#### Interpretation: Varsity Public Forum debaters at NDCA must disclose, on the Public Forum section of current year’s Opencaselist under their Tabroom entry code, the highlighted, tagged, and cut evidence as read in the round from their constructive speech immediately after each debate.

#### They violate it.

#### Disclosure is a voter

#### 1 – it increases strategy based topic clash – disclosure allows in-depth and nuanced discussions and testing of arguments specific to the topic

#### 2 – it decreases the inequity gap – camps, prep groups and private coaching are inevitable which provide certain groups unique advantages to intel gathering – our interp sets a strict baseline that everyone at a national tournament has the same access to information regardless of extracurricular behavior – setting good norms outweighs. They gave themselves an unfair advantage

#### Theory is a prior question to the content of arguments decided on competing interpretations – the impacts above have already been triggered – drop the team to discourage the practice, there are no reverse voting issues because you don’t win for proving you are educational.

### Contention 1– Prices

#### Electricity prices are relatively low.

Kennedy ’25 [Ryan; 01/16/2025; Master of Energy and Environmental Management degree at the University of Connecticut; "Wholesale electricity prices lower and more stable in 2024", pv magazine USA, https://pv-magazine-usa.com/2025/01/16/wholesale-electricity-prices-lower-and-more-stable-in-2024/ anish]

Data from the Energy Information Administration (EIA) show that wholesale electricity prices were lower and more stable in 2024 than in 2023. EIA said pricing was significantly more stable than the last several years. EIA attributed the lower prices and diminished volatility to a decline in natural gas prices and to increases in low-cost renewable energy resources and battery energy storage capacity. Natural gas prices from Louisiana’s Henry Hub, a benchmark for the market, averaged $2.21 per million British thermal units, the lowest average annual price in inflation-adjusted dollars ever reported. “Price changes for natural gas have an outsized influence on wholesale electricity prices because natural gas prices tend to set the marginal price of electricity during most hours in most regional markets,” EIA said. “The wholesale price of electricity on the electric power grid reflects the real-time cost for supplying electricity, which can be driven by fluctuations in demand.”

#### The most recent international studies show that nuclear energy raise electricity prices

Hannam 24 [Peter, 9-19-24, “Coalition’s nuclear plan will add $665 a year to average power bill, report warns,” Guardian, https://www.theguardian.com/australia-news/2024/sep/20/coalition-nuclear-power-plan-will-add-665-dollars-to-average-power-bill-a-year-report-warns?utm\_source=chatgpt.com

