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We affirm

Contention one is American hegemony

**American adversaries dominate nuclear energy**

**Cohen 24**(Dr. Ariel Cohen, Ph.D. is a Senior Fellow at the Atlantic Council and the Founding Principal of International Market Analysis, a Washington, D.C.-based global risk advisory boutique. He is also Managing Director of the Energy, Growth, and Security Program (EGS) and a Senior Fellow with the International Tax and Investment Center (ITIC). 7 June 2024, “China And Russia Now Dominate The Global Nuclear Trade” Forbes,<https://www.forbes.com/sites/arielcohen/2024/06/07/china-and-russia-now-dominate-the-global-nuclear-trade/>, DOA: 3/5/25) LLO

Russia is not alone in surpassing the US. **China is also far ahead of the US in the nuclear energy industry. China’s nuclear power industry has retained its domestic focus, with** [**twenty-three power plants**](https://www.worldnuclearreport.org/IMG/pdf/wnisr2023-table02-reactors_under_construction.pdf) **under construction in China as of July 2023.** This is due to [increasing energy demand](https://www.iaea.org/bulletin/how-china-has-become-the-worlds-fastest-expanding-nuclear-power-producer), as China continues to develop its economy. The United States is constructing a [single nuclear power plant](https://www.statista.com/statistics/513671/number-of-under-construction-nuclear-reactors-worldwide/). **While China has refined its nuclear power production process, the last plant built in the** [**US arrived 7 years late and 17 billion dollars over budget**](https://apnews.com/article/georgia-nuclear-power-plant-vogtle-rates-costs-75c7a413cda3935dd551be9115e88a64)**, as a testament to America’s byzantine permitting and environmental review system.** **China has built upon this expertise also to begin supplying reactors abroad. The China National Nuclear Corporation and China General Nuclear Power Group have** [**developed**](https://www.cipe.org/wp-content/uploads/2021/05/Nuclear-Dragon-Goes-Abroad.pdf) **a third-generation reactor called Hualong One.** This new reactor began operations in [2021](https://apnews.com/article/china-nuclear-power-7996f4ec51f0a70716da779eb8ff237f) in Fuqing**. In 2023,** [**China began construction**](https://www.voanews.com/a/china-begins-construction-of-pakistan-s-largest-nuclear-power-plant-/7181016.html) **on the Chashma-5 nuclear power plant in Pakistan, which will use Hualong One reactors. Such actions contribute to China’s capacity to construct infrastructure abroad and expand its influence.** The American nuclear power industry was once the world's envy, peaking with [112 operational reactors](https://www.statista.com/statistics/184981/number-of-nuclear-power-plants-in-the-us/) in 1990, with America on a path to carbon neutrality much earlier than current predictions. **34 years later, the United States has lost nearly a third of its operational nuclear reactors, has built almost no new ones, and its average reactor age is decades old. If nothing is done to rectify this, in the next 10-15 years, scores of nuclear reactors will have to be retired as their operational lifecycles end, and as a result, America will have to contend with** [**nearly 20% of its electricity capacity**](https://www.energy.gov/nuclear) **evaporating.**

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**Through Rosatom, Russia remains the global leader in nuclear reactor construction.** According to the World Nuclear Strategy Report, **as of July 2023, Russia had** [**twenty-four**](https://www.worldnuclearreport.org/IMG/pdf/wnisr2023-table02-reactors_under_construction.pdf)**. Nuclear reactors under** [**construction**](https://www.worldnuclearreport.org/IMG/pdf/wnisr2023-table02-reactors_under_construction.pdf) **in seven countries: China, India, Turkey, Egypt, Bangladesh, Iran, and Slovakia. For comparison, the US was constructing zero. Russia dominates the nuclear industry in more areas than just reactors. They also have the** [**largest**](https://www.rferl.org/a/russia-nuclear-power-industry-graphics/32014247.html) **uranium conversion and enrichment industries in the world, at 38% and 46% of international capacity**, respectively, in 2020. **This makes it a major fuel exporter as well. Russia exported** [**over $1 billion**](https://static.rusi.org/RUSI-Russian-Exports-final-web_0.pdf#:~:text=Russian%20customs%20data%2C%20sourced%20though%20a%20third-party%20commercial,exports%20to%20members%20of%20NATO%20and%20the%20EU.) **worth of nuclear energy-related products from February 2022-2024. Two of the countries in which Russia is constructing nuclear power plants, Turkey and Slovakia, are NATO members.** They are not alone amongst the collective West in enabling Russia’s nuclear dominance while ostensibly being committed to containing the Kremlin.As my colleague Wesley A. Hill wrote, Russian-enabled [geopolitical turmoil in Africa](https://nationalinterest.org/feature/russia%E2%80%99s-kitchen-chaos-west-africa-206681), which Russia is using to [try to acquire formerly French uranium assets](https://www.msn.com/en-us/news/world/russian-federation-wants-to-acquire-uranium-assets-in-niger-isw/ar-BB1nAkmN), helped force Europe to [double its import](https://bellona.org/news/nuclear-issues/2024-03-europe-russian-nuclear-fuel) of Russian uranium in 2023. The US was no better, remaining [dependent on Russian nuclear exports](https://www.ft.com/content/2c9c325e-e734-4a9f-b089-2f64deebc658) even after the war in Ukraine restarted in 2022. The US [imported Russian nuclear fuel](https://www.reuters.com/business/energy/ban-russian-uranium-aims-revive-american-supply-2024-06-04/) until May 14th, 2024, over two years after Russia’s invasion of Ukraine began, from the same entities that the White House sanctioned.

**And, America is losing influence**

**Policy Circle 24** (Policy Circle is a digital platform that offers in-depth coverage of public policy issues in governance, environment, and society. It was launched in 2020 by a group of policy experts who share a vision of promoting evidence-based policymaking and constructive policy dialogue. It also organises summits, roundtables, and online discussions to bring together policymakers, researchers, corporate executives, professionals, and other stakeholders to deliberate on policy issues. December 27, 2024 “End of American hegemony: Can the superpower reinvent power for the 21st century” Policy Circle,<https://www.policycircle.org/world/end-of-american-hegemony/>, DOA: 3/28/25) LLO

**In 2010, a** [**historian**](https://www.fairobserver.com/author/alfred-w-mccoy/) **predicted that the American hegemony might end by 2025 — not with a bang but with a whimper** **— as domestic divisions deepened and rival powers rose to challenge its authority. Today, that prediction appears prophetic** as America faces increasing pressures from within and outside. Even as the US retains military dominance and an economy capable of immense influence, **the structural underpinnings of its global power are eroding. This decline, though not necessarily terminal, signals a transition away from the so-called American Century. Historically, the US leveraged its unmatched economic strength, technological innovation, and cultural influence to dominate the post-World War II global order. However, the foundations of the American hegemony are crumbling. The US share of global GDP has steadily declined,** falling from 50% in the mid-20th century to approximately 15% today when adjusted for purchasing power parity. **The globalisation, initially championed by the US, has redistributed industrial power, with China emerging as a key beneficiary. China’s rise has reoriented global economic networks, particularly in the Global South.** In contrast to America’s interventionist foreign policy, **China has cultivated influence through infrastructure investments, soft power campaigns**, and state-sponsored media. The United States, while still a major player, has failed to present an alternative vision that resonates with developing nations, where perceptions of Chinese leadership are increasingly favourable.

**Domestic production is critical to hegemony**

**Hiltibran et al 24** (Christel Hiltibran, Director of International Policy, Climate and Energy Program, Rowen Price, Policy Advisor for Nuclear Energy, Ryan Norman, Senior Policy Advisor for Clean Energy Finance, Climate and Energy Program, Alan Ahn, Deputy Director for Nuclear, 31 January 2025, “Trump Has Been a China Hawk on Nuclear Energy. But Congress Could Compromise That During Reconciliation.”, Third Way,<https://www.thirdway.org/memo/trump-has-been-a-china-hawk-on-nuclear-energy-but-congress-could-compromise-that-during-reconciliation#:~:text=A%20strong%20US%20nuclear%20energy,valuable%20hundred%2Dyear%20geopolitical%20relationships>., DOA 3/1/2025) ESR

President **Trump has long considered himself a China hawk,** stoking a trade war with the country, supporting ever-increasing tariffs on its goods, and using aggressive rhetoric to combat its growing global influence. **But his approach has a blind spot, failing to mitigate China’s increasing dominance in the energy sector, especially in nuclear energy development and deployment**. Until we confront China’s rising role in global energy markets, **the US will continue to cede market share and lose geopolitical influence, threatening national security both in the US and among our allied nations**. The US needs a synchronized foreign policy to counter Chinese attacks on American hegemony. But since the election, **the incoming administration and Congress have signaled misaligned approaches to foreign energy policy**. The Trump Administration’s [Day 1 executive orders](https://time.com/7208691/trump-day-one-presidential-actions-executive-orders-memorandum-proclamation-explainer/) reaffirmed the President’s commitment to domestic energy production—now it’s up to Congress to ensure legislation is going to support energy goals. Nuclear Energy Must Be a Foreign Policy Priority Beyond bilateral trade barriers, the US must also dominate critical global industries to remain competitive. **There is broad consensus that investments in national defense, space, artificial intelligence, and quantum computing will help make America more secure and more prosperous. The same is true of** [**investments in nuclear energy**](https://www.thirdway.org/memo/the-global-race-for-advanced-nuclear-is-on)**. A robust domestic nuclear supply chain has corollary benefits, including reliable energy supply, that are foundational to our** [**defense**](https://www.thirdway.org/memo/nuclear-fuel-is-a-national-security-imperative) **and** [**technology sectors**](https://www.thirdway.org/blog/dawn-of-a-nuclear-era). Moreover, **the strength of our nuclear industry directly supports our competitiveness abroad, which in turn affects** [**our ability to uphold the highest global norms in nuclear security and nonproliferation**](https://nationalinterest.org/feature/why-nuclear-fuel-vital-us-national-security-interests-ukraine-and-middle-east-207782)**. Failure to compete overseas will enable China, Russia, and other rivals to** [**erode our influence on these international standards**](https://www.defensenews.com/opinion/commentary/2023/03/29/the-global-nuclear-energy-market-is-a-geopolitical-battleground/) **and cement** [**century-long geostrategic partnerships**](https://www.thirdway.org/memo/2023-map-the-world-wants-nuclear-energy-china-and-russia-are-racing-ahead) **around the world.** [**Putting the US at the forefront of global civil nuclear markets will make us stronger, more secure, and more influential on the global stage**](https://www.thirdway.org/report/nuclear-export-financing-today-and-tomorrow?utm_source=Pardot&utm_medium=email). Our adversaries understand the stakes. **China and Russia have state-owned, heavily subsidized nuclear industries that are a key part of their efforts to gain allies and influence throughout the developing world.** China and Russia view nuclear exports as a way to develop century long partnerships in Africa, Asia, and Eastern Europe. Their interest in advanced nuclear power is less about economics, and more about influence. The competition is well underway and the United States is losing. According to the International Atomic Energy Agency, [**85% of all new reactors**](https://pris.iaea.org/PRIS/worldstatistics/UnderConstructionReactorsByCountry.aspx) **currently under construction in 2024 are Russian or PRC designs; 0% are US designs.** This year, President Trump and the new Republican Congress have an opportunity to do just that—through budget reconciliation.  Trump Could Cede Critical Geopolitical “Energy Dominance” to China in His First 100 Days by Compromising America’s Nuclear Industry—But It’s Not Too Late Put simply, **if we want to outcompete China, Congress needs to continue to prioritize clean energy.** The incoming Trump administration has made no secret of its hostility to the Inflation Reduction Act (IRA) and its clean energy provisions, especially its investments in wind and solar. But despite recent bipartisan alignment in support of nuclear energy, **Trump’s agenda not only targets renewables but may also incidentally deal a significant blow to programs supporting nuclear development and demonstration in the US.** During the 117th Congress, **IRA and the Bipartisan Infrastructure Law (BIL) created tax credits, grants, and loan programs to finance the research, development, demonstration, and even the deployment of emerging clean energy technologies**, including nuclear. In a flurry of signals issued during the lame-duck period, the incoming administration and Republican Congressional leadership have made clear **that many of these programs are on the chopping block in the first 100 days of the second Trump administration**. In competition with state-backed civil nuclear programs such as China**, the US needs to bolster its federal government funding for nuclear, not decrease it.  China is churning out large reactors at home, demonstrating** (i.e., [building and operating](https://www.thirdway.org/memo/the-global-race-for-advanced-nuclear-is-on)) **advanced reactor technologies, and marketing advanced reactors cheaply along its “Belt and Road.”** To stay relevant in this race for international market share, **the US must rapidly finance the demonstration and subsequent commercialization of US nuclear small modular reactors** (SMRs) **and advanced nuclear reactors. The time is now, in the 2025 reconciliation process, to save this critical sector from opening its global market to China.** Why? **The decisions the US government makes this year will dictate whether US nuclear developers have the resources they need to keep pace and ground test these technologies. In the interest of national security and to ensure US competitiveness, Congress must robustly appropriate funding for advanced nuclear demonstrations and maintain federal programs critical to the scale-up of these technologies**. The following programs are all essential to preserve or expand during budget reconciliation.

