually, risks credibility

**Skold 20** (Martin Skold served as a senior adviser and campaign manager to former Massachusetts Governor Bill Weld's 2020 Republican presidential primary campaign, and a foreign policy assistant to Rep. Paul Ryan in 2011. He holds a PhD in international relations from the University of St. Andrews, where his dissertation focused on the strategy of great power competition. 4/2/20, "The Superpower Remover", American Interest,<https://www.the-american-interest.com/2020/04/02/the-superpower-remover/>   //   DOA: 4/3/25)JDE

**“**Facing this much economic damage, the United States also faces a threat to its power and security, and the world order on which its security depends. Even as it looks to its citizens’ welfare at home, the United States must be cognizant of the national security challenge that the pandemic and recession pose. On this point, it is important to recall that **American global hegemony rests on its unparalleled ability to project force abroad. That ability is sure to be tested going forward. The U.S. defense budget will have to end up on the chopping block**—if not now, then in the coming years **when deficits really start to soar**. At the moment, the United States is spending about [$686 billion](https://dod.defense.gov/Portals/1/Documents/pubs/FY2019-Budget-Request-Overview-Book.pdf) on defense annually, and [$375 billion](https://www.whitehouse.gov/wp-content/uploads/2020/02/hist_fy21.pdf) to service the national debt. The second is already [projected](https://www.cbo.gov/system/files/2019-08/55551-CBO-outlook-update_0.pdf) to overtake the first. **COVID-19 will no doubt accelerate this trend. The entire U.S. alliance network, by which the United States has historically led the world, depends on the perceived ability of the United States to respond militarily if an ally gets in trouble. A blow to U.S. credibility in this area can bring the entire system down.** If a NATO ally is attacked and the United States does not respond, NATO ceases to be credible and probably falls apart (and takes the EU with it). Similarly, if any of the countries along the First Island Chain—Japan, South Korea, Taiwan, or the Philippines—are attacked, and the United States does not respond, those states will quickly make their peace with China. If credible doubts about the United States’ ability to do any of the above emerge, serious strategic realignments could well break out across the world. It is unclear where the breaking point is, but the numbers have not been moving in the United States’s favor. The U.S. Navy has been planning to deploy 355 ships as a (probably inadequate) measure to counter China’s growing fleet; as a popular naval blogger recently [noted](https://blog.usni.org/posts/2020/03/18/behold-the-black-swan), a fraction of that number now looks optimistic. Similar statements could be made about efforts to [modernize the Air Force](https://www.airforcetimes.com/opinion/commentary/2020/03/02/congress-is-ultimately-to-blame-for-f-35-fiasco/) or to [retool the Army](https://www.businessinsider.com/army-combat-brigades-switch-to-armor-to-prepare-for-great-power-fight-2018-9). In any case, **the incentives are there for China, and perhaps even Russia, to test the boundaries of America’s already-wavering resolve and to undermine the credibility of U.S. security guarantees. We should expect more provocations if the United States visibly weakens.”**

#### T: Nuclear reactors would be vulnerable to kinetic attack

**Kuperman 24** (Alan J. Kuperman is associate professor and coordinator of the Nuclear Proliferation Prevention Project at the LBJ School of Public Affairs, University of Texas at Austin. 10/7/24, “[On Army bases, nuclear energy can’t add resilience, just costs and risks](https://breakingdefense.com/2024/10/on-army-bases-nuclear-energy-cant-add-resilience-just-costs-and-risks/)”, Breaking Defense,<https://breakingdefense.com/2024/10/on-army-bases-nuclear-energy-cant-add-resilience-just-costs-and-risks/>   //   DOA: 3/5/25)JDE