The Coalition’s plan for seven nuclear power plants would lift power bills for average households by $665 a year based on estimated costs of six overseas nuclear projects, according to an Institute for Energy Economics and Financial Analysis report. The Ieefa findings built on the CSIRO’s GenCost studies that have shown nuclear energy to be the most expensive form of new power generation. It assessed recent construction costs at plants in the US, UK, Finland and France, and two proposed plants – one in the Czech Republic and an abandoned small modular reactor in the US. “The cost of electricity generated from nuclear plants would likely be 1.5 to 3.8 times the current cost of electricity generation in eastern Australia,” the Ieefa report by Johanna Bowyer and Tristan Edis found. “In the international examples examined, the capital cost of nuclear power plants was very high – up to $90bn,” Bowyer said. “Recent international large-scale nuclear projects have experienced construction challenges, delays and cost blowouts.” Nuclear’s cost disadvantage compared with solar, wind and other generation types is likely underestimated, Edis said. Ieefa’s modelling assumed a 60-year economic lifetime excluding likely refurbishment costs, a “very high” 93% utilisation rate and no financial premium despite the higher construction risks of nuclear plants. “Further, Australia has very limited nuclear capability, and all examples used were from countries which already have an established nuclear industry,” Edis said. “So Australia could see even higher bills than what our study shows. “Nuclear is often mistakenly perceived to be a cost-effective technology because it is in widespread use across the globe,” he said. “Yet most of the plants built in the western world were committed based on projected costs and timeframes that turned out to be horrible underestimates.” The Ieefa paper’s release coincided with an update of the world nuclear energy industry status report supported by the German and Austrian governments among others. It found nuclear generation capacity shrank 1 gigawatts last year and host nations excluding China closed a net 51 units over the past two decades. Most energy companies and the Albanese government have rejected the Coalition’s nuclear plans, citing costs and their likely unavailability for many years, since they were announced in June. Peter Dutton is expected to provide more details at a Ceda thinktank event in Sydney on Monday. The government has set a target of supplied 82% of electricity from renewable energy sources by 2030, or about double the present proportion. The Australian Energy Market Operator, though, has repeatedly warned renewables were not being added fast enough to cope with expected closures of coal-fired plants. Ted O’Brien, the opposition’s climate and energy spokesperson, said Ieefa’s modelling “does not reflect Coalition policy” and matched previous critiques “where a dodgy piece of analysis cherrypicks the worst-case scenario projects and pretends that it’s common practice”. “Our zero-emissions nuclear power plants will be government-owned and, unlike Labor’s capacity investment scheme, we will release our costings ahead of the next election,” O’Brien said. The world nuclear energy industry status update, meanwhile, found total investment in non-hydro renewables capacity reached a record US$623bn (A$913bn) in 2023, or 27 times the reported global investment decisions for nuclear plant construction. Solar generation capacity rose 73% and windfarm capacity 51%, adding a combined 460GW of new renewables capacity even as nuclear generation shrank 1GW. Wind and solar electricity amounted to 50% more than nuclear, the report found. All up, 13 nations were hosting 59 nuclear reactor construction projects, or three fewer countries than in mid-2023. At least 23 of those projects faced delays. China dominated with 27 reactors being built, all at home. Russia accounted for the bulk of the remainder, with 26 units under construction, 20 of which were in seven nations, said the report co-written by the independent analyst and nuclear critic Mycle Schneider.

#### High prices stunt crypto production or move it to other countries.

Bedwell et al. ’18 [Helena; 02/05/2018; Bloomberg News Reporter; Vanessa Dezem, Master’s degree in Digital Journalism from Instituto de Empresa; Stephen Stapczynski, Leading Asia Energy Coverage at Bloomberg News; Jonathan Tirone, Foreign Correspondent; "The Cost of Crypto Is Turning Miners Towards Green Power", BloombergNEF, https://about.bnef.com/blog/the-cost-of-crypto-is-turning-miners-towards-green-power/ anish] *\*Figures omitted*