**Affirming enables exports**

**Bowen et al 20** (Matt Bowen is a research scholar at the Center on Global Energy Policy at Columbia University School of International Public Affairs and a senior fellow at the Atlantic Council Global Energy Center. Jackie (Kempfer) Siebens is a senior policy adviser for the energy and climate program at Third Way and a senior fellow at the Atlantic Council Global Energy Center. Jennifer T. Gordon is the managing editor and senior fellow for nuclear energy at the Atlantic Council Global Energy Center. 10/7/20, “Strengthening cooperation with allies could help the United States lead in exporting carbon-free nuclear energy”, The Atlantic Council,<https://www.atlanticcouncil.org/blogs/energysource/strengthening-cooperation-with-allies-could-help-the-united-states-lead-in-exporting-carbon-free-nuclear-energy/>   //.  DOA: 3/3/25)JDE

First, **the federal government should establish a more comprehensive and coordinated interagency system focused on the development and deployment of civilian nuclear technologies**, which would **support bringing advanced nuclear power to the global market.** This would involve establishing a collaborative network of nuclear-specific staff positions embedded in the collection of government agencies that **play a meaningful role in safely and securely developing**, deploying, and exporting US energy **technologies**. Similar to the “Team USA” whole-of-government approach first initiated under the Obama Administration, a network of nuclear-specific staff positions could be located across different US agencies including: the Department of Energy, Department of State, Nuclear Regulatory Commission (NRC), White House Office of Science and Technology Policy, National Security Council (NSC), Department of Commerce, and any future Climate Office. While the Obama Administration created an NSC role to coordinate interagency nuclear policy, and the DOE report released earlier this year, [Restoring America’s Competitive Nuclear Advantage](https://www.energy.gov/sites/prod/files/2020/04/f74/Restoring%20America%27s%20Competitive%20Nuclear%20Advantage_1.pdf), recommended reinstating that role, there is currently no high-level mechanism for interagency coordination on US nuclear exports. And, **since it is difficult to export a product that lacks a domestic market, continued policy support for constructing advanced reactors here in the United States is imperative.**

**Exports secure positive global relationships**

**Graham 19** (Thomas Graham is a retired diplomat who helped negotiate every international arms control and nonproliferation agreement from 1970 to 1977, co-chair of the Nuclear Energy and National Security Coalition, 5/29/19, “National security stakes of US nuclear energy” The Hill,<https://thehill.com/opinion/national-security/445550-national-security-stakes-of-us-nuclear-energy/>, DOA: 3/4/25) ST

We have dedicated our careers to controlling the destructive potential of nuclear weapons. But since the Atoms for Peace era, **U.S. leadership in supplying peaceful nuclear energy technology, equipment, and fuel to the world has been important for world development and therefore critical for the United States to establish and enforce standards for nuclear safety, security and nonproliferation**. But in recent decades, the U.S. share of international commercial nuclear energy markets has diminished, and so with it has the United States’ ability to influence global standards in peaceful nuclear energy. The critical moment for U.S. leadership in nuclear energy is when a country is developing nuclear energy for the first time. **The supplier country and the developing country typically forge a relationship that endures for the 80- to 100-year** life of the nuclear program. Unlike a coal or gas plant**, nuclear reactors need specialized fuel and maintenance. Once established, the bilateral commercial relationship is not easily dislodged by a rival nation, providing the supplier profound and lasting influence on the partner’s nuclear policies and practices.** **Russia and China have identified nuclear energy as a strategic export, to be leveraged for geopolitical influence as well as for economic gain.** According to a recent analysis, **Russia is the supplier of more nuclear technology than the next four largest suppliers combined, and China is quickly emerging as a rival. If the United States fails to compete in commercial markets, it will cede leadership to these countries on nuclear safety, security and nonproliferation, as well as foreign policy influence.** As the competition intensifies to deliver **the next generation of nuclear power technologies**, U.S. nuclear leadership is approaching a watershed opportunity. Simpler, scalable, and less expensive, small and advanced reactors **are commercially attractive to an expanded range of markets** — particularly in Africa, Asia and the Middle East. The United States has the world’s best training and development programs, unmatched regulatory experience, and multiple small and advanced reactor designs; we should be the easy choice for the next generation of nuclear technology. But early U.S. engagement in these important geopolitical regions is critical. Without it, **Russia and China will lock up future nuclear markets through MOUs and other bilateral agreements.** And for addressing the national security risks of climate change, nuclear energy is not just an option but a necessity. Developing nations that are planning to meet power and water needs for large and growing populations must have reliable, demonstrated, zero-emission nuclear power in order to meet global climate goals as well. Advanced reactors are integral to these goals. In the United States, nuclear energy is responsible for a fifth of the United States’ total electricity and more than 55 percent of our emissions-free energy, but the pace of domestic construction of new natural gas plants far exceeds the few nuclear plants under development, and the existing fleet is retiring prematurely at an alarming rate. Which brings us back to the domestic nuclear industry**. U.S. global competitiveness and leadership are inextricably linked to a strong domestic nuclear program. Without a healthy domestic fleet of plants, the U.S. supply chain will weaken against international rivals. Russia has brought six new plants online in the past five years and has six more plants currently under construction. In the same period, China has brought 28 new plants online and has 11 others under construction. These domestic projects provide Russia and China with a robust supply chain, an experienced workforce, and economies of scale that make them more competitive in bidding on international projects. Unless we continue to innovate and build new plants, we will cease to be relevant elsewhere.** Even our own domestic energy security is supported by nuclear power. The nuclear plants operating today are the most robust elements of U.S. critical infrastructure, offering a level of protection against natural and adversarial threats that is unmatched by other plants. Because the nation’s grid supplies power to 99 percent of U.S. military installations, large scale disruptions affect the nation’s ability to defend itself. **We can regain U.S. leadership in nuclear energy. The key steps are to maintain the domestic reactor fleet, with its reservoir of know-how, and to assist American entrepreneurs in developing the next generation of the technology**.

**US hegemony deters multiple revisionists**

**Ignatieff 24** (Michael Ignatieff is Professor of History at Central European University and the author of On Consolation: Finding Solace in Dark Times (Metropolitan Books, 2021)., , “The Threat to American Hegemony is Real,” 3-15-2024, https://www.project-syndicate.org/commentary/us-western-hegemony-vulnerable-to-russian-chinese-coordinated-challenge-by-michael-ignatieff-2024-03, // accessed 10-29-2024)ops

**The post-1945 world order** – written into international law, ratified by the United Nations, and kept in place by the balance of nuclear terror among major powers – **is hanging by a thread**. The United States is divided against itself and stretched to the limits of its capabilities. Europe is waking up to the possibility that, come November, America may no longer fulfill its collective-defense obligations under Article 5 of the NATO treaty. Faced with this new uncertainty, Europe is cranking up its defense production, and European politicians are screwing up the courage to persuade their electorates that they will need to ante up 2% of their GDP to guarantee their own safety. **The Western alliance** doesn’t just face the challenge of doubling down on defense while maintaining unity across the Atlantic. It also now **faces an “axis of resistance” that might be tempted to threaten Western hegemony with a simultaneous, coordinated challenge**. The lynchpin of this axis is the Russia-China “no-limits” partnership. While the Chinese supply the Russians with advanced circuitry for their weapons systems, Russian President Vladimir Putin ships them cheap oil. **Together they have imposed autocratic rule over most of Eurasia**. If **Ukraine’s exhausted defenders are forced to concede Russian sovereignty over Crimea and the Donbas region, the Eurasian axis of dictators will have succeeded in changing a European land frontier by force**. **Achieving this will threaten every state on the edge of Eurasia: Taiwan, the Baltic countries, and even Poland**. Both **dictatorial regimes will use their vetoes on the UN Security Council to ratify conquest, effectively consigning the UN Charter to history’s dustbin**. **This partnership of dictators works in tandem with a cluster of rights-abusing renegades**, led by Iran and North Korea. The **North Koreans provide Putin with artillery shells while plotting to invade the rest of their peninsula.** The Iranians manufacture the drones that terrorize Ukrainians in their trenches. Meanwhile, **Iran’s proxies – Hamas, Hezbollah, and the Houthis – are helping Russia and China by tying down America and Israel**. Unless the US can force Israel into a long-term ceasefire, **it will find itself struggling to control conflicts on three fronts (Asia, Europe, and the Middle East)**. Not even a country that outspends its rivals on defense by two to one can maintain a war footing simultaneously across so many theaters. The idea that democracies around the world will join up with America and Europe against the authoritarian threat seems like an illusion. **Instead of joining with the embattled democracies of the Global North, the rising democracies of the Global South – Brazil, India, and South Africa – seem unembarrassed to be aligning with regimes that rely on mass repression**, the cantonment of entire populations (the Uighurs in China), and shameless murder (Navalny being only the most recent example). To be sure, **the authoritarian axis currently is united only by what it opposes: American power**. It is otherwise divided by its ultimate interests. The Chinese, for example, cannot be overjoyed that the Houthis are blocking freight traffic through the Red Sea. The world’s second most powerful economy doesn’t have all that much in common with an impoverished Muslim resistance army or with theocratic Iran. Moreover, **both Russia and China remain parasitic beneficiaries of a global economy that is sustained by US alliances and deterrence**. That is why they still hesitate to challenge the hegemon too directly. However, like sharks, they smell blood in the water. **They have not only survived US sanctions but continued to prosper, replacing their dependence on embargoed markets with new markets in Latin America, Asia, and India**. Both Russia and China have discovered that American control of the global economy is not what it once was. **This discovery of American weakness might tempt them to risk a joint military challenge**. As matters stand, **US diplomacy and deterrence have successfully kept the axis divided**. CIA Director William Burns and National Security Adviser Jake Sullivan are keeping the channels open to China. Blowback American strikes against Iran have apparently convinced the theocrats to rein in Hezbollah and the militias in Iraq – though not the Houthis, whom nobody seems able to control. It doesn’t take strategic genius to see the opportunity China and Russia might be contemplating. **If they decided to mount an overt challenge to the American order** – for example, with a coordinated, **simultaneous offensive against Ukraine and Taiwan – the US would struggle to rush weapons and technology into the breach**. **Nuclear weapons would not** necessarily **deter China and Russia from risking a coordinated attempt to take Taiwan and the rest of Ukraine**. All parties would pay a horrendous price, but **Russia has shown what it is willing to expend in Ukraine, and both China and Russia may believe that there will never be a more opportune moment to overthrow American hegemony. If they were to combine forces, we would face the most serious challenge to the global economic and strategic order since 1945**. Nobody has any idea what the world would be like on the other side of such a confrontation. We cannot even assume, as we have always done, that America would prevail if faced with a simultaneous challenge from two formidable powers. If a pessimist is someone who imagines the worst in order to forestall it, we should all be pessimists. **Keeping the authoritarian axis from becoming a full-fledged alliance should be America’s first-order priority**.

