# **Neg Case**

#### **Even if nuclear energy is good or bad in a vacuum, this debate is about federal investment in nuclear energy, which we would say is deeply disruptive and harmful.**

#### **Private investment is already working, Obando 24 reports that**

**Obando 24** [Sebastian Obando, 11-24-2024, “Data center boom fuels demand for nuclear projects”, Utility Dive, https://www.utilitydive.com/news/data-center-boom-fuels-nuclear-construction-projects/733603/] //bid daddy yerg

**Tech giants are increasingly turning to nuclear power to meet the growing energy demands of the data center boom.**  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 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 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 intelligenc**e, 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.** 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 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. **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 with Constellation Energy to purchase power generated by the Crane Clean Energy Center, formerly known as Three Mile Island Unit 1. T**he 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.

#### **Fossil fuels are being phased out. Bremmer 25 assures that**

**Bremmer 25** [Ian Bremmer, Founder and President of Eurasia Group and GZERO Media, is a member of the Executive Committee of the UN High-level Advisory Body on Artificial Intelligence, 2-11-2025, Trump Will Not Kill the Global Energy Transition, Project Syndicate, https://www.project-syndicate.org/commentary/trump-will-not-kill-global-energy-transition-by-ian-bremmer-2025-02, accessed 3-29-2025.] //aayush

NEW YORK – Donald **Trump’s return to the White House has raised fears that the global energy transition will be thrown into reverse**. The US president has vowed to “drill, baby, drill,” roll back environmental regulations, and end the “green new scam.” **As Earth continues to warm – last month was the hottest January on record, and 2024 was the first year with global average temperatures exceeding 1.5° Celsius above pre-industrial levels – many worry that we are about to witness a worldwide slowdown in the shift away from fossil fuels**. But **Trump couldn’t kill the green transition during his first term, and he can’t kill it this time, either**. The reason is simple: **Technological breakthroughs, steep learning curves, and plummeting costs have made clean energy cheaper than fossil fuels in most places**. Moreover, the revolution was just getting started in 2017, whereas now **it has reached escape velocity. Its momentum is being driven not by politics or government intervention, but by markets**. The fact that **deep-red** (Republican-leaning) **Texas leads the United States in renewables deployment is a case in point. Politics will no longer hold back the American energy transition.** This is not to say that politics won’t slow the US transition. The Trump administration is already taking steps to loosen environmental and climate regulations, promote domestic oil and gas production, support gas-fired power plants, and end incentives to adopt clean energy and electric vehicles (EVs). The president’s day-one executive orders expanded the federal lands available for oil and gas exploration, reversed former President Joe Biden’s suspension of approvals for new liquefied natural gas terminals, and paused new wind projects on federal land and coastal waters. Aided by Republican majorities in Congress, Trump will seek to repeal roughly half of the Inflation Reduction Act’s outlays, including its provisions supporting EVs and offshore wind, as well as the IRA’s investment and production tax credits. Yet **that will not be enough to halt the forward movement of the US energy transition. Despite Trump’s claims of a “national energy emergency,” the US has been a net energy exporter since 2019 and already produces more oil than any country in history. Yet with prices low and US oil and gas output already at record levels, fossil-fuel production will struggle to rise much higher in the near term**, regardless of what Trump does. **The deployment of clean energy will therefore continue, driven by increasing power demand and declining costs – especially for solar**. American electric utilities will still invest aggressively in renewables to keep pace with rising energy use and ensure grid adequacy, even as new gas-fired power plants expand, too. US **automakers will not abandon their long-term EV plans just because the Trump administration has eliminated subsidies** and canceled funding for charging infrastructure. Besides, **Democratic-controlled states will continue pursuing ambitious standard-setting decarbonization policies, as they did during Trump’s first term**. Perhaps more importantly, **meaningful parts of the IRA will remain in place because of their political support with Republican constituencies**, which have benefited disproportionately from the new investments and job creation. Next-generation clean-energy technologies – **nuclear, geothermal, and carbon capture and storage – will continue receiving support**. As for the energy transition abroad, the implications of America’s retreat from global climate leadership will be significant, but not fatal. **Trump’s decision to withdraw the US from the Paris** climate agreement (again) **and withhold funding from the United Nations Framework Convention on Climate Change will reduce climate-finance flows for emerging economies**, dampening their enthusiasm for accelerated climate action and encouraging some (like Argentina and Indonesia) to follow Trump’s lead. **But just as the US transition is unstoppable, so, too, is the global transition**. Other industrialized countries will remain broadly committed to the Paris climate agreement and subject to the same market forces that are driving developments in the US. **Europe views the energy transition as a way to reduce its import reliance and improve its energy security. India, the world’s fastest-growing emitter, sees decarbonization as an economic opportunity and a necessary step to reduce some of the world’s worst air pollution**. And most other emerging markets are eager to accelerate their renewables deployment for purely economic reasons. Most critically, **China** – the largest source of global emissions – **is set to reach peak emissions five years ahead of its previously stated 2030 target**. Chinese manufacturers of solar panels, EVs, and batteries already dominate global supply chains and will not abandon their ambitions to expand simply because of changes in US demand or market access. If anything, they see the Trump administration’s policies as an opportunity to gain global market share, speeding adoption of these technologies and driving further price declines. While the US falls further behind China in clean energy, the continuing decline in renewable power costs will encourage more emerging markets to choose domestic solar and wind over volatile imported fossil fuels. **The economic and technological forces driving the clean-energy revolution have simply become too powerful for any single country or political leader to stop. The global energy transition will power forward, even if the road ahead includes a few more bumps**.

#### **Thus, market share is expected to grow significantly in the long term. Maguire 25**

**Maguire 25** [Daniel Maguire (Research Analyst, Autonomous Technology & Robotics), 3-18-2025, "Can The US Triple Its Nuclear Capacity By 2050?", Ark Invest, https://www.ark-invest.com/articles/analyst-research/can-the-us-triple-its-nuclear-capacity-by-2050] //bid daddy yerg

**Hyperscalers like Microsoft, Google, and Amazon are catching the nuclear energy wave in an attempt to meet the rising power demands associated with Artificial Intelligence** (AI).2 Commitments to net-zero carbon emissions have spurred new and renewed interest in nuclear energy, as shown below. ARK’s research suggests that the US must deploy microreactors, Small Modular Reactors (SMRs), and large-scale reactors to triple nuclear capacity by 2050. **For fifty years, excessive regulation has hampered the development of nuclear energy, leading to cost overruns and delays. Our research shows that regulatory hurdles instituted during the 1970s3 derailed the decline in US nuclear construction costs projected by Wright’s Law.4 That regulatory derailment has deprived the US of its share of global nuclear construction projects—with none currently underway—while countries like China are expanding their nuclear capacity aggressively, as shown below. Today, the US nuclear industry is beginning to revive and could be on the threshold of a renaissance**. In July 2024, the ADVANCE Act directed the Nuclear Regulatory Commission (NRC) to streamline licensing,6 and now the Department of Energy (DoE) is investing billions in nuclear energy. Meanwhile, as AI boosts demand for power, hyperscalers like Meta Platforms, Alphabet, Amazon, and Microsoft seem willing to pay higher rates for power purchase agreements (PPAs)7 to fund first-of-a-kind (FOAK) designs. As risk capital encourages new designs and regulators lower hurdles to innovation, Wright’s Law suggests that the cost competitiveness of nuclear power will be restored, ultimately lowering electricity prices and reigniting the powerful trends aborted by regulation in 1974.8 **To triple capacity by 2050, the US must add ~200 gigawatts (GW) of nuclear power. By 2035, the US plans to deploy 35GW and then add 15GW per year by 2040.9 Some older reactors may restart,10 but advanced reactors are likely to be the primary path to expansion, as shown below.** Moreover, the US must invest heavily in the nuclear supply chain to reduce reliance on Russian imports.11

#### **Unfortunately, nearly every instance of government involvement has backfired, and nuclear energy is going to be another example of policy failure. De Rugy 15**

**De Rugy 15** [Veronique De Rugy, George Gibbs Chair in Political Economy and Senior Research Fellow at the Mercatus Center at George Mason University and a nationally syndicated columnist. Her primary research interests include the US economy, the federal budget, taxation, tax competition, and cronyism. Her popular weekly columns address economic issues ranging from lessons on creating sustainable economic growth to the implications of government tax and fiscal policies. She has testified numerous times in front of Congress on the effects of fiscal stimulus, debt and deficits, and regulation on the economy, 3-24-2015, Subsidies Are the Problem, Not the Solution, for Innovation in Energy, Mercatus Center, https://www.mercatus.org/research/federal-testimonies/subsidies-are-problem-not-solution-innovation-energy, accessed 3-18-2025.] //aayush

