## 1NC

### 1NC---Tradeoff

#### Contention One is a TRADEOFF.

#### The renewable energy market is strong despite Trump.

Copley 25 [Michael (correspondent on NPR's Climate Desk; covers what corporations are and are not doing in response to climate change, and how they're being impacted by rising temperatures.), “America's clean-energy industry is growing despite Trump's attacks. At least for now,” March 12, 2025, NPR, https://www.npr.org/2025/03/12/nx-s1-5319056/trump-clean-energy-electricity-climate-change] DOA 03-17-2025//abhi☺\*\*\*Brackets in OG\*\*\*

Despite the **Trump administration's wide-ranging attacks** on **renewables** like wind and solar power, the **clean-energy industry** is on pace for **record** **growth** this year, according to government analysts.¶ The buildout of big solar and battery plants is expected to hit an all-time high in 2025, accounting for 81% of new power generation that companies will add to America's electric grids, the Energy Information Administration (EIA) said in a recent report. Including **wind** projects, the share of new **power capacity** that's expected to come **online this year** from **renewables and batteries** **jumps** to **93%**, the EIA said.¶ The U.S. needs all the power it can get, because electricity **demand** is **surging** for the first time in decades, industry analysts and executives say. That means kickstarting development of nuclear power and geothermal projects, burning more natural gas and, in some cases, delaying retirement of old coal plants. But in the scramble for electricity, **renewable**-**energy** and battery plants are **crucial**, **analysts** and **executives** say, because **they're** **quick** **to** **build** and **provide electricity that's** relatively **cheap**.¶ "There is no doubt that the increased demand for electricity over the next decade, coming from data centers and advanced manufacturing, will continue to require vast amounts of renewable energy and batteries," Andrés Gluski, chief executive of The AES Corporation, a power company that owns both clean-energy and fossil-fuel plants, told Wall Street analysts recently.¶ Still, the renewables industry faces potential upheaval. The Trump administration tried to withhold federal funding Congress previously approved for climate and clean-energy projects. Trump also ordered the government to temporarily stop issuing or renewing leases for offshore wind projects in federal waters. The Department of the Interior limited who at the agency can issue permits for renewable energy projects on public lands, which could slow permitting. And conservatives are pushing Congress to wipe out tax incentives for clean energy.¶ If the disruptions spread, companies could abandon plans to build new power plants. That could dampen economic growth and hamstring efforts to develop data centers for artificial intelligence, a priority of the Trump administration. In an interview that aired Sunday on Fox News, Trump declined to rule out the possibility of an economic recession this year.¶ "At a time when we're all very concerned about energy abundance and this administration's broad goal of re-establishing energy dominance, just the idea that we'd be constraining the build of new energy [infrastructure] really feels like it's rowing in the wrong direction," says Rich Powell, chief executive of the Clean Energy Buyers Association, whose members range from Amazon to ExxonMobil to Walmart.¶ Interior Secretary Doug Burgum chairs the Trump administration's National Energy Dominance Council. An Interior Department spokesperson, Elizabeth Peace, said in a statement that the agency supports renewable-energy development "where it makes sense while ensuring that all energy sources contribute to a reliable and affordable power grid."¶ **Demand** for clean energy 'is certainly **not going away'**¶ The clean-energy industry has exploded over the past decade. Solar, in particular, has accelerated. Meanwhile, growth in the wind industry has slowed because of problems ranging from inflation to pushback on siting projects.¶ The industry overall has boomed thanks to falling technology costs, federal tax incentives and state renewable-energy mandates. The market got another big boost in 2022, when President Joe Biden signed the Inflation Reduction Act, which provided hundreds of billions of dollars in federal funding for clean-energy projects, among other climate investments.¶ **Corporations** like **Amazon**, **Meta** and **Google** have also played a role, **signing** **contracts** to buy ever-larger amounts of **renewable energy**.¶ "I expect that that will continue," says Powell of the Clean Energy Buyers Association. "The demand is certainly not going away."¶ Some big investors seem to take a similar view. Led by Trump supporter Steve Schwarzman, the investment firm Blackstone said in February that it raised $5.6 billion for its "energy transition" business, which in the past has invested in companies that work in the renewable energy industry. Also last month, Brookfield Asset Management agreed to buy a U.S. renewable energy business for more than $1.7 billion.¶ "Renewables will be the biggest beneficiary of growing electricity demand because they are **the cheapest option**, and [electricity buyers] will always absorb as much of the cheapest source of power before turning to more expensive forms of power," Brookfield's chief executive, Bruce Flatt, told Wall Street analysts in February.¶ Congressional Republicans have backed Trump's pro-fossil fuel agenda. But a group of 21 GOP lawmakers recently called for Congress to preserve tax credits that support the renewable energy industry. "As energy demand continues to skyrocket, any modifications that inhibit our ability to deploy new energy production risk sparking an energy crisis in our country, resulting in drastically higher power bills for American families," the lawmakers wrote to the Republican chairman of the House Ways and Means Committee, Rep. Jason Smith of Missouri.¶ Key conservatives call for backing natural gas instead¶ Clean energy's draw could wear off as Trump's policies take effect, says Diana Furchtgott-Roth, director of the Center for Energy, Climate, and Environment at the Heritage Foundation, a conservative think tank. The Heritage Foundation produced a governing agenda called Project 2025 that aligns with many actions Trump has taken so far. Among its dozens of recommendations, the plan calls for Congress to repeal the Inflation Reduction Act, which could eliminate tax incentives that lower the price tag for clean-energy projects.¶ "I think that what you're seeing [right now] is people operating with the old prices" in U.S. power markets, Furchtgott-Roth says. "But I think that that might change."¶ Rather than renewables and batteries, Furchtgott-Roth says natural gas is "the wave of the future for the United States." After all, she says, the country has "an almost infinite supply." The U.S. has huge reserves of natural gas, but its main component, methane, is a big contributor to global warming.¶ Natural gas fueled about 43% of America's electricity last year, according to a report from BloombergNEF and the Business Council for Sustainable Energy. The country will almost certainly burn more gas to meet growing power demand, industry analysts say. Gas plants can produce electricity when it's needed, which regulators say is becoming more important because large parts of the country are expected to face a growing risk of blackouts as coal plants retire.¶ "We are unabashedly pursuing a policy of more American energy production and infrastructure, not less," Energy Secretary Chris Wright said Monday at an energy conference in Houston, where he touted the importance of natural gas, according to a copy of his prepared remarks. Wright downplayed the role of renewables and called climate change a "side effect of building the modern world."¶ Executives say it will take years to build a lot of new gas plants¶ A problem with gas plants, though, is that the cost to build them has risen, industry executives say. Gas turbines are also on backorder, and that means companies can't build plants fast enough to meet rising electricity demand in the next few years.¶ "Renewables and storage are ready now to meet that demand and will help lower power prices. Gas-fired generation is moving forward but won't be available at scale until 2030," John Ketchum, chief executive of NextEra Energy, told Wall Street analysts days after Trump's inauguration. NextEra runs one of the world's top renewable energy developers and also has a big natural gas business.¶ The EIA says solar will account for just over half of new power generation that will get built in the U.S. this year. So far, the Trump administration hasn't targeted solar like it has the wind industry, and developers are moving ahead with projects, says Paula Mints, chief analyst at SPV Market Research, which tracks the solar market. But she says companies are nervous.¶ Sweeping tariffs from the Trump administration could increase costs across the U.S. energy industry, making it more expensive to build new power plants of all kinds, says John Hensley, senior vice president of markets and policy analysis at American Clean Power, a trade group.¶ And if Congress gets rid of clean-energy tax credits in the Inflation Reduction Act, power prices for homeowners, renters and businesses would go up, and the country would build fewer clean energy projects, according to a study commissioned by the Clean Energy Buyers Association.¶ The result is confusion in the market, leading some businesses to rethink U.S. investments. Days after Trump's inauguration, an Italian company called the Prysmian Group cancelled plans to build a factory in Massachusetts that would have supplied undersea cables for offshore wind projects. An Indian solar manufacturer, Premier Energies, recently told investors that it paused plans for a U.S. plant until it knows what will happen to federal tax incentives. And Aspen Aerogels, an American firm, stopped construction of a factory in Georgia where it planned to make components for electric vehicles, citing an "evolving environment." In a recent report, Climate Power, an advocacy group, says more than 42,000 announced clean-energy jobs have been "threatened or eliminated" since Trump took office.¶ In the face of rising power demand, the last thing the country needs is to slow down clean-energy development, Ketchum told analysts in January.¶ "We can't afford to take any options off the table," he said.

#### Investing in nuclear energy would crowd out better, renewable solutions.

Lovins 21 [Amory B. (Professor and Lecturer of Civil and Environmental Engineering @ Stanford University), “Why Nuclear Power Is Bad for Your Wallet and the Climate,” Bloomberg Law, Dec. 17, 2021, https://news.bloomberglaw.com/environment-and-energy/why-nuclear-power-is-bad-for-your-wallet-and-the-climate] DOA 03-17-2025//abhi☺

