# DA – Energy

### 1NC: Nuclear Energy DA

#### Weapons latency is the key motivating factor for developing nuclear energy. This card also answers nuke war – tactical strikes and intervention prevent escalation.

Shellenberger 18 [Michael Shellenberger, “For Nations Seeking Nuclear Energy, The Option To Build A Weapon Remains A Feature Not A Bug,” Forbes (Aug. 29, 2018). hellenberger is an American author, environmental policy writer, cofounder of Breakthrough Institute and founder of Environmental Progress; graduated from the Peace and Global Studies (PAGS) program at Earlham College in 1993.] recut CHSTM

After Saudi Arabia’s crown prince told CBS News last March that, if Iran decides to build a nuclear weapon, “we will follow suit as soon as possible,” opponents of the technology pounced. “Saudi Arabia’s crown prince has confirmed what many have long suspected,” said Massachusetts Senator Ed Markey, “nuclear energy in Saudi Arabia is about more than just electrical power.” The controversy was viewed as a potential blow to U.S. efforts to win the contract to build that nation’s first nuclear plant. “Saudi Prince’s Nuclear Bomb Comment May Scuttle Reactor Deal,” noted Bloomberg. In truth, no nation decides to get a nuclear weapon simply because they have nuclear power plants, and the fuel used in nuclear plants is not enriched enough to make a weapon. But under the rules of the 1968 Non-Proliferation Treaty, nations are allowed to have facilities to enrich uranium, and extract plutonium from spent fuel, which could be used to build a weapon. "The idea of Saudi Arabia having a nuclear program with the ability to enrich is a major national security concern," said the Republican chair of the House Foreign Affairs Subcommittee on the Middle East and North Africa. Using enrichment or reprocessing facilities to create weapons-grade materials would require expelling international inspectors and risking trade sanctions — or worse. In 1981 and 2007, for instance, Iraq and Syria, respectively, suffered bombing attacks carried out by Israel on their nuclear facilities. But when push comes to shove, nations that feel they need a weapon will take those risks. “North Korea has provided the blueprint,” Vipin Narang, a professor of political science and nuclear weapons expert at Massachusetts Institute of Technology (M.I.T.) told me. “If you want a meeting with the president of the U.S., and insurance against an invasion,” explained Narang, “then get a nuclear weapon. Do it secretly. Make it ambiguous. Build a reactor, pull out of [the Non-Proliferation Treaty], kick out the inspectors. ” Since its birth in the 1950s, the nuclear industry and scientific community have stressed the separateness of energy production and weapons. But recent statements by Middle Eastern leaders have thrust the connections — technical, workforce, and motivational — into the limelight. Of the 26 nations around the world that are building or are committed to build nuclear power plants, 23 have a weapon, had a weapon, or have shown interest in acquiring a weapon, according to a new Environmental Progress analysis. The 13 nations that had a weapons program, or have shown interest in acquiring a weapon, are Argentina, Armenia, Bangladesh, Brazil, Egypt, Iran, Japan, Romania, Saudi Arabia, South Korea, Taiwan, Turkey, United Arab Emirates (U.A.E.). Consider: U.A.E., which has finished construction of its first nuclear plant, and has shown high-level interest in acquiring a nuclear weapon — something acknowledged by former Secretary of State Hillary Clinton; Turkey has begun construction of a nuclear plant and, may be secretly developing a weapon or “laying the groundwork to replace the nuclear umbrella the US provides;” Egypt will start construction of a nuclear plant in 2020 and is viewed by experts as a possible nuclear weapons state if Iran decides to acquire a weapon; Bangladesh has shown interest in developing weapons latency in the past and currently has a nuclear plant under construction. Brazil is seeking to a multipurpose reactor, has in the past sought a weapon, and “will leave the door open to developing nuclear weapons“ according to a new Stratfor analysis. This trend fits the historic pattern. In the 60 years of civilian nuclear power, at least 20 nations\* sought nuclear power at least in part to give themselves the option of creating a nuclear weapon. Of the other nations building nuclear plants, seven