The **Obama** administration’s FY 2016 budget **asks for a 42 percent increase in funding for the Department of Energy’s Office of Energy Efficiency and Renewable Energy** (EERE) and its portfolio of programs. Yet **more than 40 years after President Richard Nixon announced “Project Independence”—to wishfully wean the American economy off oil and decades of federal involvement in efforts to develop “alternative” energies—we are once again discussing how many more taxpayer dollars should be thrown at the alternative energy wall in the hopes that something will finally stick**. Far from suggesting that alternative energies aren’t welcome or desirable, I believe that it’s time for policymakers to recognize that **allowing the marketplace to determine winners and losers is preferable to a politicized, top-down approach that has produced more black eyes than benefits**. These black eyes belong to both parties and extend well beyond Solyndra and the ill-fated 1705 energy loan program, which has become a symbol of the problems with federal involvement in energy markets. Indeed, a **short list of the federal missteps over the years would include so-called clean coal, the Synthetic Fuels Corporation, the Clinch River Breeder Reactor, National Ignition Facility, Superconducting Super Collider, FutureGen, Partnership for a New Generation of Vehicles, FreedomCAR, and the Yucca Mountain nuclear waste repository mess**. I would argue that the most important consideration today should not be whether the Obama administration wishes to spend too much on EERE programs. (It does.) Nor should it be to figure out which special-interest squeaky wheels should get the most grease. What I believe **we should be discussing** is **whether these subsidy programs should exist at all**. I would argue that **EERE programs should be abolished, along with all other energy subsidies**—including those that benefit fossil-fuel production—because 1) **government lacks the incentives to manage funds that private investors have**; 2) **giving subsidies to some businesses puts other businesses that do not receive such subsidies at a disadvantage, distorting investment and other economic activity**; and 3) **the existence of government subsidies increases the incentive to lobby and the power of special interests**. GOVERNMENT LACKS THE PROPER INCENTIVES Even with the best of intentions, **elected officials and bureaucrats simply do not possess the proper incentives to manage taxpayers’ money prudently**. They are not rewarded when they maximize consumer value; nor are they punished when they take unnecessary risks or fail to minimize costs. **Government actors operate with limited knowledge**. While individuals acting in markets are able to use price signals to guide their decisions. **When a private company fails, the owners and its investors lose**. **Government decision makers have no such guide**. They have no way of accounting for the value or costs of their decisions. And **when the government fails, taxpayers lose. Subsidies are justified as being necessary to encourage the development of alternative energies** because the private sector is unwilling to undertake the risk necessary for their development. The truth is that **private investors should avoid throwing scarce dollars at endeavors that do not make economic sense**. Instances where the private sector will not invest signal that it would also be a bad idea for taxpayers to “invest.” Policymakers who believe that entrepreneurs and venture capitalists are investing insufficiently in new technologies should focus their efforts on reducing the federal tax burden on businesses and investment rather than attempting to subsidize specific firms, industries, or technologies. **Lowering the tax burden is more likely to result in higher economic growth, innovation, and job creation**—**the same canned justification that policymakers often fall back on to justify subsidy programs**. It is amazing that many of the policymakers who believe that the private sector needs the government to fill this mythical investment gap are the same ones who want to further tax the rewards of investment, and support sending the money to agencies like EERE that fund the research and development of commercial products. Advanced research and development subsidies are a form of corporate welfare because the **rewards end up going to private interests while the costs are borne by taxpayers**. This cycle of “tax and subsidize” is **just another example of the government robbing Peter to pay Paul**. Policymakers like to tout Paul’s “success stories” when defending energy subsidies, but somehow Peter escapes acknowledgement. **SUBSIDIES DISTORT ECONOMIC ACTIVITY** Policymakers justify energy subsidies by arguing that they are needed to fix alleged imperfections in the marketplace. The **imperfections**, however, **are typically short-term issues** (e.g., oil price spikes) **that the marketplace will address—if allowed**. **Policymakers often rush to address short-term concerns with government interventions, including subsidies, which end up distorting economic activity and generating failures of their own**. The problem is compounded by the reality that policymakers usually have political and parochial interests in mind when creating and sustaining subsidy programs. When government intervenes, 1) **subsidized firms get an unfair competitive advantage over firms that do not receive a government subsidy**, and 2) **policymakers**, instead of the market, **pick winners and losers**. Unseen Losses of Unsubsidized Competitors By aiding particular businesses and industries, **subsidies put other businesses and industries at a disadvantage.** This market distortion **generates losses to the economy that are not easily seen and thus generally aren’t considered by policymakers**. For example, **energy companies that don’t receive a government subsidy are disadvantaged when they compete against companies that do receive government backing**. A company or entrepreneur with a superior product or technology might never reach the market because they didn’t have access to government handouts. **The result is a diversion of resources from businesses preferred by the market to those preferred by policymakers, which leads to losses for the overall economy**. The Cost of Policymakers Picking Winners and Losers **When the government starts choosing industries and technologies to subsidize, it often makes bad decisions at taxpayer expense, because policymakers possess no special knowledge that allows them to allocate capital more efficiently than markets**. Businesses and venture capital firms make many mistakes as well, but they bear the consequences of those mistakes. **When the government picks losers, the costs are involuntarily borne by taxpayers**. Even the **supposed “success stories” that government officials and the direct beneficiaries of subsidies like to tout at congressional hearings do not come without cost**. In addition to the taxpayer money that’s spent when policymakers try to steer the market in certain directions, **government intervention can also delay the development of superior alternatives by companies and entrepreneurs who didn’t receive government backing**. Worse, **young companies and entrepreneurs can have a harder time acquiring capital because private investors usually prefer to provide capital to projects that are subsidized over ones that are not**. In a 2009 article in Wired magazine, Darryl Siry, a former executive with Tesla Motors, which has benefitted from government handouts, wrote that startup companies applying for energy subsidies “have admitted that private fundraising is complicated by investor expectations of government support.” He noted that the government trying to pick winners distorts the market for private capital, which “will have a stifling effect on innovation, as private capital chases fewer deals and companies that do not have government backing have a harder time attracting private capital.” **CORRUPTING INFLUENCE OF SPECIAL INTERESTS** Numerous economists have demonstrated that **government officials benefit by acting on behalf of special interests under the guise of working on behalf of the public good**. Policymakers aren’t driven by the profit motive as is the case in the marketplace; rather, **concerns about reelection and other self-rewarding benefits drive the decision-making process**. Thus, **interest groups who gain**, or stand to gain, **from government subsidies are willing and able to exploit the natural self-interest of policymakers**. When “free” government money is up for grabs, **interests that stand to benefit have a strong incentive to organize and lobby for a slice of the pie**. **Policymakers face little or no cost for conferring benefits** on particular interests who return the favor by delivering votes and campaign funds. Adding in the **lack of incentive for policymakers to be good stewards of taxpayers’ money results in government programs that exist to pick winners and losers in the marketplace—the “winner” being a politically predetermined outcome**. Unfortunately, when the government tries to pick winners and losers, **it often picks the wrong horse at the expense of taxpayers and the broader economy**. Government subsidies create an unhealthy—and sometimes corrupt—relationship between commercial interests and the government. **The more the government has intervened in energy markets, the more lobbying activity has been generated. The more subsidies that it hands out to businesses, the more pressure policymakers face to keep the federal spigot flowing. As the number of lobbyists grow, more economic decisions are made on the basis of politics, and more resources are misallocated. And the door opens to cronyism** and corruption. Solyndra has become emblematic of these issues, even as policies expanding subsidies for alternative energy companies have been pursued enthusiastically over the past several years. According to the New York Times, Solyndra “spent nearly $1.8 million on Washington lobbyists, employing six firms with ties to members of Congress and officials of the Obama White House” during the period of time that its subsidized loan request was under review by the Department of Energy. Beyond Solyndra, the Washington Post found that “$3.9 billion in federal grants and financing [from the Department of Energy] went to 21 companies backed by firms with connections to five Obama administration officials.” **THE DEPARTMENT OF ENERGY’S 1705 LOAN PROGRAM** The Department of Energy’s 1705 loan program **is a good example of the gap between what subsidy proponents claim they will achieve and what actually happens**. The program was a key part of the Obama administration’s **2009 stimulus program** and was **justified on the grounds that viable renewable energy companies lack sufficient access to capital**. The alleged imperfections of capital markets is a common—and mistaken—claim often used by policymakers to justify government intervention in various areas of the economy. In reality, **nearly 90 percent of the 1705 loan guarantees went to subsidize projects backed by large, politically connected companies including NRG Energy Inc. and Goldman Sachs**. Thus, it’s hard to believe that taxpayer-backed loans were necessary to make up for a supposed lack of capital available to economically viable commercial concerns. The **1705 program is also a good example of the government favoring multiple interest groups at the expense of taxpayers**: (1) lenders who are reimbursed by taxpayers in the event of a default and (2) the companies that borrow at beneficial rates and conditions. But while banks and companies that receive the guarantees get the upside of the program, **taxpayers bear the risk and shoulder the burden when companies like Solyndra go under and default on their loans**. While the results of the 1705 loan program speak for itself, the true problem is deeper than the numbers. Like most government interventions, **this program**—and government interventions in general—**create serious and systemic distortions in the market. These distortions create the conditions for businesses to maximize profits by pleasing government officials rather than customers**. This is called **cronyism**, and it **entails enormous**—and, most often, unseen—**economic costs**. CONCLUSION When the government subsidizes businesses, it weakens profit-and-loss signals in the economy and undermines market-based entrepreneurship. **Most of America’s technological and industrial advances have come from innovative private businesses in competitive markets**. Indeed, it is likely that most of our long-term economic growth has come not from existing large corporations or governments but from entrepreneurs creating new businesses and pioneering new industries. Such entrepreneurs have often had to overcome barriers put in place by governments and dominant businesses receiving special treatment. **Policymakers who are interested in supporting the entrepreneurs and companies that will deliver the next generation of energy supplies and products should focus their attention on correcting the federal government’s hostile tax climate and dispense with the futile hopes of outsmarting the marketplace**.

#### **Thus, if the federal government intervenes, there will be 2 major harms.**

## **First is lobbying.**

#### **Big oil is staying down right now. Dareen 25**

**Dareen 25** [Seher Dareen, oversees and writes market reports with the commodities and energy team in Bangalore round-the-clock and monitors newsworthy events in the resources space, 1-27-2025, Big Oil in no rush to 'drill baby drill' this year despite Trump agenda, Reuters, https://www.reuters.com/business/energy/big-oil-no-rush-drill-baby-drill-this-year-despite-trump-agenda-2025-01-27/, accessed 3-24-2025.] //aayush