It gets even worse. To prevent costs from rising even higher, **the nuclear industry has decided that its small reactors** — the kind the Army is seeking — **will be built without a containment building that could prevent radiation from escaping in the event of an accident**. This also means the **reactors would be more vulnerable to attack by aircraft, missiles, rockets, and drones.** A successful kinetic attack could spread radioactivity in at least two ways. First, **like a “dirty bomb,” it could disperse the reactor’s solid irradiated fuel over a wide area into a few or many radioactive chunks that would be very hazardous if approached**. Even worse, if the attack interrupted the reactor’s active or passive cooling, **the fuel could overheat and breach its cladding, thereby allowing gaseous radioactivity to spread more widely**. Ironically, it is not clear if the Army even wants these nuclear reactors, which originally were proposed in 2018 by [Congressional](https://www.congress.gov/115/plaws/publ232/PLAW-115publ232.pdf#page=87) advocates of nuclear energy, who also have promoted nuclear reactors for [Air Force](https://www.eielson.af.mil/microreactor/) bases and [forward operating bases](https://www.defense.gov/News/Releases/Release/Article/3915633) — including in war zones where they would be even more [vulnerable](https://sites.utexas.edu/nppp/files/2021/04/Army-Reactor-Report-NPPP-2021-April.pdf#page=4).

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**Larson 25** (Aaron Larson is POWER’s executive editor. 1/2/25, “War and Nuclear Energy: Risks Are Enormous for Power Industry and World”, POWER,<https://www.powermag.com/war-and-nuclear-energy-risks-are-enormous-for-power-industry-and-world/>   //   DOA: 4/3/25)JDE

The Risks in War Zones However, **nuclear power plants present significant vulnerabilities during wartime, which can pose catastrophic risks to both military personnel and civilian populations**. For example, a direct military strike or significant damage to a nuclear power plant could cause a massive radiological release, creating an environmental catastrophe far beyond the immediate conflict zone. The Chernobyl and Fukushima incidents have demonstrated how nuclear facility damage can create long-lasting contamination spanning hundreds of square miles. **Nuclear power plants are high-value strategic targets. An attacking force might intentionally target these facilities to create widespread environmental disruption, cause massive civilian displacement, generate long-term economic and environmental damage, or potentially contaminate critical infrastructure and agricultural lands. Unlike conventional military targets, damage to nuclear facilities can create radioactive exclusion zones, render surrounding areas uninhabitable for decades, contaminate water sources, cause long-term health risks through radiation exposure, and disrupt agricultural and economic activities in vast regions. Protecting nuclear facilities during conflict is extremely challenging**. Reactors require continuous cooling systems, robust infrastructure maintenance, specialized personnel to prevent potential meltdown scenarios, and extreme security measures that become exponentially more difficult during active combat. Meanwhile, **the mere threat of nuclear facility damage can create significant psychological pressure, potentially forcing strategic withdrawals or negotiations due to the potential for catastrophic consequences.** A Real-World Problem **The risks associated with war and nuclear power are not just a thought exercise today—there’s been a real situation at hand for nearly three years. Russia invaded Ukraine on Feb. 24, 2022. Notably, the largest nuclear plant in Europe**—[the Zaporizhzhia facility, which has six VVER-1000 units each with a capacity of about 950 MW—was seized almost immediately by Russian forces on March 4, 2022](https://www.powermag.com/ukraines-largest-nuclear-power-plant-taken-by-russian-forces/). Fighting in the territory surrounding the Zaporizhzhia plant quickly raised concerns that its reactors could be critically damaged in the crossfire. Concerns were heightened in August 2022 when [two of the four high-voltage (750-kV) offsite power lines to the site were damaged by an attack](https://www.powermag.com/operating-energy-systems-in-a-war-torn-country-dtek-prepares-for-winter/). Representatives of the International Atomic Energy Agency (IAEA), including Director General Rafael Mariano Grossi, visited the plant in late August 2022 to assess the threat of a nuclear accident. Grossi addressed the United Nations Security Council via video link on Sept. 6, 2022, saying the establishment of a “Nuclear Safety and Security Protection Zone” was urgently needed at the Zaporizhzhia site to ensure that the physical integrity of the plant was not compromised. While no agreement was ever reached to formally implement a protection zone at Zaporizhzhia, the IAEA has continued to closely monitor and assess the situation at the site on a daily basis. It has prioritized nuclear safety and security implications, alongside ongoing verification activities. At the [American Nuclear Society’s Winter Conference and Expo in Orlando, Florida](https://www.ans.org/meetings/wc2024/), on Nov. 18, 2024, Grossi spoke about the work the IAEA has done in Ukraine during the war. He specifically highlighted an attack that had taken place just days before the Orlando event. “A tremendous, ferocious attack on Ukraine’s energy infrastructure reminded us once again that nuclear has sometimes unexpected challenges,” he said. Grossi noted that monitoring activities at a nuclear plant on the front lines of a war is “an amazing challenge.” Still, he said it was incredibly important for the IAEA to be there. “This is why today I have teams of dedicated staff, not only in Zaporizhzhia, but also in Rivne, in Khmelnitski, in South Ukraine, in Chernobyl,” he said, referring to all the nuclear facilities in Ukraine, which total 15 operable reactors and four permanently shut down reactors. “Every three weeks crossing the front lines. I’ve done it myself five times. They do it all the time. And sometimes we’ve done it under fire. The proud flag of the IAEA, which represents us all, is there to remind those who are in conflict that nuclear energy is for peace.” The nuclear industry has a safety maxim that posits “an accident anywhere is an accident everywhere.” In the case of war and nuclear power, the stakes are high for everyone and an accident must be avoided at all costs.