As Congress and the Department of Energy pile new subsidies on nuclear power and the Nuclear Regulatory Commission seeks to gut its regulation, its marginal output additions have shrunk below 0.5% of the world market, says physicist Amory B. Lovins, adjunct professor of civil and environmental engineering at Stanford University. He explains why nuclear energy is not the answer to climate change, but actually worsens it due to climate opportunity cost.¶ Does climate protection need more nuclear power? No—just the opposite. Saving the most carbon per dollar and per year [requires](https://archive.ph/o/XCFD6/https:/www.youtube.com/watch?v=kgCBLG4ci9g&t=3321s) not just generators that burn no fossil fuel, but also those deployable with the least cost and time. Those [aren’t nuclear](https://archive.ph/o/XCFD6/https:/www.eesi.org/files/Amory_Lovins_032x21_v3.pdf).¶ Making 10% of world and 20% of U.S. commercial electricity, nuclear power is historically significant but now stagnant. In 2020, its global capacity additions minus retirements [totaled](https://archive.ph/o/XCFD6/https:/pris.iaea.org/pris/) only 0.4 GW (billion watts). Renewables in contrast [added](https://archive.ph/o/XCFD6/https:/www.iea.org/reports/renewable-energy-market-update-2021) 278.3 GW—782x more capacity—able to produce about 232x more annual electricity (based on U.S. 2020 performance by technology). **Renewables** swelled supply and displaced **carbon** as much **every 38 hours** as **nuclear** did **all** **year**. As of early December, 2021’s score looks like nuclear –3 GW, renewables +290 GW. Game over.¶ The world already invests annually $0.3 trillion each, mostly voluntary private capital, in energy [efficiency](https://archive.ph/o/XCFD6/https:/www.iea.org/reports/energy-efficiency-2021) [and](https://archive.ph/o/XCFD6/https:/about.bnef.com/energy-transition-investment/) [renewables](https://archive.ph/o/XCFD6/https:/iea.blob.core.windows.net/assets/5ae32253-7409-4f9a-a91d-1493ffb9777a/Renewables2021-Analysisandforecastto2026.pdf), but about $[0.015](https://archive.ph/o/XCFD6/https:/www.fs-unep-centre.org/wp-content/uploads/2020/06/GTR_2020.pdf)–[0.03](https://archive.ph/o/XCFD6/https:/iea.blob.core.windows.net/assets/5e6b3821-bb8f-4df4-a88b-e891cd8251e3/WorldEnergyInvestment2021.pdf) trillion, or 20–40x less, in nuclear—mostly conscripted, because investors got burned. Of 259 US power reactors ordered (1955–2016), only 112 got built and 93 remain operable; by mid-2017, just 28 stayed competitive and suffered no year-plus outage. In the oil business, that’s called an 89% dry-hole risk.¶ Renewables provided [all](https://archive.ph/o/XCFD6/https:/www.bnef.com/news/988459) global electricity growth in 2020. Nuclear power struggles to sustain its miniscule marginal share as its vendors, culture, and prospects [shrivel](https://archive.ph/o/XCFD6/https:/www.worldnuclearreport.org/). World reactors [average](https://archive.ph/o/XCFD6/https:/www.worldnuclearreport.org/) 31 years old, in the U.S., 41. Within a few years, old and uneconomic reactors’ retirements will consistently eclipse additions, tipping output into permanent [decline](https://archive.ph/o/XCFD6/https:/www.worldnuclearreport.org/-World-Nuclear-Industry-Status-Report-2021-.html). World nuclear capacity already [fell](https://archive.ph/o/XCFD6/https:/www.bnef.com/interactive-datasets/2d5d59acd9000010?data-hub=7) in five of the past 12 years for a 2% net drop. Performance has become erratic: the average French reactor in 2020 [produced](https://archive.ph/o/XCFD6/https:/www.worldnuclearreport.org/-World-Nuclear-Industry-Status-Report-2021-.html) nothing one-third of the time.¶ China accounts for most current and projected nuclear [growth](https://archive.ph/o/XCFD6/https:/www.worldnuclearreport.org/IMG/pdf/wnisr2021-hr.pdf). Yet China’s 2020 renewable investments about [matched](https://archive.ph/o/XCFD6/https:/www.worldnuclearreport.org/-World-Nuclear-Industry-Status-Report-2021-.html) its cumulative 2008–20 nuclear investments. Together, in 2020 in China, [sun and wind](https://archive.ph/o/XCFD6/https:/www.worldnuclearreport.org/-World-Nuclear-Industry-Status-Report-2021-.html) generated twice nuclear’s output, adding 60x more capacity and 6x more output at [2–3](https://archive.ph/o/XCFD6/https:/www.bnef.com/insights/26555/view) times lower forward cost per kWh. Sun and wind are now the [cheapest](https://archive.ph/o/XCFD6/https:/www.bnef.com/insights/26555/view) bulk power source for over 91% of world electricity.¶ Nuclear Power Has No Business Case¶ Nuclear power has bleak prospects because it has no business case. New plants cost [3–8](https://archive.ph/o/XCFD6/https:/www.lazard.com/perspective/levelized-cost-of-energy-levelized-cost-of-storage-and-levelized-cost-of-hydrogen/)x or [5–13](https://archive.ph/o/XCFD6/https:/www.bnef.com/series/2d5e49e01a000011)x more per kWh than unsubsidized new solar or windpower, so new nuclear power produces 3–13x fewer kWh per dollar and therefore displaces 3–13x less carbon per dollar than new renewables. Thus buying nuclear makes climate change [worse](https://archive.ph/o/XCFD6/https:/www.forbes.com/sites/amorylovins/2019/11/18/does-nuclear-power-slow-or-speed-climate-change/). End-use efficiency is even cheaper than renewables, hence even more climate-effective. Arithmetic is not an opinion.¶ Unsubsidized efficiency or renewables even beat most existing reactors’ operating cost, so a dozen have closed over the past decade. Congress is trying to rescue the others with a $6 billion lifeline and durable, generous new operating subsidies to replace or augment state largesse—adding to existing federal subsidies that [rival or exceed](https://archive.ph/o/XCFD6/https:/www.ucsusa.org/resources/nuclear-power-still-not-viable-without-subsidies) nuclear construction costs.¶ But no business case means no climate case. Propping up obsolete assets so they don’t exit the market blocks more climate-effective replacements—efficiency and renewables that save even more carbon per dollar. Supporters of new subsidies for the sake of the climate just got played.¶ Fashionably [rebranded](https://archive.ph/o/XCFD6/https:/spectrum.ieee.org/the-forgotten-history-of-small-nuclear-reactors) “[Small Modular](https://archive.ph/o/XCFD6/https:/www.ewg.org/news-insights/news/why-small-modular-nuclear-reactors-wont-help-counter-climate-crisis)” or “Advanced” reactors [can’t change](https://archive.ph/o/XCFD6/https:/www.pnas.org/content/115/28/7184) the [outcome](https://archive.ph/o/XCFD6/https:/ieeexplore.ieee.org/document/9374057). Their smaller units cost less but output falls even more, so SMRs save [money](file:///Eyes%20Wide%20Shut/%20Problems%20with%20the%20Utah%20Associated%20Municipal%20Power%20Systems%20Proposal%20to%20Construct%20NuScale%20Small%20Modular%20Nuclear%20Reactors) only in the sense in which a smaller helping of foie gras helps you lose weight.¶ They’ll initially [at least](https://archive.ph/o/XCFD6/https:/www.bnef.com/insights/26559) double existing reactors’ cost per kWh; that cost is ~3–13x renewables’ (let alone efficiency’s); and renewables’ costs will [halve again](https://archive.ph/o/XCFD6/https:/www.bnef.com/insights/26555/view) before SMRs can scale. Do the math: 2 x (3 to 13) x 2 = 12–52-fold. Mass production can’t bridge that huge cost gap—nor could SMRs [scale](https://archive.ph/o/XCFD6/https:/www.foreignaffairs.com/articles/2021-07-08/nuclear-energy-will-not-be-solution-climate-change) before renewables have decarbonized the US grid.¶ Even free reactors couldn’t compete: their non-nuclear parts [cost](https://archive.ph/o/XCFD6/https:/www.eesi.org/files/Amory_Lovins_032x21_v3.pdf) too much. Small Modular Renewables are decades ahead in exploiting mass-production economies; nuclear can never catch up. It’s not just too little, too late: **nuclear** **hogs** **market** **space**, **jams** **grid** **capacity**, and **diverts** **investments** that more-climate-effective **carbon**-**free** **competitors** then **can’t** **contest**.¶ Meanwhile, SMRs’ novel [safety](https://archive.ph/o/XCFD6/https:/www.ucsusa.org/resources/advanced-isnt-always-better) and [proliferation](https://archive.ph/o/XCFD6/https:/www.tandfonline.com/doi/abs/10.13182/NT13-A19873) issues threaten threadbare schedules and budgets, so promoters are attacking bedrock safety regulations. NRC’s proposed [Part 53](https://archive.ph/o/XCFD6/https:/www.nrc.gov/reactors/new-reactors/advanced/rulemaking-and-guidance/part-53.html) would perfect long-evolving regulatory capture—shifting its expert staff’s end-to-end process from specific prescriptive standards, rigorous quality control, and verified technical performance to unsupported claims, proprietary data, and political appointees’ subjective risk estimates.¶ But that final abdication can’t rescue nuclear power, which [stumbles](https://archive.ph/o/XCFD6/https:/www.worldnuclearreport.org/-World-Nuclear-Industry-Status-Report-2021-.html) even in countries with impotent regulators and suppressed public participation. In the end, physics and human fallibility win. History teaches that lax regulation ultimately causes confidence-shattering mishaps, so gutting safety rules is simply a deferred-assisted-suicide pact.¶ Modern renewable generation keeps [rising](https://archive.ph/o/XCFD6/https:/www.eesi.org/files/Amory_Lovins_032x21_v3.pdf) faster than nuclear output ever did in its 1980s [heyday](https://archive.ph/o/XCFD6/https:/www.sciencedirect.com/science/article/pii/S221462961830834X?via%3Dihub). During 2010–20, renewables [reduced](https://archive.ph/o/XCFD6/www.iea.org/articles/global-energy-%20review-co2-emissions-in-2020) global power-sector carbon emissions 6x more than coal-to-gas switching (ignoring methane escape), and 5x more than nuclear growth.¶ Among compelling examples, Germany [replaced both](https://archive.ph/o/XCFD6/https:/www.cleanenergywire.org/factsheets/germanys-energy-consumption-and-power-mix-charts) nuclear and coal generation with efficiency and renewables: in 2010–20, generation from lignite fell 37%, hard coal 64%, oil 52%, and [nuclear](https://archive.ph/o/XCFD6/https:/www.cleanenergywire.org/factsheets/history-behind-germanys-nuclear-phase-out) 54%; gas power rose 3%; GDP rose 11% (17% pre-pandemic); power-sector CO2 fell 41%, meeting its target a year early with five percentage points to spare.¶ Japan’s savings and renewables meanwhile [displaced](https://archive.ph/o/XCFD6/https:/www.renewable-ei.org/en/statistics/energy/?cat=electricity%23annual) 109% of lost nuclear output if adjusted for GDP growth, 95% if not, so its 21 “operational” reactors, shut for 10–14 years and counting, lost their market. And no country retains an operational need or business case for big “baseload” thermal plants—costly, inflexible, now superfluous for reliability—though inflexible mindsets retire even more slowly.¶ Many in Washington mouth the mushy mantra that climate urgency demands “all of the above.” Actually, no: the more urgent climate change is, the more we must invest judiciously, not indiscriminately, to buy cheap, fast, sure options instead of **costly**, **slow**, **speculative** **ones**. Only this strategy saves the most carbon per dollar and per year. Anything else worsens climate change.¶ So the next time you hear some official, eager to appease every constituency, say we support “all of the above—we’re not picking and backing winners,” remember the retort by the dean of U.S. utility regulators, [Peter Bradford](https://archive.ph/o/XCFD6/https:/www.ucsusa.org/about/people/peter-bradford): “No, we’re not picking and backing winners. They don’t need it. We’re picking and backing losers.”

#### Nuclear energy will not save us from the climate crisis, but renewables will. That’s better than their WNA evidence which is an association for nuclear, whereas this evidence is a Stanford professor.

Jacobson 24 [Mark Z. (Professor of Civil and Environmental Engineering & Director of the Atmosphere/Energy Program @ Stanford University), “7 reasons why nuclear energy is not the answer to solve climate change,” OneEarth, Oct. 10, 2024, https://www.oneearth.org/the-7-reasons-why-nuclear-energy-is-not-the-answer-to-solve-climate-change/)]DOA 03-17-2025//abhi☺\*\*\*Ellipsis in OG\*\*\*