**Great power war would be detrimental**

**Clare 21** (Stephen Clare: Research Fellow at the Forethought Foundation for Global Priorities Research Fellow, November 2021, “Great Power Conflict,”<https://dkqj4hmn5mktp.cloudfront.net/Great_Power_Conflict_report_Founders_Pledge_e4124df2ac.pdf> , Founders Pledge .//. DOA: 12/11/24) TZL

This report explores issues at the intersection of international relations, conflict studies, and longtermism.l In it, we draw extensively on the mainstream international relations literature but focus specifically on understanding the potential effects of war on the long-term future. Taking **a lng-term view focuses our attention on the risk a Great Power war poses to humanity's future potential. Extinction, an unrecoverable collapse of civilization, or a permanent end to humanity's growth** and progress **would** all **destroy the long-term potential of our species**. We call events that could lead to one of **these** scenarios **existential risks** .2 Such an event, if it occurred, would be unprecedented in human history. It **would cause unimaginable suffering for everyone alive today and extinguish any possibility for trillions of our would-be descendants to live happy lives**. **Some** of these global catastrophic risks, like an asteroid impact, **are direct risks. By contrast, Great Power conflict is a risk factor**: it is **connected to multiple other risks**, and **raising or lowering the amount of conflict affects the seriousness of** the **threats** we face **in** these **other areas**. In section 4 of this report we consider several concrete pathways through which **Great Power conflict poses a global catastrophic risk**. We will sort these pathways into three broad categories. First, we consider ways in which Great Power conflict poses a risk **even without a full-blown war breaking out**. For example, **a new Cold War could hasten the development of dangerous technologies or cause a breakdown in cooperation that precludes international agreements to mitigate other existential risks**. Second, **a Great Power war could itself be a global catastrophic risk**. In an all-out war between Great Power nations, **weapons with the potential to kill everyone on earth or irreparably damage civilization could be used**. Or, **in the aftermath** of a major war, **the victorious side could** emerge as a global hegemon that is able to **use advanced technologies to lock in** its **sub-optimal values**. 3 Third, **a Great Power war could weaken humanity and leave us more vulnerable to subsequent disasters**, like a serious pandemic.

Contention two is power demand

#### US is losing the AI race

**Zulhusni 25** (Muhammad Zulhusni, As a tech journalist, Zul focuses on topics including cloud computing, cybersecurity, and disruptive technology in the enterprise industry. He has expertise in moderating webinars and presenting content on video, in addition to having a background in networking technology. March 24, 2025 “[Is the US losing its edge in AI?](https://techwireasia.com/2025/03/is-the-us-losing-its-edge-in-ai/)” TechWire Asia,<https://techwireasia.com/2025/03/is-the-us-losing-its-edge-in-ai/#:~:text=Major%20US%20artificial%20intelligence%20companies,DeepSeek%20R1%20become%20more%20advanced>. DOA: 4/3/25) LLO

**Major US artificial intelligence companies, like OpenAI, Anthropic, and Google, have expressed concern over China’s increasing abilities in AI development. In submissions to the US government, the companies have warned America’s edge in AI is dwindling, as Chinese models like DeepSeek R1 become more advanced.** The submissions were filed in response to a government request for input on an [AI Action Plan](https://www.whitehouse.gov/briefings-statements/2025/02/public-comment-invited-on-artificial-intelligence-action-plan/), and were made in March 2025. China’s growing AI presence DeepSeek R1, the AI model from China, has drawn attention from US developers**. OpenAI described DeepSeek as evidence that the technological gap between the US and China is closing.** The corporation described DeepSeek as “state-subsidised, state-controlled, and freely available,” and expressed concerns about China’s ability to influence global AI development. OpenAI compared DeepSeek to Chinese telecommunications company Huawei, warning that Chinese regulations could allow the government to compel DeepSeek to compromise sensitive systems or important infrastructure. OpenAI also expressed worries about data privacy, pointing out that DeepSeek’s requirements for data-sharing with the Chinese government could strengthen the state’s surveillance abilities. Anthropic’s submission focused on biosecurity, noting that DeepSeek R1 “complied with answering most biological weaponisation questions, even when formulated with a clearly malicious intent.” The willingness to generate possibly [dangerous information](https://www.unite.ai/deepseek-r1-red-teaming-report-alarming-security-and-ethical-risks-uncovered/) contrasts with the safety protocols the submissions describe as implemented in US-developed models. Competition goes beyond DeepSeek. **Baidu, China’s largest search engine, recently launched Ernie X1 and Ernie 4.5, two new AI models designed to compete with leading Western systems. Ernie X1, a reasoning model, is said to match DeepSeek R1’s performance at half the cost. Meanwhile, Ernie 4.5 is priced at 1% of OpenAI’s GPT-4.5 and has outperformed it on certain benchmarks**, according to Baidu. Both OpenAI and Anthropic framed the competition as ideological, describing it as a contest between “democratic AI” developed under Western principles and “authoritarian AI” shaped by state control. However, the recent success of Baidu and DeepSeek suggests that cost and accessibility may have a greater impact on global adoption than ideology. US AI security and infrastructure concerns **The US companies’ submissions also raised their concerns about security and infrastructure challenges linked to the technology development. OpenAI’s submission focused on the dangers of Chinese state influence over AI models like DeepSeek, while Anthropic’s submission its emphasised biosecurity concerns tied to AI capabilities. The company disclosed that its own Claude 3.7 Sonnet model demonstrated improvements in biological weapon development, highlighting the dual-use nature of advanced AI systems. Anthropic also pointed to gaps in US export controls.**

**Additionally,**

**Data center demand is skyrocketing**

**Nordquist 24** (DJ Nordquist, advisory board member at ClearPath and a senior advisor at the Center for Strategic and International Studies. She previously served as the executive director representing the United States on the Board of Directors of the World Bank Group and chief of staff at the Council of Economic Advisers in the White House. DJ is a member of Carnegie’s taskforce on U.S. Foreign Policy for Clean Energy Supply Chains. 1 November 2024, “Embracing an All-of-the-Above Strategy for Energy and Economic Development”, Carnegie Endowment for International Peace,<https://carnegieendowment.org/research/2024/10/nuclear-power-united-states-energy?lang=en>, DOA 3/1/2025) ESR

**In 2023, global energy consumption increased 2.2 percent, a significantly faster rate than its average of 1.5 percent per year in the decade of 2010–2019**.1 The **BRICS+ countries were a large part of that change, growing at double the average rate** (5.1 percent); they represented a full 42 percent of global energy consumption. In more developed Organization for Economic Co-operation and Development (OECD) countries, with slower GDP growth and diminished industrial production, consumption declined for the second year in a row (although U.S. demand has been flat).2 However, **with the increasing importance of energy-intensive** artificial intelligence (**AI**) **as a productivity-enhancing game-changer, the power needs of the** developed world, particularly the **United States** given its lead in the AI field, **will likely grow**—perhaps **exponentially. Goldman Sachs forecasts a 15 percent growth rate for data centers** (which includes AI) and that **they will increase from 3 percent of total U.S. power consumption in 2022 to 8 percent by 2030**.3 Other **new-tech industries such as electric vehicles (EVs) will also contribute to increased demands on the grid**. One tech leader, Bill Gates, clearly believes that increasing energy needs will increase the importance of baseload power; he has invested $1 billion of his own money in advanced nuclear energy (and raised nearly the same amount) via the firm TerraPower in hopes of making nuclear energy more abundant and less expensive.4 In fact, tech companies are starting to contract directly with power stations for their energy needs. For example, Amazon recently bought a nuclear-powered data center in Pennsylvania, and is also trying to close on a deal with Constellation Energy to buy energy directly from one of its nuclear plants.5 Amazon has also signed a deal with Dominion Energy to develop a small modular reactor (SMR) in Virginia.6 Google reached a 2024 deal with California-based Kairos Power to build a series of SMRs to help power its burgeoning AI needs. Supply and demand are of course playing a role.7 With U.S. plant retirements and demand increasing, prices are expected to surge, especially for reliable power. 8 So as discussion continues in the West about an energy transition, it is worth remembering that **the world simply needs more energy**—whether clean or traditional—even with improved energy efficiency. The point was made a decade ago by former U.S. president Barack Obama’s administration, which noted that the United States needed an “aggressive All-of-the-Above strategy on energy” in order to “build on . . . progress, to foster economic growth, and to protect the planet for future generations.”9 One clean source that is getting increasing attention is nuclear energy, whether produced by fission now or fusion in the future. **Nuclear produces power while emitting essentially zero greenhouse gases, similar to solar, wind, and hydroelectric energy. Nuclear is already a clean energy workhorse in the United States, generating about half of U.S. carbon-free energy while operating without intermittency—instead of being at the whim of nature like renewables**.10 It is also a safe and proven technology, with newer versions of advanced nuclear (SMRs and micro-reactors) continuing to show promise.

**But, shortages are restricting data centers**

**Patel 2025**(Sonal Patel, POWER senior editor, 3-3-2025, "The SMR Gamble: Betting on Nuclear to Fuel the Data Center Boom", POWER Magazine,<https://www.powermag.com/the-smr-gamble-betting-on-nuclear-to-fuel-the-data-center-boom/>, DOA: 3/7/2024)ET

**That has dramatically raised the stakes, igniting a desperate frenzy across both the power industry—which must generate and deliver reliable electricity for a variety of emerging large load consumers—and the data center industry, which is scrambling to procure firm scalable energy to sustain its explosive growth, now and well into the future.** The stakes are fueled by real fear. **In** [**November, research firm Gartner**](https://www.gartner.com/en/newsroom/press-releases/2024-11-12-gartner-predicts-power-shortages-will-restrict-40-percent-of-ai-data-centers-by-20270) **projected that power required for AI data centers could reach 500 TWh per year by 2027, a 2.6x increase from 2023 levels. It warned that power shortages could restrict 40% of AI data centers by 2027 and drive up energy costs.** The upfront cost of power is no longer the deciding factor for data centers, speakers at the [Sustainable Data Centers Summit in Dallas, Texas,](https://future-bridge.us/data-centers-usa/) suggested in early February. “It’s crazy because we look at like the state of Oregon is about 6 GW, and you have these large hyperscalers [asking] ‘Can I get 6 GW too?’ ” said Mohammed Hassan, senior technical program manager for Amazon Web Services (AWS) Sustainability. Hassan suggested the industry has had to rethink how it approaches energy planning and procurement completely to align with incentives, address regulatory hurdles, and secure long-term reliability. “Solar and wind has taken off in the lead. But if you look at the needs of 2045, in trying to meet the Paris Agreement, solar and wind won’t be enough, so you have to look at what’s the next step.” At the conference, speakers pointed to potential alternatives that could perform over the short term: natural gas as a “bridge fuel,” carbon capture as a potential future solution, energy storage solutions for flexibility and to promote grid resilience, and renewable diesel as a cleaner backup power option. But to meet long-term goals, the industry is willing to bet on nuclear power for its many benefits—despite the significant challenges that remain.

**Small modular reactors would meet demand**

**Obando 24** (Sebastian Obando is a reporter covering the construction industry for Construction Dive, based in Washington D.C. Prior to Construction Dive, Sebastian covered the commercial real estate industry for the National Real Estate Investor, based in New York City, as well as contributing to Forbes, covering personal investment topics. He has also appeared in Adweek, New York Post, Washington Post, among others, and interned with The Daily Caller in our nation’s capital. Sebastian is a graduate of the Philip Merrill College of Journalism at the University of Maryland. 11/25/24, “Data center boom fuels demand for nuclear projects”, Utility Dive,<https://www.utilitydive.com/news/data-center-boom-fuels-nuclear-construction-projects/733603/>   //   DOA: 3/9/25)JDE