have weapons (France, U.S., Britain, China, Russia, India and Pakistan), two had weapons as part of the Soviet Union (Ukraine and Belarus), and one (Slovakia) was part of a nation (Czechoslovakia) that sought a weapon. Poland, Hungary, and Finland are the only three nations (of the 26) for which we could find no evidence of “weapons latency” as a motivation. While those 23 nations clearly have motives other than national security for pursuing nuclear energy, gaining weapons latency appears to be the difference-maker. The flip side also appears true: nations that lack a need for weapons latency often decide not to build nuclear power plants, which can be more difficult and expensive than fossil fueled ones. Recently, Vietnam and South Africa, neither of which face a significant security threat, decided against building nuclear plants and opted instead for burning more coal, despite suffering from air pollution and professing concern for climate change. Why Nuclear Energy Prevents War In 2015, two scholars at Texas A&M university, Matthew Fuhrmann and Benjamin Tkach, set out to answer two questions: how many nations have the ability to build a weapon? And what impact does nuclear weapons “latency” have on war? A growing body of research had found that latency deters against military attacks, Fuhrmann and Tkach noted. But with Israel and U.S. threatening pre-emptive action against Iran, could latency also be a threat to peace? Fuhrmann and Tkach found that 31 nations had the capacity to enrich uranium or reprocess plutonium, and that 71 percent of them created that capacity to give themselves weapons latency. What was the relationship between nuclear latency and military conflict? It was negative. “Nuclear latency appears to provide states with deterrence-related benefits,” they concluded, “that are distinct from actively pursuing nuclear bombs.” Why might this be? Arriving at an ultimate cause is difficult if not impossible, the authors note. But one obvious possibility is that the “latent nuclear powers may be able to deter conflict by (implicitly) threatening to ‘go nuclear’ following an attack.” Nuclear isn’t the first energy technology whose adoption was driven by national security. Before World War I, the British Navy switched to petroleum-powered ships that could travel twice as far, emit less smoke (that potential enemies could see), and refuel more quickly than coal-powered ones. And today’s efficient natural gas turbines exist in large part thanks to decades of military procurement of jet turbines. Every past energy transition has followed the same progression. The new fuel, whether coal, oil, natural gas, or uranium, starts out as a premium product more expensive than the incumbent and comes down in price over time. For early adopters of the new fuel-technology combination, notes economist Roger Fouquet, a new energy source must offer some “superior or additional characteristics (e.g. easier, cleaner or more flexible to use).” After over 60 years of national security driving nuclear power into the international system, we can now add “preventing war” to the list of nuclear energy’s superior characteristics. “Your view that weapons drove nations to energy, not the other way around,” M.I.T.’s Narang told me, “may be more accurate given what we now know about many of these countries.” He pointed to Sweden and Switzerland: Both are neutral nations outside of NATO that had a very deep interest in weapons and a program through the 1960s. Today they are championed as nonproliferation nations, but both militaries were very interested in having the basis for a nuclear weapons program if necessary. Both used nuclear energy to explore those options. Before Iran, Narang notes, the nation most famous for nuclear weapons hedging was Japan. After six decades of peaceful nuclear power, it’s an open secret that Japan has created enough plutonium to create 6,000 bombs — as well as an excellent rocket program. That doesn’t mean nuclear power is a sure thing in nations with nuclear weapons. France officially pledged under its last government to sharply reduce its reliance on nuclear power. But then President Emmanuel Macron explicitly said late last year that he would not carry out the policy. Japan, which lacks a weapon, closed all of its nuclear reactors after the 2011 Fukushima panic and intends to restart just two-thirds of them. At the same time, it has shown no interest in giving