There is a small group of scientists that have proposed replacing 100% of the world’s fossil fuel power plants with nuclear reactors as a way to solve climate change. Many others propose nuclear grow to satisfy up to 20 percent of all our energy (not just electricity) needs. They advocate that nuclear is a “clean” carbon-free source of power, but they don’t look at the human impacts of these scenarios. Let’s do the math...¶ One nuclear power plant takes on average about 14-1/2 years to build, from the planning phase all the way to operation. According to the [World Health Organization](https://www.who.int/gho/phe/outdoor_air_pollution/en/), about 7.1 million people die from air pollution each year, with more than 90 percent of these deaths from energy-related combustion. So switching out our energy system to nuclear would result in about 93 million people dying**, as we wait** for all the new nuclear plants to be built in the all-nuclear scenario.¶ Utility-scale wind and solar farms, on the other hand, take on average **only** **two** to five years, from the planning phase to operation. Rooftop solar PV projects are down to only a 6-month timeline. So transitioning to [100% renewables](https://www.oneearth.org/100-renewable-energy/) as soon as possible would result in tens of millions fewer deaths. ¶ This illustrates a major problem with nuclear power and why renewable energy -- in particular Wind, Water, and Solar (WWS) -- avoids this problem. Nuclear, though, doesn’t just have one problem. It has seven. Here are the seven major problems with nuclear energy:¶ 1. Long Time Lag Between Planning and Operation¶ The time lag between planning and operation of a nuclear reactor includes the times to identify a site, obtain a site permit, purchase or lease the land, obtain a construction permit, obtain financing and insurance for construction, install transmission, negotiate a power purchase agreement, obtain permits, build the plant, connect it to transmission, and obtain a final operating license.¶ The planning-to-operation (PTO) times of all nuclear plants ever built have been 10-**19 years or more**. For example, the Olkiluoto 3 reactor in Finland was proposed to the Finnish cabinet in December 2000 to be added to an existing nuclear power plant. Its latest estimated completion date is 2020, giving it a PTO time of 20 years.¶ The Hinkley Point nuclear plant was planned to start in 2008. It has an estimated the completion year of 2025 to 2027, giving it a PTO time of 17 to 19 years. The Vogtle 3 and 4 reactors in Georgia were first proposed in August 2006 to be added to an existing site. The anticipated completion dates are November 2021 and November 2022, respectively, given them PTO times of 15 and 16 years, respectively.¶ The Haiyang 1 and 2 reactors in China were planned to start in 2005. Haiyang 1 began commercial operation on October 22, 2018. Haiyang 2 began operation on January 9, 2019, giving them PTO times of 13 and 14 years, respectively. The Taishan 1 and 2 reactors in China were bid in 2006. Taishan 1 began commercial operation on December 13, 2018. Taishan 2 is not expected to be connected until 2019, giving them PTO times of 12 and 13 years, respectively. Planning and procurement for four reactors in Ringhals, Sweden started in 1965. One took 10 years, the second took 11 years, the third took 16 years, and the fourth took 18 years to complete. ¶ Many claim that France’s 1974 Messmer plan resulted in the building of its 58 reactors in 15 years. This is not true. The planning for several of these nuclear reactors began long before. For example, the Fessenheim reactor obtained its construction permit in 1967 and was planned starting years before. In addition, 10 of the reactors were completed between 1991-2000. As such, the whole planning-to-operation time for these reactors was at least 32 years, not 15. That of any individual reactor was 10 to 19 years.¶ 2. Cost¶ The levelized cost of energy (LCOE) for a new nuclear plant in 2018, based on [Lazard](https://www.solarempower.com/news/levelized-cost-energy-storage/), is $151 (112 to 189)/MWh. This compares with $43 (29 to 56)/MWh for onshore wind and $41 (36 to 46)/MWh for utility-scale solar PV from the same source. ¶ This nuclear LCOE is an underestimate for several reasons. First, Lazard assumes a construction time for nuclear of 5.75 years. However, the Vogtle 3 and 4 reactors, though will take at least 8.5 to 9 years to finish construction. This additional delay alone results in an estimated LCOE for nuclear of about $172 (128 to 215)/MWh, or a cost 2.3 to 7.4 times that of an onshore wind farm (or utility PV farm).¶ Next, the LCOE does not include the cost of the major nuclear meltdowns in history. For example, the estimated cost to clean up the damage from three Fukushima Dai-ichi nuclear reactor core meltdowns was [$460 to $640 billion](https://www.washingtonpost.com/world/asia_pacific/eight-years-after-fukushimas-meltdown-the-land-is-recovering-but-public-trust-has-not/2019/02/19/0bb29756-255d-11e9-b5b4-1d18dfb7b084_story.html?utm_term=.8344c816d5bb). This is $1.2 billion, or 10 to 18.5 percent of the capital cost, of every nuclear reactor worldwide. ¶ In addition, the LCOE does not include the cost of storing nuclear waste for hundreds of thousands of years. In the U.S. alone, [about $500 million](https://earth.stanford.edu/news/qa-what-should-we-do-nuclear-waste#gs.1sfx0x) is spent yearly to safeguard nuclear waste from about 100 civilian nuclear energy plants. This amount will only increase as waste continues to accumulate. After the plants retire, the spending must continue for hundreds of thousands of years with no revenue stream from electricity sales to pay for the storage.¶ 3. Weapons Proliferation Risk¶ The growth of nuclear energy has historically increased the ability of nations to obtain or harvest plutonium or enrich uranium to manufacture nuclear weapons. The Intergovernmental Panel on Climate Change (IPCC) recognizes this fact. They concluded in the Executive Summary of their 2014 report on energy, with “robust evidence and high agreement” that nuclear weapons proliferation concern is a barrier and risk to the increasing development of nuclear energy:¶ Barriers to and risks associated with an increasing use of nuclear energy include operational risks and the associated safety concerns, uranium mining risks, financial and regulatory risks, unresolved waste management issues, nuclear weapons proliferation concerns, and adverse public opinion. ¶ The building of a nuclear reactor for energy in a country that does not currently have a reactor allows the country to import uranium for use in the nuclear energy facility. If the country so chooses, it can secretly enrich the uranium to create weapons-grade uranium and harvest plutonium from uranium fuel rods for use in nuclear weapons. This does not mean any or every country will do this, but historically some have and the risk is high, as noted by IPCC. The building and spreading of Small Modular Reactors (SMRs) may increase this risk further.¶ 4. Meltdown Risk¶ To date, 1.5 percent of all nuclear power plants ever built have melted down to some degree. Meltdowns have been either catastrophic (Chernobyl, Ukraine in 1986; three reactors at Fukushima Dai-ichi, Japan in 2011) or damaging (Three-Mile Island in 1979; Saint-Laurent France in 1980). The nuclear industry has proposed new reactor designs that they suggest are safer. However, these designs **are** generally **untested**, and there is no guarantee that the reactors will be designed, built, and operated correctly or that a natural disaster or act of terrorism, such as an airplane flown into a reactor, will not cause the **reactor** to **fail**, resulting in a major **disaster**. ¶ 5. Mining Lung Cancer Risk¶ Uranium mining causes lung cancer in large numbers of miners because uranium mines contain natural radon gas, some of whose **decay** **products** are **carcinogenic**. A [study](https://www.cdc.gov/niosh/pgms/worknotify/uranium.html) of 4,000 uranium miners between 1950 and 2000 found that 405 (10 percent) died of lung cancer, a rate six times that expected based on smoking rates alone. 61 others died of mining-related lung diseases. Clean, renewable energy does not have this risk because (a) it does not require the continuous mining of any material, only one-time mining to produce the energy generators; and (b) the mining does not carry the same lung cancer risk that uranium mining does.¶ 6. Carbon-Equivalent Emissions and Air Pollution¶ There is no such thing as a zero- or close-to-zero emission nuclear power plant. Even existing plants emit due to the **continuous** **mining** and **refining** of **uranium** needed for the plant. **Emissions** from new nuclear are 78 to 178 g-CO2/kWh, not close to 0. Of this, 64 to 102 g-CO2/kWh over 100 years are emissions from the background grid while consumers wait 10 to 19 years for nuclear to come online or be refurbished, relative to 2 to 5 years for wind or solar. In addition, all nuclear plants emit 4.4 g-CO2e/kWh from the water vapor and heat they release. This contrasts with solar panels and wind turbines, which reduce heat or water vapor fluxes to the air by about 2.2 g-CO2e/kWh for a net difference from this factor alone of 6.6 g-CO2e/kWh.¶ In fact, China’s investment in nuclear plants that take so long between planning and operation instead of wind or solar resulted in China’s **CO2** **emissions** **increasing** 1.3 percent from 2016 to 2017 **rather** **than** **declining** by an estimated average of 3 percent. The resulting **difference** **in** **air** **pollution** emissions may have caused **69,000 additional air pollution deaths** in China in **2016** **alone**, with additional deaths in years prior and since. ¶ 7. Waste Risk¶ Last but not least, consumed fuel rods from nuclear plants are radioactive waste. Most fuel rods are stored at the same site as the reactor that consumed them. This has given rise to hundreds of radioactive waste sites in many countries that must be maintained and funded for at least 200,000 years, far beyond the lifetimes of any nuclear power plant. The more nuclear waste that accumulates, the greater the risk of **radioactive** **leaks**, which can **damage** **water** supply, **crops**, **animals**, and **humans**.

#### It spills over.

Hultman and Gross 21, [Nathan Hultman is a Former Senior Fellow at the Brookings Institute and Samantha Gross is the Director - Energy Security and Climate Initiative at the Brookings Institute, PhD, “How the United States can return to credible climate leadership”, The Brookings Institute, 3-12-1, https://www.brookings.edu/research/us-action-is-the-lynchpin-for-successful-international-climate-policy-in-2021/, HK]