Vakhtang Gogokhia’s plan to extract cryptocurrencies from the netherworld of cyberspace relies on a strategy familiar to many old-school manufacturers who use a lot of energy — the cheaper the fuel, the better. That’s why Gogokhia, who heads a startup called Golden Fleece, put a cargo container with Chinese-built computers inside a dilapidated Soviet-era tractor factory in Georgia, about 60 miles (100 kilometers) east of the Black Sea. The site made sense for running servers 24 hours a day because it has access to low-cost electricity generated by water flowing from the nearby Caucasus Mountains. There also are plans for solar panels and wind turbines. Renewable energy is becoming the preferred way of mining digital currencies like Bitcoin as prices surge and the industry seeks more computing power. While traditional fuels like coal remain staples for many utility grids, big miners including Bitmain Technologies Ltd., HIVE Blockchain Technologies Ltd. and Bitfury Group are tapping clean power in places like Canada, Iceland and Paraguay — and luring investors worried about the industry’s carbon footprint. “To conquer the riches of cryptocurrency,” said Gogokhia, Golden Fleece’s 28-year-old chief executive officer and a former employee of the state-owned electricity grid, “we undertook the quest to build cheap, green and sustainable mining farms in Georgia.” It’s easy to see why energy sources are getting more attention. The increasingly difficult computations for creating new blockchains — the encrypted digital ledgers that underpin cryptocurrencies — require ever-more powerful computers. And many of the big server farms need air conditioning to keep from overheating. The industry’s electricity use jumped almost eight-fold in the past year, and spending on power can eat up 30 percent to 60 percent of revenues, Bloomberg New Energy Finance estimates. “The price of electricity mostly drives where mining is taking place,” said Christian Catalini, who founded the Cryptoeconomics Lab at the Massachusetts Institute of Technology outside of Boston. “If the price of electricity increases in one location, mining will likely just move somewhere else.” A move toward increased mobility by producers has prompted Austria’s Hydrominer GmbH and Switzerland’s Envion AG to build computer-packed data centers into cargo containers that can be hauled off to new locations. Over the past year, creating cryptocurrencies almost anywhere got more profitable as prices skyrocketed, sparking a rapid global expansion of mining activities along with hundreds of new kinds of tokens. Bitcoin alone was valued at more than $325 billion in December — exceeding the market capitalization of Wal-Mart Stores Inc., after jumping to almost $20,000 each from less than $800 a year earlier. Still, the computers needed to create and sustain Bitcoin require as much electricity every day as 30 nuclear power reactors running at full capacity, and the industry already is using more than all the world’s electric vehicles, BNEF estimates. While the technology around creating cryptocurrencies may evolve to be more efficient, requiring less energy, electricity costs remain a key concern for miners, especially after Bitcoin fell to below $8,000 this month. Compounding the risk from volatile prices, some older operations are under pressure from regulators and investors, even in places where electricity prices are low. In China, the world’s the biggest cryptocurrency producer, many server farms rely on cheap, surplus power from coal-fired plants that contribute to pollution. The government has forced industries to limit climate-warming emissions, and officials are contemplating new taxes to assert more control over domestic power markets and digital currency operations. About 70 percent of major Bitcoin-mining pools are based in China or owned by Chinese companies, according to Blockchain.info. With the prospect of new limits in China, investors are looking elsewhere. In Georgia, which gets about three quarters of its electricity from hydroelectric plants, Golden Fleece will pay $50 per megawatt-hour, or well below the world average of $121, BNEF data show. Iceland and Switzerland are even cheaper, while Canada and Paraguay are among those at half the global average. “Mining with clean energy is possible and economically sound in those places,” said Guy Lane, director of the Long Future Foundation, an Australian-based non-profit. The foundation promotes ideas to protect the planet and has studied the impact of cryptocurrencies on the environment. The industry’s increasing enthusiasm for finding clean power comes at a time when renewable energy has become a staple in utility grids around the world as the technology improved and costs fell. In the U.S., renewables like wind and solar accounted for 17 percent of electricity supply last year, twice the market share of a decade earlier, reducing demand for coal, government data show. Renewables will capture $9 of every $10 spent on new power projects through 2040, according to BNEF’s New Energy Outlook report, with startups from Australia to Texas to Estonia trying to give rooftop solar and windmill owners the chance to sell directly to consumers. Places with surplus hydroelectric capacity are also drawing more attention. In Paraguay’s Ciudad del Este, a municipality on the Parana River across the border of southern Brazil, cryptocurrency miners are setting up in the city’s free-trade zone. They are tapping cut-rate power generated from the nearby 14-gigawatt Itaipu hydropower plant, the world’s second-biggest dam, which produces more electricity than Paraguay can consume. Prices are about a quarter of what they are in neighboring Brazil. “Miners are looking for where they can have higher margins,” said Brazilian miner Rocelo Lopes, adding that his 6,000 computers in Ciudad del Este are South America’s biggest cryptocurrency operation. “It is a very volatile market, and from one day to the next, you can lose money.” In Canada, utilities Hydro Quebec and BC Hydro are courting cryptocurrency miners, according to Harry Pokrandt, the CEO at Vancouver-based HIVE Blockchain Technologies. But cheap electricity isn’t the only consideration, he said. The local speed and reliability of the internet and a solid legal framework are almost as important, and climate matters because cooler weather means lower costs to keep their computers cool. Back in Georgia, Golden Fleece is trying to raise $40 million — through an initial coin offering that promises investors a dividend paid in a digital currency. The cash would be used to build servers to mine Etherium, an increasingly popular token that recently fetched $1,125, up from $230 as recently as September. The country’s richest man, former Prime Minister Bidzina Ivanishvili, helped BitFury set up a mining center in a Tbilisi free-trade zone that cost more than $100 million. “Miners are looking for where they can have higher margins,” said James Butterfill, the executive director and head of research and investment strategy at ETF Securities UK Ltd. “It is a very volatile market, and from one day to the other, you can lose money. So having a cheap source of power is very important.”