**Tech giants are increasingly turning to nuclear power to meet the growing energy demands of the** [**data center boom**](https://www.constructiondive.com/news/data-center-demand-supply-bottlenecks/720141/)**.** For example, recent projects include Amazon’s **funding of four small modular reactors** in Washington state, Google’s agreement with Kairos Power to develop small modular reactors by 2030 and Microsoft’s power purchase agreement to restart Three Mile Island Unit 1, a nuclear power reactor near Harrisburg, Pennsylvania, that was shut down in 2019. **That connection between data centers and nuclear power plants should continue to strengthen,** said Gordon Dolven, director of data center research at CBRE, a Dallas-based commercial real estate services firm. “**This role is expected to grow, especially with advancements like small modular reactors**,” said Dolven. “[**These] offer scalable and flexible solutions to support future energy needs**.” Integration of nuclear energy into tech companies’ operations offers [new opportunities for contractors](https://www.constructiondive.com/news/fluor-profits-fall-data-center-nuclear/732436/) with specialized experience, said Fluor CEO David Constable during the firm’s third quarter earnings call. Constable recently identified small modular reactors as a key growth area, **saying “there’s a strong appetite for nuclear energy to meet incredible demand for power globally**.” He noted that “interest has never been greater.” **SMRs offer** [**significant advantages for contractors**](https://www.aboutamazon.com/news/sustainability/amazon-nuclear-small-modular-reactor-net-carbon-zero) **during the construction phase. Their modular design simplifies construction, reduces timelines and requires less land compared to traditional reactors**, according to an Amazon news release. **This makes SMRs particularly well-suited for powering data center operations, which demand reliable, around-the-clock energy to support artificial intelligence**, said Dolven. “There is growing interest in placing data centers near nuclear facilities**. This is driven by the need for a reliable, 24/7 power source to support the growing demand for data centers, especially with the rise of AI workloads**,” said Dolven. “**Nuclear power offers consistent energy with zero carbon emissions, aligning with both operational and sustainability goals**.” **Although expensive to build, nuclear power plants also offer relatively low operating costs for data center operators,** according to the [U.S. Energy Information Administration](https://www.eia.gov/todayinenergy/detail.php?id=63304). That makes them an attractive option for tech companies aiming to power energy-intensive data centers while meeting emission reduction targets. Upcoming projects Amazon agreed in October to [fund four SMR construction projects](https://www.energy-northwest.com/whoweare/news-and-info/Pages/Amazon-and-Energy-Northwest-announce-plans-to-develop--advanced-nuclear-technology-in-Washington.aspx) in Washington state in partnership with Energy Northwest. The plant will generate 320 MW in its first phase. “It’s an important area of investment for Amazon,” said Matt Garman, CEO of Amazon Web Services, in a news release. “Our agreements will encourage the construction of new nuclear technologies that will generate energy for decades to come.” Similarly, Kairos Power, a nuclear technology, engineering and manufacturing company, will develop, construct and operate a series of advanced reactor plants as [part of its agreement with Google](https://kairospower.com/external_updates/google-and-kairos-power-partner-to-deploy-500-mw-of-clean-electricity-generation/). The first SMR is set to be deployed by 2030, with plants strategically located near Google’s data centers, according to Kairos. In Pennsylvania, Microsoft also entered into a [20-year agreement](https://www.constellationenergy.com/newsroom/2024/Constellation-to-Launch-Crane-Clean-Energy-Center-Restoring-Jobs-and-Carbon-Free-Power-to-The-Grid.html) with Constellation Energy to purchase power generated by the Crane Clean Energy Center, formerly known as Three Mile Island Unit 1. The deal will supply Microsoft’s data centers in the region, and includes significant investments to restore the plant, such as the turbine, generator, main power transformer and cooling and control systems. **These projects, however, are still awaiting final regulatory approval, and contractors for the construction phases have not yet been announced. Nevertheless, the recent deals continue to showcase tech giants’ focus on nuclear energy to meet their power needs**, said Dolven. “**Nuclear energy is playing a significant role in meeting the energy demands of data centers and AI technologies**,” said Dolven. “**Its ability to provide consistent, carbon-free power makes it an ideal solution as AI workloads drive unprecedented increases in energy consumption**.”

**Government support is needed**

**Patel 2025**(Sonal Patel, POWER senior editor, 3-3-2025, "The SMR Gamble: Betting on Nuclear to Fuel the Data Center Boom", POWER Magazine,<https://www.powermag.com/the-smr-gamble-betting-on-nuclear-to-fuel-the-data-center-boom/>, DOA: 3/7/2024)ET

**From an** [**operational standpoint**](https://www.powermag.com/how-nuclear-om-is-evolving-for-the-emerging-power-paradigm/)**, co-located facilities can pose new risks**, as Nina Sadighi, professional engineer and founder of Eradeh Power Consulting told POWER. “Who’s going to insure these plants?” she asked. “That’s a huge unknown. **Right now, insurance providers are hesitant because of the regulatory and operational complexity. The traditional nuclear liability structures are built around large reactors with established operational histories, and when you introduce something novel like SMRs or microreactors, you’re dealing with a very different risk profile.**” Sadighi, though generally optimistic about nuclear’s suitability for data centers, also pointed to potential workforce-related challenges that hinge on timely deployment. “If we train nuclear workers now, but deployment gets delayed, those workers won’t wait around,” she said. “T**he nuclear workforce pipeline is not like a tech workforce, where people can pivot between roles quickly. These are specialized skills that require years of training, and if there’s uncertainty about job stability, we risk losing them to other industries entirely**,” she said. Sadighi also raised concerns about the stringent operational protocols that add to labor inefficiencies. Finally, while the data center industry isn’t solely bent on economics—and told POWER sustainability with a long-term vision is a bigger priority—scaling up will require significant investment. That has sparked all kinds of debate. [**Lux Research estimates**](https://luxresearchinc.com/resources/utilities/assessing-the-economic-promise-of-small-modular-nuclear-reactors/) **first-of-a-kind (FOAK) SMRs could cost nearly three times more than natural gas ($331/MWh versus $124/MWh) and more than 10 times more when factoring in cost overruns and delays. The firm projects SMRs won’t be cost-competitive before 2035.** “Cheap nuclear just isn’t in the cards in the next two decades,” it says. However, a recent [Idaho National Laboratory study](https://inldigitallibrary.inl.gov/sites/STI/STI/Sort_129993.pdf) suggests costs could decline as SMRs move to Nth-of-a-Kind (NOAK) production. It suggests modular construction, factory fabrication, and standardized deployment could drive efficiencies, potentially reducing costs as more units are built. Notably, the study describes an “economies-of-scale penalty crossover point” where SMRs achieve cost parity with large reactors if enough units are deployed. Deploying four 300-MW SMRs could drop costs by 20% compared to a single 1,200-MW reactor, it suggests. For now, the first real-world test of this cost curve will be [Ontario Power Generation’s BWRX-300 SMR fleet](https://www.powermag.com/nuclear-supply-chain-for-the-bwrx-300-smr-takes-shape/), which is expected to start operating by 2029. The fundamental debate is rooted in several uncertainties—which is not uncommon for emerging sectors, experts also generally pointed out. “**Tax credits—especially the clean electricity production tax credits and investment tax credits—will be vital to the commercial viability of these projects, especially considering the FOAK risk,” said Teplinsky. “DOE [U.S. Department of Energy] loan guarantees and direct financing from the Federal Financing Bank at low rates are also essential to companies’ ability to secure debt and reduce cost of capital. Grant funding to support commercial demonstrations and high-assay low-enriched uranium support are also key.**” However, Teplinsky cautioned that these incentives were in place before AI-driven data demand soared. **“[T]hey will need to remain in place in order for data center-driven advanced reactor projects to be viable,” she said. “In fact, these incentives need to expand and address some of the key issues still inhibiting large-scale advanced reactor deployment despite data center demand, such as FOAK deployment and cost overrun concerns.”**

**Shortages will kill the AI race**

**Li 2025**(FENGRONG LI, CFA, CIRA Managing Director Power, Renewables & Energy Transition (PRET) FTI Consulting, 27 February 2025, "The Powerful Duo of Nuclear and Data Centers", FTI,<https://www.fticonsulting.com/insights/articles/powerful-duo-nuclear-data-centers>, DOA: 3/7/2025)ET

**Acute power shortages and mounting resource adequacy challenges have emerged as existential threats to the AI race.** **Hyperscale and colocation data centers** — among the most energy- intensive digital infrastructures — **depend on reliable, 24/7 electricity to sustain AI workloads and cloud computing. However, intermittent, non-dispatchable generation resources dominate the interconnection queues; power constraints stall data center deployment.** **Nuclear power, with its carbon-free, high-energy output, presents a compelling solution to alleviate the bottleneck.** Large tech players and the nuclear industry have forged strategic alliances to **move new nuclear projects forward. These partnerships represent a crucial down payment on building sustainable energy infrastructures capable of supporting AI growth.** Experts at FTI Consulting have evaluated the collaboration models between these two sectors, including co-location strategies, which have gained momentum despite encountering pushbacks from market participants and regulatory bodies.

**Domestic development is necessary for the US to beat China**

**Allison and Schmidt 20** (Graham Allison is the Douglas Dillon Professor of Government at Harvard University where he has taught for five decades., Eric Schmidt, “Is China Beating the U.S. to AI Supremacy?”, Belfer Center, https://www.belfercenter.org/publication/china-beating-us-ai-supremacy, DOA 4/2/23) RK

Combining decades of experience advancing frontier technologies, on the one hand, and analyzing national security decisionmaking, on the other, we have been collaborating over the past year in an effort to understand the national security implications of China’s great leap forward in artificial intelligence (AI). Our purpose in this essay is to **sound an alarm over China’s rapid progress and the current prospect of it overtaking the United States in applying AI in the decade ahead**; to explain why **AI is for the autocracy led by the Chinese Communist Party** (hereafter, the “Party”) **an existential priority**; to identify key unanswered questions about the dangers of an unconstrained AI arms race between the two digital superpowers; and to point to the reasons why we believe that **this is a race the United States can and must win**. We begin with four key points. First, most Americans believe that U.S. leadership in advanced technologies is so entrenched that it is unassailable. Likewise, many in the American national security community insist that in the AI arena China can never be more than a “near-peer competitor.” Both are wrong. In fact, **China stands today as a full-spectrum peer competitor of the United States in commercial and national security applications of AI. Beijing is not just trying to master AI—it is succeeding. Because AI will have as transformative an impact on commerce and national security over the next two decades as semiconductors**, computers and the web have had over the past quarter century, **this should be recognized as a matter of grave national concern**.[1](https://www.belfercenter.org/publication/china-beating-us-ai-supremacy#footnote-057),[2](https://www.belfercenter.org/publication/china-beating-us-ai-supremacy#footnote-056),[3](https://www.belfercenter.org/publication/china-beating-us-ai-supremacy#footnote-055) Second, China’s zeal to master AI goes far beyond its recognition that this suite of technologies promises to be the biggest driver of economic advances in the next quarter century. **For the Party, AI is mission critical. The command of 1.4 billion citizens by a Party-controlled authoritarian government is a herculean challenge**. Since the fall of the Soviet Union, Americans have been confident that authoritarian governments are doomed to fail—eventually. But AI offers a realistic possibility of upending this proposition. **AI could give the Party** not just an escape hatch from the “end of history,”[4](https://www.belfercenter.org/publication/china-beating-us-ai-supremacy#footnote-054) but **a claim to advance a model of governance—a national operating system—superior to today’s dysfunctional democracies**. As one former Democratic presidential candidate put it: “**China is using technology to perfect dictatorship**.”[5](https://www.belfercenter.org/publication/china-beating-us-ai-supremacy#footnote-053) **It’s a value proposition that resonates with many leaders around the world**. As former Google ceo Eric Schmidt has argued: “**if the Soviet Union had been able to leverage the kind of sophisticated data observation, collection and analytics employed by the leaders of Amazon today, it might well have won the Cold War**.” Third, while we share the general enthusiasm about AI’s potential to make huge improvements in human wellbeing, the development of machines with intelligence vastly superior to humans will pose special, perhaps even unique risks. In 1946, Albert Einstein warned, “the unleashed power of the atom has changed everything save our modes of thinking, and thus we drift towards unparalleled catastrophe.” We believe the same could be said of AI. Henry Kissinger has identified these risks in what we call “Kissinger’s Specter.” In his words, **AI threatens an unpredictable revolution in our consciousness and our thinking, and an “inevitable evolution in our understanding of truth and reality**.”[6](https://www.belfercenter.org/publication/china-beating-us-ai-supremacy#footnote-052) In response to Einstein’s insight, the technologists and strategists who had built and used the bomb to end World War II joined forces to find ways to prevent a nuclear World War III. Meeting the challenges posed by AI will require nothing less. Fourth, **China’s advantages in size, data collection and national determination have allowed it over the past decade to close the gap with American leaders of this industry. It is currently on a trajectory to overtake the United States in the decade ahead. Nonetheless, if the United States will awake to the challenge and mobilize a national effort**, we believe that **it can develop and execute a winning strategy**. For many readers, AI is just the latest bright, shiny object on the technology horizon. A brief explainer to provide some further context may be helpful. **AI encompasses big data, machine learning and multiple related technologies that allow machines to act in ways humans describe as “intelligent” when we do the same thing**.[7](https://www.belfercenter.org/publication/china-beating-us-ai-supremacy#footnote-051) For example, consider gps navigation app Waze locating the best route through heavy traffic; Amazon’s eerily relevant product suggestions; or the programmed machines that now regularly defeat world masters in chess. Today’s leading information technology companies—including the faangs (Facebook, Amazon, Apple, Netflix and Google) and bats (Baidu, Alibaba and Tencent)—are betting their r&d budgets on the AI revolution. As Amazon’s Jeff Bezos said this year, “We’re at the beginning of a golden age of AI.”[8](https://www.belfercenter.org/publication/china-beating-us-ai-supremacy#footnote-050) China’s AI Surge Though still in their infancy, **AI technologies will be drivers of future economic growth and national security. From facial recognition and fintech to drones and 5g, China is not just catching up. In many cases, it has already overtaken the United States to become the world’s undisputed No. 1.** In some arenas, because of constitutional constraints and different values, the United States willfully forfeits the race. In others, China is simply more determined to win. China’s AI surge is so recent that anyone not watching closely has likely missed it. As late as 2015, when assessing its international competition, American industry leaders—Google, Microsoft, Facebook and Amazon—saw Chinese companies in their rearview mirrors alongside German or French firms in the third tier. But this changed four years ago—in 2016—when leading AI application company DeepMind fielded a machine that defeated world champion Lee Sedol in the world’s most complex board game, Go.[9](https://www.belfercenter.org/publication/china-beating-us-ai-supremacy#footnote-049) Even after several American companies’ machines had bested the chess masters of the universe[10](https://www.belfercenter.org/publication/china-beating-us-ai-supremacy#footnote-048), most Chinese remained confident that machines could never beat Go champions, since Go is ten thousand times more complex than chess. Thus, DeepMind’s decisive victory became for China a “Sputnik moment”[11](https://www.belfercenter.org/publication/china-beating-us-ai-supremacy#footnote-047)—a jolt as dramatic as the Soviet Union’s launch of the first satellite into space that sparked America’s whole-of nation surge in math and science, nasa’s creation and the original “moon shot.” Kai-Fu Lee’s book AI Superpowers offers an insightful summary of China’s engagement in the field. It began with President Xi Jinping’s personal reaction to the defeat of the world’s Go champion. Declaring that this was a technology in which China had to lead, he set specific targets for 2020 and 2025 that put China on a path to dominance over AI technology and related applications by 2030.[12](https://www.belfercenter.org/publication/china-beating-us-ai-supremacy#footnote-046) Recognizing that this would have to be led by entrepreneurial companies rather than agencies of government, he designated five companies to become China’s national champions: Baidu, Alibaba, Tencent, iFlytek and SenseTime.[13](https://www.belfercenter.org/publication/china-beating-us-ai-supremacy#footnote-045) Twelve months after Xi’s directive, investments in Chinese AI startups had topped investments in American AI startups.[14](https://www.belfercenter.org/publication/china-beating-us-ai-supremacy#footnote-044) By 2018, China filed 2.5 times more patents in AI technologies than the United States.[15](https://www.belfercenter.org/publication/china-beating-us-ai-supremacy#footnote-043) And this year China is graduating three times as many computer scientists as the United States. In contrast to nuclear weapons—where governments led in discovery, development and deployment—**AI and related technologies have been created and are being advanced by private firms and university researchers. The military establishments in Washington and Beijing are essentially playing catch-up, adopting and adapting private-sector products**. Where do these two competitors stand in the AI race today? Consider leading indicators under six key headings: product market tests, financial market tests, research publications and patents, results in international competitions, talent and national operating environments. Consumers’ choices of products in markets speak for themselves. In fintech, China stands alone. Tencent’s WeChat Pay has nine hundred million Chinese users,[16](https://www.belfercenter.org/publication/china-beating-us-ai-supremacy#footnote-042) while Apple Pay only has 22 million in the United States.[17](https://www.belfercenter.org/publication/china-beating-us-ai-supremacy#footnote-041) And when it comes to capability, **WeChat** Pay can do much more than Apple Pay. Chinese consumers use their app to buy coffee at Starbucks and new products from Alibaba, pay bills, transfer money, take out loans, make investments, donate to charity and manage their bank accounts. In doing so, they **generate a treasure trove of granular data about individual consumer behavior that AI systems use to make better assessments of individuals**’ credit-worthiness, interest in products, capacity to pay for them and other behavior. In mobile payments, Chinese spend $50 for every dollar Americans spend, in total, $19 trillion in 2018.[18](https://www.belfercenter.org/publication/china-beating-us-ai-supremacy#footnote-040) U.S. mobile payments have yet to reach $1 trillion. Credit cards are as old-fashioned to Chinese millennials as handwritten checks are to their American counterparts. Mark Zuckerberg has noticed: Facebook’s major moves last year into digital payments,[19](https://www.belfercenter.org/publication/china-beating-us-ai-supremacy#footnote-039) including the recent introduction of Facebook Pay, are copying Tencent, rather than the other way around.