Since greenhouse gas emissions mix throughout the global atmosphere and oceans, emissions in one part of the world impact the climate everywhere. The Paris Agreement calls for all countries to reduce emissions in line with their own development goals and political realities. But science suggests that a goal of net-zero emissions from the largest emitting countries by mid-century is necessary. In this context, credible U.S. action is critical**.** As the world’s largest economy, second-largest greenhouse gas emitter, and superpower re-engaging on climate diplomacy, U.S. actions can either dampen or accelerate global action. If the United States fails to make commitments that the rest of the world views as serious, it will be harder to pressure other countries to take more serious action. Credible U.S. action could form the basis for genuine leadership, as the United States displayed preceding the Paris COP through its bilateral commitments with China. The good news is that Biden is appointing climate experts to positions throughout the executive branch and promises a “whole of government” approach to climate change. However, despite unified political control of the White House and (narrowly) Congress, the nation remains polarized on whether and how to respond to the climate crisis. Many actions that could move the United States toward a low-carbon economy do not require legislation and could be implemented with little or no bipartisan support, but given that such actions were reversed when the Trump administration replaced the Obama administration, these may not be enough to demonstrate U.S. credibility. U.S. leadership in innovation, financial markets, and civil society provide additional opportunities for international engagement and action. Changes in how we understand the low-carbon transition are an additional source of good news. The conversation on climate action is shifting from one focused solely on costs to one centered around opportunities: for low-cost renewable electricity generation, for growth in jobs and communities, for greater justice for communities that have long been disproportionately affected by pollution, for development in countries that currently lack modern energy services. The cost of renewable electricity has fallen rapidly and technological advancements in other sectors, like batteries, are reducing the cost of decarbonization. A zero-carbon world is coming into view. THE GLOBAL AND NATIONAL CONTEXT FOR ACCELERATING U.S. CLIMATE ACTION The United States sat on the sidelines for four years of global climate action, and the world changed while we were away. The science about climate change became clearer and our allies and partners abroad are stepping up their national climate strategies in response. Now that the United States is back in the game, they expect ambitious action, including a new U.S. climate target or nationally determined contribution (NDC). In this context, after whipsawing political positions on climate change, the United States must advance a credible strategy for robust and continued climate action at home that is seen as reliable and not subject to reversals over time. In some ways, such action at home faces headwinds, but in other ways there are reasons for optimism. With Congress finely balanced, the pathway for successful legislation on climate has narrowed. Moreover, the White House and Congress are focused on the immediate crisis of the COVID-19 pandemic and the resulting deep economic recession. At the same time, a strong set of near-term options exist to embed policies to support climate action, low-emission transportation, and clean energy development into current discussions around economic recovery and investment. In this way, spending designed to pull the nation out of the recession would encourage investments to reduce emissions and increase resilience to climate change. Another element that has changed in the past four years — and that supports enhanced domestic climate policies and international credibility — is the increased breadth and depth of sub-national action on climate in the United States. In fact, subnational actors with significant climate commitments (including states, cities, and businesses) represent roughly 70% of U.S. GDP — equivalent to the world’s second largest economy, roughly the size of China’s. Using policy authorities at their disposal, many of which are significant, these actors have advanced climate action across multiple sectors and greenhouse gases, including electricity, clean transportation, land use, methane, hydrofluorocarbons, and more. Even outside of federal regulation and legislation, such policies already are driving significant reductions in U.S. emissions and could do more if expanded in line with recent trends. As another example, over 600 local governments in the United States have developed climate action plans. While the majority of these municipalities are lagging in their efforts to meet their targets, some large cities (Los Angeles, New York City, and Durham, North Carolina, for example) have achieved significant reductions and have highly qualified organizations to demonstrate how such reductions can be achieved. POLICY RECOMMENDATIONS Against this backdrop, the United States can and should re-engage fully with the international community to support global action. To do so, it must act in five linked ways. As the federal government dismantled its climate efforts, the subnational community substantially increased its climate commitments. As a result, the United States has highly motivated and experienced actors outside the federal government. Embed climate action into U.S. society. The core project for the United States this year, and for years to come, is to develop and implement a national climate strategy that brings to bear all possible areas of policy action. In many ways the U.S. is playing catch-up, but one important advantage developed during the Trump years. As the federal government dismantled its climate efforts, the subnational community substantially increased its climate commitments. As a result, the United States has highly motivated and experienced actors outside the federal government. Federal action to catalyze and encourage these local efforts will be a key part of a bottom-up climate strategy, enabling more robust policy through oscillating political cycles at the national level. Subnational actions are key, but some actions must take place at the federal level. New legislation is a first potential contributor. Given the current makeup of Congress, actions rooted in tax credits, investment, and stimulus are likely to have some traction in the near term. Other policies will have to be evaluated in light of their potential support. A second possible contributor is administrative actions that can be implemented by the executive branch, including regulatory actions under existing laws. Such administrative actions are less durable than legislative outcomes, but remain on the table as options. Advance subnational diplomacy. While not all countries are structured like the United States, bottom-up leadership and implementation are central to success in some form in all countries. The United States can use its non-federal actors in its diplomatic efforts to support and bolster climate action around the world. For this, U.S. cities, states, and businesses can collaborate with their counterparts in other countries to discuss opportunities and strategies, supported by the U.S. diplomatic effort. Such efforts could take place through a U.S. State Department Office of Subnational Diplomacy, as recommended by Anthony F. Pipa and Max Bouchet in their brief for this series. Announce an ambitious yet credible U.S. nationally determined contribution. As a central pillar of the Paris Agreement, countries around the world regularly offer their NDCs and report on progress. Each country’s NDC is viewed as an indicator of the country’s overall climate ambition. The U.S. target will likely have an outsized impact on overall global action this year. President Biden has committed to offer the next U.S. NDC at a leaders’ meeting that he will host on Earth Day, April 22. In parallel with developing the national climate strategy, Washington will be undertaking an assessment of the possible emissions reductions associated with such a strategy. International perception of the U.S. domestic commitment is important; the commitment must be seen as sufficiently ambitious to unlock the other diplomatic opportunities available to the United States. The goal of achieving emissions reductions of approximately 50% below 2005 levels by 2030 is receiving a great deal of attention, but is highly ambitious for the United States. Achieving such a target would be a challenge, but the whole-of-society approach described above could improve the probability of reaching such a goal. Revisit U.S. domestic financial regulations and international climate finance. Mobilizing new sources of finance to support a rapid economic and technological transition is central to addressing climate change. Here too, the United States provides an important link between domestic and international actions. Domestically, the U.S. financial system leads the world, but U.S. financial regulations do a poor job of requiring disclosure of climate-related risk, including the physical risks associated with climate change. Recent movement toward addressing these issues can be accelerated. For example, the Federal Reserve recently joined the Network for Greening the Financial System and Treasury Secretary Janet Yellen made clear in her confirmation hearing that she believes climate change is a risk to the financial system. Through its outsized influence on the global financial system, the United States can encourage greener investment. Greater disclosure of climate risks would allow investors to direct funds to low-carbon and resilient assets, potentially moving the needle in areas where policy lags behind. The United States must also exercise leadership in marshalling the financing that developing countries, especially the larger emitters, will need to raise their climate ambition, and to help poor and vulnerable countries adapt to the already evident impacts of climate change. This includes ensuring that developed countries live up to their commitment to mobilize $100 billion per year in climate finance, a central tenet of the climate accords. For the United States, meeting its commitment to the Green Climate Fund, established under the U.N. climate framework a decade ago, will be an immediate litmus test. The United States must also play a leadership role in unleashing the potential of the International Monetary Fund and the multilateral development banks in supporting more ambitious climate action. These institutions can play a role beyond their own financing by catalyzing private investment through reducing and sharing risk. The COVID-19 pandemic provides an opportunity to “build back better” by tackling the interrelated challenges of job growth, climate change, pollution, and biodiversity. Support international efforts and national strategies. The United States can employ its substantial foreign policy apparatus to engage with key countries, partners, and allies around the world. In doing this, the United States can first communicate how it will achieve its own ambitious goals, then seek to understand how other countries anticipate delivering on their own goals and work with them bilaterally or multilaterally to support their national climate strategies. Finally, it can work with partners around the world to ensure that there is broad support for a strong outcome at the climate conference later this year. Fundamentally, the climate challenge requires pushing the technological frontier in a dozen key sectors, from electricity to cars to building materials. In every sector the challenge is different, and in every sector there are different arrays of international partners, such as national and subnational governments and pioneering firms. The United States should ally with the U.K. government as it advances key “campaigns” that reflect this sector-focused approach to deep decarbonization. The effort should identify a few sectors, such as cars and electricity, where the United States is at the frontier and can particularly shape the global effort. CONCLUSION When the Paris Agreement was concluded in 2015, the world took a significant step toward addressing climate change. Paris established an architecture to encourage a global “race to the top” of climate ambition and catalyzed the first set of national climate targets as a down payment on a global emissions trajectory toward net zero. The intervening years have seen some negative forces, such as the U.S. opposition internationally and rollbacks domestically, and more recently the pandemic and economic recession. Yet there have also been positive surprises — increased national ambition in many other countries, continued advancements in the quality and cost of clean technologies, and the groundswell of subnational action in the United States and elsewhere. U.S. global leadership on climate is again a possibility and the opportunity for a new, major step on climate change is palpable. This moment has arrived just in time to have a chance to put the world on a safer climate trajectory. U.S. action today, with a joint domestic and international strategy, is critical for our shared global success.

#### Solving the climate crisis is critical.

Sears 21 [Nathan; April 2021; Ph.D. Candidate in Political Science at the University of Toronto, former Professor of International Relations at the Universidad de Las Americas, Trudeau Fellow in Peace, Conflict, and Justice at the Munk School of Global Affairs; Conference Paper for the International Studies Association, “Great Powers, Polarity, and Existential Threats to Humanity: An Analysis of the Distribution of the Forces of Total Destruction in International Security,” p. 1-38]

Climate Change¶ Humanity faces existential risks from the large-scale destruction of Earth’s natural environment making the planet less hospitable for humankind (Wallace-Wells 2019). The decline of some of Earth’s natural systems may already exceed the “planetary boundaries” that represent a “safe operating space for humanity” (Rockstrom et al. 2009). Humanity has become one of the driving forces behind Earth’s climate system (Crutzen 2002). The major anthropogenic drivers of climate change are the burning of fossil fuels (e.g., coal, oil, and gas), combined with the degradation of Earth’s natural systems for absorbing carbon dioxide, such as deforestation for agriculture (e.g., livestock and monocultures) and resource extraction (e.g., mining and oil), and the warming of the oceans (Kump et al. 2003). While humanity has influenced Earth’s climate since at least the Industrial Revolution, the dramatic increase in greenhouse gas emissions since the mid-twentieth century—the “Great Acceleration” (Steffen et al. 2007; 2015; McNeill & Engelke 2016)— is responsible for contemporary climate change, which has reached approximately 1°C above preindustrial levels (IPCC 2018).¶ Climate change could become an existential threat to humanity if the planet’s climate reaches a “Hothouse Earth” state (Ripple et al. 2020). What are the dangers? There are two mechanisms of climate change that threaten humankind. The direct threat is extreme heat. While human societies possesses some capacity for adaptation and resilience to climate change, the physiological response of humans to heat stress imposes physical limits—with a hard limit at roughly 35°C wet-bulb temperature (Sherwood et al. 2010). A rise in global average temperatures by 3–4°C would increase the risk of heat stress, while 7°C could render some regions uninhabitable, and 11–12°C would leave much of the planet too hot for human habitation (Sherwood et al. 2010). The indirect effects of climate change could include, inter alia, rising sea levels affecting coastal regions (e.g., Miami and Shanghai), or even swallowing entire countries (e.g., Bangladesh and the Maldives); extreme and unpredictable weather and natural disasters (e.g., hurricanes and forest fires); environmental pressures on water and food scarcity (e.g., droughts from less-dispersed rainfall, and lower wheat-yields at higher temperatures); the possible inception of new bacteria and viruses; and, of course, large-scale human migration (World Bank 2012; Wallace-Well 2019; Richards, Lupton & Allywood 2001). While it is difficult to determine the existential implications of extreme environmental conditions, there are historic precedents for the collapse of human societies under environmental pressures (Diamond 2005). Earth’s “big five” mass extinction events have been linked to dramatic shifts in Earth’s climate (Ward 2008; Payne & Clapham 2012; Kolbert 2014; Brannen 2017), and a Hothouse Earth climate would represent terra incognita for humanity.¶ Thus, the assumption here is that a Hothouse Earth climate could pose an existential threat to the habitability of the planet for humanity (Steffen et al. 2018., 5). At what point could climate change cross the threshold of an existential threat to humankind? The complexity of Earth’s natural systems makes it extremely difficult to give a precise figure (Rockstrom et al. 2009; ). However, much of the concern about climate change is over the danger of crossing “tipping points,” whereby positive feedback loops in Earth’s climate system could lead to potentially irreversible and self-reinforcing “runaway” climate change. For example, the melting of Arctic “permafrost” could produce additional warming, as glacial retreat reduces the refractory effect of the ice and releases huge quantities of methane currently trapped beneath it. A recent study suggests that a “planetary threshold” could exist at global average temperature of 2°C above preindustrial levels (Steffen et al. 2018; also IPCC 2018). Therefore, the analysis here takes the 2°C rise in global average temperatures as representing the lower-boundary of an existential threat to humanity, with higher temperatures increasing the risk of runaway climate change leading to a Hothouse Earth.¶ The Paris Agreement on Climate Change set the goal of limiting the increase in global average temperatures to “well below” 2°C and to pursue efforts to limit the increase to 1.5°C. If the Paris Agreement goals are met, then nations would likely keep climate change below the threshold of an existential threat to humanity. According to Climate Action Tracker (2020), however, current policies of states are expected to produce global average temperatures of 2.9°C above preindustrial levels by 2100 (range between +2.1 and +3.9°C), while if states succeed in meeting their pledges and targets, global average temperatures are still projected to increase by 2.6°C (range between +2.1 and +3.3°C). Thus, while the Paris Agreements sets a goal that would reduce the existential risk of climate change, the actual policies of states could easily cross the threshold that would constitute an existential threat to humanity (CAT 2020).

### 1NC---Terror

#### Contention 2 is TERROR.

#### New reactors will be built with HALEU.

Robinson 24 [Julia (MA in science communication and science correspondent @ Chemistry World, former leader of clinical and science content at The Pharmaceutical Journal), “Proliferation warnings over enriched nuclear fuel for advanced reactors,” Chemistry World, Jun. 12, 2024, https://www.chemistryworld.com/news/proliferation-warnings-over-enriched-nuclear-fuel-for-advanced-reactors/4019621.article, DOA 03-23-2025] anika + abhi

Governments and oth­ers promoting the use of high-assay low-enriched uranium (HALEU) for nuclear power have not considered the po­tential terrorism risk that widespread adoption of this fuel creates, nuclear scientists have warned. HALEU is a nuclear reactor fuel enriched with uranium-235 to between 5 and 20%. At 20% uranium-235 and above, the mix­ture is called highly-en­riched uranium (HEU) and it is internationally recognised that it can be **employed in nuclear weapons**. Related stories War of words ensues over proliferation warnings on enriched nuclear fuel ‘It’s an efficient machine to destroy nuclear waste’: nuclear future powered by thorium beckons Imperial College nuclear reactor becomes first UK site to be completely decommissioned **Historically, HALEU use has been limited to research reactors**, where it is used in **small** **quantities**, while commercial reactors typically use fuels with low enrichments, in the range of 3 to 5% uranium-235, which cannot sustain an explosive chain reaction. However, new advanced reactors are being **designed to run on HALEU** – most favouring 19.75% uranium-235 HALEU – in the hope that these reactors will be smaller, more flexible and less expensive. In the US, the Department of Energy (**DOE**) and US Department of Defense are providing funds for **more than 10 reactor concepts**, while the UK’s Civil Nuclear Roadmap, announced on 11 January, promised up to £300 million of investment specifically to develop HALEU fuel production. However, in a policy forum in Science, experts in nuclear science and global security highlight that in many of the designs, the amount of HALEU needed is ‘**hundreds to thousands of kilograms’**, which may mean that **a single reactor contains enough HALEU to make a nuclear weapon**. The authors said that estimates indicate that quantities ranging from several hundred kilograms to about a tonne of 19.75% HALEU could produce **explosive** **yields** **similar** **to** or **greater** **than** that of the **Little** **Boy** **bomb** **dropped** on **Hiroshima**. If this is the case, they said, commercial­ising HALEU fuels **without ensuring** that the material is ‘appropriately protected against **diversion** by **national** **governments** or **theft** by **terrorists** would **pose** a **serious** **threat** to **security’**. ‘The time has come to review policies governing the use of this material,’ the authors write. ‘We recommend that the US Congress direct the DOE’s National Nuclear Security Administration to com­mission a fresh review of HALEU prolif­eration and security risks by US weapons laboratory experts.’ They also suggested that, according to the informa­tion available, a reasonable balance of the risks and benefits could be struck if enrichment of uranium-235 was restricted to 12% or less.