HOUSTON, Jan 27 - **Wall Street expects U.S. oil and gas companies to keep a lid on spending in 2025 and keep their focus on generating shareholder returns, despite calls** by President Donald Trump **to "drill, baby, drill."** Big Oil begins reporting fourth-quarter results this week, and outlooks for the coming year should reflect the **dissonance between Trump's oil and gas-maximizing agenda and investor expectations**. The **industry has pushed in recent years to drive down costs and increase production by using more efficient technology** rather than drilling many new wells. **Producers also must contend with lower global oil prices as the post-pandemic demand rebound runs its course and as China's economy struggles**. Benchmark Brent **crude oil prices are projected to average $74 per barrel in 2025, down from $81 in 2024**, according to the U.S. Energy Information Administration. **Overall, for the U.S. exploration and production sector, analysts at Scotiabank expect companies to target up to 5% production growth this year, and flat to slightly lower year-over-year capital expenditures. The exception is Exxon Mobil, which plans a large increase in production**. The largest U.S. oil company intends to more than triple its production in the Permian, the top U.S. shale field, and pump 1.3 million barrels per day from its lucrative operations in Guyana by 2030. "**We expect most oil and gas producers to remain disciplined with capital expenditures**," said Rob Thummel, senior portfolio manager at Tortoise Capital. "**However, less regulation will make it easier to increase drilling activity if commodity prices reach levels that are too high**." Chevron (CVX.N), which reports results on Friday, is expected to grow production by about 3% this year and in the mid-single digit percentage in 2026, said Barclays analysts in a research note. The company has followed a **conservative strategy**, **moving out of a phase of heavy investment in new projects, and is now generating cash**, said analysts from RBC Capital Markets in a note. **Chevron could also announce a dividend increase of at least 5% over the previous year**, Thummel added, as dividend **increases have been between 6% to 8% previously**. Chevron is expected to report $3.87 billion in profit, according to data compiled by LSEG, which would be a decline from $6.45 billion in the year-ago quarter. Exxon Mobil, meanwhile, is expected to report $6.85 billion in profit, down from $9.96 billion in the same quarter last year. The company signaled last month that **lower oil refining profits and weakness across its business would reduce earnings by about $1.75 billion compared to the third quarter**. An arbitration panel will decide in May on Exxon's challenge to Chevron's acquisition of Hess - a purchase that would give Chevron a rival stake in Guyana's rich offshore reserves. Exxon has claimed a contractual right to buy Hess' stake in the field. Producer ConocoPhillips (COP.N) could also grow oil and gas production in the low single-digit percentage this year to focus on returning cash to shareholders, Barclays said. The company in December completed its $22.5 billion buyout of smaller peer Marathon Oil, which had been under a Federal Trade Commission review. This could, according to Scotiabank analysts, swing its performance up. Occidental (OXY.N), meanwhile, is expected to report $730.9 million in adjusted profit for the fourth quarter, up from $710 million in the same quarter last year. The oil producer closed its acquisition of CrownRock in August and its capex this year is expected to total $7.44 billion, up from $6.9 billion last year, Barclays said. For Diamondback Energy (FANG.O), Raymond James analysts expect the company to choose free cash flow over growth after its acquisition of Endeavor. Profit is expected to come in at $977 million, up from $854 million in the same quarter last year. Production growth is expected to be flat with lesser spending in 2025, they added.

#### **However, oil lobbying is extremely powerful. Pearson 24**

**Pearson 24** [Daisy Pearson, Movement building officer (and unofficial in-house graphic designer) at Global Justice Now. She supports local group activism across the country, helping to organise events and designing campaigning materials and resources, 8-6-2024, To End Fossil Fuels, We Need To Take On Monopoly Power, Global Justice Now, https://www.globaljustice.org.uk/blog/2024/08/energy-monopolies-and-the-case-for-a-fossil-fuel-treaty/, accessed 3-11-2025.] //aayush

**Driving the divide** One of the first places **we should start is dismantling monopoly power**. In our recent report, Taken, Not Earned, produced with Balanced Economy Project, SOMO and LobbyControl, we **looked at how monopolists are driving the world’s power and wealth divide. Our economy is dominated by monopolies, with just a handful of companies dominating in most sectors**, from tech to pharma, agriculture and energy. **These vast monopoly corporations are wealth extraction machines: squeezing suppliers, overcharging consumers, evading tax, exploiting workers, destroying the environment and funnelling the money into the pockets (or tax havens) of billionaires**. Monopoly wealth is both exploitative and unjust, and it is destroying society and the planet along the way. **The energy sector is dominated by massive corporations. Oil giants are particularly well known: think Shell, BP, Exxon, Chevron and Total. These five conglomerates alone made $281 billion in the two years following Russia’s invasion of Ukraine, at precisely the time so many people were hit by vastly inflated energy bills**. They paid out over $200 billion of this directly to enrich their already wealthy shareholders, rather than investing it into any form of energy transition. In fact, **what funds they did invest were overwhelmingly in further fossil fuel production**, not in renewables. Despite many PR and advertising campaigns suggesting otherwise, **major energy companies’ investment in renewables is actually decreasing, as corporations like Shell and BP roll back on their plans to curb fossil fuel extraction**. In 2019, more than two-thirds of all energy was produced by the largest six companies. In 2021 dozens of smaller energy companies failed, further concentrating energy giants’ hold on the market. While geopolitical conditions at the time put a strain on all energy companies, high market concentration makes it near impossible for small businesses to emerge and survive. Dominant corporations squeeze out smaller competitors, enabled by public policies that favour big firms. **Such extreme market concentration gives these few corporations (and their billionaire owners) unprecedented power and influence over our political institutions, eroding democracy, and enabling them to circumvent labour and environmental regulations with little accountability**.

#### **Significant government legislation causes concessions and lobbying influence causes acquiescence. Lefebvre 22**

**Lefebvre 22** [Ben Lefebvre, Lefebvre has covered energy industry and policy issues for nearly a decade. Prior to starting at Politico, he worked in Tokyo for three years covering the East Asia nuclear, coal industries for trade publication ICIS. He also wrote about Japanese business and culture for Quartz during that time.Before that he worked in Houston covering the energy boom for Dow Jones and the Wall Street Journal. He got his start in journalism at The Metro Times covering Detroit city hall shenanigans. He graduated with a degree in English from the University of Michigan, 7-28-2022, 'Easter eggs' in climate bill delight oil and gas industry, POLITICO, https://www.politico.com/news/2022/07/28/manchin-oil-gas-biden-schumer-climate-bill-00048514, accessed 3-24-2025.] //aayush

**The oil and gas industry doesn’t hate the climate bill**. The industry as a whole isn’t yet embracing the $700 billion-plus **reconciliation deal**, which would **penalize some forms of fossil fuel pollution** while making one of the largest investments in clean energy in U.S. history. **But the legislation also contains what some called “Easter eggs” that would benefit oil and gas companies, including access to new swaths of federal waters in Alaska and the Gulf of Mexico**. “There are **some things in there that are helpful to our business**,” **Rich Walsh, senior vice president and general counsel at Valero, one of the country’s largest fuel refiners, said** during an earnings call Thursday with investors. Frank Maisano, a partner at the at law firm Bracewell, said **the compromise deal offers wins for both the fossil fuel and green energy industries**. “**There are a lot of pieces in there that are going to be valuable to different sectors**,” said Maisano, whose firm works with companies in both fields. Maisano added that Sen. **Joe Manchin** (D-W.Va.), who **reached the deal with** Senate Majority Leader **Chuck Schumer**, “has been **clear on where he stands — to have some mix of benefits and not lean too heavily on renewables only**. That’s what he’s gotten here.” The bill, H.R. 5376 (117th), would spend an estimated $370 billion in an attempt to slash carbon emissions across the U.S. economy by the end of the decade, by an estimated 40 percent from 2005 levels. But **it includes proposals to ease federal rules that the West Virginia senator has said are constricting fossil fuel production and slowing needed upgrades to the power grid**. The compromise has infuriated some progressive environmental activists. One such group, the climate organization 350.org, called the bill “a sham” because of the fossil fuel provisions and accused the Biden administration of “engaging in a bait and switch tactic on climate legislation.” Still, other environmental groups have said they can live with the trade-offs. **And the oil and gas industry has identified provisions that may make the climate medicine go down a little easier**. Walsh, at Valero, pointed to a portion of the bill that would allocate $500 million to expand biofuel infrastructure such as storage tanks and blending facilities. The bill would also require the Interior Department to offer at least 2 million acres a year for onshore oil and gas lease sales. Unless it holds those lease sales, the bill says, the department could not offer rights of way for solar and wind power projects. Those **leasing provisions alone would offer a win for oil and gas companies that are feuding with the Biden administration over Interior’s slow pace of fossil fuel lease sales**, one lobbyist for the industry said. **Meanwhile, the bill’s proposal to charge a fee of up to $1,500 a ton for the petroleum industry’s emissions of methane, a potent greenhouse gas, would be less of an issue for large oil companies already working on reducing them**, industry analysts said. **“If you look at the pros and cons, the pros generally outweigh the cons,” the lobbyist said, speaking on condition of anonymity because he wasn’t authorized to speak to the news media.** “The Easter eggs that Manchin forced into the bill on leasing, **they’re a big deal. If you squint hard enough, you can see this being a bipartisan compromise.” The bill would also make it easier for businesses to use a tax credit for deploying technology that captures and stores planet-warming carbon emissions**, which has become big business for companies like Exxon Mobil and Chevron. The technology, which Manchin has championed as a way to stave off climate change but environmental groups and other critics say is not ready for prime time, aims to strip the carbon emissions from industrial smokestacks and bury them. “If enacted ... this package would provide the most transformative and far-reaching policy support in the world for the economy-wide deployment of carbon management technologies,” Madelyn Morrison, spokesperson for the advocacy group Carbon Capture Coalition, said in a prepared statement. Oil company BP said the deal offers a lot to like for oil companies that are extending their reach into renewables, carbon capture and other forms of alternative energy. “We applaud Senate lawmakers for making progress toward a historic climate deal,” BP spokesperson Josh Hicks said in an email. “BP has actively advocated for Congress to pass strong climate legislation, including the full suite of clean-energy and low-carbon tax credits the U.S. House passed in 2021. We will continue engaging constructively with policymakers to advance these measures as we aim to become a net zero company by 2050 or sooner.” Still, **not everyone in the industry was willing to call the bill a win**. The American Petroleum Institute, the **trade group representing the largest oil producers in the country, was more measured in its initial take. “While there are some improved provisions in the spending package released last night, we oppose policies that increase taxes and discourage investment in America’s oil and natural gas,” said Amanda Eversole, API’s executive vice president and chief advocacy officer, in a statement**.