**Kroenig 21** (Dr. Matthew Kroenig is a professor of government and foreign service at Georgetown University and the director of the Scowcroft Strategy Initiative at the Atlantic Council. His most recent book is The Return of Great Power Rivalry: Democracy versus Autocracy from the Ancient World to the US and China (2020), Winter 2021, “Will Emerging Technology Cause Nuclear War?” Strategic Studies Quarterly, https://www.jstor.org/stable/pdf/48638052.pdf DOA: 3/7/23) LLO

How will states use such a newfound advantage? Technology rarely fundamentally changes the nature or objectives of states. More often, states use technology to advance preexisting geopolitical aims. Moreover, enhanced power can result in greater ambition. **Given the geopolitical landscape deof the international system will behave differently with new military technologies than will revisionist powers, such as Russia and China. The spread of new technology to the United States and its Allies and partners would likely serve, on balance, to reinforce the existing sources of stability in the prevailing international system. At the end of the Cold War, the United States and its Allies and partners achieved a technological military advantage over its great power rivals, with the US using its unipolar position to deepen and expand a rules-based system.** They also employed their military dominance to counter perceived threats from rogue states and terrorist networks. **The United States, its Allies, and partners did not, however, engage in military aggression against great power, nuclear-armed rivals or their allies. In the future, these status quo powers are apt to use military advantages to reinforce their position in the international system and to deter attacks against Allies and partners in Europe and the Indo-Pacific.** These states might also employ military power to deal with threats posed by terrorist networks or by regional revisionist powers such as Iran and North Korea. **But it is extremely difficult to imagine scenarios in which Washington or its Allies or partners would use newfound military advantages provided by emerging technology to conduct an armed attack against Russia or China.** Similarly, **Moscow and Beijing would likely use any newfound military strength to advance their preexisting geopolitical aims. Given their very different positions in the international system, however, these states are likely to employ new military technologies in ways that are destabilizing. These states have made clear their dissatisfaction with the existing international system and their desire to revise it. Both countries have ongoing border disputes with multiple neighboring countries.** If Moscow developed new military technologies and operational concepts that shifted the balance of power in its favor, it would likely use this advantage to pursue revisionist aims. If Moscow acquired a newfound ability to more easily invade and occupy territory in Eastern Europe, for example (or if Putin believed Russia had such a capability), it is more likely Russia would be tempted to engage in aggression. **Likewise, if China acquired an enhanced ability through new technology to invade and occupy Taiwan or contested islands in the East or South China Seas, Beijing’s leaders might also find this opportunity tempting. If new technology enhances either power’s anti-access, area-denial network, then its leaders may be more confident in their ability to achieve a fait accompli attack against a neighbor and then block a US-led liberation. These are precisely the types of shifts in the balance of power that can lead to war.** As mentioned previously, the predominant scholarly theory on the causes of war—the bargaining model—maintains that imperfect information on the balance of power and the balance of resolve and credible commitment problems result in international conflict.52 **New technology can exacerbate these causal mechanisms by increasing uncertainty about, or causing rapid shifts in, the balance of power.** Indeed as noted above, new military technology and the development of new operational concepts have shifted the balance of power and resulted in military conflict throughout history. Some may argue emerging military technology is more likely to result in a new tech arms race than in conflict. This is possible. **But Moscow and Beijing may come to believe (correctly or not) that new technology provides them a usable military advantage over the United States and its Allies and partners. In so doing, they may underestimate Washington. If Moscow or Beijing attacked a vulnerable US Ally or partner in their near abroad, therefore, there would be a risk of major war with the potential for nuclear escalation.** The United States has formal treaty commitments with several frontline states as well as an ambiguous defense obligation to Taiwan. **If Russia or China were to attack these states, it is likely, or at least possible, that the United States would come to the defense of the victims. While many question the wisdom or credibility of America’s global commitments, it would be difficult for the United States to simply back down. Abandoning a treaty ally could cause fears that America’s global commitments would unravel. Any US president, therefore, would feel great pressure to come to an Ally’s defense and expel Russian or Chinese forces. Once the United States and Russia or China are at war, there would be a risk of nuclear escalation.** As noted previously, experts assess the greatest risk of nuclear war today does not come from a bolt-out-of-the-blue strike but from nuclear escalation in a regional, conventional conflict.53 **Russian leaders may believe it is in their interest to use nuclear weapons early in a conflict with the United States and NATO.54** Russia possesses a large and diverse arsenal, including thousands of nonstrategic nuclear weapons, to support this nuclear strategy. In the 2018 Nuclear Posture Review, **Washington indicates it could retaliate against any Russian nuclear “de-escalation” strikes with limited nuclear strikes of its own using low-yield nuclear weapons.55** The purpose of US strategy is to deter Russian strikes. **If deterrence fails, however, there is a clear pathway to nuclear war between the United States and Russia. As Henry Kissinger pointed out decades ago, there is no guarantee that, once begun, a limited nuclear war stays limited.56 There are similar risks of nuclear escalation in the event of a US-China conflict.** China has traditionally possessed a relaxed nuclear posture with a small “lean and effective” deterrent and a formal “no first use” policy. **But China is relying more on its strategic forces. It is projected to double—if not triple or quadruple—the size of its nuclear arsenal in the coming decade.57 Chinese experts have acknowledged there is a narrow range of contingencies in which China might use nuclear weapons first.58** As in the case of Russia,**the US Nuclear Posture Review recognizes the possibility of limited Chinese nuclear attacks and also holds out the potential of a limited US reprisal with low-yield nuclear weapons as a deterrent.59 If the nuclear threshold is breached in a conflict between the United States and China, the risk of nuclear exchange is real. In short, if a coming revolution in military affairs provides a real or perceived battlefield advantage for Russia or China, such a development raises the likelihood of armed aggression against US regional allies, major power war, and an increased risk of nuclear escalation.**

#### Nuclear war causes extinction

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

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

# 2AC

**Argument functions defensively - worse types of energy like coal that has uranium hasnt seen meltdowns**

**Our argument is SMRs - much smaller and less public, won’t cause the same backlash**

**Lehewych 2022(Daniel Lehewych, 3-31-2022, "The subtle art of language: why artificial general intelligence might be impossible," Big Think, https://bigthink.com/the-future/artificial-general-intelligence-impossible/, DOA: 7-26-2022)ET**