#### But a lack of DOE funding is preventing its implementation.

Geiger 25 [Julianne (veteran editor, writer and researcher @ Oilprice.com, member of the Creative Professionals Networking Group), “Trump Freezes Department of Energy’s $50 Billion Budget,” OilPrice.com, Jan. 24, 2025, https://oilprice.com/Latest-Energy-News/World-News/Trump-Freezes-Department-of-Energys-50-Billion-Budget.html, DOA 03-23-2025] anika + abhi

In a sweeping move that halts billions in spending, President Trump’s administration has frozen the Department of Energy's (DOE) activities pending a comprehensive review of its alignment with his priorities. According to a memo from acting Energy Secretary Ingrid Kolb, the freeze affects **grants, loans, procurement, studies, and even personnel decisions**, effectively bringing the agency’s **$50 billion budget to a standstill**. Beyond bureaucratic tinkering, the halt is a direct shot at dismantling Biden-era climate policies. The DOE’s Loan Programs Office, **holding $41.2 billion** in conditional commitments to energy technology companies, now finds its **purse strings tightly cinched**. Other **critical missions**, like nuclear waste cleanup and maintenance of emergency crude reserves, are similarly **on pause**. The order mirrors an earlier Trump directive freezing funds tied to Biden’s Inflation Reduction Act and a bipartisan infrastructure law, both of which allocated billions for clean energy initiatives. Trump, who has championed fossil fuels as a cornerstone of his energy policy, has made it clear that climate-focused spending is no longer a federal priority. The Interior Department issued a similar freeze on wind and solar project leases on federal lands and waters. While the Trump administration’s goal is to “unleash” American energy by cutting red tape, critics argue that freezing investments in innovative technologies jeopardizes long-term energy security. For now, the **DOE** and the clean energy sector are **left in limbo** pending the results of a review that could redefine the nation’s energy landscape.

#### Aff funding allows HALEU reactors.

Ekinci et al. 24 [Fatih Ekinci is a researcher at the Department of Medical Physics at the Institute of Nuclear Sciences of Ankara University, Mehmet Serdar Guzel is a researcher at the Department of Computer Engineering at Ankara University, Koray Acici is a researcher at the Department of Artificial Intelligence and Data Engineering at Ankara University, Tunc Asuroglu is a faculty member of the Medicine and Health Technology department at Tampere University, 7-31-2024, "The Future of Microreactors: Technological Advantages, Economic Challenges, and Innovative Licensing Solutions with Blockchain," Applied Sciences, Volume 14, Issue 15, https://www.mdpi.com/2076-3417/14/15/6673, accessed 3-15-2025] zayd 🍃

The successful deployment of microreactors heavily depends on the current state and future of nuclear fuels. In this context, various strategies must be developed for the production and supply chain management of HALEU fuel.¶ Firstly, it is essential to increase the existing HALEU production capacity. Modernizing current production facilities plays a critical role in this process. Updating these facilities with new technologies will enhance production efficiency and allow for higher quantities of HALEU production. Additionally, establishing new facilities for the production of highly enriched uranium is crucial. These new facilities should be planned to meet increasing demand and operated in compliance with international standards.¶ Various research and development projects should be conducted to develop HALEU production techniques and improve existing methods. The United States, in particular, is undertaking several R&D projects aimed at increasing HALEU production capacity. These projects should focus on developing new production techniques and improving current ones. Moreover, these projects should be supported through international collaborations and increased knowledge sharing.¶ Effective supply chain management must be established to ensure the secure and efficient supply of HALEU fuel. Strict security protocols and logistical planning should be implemented at all stages from production to consumption. Innovative solutions like blockchain technology should be utilized in this context. Blockchain can enhance the transparency and reliability of the supply chain by recording and tracking all movements of the fuel from production to final use.¶ To balance the high costs of HALEU fuel and make microreactors economically attractive, economic incentives and support programs should be developed. Such incentives will facilitate the long-term economic benefits of microreactors.

#### That invites runaway terror and prolif.

Nurnberger 24 [Lisa Nurnberger, bachelor’s from Penn State and oversees the Media Team, and received a first place award from the Society of Professional Journalists, 6-6-2024, "Analysis Published in Science Finds High Assay Low-Enriched Uranium Fuel to be Produced for Small Nuclear Power Reactors Poses a Greater Proliferation Threat than Previously Acknowledged" Union of Concerned Scientists, https://www.ucs.org/about/news/analysis-published-science-finds-high-assay-low-enriched-uranium-fuel-be-produced-small?, accessed: 4-3-2025] anika + OA

An analysis published today in the journal Science found that, contrary to a widely held assumption, the high assay low-enriched uranium (HALEU) now being produced with federal subsidies to fuel the next generation of small nuclear power reactors can be used directly to make nuclear weapons, and thus presents greater terrorism and nuclear proliferation threats than publicly acknowledged by the federal government and industry.¶ “Were HALEU to become a standard reactor fuel without appropriate restrictions determined by an interagency security review, other countries would be able to obtain, produce, and process weapons-usable HALEU with impunity, eliminating the sharp distinction between peaceful and nonpeaceful nuclear programs,” according to the analysis conducted by five of the world’s leading academic and independent proliferation experts. “Such countries would be only days away from a bomb, giving the international community no warning of forthcoming nuclear proliferation and virtually no opportunity to prevent it.”¶ The paper calls for additional measures to mitigate this risk as the United States and other countries pursue international deployment of HALEU-fueled reactors. “Given the stakes, we recommend that the US Congress direct the DOE’s National Nuclear Security Administration to commission a fresh review of HALEU proliferation and security risks by US weapons laboratory experts.”¶ Fuels for today’s commercial reactors do not rely on HALEU, which is enriched to between 10% and 20% uranium-235, and instead typically use uranium enriched to below 5%. At those levels, the fuel cannot sustain an explosive chain reaction, which has prevented nations or terrorists from repurposing commercial reactor fuel for weapons.¶ However, for technical reasons, many of the nuclear reactor designs that engineers want to build today would use HALEU. Since HALEU is below the 20% enrichment lower bound that defines highly-enriched uranium (HEU), which is understood to be directly usable in nuclear weapons, development of these reactors has not raised significant proliferation concerns.¶ But by reviewing information in the open literature to analyze the quantities and enrichment levels of HALEU that the new reactors would use, the authors of the Science paper concluded that HALEU above about 12% uranium-235 could be used to make practical weapons with yields comparable to the bombs that destroyed Hiroshima and Nagasaki. Many proposed reactors could contain enough HALEU to make a nuclear weapon and thus pose serious security risks, according to the article.¶ These risks are increasing because, although the quantity of HALEU in commercial use today is relatively small, the federal government is actively encouraging HALEU use and funding its production.

#### Safeguards fail and reactors get exported.

UCS 21 (\*Union of Concerned Scientists, nonprofit science advocacy organization, No date listed, 3-14-2021 from Internet Archive, “’Advanced’ Isn’t Always Better: Assessing the Safety, Security, and Environmental Impacts of Non-Light Water Nuclear Reactors,” https://www.ucsusa.org/sites/default/files/2021-05/ucs-es-AR-3.21-web\_May%20rev.pdf)

Nuclear proliferation and nuclear terrorism risk is the danger that nations or terrorist groups could illicitly obtain nuclear-weapon-usable materials from reactors or fuel cycle facilities. LWRs operating on a once-through fuel cycle present relatively low proliferation and terrorism risks. However, any nuclear fuel cycle that utilizes reprocessing and recycling of spent fuel poses significantly greater nuclear proliferation and terrorism risks than do LWRs without reprocessing, because it provides far greater opportunities for diversion or theft of plutonium and other nuclear-weaponusable materials. International safeguards and security measures for reactors and fuel cycles with reprocessing are costly and cumbersome, and they cannot fully compensate for the increased vulnerability resulting from separating weapon-usable materials. Also using HALEU instead of less-enriched forms of LEU would increase proliferation and terrorism risks, although to a far lesser extent than using plutonium or uranium-233. ¶ Nuclear proliferation is not a risk in the United States simply because it already possesses nuclear weapons and is designated as a nuclear-weapon state under the Nuclear Non-Proliferation Treaty. As such, it is not obligated to submit its nuclear facilities and materials for verification by the International Atomic Energy Agency (IAEA), although it can do so voluntarily. However, US reactor development does have implications for proliferation, both because US vendors seek to export new reactors to other countries and because other countries are likely to emulate the US program. The United States has the responsibility to set a good international example by ensuring its own nuclear enterprise meets the highest nonproliferation standards.4

#### Right-wing domestic extremists are a unique nuclear terror risk---ideology and access due to federal proximity.

Becca Earnhardt 21, Research Associate with the Nuclear Security program at the Stimson Center, et al., 1/14/21, “A threat to confront: far-right extremists and nuclear terrorism,” https://thebulletin.org/2021/01/a-threat-to-confront-far-right-extremists-and-nuclear-terrorism/

Last March, neo-Nazi Timothy Wilson was killed during a shootout as he was planning to bomb a hospital treating COVID-19 patients. Like other neo-Nazis, Wilson viewed the pandemic and increased unrest among the American public as an opportunity to popularize Nazi ideas, spark further chaos, and accelerate societal collapse.[1] This past week, Ashli Babbitt was shot and killed while storming the US Capitol as part of a right-wing uprising; several years earlier, she was an employee of the Calvert Cliffs nuclear plant, exhibiting violent behavior during this period. [2] Acts of violence by far-right extremists are on the rise in the United States. Until now, most of these incidents have lacked sophistication, but a critical question for national security experts is whether US far-right extremist groups that espouse violence can carry out something catastrophic. Every president serving in the last two decades has said that nuclear terrorism is a significant national security threat. Analysis of this threat has been, for good reason, mostly focused on foreign extremist groups, but recent events raise questions of whether there should be greater focus in the United States on far-right, domestic extremist threats. These extremists represent a unique danger because of their prevalence in federal institutions such as the military and the potential that they might infiltrate nuclear facilities, where they could access sensitive information and nuclear materials. The far-right extremist nuclear terrorism threat, which has some history, is amplified today by an ideology focused on accelerating the collapse of society and a documented interest in pursuing nuclear terrorism. Officials need to act decisively to better understand and mitigate this threat. 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] 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] 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] 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] 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] 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] 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] Indiscriminate, highly destructive acts of terror—like a nuclear attack—are therefore perfect tools to sow chaos and accelerate this societal collapse.