#### **The threat of alternative energy causes massive production increases. Norman 24**

**Norman 24** [Maya A. Norman, Columbia University, Wolfram Schlenker, Research Associate @ Harvard, 5-xx-2024, Empirical Tests of the Green Paradox for Climate Legislation, National Bureau of Economic Research, https://www.nber.org/system/files/working\_papers/w32405/w32405.pdf, accessed 4-3-2025.] //bid daddy yerg + aayush

Climate legislation often establishes goals for the future to give companies and consumers time to adapt and plan for a transition away from fossil fuels. For example, the European Union enacted the goal to be climate neutral (net zero emissions) by 2050, while China established the same goal for 2060. Fossil fuels are exhaustible resources, and their finite availability dictates their use and price path (Hotelling 1931). This scarcity leads to a price that exceeds the marginal extraction cost, resulting in resource rents that ensure less is consumed today and fossil fuels are saved for the future.1 The literature on the “Green Paradox” highlights that **climate legislation**, which limit future fossil fuel use, **give** resource **owners an incentive to extract more in the present** and medium term **before** the **regulation** binds, **leading to lower prices**, accelerated resource depletion, **and higher consumption** today. This theoretical literature is based on Hotelling’s seminal model (Hoel 2010a, Sinn 2008a, Sinn 2008b, Van der Ploeg and Withagen 2012, Van der Ploeg and Withagen 2015). By the same logic, a global carbon tax on fossil fuels with scarcity rents will not be passed on to consumers. If producers did so, then demand for fossil fuels would fall, cumulative consumption would decrease and not all fossil fuels would be used, incentivizing resource owners to lower fossil fuel prices to sell all units. In the end, much of a carbon tax would be absorbed by producer rents with limited effects on fossil fuel use or consumers (Dasgupta, Heal and Stiglitz 1980, Heal and Schlenker 2019). What is common to both a carbon tax and future carbon quantity regulation is the concern that such legislation might not lead to the desired reductions in cumulative fossil fuel use and may even accelerate consumption today through lower prices, limiting the regulation’s effectiveness. On the other hand, the limited pass-through alleviates widely held apprehensions that such policy would have distributional consequences and high personal costs. If the dynamics of Hotelling’s rule shield consumers from a global carbon tax, it would significantly improve public opinion of such a policy (Dechezleprˆetre, Fabre, Kruse, Planterose, Sanchez Chico and Stantcheva 2022). The “Green Paradox” hence has important implications for both the effectiveness of climate legislation in limiting fossil fuel use as well as the pass-through of carbon taxes, yet most of the literature to date has been theoretical. Our paper adds to the emerging empirical literature on the “Green Paradox.” Specifically, we test the predictions of the “Green Paradox” **using several** data **sources on different timescales**. We **consistently find evidence** of the mechanism underlying the “Green Paradox:” additional restrictions on oil use, or an increased likelihood of future restrictions, reduce both the oil spot price and oil futures prices in the years for which futures data are traded, i.e., the following two years. This occurs as supply is reallocated from the future to the present. This pattern holds true when analyzing monthly returns in conjunction with decades-long data on policy stringency, when using high-frequency daily data on oil prices coupled with daily changes in prediction market prices, as well as when estimating the oil price return after unexpected news regarding court cases that limited future fossil fuel use. Empirically testing the “Green Paradox” is difficult because the analysis requires information about firms’ expectations of climate policy stringency for which there is very little data. We side step this challenge through the use of prediction market prices, a measure that captures the market’s expectations, a news based index proxying for information shocks related to climate policy, and unexpected news regarding court cases that mandated changing climate policy. We begin by documenting that oil price shocks, i.e., changes in the daily oil price, have become stickier over the last three decades, implying that shocks have become more permanent rather than transitory. Under the “Green Paradox,” uncertainty from climate legislation deliberations leads to persistent (sticky) price changes, as changes in expectations around future climate **legislation reset the entire future** oil price **path** and hence impact all maturities equally. Consistent with this prediction, we find the **persistence of** spot price **shocks** among maturities ranging from 1 to 24 months greatly increased during periods when climate bills were under consideration (the 2000s and 2010s). Daily changes in the oil spot price translate into roughly the same change in oil futures prices with a maturity one month into the future throughout the sample period. However, the story differs for longer-term maturities: in the 1990s, spot price shocks phased out for oil futures with longer maturities. Specifically, only about a third of the spot price change was reflected in the oil futures with a 24-month maturity. Around 2010, the fraction doubled to two thirds, i.e., daily shocks phased out slower with longer-term maturity futures. This finding only reverses in the 2020s, when COVID-related temporary supply disruptions lead to a decoupling of future and spot price movements. The time profile of how shocks phase out provides an important baseline for subsequent analysis. In a second step, we pair monthly oil price data with monthly estimates of U.S. renewable policy and international climate negotiation salience. We measure policy salience using Noailly, Nowzohour and Van Den Heuvel (2021)’s news-based indices generated by text-mining articles from ten leading US newspapers published between 1981 and 2019. The indices reflect the monthly number of articles covering US renewable policy and international climate negotiations, respectively, relative to the total number of articles published. While the “Green Paradox” makes no direct predictions of the effect of climate policy salience on oil prices, the measure of climate policy salience used in this paper generally tracks events that strengthened future climate policy, i.e., the renewable policy index peaks after the passage of renewable policy. Hence, pairing oil prices with the news based indices can provide a suggestive yet compelling test of the paradox’s prevalence over the last four decades. The “Green Paradox” predicts that the indices should be negatively correlated with oil prices. For example, increases in the international negotiations index indicate international cooperation around climate likely strengthened, elevating the expected stringency of future climate policy, causing oil producers to supply more today, and consequently reducing prices. Consistent with the paradox’s predictions, we find increases in the salience of international climate negotiations significantly reduce oil prices. On the other hand, we find increases in the salience of renewable energy policy significantly increase oil prices. Renewable energy programs have two countervailing effects: strengthening renewable energy policy could reduce the backstop price causing oil producers to increase supply today, reducing oil prices. Alternatively, strengthening of renewable policy has often occurred in place of climate policy, thereby easing the concern that there might be future restriction on fossil fuel use, resulting in higher oil prices as future supply is no longer threatened. Our finding suggests that the latter dominates, i.e., oil **producers do not view current** renewable **policy as a threat** to future oil demand and supply in the future, but instead as a distraction from climate policy, reducing the probability of stricter climate policy in the future. We present tests to rule out reverse causality, i.e., the possibility that higher oil prices correlated with positive oil future returns increased the likelihood that renewable policy passed and renewable policy salience. Specifically, our findings are robust to controlling for the oil spot price. In a third step, we present a direct test of the “Green Paradox” in our preferred specification by pairing daily oil price data with daily estimates of the market’s expectations that Waxman-Markey would pass. Waxman-Markey was a climate bill that intended to limit economy wide greenhouse gas emissions in the U.S. through cap and trade. We retrieve the market’s expectations using prediction market contract prices in 2009 and **2010**. Theory predicts that increases in the probability of a cap and trade bill passing should reduce contemporaneous oil prices and vice versa. Consistent with this prediction, we find a significant negative coefficient; prices of oil futures decline whenever the expected likelihood that the bill will pass increases. This effect is persistent across all futures contracts, even increasing for longer-term maturities, suggesting that the relationship reflects long-term adjustments in the expected oil price path rather than temporary shocks. Through our analysis we find (i) the passage of the **Waxman-Markey bill would** ha**ve increased** global oil **consumption** 2-**4%** and (ii) Waxman-Markey deliberations increased oil consumption by 8-27 million metric tons equivalent to 1-3 days of global oil consumption. We present two pieces of evidence to rule out the possibility that reverse causality could explain our finding, i.e., that lower oil prices associated with negative returns increased the likelihood that a climate bill would pass, or stated differently, opposition to the bill was higher when oil prices were higher. We find that the effect is even larger and more significant when we limit the sample to days with major changes in prediction market prices – these major changes were driven by political negotiations at committee meetings that were scheduled in advance and should not have been influenced by day-to-day oil price movements, ruling out reverse causality. Moreover, there is no qualitative difference in the relationship when we control for the oil spot price. In a falsification check, we find no significant effect if we use a one-period lead in prediction market price changes,2 confirming that prediction market movements on a particular day and the implied news on that day lead to changes in oil future prices. In a fourth step, we construct the abnormal oil price returns on the days two historic climate court cases were made public. Specifically, we study the effect of the surprise Urgenda v. Netherlands rendering, when a Dutch court sided with an environmental group and ordered the Dutch government to have stricter limits on future fossil fuel emissions. When the ruling was announced, people predicted it would set a precedent for all countries subject to the European Convention. Additionally, we study the effect on the day news coverage suggested that Justice Kennedy, the swing vote in the Massachusetts v. EPA Supreme Court case, would support the states suing the EPA to regulate automobile carbon dioxide emissions. At the time that the case was deliberated, numerous additional climate court cases awaited the Supreme Court’s verdict, including a case challenging the EPA’s refusal to regulate power plant carbon dioxide emissions. In both instances, we find significant negative coefficients, i.e., oil futures prices declined when new information increased the expected likelihood of limitations on future fossil fuel use. Taken together, these findings show that the oil market is sensitive to climate laws and that expected restrictions on future fossil fuel use will lead to increased consumption today. The economics of exhaustible resources predicts that discoveries of an exhaustible resource influence the scarcity of a resource and its price (Ekeland, Schlenker, Tankov and Wright 2022). If total availability of an exhaustible resource goes up through a new discovery, the expected future price path resets and is lowered. The effect of climate legislation is analogous: by limiting resource use in the long-term, available resources are shifted towards the short and medium-term. By the same token, scarcity rents will absorb carbon taxes, shielding consumers. Our paper contributes to the emerging empirical literature on the “Green Paradox,” by documenting how environmental laws can increase present-day oil demand through lowering prices. Grafton, Kompas, Long and To (2014) show that increases in biofuel production, a substitute to fossil fuels, increase oil production. Di Maria, Lange and van der Werf (2014) show that the passage of the acid rain program decreased the price of high-sulphur coal. Merrill (2018) finds the out-of-committee introduction of climate related bills in congress accelerate oil and gas firm wellhead investments. Lemoine (2017) observes an abnormal return in coal futures on the day Graham abandoned the Waxman-Markey bill on Monday, April 26, 2010. Barnett (2023) observe abnormal returns in the oil spot price in response to climate transition events – major events in the energy industry, election results, and other major shifts in climate policy. A challenge of previous papers is to determine when the market updated its beliefs about the likelihood of a policy change. The “Green Paradox” is derived from expectations of future prices, and markets might see and react to an impending regulation before it is officially implemented and ratified (Dube, Kaplan and Naidu 2011, McDermott, Meng, McDonald and Costello 2019, Langer and Lemoine 2020). Lemoine (2017), Merrill (2018), and Di Maria et al. (2014) test the paradox’s predictions using policy or information shocks occurring at a specific moment, relying on comparisons between the period before and after a single shock. Grafton et al. (2014) uses annual variation in biofuel production as a proxy for annual variation in biofuel subsidies to test the paradox. Barnett (2023) interacts climate transition events with a portfolio tracking the response of firms highly exposed to climate transition risk to account for and recover dynamics in the magnitude and timing of transition events. We see the novelty of our paper as follows: our approach’s reliance on monthly and daily information shocks allow us to both capture how the policy making process – announcements, deliberation, redrafting, and upheavals – impacts oil prices and employ more convincing variation in the market’s beliefs regarding the stringency of future climate policy. Additionally, the referenced empirical “Green Paradox” literature might be susceptible to reverse causality. For political economy reasons, a bill might be more easily passed when a resource was declining in economic importance and the price was falling. Or, a subsidy might be more easily implemented when there is generally more demand for fuel. In both cases, estimates of the “Green Paradox” could instead reflect reverse causality. A key innovation of our paper is that our approach is more defensible against the concerns of reverse causality as we employ a panel data set encompassing numerous daily changes in expectations that occurred in response to previously scheduled committee meetings. These meetings, scheduled weeks or months in advance, are unlikely to coincide with daily oil spot price shocks Our paper builds most closely on Lemoine (2017) and reinforces its findings. We make several additional contributions: first, our analysis is less likely to be confounded by other events as our analysis relies on various time scales including high-frequency daily data.