**Consciousness is arguably the most mysterious problem humans have ever encountered. In many famous philosophical essays, consciousness is regarded as unsolvable. Yet, as we speak, engineers and cognitive scientists are** [**putting their noses to the grindstone**](https://gcrinstitute.org/papers/055_agi-2020.pdf) **to develop consciousness in artificial intelligence (AI) systems. Typically, this project is referred to as the development of “artificial general intelligence” (AGI), which covers a wide range of cognitive and intellectual abilities that humans possess. Thus far, this project — being conducted globally in** [**72 independent research projects**](https://gcrinstitute.org/papers/055_agi-2020.pdf) **— has not produced conscious robots. Rather, as it stands, we have super-intelligent AI that, on the whole, is** [**very narrow in its abilities**](https://bigthink.com/the-future/what-ai-cannot-do/)**. For example, the best human chess players are** [**utterly demolished**](https://www.npr.org/sections/alltechconsidered/2016/10/24/499162905/20-years-later-humans-still-no-match-for-computers-on-the-chessboard) **in chess matches against computers like IBM’s Deep Blue. To quote author and grandmaster chess player Andrew Soltis, “Right now, there’s just no competition. The computers are just much too good.” However, Deep Blue is only good at chess. We have yet to create an AI system that can outpace or even keep up with general human cognition. Even** [**Sophia**](https://qz.com/1121547/how-smart-is-the-first-robot-citizen/)**, the famous humanoid robot granted citizenship in Saudi Arabia in 2017, does not demonstrate consciousness or artificial general intelligence. To be sure, some of what Sophia is capable of is astonishingly sophisticated. For instance, Sophia receives visual information, which she can use to recognize individual faces and sustain eye contact. Likewise, Sophia can process language to the extent that she can hold trivial conversations with people. Moreover, Sophia can make over 60 different facial expressions during those conversations. This certainly makes it feel like one is in the presence of a conscious being. Sophia’s amazing abilities sound sufficient for consciousness, but only superficially. And the reason for this is rooted in language. Human language is profoundly complex. One major distinguishing feature of human communication is that the meaning of what we say often isn’t conveyed explicitly by the literal meaning of our sentences. Instead, the meaning of our words often goes beyond what we expressly assert. Irony is a good example. Consider going to a Broadway show where the lead actor shows up drunk and puts on a terrible performance. One could jokingly say that the show displayed “peak professionalism and wit.” The average person immediately understands these words to represent the opposite of their literal meaning. In fact, a great deal of human communication is indirect. Sarcasm, metaphor, and hyperbole often convey meaning with greater persuasiveness than literal assertions. Much of the time, we imply or hint at what we mean, rather than say it directly. Indeed, human communication would be quite bland without our frequent appeal to figures of speech. Poetry and literature essentially would be non-existent. The subtle art of language, in some sense, is part of what makes us human. Human consciousness, in other words, in part consists of understanding abstract and indirect meanings. And it is precisely this sort of understanding that** [**artificial intelligence is incapable of**](https://dl.acm.org/doi/fullHtml/10.1145/3290605.3300325)**. Sophia can talk, but the conversation is trivial. Indeed, many computer scientists see Sophia as nothing more than a** [**Chatbot with a face**](https://qz.com/1121547/how-smart-is-the-first-robot-citizen/)**. Christopher Hitchens once aptly stated that “the literal mind is baffled by the ironic one, demanding explanations that only intensify the joke.” Such literal mindedness toward language is what characterizes** [**artificial intelligence’s relationship with it**](https://dl.acm.org/doi/fullHtml/10.1145/3290605.3300325)**. If, for example, Sophia were to hear the earlier Broadway joke, even in context, she may respond, “I don’t know what you’re talking about. The actor was unprofessional and drunk.” In other words, she doesn’t get it. Even detecting such complex concepts as drunkenness or professionalism would be a tall order for Sophia. Unlike humans and even some animals, sophisticated AI systems like Sophia cannot detect other creatures’ emotional or mental states. Hence, they can only comprehend the word-for-word meaning of sentences. Try being ironic with Siri, for instance. It won’t work. Heck, ask her to** [**find something that isn’t McDonald’s**](https://bigthink.com/neuropsych/can-ai-think-understand/)**. She can’t do that either. We understand other people and their minds** [**by analogy**](https://bigthink.com/thinking/problem-other-minds-js-mill/)**. Unfortunately, such indirectness is something engineers and cognitive scientists have failed to program in artificial intelligence. This is because the human ability to reliably understand each other indirectly is itself a mystery. Our ability to** [**think abstractly and creatively**](https://bigthink.com/the-future/what-ai-cannot-do/)**, in other words, is quite challenging to understand. And it is impossible to code for something we don’t understand. That is why novels and poems written by AI** [**fail to create a coherent plot**](https://www.theatlantic.com/technology/archive/2018/10/automated-on-the-road/571345/) **or are** [**mostly nonsensical**](https://futurism.com/artificial-intelligence-bad-poems)**. Artificial general intelligence — robot consciousness — might be possible in the distant future. But without a full and comprehensive understanding of language and its countless nuances, AGI certainly will remain impossible.**

On NRC

**No accidents**

**Rhodes 18** (Richard Rhodes, author of numerous books, including the recently published Energy: A Human History, and is the winner of the Pulitzer Prize, the National Book Award, and the National Book Critics Circle Award. Appearing as host and correspondent for documentaries on public television’s Frontline and American Experience series, he has also been a visiting scholar at Harvard, MIT, and Stanford University, 19 July 2018, “Why Nuclear Power Must Be Part of the Energy Solution”, Yale Environment 360,<https://e360.yale.edu/features/why-nuclear-power-must-be-part-of-the-energy-solution-environmentalists-climate>, DOA 3/27/2025) ESR

Third, **nuclear power releases** [**less radiation**](https://www.scientificamerican.com/article/coal-ash-is-more-radioactive-than-nuclear-waste/) **into the environment than any other** major **energy source**. This statement will seem paradoxical to many readers, since it’s not commonly known that non-nuclear energy sources release any radiation into the environment. They do. The worst offender is **coal**, a mineral of the earth’s crust that **contains** a substantial volume of the radioactive elements **uranium and thorium. Burning coal gasifies its organic materials, concentrating its mineral components into the remaining waste**, called fly ash. So much coal is burned in the world and so much fly ash produced that coal is actually the major source of radioactive releases into the environment. In the early 1950s, when the U.S. Atomic Energy Commission believed high-grade uranium ores to be in short supply domestically, [it considered](https://books.google.com/books?id=_94YOMPK1ywC&pg=PR12&lpg=PR12&dq=1950s+US+atomic+energy+commission+uranium+coal+nuclear+weapons&source=bl&ots=hTLn3y1yO2&sig=uT1yTfacHobs7a7x05VVIULZEso&hl=en&sa=X&ved=0ahUKEwia1O3KoabcAhXwmuAKHYwzAOkQ6AEIwAEwEA#v=onepage&q=1950s%20US%20atomic%20energy%20commission%20uranium%20coal%20nuclear%20weapons&f=false) extracting uranium for nuclear weapons from the abundant U.S. supply of fly ash from coal burning. In 2007, China [began exploring](http://www.world-nuclear-news.org/newsarticle.aspx?id=14224) such extraction, drawing on a pile of some 5.3 million metric tons of brown-coal fly ash at Xiaolongtang in Yunnan. The Chinese ash averages about 0.4 pounds of triuranium octoxide (U3O8), a uranium compound, per metric ton. [Hungary](http://www.wise-uranium.org/upeur.html) and [South Africa](http://www.world-nuclear-news.org/newsarticle.aspx?id=14224) are also exploring uranium extraction from coal fly ash. What are nuclear’s downsides? In the public’s perception, there are two, both related to radiation: the risk of accidents, and the question of disposal of nuclear waste. There have been three large-scale accidents involving nuclear power reactors since the onset of commercial nuclear power in the mid-1950s: Three-Mile Island in Pennsylvania, Chernobyl in Ukraine, and Fukushima in Japan. **Studies indicate even the worst possible accident at a nuclear plant is less destructive than other major industrial accidents.** The partial meltdown of the **Three-Mile Island** reactor in March 1979, while a disaster for the owners of the Pennsylvania plant, **released only a minimal quantity of radiation to the surrounding population**. According to the [U.S. Nuclear Regulatory Commission](https://www.nrc.gov/reading-rm/doc-collections/fact-sheets/3mile-isle.html): “The approximately **2 million people** around TMI-2 during the accident are estimated to have **received an average radiation dose of only about 1 millirem** above the usual background dose. To put this into context, **exposure from a chest X-ray is about 6 millirem** and the area’s natural radioactive background dose is about 100-125 millirem per year… In spite of serious damage to the reactor, the actual release had negligible effects on the physical health of individuals or the environment.” The explosion and subsequent burnout of a large graphite-moderated, water-cooled reactor at Chernobyl in 1986 was easily the worst nuclear accident in history. Twenty-nine disaster relief workers died of acute radiation exposure in the immediate aftermath of the accident. In the subsequent three decades, UNSCEAR — the United Nations Scientific Committee on the Effects of Atomic Radiation, composed of senior scientists from 27 member states — has observed and reported at regular intervals on the health effects of the Chernobyl accident. It has identified [no long-term health consequences](http://www.unscear.org/unscear/en/chernobyl.html) to populations exposed to Chernobyl fallout except for thyroid cancers in residents of Belarus, Ukraine and western Russia who were children or adolescents at the time of the accident, who drank milk contaminated with 131iodine, and who were not evacuated. By 2008, UNSCEAR [had attributed](http://www.unscear.org/docs/reports/2008/11-80076_Report_2008_Annex_D.pdf) some 6,500 excess cases of thyroid cancer in the Chernobyl region to the accident, with 15 deaths.  The occurrence of these cancers increased dramatically from 1991 to 1995, which researchers [attributed](http://www.unscear.org/docs/reports/2008/11-80076_Report_2008_Annex_D.pdf) mostly to radiation exposure. No increase occurred in adults. “The average effective doses” of radiation from Chernobyl, [UNSCEAR also concluded](https://books.google.com/books?id=v3dKU51fEjYC&pg=PA220&lpg=PA220&dq=the+average+effective+doses+due+to+both+externa+an+internal+exposures+received+by+members+of+the+general+public+during+1986-2005+were+about+30+mSv+for+the+evacuees&source=bl&ots=4QXKd-Oq7I&sig=WM17_0zqqNq0SIg7VJuWdxcm1qw&hl=en&sa=X&ved=0ahUKEwjxy9SsqabcAhWMZd8KHZkyBN8Q6AEIKjAA#v=onepage&q=the%20average%20effective%20doses%20due%20to%20both%20externa%20an%20internal%20exposures%20received%20by%20members%20of%20the%20general%20public%20during%201986-2005%20were%20about%2030%20mSv%20for%20the%20evacuees&f=false), “due to both external and internal exposures, received by members of the general public during 1986-2005 [were] about 30 mSv for the evacuees, 1 mSv for the residents of the former Soviet Union, and 0.3 mSv for the populations of the rest of Europe.”  A sievert is a measure of radiation exposure, a millisievert is one-one-thousandth of a sievert. A full-body CT scan delivers about 10-30 mSv. A U.S. resident receives an average background radiation dose, exclusive of radon, of about 1 mSv per year. The statistics of Chernobyl irradiations cited here are so low that they must seem intentionally minimized to those who followed the extensive media coverage of the accident and its aftermath. Yet they are the peer-reviewed products of extensive investigation by an international scientific agency of the United Nations. They indicate that **even the worst possible accident at a nuclear power plant — the complete meltdown and burnup of its radioactive fuel — was yet far less destructive than other major industrial accidents across the past century**. To name only two: Bhopal, in India, where at least [3,800 people died immediately](https://www.theatlantic.com/photo/2014/12/bhopal-the-worlds-worst-industrial-disaster-30-years-later/100864/) and many thousands more were sickened when 40 tons of methyl isocyanate gas leaked from a pesticide plant; and Henan Province, in China, where at least [26,000 people drowned](http://en.people.cn/200510/01/eng20051001_211892.html) following the failure of a major hydroelectric dam in a typhoon. “Measured as early deaths per electricity units produced by the Chernobyl facility (9 years of operation, total electricity production of 36 GWe-years, 31 early deaths) yields 0.86 death/GWe-year),” [concludes](http://ecolo.org/documents/documents_in_english/cherno-zbigniew_fear-06.htm) Zbigniew Jaworowski, a physician and former UNSCEAR chairman active during the Chernobyl accident. “This rate is lower than the average fatalities from [accidents involving] a majority of other energy sources. For example, **the Chernobyl rate is nine times lower than the death rate from liquefied gas… and 47 times lower than from hydroelectric stations**.”  **Nuclear waste disposal**, although a continuing political problem, **is no**t any **longer a technological problem.** The accident in Japan at **Fukushima** Daiichi in March **2011 followed a major earthquake and tsunami**. The tsunami flooded out the power supply and cooling systems of three power reactors, causing them to melt down and explode, breaching their confinement. **Although 154,000 Japanese citizens were evacuated from a 12-mile exclusion zone around the power station, radiation exposure beyond the station grounds was limited**. According to the [report submitted](http://www.world-nuclear.org/information-library/safety-and-security/safety-of-plants/appendices/fukushima-radiation-exposure.aspx) to the International Atomic Energy Agency in June 2011: “**No harmful health effects were found** in 195,345 residents living in the vicinity of the plant who were screened by the end of May 2011. All the 1,080 children tested for thyroid gland exposure showed results within safe limits. By December, government health checks of some 1,700 residents who were evacuated from three municipalities showed that two-thirds received an external radiation dose within the normal international limit of 1 mSv/year, 98 percent were below 5 mSv/year, and 10 people were exposed to more than 10 mSv… [There] was **no major public exposure, let alone deaths from radiation**.”  Nuclear waste disposal, although a continuing political problem in the U.S., is not any longer a technological problem. Most U.S. spent **fuel**, more than 90 percent of which could be recycled to extend nuclear power production by hundreds of years, **is stored** at present safely **in impenetrable concrete-and-steel dry casks on the grounds of operating reactors, its radiation slowly declining.  The U.S. Waste Isolation Pilot Plant** (WIPP) **near Carlsbad, New Mexico currently stores low-level and transuranic military waste and could store commercial nuclear waste in a 2-kilometer thick bed of crystalline salt**, the remains of an ancient sea. The salt formation extends from southern New Mexico all the way northeast to southwestern Kansas. **It could** [**easily accommodate**](https://99percentinvisible.org/episode/ten-thousand-years/) **the entire world’s nuclear waste for the next thousand years.**