#### Even one attack escalates---turns every impact.

Arguello & Buis 18 [Irma Arguello and Emiliano J. Buis, \* founder and chair of the NPSGlobal Foundation, and head of the secretariat of the Latin American and Caribbean Leadership Network. She holds a degree in physics, a Master’s in business administration, and completed graduate studies in defense and security, \*\* lawyer specializing in international law. He holds a PhD from the University of Buenos Aires (UBA), a Master’s in Human and Social Sciences from the University of Paris/Panthéon-Sorbonne, and a postgraduate diploma in national defense from the National Defense School, “The global impacts of a terrorist nuclear attack: What would happen? What should we do?,” 2018, *Bulletin of the Atomic Scientists*, Vol. 74, Issue 2, pp. 114-119, https://doi.org/10.1080/00963402.2018.1436812, Recut EA]

The consequences of a terrorist nuclear attack ¶ A small and primitive 1-kiloton fission bomb (with a yield of about one-fifteenth of the one dropped on Hiroshima, and certainly much less sophisticated; cf. Figure 1), detonated in any large capital city of the developed world, would cause an unprecedented catastrophic scenario. ¶ [FIGURE 1 OMITTED]¶ An estimate of direct effects in the attack’s location includes a death toll of 7,300-to-23,000 people and 12,600-to-57,000 people injured, depending on the target’s geography and population density. Total physical destruction of the city’s infrastructure, due to the blast (shock wave) and thermal radiation, would cover a radius of about 500 meters from the point of detonation (also known as ground zero), while ionizing radiation greater than 5 Sieverts – compatible with the deadly acute radiation syndrome – would expand within an 850-meter radius. From the environmental point of view, such an area would be unusable for years. In addition, radioactive fallout would expand in an area of about 300 square kilometers, depending on meteorological conditions (cf. Figure 2). ¶ [FIGURE 2 OMITTED]¶ But the consequences would go far beyond the effects in the target country, however, and promptly propagate worldwide. Global and national security, economy and finance, international governance and its framework, national political systems, and the behavior of governments and individuals would all be put under severe trial. The severity of the effects at a national level, however, would depend on the countries’ level of development, geopolitical location, and resilience. ¶ Global security and regional/national defense schemes would be strongly affected. An increase in global distrust would spark rising tensions among countries and blocs, that could even lead to the brink of nuclear weapons use by states (if, for instance, a sponsor country is identified). The consequences of such a shocking scenario would include a decrease in states’ self-control, an escalation of present conflicts and the emergence of new ones, accompanied by an increase in military unilateralism and military expenditures. ¶ Regarding the economic and financial impacts, a severe global economic depression would rise from the attack, likely lasting for years. Its duration would be strongly dependent on the course of the crisis. The main results of such a crisis would include a 2 percent fall of growth in global Gross Domestic Product, and a 4 percent decline of international trade in the two years following the attack (cf. Figure 3). In the case of developing and less-developed countries, the economic impacts would also include a shortage of high-technology products such as medicines, as well as a fall in foreign direct investment and a severe decline of international humanitarian aid toward low-income countries. We expect an increase of unemployment and poverty in all countries. Global poverty would raise about 4 percent after the attack, which implies that at least 30 million more people would be living in extreme poverty, in addition to the current estimated 767 million. ¶ [FIGURE 3 OMITTED]¶ In the area of international relations, we would expect a breakdown of key doctrines involving politics, security, and relations among states. These international tensions could lead to a collapse of the nuclear order as we know it today, with a consequent setback of nuclear disarmament and nonproliferation commitments. In other words, the whole system based on the Nuclear Non- Proliferation Treaty would be put under severe trial. After the attack, there would be a reassessment of existing security doctrines, and a deep review of concepts such as nuclear deterrence, no-first-use, proportionality, and negative security assurances. ¶ Finally, the behavior of governments and individuals would also change radically. Internal chaos fueled by the media and social networks would threaten governance at all levels, with greater impact on those countries with weak institutional frameworks. Social turbulence would emerge in most countries, with consequent attempts by governments to impose restrictions on personal freedoms to preserve order – possibly by declaring a state of siege or state of emergency – and legislation would surely become tougher on human rights. There would also be a significant increase in social fragmentation – with a deepening of antagonistic views, mistrust, and intolerance, both within countries and towards others – and a resurgence of large-scale social movements fostered by ideological interests and easily mobilized through social media.¶ Prevention, preparedness, response¶ Given the severity of the impacts, no country in possession of nuclear weapons or weapons-usable materials can guarantee its full protection against nuclear terrorism or nuclear smuggling for proliferation purposes. Nor is it realistic to conceive of full compensation to others in the international community, if a catastrophic event happens because of any country’s acts or omissions. Therefore, we consider that prevention is the only acceptable way forward to preserve global stability.

#### Independently, prolif ensures extinction.

**Kroenig 15** [Matthew Kroenig, 2015, [M.A & PhD @ UC Berkely, Associate Professor of Government and Foreign Service @ Georgetown University, VP & Senior Director @ Atlantic Council], The History of Proliferation Optimism: Does It Have a Future?, Taylor & Francis, https://www.tandfonline.com/doi/abs/10.1080/01402390.2014.893508, accessed: 8-6-2024] TM

The **spread** of **nuclear weapons** **poses** at least six **severe threats** to international **peace** and **security** including: **nuclear war**, **nuclear terrorism**, global and regional **instability**, constrained US freedom of action, **weakened alliances**, and further **nuclear** **proliferation**. Each of these threats has received extensive treatment elsewhere and this review is not intended to replicate or even necessarily to improve upon these previous efforts. Rather the goals of this section are more modest: to usefully bring together and recap the many reasons why we should be pessimistic about the likely consequences of nuclear proliferation. Many of these threats will be illuminated with a discussion of a case of much contemporary concern: Iran’s advanced nuclear program. Nuclear War The **greatest** **threat** posed by the spread of nuclear weapons is **nuclear** **war**. The **more states** in possession of nuclear weapons, the **greater the probability** that **somewhere**, someday, there will be a **catastrophic nuclear** war. To date, nuclear weapons have only been used in warfare once. In 1945, the United States used nuclear weapons on Hiroshima and Nagasaki, bringing World War II to a close. Many analysts point to the 65-plus-year tradition of nuclear non-use as evidence that nuclear weapons are unusable, but it would be naïve to think that nuclear weapons will never be used again simply because they have not been used for some time. After all, analysts in the 1990s argued that worldwide economic downturns like the Great Depression were a thing of the past, only to be surprised by the dot-com bubble bursting later in the decade and the Great Recession of the late 2000s.48 This author, for one, would be surprised if nuclear weapons are not used again sometime in his lifetime. Before reaching a state of **MAD**, **new** **nuclear** **states** go through a **transition** **period** in which they **lack** a **secure**-**second strike** **capability**. In this context, one or both **states** might **believe** that it has an **incentive** to **use** nuclear weapons **first**. For example, if Iran acquires nuclear weapons, neither Iran, nor its nuclear-armed rival, Israel, will have a secure, second-strike capability. Even though it is believed to have a large arsenal, given its small size and lack of strategic depth, Israel might not be confident that it could absorb a nuclear strike and respond with a devastating counterstrike. Similarly, Iran might eventually be able to build a large and survivable nuclear arsenal, but, when it first crosses the nuclear threshold, Tehran will have a small and vulnerable nuclear force. In these pre-MAD situations, there are at least three ways that nuclear war could occur. First, the state with the nuclear advantage might believe it has a splendid first strike capability. In a crisis, Israel might, therefore, decide to launch a **preventive nuclear strike** to disarm Iran’s nuclear capabilities. Indeed, this **incentive** might be further increased by Israel’s aggressive strategic culture that emphasizes **preemptive action**. Second, the state with a small and vulnerable nuclear arsenal, in this case Iran, might feel **use them or lose them pressures**. That is, in a crisis, Iran might decide to strike first rather than risk having its entire nuclear arsenal destroyed. Third, as Thomas Schelling has argued, **nuclear** **war** could **result** due to the **reciprocal** **fear** of **surprise** **attack**.49 If there are advantages to striking first, one state might **start** a **nuclear** **war** in the **belief** that **war** is **inevitable** and that it would be***better to go first than*** *to go* ***second***. Fortunately, there is no historic evidence of this dynamic occurring in a nuclear context, but it is still possible. In an Israeli–Iranian crisis, for example, Israel and Iran might both prefer to avoid a nuclear war, but decide to strike first rather than suffer a devastating first attack from an opponent. Even in a world of MAD, however, when both sides have secure, second-strike capabilities, **there is still a risk of nuclear war**. Rational deterrence theory assumes nuclear-armed states are governed by rational leaders who would not intentionally launch a suicidal nuclear war. This assumption appears to have applied to past and current nuclear powers, but there is no guarantee that it will continue to hold in the future. Iran’s theocratic government, despite its inflammatory rhetoric, has followed a fairly pragmatic foreign policy since 1979, but it contains leaders who hold millenarian religious worldviews and could one day ascend to power. We cannot rule out the possibility that, as **nuclear** **weapons** continue to **spread**, some **leader** somewhere will **choose** to **launch** a **nuclear** **war**, knowing full well that it could result in self-destruction. One does not need to resort to irrationality, however, to imagine nuclear war under MAD. Nuclear weapons may deter leaders from intentionally launching full-scale wars, but they do not mean the end of international politics. As was discussed above, **nuclear**-armed **states** still have **conflicts** of interest and **leaders** still **seek** to **coerce** nuclear-armed **adversaries**. Leaders might, therefore, choose to launch a limited nuclear war.50 This strategy might be especially attractive to states in a position of conventional inferiority that might have an incentive to escalate a crisis quickly to the nuclear level. During the Cold War, the United States planned to use nuclear weapons first to stop a Soviet invasion of Western Europe given NATO’s conventional inferiority.51 As Russia’s conventional power has deteriorated since the end of the Cold War, Moscow has come to rely more heavily on nuclear weapons in its military doctrine. Indeed, Russian strategy calls for the use of nuclear weapons early in a conflict (something that most Western strategists would consider to be escalatory) as a way to de-escalate a crisis. Similarly, Pakistan’s military plans for nuclear use in the event of an invasion from conventionally stronger India. And finally, Chinese generals openly talk about the possibility of nuclear use against a US superpower in a possible East Asia contingency. Second, as was also discussed above, leaders can make a ‘threat that leaves something to chance’.52 **They can initiate a nuclear crisis**. By playing these **risky** **games** of **nuclear** **brinkmanship**, states can **increase the risk of nuclear war** in an attempt **to force a less resolved adversary** to **back down.** Historical **crises** have not resulted in nuclear war, but many of them, including the 1962 Cuban Missile Crisis, **have** **come close**. And scholars have documented historical incidents when accidents nearly led to war.53 When we think about future nuclear crisis dyads, such as Iran and Israel, with fewer sources of stability than existed during the Cold War, we can see that there is a real risk that a future crisis could result in a devastating nuclear exchange. Nuclear Terrorism The **spread** of **nuclear** **weapons** also **increases the risk of nuclear terrorism**.54 While September 11th was one of the greatest tragedies in American history, it would have been much worse had Osama Bin Laden possessed nuclear weapons. Bin Laden declared it a ‘religious duty’ for Al- Qa’eda to acquire nuclear weapons and radical clerics have issued fatwas declaring it permissible to use nuclear weapons in Jihad against the West.55 Unlike states, which can be more easily deterred, there is little doubt that if **terrorists** **acquired** nuclear **weapons**, they would **use** **them**.56 Indeed, in recent years, many US politicians and security analysts have argued that nuclear terrorism poses the greatest threat to US national security.57 **Analysts** have pointed out the tremendous **hurdles** that terrorists would have to overcome in order to acquire nuclear weapons.58 Nevertheless, as **nuclear** **weapons** **spread**, the **possibility** that they will **eventually fall into terrorist hands increases**. **States** could **intentionally** **transfer nuclear weapons**, or the fissile material required to build them, to **terrorist** groups. There are good reasons why a state might be reluctant to transfer nuclear weapons to terrorists, but, as nuclear **weapons spread**, the probability that a **leader** might someday **purposely arm** a **terrorist group increases**. Some fear, for example, that Iran, with its close ties to Hamas and Hizballah, might be at a heightened risk of transferring nuclear weapons to terrorists. Moreover, even if no state would ever intentionally transfer nuclear capabilities to terrorists, a **new nuclear state**, with **underdeveloped security** procedures, might be vulnerable to **theft**, allowing terrorist groups or corrupt or ideologically-motivated insiders to transfer dangerous material to terrorists. There is evidence, for example, that representatives from Pakistan’s atomic energy establishment met with Al-Qa’eda members to discuss a possible nuclear deal.59 Finally, a **nuclear**-**armed** **state** could **collapse**, resulting in a breakdown of law and order and a **loose** **nukes** problem. US officials are currently very concerned about what would happen to Pakistan’s nuclear weapons if the government were to fall. As nuclear weapons spread, this problem is only further amplified. Iran is a country with a history of revolutions and a government with a tenuous hold on power. The regime change that Washington has long dreamed about in Tehran could actually become a nightmare if a nuclear-armed Iran suffered a breakdown in authority, forcing us to worry about the fate of Iran’s nuclear arsenal. Regional InstabilityThe **spread** of **nuclear** **weapons** also **emboldens nuclear powers**, contributing to **regional instability**. States that **lack** **nuclear** **weapons** need to **fear** **direct** **military** **attack** from other states, but states with **nuclear weapons** can be confident that they can deter an intentional military attack, giving them an incentive to be more **aggressive** in the **conduct** of their **foreign** **policy**. In this way, nuclear weapons provide a shield under which states can feel free to engage in **lower-level aggression**. Indeed, international relations theories about the ‘stability-instability paradox’ maintain that stability at the nuclear level contributes to conventional instability.60 **Historically**, we have seen that the **spread of nuclear weapons** has **emboldened** their **possessors** and contributed to **regional instability**. Recent scholarly analyses have demonstrated that, after controlling for other relevant factors, **nuclear**-**weapon** **states** are **more** **likely** to **engage** in **conflict** than **nonnuclear**-**weapon** **states** and that this aggressiveness is more pronounced in new nuclear states that have less experience with nuclear diplomacy.61 Similarly, research on internal decision-making in Pakistan reveals that Pakistani foreign policymakers may have been emboldened by the acquisition of nuclear weapons, which encouraged them to initiate militarized disputes against India.62 Currently, Iran restrains its foreign policy because it fears major military retaliation from the United States or Israel, but with nuclear weapons it could feel free to push harder. A nuclear-armed Iran would likely step up support to terrorist and proxy groups and engage in more aggressive coercive diplomacy. With a nuclear-armed Iran increasingly throwing its weight around in the region, we could witness an even more crisis prone Middle East. And in a poly-nuclear Middle East with Israel, Iran, and, in the future, possibly other states, armed with nuclear weapons, any one of those crises could result in a catastrophic nuclear exchange.