#### T: Efficiency

**Sovacool 10** (Benjamin Sovacool: Lee Kuan Yew School of Public Policy, National University of Singapore. 6/1/10, “Critically weighing the costs and benefits of a nuclear renaissance”, Journal of Integrative Environmental Sciences,<https://www.tandfonline.com/doi/full/10.1080/1943815X.2010.485618#d1e227>   //   DOA: 3/3/25)JDE

**A third disadvantage relates to the energy payback ration of the nuclear fuel cycle, or how much energy one gets out of a nuclear power plant after they deduct the energy needed for construction, operation, fueling, decommissioning, and storage**. Helen Caldicott has noted, for example, that **a nuclear power plant must operate at full load for 10–18 years before it has paid off its energy debts** (Caldicott [Citation1994](https://www.tandfonline.com/doi/full/10.1080/1943815X.2010.485618)). A separate study looking at the energy payback ratio of different electricity systems, **the ratio of total energy produced compared to the energy needed to build and operate an energy system, found that hydroelectric, wind, and biomass power plants are at least 1.5–20 times more efficient than nuclear reactors** (Gagnon [Citation2008](https://www.tandfonline.com/doi/full/10.1080/1943815X.2010.485618)).

#### 5. T: Uranium shortage

**Sovacool 10** (Benjamin Sovacool: Lee Kuan Yew School of Public Policy, National University of Singapore. 6/1/10, “Critically weighing the costs and benefits of a nuclear renaissance”, Journal of Integrative Environmental Sciences,<https://www.tandfonline.com/doi/full/10.1080/1943815X.2010.485618#d1e227>   //   DOA: 3/3/25)JDE