#### Keeping crypto mining in the U.S. prevents financial abuse and dirty emissions.

Les and Morgenstern ’23 [03/25/2023; Jason Les, CEO of Riot Platforms, Inc.; Brian Morgenstern, Riot’s head of public policy and was a senior adviser and deputy assistant secretary of the Treasury from 2017 to 2020; "Why keeping Bitcoin mining in the U.S. helps the economy, national security, and even the environment", Fortune Crypto, https://fortune.com/crypto/2023/03/25/why-keeping-bitcoin-mining-in-the-u-s-helps-the-economy-national-security-and-even-the-environment/ anish]

Relative to other leading Bitcoin mining jurisdictions, the U.S. has an extremely clean energy grid. Texas is a leader in Bitcoin mining and the home of Riot Platforms’ operations, the largest Bitcoin mine in North America. According to the American Clean Power Association, Texas led the nation in renewable energy capacity added in 2021—close to three times that of second-place California. Pushing Bitcoin mining offshore, under the guise of environmentalism, would only mean the U.S. will capture less of Bitcoin’s value, and more mining will happen connected to dirtier energy grids in more hostile parts of the world. For example, Russia is infamous for not only fossil fuel production and its use of energy for political brinksmanship, it’s among world leaders in leaking methane into the atmosphere. It’s already among the top five Bitcoin mining jurisdictions and seeking more market share. Weakening the American Bitcoin mining industry would be an enormous gift to Russia—and increase global carbon emissions. That leads to the national security issue. As noted in a recent Justice Department report on cryptocurrencies, America has strong anti-money laundering rules and ensures that as people move Bitcoin value from the network in and out of traditional accounts, it is traceable—nefarious actors can be caught, unlike in other parts of the world. Russia, for example, is a world leader in ransomware attacks and the abuse of cryptocurrency, as well as traditional financial intermediaries. Keeping Bitcoin mining in America means that more value will be captured by highly regulated U.S. companies and law-abiding individuals simply interested in optionality when it comes to storing and transferring value. Bitcoin mining has created thousands of jobs. Riot alone employs approximately 500 people, many in Rockdale, Texas, a community previously suffering from the closure of a large industrial aluminum-smelting plant. Riot is now helping to support a program with the Texas State Technical college to upskill the local workforce with programs in computer repair and programming. Bitcoin mining is a bourgeoning industry that’s good for the environment, the economy, and national security. Attacks from nefarious political forces should be rejected to maintain America’s leadership role in the digital economy.

#### Otherwise, crypto laundering causes sanctions evasion---extinction.

Mohammad Omar Farooq & Mohammad Dulal Miah 22, Miah received his PhD in Development Economics from Ritsumeikan Asia Pacific University, Japan. His research interests include property rights, economic development, the economics of rents and justice seeking, comparative financial system, corporate governance, etc.; Farooq is Head of the Center for Islamic Finance, Bahrain Institute of Banking Finance. His interests include Islamic economics/banking/finance, Islamic law and jurisprudence, and Islamic political economy, "Fintech, Technomania, and Persistent Socio-Civilizational Challenges," Digital Transformation in Islamic Finance, Routledge, 2022, pp. 64-80