#### **Allowing big oil to expand is devastating. Miller 21**

**Miller 21** [Anna Miller, leads the media and external communication strategy at Harvard Chan C-CHANGE, translating the Center’s research into messages that are actionable, accessible, and personal. She works with the media, policymakers, health care providers, and researchers to turn science into climate action that improves health. Miller received her Master’s in Public Health from Harvard T.H. Chan School of Public Health in 2019, 2-9-2021, Fossil fuel air pollution responsible for 1 in 5 deaths worldwide, Harvard T.H. Chan School of Public Health, https://hsph.harvard.edu/climate-health-c-change/news/fossil-fuel-air-pollution-responsible-for-1-in-5-deaths-worldwide/, accessed 3-29-2025.] //aayush

**New research from Harvard University**, in collaboration with the University of Birmingham, the University of Leicester and University College London, **found that more than 8 million people died in 2018 from fossil fuel pollution**, **significantly higher than previous research suggested**—**meaning that air pollution from burning fossil fuels like coal and diesel was responsible for about 1 in 5 deaths worldwide**. The study, “Global Mortality From Outdoor Fine Particle Pollution Generated by Fossil Fuel Combustion,” published in Environmental Research, is based on a groundbreaking analysis that enabled the researchers to **directly attribute premature deaths from fine particulate pollution (PM 2.5) to fossil fuel combustion**. “Often, **when we discuss the dangers of fossil fuel combustion, it’s in the context of CO2 and climate change and overlook the potential health impact of the pollutants co-emitted with greenhouse gases**,” said Dr. Joel Schwartz, Professor at Harvard Chan School and co-author of the study. “We hope that **by quantifying the health consequences of fossil fuel combustion, we can send a clear message to policymakers and stakeholders of the benefits of a transition to alternative energy sources**.” The findings underscore the **detrimental impact of fossil fuels on global health**. “The health gains we can achieve from getting off fossil fuels is twice what we thought it was yesterday,” said Dr. Aaron Bernstein, Director of the Center for Climate, Health, and the Global Environment at Harvard Chan School. “The Global Burden of Disease study estimated deaths from fossil fuels numbered 4.2 million in 2015, but thanks to more rigorous science, we can now see that **fossil fuels cause far more harm than previously understood. Now more than ever we can see the healthier, more just and sustainable world that climate actions can deliver**.”

## **Second is investment disruption.**

#### **The market’s sustainable now. P&S 25**

**P&S 25** [P&S Intelligence, P&S Intelligence is a leading market research and consulting services provider to clients across the globe, xx-xx-2025, U.S. Nuclear Power Market Size, Share & Trends Analysis, 2032, P&S Intelligence, https://www.psmarketresearch.com/market-analysis/us-nuclear-power-market, accessed 3-21-2025.] //aayush

**U.S. Nuclear Power Market Overview The U.S. nuclear power market valued USD 13.3 billion in 2024**, and **this number is expected to increase to USD 19.6 billion by 2032, advancing at a CAGR of 5.1% during 2025–2032**. The **market is driven by the growing demand for electricity due to a burgeoning population, rampant urbanization and industrialization, and booming construction sector**. Amidst all this, the rising emissions of GHGs and the country’s efforts to limit them drives the demand for green energy. The **existing nuclear reactors sustain the nation's electricity supply to a considerable degree, but must deal with higher operational expenses and several regulatory constraints.** Therefore, plant life is being expanded through modern techniques and advanced nuclear reactors, including small modular reactors, are being deployed. U.S. Nuclear Power Market Dynamics **Small Modular Reactors Are Biggest Trends** Small modular reactors (**SMRs**) **are attracting increasing interest because of their reduced costs and adaptive nature**. SMR development is **led by major power companies, such as NuScale, GE Hitachi, Toshiba, and Rolls-Royce. In January 2024, NuScale Power's VOYGR received the U.S. Nuclear Regulatory Commission certification**. Several small modular reactor installations at existing nuclear power facilities are currently in planning or execution. **In October 2024, Amazon.com Inc. announced three agreements in the area of SMRs**. The agreement with Energy Northwest in Washington state will entail the development of four advanced SMRs with a capacity of 320 Megawatts in the first phase and ultimate capacity of 960 MW. **The reactors will be developed by X-energy, which Amazon announced a significant investment to enable 5 GW of capacity. Amazon also signed an agreement** with utility company Dominion Energy **to develop SMRs** near the latter’s nuclear power station in North Anna. **The project will produce around 300 MW of nuclear power for the residents of Virgina**. Just like the conventional high-capacity reactors, SMRs are ideal for power generation, heat production, desalination, desalination, and many other purposes. The DoE is currently engaged in the development of SMRs cooled by light water, which would further bring down the cost of the technology. Moreover, they are being designed to be simpler in design yet highly safe. **Rising Demand for Clean Energy Propels Market** Nuclear power plays a crucial role in meeting the expanding electrical requirements due to **population increase, demand for transport electrification, and industrial growth**. **Nuclear power generates about 18% of the national electricity and almost 50% of the nation's emission-free electricity**. In 2023, 775 billion kilowatt-hours of nuclear power was produced in the country, as per the EIA. In 2024, utility-scale nuclear power plants in the U.S. had a cumulative capacity of 96,402.8 MW. The high operating efficiency of nuclear power plants enhances economic performance, which enables a stable and continuous power supply. As per the DoE, **nuclear power plants boast a capacity factor** (duration for which they operate at full power) of over 92%. This is on contrast to 56% for natural gas, 41% for hydropower, 40% of coal-based, 35% of wind, and 25% of solar power plants. **The price competition for nuclear power stands strong when compared to different forms of electrical power generation specifically in areas with limited easy access to cheap fossil fuel sources**. The **market is seeing increasing investment because the government at the federal and state levels supports nuclear power through tax credits, research and development funding, and loan guarantees**. The biggest reason behind this is the high GHG emissions of the U.S., which are only behind those of China. As per the EPA, the country emitted 6,343 million tCO2e of emissions in 2022, which is why it is aiming for a zero-emission grid by 2030.

#### **In fact, demand increases are almost too quick — we’re on the brink. Szafron 25**

**Szafron 25** [Jeremy Szafron, Kitco.com. “Uranium’s Turning Point: Supply Squeeze, AI Demand, and the Nuclear Energy Boom - Scott Melbye,” Mar 18, 2025. https://www.kitco.com/news/article/2025-03-18/uraniums-turning-point-supply-squeeze-ai-demand-and-nuclear-energy-boom. A graduate of Concordia University with a BA in Journalism, Jeremy's academic background laid the foundation for his diverse and dynamic career. Now, as an Anchor at Kitco News, Jeremy will continue to inform a global audience of the latest developments and critical themes in finance and commodities.] //arrguy

‌(Kitco News) - **The uranium market is at a breaking point, caught between skyrocketing demand for nuclear power and a crippling supply deficit. As data centers, AI, and national security concerns drive unprecedented energy consumption, the need for uranium has never been greater.** At the 2025 PDAC conference in Toronto, Scott Melbye, CEO of Uranium Royalty Corp. and EVP of Uranium Energy Corp., laid out the stakes: “The last three, four years and currently where we are today, I’ve never seen a better narrative around nuclear power, behind uranium.” Melbye, a 41-year veteran of the uranium sector, has seen boom-and-bust cycles, but this time is different. **“We’re building nuclear power plants and we’re proposing new nuclear power plants faster than we’re bringing on new uranium supply.”** Global uranium demand is surging – but supply isn’t keeping up The world is rapidly shifting toward nuclear power, with over 30 countries and 160 corporations pledging to triple nuclear power by 2050. “We now have… we’ve gone from a flat market where nuclear energy wasn’t growing or even declining after Fukushima to a point now where nuclear energy’s looking to double by 2040,” Melbye said. But supply isn’t keeping up with demand. “We need new mines tomorrow, and the easier mines, if there is such a thing in mining, are the restart of operations,” he said. “The U.S. needs baseload demand growth for electricity again, and data centers are making that an even greater challenge.”

#### **Thus, sudden government investment would be devastating. Karasa 25**

**Karasa 25** [Ignas Mikalauskas and Darius Karaša, Kaunas Faculty, Vilnius University, Muitines Street 8, 44280 Kaunas, Lithuania; Lithuanian Energy Institute, Breslaujos Street 3, 44403 Kaunas, Lithuania, 3-12-2025, The Risk of Financial Bubbles in Renewable Energy Markets, No Publication, https://www.mdpi.com/1996-1073/18/6/1400/pdf?version=1741778052, accessed 3-18-2025.] //aayush

**Particularly in high-growth industries such as solar** photovoltaics (PV) **and battery** storage, the **results of this study show that markets for renewable energy are prone to financial saturation and speculative bubbles**. The results underline the need for spotting bifurcation points (~70% saturation) and overheating phases (~90% saturation) to reduce **investment risk**. This part compares results with previous studies, places them in the larger framework of financial and energy policies and presents policy and investment ideas meant to stop financial instability.

5.1. Comparison with Existing Literature

**Bubbles in RE have not been deconstructed to identify their embedded pattern** and have not been evaluated through a **new perspective of capital flows, investments, and possible financial saturation in the market**. So far, **there has been no assessment of the impact on the invested capital and how it could affect the markets**. Although the **authors analyze the bubble** (e.g., Green Bubbles), **the analyses do not include financial saturation and the impact of capital/investment on bubble formation**. The existing body of research in this field, especially from a theoretical standpoint, is insufficiently developed and applied [ 35].