Nonetheless, while historical reserves of uranium have been plentiful, **security of future supplies is uncertain**. The International Atomic Energy Agency, for instance, estimates in their Red Book that **primary supply of uranium will cover only 4–6% of the industry's need for fuel in 2025**. They warned in 2001 that **low-cost ores are being rapidly expended and countries are being forced to explore harder to reach more expensive sites** (International Atomic Energy Agency [Citation2001](https://www.tandfonline.com/doi/full/10.1080/1943815X.2010.485618)). Even more worrying is that the Red Book has been accused of historically overestimating uranium mining capacity and availability of reserves, with upward exaggerations of 20–30% common (Dittmar [Citation2009](https://www.tandfonline.com/doi/full/10.1080/1943815X.2010.485618)). One study from the Institute of Particle Physics of ETH Zurich and CERN **cautioned that extraction from known mines and secondary resources during the coming 5–10 years appears to be much more critical than generally believed, and almost no country that uses nuclear energy is self sufficient in fuel production.** Table 3, for example, shows that virtually every country producing uranium is now past its peak, and that a deficit occurred in 2008 between uranium supply and demand (with demand for natural uranium exceeding supply) (Dittmar [Citation2009](https://www.tandfonline.com/doi/full/10.1080/1943815X.2010.485618)). As depicts, Germany and France have essentially stopped uranium mining, Japan, the United Kingdom, South Korea, and Sweden never had any substantial mining operations of their own, and production in the United States is not even sufficient to satisfy 10% of national demand. For the past 15 years, only about two-thirds of global uranium requirements (between 31,000 and 44,000 tons) have been extracted from actual uranium mines, with the shortfall made up of civilian and military stocks of uranium and plutonium built up over the cold war along with mixed oxide reprocessing. These **secondary sources, however, are becoming rapidly exhausted, convincing the Nuclear Energy Agency and the IAEA to declare in the press release of their Red Book 2007 that “most secondary resources [of uranium] are now in decline and the gap will increasingly need to be closed by new production.** Given the long lead time typically required to bring new resources into production, uranium supply shortfalls could develop” (Dittmar [Citation2009](https://www.tandfonline.com/doi/full/10.1080/1943815X.2010.485618)). Such pessimism was confirmed recently by another independent study on available uranium resources at 93 deposits and fields located in Argentina, Australia, Brazil, Canada, Central African Republic, France, Kazakhstan, Malawi, Mongolia, Namibia, Niger, Russia, South Africa, United States, and Zambia (Mudd and Disendorf [Citation2008](https://www.tandfonline.com/doi/full/10.1080/1943815X.2010.485618)).

6. No card says it would go nuclear -

**Kulacki 20** (Gregory Kulacki: China Project manager at Union of Concerned Scientists. 27 April 2020, “Would China Use Nuclear Weapons First in a War With the United States?”, The Diplomat,<https://thediplomat.com/2020/04/would-china-use-nuclear-weapons-first-in-a-war-with-the-united-states/>  .//. DOA: 3/13/25) TZL