## 2NC

#### Plants take too long.

**Jacobson ’24** [Mark; Professor of Civil and Environmental Engineering & Director of the Atmosphere/Energy Program @ Stanford University; October 10; One Earth; “7 reasons why nuclear energy is not the answer to solve climate change,” https://www.oneearth.org/the-7-reasons-why-nuclear-energy-is-not-the-answer-to-solve-climate-change/; DOA: 3-25-2025] tristan

The time lag between planning and operation of a nuclear reactor includes the times to identify a site, obtain a site permit, purchase or lease the land, obtain a construction permit, obtain financing and insurance for construction, install transmission, negotiate a power purchase agreement, obtain permits, build the plant, connect it to transmission, and obtain a final operating license.

The planning-to-operation (PTO) times of all nuclear plants ever built have been 10-19 years or more. For example, the Olkiluoto 3 reactor in Finland was proposed to the Finnish cabinet in December 2000 to be added to an existing nuclear power plant. Its latest estimated completion date is 2020, giving it a PTO time of 20 years.

## On Resilience

## On climate

#### They don’t actually read evidence saying that nuclear energy is key.

#### Nuclear energy is terrible and trades off with renewables – crossapp from case.

#### Emissions increase. Empirics prove.

**Jacobson '24** [Mark Z. Jacobson; Professor of Civil and Environmental Engineering at Stanford; 10-10-2024; "7 reasons why nuclear energy is not the answer to solve climate change"; One Earth; https://www.oneearth.org/the-7-reasons-why-nuclear-energy-is-not-the-answer-to-solve-climate-change/; accessed 03-01-2025] leon

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

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

**Even if they cut all of US emissions, China and other countries will still emit and the world would grow even hotter. Renewables are easier to build and more exportable than nuclear energy, so THEY don’t spillover but the status quo does.**

#### LT. Nuclear is too slow and raises net emissions.

Ramana 24 [M.V. Ramana, Simons Chair in Disarmament, Global and Human Security and Professor of Public Policy and Global Affairs @ University of British Columbia, 7-29-2024, "Atomic Fallacy: Why Nuclear Power Won’t Solve the Climate Crisis" Literary Hub, https://lithub.com/atomic-fallacy-why-nuclear-power-wont-solve-the-climate-crisis/, accessed: 4-1-2025] OA

Some might argue that these risks are the price we must pay to counter the threat of climate change. I disagree, but even if one were to adopt this position, my research shows that nuclear energy is just not a feasible solution to climate change. A nuclear power plant is a really expensive way to produce electricity. And nuclear energy simply cannot be scaled fast enough to match the rate at which the world needs to lower carbon emissions to stay under 1.5 degrees Celsius, or even 2 degrees.¶ Cost and the slow rate of deployment largely explain why the share of global electricity produced by nuclear reactors has been steadily declining, from around 16.9 percent in 1997, when the Kyoto Protocol was signed, to 9.2 percent in 2022. In contrast, as the costs of wind and solar energy declined dramatically, and modern renewables (which do not include large dams) went from supplying 1.2 percent of the world’s electricity in 1997 to 14.4 percent in 2022.¶ Another contrast is revealing. When pro-nuclear advocates talk about solving climate change with nuclear energy, they call for building lots and lots of reactors. The World Nuclear Association, for example, proposes building thousands of nuclear reactors, which would together be capable of generating a million megawatts of electricity, by 2050. Such a goal is completely at odds with historical rates of building nuclear reactors.¶ Some proponents of nuclear energy refuse to give up on the technology. They blame the decline in nuclear energy and the high costs and long construction periods on the characteristics of older reactor designs, arguing that alternative designs will rescue nuclear energy from its woes. In recent years, the alternatives most often advertised are small modular (nuclear) reactors—SMRs for short. These are designed to generate between 10 and 300 megawatts of power, much less than the 1,000–1,600 megawatts that reactors being built today are designed to produce.¶ For over a decade now, many of my colleagues and I have consistently explained why these reactors would not be commercially viable and why they would never resolve the undesirable consequences of building nuclear power plants. I first started examining small modular reactors when I worked at Princeton University’s Program on Science and Global Security. Our group largely comprised physicists, and we used a mixture of technical assessments, mathematical techniques, and social-science-based methods to study various problems associated with these technologies. My colleague Alex Glaser, for example, used neutronics models to calculate how much uranium would be required as fuel for SMRs, which we then used to estimate the increased risk of nuclear weapons proliferation from deploying such reactors. Zia Mian, originally from Pakistan, and I showed why the technical characteristics of SMRs would not allow for simultaneously solving the four key problems identified with nuclear power: its high costs, its accident risks, the difficulty of dealing with radioactive waste, and its linkage with the capacity to make nuclear weapons. My colleagues and I also undertook case studies on Jordan, Ghana, and Indonesia, three countries advertised by SMR vendors as potential customers, and showed that despite much talk, none of them were investing in SMRs, because of various country-specific reasons such as public opposition and institutional interests.¶ We were not the only people coming up with reasons for not believing in the claim that new reactor designs would solve all these problems. Other scientists and analysts also highlighted the dangers and false promises of SMRs.¶ Nuclear advocates are not deterred by such arguments. They insist that this time it will be different. Nuclear plants would be cheap, would be quick to build, would be safe, would never have to be shut down in unplanned ways, and would not be affected by climate-related extreme weather events. The evidence from the real world, which I elaborate on later, suggests otherwise. Nuclear reactors are unlikely to possess any of these characteristics, let alone all of them. Thus, what is actually being advocated might be termed faux nuclear plants, existing only in the imagination of some, not in the real world.¶ My bottom line is that nuclear energy, whether with old reactor designs or new faux alternatives, will simply not resolve the climate crisis. The threat from climate change is urgent. The world has neither the financial resources nor the luxury of time to expand nuclear power. Meanwhile, even a limited expansion would aggravate a range of environmental and ecological risks. Further, nuclear energy is deeply imbricated in creating the conditions for nuclear annihilation. Expanding nuclear power would leave us in the worst of both worlds.

## On Econ

#### NQ. Private SMR investment is high now.

A.N.S ’24 [American Nuclear Society(non-profit org of scientists), 10-16-2024, "Amazon investing in SMRs to deploy 5 GW by 2039", American Nuclear Society, https://www.ans.org/news/article-6480/amazon-investing-in-smrs-to-deploy-5gw-by-2039/, DOA: 3-17-2025]|eti

Tech giant Amazon announced Wednesday new partnerships with Dominion Energy and X-energy to develop and deploy 5 gigawatts of nuclear energy to power needs across the country over the next 15 years.¶ Together with billionaire Ken Griffin, founder of Citadel (one of the world's leading alternative investment firms), the company is backing a $500 million investment in small modular reactors. X-energy will receive support for developing an initial 320-MW project with Energy Northwest in Washington state; and Dominion has a memorandum of understanding with Amazon to advance SMR development in Virginia.¶ The overarching goal is to provide the carbon-free electricity needed to meet growing demand for artificial intelligence applications and data center support.¶ “We need smart solutions that can help us meet growing energy demands while also addressing climate change,” said Kevin Miller, Amazon Web Services’ vice president of global data centers. “We view advanced new nuclear capacity as really key and essential.”¶ Financing for X-energy: Amazon will support Maryland-based X-energy’s reactor design and licensing, as well at the first phase of its TRISO-X fuel fabrication facility in Oak Ridge, Tenn. Griffin, affiliates of Ares Management Corp., the Nuclear Planning Group (NPG) under NATO’s governance, and University of Michigan are joining Amazon’s Climate Pledge Fund in the financing round.¶ “Nuclear is an important source of clean and reliable power that our nation needs to meet the growing demand for energy,” Griffin said. “X-energy provides an impactful solution to a critical challenge—and the support Amazon, Dow, and other major corporations have provided underscores its potential and merit.”¶ X-energy chief executive Clay Sell said, “Amazon and X-energy are poised to define the future of advanced nuclear energy in the commercial marketplace. To fully realize the opportunities available through artificial intelligence, we must bring clean, safe, and reliable electrons onto the grid with proven technologies that can scale and grow with demand. . . . We are now uniquely suited to deliver on this transformative vision for the future of energy and tech.”¶ The Xe-100 SMR is an 80-MWe high-temperature, gas-cooled reactor that can be scaled into a four-pack 320-MWe power plant and up to a 960-MWe plant with 12 units. It uses a pebble bed system (uranium particles encased in graphite) and relies on helium as a coolant. According to X-energy, the modular reactor design is “road-shippable and intended to drive scalability, accelerate construction timelines, and create more predictable and manageable construction costs.”¶ With federal support, X-energy is currently developing an initial Xe-100 plant at Dow Inc.’s manufacturing site on the Gulf Coast of Texas. The company was one of two selected by the Department of Energy’s Advanced Reactor Demonstration Program (ARDP) for funding.¶ Dominion MOU: Amazon will support the Virginia-based utility in exploring new development structures to advance SMR deployment in its state.¶ “This agreement builds on our longstanding partnership with Amazon and other leading tech companies to accelerate the development of carbon-free power generation in Virginia,” said Robert M. Blue, president and chief executive of Dominion Energy. “It's an important step forward in serving our customers' growing needs with reliable, affordable and increasingly clean energy. This collaboration gives us a potential path to advance SMRs with minimal rate impacts for our residential customers and substantially reduced development risk.”¶ Miller added, “Bringing new sources of carbon-free energy to the grid is an important part of Amazon's commitment to serve our customers and achieve net-zero carbon across our operations by 2040. Nuclear energy is safe, reliable, and can help meet the energy needs of our customers for decades to come. We're excited to innovate alongside Dominion to explore the opportunities that SMRs can bring to Virginia, while also helping us all address climate change.”¶ Power demand in Virginia is growing by more than 5 percent annually and is expected to double in the next 15 years, pushing Dominion to consider advanced nuclear reactors. Dominion put out a request for proposals in July, asking leading SMR companies to submit ideas for adding generation units at its North Anna Power Station.”¶ The big picture: Amazon’s announcement comes on the heels of similar partnerships struck between Microsoft and Constellation for dedicated power generation achieved through the start of Constellation’s Crane Clean Energy Center (formerly TMI-1) and that between Google and Kairos Power to construct seven new SMRs to feed the demand of AI needs.¶ Data center expansion and other factors are expected to increase electricity demand by 15 to 20 percent over the next decade, according to DOE. Data centers could consume as much as 9 percent of the nation’s electricity generation annually by 2030, up from 4 percent in 2023, according to a report in May by the Electric Power Research Institute.¶ At an event Wednesday morning to announce Amazon’s new nuclear ambitions, secretary of energy Jennifer Granholm applauded what she called the latest “BYOP,” or “bring your own power,” plans from a major tech company.¶ “We started convening hyperscalers about a year ago to have this conversation and talk about anticipated energy needs,” Granholm said. “We want these data centers built in the United States, for a variety of reasons, including national security.”¶ She added, “We know we need additional power to be able to do that, and we want that to be clean power.”