up its weapons latency, with its plutonium program continuing. U.S. nuclear plants are closing prematurely but mostly not because of explicitly anti-nuclear actions by political leaders. Rather, they are closing due to unusually cheap natural gas and heavily-subsidized renewables. The only two U.S. states forcing the closure of nuclear plants, California and New York, also had the strongest nuclear disarmament movements. And, notably, every single nation with a nuclear weapon is building nuclear power plants with the sole exception of Israel and North Korea. Experts believe Israel does not want nuclear plants because it would require acknowledging its nuclear weapons, and accepting inspectors, while stiff trade sanctions prevent North Korea from building nuclear power plants. Implications for Pro-Nuclear Advocacy As a lifelong peace activist and pro-nuclear environmentalist, I almost fell out of my chair when I discovered the paper by Fuhrmann and Tkach. All that most nations will need to deter military threats is nuclear power — a bomb isn’t even required? Why in the world, I wondered, is this fact not being promoted as one of nuclear power’s many benefits? The answer is that the nuclear industry and scientific community have tried, since Atoms for Peace began 65 years ago, to downplay any connection between the two — and for an understandable reason: they don’t want the public to associate nuclear power plants with nuclear war. But in seeking to deny the connection between nuclear power and nuclear weapons, the nuclear community today finds itself in the increasingly untenable position of having to deny these real world connections — of motivations and means — between the two. Worse, in denying the connection between energy and weapons, the nuclear community reinforces the widespread belief that nuclear weapons have made the world a more dangerous place when the opposite is the case. From 1400 to 1945, deaths from war rose steadily before beginning a remarkable and rapid decline that continues to this day. And while various efforts are made to deny the role of deterrence, the fact is that between 1945 to 1989, two great nations, the U.S. and U.S.S.R., with diametrically opposed interests and ideologies, and their most important allies, avoided full-scale war. The same dynamic repeated itself with India and Pakistan. Before they acquired the bomb, they had three full-scale wars. After the bomb, zero. Nuclear weapons don’t eliminate military conflicts but they greatly reduce their death tolls. The death toll from the third war between India and Pakistan to their border skirmish known as the Kargil “war” declined 90 percent, from 11,743 to 1,218. Nuclear weapons in India and Pakistan “cured the previous disease, which was massive conventional war,” Narang explained, but “didn’t solve all the problems.” Still, he added, “just because medicine has a side effect, you don’t not give the medicine.” One of the many dark fantasies about nuclear weapons is that if one were used anywhere it would lead to full-scale nuclear war everywhere. And yet the most likely use of one would be tactical — against invading troops. Pakistan might say, “If we use our own nukes, on our own territory, in the desert, against an Indian strike corps, we haven’t given them justification to use nuclear against our cities,” notes Narang. “But even then, it would be an event of such magnitude that the world would race to stop it from escalating,” he adds. “The first use of nuclear bomb since 1945? I think people will stop and ask, 'What the hell just happened?' and the international community will race to try to stop escalation.” In other words, while there is in fact a real-world relationship between nuclear energy and weapons, the relationship between weapons and the widely-feared nuclear apocalypse, or even a return to wars as brutal as World War II, is entirely imaginary — the stuff of movies, novels, and scenarios. In the real world, nuclear weapons have only been used to end or prevent war — a remarkable record for the world’s most dangerous objects. Nuclear energy, without a doubt, is spreading and will continue to spread around the world, largely with national security as a motivation. The question is whether the nuclear industry will, alongside anti-nuclear activists, persist in stigmatizing weapons latency as a nuclear power “bug” rather than tout it as the epochal, peace-making feature it is.