Richard should know about those publications, particularly the training manual. A **U.S. Department of Defense translation has been circulating within the U.S. nuclear weapons policy community for more than a decade.** The commander’s comments to the committee indicate a familiarity with the most controversial section of the manual, **which, in the eyes of some U.S. analysts, indicates there may be some circumstances where China would use nuclear weapons first in a war with the United States.** This **U.S. misperception is understandable, especially given the** [**difficulties**](https://www.armscontrol.org/act/2011-09/chickens-talking-ducks-us-chinese-nuclear-dialogue) **the Defense Department encountered translating the text into English. The language, carefully considered in the context of the entire book, articulates a strong reaffirmation of China’s no first use policy. But it also reveals Chinese military planners are struggling with crisis management** and considering steps that could create ambiguity with disastrous consequences. Lowering the Threshold Towards the end of the 405-page text on the operations of China’s strategic rocket forces, in a chapter entitled, “Second Artillery Deterrence Operations,” the authors explain what China’s nuclear forces train to do if “a strong military power possessing nuclear‐armed missiles and an absolute advantage in high‐tech conventional weapons is carrying out intense and continuous attacks against our major strategic targets and we have no good military strategy to resist the enemy.” The military power they’re talking about is the United States. The authors indicate China’s nuclear missile forces train to take specific steps, including increasing readiness and conducting launch exercises, to “dissuade the continuation of the strong enemy’s conventional attacks.” The manual refers to these steps as an “adjustment” to China’s nuclear policy and a “lowering” of China’s threshold for brandishing its nuclear forces. Chinese leaders would only take these steps in extreme circumstances. The text highlights several triggers such as U.S. conventional bombing of China’s nuclear and hydroelectric power plants, heavy conventional bombing of large cities like Beijing and Shanghai, or other acts of conventional warfare that “seriously threatened” the “safety and survival” of the nation. U.S. Misunderstanding Richard seems to believe this planned adjustment in China’s nuclear posture means China is preparing to use nuclear weapons first under these circumstances. He told Hawley that there are a “number of situations where they may conclude that first use has occurred that do not meet our definition of first use.” The head of the U.S. Strategic Command appears to assume, as do other U.S. analysts, that the Chinese would interpret these types of U.S. conventional attacks as equivalent to a U.S. first use of nuclear weapons against China. But that’s not what the text says. “**Lowering the threshold” refers to China putting its nuclear weapons on alert — it does not indicate Chinese leaders might lower their threshold for deciding to use nuclear weapons in a crisis. Nor does the text indicate Chinese nuclear forces are training to launch nuclear weapons first in a war** with the United States. China, unlike the United States, keeps its nuclear forces off-alert. **Its warheads are not mated to its missiles. China’s nuclear-armed submarines are not continuously at sea on armed patrols. The manual describes how China’s nuclear warheads and the missiles that deliver them are controlled by two separate chains of command. Chinese missileers train to bring them together and launch them after China has been attacked with nuclear weapons. All of these behaviors are consistent with a no first use policy.** The “adjustment” Chinese nuclear forces are preparing to make if the United States is bombing China with impunity is to place China’s nuclear forces in a state of readiness similar to the state the nuclear forces of the United States are in all the time. This step is intended not only to end the bombing, but also to convince U.S. decision-makers they cannot expect to destroy China’s nuclear retaliatory capability if the crisis escalates.

 On meltdown

1. **Congress has shown zero willl to store nuclear waste - the aff only make it worse**

**MacFarlane and Ewing 23** (Alison MacFarlane, director of the School of Public Policy and Global Affairs at the University of British Columbia and former chairman of the U.S. Nuclear Regulatory Commission, Rodney C Ewing, do-director of the Center for International Security and Cooperation at Stanford University and former chairman of the U.S. Nuclear Waste Technical Review Board, 6 March 2023, “Nuclear Waste Is Piling Up. Does the U.S. Have a Plan?”, Scientific American,<https://www.scientificamerican.com/article/nuclear-waste-is-piling-up-does-the-u-s-have-a-plan/>, DOA 3/3/2025) ESR