4.4 Wars and conflicts One persistent scourge of human civilization has been wars and conflicts. There was hardly any era in human history when some wars or conflicts did not take place. However, modern civilization has not seen less of them. Rather, 20th century has been noted as the century of genocide, and the same century also has seen two of the worst wars of global scales, the two world wars. If technology has brightened, enriched, and enhanced many aspects of our lives, and positively touched so many people around the world, it is also the science and technology driven by war or military pursuits that now have brought the planet to an existential threat. The human species now has built the military capacity to be able to self-destruct. As Russia invaded Ukraine, both countries part of Europe asthe hotbed of two world wars, and if the global military powers and NATO did not feel restrained and behave pragmatically, such a war initiated by a nuclear superpower can easily spin out of control and turn into another existential threat. The quest of major powers to have dominating edge over the adversaries involves no-stone-unturned approach, where they are in morbid race in biological, nuclear, chemical, and other disastrous weapons of mass destruction. Many of these wars are for vain glories of individual megalomaniacs or dominance-seeking global and regional powers. Many of these wars occur under false pretexts, and often to serve the interest of the global military weapons manufacturing industry, whose quest is not just for innovating defensive solutions, but also offensive solutions that are bought and sold like kitchen knives. In 2015, Federation of American Scientists warned: while it is impossible to precisely predict all the human impacts that would result from a nuclear winter, it is relatively simple to predict those which would be most profound. That is, a nuclear winter would cause most humans and large animals to die from nuclear famine in a mass extinction event like the one that wiped out the dinosaurs. (Starr, 2015) Some of these risks might be exaggerated, but if there is a nuclear war where nuclear powers get involved and deploy their weapons, beyond the deterrence, there is a potential existential threat to human civilization. At least in the context of wars and conflicts, without humanity-oriented values and empathy, technology so far has been more of bane than boon. The most recent development of Russian invasion of Ukraine, which can escalate to a major war of the 21st century in the heartland of Europe, has placed Fintech industry into a new bind. Fintech envisions a world with “money without borders” (Webb, 2022). Under the new, globally coordinated sanction against Russia, Fintech companies are feared to face enormous restrictions on their transactions. Ukrainian allies, in particular, the European Union, UK, and USA have imposed various sanctions on Russian government and oligarchs in response to Russia’s invasion in Ukraine. The sanctions include, along with other broad measures, expelling major Russian banks from the SWIFT, a communication system for international banking transactions. The key to implementing sanctions is the international banking system through which funds are transferred cross-borders. Banks put every measure to know their customers as well as the sources and purpose of funds being transferred. In such a process, banks are strictly reluctant to process financial transactions related to sanctioned individuals or entities. However, Flitter and Yafe-Bellany (2022) put it in this way “… if banks are the eyes and ears of governments in this space, the explosion of digital currencies is blinding them.” The primary motto of cryptocurrency is to maintain its neutrality which means that no regulatory entity including the government can prevent its use. Unlike banks which require formal approval from the respective central bank for processing major transactions, the exchange of cryptocurrency aims to bypass such procedures. In effect, no regularity entity can effectively prevent parties to exchange cryptocurrency because the exchange takes place between peers without involving any intermediary. Some countries including North Korea, Iran, and Venezuela have used the loopholes of cryptocurrency to ease the pressure of Western sanctions. North Korea is a notorious example which has occasion-ally used hacking techniques, using ransomware, to steal cryptocurrency from different parts of the world worth billions of dollars (Kim, 2022). In 2020, about 74% of global ransomware revenues valued US$400 million worth of cryptocurrency were captured by entities that are most likely linked to Russia (Flitter and Yafe-Bellany, 2022). Hence, it is highly likely that Russia would leave no stone unturned to use cryptocurrency to ease the ongoing sanctions. Abundance supply of energy has provided Russian miners with a competitive edge to mine crypto in the country. Russia ranks third in the world in mining bitcoin, the capstone among all the cryptocurrencies (Makhlouf and Selmi, 2022). Although Kazakhstan ranks second following only the USA, it is believed that Russia has an upper hand in bitcoin mining in Kazakhstan. According to Bloomberg estimation, Russia is a home to at least $214 billion worth of cryptocurrency (Fortune, 2022). Such a mounting possession of crypto would enable Russia to use crypto for buying goods and services which are currently under sanctioned. It is believed that Russia may develop a network of complicit exchange services to evade sanctions. For instance, Russia is on the verge to develop some new tools that can help mask the origin of such transactions that would allow businesses to trade with Russian entities without the risk of being detected. In addition, there are some cryptocurrencies such as Moreno, which apply private distributed ledger with a feature of privacy-enhancing technology that aims to conceal transactions. Russia can also resort to dark web marketplace such as Hydra, powered by cryptocurrency, to accomplish obscured transactions. Strict regulations and their compliance requirement enable such platforms to remain outside of researchers and regulator’s focus. Besides Hydra, other money laundering techniques, such as “nesting,” are also used for anonymous transactions. Nesting and other such techniques can hide themselves within a larger, legitimate structure to avoid regulatory purview. Moreover, the Russian government plans to develop its own digital currency, digital ruble, so that the country can use it with partner countries without first converting to dollars. China, which has already initiated digital currency, is highly likely to partner with Russia. Moreover, it is still possible that some illicit trades are happening under the radar because exchanges and cryptocurrency compliance firms do not necessarily know about all the wallets controlled by proxies of an individual on a sanction list. In such a case, sanctions against Russia wouldn’t achieve the intended purpose. This proves that while Fintech aims to facilitate transactions with ease and lower transaction cost, its use can also create a loophole for violating international orders and legitimacy.