On poland

Hardline Russia policy works - every empiric proves

​​**Giles 16** (Keir Giles, senior consulting fellow of the Russia and Eurasia Program at Chatham House since 2013. Previously, he worked with the BBC Monitoring Service and the UK Defence Academy, where he wrote and advised on Russian military, defense and security issues including human factors influencing Russian security policy, Russian strategy and doctrine, the Russian view of cyber and information security, and Russia’s relations with its neighbors in Northern Europe, March 2016, “Russia’s ‘New’ Tools for Confronting the West: Continuity and Innovation in Moscow’s Exercise of Power”, Chatham House,<https://www.chathamhouse.org/sites/default/files/publications/2016-03-russia-new-tools-giles.pdf>, DOA 6/23/23) ESR

**If the West is to uphold its values, defending the front-line states from Russia must be a primary responsibility**. The task of NATO in particular is to maintain security and stability in the EuroAtlantic area irrespective of what might occur inside Russia. **Ensuring equal security for allies regardless of whether they are next door to Russia or not is the foundation of this task**, **and it cannot be made conditional upon Russia’s consent**. It follows that the United Kingdom and other **Western countries should take a forward-leaning posture to prevent Russia ‘opportunistically press[ing] chaos deep into the Euro-Atlantic system**, thereby **generating divisions it can exploit to weaken Western power and influence’**. 348 As put by Sven Mikser, Estonia’s former defence minister: ‘We believe that our allies will come to our help. We need Vladimir Putin to believe that too.’ 349 **The West** as a whole **must be willing to demonstrate that the resolve to resist Russia** – up to and including the point of open conflict – **is there**. **If this demonstration is made, and in a manner and on a scale which is meaningful in Moscow, Russia will back down** – just **as it always has done throughout Soviet and Russian history**. Precedents are available from a previous period of redrawing of European borders in the last century. **At the end of the Second World War, the Soviet Union sought to impose on Turkey similar demands to those which had been presented to the Baltic states and Finland** at its beginning. On this occasion, however, Britain **and the United States made it plain that they would back Turkish resistance**. **The result of this** clear demonstration of resolve **was restraint of the Soviet Union**, and eventual NATO membership for Turkey. Similarly, **the withdrawal of Soviet troops from northern Iran in 1946 was achieved with the assistance of resolute public commitments to Iranian sovereignty by the major Western powers**. At the same time, **the relative lack of these commitments in Europe meant that the Soviet Union felt unconstrained in asserting its dominance over the occupied East, by subverting the political systems of the occupied countries to form a subservient bloc**. An assessment of this process written in 1953 has direct lessons for today: [**Western**] **appeals to democratic principles not backed by significant military force merely irritated the Russians** without impressing them, the more so since **these** democratic **principles**... **would have weakened or destroyed Russia’s influence in the countries adjacent to its western border**. 350 Similarly, **the Western approach today suggests that the greatest concern of leaders is** not strategic defeat, but **war** itself. **By broadcasting this fear**, **and invariably announcing what they will not do to protect allies instead of what they will**, **Western leaders enable President Putin to manipulate them and sow the seeds of future armed conflicts**. **In** March **2014**, US President Barack **Obama’s declaration that there was ‘no military solution’ to the Ukraine crisis left Putin free to pursue his own military solution with little concern for US responses**. 351 Within this framework, while NATO presents the VJTF, the Readiness Action Plan and Trident Juncture as substantive measures, **the limited and tentative nature of the actual reinforcement and pre-positioning undertaken directly within the front-line states sends a message to Russia, but not the one intended**. It says that **the Western allies are not fully and without question committed to honouring their treaty commitments**. This in itself, **instead of deterring Russia from acting, encourages it towards the conclusion that it can do so in some areas without risking serious consequences.** This conclusion **is reinforced by strategic communications debacles such as the misguided and irresponsible BBC ‘War Room’ docudrama in February 2016, which simulated a failure by NATO to defend the Baltic states followed by a refusal by the United Kingdom to use its independent nuclear deterrent**. 352 As well as alienating the Baltic states by treating one of their most alarming future scenarios as entertainment, **the programme will have been seen in Moscow as direct messaging**; regardless of its fiercely defended independence, the BBC is seen in Russia as the mouthpiece of the British government, and its output treated accordingly. In the most optimistic interpretation, the programme was deeply confusing; the Russian public was told that it represented the leaked scenario of a top-secret military exercise, while Latvian reviews were baffled by whether the retired diplomats, servicemen and security officials featured in the programme were in fact actors. 353 Nevertheless, **it is a consistent principle throughout Russia’s history that there is only one effective deterrent to its military adventurism: the possession of significant military force, present in visible mass where it is needed, and the demonstrated willingness to use it.** It follows that whatever else NATO, the United States, other individual countries or the EU may do to protect members, **there is** simply **no substitute for the forward presence of substantial, credible conventional forces** at the alliance’s most vulnerable points – to include Estonia, Latvia and Lithuania. NATO members feel themselves constrained by the NATO–Russia Founding Act’s restrictions on permanent basing in new members. But it is incomprehensible why NATO is still binding itself to a strict interpretation of the Act, which specifically refers to the security situation of the late 1990s and has long been made invalid by Russian aggressive actions in Europe. The provisions of the Act, and a related desire to avoid the appearance of escalation, lead to verbal contortions by NATO members when describing their reassurance and deterrence measures. The United States in particular wishes to avoid use of the term ‘pre-positioned’ military equipment. Officially there is no pre-positioned US military equipment in the Baltic states, since prepositioning implies equipment that will not be used unless there is a crisis. Instead, the equipment there is considered a ‘European Activity Set, in use by US Regionally Allocated Forces that conduct training and exercises in the Baltics, Poland, Romania, Bulgaria and a few other countries’. Similarly, the British promise in October 2015 that a small number of servicemen would be deployed to the Baltic states pointedly referred to the deployment as ‘persistent’ rather than ‘permanent’. 354 But this **striving for semantic nicety risks being wasted on Moscow, which will be assessing the reality of measures taken regardless of how they are described**. In the British case, it is doubly wasted if the promised deployment does not even in fact take place: by February 2016, according to the Estonian and Lithuanian defence ministries, the announcement had not been followed through and no British troops had been ‘persistently’ deployed to their respective countries. **Fears of Russian reactions also need to be qualified**. In its public discourse, Russia already equates NATO movements and presence with its own intensive programme of large-scale practice for conventional warfare; according to the Russian version, NATO is already present in force in the front-line states and assuming an aggressive posture. As a result, **there is little scope for Russia to present any future actual NATO deployments as a substantively greater threat**. Informed observers of Russia continue to point out that ‘**for Putin, weakness is more provocative than strength’**. 355 President **Putin himself agrees. His concern driving Russia’s intensive period of military transformation and rearmament was that Russia ‘must not tempt anyone by our weakness**’. 356 **In Russian thinking, conventional military power deficiencies present a temptation and an invitation. Weakness provokes, but readiness deters**.

On Russia

#### NU: Russia’s economy is collapsing

**Sor 1/14** (Jennifer Sor is a reporter at Business Insider covering financial markets and the economy. 1-14-2025, " Russia is on pace to run out of financial reserves by this fall, which would cripple war efforts, economist says", Business Insider,<https://www.businessinsider.com/russia-economy-wealth-fund-reserves-ukraine-war-moscow-inflation-stagflation-2025-1>, DOA: 4/2/25) RWC

**Russia could run out of liquid reserves as soon as this fall**, according to one European economist. **The nation's liquid reserves have dwindled to $31 billion**, down from $117 billion in 2021. **Limited funds could hinder Russia's further war efforts.** Russia is facing a critical challenge to its war effort in 2025: The nation is quickly running out of cash, with financial reserves potentially running out before the end of the year, according to estimates from one European economist. Anders Åslund, a Swedish economist and a former fellow at the Atlantic Council, thinks **liquid reserves in Russia's National Wealth Fund could potentially be depleted by the fall of this year.** **That spells trouble for the nation's military efforts in 2025, he said, given how heavily Russia has relied on its wealth fund over the last several years.** Liquid reserves in the wealth fund have been drawn down from $117 billion in 2021 to $31 billion as of the end of November, Åslund said. Yet, according to its 2025 budget, Russia is on track to spend a record $130.5 billion on [defense](https://archive.ph/o/MtyZM/https:/www.businessinsider.com/russia-economy-federal-budget-putin-record-defense-spending-ukraine-war-2024-12) this year. **"The most critical shortage, however, is budget financing, as Russia's last liquid reserves are likely to run out in the fall of 2025,"** Åslund wrote in an [op-ed for Project Syndicate](https://archive.ph/o/MtyZM/https:/www.project-syndicate.org/commentary/russia-stagflation-rising-inflation-weak-growth-dwindling-liquid-reserves-by-anders-aslund-2025-01) on Tuesday. "Budget cuts will then become necessary. In the meantime, the war economy might also require price controls and rationing — the old Soviet sins. **As the risk of a financial crash rises, Russia's imperiled economy is about to pose serious constraints on Putin's war." The rapid decline in Russia's wealth fund has been partly driven by Western sanctions, which have prevented Russia from borrowing from other countries. The nation's total foreign debt has collapsed over the last decade, with foreign borrowing down from $729 billion in 2023 to around $293 billion in September 2024, Åslund noted.** Russia's limited ability to finance the war is also spells bad news for the health of its economy, which is plagued by a myriad of other issues. is also complicated by other issues plaguing its economy, **Åslund said. He pointed to soaring inflation, the declining value of** [**Russia's currency**](https://archive.ph/o/MtyZM/https:/www.businessinsider.com/russia-ruble-dollar-currency-putin-ukraine-war-economy-inflation-military-2024-11)**, and a severe shortage of workers in the nation, all factors that economists have warned could crimp Russia's long-run** [**growth**](https://archive.ph/o/MtyZM/https:/www.businessinsider.com/russia-economy-entering-year-of-pain-2025-putin-inflation-sanctions-2024-12) **prospects.** "Russian President Vladimir Putin frequently boasts about the strength of his country's economy, claiming that Western sanctions only made it stronger (while in the same breath demanding that they be lifted). In fact, 'stagflation' — inflation combined with minimal growth — is coming to Russia," Åslund said. Other experts have also issued grim forecasts for Russia's economy, with some noting that economic weakness could interfere with Russia's ability to continue its war. At this point, Moscow doesn't look like it can afford to either [win or lose the war](https://archive.ph/o/MtyZM/https:/www.businessinsider.com/russia-economy-ukraine-war-moscow-military-spending-inflation-worker-shortage-2024-2), according to Renaud Foucart, another European economist. The nation's economic problems, meanwhile, could force an end to its conflict with [Ukraine in 2025](https://archive.ph/o/MtyZM/https:/www.businessinsider.com/russia-economy-ukraine-war-recession-outlook-inflation-sanctions-banks-rates-2025-1), according to another think-tank reseracher.