**As small modular nuclear reactors come** [**closer to reality**](https://fortune.com/2023/01/21/nuclear-energy-nuscale-small-nuclear-reactor-design-certified-for-use-in-america/) **in the U.S., managing and disposing of their highly radioactive waste should be a national priority**. Forty years after the passage of the Nuclear Waste Policy Act, **there is, “no clear path forward for the siting, licensing, and construction of a geologic repository” for nuclear waste**, according to a recent U.S. National Academies of Science, Engineering and Medicine [report](https://nap.nationalacademies.org/catalog/26500/merits-and-viability-of-different-nuclear-fuel-cycles-and-technology-options-and-the-waste-aspects-of-advanced-nuclear-reactors). The good news is that there is already a clear strategy for managing and disposing of [this highly radioactive material](https://www.scientificamerican.com/article/nuclear-waste-lethal-trash-or-renewable-energy-source/). The bad news is that the **U.S. government has yet to seriously follow** that **plan.** The National Academies report tells us that **new or advanced reactor designs**—the hoped-for saviors of the nuclear industry—[**will not save us**](https://www.scientificamerican.com/article/lsquo-advanced-rsquo-nuclear-reactors-don-rsquo-t-hold-your-breath/) **from the need to build geologic repositories, deep-mined facilities for permanent nuclear waste disposal**. In some cases, these **new reactors** [**may make it worse**](https://news.stanford.edu/2022/05/30/small-modular-reactors-produce-high-levels-nuclear-waste/) **by creating more waste that’s more costly to manage, new kinds of complex waste, or just more waste**, period. Before we face that onrush, [we first need to deal with the large volume of waste](https://www.scientificamerican.com/article/stop-wasting-time-create-a-long-term-solution-for-nuclear-waste/) we’ve already produced. The U.S., which led the way on managing nuclear waste in the 1980s and 1990s, has now fallen to the back of the pack. About 88,000 metric tons of spent nuclear fuel from commercial reactors remain stranded at reactor sites, and this number is increasing by some 2,000 metric tons each year. These 77 sites are in 35 states and threaten to become de facto permanent disposal facilities. **Without a geologic repository, there is no way forward for the final disposal of this highly radioactive material. Storing it in pools and dry casks at reactor sites is a temporary solution;** it is safe for decades, but not the millennia needed to isolate this radioactive material from the environment. **The present U.S. policy of indefinite storage at a centralized site is not a viable solution, as it shifts the cost and risk to future generations.** Beginning now, the nation needs to follow a pathway already set out for a national nuclear waste repository. Both [a 2012 presidential Blue Ribbon Commission](https://www.energy.gov/ne/articles/blue-ribbon-commission-americas-nuclear-future-report-secretary-energy) and [an international expert panel](https://cisac.fsi.stanford.edu/research/projects/reset-nuclear-waste-policy) organized by Stanford and George Washington Universities in 2018 recommended a new, independent, waste management and disposal organization with funding outside of the annual Congressional appropriations and restrictive budgetary rules. The Blue Ribbon Commission called for creation of a new federal corporation, like the Tennessee Valley Authority, for this organization, while the Stanford/GWU panel looked to replicate not-for-profit, utility-owned, but independent, organizations modeled on successful programs in other countries, such as Sweden and Finland. Charges to nuclear-power-produced electricity fund these organizations, and they remain regulated by independent nuclear regulators. Both panels agreed on the need for an independent organization and finances. Nations that followed this blueprint are now addressing their nuclear waste problem. Sweden’s SKB nonprofit [announced last year](https://www.neimagazine.com/news/newsswedish-government-approves-skbs-final-repository-system-9448895) that it will [build a deep geologic repository](https://www.neimagazine.com/news/newsswedish-government-approves-skbs-final-repository-system-9448895) at Östhammar for the permanent disposal of spent fuel from its commercial nuclear reactors. In Finland, construction of a geologic repository began in May 2021, with plans to accept spent nuclear fuel by the mid-2020s. The Nordic countries are not the only ones making progress: France, Canada and Switzerland are all pushing toward license applications to begin construction. A U.S. waste management organization must be a trusted and capable agency that is well-funded and staffed. Sweden’s SKB sustained decades of effort on both public engagement and technical analysis around siting and now is reaping the benefits. **The U.S. Department of Energy**, the designated repository implementer established by the Nuclear Waste Policy Act, instead **suffers from leadership and priorities that change with each administration, as well as a history of broken promises that have led to little public confidence** that it is up to the job. The overwhelming majority of successful repository programs overseas are run by independent corporations established by the nuclear industry—outside government. The industry is best positioned to manage the back end of the nuclear fuel cycle, from discharge of spent fuel from the reactor, through storage, shipment and final geologic disposal. **Consent from people living nearby is another universal requirement to establish an accepted geologic repository**. Different motivations will underpin a community, tribe or state’s decision to host one. A municipality may volunteer because of the jobs that will last over the long life of the project (probably over 100 years) or improvements in roads, schools or other infrastructure. Some may feel the need to contribute to the greater good of society, especially if they benefited from the electricity produced by nuclear power, as is the case in Sweden. The 2012 Blue Ribbon Commission suggested that communities should decide for themselves what consent looks like to ensure a successful repository decision. Indeed, Canada is following this approach. The two finalist communities in its siting process will handle the decision differently, one by referendum, the other by elected council decision. Affected communities will need resources to hire their own experts to validate claims made by the designated nuclear waste management agency. Sweden, in fact, not only provided such funds, but also money for public interest groups that opposed the repository, as part of the effort to produce a compelling safety case for Östhammar. Assured finances are also key. In the U.S., **Congress hasn’t appropriated funds for its Yucca Mountain nuclear waste program since 2010**. In fact, **Congress has so badly mangled the process of collecting and** [**appropriating the ratepayers fund**](https://www.yuccamountain.org/pdf-news/yucca_020119.pdf)**,** [**now over $40 billion**](https://www.oversight.gov/sites/default/files/oig-reports/DOE/DOE-OIG-23-05.pdf)**, that it has rendered these funds essentially inaccessible**. Outrageously, this money, actually collected from electricity ratepayers, not taxpayers, is being used to offset the national debt. **Even if the U.S. starts today, it will take decades to site, design and build a facility for disposal of its nuclear waste stockpile**. That process must accelerate now, before the reactors we need for their electricity run out of room for their growing inventories of highly radioactive waste.