**Investing in nuclear empirically leads existing plants to cut jobs & trades off with other investments**

**NIRS ND** [Nuclear Information and Resource Service, non-profit advocacy group “devoted” to a “carbon-free world”, “How Nuclear Bailouts Would Cost over 60,000 Green American Jobs,” xx-xx-xxxx, accessed 4-4-2025; https://www.nirs.org/how-nuclear-bailouts-would-cost-over-60000-green-american-jobs/] squasha

Specifically:  how many jobs would a nuclear bailout actually create?

Spoiler alert! None.

Over the last few weeks, we’ve shown why subsidizing nuclear power is a bad investment for climate, environmental justice, and renewable energy. Earlier this month, we co-released a major report with Friends of the Earth that shows why nuclear bailouts fail on all counts: climate, jobs, and justice.

To be sure, this country has needed a major jobs program for at least a generation. As proponents of the Green New Deal note, because the climate crisis requires the transformation of our entire energy economy, we will need to create millions of jobs to take it on. President Biden’s American Jobs and Families Plan–and the $4.1 trillion in legislation members of Congress are advancing–are also supposed to create millions of jobs.

So this week, it’s time to dig into jobs and climate–and how subsidizing nuclear reactors hurts both.

Billions for a Nuclear Bailout = No New Jobs (at most)

That’s right. Investing tens of billions in old, uneconomical nuclear reactors will create, at most, zero actual jobs. The subsidies would go to power plants that are currently operating, ostensibly to prevent any more of them from closing because they are not making enough profits. The reality is, that the reactors that would be bailed out were built 30-50 years ago and are currently operating with full-time staff. So the best the subsidy could do is to avoid potential layoffs of nuclear workers, not create any new jobs for people who are currently unemployed or underemployed.

In reality, the subsidy could actually result in a loss of jobs. That is because the subsidies would not require the companies to keep workers employed at current levels. We know that nuclear power companies have cut jobs at reactors that are already receiving subsidies. Earlier this year, Exelon revealed that it cut its nuclear workforce in Illinois by 15% since 2016, despite receiving nearly $1 billion in subsidies over the last four years. Three of its eleven reactors in Illinois (Clinton and Quad Cities 1&2) have been receiving $235 million/year in ratepayer subsidies under a 2016 law. Yet Exelon cut its nuclear workforce statewide by about 720 jobs, averaging 65 per reactor, including at Clinton and Quad Cities. Given the financial conditions of the nuclear industry, it’s possible that thousands of nuclear workers could still lose their jobs even if Congress passes $50 billion in nuclear subsidies.

Opportunity Costs: Subsidizing nuclear power could prevent over 60,000 jobs from being created

Budgets are about choices. Senate Democrats have agreed to $3.5 trillion to fund a package of physical and social infrastructure, with funds raised by increasing the minimum income tax rates on corporations and very wealthy people (household incomes more than $400,000/year).

So the budget is set. The proposed nuclear subsidy would come out of that budget–diverting funds from other programs, priorities, and investments. By our calculations, knowing that President Biden’s American Jobs Plan proposed  $469 billion for renewable energy and other electricity infrastructure, the nuclear subsidy would take up more than 10% of that budget. This would be a massive amount of money to waste on a program that would not create a single job and, at best, would sustain a few thousand jobs at nearly four times the cost of the rest of the energy budget.

If those billions were spent on other energy programs–renewable energy, energy efficiency, battery storage, and/or grid modernization–it would create over 67,000 new jobs. That would be enough to re-employ all of the nuclear workers in other energy industries and create jobs to employ 60,000 more people who are currently unemployed or underemployed.

## On subs

#### NQ – And trump supports it. He’s already increasing our nuclear.

**Musaddique 25** [Shafi Musaddique, "Trump to help spark a nuclear energy ‘renaissance,’ investor says", February 5th, 2025, CNBC, https://www.cnbc.com/2025/02/06/trump-to-help-nuclear-energy-renaissance-tema-etfs-khodjamirian.html?scrlybrkr=e97f6680] //SC

Nuclear energy is set for a “renaissance” that will be accelerated by backing from U.S. President Donald Trump’s administration. That’s according to Yuri Khodjamirian, chief information officer at Tema ETFs, who noted that the **Trump** administration is “very, very interested in backing this technology.′ However, he also warned investors that developing this energy source is “going to take time.” New nuclear technology approvals take “10 years to get done,” Khodjamirian said, but added that the nuclear re-emergence will likely be accelerated under the new Trump administration. Speaking to CNBC’s Silvia Amaro on Tuesday’s “Squawk Box Europe,” Khodjamirian said his investment fund has its eyes on firms with a history of developing nuclear technology, such as U.S.-based BWX Technologies , which builds nuclear reactors for military carriers and submarines. Khodjamirian said Tema is being “very selective in a new technology called small scale modular reactors.” Small scale modular reactors (SMRs) are advanced nuclear reactors with the ability to provide around one-third of the generating capacity of traditional nuclear power reactors, according to the International Atomic Energy Agency. SMRs take up less physical space compared to conventional reactors and produce a large amount of low-carbon electricity. “There’s a lot of excitement there, and equally, a lot of loss-making companies that have unproven technologies, and we’re going for companies that have projects that are approved,” Khodjamirian said. The nuclear energy renaissance is partly driven by a wave of people that are “realizing that it’s a stable, clean source of energy,” the chief investment officer said, adding that he believes that “there is a need for extra investment” in nuclear, alongside green energy sources that are variable in their electricity production. “Renewables are good. They can be put up to speed quickly, but they require battery storage,” he said. Trump has moved quickly on his energy agenda since his return to the White House. The U.S. Senate on Monday confirmed Chris Wright, a fracking executive and a Trump ally, as energy secretary. Wright is a known nuclear energy supporter, having previously served on the board of advanced reactor company Oklo, as well as having held the position of chief executive at Liberty Energy. The energy firm has since appointed a new CEO following Wright’s confirmation as U.S. secretary of energy. In 2023, Wright signed a letter supporting nuclear energy. Digital borders Khodjamirian is also closely monitoring artificial intelligence volatility, after the emergence of China’s Open AI model DeepSeek sparked concerns over how much money big tech companies will invest in AI. European nations have voiced security concerns over DeepSeek. Italy was the first country to block DeepSeek on data protection concerns. France’s privacy watchdog has expressed concerns and South Korea’s industry ministry has temporarily restricted employee access to the Chinese startup’s AI model. Taiwan, meanwhile, banned state departments from using the Beijing-based chatbot, wary of potential security threats from Beijing. The international pushback shows that “no one really knows exactly how to defend digital borders,” according to Khodjamirian. Global concern will “limit the growth of this model, because it’s coming out of China, but it’s clearly showing you that the West needs to be aware that there’s a lot of technical development,” he said. ″[But] I do think it redraws some of the lines, and it’ll be interesting to see how the U.S. in particular reacts,” he added.

#### Their Shellmore evidence is about a SHIPYARD that needs more resources, not NUCLEAR ENERGY. Therefore, even if we invest in nuclear energy, we won’t have shipyards to build in.

#### NQ. Deterrence fails---China is defensive.

ICG 23 [Shoring Up, 10-27-2023, "Preventing War in the Taiwan Strait" International Crisis Group, https://www.crisisgroup.org/asia/north-east-asia/taiwan-strait-china/333-preventing-war-taiwan-strait, accessed: 10-27-2024] OA

As noted above, the status quo has traditionally comprised different elements for each of the principal actors in the Taiwan Strait. For China, it is critical that Taiwan not pursue de jure independence, which would obstruct unification, its ultimate goal. For Taiwan, the key is to maintain de facto sovereignty, thus keeping a say in determining its own status. As for the U.S., it seeks an equilibrium in which China does not pursue forceful unification and Taiwan does not declare formal independence. Within this matrix, all the parties constantly try to improve their respective positions without going so far that the others walk away from the framework altogether, potentially leading to conflict. Yet this game is dangerous: the more any party feels it is losing the ground it most cares about, the more the conflict risk rises. For purposes of assessing whether this risk is still growing, a key consideration will be how a militarily more capable China responds to a shifting environment in which the barriers to peaceful unification have got higher thanks to a stronger sense of Taiwanese identity and Washington’s efforts to strengthen Taiwan’s de facto sovereignty. On one hand, despite the challenges, peaceful unification remains Beijing’s stated preference. China appears to remain confident that, with time and a cross-strait power balance that continues to shift overwhelmingly in its favour, Taiwanese “compatriots” will come around to seeing unification as an “inevitable historical trend”.111 In 2021, Xi remarked that “time and momentum are always on our side”.112 Similarly, Xi’s report to the 20th Party Congress and 2019 speech on the 40th anniversary of the “Letter to Taiwan Compatriots”, and the 2022 White Paper on Taiwan all convey the belief that reunification is inexorably approaching.113 On the other hand, China’s war-fighting capacity has increased. Moreover, Beijing has long believed that the threat of force – replete with clearly escalatory shows of military might – is important for deterring Taiwan from moving toward formal independence and inducing caution in how Washington engages with Taipei. This mindset may increase the risk of conflict due to misjudgement or miscalculation. It is also not certain how long China’s current preferences will hold. Its decision-making about whether and how to apply force to compel unification will be both fundamentally political and also contextual – in that it will take into account various factors above and beyond the advancement of its military capabilities, including the domestic and international situation that the country faces.114 Beijing will not necessarily attack Taiwan simply because it has the military ability to do so. Nor, however, is it likely to hold back from launching an assault, regardless of its capacities at the time, if it feels Taiwan has crossed its red line, namely declaring de jure independence.115