The following timeline summarizes the key saturation thresholds for the battery- storage market, illustrating its heightened risk of speculative overheating compared to solar and wind:

Particularly in technologically advanced sectors, the **results coincide with earlier research on financial market saturation and bubble dynamics**. Previous studies on financial Energies 2025, 18, 1400 16 of 20 bubbles imply that **when market expectations differ from basic values, speculative behavior gets more intense, which causes asset overvaluation and consequent corrections** [1 ,2 ]. **Driven by governmental** and environmental **aims, the renewable energy sector follows similar investment trends, whereby fast development can cause possible overheating** [3].

• **Battery storage is the most speculative sector**. The findings reflect earlier studies showing that **newer technologies with fast growth rates**—such as battery storage—**are more prone to financial speculation** [4 ,5]. **Early bifurcation of battery storage** (2031 in the medium term, 2042 in the long term) **and expected overheating** (~2048) **point to this industry being most vulnerable financially**.

• High investment volatility of **solar energy**. **Policy-driven incentives, including feed-in tariffs** (FiTs), **have helped overcome price rises and crashes** (e.g., Spain’s solar market collapse) **according to historical studies** of solar-energy investment cycles [ 6 ,9]. This work supports these results by determining 2030 (medium term) and 2039 (long term) as the crucial solar PV bifurcation point.

• Unlike solar and battery storage, **wind energy shows reduced saturation risks**, which corresponds with past research stressing **longer investment cycles and infrastructural restrictions as natural stabilizing forces** [10].

These comparisons show that **distinct investment and policy measures are needed for renewable energy financial risks since they are technologically specific**.

5.2. Policy and Investment Implications

5.2.1. Managing Speculative Risks in Renewable Energy Markets

**The existence of speculative investment cycles implies the necessity of government actions to stop market overheating**. Renewable energy markets may suffer asset price collapses without appropriate protections, much like prior financial bubbles in other sectors [11].

**Key policy recommendations include:**

**1. Gradual Phase-Out of Incentives**: • Governments should avoid abrupt subsidy removals, as seen in past crises (e.g., Spain’s FiT reduction in 2013) [6].

• Instead, **gradual reductions in incentives can help maintain investment stability while preventing speculative surges**.

**2. Stronger Financial Oversight:**

• **Regulatory bodies should** monitor financial saturation levels (~70% and ~90% thresholds) to **intervene if speculative risks increase**.

• **Financial stress tests** for high-growth renewable energy sectors **could prevent overleveraging and mitigate market crashes**.

**3. Diversification of Investment Models:**

• Encouraging **long-term infrastructure investments** (e.g., Power Purchase Agree- ments) **over short-term speculative capital flows would reduce financial instability**.

• Governments could support public–private partnerships that focus on sustainable financing.

5.2.2. Implications for Investors

The findings underline for investors the importance of risk-adjusted portfolio manage- ment in the markets for renewable energy:

• Battery-Storage Investment Risks: **Investors should carefully evaluate market val- ues and refrain from too strong short-term speculation** given the great chance of overheating in the battery sector by 2031 and 2038 in different periods.

• The **volatility of the solar business calls for hedging techniques like diversified portfolios balancing solar investments with more reliable energy sources**.

• Wind energy as a reduced-risk option: Because of its slower saturation trajectory and reduced speculative risks, investors looking for consistent, long-term returns might give wind energy top priority.

5.3. Long-Term Sustainability of Renewable Energy Markets

Beyond only financial concerns, the **possibility of speculative bubbles in markets for renewable energy has wider consequences for energy security and climate targets. A financial crisis in renewable energy could cause**:

**• Slowness in investments, postponing the energy changeover**.

**• Loss of public trust, so lowering political and financial backing for next initiatives**.

**• Market corrections, therefore raising the capital cost for sustainable energy.**

**• Energy markets should concentrate on sustainable, policy-driven investment strategies instead of speculative development patterns** if we are to guarantee long-term stability.

#### **That’s devastating. In 2008, Boston University quantifies**

**BU-13** (Boston University, 11-1-2013, “The Financial Crisis and The Great Recession,” BU. https://www.bu.edu/eci/files/2019/06/MAC\_2e\_Chapter\_15.pdf //everyone and their mother)

**The crisis** also **spread** **beyond U.S. borders.** As **consumption** and **income declined** **in** the **United States, many countries experienced** a **significant reduction in exports** as well as a **decline in the investments** that they **held in the United States**. As a result, global GDP declined by 2 percent in 2009. It has been estimated that between 50 million and **100 million people around the world** either **fell into,** or were prevented from escaping, **extreme poverty due** **to** the **crisis**. Why did this happen? Why were its effects so long-lasting? What lessons can be learned for the future? These are complicated questions to which this chapter provides some answers.The **economic** **impact** of the **financial crisis persisted for** an **unusually long** **period**. The **unemployment rate remained above 7 percent through late 2013** (see Box 15.1). Why was this? As we saw in earlier chapters, the circular flow economy can, in difficult times, producea vicious cycle. Unemployed workers generally have less income to spend. Families facing income losses and needing financial assistance can ordinarily borrow money—but after thefinancial crisis of 2007–8, banks and financial institutions introduced tougher standardsfor credit card loans and. home equity loans, in which an equity stake in a home is posted s collateral. This led to a “credit crunch” in which families and business were unable to obtain loans. Many families were therefore compelled to cut their spending further; in the period from 2008 to 2011, U.S. consumers on average reported spending $175 per month less than they would have in the absence of a recession. Many employers, suddenly facing lower profits, fired workers, contributing to a vicious unemployment cycle. While the values of MBSs and other newfangled securities seemed to plunge overnight, it took much longer for the ensuing credit contraction to affect business bottom lines, employment decisions, and consumer spending. Thus the crisis that began in 2007 led to a recession and **very slow recovery** that **lasted more than five years**.

#### **The status quo has reaped unprecedented benefits. Don’t let it go to waste with unneeded federal intervention. Negate.**

2NC

On climate

1. Gvt projects failed in the past
2. No reason federal is key
3. Decarbonization in general – other sources lock in CC extinction

**[1] Nuclear Energy cannot stop CC - alt limitations**

**Muellner 21**--- (Nikolaus Muellner, [*Institute of Safety- and Risk Sciences, University of Natural Resources and Life Sciences, Vienna, Austria*], 08-xx-2021, "Nuclear energy - The solution to climate change?", https://www.sciencedirect.com/science/article/pii/S0301421521002330) //doa3-3-2025 + master chen 💆

Anthropogenic climate change requires a rapid shift towards a CO2 neutral economy, if the global average temperature increase is to be kept below 2∘C, or, preferably, below 1.5∘C compared to pre-industrial levels. By 2050 the economy should be CO2 neutral, therefore climate change mitigation measures are needed in the near term to medium term future. Such a shift would strongly influence the energy (and electricity) supply system, which is currently based to a larger part on fossil fuels. The most important result of the present work is that the **contribution of nuclear power to mitigate climate change is**, and will be, very **limited**. According to current planning nuclear power would avoid at most4 annually **2–3% of total global GHG emissions** in the years 2020–2040. Moreover, nuclear power **cannot be expanded** to be the main source of future electricity generation. Expansion scenarios require an increase in uranium mining, which is met by **two limitations**: **uranium production** could hardly keep up during the expansion phase, and the overall amount of available uranium is **limited**. Such scenarios would leave new nuclear power plants **without fuel** during their planned life time. Fast breeder reactors promise a solution to the problem of limited uranium-235 resources, but will not be available for commercial deployment before 2040–2050. And given the considerable research effort and research times up to now, it is even doubtful if a commercially deployable fast breeder reactor will be available then. But even assuming such a scenario were feasile, even substituting all fossil fired power plants by nuclear power plants would still leave % of projected global GHG emissions from other sectors in 2040 and would still require drastic actions to reduce all emissions to zero. The officially announced plans do not hint at expansion scenarios. They aim at replacing capacity from decommissioned plants with new builds, possibly combined with extension of life time of current operating reactors. Comparing past projections with actual build rates and given the characteristics of nuclear power (long development times, long planning and construction periods, uranium-235 resource limitations of the current reactor technology), keeping the current nuclear capacity for the next years might constitute the upper limit for the use of nuclear power. However, current nuclear reactors, no matter how safe they may be, always carry a residual risk for severe, catastrophic accidents (Sehgal, 2012) and large releases of radioactive materials (Seibert et al., 2012).

### **[3] T. Renewables cheaper and more cost effective**

**Cooke 24** --- (Stephanie Cooke, [*Ms. Cooke is a former editor of Nuclear Intelligence Weekly and the author of “In Mortal Hands: A Cautionary History of the Nuclear Age.”*], 4-18-2024, "The Fantasy of Reviving Nuclear Energy", https://archive.is/dlrjW) //doa3-2-2025 + master chen 💆at 12:38 AM