1. **T: New SMRs would create much more waste**

**Krall et al 22** (Lindsay M Krall, MacArthur Postdoctoral Fellow for 2019-2020 at Stanford University’s Center for International Security and Cooperation (CISAC). She is now based in Sweden and works on nuclear fuel and waste management. Allison M Macfarlane, director of the School of Public Policy and Global Affairs at the University of British Columbia. She is the former director of the Institute for International Science and Technology Policy at George Washington University, where she was Professor of Science Policy and International Affairs, Rodney C Ewing, Frank Stanton Professor in Nuclear Security and Co-Director of the Center for International Security and Cooperation in the Freeman Spogli Institute for International Studies and a Professor in the Department of Geological Sciences in the School of Earth, Energy and Environmental Sciences at Stanford University, 17 March 2022, “Nuclear waste from small modular reactors”, PNAS,<https://www.pnas.org/doi/pdf/10.1073/pnas.2111833119?trk=public_post_comment-text>, DOA 3/3/2025) ESR

This **analysis of three distinct SMR designs shows that**, relative to a gigawatt-scale PWR, these **reactors will increase the energyequivalent volumes of SNF, long-lived LILW, and short-lived LILW by factors of up to 5.5, 30, and 35, respectively**. These findings stand **in contrast to the waste reduction benefits that advocates have claimed for advanced nuclear technologies**. More importantly, **SMR waste streams will bear significant (radio-)chemical differences from those of existing reactors. Molten salt– and sodium-cooled SMRs will use highly corrosive and pyrophoric fuels and coolants that, following irradiation, will become highly radioactive**. Relatively **high concentrations of 239Pu and 235U in low–burnup SMR SNF will render recriticality a significant risk for these chemically unstable waste streams. SMR waste streams that are susceptible to exothermic chemical reactions or nuclear criticality when in contact with water or other repository materials are unsuitable for direct geologic disposal**. Hence, the large volumes of reactive SMR waste will need to be treated, conditioned, and appropriately packaged prior to geological **disposal**. These **processes will introduce significant costs—and likely, radiation exposure and fissile material proliferation pathways—to the back end of the nuclear fuel cycle** and entail no apparent benefit for long-term safety. Although we have analyzed only three of the dozens of proposed SMR designs, these findings are driven by the basic physical reality that, **relative to a larger reactor with a similar design and fuel cycle, neutron leakage will be enhanced in the SMR core.** Therefore, **most SMR designs entail a significant net disadvantage for nuclear waste disposal activities.** Given that **SMRs are incompatible with existing nuclear waste disposal** technologies and concepts, future studies should address whether safe interim storage of reactive SMR waste streams is credible in the context of a continued delay in the development of a geologic repository in the United States.