#### Antiprolif crushes research, tech transfer, and cheap fuels.

Mueller 16 [John Mueller, “Should We Let the Bomb Spread?” Strategic Studies Institute, US Army War College (Nov. 1, 2016). Muller is Adjunct Professor of Political Science and Senior Research Scientist at the Mershon Center for International Security Studies.] recut CHSTM

Hampering Economic Development Leonard Weiss notes that “restrictions on nuclear trade and development are important elements of a nonproliferation regime.”63 Antiproliferation efforts can thus hamper worldwide economic development by increasing the effective costs of developing nuclear energy. As countries grow, they require ever increasing amounts of power. Any measure that limits their ability to acquire this vital commodity—or increases its price—effectively slows economic growth at least to some degree and thereby reduces the gains in life expectancy inevitably afforded by economic development. In the various proclamations about controlling the proliferation of nuclear weapons, this cost goes almost entirely unconsidered. For example, one of the common proposals by antiproliferators is that no country anywhere (except those already doing it) should be able to construct any facilities that could produce enriched uranium or plutonium—substances that can be used either in advanced reactors or in bombs. The Nuclear Nonproliferation Treaty (NPT) does specifically guarantee to signing non-nuclear countries “the fullest possible exchange of technology” for the development of peaceful nuclear power. However, as Richard Betts points out, this guarantee has been undermined by the development of a “nuclear suppliers cartel” that has worked to “cut off trade in technology for reprocessing plutonium or enriching uranium,” thereby reducing the NPT to “a simple demand to the nuclear weapons have-nots to remain so.” Under some proposals, the cartel would be extended to fuel as well.64 Antiproliferator Allison is among those advocating the cartelization of nuclear fuel. He further suggests that nuclear states guarantee to sell the non-nuclear ones all the nuclear fuel they need (presumably in perpetuity) at less than half price, but does not attempt to calculate the price tag for this.65 The 2008 Graham Commission, of which Allison was a member, repeats this demand, though it suggests that nuclear fuel be made available at market prices “to the extent possible.” It, too, eschews cost considerations.66 There is, however, a glimmer of evidence that the economic cost of hampering the nuclear industry has been considered at least in passing by some dedicated antiproliferators. In a 2007 plea that the world be made free of nuclear weapons, four former top policy officials insisted that the use of highly enriched uranium be phased out from civil commerce and that it be removed from all the research facilities in the entire world, a costly demand that was not repeated in their 2008 version.67 The antiproliferation obsession has also resulted in the summary dismissal of potentially promising ideas for producing energy. Thomas Schelling points out that there was a proposal in the 1970s (a decade that experienced two major shocks in the price of oil) to safely explode tiny thermonuclear bombs in underground caverns to generate steam to produce energy in an ecologically clean manner. According to Schelling, the proposal was universally rejected by both arms control and energy policy analysts at the time “without argument, as if the objections were too obvious to require articulation.”68 On closer exploration, of course, this scheme might have proved unfeasible for technical or economic reasons. But to dismiss it without any sort of analysis was to blithely sacrifice energy needs—and therefore human welfare—to antiproliferation knee-jerk. Something similar may now be in the cards. Currently in the research phase, it may become possible in the future to reduce radically the cost of producing nuclear energy by using lasers for isotope separation to produce the fuel required by reactors.69 This, of course, might also make it easier, or at any rate less costly, for unpleasant states to develop nuclear weapons. Accordingly, a balanced assessment of costs and benefits would have to be made if the technique ever proves to be feasible. But there is an excellent chance no one will ever make it: like the technology Schelling discusses, it will be dismissed out of hand. Relatedly, the antiproliferation obsession has also sometimes hampered the potentially valuable expansion of nuclear power to ships, particularly to icebreakers.

#### Nuclear power key to avoid extinction-level climate change – switching our methods of power generation is essential.