### Contention 2-- Biodiversity

#### Even a limited expansion of nuclear power *destroys the biosphere*.

Dr. M.V. Ramana 24, PhD in Physics from Boston University, Professor and Simons Chair in Disarmament, Global and Human Security at the University of British Columbia, and Director of the Master of Public Policy and Global Affairs program at the School of Public Policy and Global Affairs, previously worked at the Nuclear Futures Laboratory and the Program on Science and Global Security, both at Princeton University, member of the International Panel on Fissile Materials, the International Nuclear Risk Assessment Group, and the team that produces the annual World Nuclear Industry Status Report, “Nuclear is not the solution: atomic power in the age of climate change”, Verso Books

My bottom line is that nuclear energy, whether with old reactor designs or new faux alternatives, will simply not resolve the climate crisis. The threat from climate change is urgent. The world has neither the financial resources nor the luxury of time to expand nuclear power. Meanwhile, even a limited expansion would aggravate a range of environmental and ecological risks. Further, nuclear energy is deeply imbricated in creating the conditions for nuclear annihilation. Expanding nuclear power would leave us in the worst of both worlds. Too virtuous to meter? Proponents of nuclear energy have other reasons to support their preferred technology. They argue that nuclear reactors can do much more than just generate electricity. The “much more” depends on the specific context, and could include creating well-paying jobs, boosting national pride, providing energy independence, supplying clean water, and producing medical isotopes to treat cancer. As the public has become more concerned about climate change, nuclear advocates have appended to this list two more applications for energy from nuclear reactors: capturing carbon dioxide from the atmosphere (direct air capture) and producing hydrogen and high temperature heat for industrial processes. All of these are reminiscent of what Admiral Lewis Strauss, one of the central characters in the hit Hollywood film Oppenheimer and the chair of the US Atomic Energy Commission in the 1950s, told the National Association of Science Writers on September 16, 1954. Ten days after the ground-breaking for first US nuclear plant, Strauss told his audience that given the great promise of nuclear technology, it would not be “too much to expect that our children will enjoy in their homes electrical energy too cheap to meter.” The many claims about what else nuclear reactors can do make one wonder: Is nuclear energy too virtuous to meter? Let me offer one example from a company called Hyperion Power Generation offering a small nuclear power plant design that was actively covered in the media between 2007 and 2012. In March 2010, the founder of this company, John Deal, told the Albuquerque Journal, “We started this company to clean water in Africa … Our emphasis is helping people not die from not having clean water … If you’ve got energy, you can have all the clean water you want.” This was not a one-off sales pitch. In their 2011 article in Issues in Science and Technology, writer Ross Carper and academic Sonja Schmid offer this description of Deal in action: In the middle of Deal’s talk in Denver, he began flipping through some artist-drawn images. The most striking of all shows a small nuclear reactor, buried and unattended at what looked to be less than 15 feet below the surface. Two simple tubes snake upward from the reactor, drawing the eye to a pair of gray above-ground tanks, with the words “Potable Water” stamped on the side. The setting? An impoverished African village complete with about a dozen mud constructed, thatch-roofed huts. A handful of people were drawn into the image, all of them walking to or from the clean water source, which is apparently powered by a $50 million HPM.7 HPM stands for Hyperion Power Module, the nuclear reactor the company was advertising, and the cost estimate of $50 million for a nuclear reactor should be seen in that light—as wishfully cheap. (A few years later, Pitch Book, a database of private equity-based corporations, listed the company as “out of business.”) Such promises of atomic energy delivering progress to Africa date back to the beginning of the nuclear age. On January 28, 1947, for example, Waldemar Kaempffert, the science editor of the New York Times, predicted, The desert of Sahara could easily be irrigated by electric pumps driven by uranium power, with the result that more surplus cotton than we could sell at a profit and more surplus plant food than we could eat would be dumped on the market. Africa would be transformed into another Europe, with savages [sic!] who never saw a steam shovel or railway train transformed into machine tenders.8 After more than half a century of experience with nuclear technology, ideas about using it to provide clean water to poor people are delusional at worst and deceptively self-serving at best. Reducing the problem of insufficient clean water to an absence of energy