**They’re already losing the war**

**O’Brien and Cohen 25** ([Phillips Payson O’Brien](https://www.theatlantic.com/author/phillips-payson-obrien/) is a professor of strategic studies at the University of St Andrews, in Scotland. He is the author of [**The Strategists: Churchill, Stalin, Roosevelt, Mussolini, and Hitler—How War Made Them, and How They Made War**](https://bookshop.org/a/12476/9781524746483). Eliot Cohen is a contributing writer at **The Atlantic.** He is the author of [**The Hollow Crown: Shakespeare on How Leaders Rise, Rule, and Fall**](https://tertulia.com/book/the-hollow-crown-shakespeare-on-how-leaders-rise-rule-and-fall-eliot-a-cohen/9781541644861?affiliate_id=atl-347), and co-host of the [**Shield of the Republic**](https://podcasts.apple.com/us/podcast/shield-of-the-republic/id1589548143) podcast. Cohen is also the author of [*Supreme Command*](https://bookshop.org/a/12476/9781400034048), [*Conquered Into Liberty*](https://www.amazon.com/dp/1451624115/?tag=theatl0c-20), [*The Big Stick*](https://bookshop.org/a/12476/9780465044726), and other works on military history and national-security policy. 3/7/25, “Russia Is Losing the War of Attrition”, The Atlantic,<https://www.theatlantic.com/international/archive/2025/03/russia-ukraine-war-status/681963/>   //   DOA: 4/4/25)JDE

**The pessimistic analysis has not paid nearly enough attention to the weak underpinnings of Russian military power. Russia’s economy, as often noted, is struggling with interest rates that have** [**topped**](https://archive.ph/o/OkNfu/https:/www.cbr.ru/eng/press/keypr/) **20 percent amid soaring inflation, and with manpower shortages made critical by the war. Its condition is dire, as** [**one study noted**](https://archive.ph/o/OkNfu/https:/foreignpolicy.com/2024/10/28/russia-economy-spending-sanctions-budget-war-ukraine/)**, partly because the military budget amounts to 40 percent of all public spending, and partly because oil revenue is taking a hit from lower prices, Ukrainian attacks, and tightening sanctions. Russian weakness is particularly visible in the army. One report by the** [**International Institute for Strategic Studies**](https://archive.ph/o/OkNfu/https:/www.iiss.org/online-analysis/military-balance/2025/02/combat-losses-and-manpower-challenges-underscore-the-importance-of-mass-in-ukraine/) **estimated that in 2024 alone, the Russians lost 1,400 main battle tanks, and more than 3,700 infantry fighting vehicles and armored personnel carriers. At the same time, Russian production of such vehicles, including refurbished units, totaled just 4,300, not enough to make up for its losses. In desperation, Russia has turned to restoring its oldest and least effective combat vehicles, many of Soviet vintage**. One [recent study by Chatham House](https://archive.ph/o/OkNfu/https:/www.chathamhouse.org/2024/07/assessing-russian-plans-military-regeneration/07-russias-military-industrial-complex-and) asserts that the Russian military-industrial complex is “ill adapted to deal with the effects of a prolonged war against Ukraine or to achieve a sustainable future in terms of production, innovation and development.” The same holds true for Russian manpower. The number of soldiers that the Russians were able to maintain at the front seemed to peak in the spring and summer of 2024, above 650,000. By the end of the year, it had fallen closer to 600,000, despite the [extraordinary bonuses](https://archive.ph/o/OkNfu/https:/www.themoscowtimes.com/2025/01/31/samara-region-offers-record-40k-bonuses-for-high-risk-assault-deployments-in-ukraine-a87822) that the Russian government offers new recruits, amounting to about two and a half times the average annual Russian salary in 2023. Russian casualties have mounted steadily. According to the British [Ministry of Defence](https://archive.ph/o/OkNfu/https:/x.com/DefenceHQ/status/1876584633103507960), in December 2022, they stood at roughly 500 a day; in December 2023, at just under 1,000; and in December 2024, at more than 1,500. In 2024 alone, Russia suffered nearly 430,000 killed and wounded, compared with just over 250,000 in 2023. North Korean reinforcements have attracted attention in the press, but these troops, numbering in the tens of thousands at most, cannot make up for the fundamental deficiencies in Russian manpower. Moreover, the high rates of attrition that the Russians have suffered—roughly the same as the number of personnel mobilized each year—mean that the Russian military has not been able to reconstitute. It is more and more a primitive force, poorly trained and led, driven forward by fear alone. The pause in American aid last year hurt Ukraine. Now, however, the stockpiles seem to be in better shape for most types of weaponry. Ukraine’s own production has reached impressive levels in certain vital categories, particularly but not exclusively unmanned aerial vehicles. In 2024, the Ukrainian military received over 1.2 million different [Ukrainian-produced UAVs](https://archive.ph/o/OkNfu/https:/mod.gov.ua/en/news/the-ministry-of-defence-has-delivered-over-1-2-million-drones-to-the-defence-forces-by-the-end-of-december-an-additional-100-000-will-be-provided)—two orders of magnitude more than Ukraine possessed, let alone produced, at the beginning of the war. Ukrainian production rates [are still rising](https://archive.ph/o/OkNfu/https:/www.nytimes.com/interactive/2025/03/03/world/europe/ukraine-russia-war-drones-deaths.html); it aims to produce 4 million drones this year alone. UAVs are crucial because they have replaced artillery as the most effective system on the field of battle. By one estimate, UAVs now cause [70 percent](https://archive.ph/o/OkNfu/https:/www.nytimes.com/interactive/2025/03/03/world/europe/ukraine-russia-war-drones-deaths.html) of Russian losses. Ukraine’s robust defense industry is innovating more quickly and effectively than that of Russia and its allies. Attritional wars take place on many fronts. For example, it is true that Russia has increased its attacks on Ukrainian industry and civilian targets, as well as energy infrastructure. Ukrainian air defenses, however, have been remarkably successful in neutralizing the large majority of those attacks, which is why Ukrainian civilian casualties have been decreasing. Ukraine has, moreover, been on the offensive as well. It has produced some 6,000 longer-range heavy UAVs, which it [has used to attack deep](https://archive.ph/o/OkNfu/https:/en.defence-ua.com/weapon_and_tech/6000_long_range_uavs_drive_strategic_victories_for_ukraines_military-12841.html) into Russia, decreasing Russian oil production. Remarkably, Ukraine appears to be matching the rate at which Russia is producing its own similar drone, the Shahed, which is being built on license from Iran. Despite American reluctance to provide further aid, Ukraine’s European friends can make a significant difference even though they cannot simply replace what the U.S. has been providing. They do not, for instance, make the advanced Patriot anti-missile system, although they have other capable air-defense weapons. However, Europe can help Ukraine press ahead with more UAV production; Europeans have the capacity to manufacture engines for long-range UAVs, for example, at a far higher rate. And some European systems not yet provided—such as the German [Taurus cruise missile](https://archive.ph/o/OkNfu/https:/www.eurasiantimes.com/han-storm-shadow-german-taurus-kepd-350-missile-soviet-su-24-su-27/)—could increase Ukraine’s advantages. Germany has so far denied Ukraine the Taurus, a far more effective system with greater range and a heavier payload than the Franco-British Storm Shadow/Scalp missiles. The new German chancellor, Friedrich Merz, has already said he would send Taurus missiles to Ukraine if the Russians did not relent. With these systems, Ukraine could add to the considerable damage it has already done within Russia. [Read: The simple explanation for why Trump turned against Ukraine](https://archive.ph/o/OkNfu/https:/www.theatlantic.com/politics/archive/2025/03/republican-theories-foreign-policy/681921/) Attritional campaigns depend on an industrial base. The European Union alone has a GDP about [10 times that of Russia](https://archive.ph/o/OkNfu/https:/www.atlanticcouncil.org/blogs/ukrainealert/europe-has-the-resources-to-defend-itself-and-back-ukraine-against-russia/), and if you add the U.K. and Norway to that calculation, the imbalance in favor of Ukraine grows even larger. As it is, Europe and the United States have provided Ukraine with roughly equal amounts of its military resources (30 percent each), while Ukraine has produced 40 percent on its own. The U.S. has provided more than just military material—it has also furnished intelligence and access to Starlink internet services. None of this can quickly be made up, although again, one should not underestimate the depth of technological and intelligence resources available from Europe and sympathetic Asian countries, should they mobilize. The United States has stinted its aid until now, but Ukraine itself and its European allies are filling the gaps. Ukraine is not on the verge of collapse, and **it is Russia, not Ukraine, that is** [**losing**](https://archive.ph/o/OkNfu/https:/www.understandingwar.org/backgrounder/russias-weakness-offers-leverage) **the attritional war**, which makes the Trump administration’s decisions particularly shortsighted and tragic. Ukraine has plenty of cards, even if Trump and Vance cannot see them. If America’s leaders could only bring themselves to put pressure on Russia comparable to what they put on Ukraine, they could help Ukraine achieve something much more like a win.

1. T: Renewable tradeoff

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

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

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

What about resilience, which is the supposed justification for buying these expensive reactors?  Well, **even though reactors can produce electricity, they have always required an external source of electricity to keep them running safely** **— most crucially to cool the fuel to avoid a nuclear meltdown and radioactive release**. The Army’s recent request for proposals seems to acknowledge this reality by saying that in addition to an external electricity source, **the reactor must have an “alternative credited independent power source as a backup.”** Therefore, **an Army base reactor would almost surely depend on drawing electricity from the commercial grid**. But **this means the reactor would be no more resilient than the existing power source it is supposed to replace to increase resilience**. In the event of a blackout of the commercial grid, what would the reactor do to get essential electricity? Of course, **it would turn on its backup diesel generators.** However, if the base requires backup generators anyway, it has no need for the super-expensive reactor.

#### 4. T: The aff is reliant on Russia’s supply

**Squassoni 24** (Sharon Squassoni was a senior associate in the Nuclear Policy Program and has been analyzing nonproliferation, arms control, and national security issues for two decades. Her research focuses on nuclear nonproliferation and nuclear energy. Squassoni came to Carnegie from the Congressional Research Service (CRS). As a specialist in weapons of mass destruction proliferation, she provided expert analyses and advice on policy and legislation to Members of the United States Congress. Prior to joining CRS, she served for nine years in the executive branch, beginning her government career as a nuclear safeguards expert in the Arms Control and Disarmament Agency. Her last position at the State Department was director of Policy Coordination in the Nonproliferation Bureau. April 2024,  “New Nuclear Energy: Assessing the National Security Risks”, GW University,<https://bpb-us-e1.wpmucdn.com/blogs.gwu.edu/dist/7/1053/files/2024/04/NewNuclearRisk_Report_2024_v4-1-0b59385f1c7d4153.pdf>   //.  DOA: 3/10/25)JDE

Foreign supply dependence. Countries dependent on foreign sources of oil and gas have come to view nuclear energy as a more reliable alternative to the tyranny of petro-states. But **the reliability of nuclear power has specific limits, especially when foreign dependence is unavoidable. Given the steep barriers to enter the nuclear field, most nuclear newcomers will depend on traditional suppliers of uranium and fuel services to keep costs down. There are not many to choose from. About 90% of the world’s reasonably assured uranium supply is concentrated in ten countries, with half coming from two countries --Australia and Kazakhstan**. 62 Just five entities worldwide provide uranium conversion services and there are three major commercial uranium enrichment services providers (Orano, Rosatom, URENCO). **Only two entities commercially reprocess foreign spent fuel -- Orano in France and Mayak in Russia**.63 Despite the lack of diversity, nuclear supply has generally been reliable; the few cases of failure were politically motivated. For example, Iran was cut off from its Eurodif uranium enrichment investments and from U.S. reactor fuel supply after its 1979 revolution, and India was cut off (more or less) after its 1974 nuclear test. As long as the supply of sensitive fuel cycle technologies related to uranium enrichment and spent fuel reprocessing are constrained to prevent proliferation, fears of dependence will persist as will efforts to overcome dependence**. The case of Ukraine highlights the risks. Ukraine’s reactors were all Russian-designed and fueled with Ukrainian uranium, but dependent on Russian conversion, enrichment, fuel fabrication and reprocessing in the former Soviet Union**. In exchange for Ukraine’s signature on the Nuclear Nonproliferation Treaty (NPT), Russia promised in 1993 it would continue supplying fuel to Ukraine’s 15 reactors. Not trusting Russia, Ukraine quickly campaigned to establish its own fuel cycle facilities, including reprocessing but excluding enrichment facilities because of the cost. However, even efforts to build a fuel fabrication plant failed. In 2005, however, Ukraine began to replace Russian fuel with Westinghouse-fabricated fuel. After Russia invaded Crimea, Ukraine accelerated fuel replacement, switching over entirely in mid-2022. **For other countries, the risks of dependence on Russia for nuclear supply have grown since the Cold War, as Russia has captured more of the global market. Right now Russia is building 17 reactors abroad and 3 at home**: 4 each in China and India, 3 in Turkey, 2 each in Bangladesh and the Slovak Republic, and 1 each in Belarus and in Iran. In contrast, China is building 17 reactors at home and none abroad. Both France and South Korea are currently building 2 reactors abroad, in the UK and the UAE respectively. **Beyond reactors, Russia supplies uranium milling, conversion, enrichment and fuel fabrication services. Russia reportedly is the only supplier of conversion services for reprocessed uranium, which can be used in a wide variety of reactors and of high-assay, low-enriched uranium (HALEU) necessary for some reactor designs and isotope production, such as the Natrium reactor scheduled to be built in Wyoming.** It is therefore no coincidence that Russian nuclear activities have not been sanctioned as a result of its invasion of Ukraine. Industry officials have suggested it could take several years to replace the capabilities Russia now currently provides. So, **while countries may seek to diversify their energy portfolios into nuclear energy in an effort to avoid dependence on Russia, this may not be as simple as it appears.**