Andriushin et al. 19 [Ivan Andriushin, Cecilia Eiroa-Lledo, Patricia Schuster, & Evgenii Varseev, “Nuclear power and global climate change,” Bulletin of the Atomic Scientists (May 20, 2019). Andriushin is project manager in the Project Office for Training of Nuclear Infrastructure Personnel at the Technical Academy of Rosatom; Eiroa-Lledo is doctorate in analytical radiochemistry at Washington State University; Schuster is University of Michigan President’s Postdoctoral Fellow in the Nuclear Engineering and Radiological Sciences Department; Varseev, pecialist degree in nuclear reactors and power facilities from Obninsk Institute for Nuclear Power Engineering.] recut CHSTM

As young professionals beginning our careers in the United States and Russia, we believe strongly that nuclear energy must play a key role in mitigating climate change. We are the first generation that is experiencing the dramatic effects of global climate change and likely the last that can do something about it. To avoid catastrophic consequences for the Earth and its people, we have to develop and implement a solution in the shortest period of time possible because the planet is at a point of no return. The climate crisis is a challenging problem that has no boundaries, with effects felt across the globe; as such, it will require a global effort to mitigate. We, the authors, are from Russia and the United States—two countries with different cultures, histories, governments, and approaches to addressing international problems. Yet by working together, our different perspectives can help to find a path forward—and can help us understand each other better, in the bargain. With current global temperatures exceeding the 1880–to-1920 pre-industrial era mean by 1 degree Celsius (1.8 degrees Fahrenheit), carbon dioxide levels being the highest in nearly one million years, and sea levels rising at an ever-increasing rate of 3.4 millimeters per year, it is undeniable that Earth is experiencing climate change. Many scientific investigations have proven that anthropogenic causes are to blame for the rapid change in climate. Industrialization has caused an increase in the release of gases, including nitrous oxide, methane, carbon dioxide, and water vapor. These gases contribute to the overall global temperature increase through the greenhouse effect. During the last two decades, several international agreements—such as the Kyoto Protocol, and the Paris Agreement—were established to prevent the continuation and acceleration of climate change. The Paris Agreement states that the levels of carbon dioxide, currently at 410 parts per million (ppm), should be reduced to below 350 ppm, a goal that is moderately stricter than that of limiting the temperature rise to less than 1.5 degrees Celsius, which is more widely cited as a goal of the agreement. Current carbon dioxide emissions worldwide are 35 billion metric tons, or gigatonnes, per year, which will continue to raise the global temperature. To slow the effects of climate change, we must reduce carbon dioxide emissions by 6 percent, or by 2.1 gigatonnes, per year. This will likely prove difficult, given that by 2050, the economies of emerging countries are projected to increase the global energy demand by 80 percent (and carbon dioxide emissions by 70 percent). Most nations with emerging economies plan to provide energy with new coal-burning power plants—between 800 and 1,600 by 2040. With these statistics in mind, it seems clear that of all the possible pathways for reducing emissions, the most promising would lie in the generation of energy with low-carbon technologies—including nuclear. If low-carbon nuclear and renewable energy sources could be substituted for coal plants, then the energy demands of these nations could be met without increasing carbon emissions. While renewables are desirable for their low-carbon emissions, increasing the use renewables will likely increase land use, presenting challenges to other sectors such as agriculture. For instance, even with a 100 percent capacity factor, 18,064 square kilometers of windfarms, photovoltaic panels, and other renewables would be needed to provide power to the city of Moscow, which has an annual electricity consumption of 56 billion kilowatt hours. This land area is seven times larger than the city of Moscow itself. Land-use impact can be reduced by instead implementing low-carbon technologies with higher power density, thereby requiring less space per energy produced. Fig.1 shows a comparison of relevant energy sources. Consequently, a better way to implement low-carbon electricity production, in our view, is through nuclear energy, which offers low-carbon energy while taking up a smaller footprint on the landscape, thus offering a more favorable power intensity—and reliable base-load electricity, which means that we could start to wean ourselves away from the use of coal in electrical power plants. The high-energy intensity base load operation character of nuclear plants is the key, as the biggest carbon dioxide emitter in electricity production is coal. According to a forecast by the Russian Academy of Sciences, the share of coal in global electricity production will be 34.5 percent by 2040; for nuclear, just 8 percent. If we managed to replace 34.5 percent of electricity production with low-carbon energy sources, then we have a better chance to reach sustainability goals. We find the most sensible proposal to cut the use of fossil fuels, especially coal, to be that proposed by the World Nuclear Association’s Harmony Program which projects nuclear energy to provide at least 25% of the world’s electricity by 2050 as part of a clean and reliable low-carbon mix. Achieving this means nuclear generation must triple globally by 2050. Current global nuclear electricity production is 2,500 terawatt-hours supplied by 447 reactors with a generation capacity of nearly 400 