ignores the many other problems that prevent African villagers from accessing clean water and the persisting legacies of colonialism and imperialism that led to “underdevelopment” in the first place.9 In his “communal memoir” of the aerospace industry Blue Sky Dream, the journalist David Beers talks about a special characteristic of the former Nazi rocket scientist Wernher von Braun, the man sometimes termed “the father of America’s space program” due to his important role in transferring rocket technology to the United States. The classic American entrepreneurial hero searches out unmet desires in the everyday world and then, with a certain flexible flair, invents the answers, products for the masses to use. Von Braun’s genius lay elsewhere. He was brilliant at inventing new and different uses for the only product he ever desired to make, the space rocket. He was a master at selling his one product to the only customers who could ever afford it, a nation’s rulers.10 Much like von Braun, vendors and advocates of nuclear power are really interested only in selling nuclear reactors, and they try to invent different uses for their favoured product. Delivering clean water, heating houses or industries, and propelling rockets and ships are all only vehicles for selling nuclear reactors. However, the appeal to other uses for nuclear reactors is also, simultaneously, an expression of the inability of the technology to economically deliver on its primary product: electricity. It is the weakness of the nuclear industry that forces it to seek alliances with other constituencies. Too destructive to meter? Nuclear energy does have one virtue, but it is one that its advocates, for the most part, avoid mentioning: its innate and inseparable connection to nuclear weapons, and more generally, to the military. I use the word “virtue” to mean both an inherent attribute and an asset beneficial to its proponents. Technically, there are significant overlaps between the apparatus needed to produce nuclear energy and what is needed to produce the fissile material, the hardest step in acquiring nuclear weapons. In addition, personnel can be interchanged between the nuclear energy and weapons programs. And finally, there are institutional incentives for organizations developing nuclear energy to get involved in making nuclear weapons, due to the political power that flows from the latter. Nuclear technology also contributes to powering long-range submarines, especially those used to fire off nuclear missiles, and to providing the material to manufacture depleted uranium munitions used in Iraq and Ukraine. I elaborate on these connections in chapter 5. Nuclear energy advocates often argue against conflating nuclear energy with nuclear weapons, but the connection is visible for all those who want to look. As of September 2023, 275 of the 410 nuclear reactors labelled as operating by the International Atomic Energy Agency are in countries possessing nuclear weapons. Add countries like Canada and Japan that are militarily allied with nuclear weapon states, and the overlap is staggering. While it is certainly true that not all countries with nuclear energy have produced nuclear weapons, they are closer to being able to do so than they would be if they had never built nuclear reactors. The overlap between the two technologies was obvious to most knowledgeable people at the beginning of the atomic age. In 1946, when discussing a proposal for the international control of nuclear weapons, Robert Oppenheimer, the head of the program that produced the first atomic bombs, which destroyed Hiroshima and Nagasaki, expressed it thus: “We know very well what we would do if we signed such a convention: we would not make atomic weapons, at least not to start with, but we would build enormous plants, and we would design these plants in such a way that they could be converted with the maximum ease and the minimum time delay to the production of atomic weapons.” Within a few years, however, countries with nuclear technology started a sustained campaign to get the public to think differently about nuclear energy, most notably after President Dwight Eisenhower’s “Atoms for Peace” speech in 1953. This “greatest of destructive forces,” Eisenhower prophesized, “can be developed into a great boon, for the benefit of all mankind,” can be put to “universal, efficient and economic usage” and whose “special purpose would be to provide abundant electrical energy in the power-starved areas of the world.” In other words, forget the destructive capacity of nuclear energy. Just focus on what a wondrous future it can create. The Soviet counterpart of this effort is captured by the slogan “May the atom be a worker, not a soldier.” The hope seems to be that by pretending that nuclear energy was not linked to weapons, public fears about the destruction that would result from the use of nuclear weapons would be quelled. Institutions and governments around the world developing nuclear technology often start by touting its potential to produce electricity. This was the case in India. For over two decades, India’s Atomic Energy