#### Self-regulation decks potential for safety

#### Graham-Leigh 24 (Elaine Graham-Leigh is an environmental campaigner. 10-31-2024, "Nuclear is Not the Solution: The Folly of Atomic Power in the Age of Climate Change – book review", Counterfire,<https://www.counterfire.org/article/nuclear-is-not-the-solution-the-folly-of-atomic-power-in-the-age-of-climate-change-book-review/>, DOA: 3/17/25) RWC

#### As Ramana points out, politicians championing nuclear power will invariably describe it is as safe, precisely because of the wide recognition that it is anything but. For nuclear supporters, the popular perception that nuclear power is dangerous is irrational ‘[radiophobia](https://www.theguardian.com/environment/2018/jun/03/was-fallout-from-fukushima-exaggerated)’, a product of hype around a few high-profile nuclear accidents and people’s illogical tendency to connect nuclear power with nuclear weapons. People fail to understand that nuclear power stations are not nuclear bombs and allow a media obsession with Three Mile Island, Chernobyl and Fukushima to turn them against a clean, safe power source. In fact, the argument goes, the history of nuclear accidents show how safe nuclear power really is. The official death toll for Chernobyl, the most serious nuclear accident, stands at 54, while, as the head of the International Atomic Energy Agency told delegates at COP26 in 2021, officially no one died from radiation at Fukushima (p.40). Historic accidents like Chernobyl and Three Mile Island are in any case the product of past nuclear-reactor designs and safety practices, while modern reactors are supposedly much safer: US company NuScale, for example, claimed of its nuclear reactor that it had only a one-in-a-billion chance of a meltdown even if hit by a hurricane (p.25). If the result of that one-in-a-billion chance would be only a handful of deaths at worst, the argument goes that despite its bad name, nuclear power must be very safe indeed. Ramana sets out how this is entirely too rosy a view of the safety record of the nuclear industry. In part, this is the result of a profit-driven industry which in many countries has been allowed essentially to regulate itself, with predictable safety results. This matters because, as Ramana says, when we are considering if nuclear power can be the solution to carbon emissions from power generation, it is the actual safety of the industry at which we must look. ‘What we should be interested in is not whether reactors can be safe, but whether they will be safe’ (p.59). Proponents of nuclear power therefore need to show how they will get to a more effective nuclear-safety regime, something that is unlikely to be achieved while the approach is still to allow the nuclear companies effectively to mark their own homework. The safety failures of the nuclear industry are however only part of the problem. It is clear from Ramana’s discussion of nuclear safety that any honest review of even the theoretical safety of any nuclear reactor would have to conclude that the likelihood of an accident would be much higher than one in a billion, even with no laxity or corner cutting. This is because the complexity of nuclear reactors in all sorts of ways makes them vulnerable to ‘normal accidents’: accidents occurring because of the structural characteristics of the system. Nuclear’s exposure to normal accidents can’t be completely overcome with safety systems, which are of course necessary, but which introduce further complex interactions and therefore ways to fail. Nor is it likely that this basic vulnerability can be disappeared through improved design, despite the claims of many in the nuclear industry. Ramana comments that the passive safety systems proposed by the nuclear industry may be more uncertain in their behaviour than the active systems they replace. None of the much-vaunted new proposed designs for nuclear reactors, from small modular reactors (SMRs) to EPRs, are likely to prove to be the breakthrough in safety that their supporters claim they are. Indeed, the difficulties in getting EPRs online at all suggest that these may not be the answer to fears about nuclear safety. The reality is that with installations as complex as nuclear reactors, the ways in which things can go wrong are almost limitless. There is no end in sight to the entirely unforeseen, such as happened at the Japanese nuclear plant at Kashiwazaki-Kariwa plant in 2007, where an earthquake allowed electrical cables to move downward, creating an opening in the reactor’s basement wall and letting radioactive material escape into the sea. No one had realised that this was even a possibility; a Tokyo Electric Power Company official confessed that it ‘“was beyond our imagination”’ (p.27). As nuclear plants are affected by the extreme weather of the climate crisis, these sorts of unforeseen failures are only likely to become more common.