World leaders are not unaware of the nuclear industry’s long history of failing to deliver on its promises, or of its weakening vital signs. Yet many continue to act as if a “nuclear renaissance” could be around the corner even though **nuclear energy’**s share of global electricity generation has **fallen by almost half** from its high of roughly 17 percent in 1996. In search of that revival, representatives from more than 30 countries gathered in Brussels in March at a nuclear summit hosted by the International Atomic Energy Agency and the Belgian government. Thirty-four nations, including the United States and China, agreed “to work to fully unlock the potential of nuclear energy,” including extending the lifetime of existing reactors, building new nuclear power plants and deploying advanced reactors. Yet even as they did so, there was an acknowledgment of the difficulty of their undertaking. “Nuclear technology can play an important role in the clean energy transition,” Ursula von der Leyen, the president of the European Commission, told summit attendees. But she added that “the reality today, in most markets, is a reality of a **slow but steady decline** in market share” for nuclear power. The numbers underscore that downturn. Solar and wind power together began outperforming nuclear power globally in 2021, and that **trend continues as nuclear staggers along.** **Solar** alone added **more than 400 gigawatts of capacity worldwide last year**, two-thirds more than the previous year. That’**s more than the roughly 375 gigawatts of combined capacity of the world’s 415 nuclear reactors,** which remained relatively unchanged last year. At the same time, investment in energy storage technology is rapidly accelerating. In 2023, BloombergNEF reported that investors for the first time put more money into stationary energy storage than they did into nuclear. Still, the drumbeat for nuclear power has become pronounced. At the United Nations climate conference in Dubai in December, the Biden administration persuaded two dozen countries to pledge to triple their nuclear energy capacity by 2050. Those countries included allies of the United States with troubled nuclear programs, most notably France, Britain, Japan and South Korea, whose nuclear bureaucracies will be propped up by the declaration as well as the domestic nuclear industries they are trying to save. “We are not making the argument to anybody that this is absolutely going to be a sweeping alternative to every other energy source,” John Kerry, the Biden administration climate envoy at the time, said. “But we know because the science and the reality of facts and evidence tell us that you can’t get to net zero 2050 without some nuclear.” A changing climate, a changing world Card 1 of 4 Climate change around the world: In “Postcards From a World on Fire,” 193 stories from individual countries show how climate change is reshaping reality everywhere, from dying coral reefs in Fiji to disappearing oases in Morocco and far, far beyond. The role of our leaders: Writing at the end of 2020, Al Gore, the 45th vice president of the United States, found reasons for optimism in the Biden presidency, a feeling perhaps borne out by the passing of major climate legislation. That doesn’t mean there haven’t been criticisms. For example, Charles Harvey and Kurt House argue that subsidies for climate capture technology will ultimately be a waste. The worst climate risks, mapped: In this feature, select a country, and we'll break down the climate hazards it faces. In the case of America, our maps, developed with experts, show where extreme heat is causing the most deaths. What people can do: Justin Gillis and Hal Harvey describe the types of local activism that might be needed, while Saul Griffith points to how Australia shows the way on rooftop solar. Meanwhile, small changes at the office might be one good way to cut significant emissions, writes Carlos Gamarra. That view has gained traction with energy planners in Eastern Europe who see nuclear as a means of replacing coal, and several countries — including Canada, Sweden, Britain and France — are pushing to extend the operating lifetimes of existing nuclear plants or build new ones. Some see smaller or more “advanced” reactors as a means of providing electricity in remote areas or as a means of decarbonizing sectors such as heat, industry or transportation. So far most of this remains in early stages, with only three nuclear reactors under construction in Western Europe, two in Britain and one in France, each more than a decade behind schedule. Of the approximately 54 other reactors under construction worldwide as of March, 23 are in China, seven are in India, and three are in Russia, according to the International Atomic Energy Agency. The total is less than a quarter of the 234 reactors under construction in the peak year of 1979, although 48 of those were later suspended or abandoned. Even if you agree with Mr. Kerry’s argument, and many energy experts do not, pledging to triple nuclear capacity by 2050 is a little like promising to win the lottery. For the United States, it would mean adding an additional 200 gigawatts of nuclear operating capacity (almost double what the country has ever built) to the 100 gigawatts or so that now exists, generated by more than 90 commercial reactors that have been running an average of 42 years. Globally it would mean tripling the existing capacity built over the past 70 years in less than half that time in addition to replacing reactors that will shut down before 2050. The Energy Department estimates the total cost of such an effort in the United States at roughly $700 billion. But David Schlissel, a director at the Institute for Energy Economics and Financial Analysis, has calculated that the two new reactors at the Vogtle plant in Georgia — the only new reactors built in the United States in a generation — on average, **cost $21.2 million per megawatt i**n today’s dollars — which translates to $**21.2 billion per gigawatt.** Using that figure as a yardstick, the cost of building 200 gigawatts of new capacity would be far higher: at least $4 trillion, or $6 trillion if you count the additional cost of replacing existing reactors as they age out. For much less money and in less time, the world can reduce greenhouse gas emissions through the use of renewables like solar, wind, hydropower and geothermal power, and by transmitting, storing and using electricity more efficiently. A recent analysis by the German Environment Agency examined multiple global climate scenarios in which Paris Climate Agreement targets are met, and it found that renewable energy “is the crucial and primary driver.” The logic of this approach was attested to at the climate meeting in Dubai, where more than 120 countries signed a more realistic commitment to triple renewable energy capacity by 2030. There’s a certain inevitability about the U.S. Energy Department’s latest push for more nuclear energy. The agency’s predecessor, the Atomic Energy Commission, brought us Atoms for Peace under Dwight Eisenhower in the 1950s in a bid to develop the “peaceful” side of the atom, hoping it would gain public acceptance of an expanding arsenal of nuclear weapons while supplying electricity “too cheap to meter.” Fast forward 70 years and you hear a variation on the same theme. Most notably, Ernest Moniz, the energy secretary under President Barack Obama, argues that a vibrant commercial nuclear sector is necessary to sustain U.S. influence in nuclear weapons nonproliferation efforts and global strategic stability. As a policy driver, this argument might explain in part why the government continues to push nuclear power as a climate solution, despite its enormous cost and lengthy delivery time. China and Russia are conspicuously absent from the list of signatories to the Dubai pledge to triple nuclear power, although China signed the declaration in Brussels. China’s nuclear program is growing faster than that of any other country, and Russia dominates the global export market for reactors with projects in countries new to commercial nuclear energy, such as Turkey, Egypt and Bangladesh, as well as Iran.

#### **[1] SMR’s aren’t economically viable – no mass manufacturing, recalls, and capital cost escalation.**

**Makhijani ‘21** [Arjun Makhijani, President of IEER, holds a Ph.D. in engineering (specialization: nuclear fusion) from the University of California at Berkeley, March 25, 2021, Why Small Modular Nuclear Reactors Won’t Help Counter the Climate Crisis, Environmental Working Group, https://www.ewg.org/news-insights/news/why-small-modular-nuclear-reactors-wont-help-counter-climate-crisis, Accessed 3-4-2025] fehmi  
Economics and scale

Nuclear reactors are large because of **economies of scale**. A reactor that produces three times as much power as an SMR does not need three times as much steel or three times as many workers. This **economic penalty** for small size was one reason for the early shutdown of many small reactors built in the U.S. in the 1950s and 1960s.

Proponents of SMRs claim that modularity and factory manufacture would compensate for the poorer economics of small reactors. Mass production of reactor components and their manufacture in assembly lines would cut costs. Further, a comparable cost per kilowatt, the argument goes, would mean far lower costs for each small reactor, reducing overall capital requirements for the purchaser.

The road to such **mass manufacturing** will be **rocky**. Even with optimistic assumptions about how quickly manufacturers could learn to improve production efficiency and lower cost, thousands of SMRs, which would all be higher priced in comparison to large reactors, would have to be manufactured for the price per kilowatt for an SMR to be comparable to that of a large reactor.

If history is any guide, the capital cost per kilowatt may not come down at all. At a fleet-wide level, the learning rate in the U.S. and France, the two countries with the highest number of nuclear plants, was negative – newer reactors have been, on the whole, more expensive than earlier ones. And while the cost per SMR will be lower due to much smaller size, several reactors would typically be installed at a single site, raising total project costs for the purchaser again.

Mass manufacturing aspects

If an error in a mass-manufactured reactor were to result in safety problems, the whole lot might have to be **recalled**, as was the case with the Boeing 737 Max and 787 Dreamliner jetliners. But how does one recall a radioactive reactor? What will happen to an electricity system that relies on factory-made identical reactors that need to be recalled?

These questions haven’t been addressed by the nuclear industry or energy policy makers – indeed, they have not even been posed. Yet recalls are a predictable and consistent feature of mass manufacturing, from smartphones to jet aircraft.

The problem is not merely theoretical.

One of the big economic problems of pressurized water reactors, the design commonly chosen for light water SMRs, including the NuScale design, which has received conditional certification from the Nuclear Regulatory Commission, was the need to prematurely replace the steam generators – the massive, expensive heat exchangers where the high-pressure hot water from the reactor is converted to the steam that drives the turbine-generators. In the last decade, such problems led to the permanent shutdown of two reactors at San Onofre, in Southern California, and one reactor at Crystal River, in Florida.

Several SMR light water designs place steam generators inside the reactor vessel (Figure 1). Replacement would be exceedingly difficult at best; problems with the steam generator could result in permanent reactor shutdown.

<<IMAGE OMITTED>>

Figure 1. Schematic of an SMR light water design with steam generator inside the reactor vessel

Source: Glaser et al. 2015

We have already seen **problems** with modular **construction**. It was a central aspect of the design of the Westinghouse AP1000 reactor, yet the AP1000 reactors built in the U.S. and China have had significant construction cost overruns and schedule delays. In 2015, a former member of the Georgia Public Service Commission told The Wall Street Journal, “Modular construction has not worked out to be the solution that the utilities promised.”

The need for mass manufacturing also creates a chicken-and-egg economic problem. Without the factories, SMRs can never hope to achieve the theoretical cost reductions that are at the heart of the strategy to compensate for the lack of economies of scale. But without the cost reductions, there will not be the large number of orders to stimulate the investments needed to set up the supply chain in the first place.

The SMR track record so far

The track record so far points to the same kind of dismal economic failure for SMRs as their larger cousins. Figure 2 shows the **capital cost escalation** for the proposed NuScale reactor and actual costs of two foreign SMRs. As a result, the total cost of a proposed project in Idaho using the NuScale design has already risen from around $3 billion, in 2015, to $6.1 billion, in 2020, long before any concrete has been poured.

<<IMAGE OMITTED>>

Figure 2. NuScale cost estimate escalations and SMR reality so far

Source: Ramana 2020

This pattern of escalations can also be anticipated for other SMR concepts, especially those not based on light water reactors. For instance, the proposed Natrium reactor – at 345 MW, slightly bigger than an SMR – is sodium-cooled. Despite about a hundred billion dollars spent worldwide since 1950, sodium cooled reactors have been commercial failures globally.

The process of getting **safety approvals** for such designs will likely take **long**er and be more **expensive**. In many cases, even setting up the certification process will take years, since the safety and accident modes differ with each design type. For instance, one risk with high-temperature gas-graphite reactors is fires, rather than meltdowns. To give a sense of scale of the expense, the NuScale SMR, which is the familiar light water design, is expected to cost roughly $1.5 billion just for **development** and **certification**. New non-light water designs will very likely cost more and take longer to develop from the concept stage to licensing review and approval.

For SMRs to consistently achieve the same cost of power production as the present large reactors would be a monumental task – and given the high costs of large reactors, SMRs would still be an **economic failure**. The costs of wind and solar electricity have been declining consistently and are projected to decline more.