Commission was ostensibly working on nuclear energy only “for peaceful purposes,” until the 1974 test of a nuclear weapon blew up that pretense.11 Many private companies profit enormously from both nuclear energy and nuclear weapons. Examples include Bechtel, Babcock & Wilcox (now BWX Technologies), and Fluor in the United States, Larsen & Toubro in India, and Rolls Royce in the United Kingdom. While there might not be a similar level of involvement by private companies in countries like China, where public sector and national organizations play the analogous roles, the differences between the two categories are not very material to understanding the structure of, and trends in, the nuclear sector. National laboratories contract out work and are sometimes even managed by private companies. And private companies thrive on public contracts that they often have exclusive access to, belying any notion of free markets and competitive entrepreneurship. For both corporate and governmental entities, nuclear technology is a wonderful asset. As analyst and disarmament activist Andrew Lichterman argues: The nuclear road provides elites in nuclear establishments with privileged access to their own country’s resources, a development context that can be shielded from foreign competition, and forms of trade and industry that can be portrayed as increasing in importance as fossil fuels diminish. This is so whether the intention to develop nuclear weapons is clear or is allowed to remain ambiguous. The powerful tools of nationalism and ‘national security’ secrecy can be used to facilitate the extraction of wealth from the rest of society and prevent scrutiny of national nuclear enterprises that whether in first generation nuclear powers or post-colonial states have been rife with technical problems, corruption, and widespread, intractable environmental impacts.12 Overview of the book The chapters that follow explain why expanding nuclear power production is neither a desirable nor a feasible solution to climate change. Due to the use and production of radioactive materials at reactors, expanding nuclear energy to mitigate climate change will inevitably result in a variety of undesirable risks and environmental impacts. Nor is it compatible with environmental and social justice.13 The consequences and burdens of such an expansion will fall primarily on communities that are distant from the centers of power, and economically and politically too marginal to figure in the calculations of decision makers. In chapter 1, I explain how all nuclear reactors, including small ones, are at risk for severe accidents due to their intrinsic technological characteristics. When it comes to nuclear facilities, I will argue, there is nothing that fits a strict definition of “safe.” The risk is exacerbated by a range of factors, including extreme weather patterns due to climate change, the multiple and conflicting priorities of organizations operating nuclear facilities, and the weakening of regulation by industry lobbyists and other powerful economic actors. Accidents, when they occur, produce radioactive contamination that reaches across space and time; thirty-five years after the Chernobyl accident, parts of Ukraine and Belarus are still uninhabitable because of high radiation levels. Radioactive cesium released by the disaster was found in sheep in England, which remained contaminated for decades; restrictions on eating these sheep were lifted in all areas only in 2012. Expanding nuclear energy production will also result in a growing inventory of radioactive wastes, no matter what kinds of reactors are used. Some of these wastes remain radioactive, and thus hazardous to human health, for hundreds of thousands of years. Despite decades of well-funded research, there is no demonstrated way to safely manage them, and because of the long periods involved, there will always be uncertainties about the fate of these materials.14 As a result, it is likely that radioactive materials will contaminate the biosphere at some point in the future. This is an important cause for opposition from communities near sites chosen for nuclear waste repositories. Another concomitant activity to the operation of reactors is uranium mining, which has been responsible for contaminating land and water around the world, especially in areas occupied by Indigenous communities. Given these inevitable impacts, nuclear power is neither clean nor sustainable. One way that some nuclear energy advocates try to get around these conclusions is by claiming that exposure to radiation is harmless, at least below some threshold. But as I explain, there is ample evidence that exposure to radiation, even at low levels, leads to cancers and other negative health outcomes.

#### Biodiversity loss causes extinction.

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As biodiversity continues to degrade, the foundation of life on Earth becomes increasingly unstable. Biodiversity loss threatens our food, water and air. It increases our vulnerability to natural disasters and imperils ecosystems crucial for human survival and wellbeing.