gigawatts-electric. Tripling that capacity will require the construction of roughly 30 nuclear reactors per year until 2050 to provide new capacity and replace plants to be retired. We recognize that these goals are very ambitious and are promoted by a nuclear industry support group. Meeting them would require a dramatic increase from the most recent five-year average of seven per year. However, such build rates were achieved in the heydays of nuclear power construction in the late 1970s and early 1980s. Returning the nuclear enterprise to that level will require many of the changes discussed in the remaining articles of this series and the recognition by governments around the world that dramatic action is required to mitigate the impending consequences of climate change. To be sure, nuclear energy has its own problems—such as fuel supplies—especially when it comes to significant global expansion. But we believe these can be solved by implementing new strategies such as a “closed” nuclear fuel cycle. That is why nuclear power alone, in our opinion, will not suffice—it is simply too expensive and requires a long start-up time. Instead, nuclear energy should be used at the same time as renewables; the strengths and weaknesses of the two complement each other. For example, in contrast to nuclear power, renewables can be brought online quickly, but have much lower capacity factors and will require breakthroughs in storage technologies. Moreover, emissions must be reduced from all energy sectors, not just electricity. The authors realize that both nuclear and renewables face significant challenges for large-scale global expansion, but we believe these can be overcome if proper policies are promoted at the national and international levels. We also want to point out that in the 1960s, people put excess faith in nuclear power, believing it would solve all of humanity’s energy needs without any drawbacks or concerns. It took time and several major accidents to realize that nuclear safety, a proper mechanism for the disposal of nuclear waste, and a way to ensure that no fuel is created for nuclear weaponry need to be the top priorities for such a powerful technology. With all this in mind, our two countries still have very different views about the future of nuclear energy, which we think is due to a combination of three factors. First, Russia has a strong economic incentive for developing the nuclear power industry because it has become the leader in exporting nuclear technology and nuclear fuel-cycle services. The United States, on the other hand, has lost much of the supply-chain capabilities to build and export nuclear power plants. Second, Russia has greater public support for nuclear power and, perhaps, the public historically relies more readily on the opinions of competent authorities, whereas in the United States the public is more skeptical about nuclear power and is able to have more input to policy and decision-making. Finally, Russia believes strongly in the expansion of nuclear power plants because—like France with its nuclear sector—Russia has a huge economic stake in the success of its nuclear endeavors and considers nuclear technology as a badge of high-technological capabilities. Russian nuclear specialists recall with great pride that the first electricity-producing nuclear power plant in the world was put into service in Obninsk, Russia, in 1954. The United States today, on the other hand, is focusing its high-tech efforts elsewhere, and the US nuclear energy industry is in comparative decline. Despite these differences, nuclear energy provides approximately the same share of electricity in each country—about 18 percent in Russia and 19 percent in the United States, although the trends are different. The United States relies on the renewal of licenses for its existing fleet of nearly 100 plants, while Russia is building six new nuclear power plants in addition to its existing 36. Nuclear technology has been an area of substantial US-Russia cooperation in the past, and we feel strongly that the two countries should be able to work cooperatively to advocate for the adoption of advanced nuclear energy today. In addition to solving the climate change crisis, this would provide an area of partnership between our two countries, whose relationship has fallen to its lowest point in decades. Public acceptance of nuclear power will also require continued improvements in the safety and security of nuclear plants and their fuel-cycle facilities. In addition, a cost-effective and responsible solution will have to be found for what to do with nuclear waste. The accompanying articles consider the various challenges to an expansion of nuclear power, including its entangled relationship to nuclear weapons and the resultant concerns about nuclear proliferation. During the Cold War, many people viewed nuclear weapons as a deterrent contributing to keeping a fragile world balance, whereas others feared their potential for global catastrophe. This fear produced a symbol—the Doomsday Clock—as a metaphor for the danger that nuclear weapons pose to mankind. We see global climate change as a similar threat. If our generation of young specialists doesn’t act now, humanity will see the consequences inflicting irrevocable harm. Fittingly, the Doomsday Clock has now been updated to include the existential threat of climate change and is currently set at two minutes to midnight—the same that it was when the first hydrogen bomb test was conducted, the only previous time in its history that the clock was this close to midnight. We have all of the basic requirements in place to avoid climate change: technology, human resources, and international channels of communication. Our grand challenge is to develop a solution, manage it quickly, and follow through in order to solve climate change by using the potential of both nuclear and renewable energy sources simultaneously, worldwide.