Lazard, a Wall Street financial advisory firm, estimates the cost of utility-scale solar and wind to be about $40 per megawatt-hour. The corresponding figure for nuclear is four times as high, about $160 per MWh – a difference that is more than enough to use complementary technologies, such as demand response and storage, to compensate for the intermittency of solar and wind.

**And empirically, investment into nuclear energy increased emissions.**

**Jacobson 24** --- (Mark Z. Jacobson, [*Professor of Civil and Environmental Engineering & Director of the Atmosphere/Energy Program, Stanford University*], 10-10-2024, "7 reasons why nuclear energy is not the answer to solve climate change", https://www.oneearth.org/the-7-reasons-why-nuclear-energy-is-not-the-answer-to-solve-climate-change/) //doa3-4-2025 + FK

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

On resilience

1. Only fed action that the card mentions is emergency planning not investment

**[1] Total grid collapse can’t happen – it’s too decentralized**

**Uchill 18** — Cybersecurity reporter at Axios, former cybersecurity reporter at The Hill, internally citing Department of Homeland Security officials and other cybersecurity experts. (Joe; Published: August 23, 2018; “Why "crashing the grid" doesn't keep cyber experts awake at night”; Accessed: September 6, 2021; [edited for gendered language] https://www.axios.com/why-crashing-the-grid-doesnt-keep-cyber-experts-awake-at-night-a40563a5-f266-493d-856a-5c9a5c1383dd.html)//CYang

Reality check: The people tasked with protecting U.S. electrical infrastructure say the scenario where hackers take down the entire grid — the one that's also the plot of the "Die Hard" movie where Bruce Willis blows up a helicopter by launching a car at it — is not a realistic threat. And focusing on the wrong problem means we’re not focusing on the right ones.

**So, why can't you hack the grid? Here's one big reason: "The thing called the grid does not exist," said a Department of Homeland Security official involved in securing the U.S. power structure. Think of the grid like the internet.** We refer to the **collective mess of servers, software, users and equipment that** routes internet traffic as "the internet." The internet **is a singular noun, but it’s not a singular thing.**

**You can’t hack the entire internet. There’s so much stuff running independently that all you can hack is individual pieces** of the internet. Similarly, the **North American electric grid is actually five interconnected grids that can borrow electricity from each other. And the mini-grids aren't singular things either. Taking down "the grid" would be more like collapsing the thousands of companies that provide and distribute power accross the country.**

**"When someone talks about 'the grid,' it's usually a red flag they aren't going to know what they are talking about," says Sergio Caltagirone, director of threat intelligence at Dragos, a firm that specializes in industrial cybersecurity including the energy sector. Redundancy and resilience: Every aspect of the electric system,** from the machines in power plants to the grid as a whole, **is designed with redundancy in mind. You can’t just break a thing or 10 and expect a prolonged blackout. On some level, most people already know this. Everyone has lived through blackouts,** but no one has lived through a blackout so big it caused the Purge.

'The power system is the most complex machine ever made by humans," said Chris Sistrunk, principle consultant at FireEye in energy cybersecurity. "Setting it up, or hacking it, is more complicated than putting a man [person] on the moon." An attack that took out power to New York using cyber means would require a nearly prohibitive amount of effort to coordinate, said Lesley Carhart of Dragos. Such a failure would also tip off other regions that there was an attack afoot. Causing a power outage in New York would likely prevent a power outage in Chicago.

**[3] We are investing more into the current grid to meet energy demand – nuclear not needed.**

**Garcia 25** — (Eduardo Garcia [*New York-based journalist covering renewable energy. Eduardo worked as a Reuters correspondent in Guatemala, Bolivia, Argentina, and Ecuador before moving to the U.S. in 2014. He has written about climate solutions for The New York Times and Slate and is the author of "Things You Can Do: How to Fight Climate Change and Reduce Waste."*], 1-28-2025, "US grid investments take off as power demand hikes", archive.is, https://archive.is/ZeiN4, accessed 4-3-2025) //FK

Transmission investments will be spurred by Order 1920, a rule issued by the Federal Energy Regulatory Commission in May 2024 that requires regional transmission organizations (RTOs) to issue long-term investment plans. Many transmission operators have unveiled hefty investment plans. In December, the Midcontinent Independent System Operator (MISO) announced a $22 billion investment to install high-voltage transmission lines in the Midwest, in addition to the $10.3 billion in transmission projects that it approved in 2022. Southwest Power Pool (SPP) approved $7.7 billion in transmission projects in October and PJM, which operates the largest network mostly in eastern U.S., is in the process of approving around $6 billion in transmission investments. Key clean power states including California, opens new tab, Texas and New York — where Con Edison is building the $810 million Brooklyn Clean Energy Hub — have also announced large transmission projects in recent years. The optimization of new power generation benefits consumers, as well as developers. **New England states are pursuing a portfolio of transmission and battery projects** that last year secured $389 million in federal funding, including a grant for utility Eversource Energy to build a switching station in Connecticut to distribute up to 2.4 GW of offshore wind capacity. These kinds of infrastructure investments effectively “allow generators to share the costs of transmission investments, reduce project risks and lower prices for consumers,” Vandan Divatia, Vice President of Transmission Policy at Eversource, told Reuters Events. Grid enhancements Federal Order 1920 also encourages faster rollout of technologies that enhance current existing grid networks, avoiding the obstacles faced when planning new transmission lines. “**We can get at least 50% more out of the existing grid with grid enhancing technologies**, power flow control devices and high performance conductors that can help RTOs address the rapid load growth that's coming and do so at a lower cost,” Pfeifenberger said. Minnesota Power will seek to install grid enhancement technologies such as Static Synchronous Compensator (**STATCOM**), which is **used to stabilize the grid when more intermittent sources of generation are added**, Gunderson said. The utility wants to expand existing corridors and/or replace existing facilities rather than build new infrastructure because the siting and routing of new projects is “always challenging due to the size of structures and substations within proximity of inhabited areas,” he said. **Advanced conductors can double transfer capacity of existing lines and reduce losses** within months, versus several years for new infrastructure, Theodore Paradise, Chief Policy and Grid Strategy Officer at conductor supplier CTC Global, told Reuters Events. California, Massachusetts and Montana have rolled out policies encouraging utilities to prioritize grid enhancement technologies and advanced conductors but adoption is lagging compared to other markets like Europe and Asia, Paradise said. A lack of transmission infrastructure could see lead tech groups look to build data centers elsewhere.

**[4a] The existing grid is 99% reliable – outages always occur but decentralized renewables solve back, not nuclear**

**Underwood 24’**

Adrienne Underwood, BA in Environmental Sustainability and Social Justice @ SFSU, Director of communications at PSE Healthy Energy, August 20 2024, Reliability, Resilience, and the Power Grid, *PSE,*<http://psehealthyenergy.org/reliability-resilience-and-the-power-grid/>, //DS

Modern life depends on reliable electricity. From data centers to air conditioning, energy-intensive technologies have [driven up](https://www.canarymedia.com/articles/transmission/suddenly-us-electricity-demand-is-spiking-can-the-grid-keep-up#:~:text=In%20the%20past%20year%2C%20estimates,according%20to%20Grid%20Strategies'%20analysis.) electricity demand across the U.S. Increased demand has amplified the risks posed by power outages, which can disrupt the essential systems that underpin economic productivity and public safety. To mitigate these risks, many states are investing in fortifying the electric grid. Yet these investments do little to protect the public when power outages inevitably occur.

So what can be done to ensure that every day life continues, even when there are disruptions to the grid? To answer that question, we must first understand the difference between grid reliability and energy resilience.

What’s the difference between grid reliability and energy resilience?

When it comes to the electrical grid, reliability is defined by the capacity to avoid power disruptions. Reliability is a measure of dependability, or lack thereof. Resilience, on the other hand, is measured by the experience of the user and their individual ability to withstand and recover when power outages arise. Distributed energy resources like generators, solar panels, and backup batteries—or even alternative fuels like propane heaters and camp stoves—can increase energy resilience because they allow individuals to maintain normalcy, even when the power grid isn’t operating normally.

How do we keep the lights on, even when the power goes out?

According to the National Renewable Energy Laboratory, the U.S. power grid is already 99.5% reliable. While there is always room to improve electrical systems, the grid can’t be hardened against everything. Power outages will always occur, especially as climate change and rising energy demand test the system’s limits. At a certain point, investments in resilience can deliver a greater return on investment than reliability alone—both for communities and, at times, the grid itself. This is especially true if we account for the avoided costs and damages from power outages.

“One way to improve energy resilience is to install technology that provides backup power, like solar and storage systems. You can do this at a household level, or at the community scale with a resilience hub, which provides people a place they can go during an outage to access reliable electricity,” says PSE Healthy Energy Scientist Bethany Kwoka. If you use medical services at home, an outage could seriously impact your health, so having household energy resilience can help you avoid that, or throwing away food that goes bad when the refrigerators and freezers fail during power outages.”

These distributed clean energy systems can be leveraged to lower the frequency of power outages. During a recent heat wave in California, over 16,000 household batteries were used to [supplement grid power](https://www.solarpowerworldonline.com/2024/07/sunruns-calready-vpp-dispatched-to-support-grid-recent-heat-wave/) and avoid rolling blackouts—part of a virtual power plant program administered by the California Energy Commission. According to Kwoka, investments in community-scale resilience can offer many of the same benefits. “Until energy resilience is affordable for all homes, having energy resilience within the community can give people a place to store their medication or charge their devices, and have access to other resources, when those resources aren’t available at home,” says Kwoka.

What does it mean to increase energy resilience to power outages?

Energy resilience during a power outage means more than keeping refrigerators cold and households lit at night. A power outage can have a ‘cascading impact,’ says Kwoka, which could be felt in all kinds of ways, many of which are not immediately apparent. Minimizing and recovering from these impacts is also core to resilience.

For example, hospitals are required to have backup power systems, yet patients may not be able to travel to their appointments. Medical staff may rely on childcare facilities during work hours, but those facilities may not be able to operate if the power is out, which could leave a hospital understaffed.

“Even if your life is only disrupted for a day or two, the real measure of resilience is how quickly, and how easily, you can recover. If you’re living paycheck to paycheck and had to miss a couple shifts at work, and now have to replace everything in your fridge or reschedule a doctor’s appointment, it’s that much more difficult to pay your rent or keep up with your healthcare needs,” Kwoka says.